



Norwegian University  
of Life Sciences

**Master's Thesis 2022 30 ECTS**

Faculty of Landscape and Society

# **Modern fishing techniques and the threat to food security. Case of Malawi**

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MSc Global Development Studies



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## **Case of Malawi**

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May, 2022

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**Declaration**

I, Amanda Gamuchirai Murawu, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for the award of any type of academic degree.

Signature.....

Date.....

**Dedication**

I dedicate this to all Fishers, Environmentalists, and Developmental Practitioners.

## **Acknowledgments**

I would like to express my gratitude to my supervisor Bishal Sitaula for his guidance and support that has helped to shape this thesis from the onset. I would like to extend great thanks to Timothy Munjoma for his assistance during my study period, as well as making my studies possible at the Norwegian University of Life Sciences (NMBU). I owe sincere gratitude to Moses Limuwa, my co-supervisor and field liaison, without whom there would be little to no data for the study. I would like to appreciate my family and friends who have been there for me throughout this journey. Above everything else, I thank the Almighty God for the life, strength, and wisdom throughout the study period through which the accomplishment has been made.

*Maita Chirandu, Maita Moyo, Maita Sahi, Maita Dhehwa rangi*



## Abstract

The trajectory of this study was to assess the use of modern fishing techniques and their relation to food security in a given context of Malawi. The study was conducted by the qualitative research approach to assess modern fishing methods used by fishers in Mangochi, Malawi. An interpretivist philosophy informed the gathering of qualitative data for this study in which data were gathered in given ground reality. The case study design was employed to gather data that answered the research questions about the effectiveness of modern fishing techniques used in Malawi. Twelve local fishers from the Mangochi district of the Southern Region of Malawi consisted of the study sample interviewed to gather data. The researcher used the snowballing technique to recruit those fishers who participated in the study. Interviews were conducted with the fishers while reports and other relevant documents were reviewed to answer the primary research questions of the study. Qualitative data analysis was adopted to analyze the data gathered using interviews and document reviews. Malawi's modern fishing technique fishers include nets (Gillnets, Seine nets, Trammel nets, and drift nets), hooks, line fishing trawls, and traps (pots and baskets). These modern fishing methods promote overfishing to the extent that fish stocks sometimes dwindle to the detriment of the fishers. As a result, fishers' livelihoods are not stable, resulting in hunger. Hunger is prevalent among fishers in Malawi in the Mangochi district. The study indicates that local media can primarily promote awareness of food security. Local media coverage allows people to understand the importance of the fishing industry in terms of its contribution to people's lives in terms of nutritional value and providing income to the fishers. The interventions suggested by the respondents to improve modern fishing techniques used by fishers included; support by stakeholders; attaining sustainability in the management of fisheries; training of fisheries in sustainable fishing techniques; use of modern technologies such as GPS in tracking and monitoring fishing activities; and mobilization of funds to promote fishing activities in Malawi. There is a need for the fishers in Mangochi to be sensitized by the fisheries department and other stakeholders such as FAO on sustainable modern fishing methods that promote food security and ensure their livelihoods.

Keywords: Lake Malawi, fishing techniques, sustainability, adaptation, Mangochi

**Abbrevi**

FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GNSS	Global Navigation Satellites Systems
GPS	Global Positioning System
IGA	Income Generating Activities
NEPAD	New Partnership for Africa's Development
ITN	Insecticide Treated Net
MDGs	Millennium Development Goals
OOH	Outdoor or Out of Home
SDGs	Sustainable Development Goals
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea

## **MODERN FISHING TECHNIQUES AND THE THREAT TO FOOD SECURITY.**

### **CASE OF MALAWI**

### **CHAPTER ONE: INTRODUCTION**

#### **Introduction**

Malawi has one of the largest lakes in the world. Lake Malawi possesses many different fishes combined (Weyl et al. 2010). The lake manages to sustain the locals of Malawi with fish and other attributes and the surrounding countries and beyond. According to Weyl et al. (2010), Lake Malawi is a source of income for many and a tourist paradise. Malawi has been on the verge of adapting to climate changes to realize and maintain food security for its populace. The fishing industry is a powerful engine for economic development. The need to improve food security implies that reliance on ancient fishing techniques such as dugout canoes, seine nets, hand lines, and fence traps, to mention a few, should be transformed.

According to Kambauwa et al. (2015), the Malawian population continues to grow. Failure to produce while preserving food will cripple Malawian food security with an expected 100% malnutrition by 2040. Therefore, not realizing and adapting conservation methods could fail to fulfill food security and end hunger by 2030. Therefore, it is of utmost importance that the locals have access to updated, quality knowledge and a skillset suitable to tackle head-on climate change, which has proven to threaten the local people of Cape Maclear's food security and other socioeconomic attributes (Ragasa et al. 2020). This introductory chapter provides a background of fishing, modern fishing techniques, and food security. The problem statement summarizes the study background, research objectives, and questions established from the problem statement.

Other key sections of this chapter include; the hypothesis, justification of the study, and study assumptions.

#### **Background**

Fishing plays the most significant role in agriculture, and the historical background of the

activity is traced to many decades ago. Fishing activities began to be recorded on paper as far back as 1886, in which the marine environment around the UK exploited its fish resources for a living. The earliest fishing records date back to more than 40,000 years. Notably, around the 16<sup>th</sup> century, fishing vessels were being used across oceans. Thurstan

(2013) argued that the oldest fishing techniques employed included; gathering, netting, trapping, and angling. The Food and Agriculture Organization (n.d.) states that the total number of fishers and fish farmers worldwide is roughly 38 million. Having a massive number of people involved in fishing shows that fishing provides direct employment or a source of income for communities, contributing to food security.

The climatic changes and the worsening economic situation in most African countries have influenced many households in Southern Africa to turn to fish farming to gain additional sources of income and security. Despite modern fishing techniques, Bethe et al. (2019) argue that households in Malawi have resorted to using insecticide-treated net (ITN) for fishing. As reported in the fisheries sector for Africa, the estimate is that Africa can support 20.7 million jobs in 2030 through fishing. The transformation from old fishing methods to modern ones is leeway for positively impacting African fishing communities' food security (FAO 2019). Sustainable Fisheries (2019) outlined the most common modern methods people use to catch fish in lakes, rivers, and other water sources. 80% of fishing uses fishing nets, the most common method of fishing. Bethe et al. (2019) state that households use insecticide-treated nets in the same vein. Other modern fishing methods employed include; purse seine, trawling, bottom trawl, gillnet, midwater trawl, fishing with the line, and dredging.

Fishing is rapidly growing across the world. Asia concentrates more on fishing, with 89% of farmed aquatic animal supply, and other regions such as Latin America, Brazil, and African countries. Limuwa et al. (2018) conducted a study to assess if fishing farming is an illusion in Lake Malawi regarding the environmental changes that have affected food security. Fewer studies have looked at how modern fishing techniques can sustainably provide livelihoods in Malawi. This qualitative study produced that despite higher numbers of people involved in fishing in Malawi, most of them reported cases of food insecurity. FAO (2020) argues that harsh weather conditions such as droughts, floods, and others negatively impact fishing in Southern Africa. The challenges have influenced some authors to see fish farming as an illusion in Malawi, making it difficult to understand the impact of modern

fishing techniques and their influence on food security.

FAO (2020) states that trawl fisheries in Malawi get licenses to operate trawling units, although other modern fishing techniques, such as vessels, are used. Based on the assumption that aquaculture plays a pivotal role in food security, the use of innovative and

contemporary fishing techniques remains unclear regarding its effectiveness in positively impacting food security. Phiri & Jere (2019), in their study on the use of light-emitting diode bulbs and Tilley lamps for light attraction in the Chilimira fishery in Lake Malawi, revealed that Chilimira nets were more innovative towards the catching of high fish yields. Fishers operate two boats in which they cast Chilimira seine/nets in a wide semi-circle, and it is then slowly pulled in a surrounding bagging motion until the boats come together. Most importantly, management of fishing activities is key to sustainability and food security in Malawi since the adoption of modern fishing techniques results in overfishing (Limuwa et al.: 2018). Adopting new fishing methods is criticized for being linked to the extinction of more than 1000 fish species in Lake Malawi if the activities are not well managed. For instance, from the 1970s to 2005, fish consumption dropped in Malawi from 14kgs to 4kgs (Limuwa et al.: 2018). Therefore, this calls for exploration to establish how these modern fishing techniques threaten food security.

### **Problem Statement**

Malawi has mainly been affected by climate change, and as expected by Bezner et al. (2018), climate change has magnified its already poor state of food security. As a result, there has been a growing need for climate adaptation to maintain and develop food production in Malawi. Lobell et al. (2008) believe that identifying adaptation measures reduces potential negative impacts of climate change and is essential to a large food-insecure human population.

This research is primarily driven by the Sustainable Development Goals (SDGs), meant to transform our world by ending poverty and providing a zero hunger world by 2030. The last couple of decades saw Malawi being hit hard by harmful and life-threatening climatic hazards, including floods and seasonal droughts, resulting in adverse effects on food and water security and mainly affecting rural communities. Reports have said at least a reasonable amount of monies invested in Malawi fisheries as a strategic way for the fishers

to realize their industry to the full of its capacity. However, one should also consider that with a reduction in fish stocks by the day (Darwall and Allison: 2009), what are the fishers' alternatives. With the available information about climate change, how have they managed to survive in a cutthroat industry where both the economics and environment are against them.

### **Objectives**

The study aimed to answer the following objectives:

- To review the effectiveness of modern fishing techniques used by locals in Malawi
- To analyze the prevalence of hunger among the fishers in Malawi
- To evaluate the impact of local media in attaining food security through fishing
- To come up with interventions to improve the modern fishing techniques in Malawi

### **Research Questions**

The study answered the questions below:

- How effective are the modern fishing techniques being implemented by locals in Malawi?
- What is the prevalence of hunger among fishers in Malawi?
- To what extent is local media impacting the attainment of food security through fishing?
- Which interventions can improve the modern fishing techniques in Malawi?

### **Hypothesis**

The study hypothesized that:

Climatic changes and poor fishing management influence modern fishing techniques, negatively affecting the food security in Malawi.

### **Justification of the study**

This study will provide great insights to various stakeholders. Therefore, it will be essential to work on aquaculture projects and fisheries management in Malawi and across the board.

Fishers:

The results from this study will be more beneficial to fishers in Malawi since they will figure out interventions to improve fisheries management to promote food security. In addition, the project will work as a manual for preventing overfishing and the effective use of modern fishing techniques to ensure sustainable livelihoods for Malawian communities.

Fisheries management:

What will be found in this study will inform those stakeholders responsible for managing fisheries in Lake Malawi to respond to the factors that negatively affect the prevention and protection of the different species of fish in Lake Malawi. Additionally, the findings will influence the development of strategies to promote the monitoring and licensing of fishing activities using modern techniques.

Policymakers:

Policymakers will be informed about the critical issues concerning improving food security and protecting aquaculture. As a result, effective policies ensure fisheries promote economic development and livelihoods for communities to prevent the extinction of the available fish species.

### **Definition of Operational Terms**

The key terms of the study depict the meanings they express in this study:

Fishing:

The New World Encyclopedia defines fishing as catching wild fish for food, recreation, trade, or in need of their products. For this study, the practice of catching fish using modern techniques in Lake Malawi is the central idea.

Modern fishing techniques:

Modern fishing techniques in line with this study mainly refer to fishing with nets, gillnet, harvesting shellfish, traps, and pots.

Food security:

FAO (2020) states that food security entails a situation in which everyone should access nutritious and sufficient food regardless of socioeconomic status.

### **Summary**

This chapter provided background data on modern fishing techniques and how they threaten food security. The background established the research gap that this study intends to fill. The other critical sections of the chapter are the problem statement, research objectives and questions, justification of the study, hypothesis, and the definition of essential terms.



## **CHAPTER TWO: LITERATURE REVIEW**

### **Introduction**

Ensuring food security in Malawi is an issue of concern in most communities that earn livelihoods through fishing. Reviewing publications, reviews, and studies that have been conducted before on the matter is the onus of this chapter. Several peer-reviewed articles related to modern fishing techniques and food security are reviewed to answer the study objectives. This review will help the researcher establish a clear understanding of how modern fishing techniques threaten food security and identify gaps in the literature that this study could fill in. The critical sections of this chapter include; Thematic background, Conceptual framework, and Empirical review.

### **2.1 Thematic Background**

This section explores the different connotations and suppositions about; fisheries and climate, human development, and food security, closely following the study objectives.

#### **2.1.1 Fisheries and Climate**

Lake Malawi hosts over 1000 fish species and fish catching gear (Limuwa et al.: 2018). However, it is not clear if fishing practices are sustainable in ensuring Lake Malawi uses different methods to catch fish. However, it is not clear if these practices are sustainable to ensure food security. Weyl et al. (2010) argue that Chembe fisheries have experienced reduced rainfall levels in which the fish stocks. Reports have shown that modern fishing

techniques used by artisanal fisheries mostly rely on seines and dugouts. Fish species such as "Usipa" mostly rely on the environment that determines their flourishing and death.

Climatic change has become a topical issue worldwide, and the same is associated with various implications for fisheries. The world has started implementing measures to help fisheries adapt to climatic changes that threaten fishery activities. FAO (2018) documented the devastating effects of climate on marine, inland fisheries, and aquaculture, in which several countries have been worried about eradicating poverty (food security).

The FAO Report (2018) highlighted that climate change by 2050 will decrease the maximum catch potential of fish in the world's economic zones by 2.8% to 5.3 %. Various studies and reports that climate change poses vulnerability to fisheries, leading to changes in a nation's food security is reflected. For example, climate change can result in water scarcity, negatively affecting countries such as Cambodia, Congo, Colombia, Morocco, Spain, and Pakistan. Studies in these countries have shown that climate change primarily results in the loss of production and infrastructure from floods, harmful algal blooms, and increases in the risks of diseases. This study concluded that countries such as Uganda, Nigeria, and Egypt were more vulnerable to climatic changes concerning the status of their fisheries (Muhala et al., 2021).

In line with its surveys and reports, the World Bank Group Report (2019) established that climate change poses risks to fisheries. The report found several factors associated with climate to fisheries: ocean acidification, sea-level rise, high water temperatures, deoxygenation, and changes in ocean currents. A study by Muhala et al. (2021) on climate change in fisheries and aquaculture caused by cyclones Idai and Kenneth established a positive connection between climate change and fishing in which fisheries can be affected. Their research demonstrated that climatic changes could increase fishing vulnerability if water sources are affected by environmental changes threatening food security. Cyclones Idai and Kenneth, as of 2019, killed around 600 people in Mozambique and left out about 2.2 million people in need of assistance. Central provinces such as Zambezia and Sofala were negatively affected to the extent that operations in fisheries almost stopped. In the same vein, interview data from the fishers in Mozambique revealed that natural events

affected about 1,440 fishers, 590 vessels were lost, and 67 boat engines were lost in Sofala province. The loss of about 58 fish tanks and 204 cages in Sofala is a severe concern because it threatens food security.

Evidence points to climate change negatively impacting fish stocks and aquaculture production. Given that tropical fisheries heavily contribute to the well-being of societies, the correlation between climate and fisheries is essential to understand how the physical and biogeochemical oceanic changes and greenhouse gasses affect fish stocks and the operations of fisheries. Lam et al. (2020) argue that climatic changes have substantial implications for

attaining the UN Sustainable Development goals. Looking at the conditions of ocean warming, acidification, and sea-level rise, among others, the production of fisheries projects to decline. Research has shown a trend of the increasing vulnerability of fisheries mainly due to climate-driven reductions, making tropical marine fisheries vulnerable, and billions of people can be negatively affected.

### **2.1.2 Human Development**

Fisheries largely contribute to human development. Van de Burgt (2013) argues that modern fisheries provide a platform for eradicating poverty among communities that live near water sources such as lakes and oceans. Likewise, we (2018) found a positive connection between human development and fisheries. Human development mainly connotes the process of enlarging people's freedoms and opportunities and improving their well-being. Thus, in this respect, fisheries can contribute to human development if they are well managed. Conversely, a country with a lower development index is more likely to have fewer fisheries, which threatens food security (FAO, 2019).

Ratner et al. (2013) 's article showed the connection between fisheries and human development. Countries such as India, Cambodia, the Philippines, and South Africa have reached great strides through fisheries in which their populations have improved their well-being. Notably, fisheries can better contribute to human rights protection and human development. Lynch et al. (2016) found that marine production and inland fisheries heavily improve people's lives across the globe. Additionally, it was reported that fisheries provide food for billions and livelihoods for millions of people globally, showing a positive

connection to human development. Fishing is crucial for ensuring human development through which access to adequate food and income generated from fisheries would pave the way for better living standards for humans.

For example, the South African government has acknowledged the great opportunities for marine and freshwater aquaculture. South Africa has realized good opportunities to expand the welfare of its citizens and contribute to food security, create jobs, develop the economy using proceeds from fisheries, and improve export opportunities (Lynch et al.: 2016). The third conference on global agriculture, food security, and climate change pointed to the significance of fisheries to human development (FAO, 2013).

### **2.1.3 Food Security**

Food security is a significant concern in many countries. Most economies' food security levels are still fragile based on various factors. Some of the significant factors highlighted include; poor weather conditions, prolonged dry spells, and economic hardships to which most communities remain vulnerable. The United Nations (2022) states that food security is one of the Sustainable Development Goals targets in 17 states, "...end hunger, achieve food security, improve nutrition and promote sustainable agriculture". The SDGs target Zero Hunger by 2030, in which indicators have been developed to ensure that society's most vulnerable groups are tracked to check on their levels of vulnerability to hunger.

The UN (2021) found out Covid-19 pandemic has also worsened the vulnerability of some populations, which plunge into hunger and poverty. In line with the mid-2021 UN Report, about 720 to 811 people worldwide went hungry in 2020 since they could not afford healthy or nutritious food. Notably, changes in the world's food markets have also been attributed to the causes of food security patterns. Most worryingly is that of the total number (768 million) of undernourished people in the world recorded in 2020, 282 million live in Africa. The Malawian situation on hunger is not pleasing based on the expectations of the world agencies on achieving zero hunger and improved food security. From July 2021 to March 2022, analysis in Malawi established that more than 1 million people are going through massive levels of extreme food insecurity. Notwithstanding this high level of food insecurity

levels, the country produces about 46% of maize. Covid-19 has also been found to be the major contributor to food insecurity in Malawi since the majority of the people lost their incomes after the shutting down of most companies. The contribution of fisheries to food security is a matter of concern in Malawi.

Global Fish Alliance (2021) explored the importance of fisheries on food security in Malawi. It established that fish provides vital and unique nutritional benefits: protein, vitamins, minerals, and other micronutrients. In line with their results, the Global Fish Alliance (2021) highlighted that fisheries and their families in Malawi are much better since they have better access to good meal frequency, meal composition, meal diversity, and household assets and income. That primarily implies that fisheries largely contribute to food security. FAO (2013) also argues that the fisheries sector directly employs more than 62 000 people in secondary employment in Malawi, which means a lot to the fish against hunger

and improved food security. Most people are crew owners in capture fisheries, fish processing, fish trading, and boat building. The Malawi Poverty Reduction Strategy Paper (2020) highlighted that fish in Malawi is one of the largest protein sources for the Malawian population, thus implying that the fisheries promote food security. Global Fish Alliance (2021) argues that fisheries in Malawi are a vital source of employment, rural income, food security, and import substitution. On the contrary, decreased outputs in fisheries caused by various factors such as climatic changes, overfishing, and erratic rainfalls can indirectly lead to food insecurity in the country.

## **2.2 Conceptual Framework**

This section explores the conceptual framework aligned with the study phenomenon of modern fishing techniques and food security. The conceptual framework plays a central role in qualitative research. Ravitch and Riggan (2016) argue that a conceptual framework mainly works as a guide and ballast to a study. It helps the researcher integrate all aspects that inform the research process together. The way conceptual framework parts interact determines the rigor of the research. This section discusses the vulnerability framework, anticipatory adaptation framework, and food security framework.

### **2.2.1 Vulnerability Framework**

Fussel (2006) expressed that vulnerability can mean being exposed to hazardous conditions, leaving one to rely on a mere coping capacity. With the climate change effects taking a toll on Malawi, the floods in 2015, followed by a drought in 2016, buttressed how Malawi needed to implement more adaptive, effective methods to defend against the threat to its food security (Haug and Wolf: 2017). Malawi remains vulnerable to climate change, with droughts and floods causing poor fish production and destroying functional biodiversity (Nangoma: 2007). The rise in food shortages and malnutrition betray how Malawi seems to have taken the opposite direction of the Millennium Development Goals.

The local people of Chembe are a group of interest, given they are located on the southern part of Lake Malawi, which is believed to have the highest fishing concentration (Weyl et al.: 2010). Therefore, it is the hotspot for most fishers. Despite not having enough data on fisheries and climate change, overwhelming data proves the decline in catch rates and

overfishing (Weyl et al.: 2010) in Lake Malawi. The lakeshore people rely on the Lake daily to the extent that it has dramatically affected fish stock production. Given a decrease in production, demand for fish stocks has risen, leaving prices to go up (Limuwa et al.: 2018). One can see how it can be a problem for most of the Cape Maclear populace, which is financially unstable. The lakeshore people are perceived to be in a Hand-to-mouth economic structure. They cannot wait for months until they start getting profits from other adoptive measures like fish farming or farming and other IGAs (Limuwa et al.: 2018). At least 65% percent of the population lives below the poverty line (Kaunda and Chapotoka: 2011). Due to these economic hardships, some women have found themselves exchanging sex for fish (Silver: 2019), which is true of lakeshore women relying on fish retail to make ends meet. In these instances, most women conduct transactional 'risky' sex that will likely leave them infected by one of the many sexually transmitted diseases.

The vulnerability framework helps bring to light the great majority affected by the poor production of Lake Malawi as a result of climate change. The group of minorities is registering women, but orphans and the disabled mostly. In a male-dominant cutthroat industry, it is safe to assume that if anyone can win at fishing using traditional seines and canoes, they will like to be non-disabled men. Anyone who does not fit the profile is a minority and is likely to be taken advantage of by climatic and economic crises.

### 2.2.2 Anticipatory Adaptation Framework

Anticipatory adaptation merely refers to getting ready for climate change disasters. Adapting to this framework is believed to keep most out of vulnerability. Orsato et al. (2019) believe the framework can be used before, during, and after a disaster and a flood or drought in the researchers' case. It is basically what the typical folk call 'Plan B,' and everyone needs one of those. Tebbutt et al. (2016) mention providing assistive products, Information Communication Technology, among others, to educate and involve the marginalized communities to fight and end poverty and hunger by 2030 sustainably. Sutcliffe et al. (2015) understand that climate change perceptions still vary, and its impact is only registered depending on whether it is on or off (fishing) season. Understanding the actual climate change narrative can then enhance the community to move forward to adaptation and other adoptive measures.

Ecological vulnerability is proven to be prominent in Malawi (Allison et.al : 2009). Lake communities have put in bylaws where certain fishing gears and methods are prohibited for a period of 2 months. The initiative allows time for fishes to breed freely and grow. Village heads and opinion leaders control the locals and keep sensitizing them on the dangers of overfishing, keeping in mind generations to come. As emphasized earlier by SAT and Africa Agenda 2063, the study noted that dedicated capacity building could go a long way with the locals. For example, Malawi FRT capacitates national and community-based radio stations on agriculture, nutrition, and climatic changes (Ragasa et al., 2020). With a literacy rate of at least 75% and 59% between men and women, radio in local languages sounds viable to be the most accessible means of communication by fishers in remote areas. The study seeks to see how much-disseminated information by the FRT has impacted the lives of the lakeshore locals. After all, a radio only needs basic comprehension.

Efforts to promote the livelihood of the fishers have led the Malawian government, in conjunction with development agencies, to promote fish farming, with at least 7000 fish ponds recorded in 2005 compared to the 100 in the 1960s (Limuwa et al.: 2018). However, there is a need to be jack-of-all-trades since it has proven that one trade continues to fail the Malawian locals when it comes to sustainability. Regardless of the efforts shown, it is saddening to think slight improvement is showing from Malawi. History has proven that environmental changes have resulted in the extinction of Lake Malawi's pride, the cichlid

fish (Ivory et al.: 2016). What can one do when all they have been exposed to is agriculture and fishing. Modern adaptive fishing techniques have been brought to light, finding the Malawian locals exposed to ideas like permaculture, aquaculture, conservation, and Income Generation Activities. Given that the study takes place in the Southern Region, it is only fair that aquaculture is taken as a solid adaptive technique for the riparian communities (Limuwa et al.: 2018).

Though still under limited operations, aquaculture has shown optimistic projections that by 2025 the yield will increase by almost 100% (Weyl et al.: 2010). It is worth noting that Malawi allows the locals to be part of the legal framework, given a chance to suggest and see-through management tactics (Weyl et al.: 2010). Leaving no one behind is the main agenda of the SDGs (Tebbutt et al.: 2016). It is expected that the lakeshore communities be exposed to whatever know-how is available when it comes to climate change and adaptive as well as adaptive measures. Measures are strictly based on the FAO code of conduct (Limuwa et al.: 2018). Though the Malawians have since adopted fish farming for over 100 years, there is little data on its success as a source of livelihood, but there is hope for improvement (Limuwa et al.: 2018).

Communities that rely on Lake Malawi have continued to exploit it because there are no other viable socio-economic sources in their grasp (Limuwa et al.: 2018). Those that have turned to fish farming often find themselves at crossroads when it is a farming season, and they are short-staffed, leading most fish stocks to die or lack the nutritional content expected, and that is how most ponds have failed. The concept of climate change adaptation seems viable only with the full engagement of the government, development agencies, and the community itself. There is no point in educating one who does not comprehend.

### **2.2.3 Food Security Framework**

Climate changes have affected global food production and consumption (Limuwa et al.: 2018). With the world population on a rise and an increase in demand-supply of almost everything, Lake Malawi has shown indicators of exploitation that have resulted in the exhaustion of species (Weyl et al.: 2010) like the valuable Chambo popular amongst the



Chembe people (Hara and Njaya: 2015). As a result, the locals have changed their fishing eating habits and have since added ornamental species to their diet (Limuwa et al.: 2018). Ecker & Breisinger (2012) define the food security concept as focusing on malnutrition and bidding to realize nutrition more than anything. One can note that the scholars believe that food shortages are a thing of the past, and now the problem lies with nourishment and well-being. However, they do not cross out that the framework can also be applied to food shortages after all food shortages have resulted in malnutrition for Chembe locals.

With the world population on a rise and an increase in demand-supply of almost everything, Lake Malawi has shown indicators of exploitation that have resulted in the exhaustion of species (Weyl et al.: 2010) like the valuable Chambo popular amongst the Chembe people (Hara and Njaya: 2015). The study aims to bring to light how the Chembe anglers have managed to thwart the threat to their food security. With the SDGs in mind, the researcher will shed more on how sustainable the food systems are, considering the fish stock and how conservation might come as a myth to the local Chembe anglers, who are believed to be spiritual and therefore anthropocentric. This framework tends to align itself with the human rights-based framework, where the belief is that the environment owes humanity and thus should exist only to realize humanity's needs (Hara and Njaya: 2015).

## **2.3 Empirical Review**

This section covers the empirical review in which observed and measured data from previous studies derive knowledge from experience other than belief or theories. Creswell (2018) argued that the practical review helps the researcher design a research method compared to designs used in previous studies.

### **2.3.1 Effectiveness of Modern Fishing Techniques**

The recent years in the fishing industry have been associated with significant changes in fishing technologies in which fisheries began adopting modern ways of fishing. Despite the benefits of these modern fishing techniques, a question remains regarding the effectiveness of these methods in ensuring food security and the prevention of fish species to future

generations. In light of Prado (2014), modern fishing equipment has been increased in terms of its dimensions, designs, and the use of new synthetic fibers. In his study, Prado (2014) revealed that the fishing behaviors could be transformed based on the improvements in the fishing techniques.

A recent analysis of the fishing techniques in fisheries across the globe established the massive contribution of these fishing operations to the development of fishing gears that can be used during operations to maximize safety and prevent overfishing. Banks et al. (2001) final report on the impact of technological progress on fishing effort solely focused on the technical improvement of fishing techniques and the efficiency rate in terms of high catching capacity and the prevention of extinction of fish species. Banks et al. (2001) studied four fisheries: Dutch beam trawl fishery for flatfish and Danish trawl fishery for the Baltic Sea. Their qualitative analysis established that these technologically improved techniques promote tonnage and stricter control of fishing trends. Notably, this largely contributes to increased food security if the fisheries are well-managed.

Banks et al. 's (2001) report showed that these innovations in fisheries had improved the working conditions, safety, better product quality, and reduced operating costs. Based on an econometric analysis involving the estimation of a production function, it was found that technologically improved fishing techniques improve productivity, narrowing food insecurity in fishing communities. FAO (2018) highlighted that modern fishing management

techniques contribute to the surplus production of fish stocks in which fishers now catch a fleet of fish. Improving the catching capacity is a critical issue that modern fishing gears such as nets, hook and line fishing, pots, and traps, among others, are perceived as high-performing top fishing gears in most fisheries, seas, and lakes.

Girard and Du Payrat (2017) looked at inventories of new technologies in fisheries. They argued that Coastal states should be guided by legislation despite adopting modern fishing techniques and frameworks that recommend the use of marine resources. UN Convention 1982: Law of the Sea (UNCLOS) outlined fisheries' responsibilities to benefit marine resources. In the same vein, fishing practices should be aligned to ensure sustainable exploitation of fish stocks, better management of the fisheries, and reducing illegal fishing techniques. Girard and Payrat (2017) reported that modern technological fishing techniques

had been categorized as game-changers for managing fisheries and promoting food security. FAO Report (2018) supports the above argument citing that recent technologically driven fishing technologies have been allowed by most governments based on their ability to collect more data on fish stocks, improved monitoring, and enforcement of the positive environmental practices. Thus, these modern techniques can ensure the effectiveness of policies toward the sustainable management of fisheries.

In other coastal areas, fisheries use computer handheld devices, a user-friendly Global Positioning System (GPS), and the Global Navigation Satellites Systems (GNSS) to ensure the proper management and monitoring of fisheries to prevent overfishing illegal fishing. Such technologically driven improvements in modern fishing techniques can be classified as a game-changer in ensuring food security. Despite their challenges, fisheries in less economically African zones have increased interest in modern techniques. However, the issue of resource limitations mainly curtails African fisheries' ability to fully adopt sustainable fishing measures in lakes (FAO: 2018). On the contrary, Banks et al. (2014) highlighted the possibility of overfishing if the activities are not well-controlled or managed. Illegal fishing can also contribute to overfishing, which negatively affects food security. FAO (2020) report revealed that most African Lakes have reported that overfishing is caused by free access to fishing grounds (coastal areas), profit maximization behaviors in fishing units, and increasing population around the lakes in which fishing becomes the effective alternative of employment. This will ultimately result in negative implications for food security in the future.

### **2.3.2 Prevalence of Hunger among Fishers**

Hunger is one of the most threatening situations that vulnerable populations experience. Hunger is classified as the highest level of lacking food but having the desire to eat. Despite the global motive to end hunger as spelled out in the SDGs, the problem still exists in most populations in which fishers are not excluded. FAO (2021) reported that hunger and malnutrition have reached higher-ends in, which Covid-19 has worsened the rift. FAO (2020) said that the World fisheries state primarily depicts the prevalence of hunger among fishers. According to the FAO Report (2020), global fish production was standing at 179 million tonnes as of 2018. However, the tonnage changes from time to time due to climatic changes and erratic rainfalls across the different regions.

Several millions of people worldwide are suffering from hunger and malnutrition, in which fishers are not excluded. FAO Report (2021), the high poverty levels result in inequalities and injustices. The WorldFish Center (2019) working paper established that fisheries and aquaculture are the critical sources of food and income for many developing countries to ensure food security. In the same vein, modern fishing techniques have been associated with overfishing if not adequately controlled and managed. This would negatively affect food security and cause hunger among the fishers who rely on fishing as the source of their livelihood. Another study established a positive connection between poverty and fishers who operate informally with food insecurity implications.

According to the WorldFish Center (2019), Fishers are not much exposed to hunger, particularly third-world countries. Fish provides nutritional benefits to individuals and families. In the same vein, the World Bank Report (2020) supports this notion saying fishing contributes to food security since it increases the purchasing power of individuals or households. A survey conducted in Mozambique and Madagascar coastal areas established that fishers are considered healthy because they have access to nutritious food and earn livelihoods from fishing. Most importantly, the WorldFish Center (2019) demonstrated that about US\$100 billion a year is generated from the exporting of fish species from developing to developed countries, and this process resembles the overcoming of hunger and starvation among the anglers. For example, Mauritania and Vietnam reported gaining about 10% of their GDP from significant fish-producing countries.

The rapid increase in fishing in Sub-Saharan African countries largely contributes to a positive trade balance. The value of fish exports in these developing countries promotes revenue for the fishery beneficiaries resulting in positive advantages of earning income that overrides the problems such as hunger. However, poor diet is a significant concern in vulnerable communities in Sub-Saharan Africa. O'Meara et al. (2021), in their study on inland fisheries on dietary quality of young children in sub-Saharan Africa, found out that fishers have fish as the direct source of nutritious food for their children, particularly those who informally or illegally caught fish. O'Meara et al. (2021) state that fish is the most consumed animal food source in Malawi and Zambia. On the contrary, this study established a need to improve dietary solutions for children in Sub-Saharan Africa to improve food security and overcome malnutrition. If uncontrolled, modern fishing techniques would result in overfishing and the extinction of fish species, negatively affecting the dietary solutions

for fishers and their families in poor Malawian areas.

The world expects to improve its diet by getting rich-nutrient fish. However, based on 6328 children studied in Sub-Saharan Africa, it proves that most children have inadequate diet diversity. Based on these findings, the WorldFish Center (2021) highlighted that 20% of this population relies on eating fish from nearby inland fisheries as their only flesh food. Rural people have only gotten flesh foods from fish since other flesh sources are not accessible to about 65% of rural children due to poverty. The numbers show the extent of hunger among anglers, particularly those in remote areas where fishing is only the source of living.

### **2.3.3 Impact of Local Media on attaining Food Security through Fishing**

Local media plays a pivotal role in communities, particularly fish farming communities. Media is the primary means of mass communication in which information is disseminated through broadcasting, publishing, and the Internet. Media has enormous implications for the development of our society, and it is fundamental to the social, economic, and political facets of life. Generally, media entails how messages are delivered from the sender to the targeted audience through TV, Radio, Print, and the Internet. The Foreign & Commonwealth Office & Browne (2011) argue that the media provides us with facts in order to make informed decisions. Notably, media has four categories that include; print media (Newspapers, Magazines), Broadcast media (TV, Radio), Outdoor or Out of Home (OOH)

Media, and the Internet. Regarding the Internet, the use of social media platforms such as Facebook, Twitter, and Instagram, among other media, is critical in transmitting information to the targeted populations across the world. Fish farming communities can benefit significantly from fish farming and fish techniques through local media to ensure food security. Kutyauro et al. (2021), in their study on media coverage on food security and climate-smart agriculture in Zimbabwe, highlighted the implications of local media on food security. Food security is now a global concern that many nations strive to address. Since the establishment of the SDGs, most local media news has emphasized eradicating hunger by 2030, which is Goal number 2 of the SDGs. Kutyauro et al. (2021) analyzed newspaper coverage on crop production, fisheries, postharvest management, value addition, and climate change. However, the media coverage still covers less, particularly fisheries. Results from 469 food security articles show that media coverage mainly concentrates on climate change

sidelining the issue of food security through fishing. 22.6% of the analyzed articles were related to climate change leaving only 3% for food security through fishing. That alone shows that locals are still neglecting to influence the improvement of food security through fishing.

A review by Ssimbwa (2019) on the use of local media to enhance food security provided tremendous insights into the vast role that local media can play. The review's target area was Somaliland, in which assessment issues included; accessibility, affordability, production, and food security. The local media could facilitate the needed change in communities by highlighting and empowering communities about the importance of fishing activities to local communities. Ssimbwa (2019) argues that most media news in Somaliland published about the benefits of fish as the primary source of food and how fishing activities can be a game-changer in the lives of vulnerable communities. Ssimbwa (2019)'s article understands food security as the situation when people have access to nutritious and dietary fulfilling food regardless of economic, physical, and social status, among others (World Food Summit: 1996). In light of this definition, the local media can raise awareness about the gains accessible from fishing, such as nutrients, food sources, and livelihoods for many populations.

FAO Report (2018) looked at the development of food security by strengthening journalists to increase awareness of food security in Tajikistan. Journalists were involved in a two-day training by FAO and the United Nations to improve journalists' ability to raise awareness of

food security based on their expertise in agriculture, food security, and nutrition. Conducting the training meant the media could build awareness and influence public opinion. Despite only reporting, the media has the power to lead in communicating reliable information and promote an inclusive approach to agricultural growth and the expansion of fisheries towards the improvement of nutritional value for communities through fishing. The United Nations (2019) argues that the media effectively raises awareness and informs the public about the importance of using fishing as a nutritious food source.

Isernia and Marcolin (2018) also assessed the role of the media in increasing awareness of food security and sustainability. This article essentially shows a positive connection between the local press and understanding of the need to improve food security. The use of fishing,

particularly modern techniques that allow the catching of large tonnages, will enable vulnerable communities to have better diets and income. Thus, the media is inseparable from promoting food security through fishing in remote communities.

### **2.3.4 Intervention to improve Modern Fishing Techniques**

Modern fishing techniques are a game-changer in the fishing industry. Nevertheless, at the same time, poor control measures can result in devastating consequences that would defeat the purpose of fishing. Therefore, the fishing revolution in African countries is a panacea to development and attaining food security as stipulated by the SDGs (2030 agenda).

#### **Training the fishers and fisheries**

To reduce poverty and promote food security, NEPAD developed training manuals for local fishers and inland fisheries in sub-Saharan African countries to ensure a revolutionized fishing system. For example, NEPAD trained locals in southern Malawi in which more villagers were exposed to the digging of ponds to raise fish. After this training, these communities realized better proceeds from fish than the growing of maize. Training in aquaculture is crucial to attaining better lives for fishers in southern parts of Malawi. Notably, training helps individuals gain critical skills that facilitate effective, sustainable practices that protect the environment. For instance, those individuals engaged in training by NEPAD reported that they can now pay school fees for their children and meet local needs.

Thus, if fishers are allowed to gain expertise in fishing, they can improve their lives, and in particular, this implies a direct contribution to food security.

#### **Funding fisheries to improve the safety of their practices**

The effective management of fisheries can be improved mainly by mobilizing funding for fisheries to ensure ecological resilience among coastal communities. According to FAO (2019), Sri Lanka fisheries gained some funding from the Agriculture ministry to support their local agriculture. The funds' allocation was to ensure fisheries' training and management, improvement of infrastructure, and the purchase of fishing gear such as canoes, nets, and boats, among others FAO (2019). Most importantly, access to funding to

improve the fishing practices to prevent overfishing and the extinction of various fish species. Thus, the mobilization of funds to promote the activities of fisheries is a crucial strategy for improving the status of the key actors in fish farming in specific countries.

### **Summary**

The review mainly looked at the articles and other published information that focuses on modern fishing techniques and food security. Discussing fishing activities has been there since time immemorial. The empirical review looked at the major themes developed from the study objectives. Studies helped gain a deeper understanding of how modern fishing techniques affect food security.



## **CHAPTER THREE: RESEARCH METHODS**

### **Introduction**

This chapter focused on the research methodology. This study was adopted to assess the modern fishing techniques and the threat to food security in Malawi. Research methodology mainly considers those specific procedures or techniques employed in identifying, selecting, processing, and analyzing information about a phenomenon. The chapter navigates significant sections, including; the research approach, research philosophy, research design, population and sample, data collection instruments, data analysis, and ethical considerations.

### **Research Approach**

A research approach mainly refers to a plan or approach adopted in exploring a specific phenomenon. The primary research approaches include; qualitative, quantitative, and mixed research methods (Creswell: 2018). This study adopted the qualitative research approach. Aspers and Corte (2019) define a qualitative research approach as an achieved iterative process in which an improved understanding of a community by establishing new significant distinctions by getting closer to a phenomenon under scrutiny. Again, McLeod (2019) states that qualitative research can understand how individuals perceive and give meaning to their social reality. In this regard, looking closer at modern fishing techniques and how they impact food security is crucial.

Qualitative can be descriptive but cannot be measured. In the same vein, conceptual and methodological data are categories of qualitative data in which abstract data is concerned with understanding human behavior from the informant's perspective. In contrast, the methodology centers on the data collected through participant observations and interviews, with themes developed to describe the gathered data.

The researcher used a qualitative approach for this study mainly because it provided excellent benefits for understanding the concept under research. Rahman (2016) posits that

qualitative research can primarily produce a thick (detailed) description of the study's

participants' feelings, opinions, experiences, and interpretations. Thus, detailed data was gained on how modern fishing techniques impact food security. On the contrary, qualitative research can fail to consider some contextual sensitivities, particularly on meanings and experiences of the study setting. Therefore, the researcher ensured that the data collection process maximized the collection of all relevant data.

### **Research Philosophy**

Research philosophy is considered a belief about how data about a phenomenon should be solicited (Creswell and Clark: 2017). Several research philosophies include; positivism, interpretivism, and pragmatism, among others. This study adopted interpretivism, which is more suitable for a qualitative research study. Creswell (2018) argues that the interpretive approach mainly concerns the subjective interpretation of the intervention in reality. The natural environment (setting) is a significant point of analysis which. In this case, Lake Malawi fisheries are concerned about how modern fishing techniques impact food security. Notably, interpretivism shapes society and qualitative methods. The primary benefit of employing the interpretivism philosophy is that the data gathered was reliable and representative of fishers' views about the use of modern fishing techniques. Additionally, an empathetic understanding of why respondents act and respond in a certain way was gained. Interpretivism was more inclined to use unstructured interviews and observations, which this study adopted.

### **Research Design**

A research design entails merely a strategy for answering research questions. Creswell (2018) argues that a research design refers to a plan for collecting data to answer a specific research question. For example, a case study was adopted to assess modern fishing techniques and their threat to food security. A case study is understood by Crowe et al.

(2011) as an in-depth and multifaceted exploration of complex issues in real-life contexts. Yin (2014) also argues that case studies help establish causal links and pathways resulting

from a new policy initiative or service development. Thus, this study gained a deeper understanding of fishers in Malawi. The case for this study where data was gathered was Cape Maclear (Chembe), a town in the Mangochi District of Malawi's Southern Region. This area is on the Southern side of Lake Malawi.

### **Study Area**

A research population is a group of people from Cape Maclear (or Chembe), a town in the Mangochi District of Malawi's Southern Region. The southern part of Lake Malawi is believed to be the most productive (Hara and Njaya: 2015). The research compromised local fishers and NGOs that have taken a mandate to help the government of Malawi to improve food security and end hunger by 2030.

### **Population and Sample**

The study population was fishers in Lake Malawi Mangochi district involved in modern fishing techniques. This population was used because it contained the fishers using modern fishing techniques, making it possible to understand how they threaten food security.

### **Sample**

A sample entails a manageable group of subjects drawn from a larger population (McNamara: 2019). Therefore, it was not possible to study the whole population of fishers but to select a small representative group. Twelve fishers were chosen to be involved in the interviews that assessed the use of modern fishing techniques and how it threatens food security.

### **Sampling Procedures**

Sampling procedures are understood as the processes conducted to recruit study participants. For this study, snowball sampling was employed to recruit the fishers who participated.

### **Snowball Sampling**

Snowball sampling is defined by Creswell and Clark (2018) as to how research participants recruit other participants who are hard to find through referrals (ball rolling) until the sample becomes considerable. This is a non-probability sampling technique in which the researcher selected the first fisher who then identified other fishers, and the process went on like that. The primary benefit of using snowball sampling was that it helped the researcher to be connected to the fishers in the Mangochi district who were hard to identify without the help of other fishers. Furthermore, the process of locating the study participants was quick and easy. Thus, the study established representative findings that answered the study hypothesis.

### **Research Instruments**

Research instruments are classified as those tools used to collect, measure, and analyze data related to the study phenomenon. Unstructured interviews and document reviews were employed to gather data for answering the study questions.

#### **1. Unstructured Interviews**

The research interviewed the fishers. McLeod (2014) defines unstructured interviews as an instrument that does not have any questions but only asks open-ended questions to address a specific research phenomenon. As a result, the interview was more like a natural conversation. The researcher conducted interviews with 12 fishers selected from the Mangochi district in Malawi. As McLeod (2014) argued, the strengths of unstructured interviews are that they are more flexible and adaptable and change directives depending on the respondents' answers. Another advantage was that open questions enhanced the creation of a rapport and comfortable environment that influenced the respondents to freely disclose

their views and experiences in line with the study questions. Creswell (2018) argues that unstructured interviews improved the validity of the study findings. On the contrary, unstructured interviews can be time-consuming since analysis methods such as thematic analysis are employed. The researcher overcame this limitation by ensuring that the interviews were booked well and more time was allocated to the data collection process.

## **2. Document Review**

Data was also collected using document review. Bowen (2009) defines document analysis as qualitative research in which documents are interpreted to give voice and meaning to an assessed topic. Data from the documents were coded into themes that were analyzed. In this study, archival records, reports, and data from FAO, Red Cross, and LUANAR from Malawi Fisheries were used as the source of data. O'Leary (2014) states that the use of document review allows triangulation which promotes the reliability of the study. The researcher followed the process below to gather data using document review:

- Creation of a list of texts to explore
- Attention to linguistic or cultural barriers
- Acknowledgment and ways to overcome biases
- Develop appropriate skills for research
- Consider strategies for ensuring credibility
- Know the data one is searching for
- Consider ethical issues

- Have a backup plan

The researcher used a document review guide, which will be derived from the study objectives.

### **Data Analysis**

Qualitative data analysis, as opined by Creswell (2014), was subsequently conducted through the use of the following procedures:

1. Transcribing the interviews,
2. Immersing oneself within the data to gain detailed insights into the phenomena under exploration
3. Developing a coding system
4. Link codes or units of collected data to form overarching theming, leading to the development of a theory

Data captured during the interviews were recorded using a mobile phone recording application. As recommended by Yin (2018), the voice recordings were transcribed to check for the accuracy of these transcriptions. The researcher followed an inductive logical process in analyzing the data. First, the qualitative analysis of the data was conducted using Microsoft Editable Excel. Next, data were organized into codes arranged in terms of similarities and differences. Lastly, subheadings were

created to present and interpret the study findings based on the study themes. Additionally, the researcher also took verbatim quotes from the field data that highly represent the fishers' views on using modern techniques and how they threaten food security.

### **Strategies for ensuring trustworthiness**

The researcher ensured the trustworthiness of the qualitative findings from this study by employing the strategies explained below. Devault (2019) opines that it is essential to focus on data trustworthiness than on the data itself.

#### **1. Credibility**

In ensuring the credibility of qualitative findings in this study, the researcher made sure that she persistently interviewed the study subjects (fishers). Additionally, the use of different research instruments for collecting various sources of information enabled the establishment of a complete understanding of the study phenomenon.

#### **2. Transferability**

The researcher designed the questions on the instruments so that the data can apply to different situations and contexts. In ensuring transferability, the researcher employed snowball sampling to recruit the heads so that the data they provided was directly related to the study questions.

#### **3. Dependability**

Dependability infers a situation where study findings were repeatable and consistent. The researcher ensure reliability in this study by hiring an external auditor (external researcher) who examined the processes for data analysis, data collection, and study results. Two heads are better than one, which ensures the accuracy of the results. Therefore, gaining valuable

insights to build more robust findings was a priority.

#### **4. Audit Trails**

According to O'Leary (2014), audit trails are used in qualitative strategies to establish the conformability of a study's findings. The researcher ensured this by articulating the data coding process with the study themes. As a result, the decisions for analyzing data are evident.

#### **Ethical Considerations**

The issues of progress in programs may be sensitive to most since some have been reported not to have access to climatic adaptation sensitization. Therefore, the need to do honest reporting and keep it confidential if the requirement applies to the informants throughout the study. With the Covid-19 pandemic, the researcher expected more data collection challenges. Traveling restrictions have left the researcher to rely on updated secondary data. Secondary data was likely to be biased depending on the researchers' intent, area, and time of research result. Some research could have been vague when explaining which methods they used to acquire the information, which can be a problem when trying and validating the content at hand. Primary data to be sourced on trusted online research sites and by an Assistant in Malawi. People were more skeptical about gathering or interacting with persons from the most affected Covid-19 regions. Time influenced how this study progressed.

#### **Summary**

<b>Research Objectives</b>	<b>Theory/Concepts</b>	<b>Methodology</b>
To review the effectiveness of modern fishing techniques being	Anticipatory adaptation framework	Qualitative approach



implemented by locals in Malawi		
To analyze the prevalence of hunger among the fishers in Malawi	Vulnerability framework	Qualitative approach
To evaluate the impact of local media in attaining food security through fishing	Food security framework	Qualitative approach

The chapter presented and justified the methods and techniques employed in gathering qualitative data that suitably answer the study questions. The next chapter presents, analyzes, and discusses the qualitative findings from unstructured interviews and document reviews.

## **CHAPTER FOUR: FINDINGS AND ANALYSIS**

### **Introduction**

The chapter presented findings gathered to answer the critical questions about modern fishing techniques and how they threaten food security in Malawi fisheries. Twelve fishers from the Mangochi District of Malawi's Southern Region were interviewed, and relevant documents were reviewed to gain a deeper understanding of modern fishing techniques. Qualitative data gathered in the study is organized using themes developed from the study objectives. The other segment of this chapter discussed the previous findings concerning the data extrapolated in line with modern fishing techniques and threats to food security.

### **4.1 Response rate**

The total number of respondents recruited to participate in this study was twelve fishers. Notably, all the 12 fishers fully participated in the researcher's interviews, making the response rate 100%. Therefore, the study was able to gain adequate findings in line with the use of modern fishing techniques and their threat to food security in Malawi because all the selected participants contributed to the study.

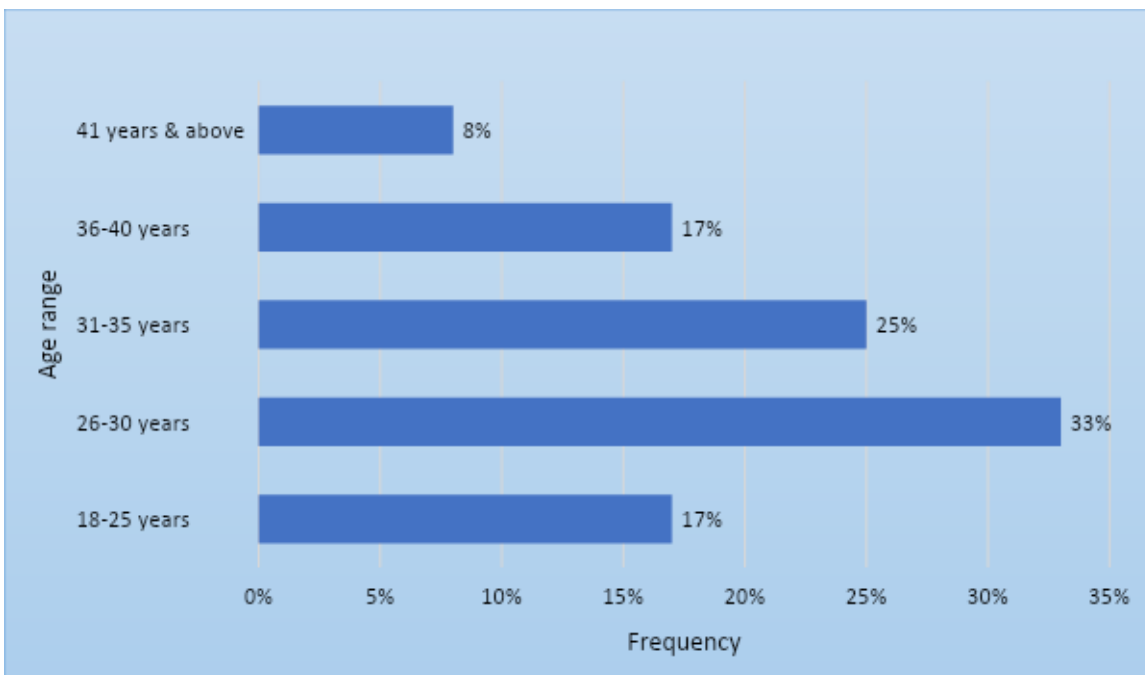
#### **4.1.1 Demographic data**

The demographic information from the fishers, such as sex, age, experience in the fishing industry, and source of income, was obtained. Seventeen percent (17%) of the interviewed fishers were females, while the remaining 10(83%) were males. The results show that the fishing industry in Malawi is a male-dominated industry that has few women. Therefore implies that the responses gathered were largely masculine-oriented. However, the study managed to gather responses from both males and females. Thus, this makes the study findings less gender-biased in line with the assessment of modern fishing techniques and the threat to food security.

### Age of the respondents

The study solicited the ages of the fishers who participated in the interviews. The chart below outlined the age distribution of the respondents as they reported during the interviews.

N = 12



**Figure 4.1: Age distribution of the fishers**

Figure 4.1 shows that 17% of fishers are aged between 18 to 25 years, 33% are aged between 26 and 30 years, 25% are aged between 31 and 35 years, 17% are aged between 36 and 40 years, as well as 8% who were aged between 41 years and above. The age discrepancy of the fishers shows that they were all mature enough to fully respond to the interview questions about the modern fishing techniques in Malawi and their relation to food security.

### **Years in the fishing industry**

Fishers' experience in terms of years helps build their strengths in understanding whether modern fishing techniques are below.

**Table 4.3: Distribution of fishers' experience in the fishing industry**

<b>Experience in the Fishing Industry</b>	<b>Count (%)</b>
<b>0-5 years</b>	<b>17%</b>
<b>5-10 years</b>	<b>33%</b>
<b>11-15 years</b>	<b>25%</b>
<b>16 years and above</b>	<b>25%</b>

**N = 12**

Table 4.3 shows that 17% of the fishers had 0-5 years experience in the fishing industry, 33% had 6-10 years experience, 25% had 11-15 years experience, and 25% had 16 and above experience in the fishing industry. The results show that most fishers had more than six years of experience. That alone implies that the study gained insights into most fishers who understand modern fishing techniques and their possible relationship with food security.

### **Source of livelihood/Employment status**

The study found out that all the twelve fishers who participated in the study relied on fishing as their primary source of income. The fishers were self-employed in which they gained their livelihoods by selling the fish they caught and sold in the study area.

## **4.2 Modern fishing techniques used by fishers in Malawi**

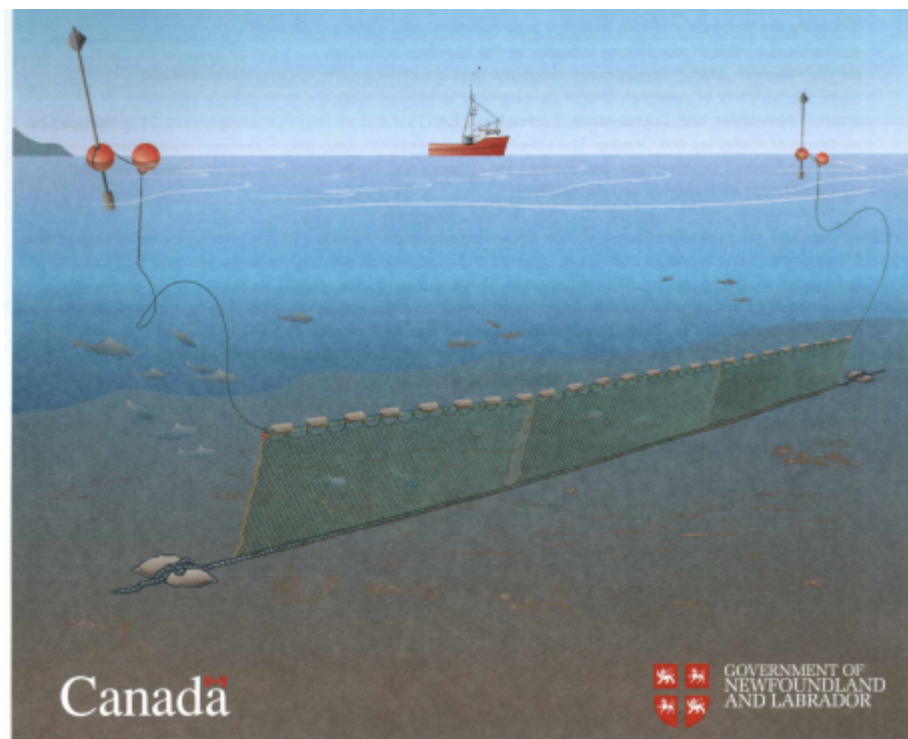
The modern fishing techniques found in this study were presented and analyzed in the sections below. Verbatim captions from the interview and the document reviews are supportive evidence for the study.

## Nets

Nets are one of the modern fishing techniques that fishers in Mangochi use to catch fish. Fishing nets such as Gillnets, Seine nets, Trammel nets, and Drift nets are used mainly by fisheries in the study area, particularly in seas and freshwater areas. Fishes are entangled, trapped with the head, and when they retreat, they get trapped with their gills. The image below shows a fishing net that fishers use.



Ordinary Fishnet



## Gillnet

One of the fishers highlighted that;

*"We use round nets or ring nets to catch various fish species. We also use drift nets that can stretch up to 60km long".*

Another fisher has this to say;

*"Trap nets have the greatest benefit because they are stationary, and we stake them on the shore of the sea or dams."*

One fisher highlighted that;

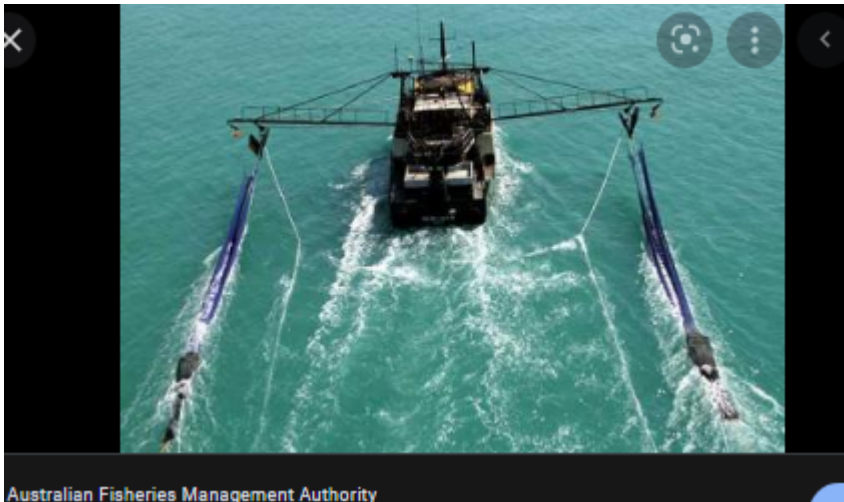
*"Modern nets are made of more or less thick material that forms a mesh through which fish cannot escape. Some are of nylon or other braided or twisted materials."*

The majority of the fishers reported nets being one of the modest ways to catch various fish species. Nets are anchored on the sea beds through weights to catch more fish at one goal. Berthe et al. (2019) conducted a study on poverty and food security in line with the misuse of treated mosquito nets in Malawi. Reports state that fishers in Malawi were using insecticide-treated mosquito nets to catch fish in freshwater bodies (Amoroso et al., 2018). Carrington (2018) argues that nets have become the most modern method used by fishers worldwide to catch fish stocks. However, the draconian ban on mosquito net fishing in some

countries has become topical. (FAO, 2019).

## Trawls

Trawls were also one of the modern fishing techniques that fishers in Malawi use. Trawls are funnel-shaped, having a bag at the end in which they can be cast 50 to 300 meters deep (Limuwa et al. 2018).



## Fishing Trawls

Accessed on:  
[https://www.google.com/search?q=fishing+trawls&client=opera&hs=a0p&sxsrf=ALiCzsba bDiB4GGz4XOZk3liSoAin7yqYw:1651797891401&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjW2LrU0sn3AhUQgFwKHcbhCh0Q\\_AUoAXoECAEQAw&biw=813&bih=724&dpr=0.83#imgsrc=rkCqmDjl-XDETM](https://www.google.com/search?q=fishing+trawls&client=opera&hs=a0p&sxsrf=ALiCzsba bDiB4GGz4XOZk3liSoAin7yqYw:1651797891401&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjW2LrU0sn3AhUQgFwKHcbhCh0Q_AUoAXoECAEQAw&biw=813&bih=724&dpr=0.83#imgsrc=rkCqmDjl-XDETM)

Additionally, beam trawls are used with an expansive bar and iron chains to guide all the fish towards the net. However, this fishing technique is highly criticized because of its immense destruction of marine flora (FAO, 2019). That alone thoroughly explains the need to monitor modern fishing techniques wisely and under recommended conditions. Conservative organizations have urged the use of Chilimira nets used in Malawi at Chilimira fisheries in which the

## Traps (pots and baskets)

The study found that traps (baskets and pots) are also the modern fishing methods that

fishers in Malawi use.



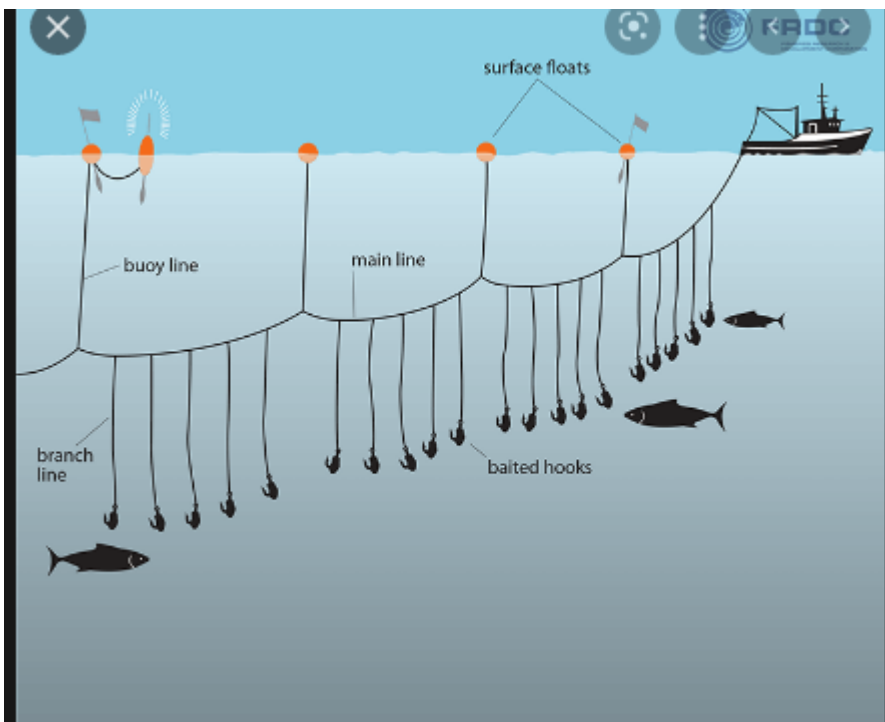
### Fishing Traps/baskets

Traps are made in different sizes and shapes so that they can catch fish at the bottom of the sea. In addition, fishers reported that they use some equipment to mark the location of the fish traps. Amoroso et al. (2018) reported that bottom trawlers catch around 19 million tonnes of fish per year. Bottom trawling footprints are also highly used in most oceans and sea bodies.

### Hooks and line fishing

Line fishing and hooks were also modern methods fishers used to catch various fish species in Malawi. Line fishing has a considerable bycatch rate though it is criticized.





### Line fishing and hooks

Demersal longlines can be stretched on sea-beds to catch fish. FAO (2021) states that modern fishers have adopted longline fishing techniques to catch major fish species such as tuna and yellowfin tuna fish. Fishers in Egypt reported that they use units made up of baskets made up of horizontal lines of about 250 to 800 m long that contain a wire and hook in which the hooks are set in while the mainline floats on top of the water (Renjith, 2019). Another survey by FAO (2021) states that there exist industrial tuna long-liners that contain large vessels that can reach faraway fishing grounds. The results of this study support Renjith (2019) that hook and line gears are the most common fishing gears used by mechanized and artisanal fishing sectors.

Document review data revealed that fishers use traps, pots, nets, and hooks to catch fish in Malawi. It was reported that more concern had been raised over the use of mosquito-insecticide-treated nets for small-scale fishing activities in which the practice has been associated with polluting water and affecting most fish species. Davidse et al. (2018)

highlighted that most fisheries in India and other parts of the world are now using nets such as Gillnets to catch colossal fish stocks in which the schools of fish can be captured using these gillnets. Concerns have been raised over the effectiveness of these modern fishing

techniques in ensuring the sustainability of the fishing industry. In the same vein, Girad & Payrat (2017) alluded to the fact that the modern technological fishing techniques are described as game-changers for the effective management of fisheries since they promote higher yields of fish that would ensure fishers have a sustainable income.

#### Effectiveness of modern fishing techniques in Malawi

The interviewed fishers outlined the effectiveness of the various modern fishing techniques in the study area. The majority of the interviewed fishers highlighted that the modern fishing techniques that are in use in Malawi intensively maximize the catching of high yields. One of the fishers highlighted that;

*“Modern fishing techniques allow us to catch groups of fish swimming together. To add on, having higher yields from these methods promote access to money that can provide sustenance to the fishers”.*

Another fisher said that;

*"The use of modern fishing methods demands high monitoring to prevent the extinction of fish species. For example, huge trawler nets and walls can catch all fish swimming in groups".*

World Economic Forum (2020) states that some modern fishing methods mainly contribute to the overfishing of critical species. Lack of monitoring of these methods resultantly contributes to the uncontrolled catching of large schools of fish despite how that would impact food security in the future. Grimaldo et al. (2020) found that the long-term impact of using nets such as gillnets would result in considerable threats to food security. A recent 2018 study by FAO correlates to the findings of this study in which modern fishing techniques were found to be highly contributory to surplus production of fish stocks, improved welfare of the fishers, and improved food security. On the contrary, legislative frameworks should guide fish-catching to prevent overfishing.

The results obtained from the document review assessed the effectiveness of the modern fishing techniques used in Malawi. The reports from the fisheries departments, newsletters, and articles reported that nets, trawls, hooks, and lines are primarily used in Malawi

fisheries. Additionally, the media reports brought in a new modern technique of using computer handheld devices and cameras for navigating the fish catching process. The

review of existing literature showed that these technologies are meant to combat illegal fishing activities in Malawi. Furthermore, Global Navigation Satellites Systems (GNSS) and Global Positioning System (GPS) can and are used in coastal areas to monitor fishing activities in both formal and informal activities. These findings are in line with FAO (2018), which found that the problem of overfishing due to modern fishing techniques has been addressed through coordinated management systems in fisheries. Thus, the prevention of free access to coastal areas has become the most suitable alternative to prevent overfishing and sustainably promote food security. Document review managed to bring in unique data about the management and monitoring of fishing activities using modern technologies, which the interviews did not point out.

### **Prevalence of hunger among fishers in Malawi**

The fishers, during the interviews, were asked about the prevalence of hunger among them in Malawi. The significant findings were that most fishers in Malawi lack food to eat, and the emergence of Covid-19 had worsened this. One of the fishers who were interviewed highlighted that;

*"We mostly face challenges to adequate food because fishing is our major source of livelihood. Sometimes fish stocks will be below, or we can face weather challenges such that we fail to catch fish. At the same time, the market is not always giving as we prefer".*

Another interviewed fisher revealed that;

*"Our families can have access to nutritional food (protein) and income for their living. Our community relies on the fish we catch, especially in good years when we receive enough rainfall."*

On the contrary, another respondent reported that:

*"Most communities depend on seafood. Now we have seen the reduction in fish stocks such that catch yields have become very low, causing hunger to the fishers across Mangochi. Sometimes we can only get fish for our consumption or fail to have some yields."*

The direct responses captured from the fishers show that fishers experience hunger in Malawi since climatic changes have resulted in the reduction of fish species. Additionally,

mismanagement of water bodies has also resulted in overfishing such that some fish species now cease to exist. The findings concur with the results that were obtained by Taylor et al. (2019) in their study on the Measurement of the implications of marine food security in the Western Indian Ocean, in which they established that the ocean remains the source of protein and employment for 10% of the world's population. However, Taylor et al. (2019) argued in their study that increases in ocean pollution, loss of habitat, and changes in ocean productivity had caused high increases in food insecurity among fishing communities. Thus, hunger has become more prevalent in fishers who only rely on fishing as their source of income and protein.

#### How modern fishing techniques promote livelihoods for fishers

The fishers in the interviews were asked to explain how modern fishing techniques promote livelihoods for fishers. It was established that the majority of the fishers revealed that modern fishing techniques such as nets, trawling, line fishing, and hooking enable the fishers to have higher yields or stocks of fish. Higher yields increase the income which the fishers get, which implies improved livelihoods. In their study, Taylor et al. (2019) reported that aggregated statistics show that fish highly contribute to food security in Kenya, Malawi, Mozambique, Comoros, and Mauritius. On the other hand, FAO (2020) argues that the number of people suffering from hunger has increased in the past decade based on the climatic changes that have been experienced in Sub-Saharan Africa. These climatic changes have contributed to food insecurities for most populations in which fishers are not an exception. Therefore, as the study established, modern fishing techniques promote livelihoods since they can catch more fish stocks. However, climatic changes have affected fish populations in most water bodies across the Sub-Saharan region.

#### The extent to which modern fishing techniques threaten the achievement of food security

The study also explored how modern fishing techniques threaten the achievement of food security in Malawi. The study found that the respondents said that nets, traps, and hooks could result in overfishing and cause the decline of fish stocks/populations. In the same vein, one of the respondents highlighted that;

*"Most fishers use mosquito-treated nets that catch all sizes of fish from small to large, leaving no room for the future. If these modern methods are not fully managed, we will experience greater food insecurity because fish stocks will decrease".*

The findings align with what McClanahan et al. (2013) found in their article on fisheries management for human and food security. Thus, the use of nets, traps, and hooks in Malawi highly threatens food insecurity if they are not fully managed and controlled because they promote overfishing of all fish sizes and species. With theIn addition to the recent climatic changes being experienced in most countries in the African region, rainfall patterns can change the fish stocks to the extent that modern fishing techniques will promote an increase in malnutrition and the operations of local fisheries (Phiri & Jere, 2019). Thus, fishers will have lower yields, and the price of fish will increase, making it difficult for the populations to afford fish.

Reports, newsletters, and other reviewed publications concerning the prevalence of hunger among fishers show a heavily threatening situation that fishers face. The review mainly found that climatic changes and poor control or management of water bodies/coastal areas result in the heavy reduction of fish stocks in Malawi. In addition, most documents reported erratic rainfall affecting the fish stocks to the extent that fishers experience hunger since fishing is their primary source of income and protein. The continued existence of this challenge is the key impediment to the attainment of food security through the fishing industry.

It was shown that 75% of fishers experience hunger, particularly in seasons where there are erratic rainfall patterns. This was intriguing because fishers rely on fish as a source of protein, while their livelihoods are based on their fishing activities. FAO's (2018) report shows that 10% of the world relies on fish as a source of protein and employment. The reduction of fish stocks due to low rainfall negatively impacts fishers in Malawi. World Fisher Center (2019) established that modern fishing techniques are causing overfishing that, in the same vein, contributes to reduced output for fisheries, thus resulting in hunger and malnutrition. The results heavily show a positive connection between poverty, hunger, and poor management of fishing activities. Food insecurity is a matter of concern in Malawi, considering the experiences of fishers based on the impacts of some modern fishing techniques such as gillnets, among others. Despite what the reviewed documents showed, fish in Zambia, according to O' Meara et al. (2021), is the most consumed animal food source. Nutritionists have recommended sustainable fishing techniques to promote stable dietary solutions to the Zambian population and prevent the extinction of fish species in water bodies and coastal areas.

## **Impact of local media in attaining food security through fishing**

The interviews explored how local media impacts the attainment of food security through fishing in Malawi. The fishers' responses were captured in line with how the local media promote the use of the fishing industry to ensure the improvement of food security in the more significant part of the communities in Malawi.

### Local media coverage and the promotion of food security

The administered interviews looked at local media's coverage of promoting food security in line with the use of modern fishing techniques. The interviewed fishers were tasked to outline the media's involvement in the fishing industry. It was reported that the internet, TV-Radio, and magazines help promote the dissemination of information about the importance of fishing to food security. One interviewed fisher has to say the following;

*"These days, social media platforms such as Facebook, Instagram, and Whatsapp are highly efficient in spreading information about fish operations in Malawi. For example, fishers are part of those social media groups for marketing purposes such that fishers can interact with buyers online. The benefits of eating fish can be easily understood through social media".*

In agreement with the above, another fisher revealed that;

*"Most people can now make their fish orders using social media, and they now know various species of fish since we provide them with pictures and nutritional information about these fish species."*

Also, some fishers said that;

*"TV programs broadcast about fishing activities in Mangochi and other fishing communities. They explain how fish remains the main source of protein (white meat) that is highly beneficial to people's health. One of the programs that I saw on TV outlined how people are earning an income from fishing."*

It can be understood that the media is a powerful resource that can promote the use of modern fishing methods towards the achievement of food security. In the same vein, colossal media coverage would mean that stakeholders can be interested in funding and helping fishing projects and fish farming in freshwater bodies in Malawi. Based on the cases of unemployment being experienced, the fishing industry can bring viable solutions toward

employment creation, raising income levels; thus, food security can be improved likewise. Earlier studies emphasized the need to use local media to empower people about the need to strengthen fisheries since climate change could threaten the latter if measures are not implemented to prevent it. However, studies by Kutyauro et al. (2021) revealed that local media use in the fishing industry is still used at a minimum resulting in slow progress towards attaining food security. It was established from an analysis of 469 food security studies that media coverage concentrates more on climate change, highlighting the contribution of fisheries to food security. Thus, local media use should be strengthened to ensure that its benefits are realized in communities such that fishing activities are intensified and managed in a positive manner that prevents overfishing.

#### How local media influence stakeholders

The respondents were also asked to explain how local media influence stakeholders to ensure the effective management of fisheries towards preventing the effects of modern fishing techniques and their threat to food security. Notably, the study found that crucial media organizations were vital in educating communities about the immense contribution of fisheries in promoting food security. For example, the interviewed respondents highlighted that media organizations could host programs that aim to teach communities about the nutritional value of fish to people's health and how fishing activities can promote livelihoods for many.

Most respondents highlighted that the fish industry should be popularized through media houses and online platforms to promote food security. Kutyauro et al. (2019) conducted a study on intelligent agriculture and its relation to food security. Kutyauro et al. (2019)'s study analyzed media coverage of newspapers on crop production, animal production, food safety, value addition, and marketing, among other stakeholders' significant roles, such as media houses,

Key organizations such as FAO and World Food Programme, among other local stakeholders, can immensely contribute with support to engage local fisheries and the communities to intensify their activities to ensure that their livelihoods are greatly enhanced. It is possible to overcome the impact of climatic changes if stakeholders promote fishing activities. Shava & Gunhidzirai (2017) argued that fish farming is an innovative strategy that can promote food security in African nations, particularly those drought risk regions, mainly if stakeholders promote the process. Therefore, the involvement of NGOs in the

The fishing industry was an essential step by stakeholders to influence the use of modern fishing methods to address food insecurity among fishers.

Media reports and statistics from Mangochi fisheries showed that fish farming communities are little known or explored. The local media has a vital role in showing the contribution of this fishing sector to the economy and food security. The study results showed that the media enormously promotes modern fishing techniques' safety and effectiveness in fisheries and other coastal areas. The review established that the primary forms of media used in Malawi include TV, Radio, social media, the internet, and Newspapers. Media reports for water regulatory bodies show that various efforts have been put in the last decade to educate communities about the immense contribution of the fishing industry to the economy and its ability to create employment and promote food security.

It was established that fisheries are benefiting from using media to sell their fish stocks and have easy access to markets while, in the same vein, gaining a livelihood. These findings are not new since a study by Kutyauro et al. (2021) established the same in Zimbabwe, in which fisheries market their products using Whatsapp, Facebook, and Instagram, among others. Local assessments by stakeholders that work on water resources have recently concentrated on conserving water resources to promote fishing. Modern fishing techniques have been criticized as damaging if a regulatory body does not fully control the methods. Kutyauro et al. (2021) explored the analysis made on the impact of local media on the effectiveness of modern fishing methods, and aspects such as post-harvest management, value addition, overfishing, and the protection of water resources were the critical assessment milestones. Based on prior studies and what this study revealed, it is clear that local media can enhance food security by empowering the fishers and the community on the fishing industry's immense contribution to creating employment, adding nutritional value, and promoting livelihoods in fishing communities. Ssimbwa (2019) argues that most media news in Somaliland published about the benefits of fish as the primary source of food and how fishing activities can be a game-changer in the lives of vulnerable communities. Ssimbwa (2019) 's article brought to light the meaning of food security as the situation when adequate and sustainable food is accessible, enough, safe, and nutritious to meet their dietary requirements (World Food Summit, 1996).



### **Interventions to improve the modern fishing techniques being used by fishers**

The study also explored the interventions employed to improve modern fishing techniques that fishers use in Malawi. The interviews revealed that the fishing methods in use should be enhanced to prevent overfishing and undermine food security in communities in Malawi. Ingenuity in communities will lead to surviving and finding modern sustainable fishing techniques.

Interventions that can improve modern fishing techniques used by fishers in Malawi

During the interview, the fishers outlined how to improve modern fishing techniques in Malawi and explained how this would enhance food security and create employment. The fishers showed positive interest in improving modern fishing techniques to ensure fish stocks' continuous flow and livelihoods. One of the fishers disclosed that;

*"Honestly, the use of nets, pots, and traps demand high management and controls by fisheries management because lack of these controls will cause most fish species to be overfished. Some of the methods should be banned, and for example, some countries banned trawls because they can catch even tiny fish leaving no opportunities for the multiplication of schools of fish".*

It was also expressed by the farmer that;

*"Funding from stakeholders concerned with the conservation of aquatic life can highly promote the maintenance of fishing standards to ensure controlled catching of fish. This can highly save the collapse of fisheries across Malawi".*

Massive overconsumption of fish and overfishing can negatively hurt the fishing industry and efforts to promote food security. FAO (2021) suggested that marine conservation should be treated as a policy issue such that fishing remains a sustainable activity for future generations. Organizations such as FAO denounced the use of trawling huge nets across the ocean since that causes the scooping of every animal in the water, thus destroying the water ecosystem. Thus, the banning of trawling in Malawi can be a practical move toward ensuring better livelihoods for future generations and the continuous supply of protein to populations.

During the interviews, it was heard that;

*“All fishing activities here in Mangochi and Malawi should be managed and controlled to prevent the replenishment of fish stocks. Losing fish species would be a heavy loss that would take countless years to recover from”.*

In light of the above, the valuable support of management that controls and manages fishing activities can initiate the ban of unsustainable fishing methods such as trawling coupled with the prevailing climatic changes that the world is experiencing. In this vein, Amoroso et al. (2018) reflect on an American and British Columbian study that found that fisheries control enabled a catch increase of 19% while bycatch was reduced by 66%. Furthermore, it was reported that fishing businesses complied with the management controls. Notably, the fishers of this study suggest that control and management of fishing activities is a crucial strategy for improving food security and enhancing livelihoods for communities that rely on fishing.

Attaining sustainability in the management of fisheries and improving food security in Malawi

The study assessed the essence of the sustainability of fisheries towards improving food security in Malawi. The interviewed respondents highlighted their views on how best sustainability can be ensured in managing fisheries in Malawi. Most importantly, most fishers said that the ministry responsible for water sources and resources should ensure that marine resources are well managed. One of the interviewees stated that;

"Sustainability can be attained if fisheries have leaders who manage the catching and sale of fish in marine resources. In addition, the practices should be informed by SDG goal 14. The respondents showed much concern about the sustainability of the fishing activities in light of the need to ensure the persistence of income continuity and the improvement of food security. FAO (2021) argues that fisheries contribute about 10% of employment and protein globally, implying that effective fisheries management would promote the sustenance of fishing activities. Therefore, fishing activities in Malawi need to be well-managed and controlled to ensure that fishers have a stable source of income and nutrition.

The data from the document review revealed several strategies that can be employed to promote the sustainability of fishing activities in Malawi. First, all the reviewed documents mentioned the training of fishers and fisheries as a critical solution to ensuring sustainable

fishing activities (Renjith, 2019). This aligns with NEPAD, which developed training manuals for local fishers and inland fisheries in sub-Saharan African countries to ensure a revolutionized fishing system. For example, NEPAD trained locals in southern Malawi in which more villagers were exposed to the digging of ponds to raise fish. After this training, these communities realized better proceeds from fish than the growing of maize.

The study obtained that the effective management of fishing activities needs adequate resources. In the same vein, using technologies such as GPS, among others, demands resources to ensure their practical use. According to FAO (2019), Sri Lanka fisheries gained some funding from the Agriculture ministry to support local agriculture, and the funds were allocated to ensure training of fisheries and their management, improvement of infrastructure, as well as the purchase of fishing gear such as canoes, nets, boats among others. Most importantly, access to funding to improve the fishing practices to prevent overfishing and the extinction of various fish species.

### **Summary**

The study established that the main modern fishing methods that fishers use in Malawi include; trawls, nets, traps and buckets, line fishing, and hooks. These fishing methods report being adequate for gathering higher fish yields. However, the use of these methods was associated with overfishing, in which most fish species can become extinct if the activities are not monitored thoroughly. Climatic changes have devastating effects on the lives of fishers in Malawi who are wallowing in poverty based on reduced rainfall patterns affecting fish stocks and their fishing yields. The study found out that modern fishing techniques highly promote food security in which fishers can add value to their diet and earn livelihoods from fishing activities.

## **CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS**

This chapter summarizes a thesis, including the research problem, literature review, methodology, and critical study findings. Conclusions and the recommendations made from The results of this study are evident in this chapter.

### **Summary**

The trajectory of this study was to assess the use of modern fishing techniques and their relation to food security in Malawi. The analysis was needed to understand the prevalence of hunger among fishers and the contribution of fishing to Malawi's economy and food security using a case study. The reviewed literature related to the study aided in understanding the benefits of modern fishing techniques to fishers' livelihoods and their impact on food security.

The study applied the qualitative research approach to assess modern fishing methods for fishers in Mangochi in Malawi. A case study was designed to examine the effectiveness of modern fishing techniques used. Twelve local fishers from the Mangochi district of the Southern Region of Malawi consisted of the study sample in which interviews were conducted to gather data. The researcher used the snowballing technique to recruit those fishers who participated in the study.

Interviews were conducted with the fishers while reports and other relevant documents were reviewed to answer the primary research questions of the study. Qualitative data analysis was adopted to analyze the data gathered using interviews and document reviews. Our results indicate that the modern fishing techniques used by fishers in Malawi were nets (Gillnets, Seine nets, Trammel nets, and drift nets), hooks, line fishing trawls, and traps (pots and baskets). These fishing methods effectively produced high yields of fish and enabled livelihoods for the fishers.

The Malawian government has many visions for their Africa Agenda 2063, labeled Malawi 2063. Among the ten visions are 'a deep knowledge-based economy; an ' effective governance systems and institutions that strictly adheres to the rule of law,' and 'an environmentally sustainable economy (UN: 2021). The visions mentioned above support the researchers' point of call. Malawi fisheries must be vibrant and knowledgeable on all the nitty-gritty of climate change and sustainable economies.

The MW 2063 calls for state and non-state actors to implement sustainable development strategies to create wealth and self-reliance among the Malawian populace. That alone denotes human development to be vital among the fishers to create a sustainable, food-secure environment.

Hunger appears to be prevalent among fishers in the study area. Furthermore, these modern fishing methods promote overfishing to the extent that fish stocks sometimes dwindle to the detriment of the fishers. As a result, fishers' livelihoods are not stable and likely result in hunger.

Local media use allows people to understand the importance of the fishing industry in terms of its contribution to people's lives in terms of nutritional value and providing income to the fishers. The majority of the study respondents revealed that stakeholders could be influenced by local media reports about fishing activities and how they can promote food security.

Interventions suggested by the respondents in order to improve modern fishing techniques included;

- More incredible support by relevant agency management of fisheries on a sustainable basis;
- Training fishers using sustainable fishing techniques;
- Use of modern technologies such as GPS in tracking and monitoring fishing activities;
- Mobilization of funds to promote fishing activities.

## **Conclusions**

The study concluded that; Hooks and line fishing are sustainable modern ways of fishing that potentially promote aspects of food security. Pots and baskets appear to be helpful in the production of high fish yields. The use of trawls and nets fishing techniques promotes effective fishing for fishers in Mangochi. Hunger appears to be prevalent among fishers, particularly in low-rainfall seasons. The majority of fishers earn a living and use fish as a source of protein. However, fishers' livelihoods are potentially unstable due to climatic changes and a lack of resources. Local media such as newspapers, social media, and TV and radio stations could inform the fishing industry's contribution to food security. In addition, local media can influence policy development and economic reforms to protect and promote

the use of water resources to improve food security in Malawi. Effective management and monitoring of fisheries can leverage modern fishing techniques in Malawi to promote food security. Fisheries can be practical if the responsible authorities use modern technologies such as GPS and trackers. In addition, training fishers can empower them to use fishing techniques wisely and sustainably to prevent overfishing.

### **Recommendations**

The study recommends;

1. Fishers in Mangochi need sensitization by the fisheries department and other stakeholders such as FAO on sustainable modern fishing methods that promote food security and ensure their livelihoods. The training ensures fishers gain stable income and reduce hunger even during drought seasons.
2. The fisheries sector should mobilize funds to cater to the effective management of fishing activities in Mangochi. In addition, modern technologies such as GPS, among others, can track and monitor fishing activities. Therefore, preventing overfishing and the extinction of fish species and ensuring the sustainability of fishers' livelihoods.

Policymakers should develop and implement context-responsive policy to promote fishing activities in Mangochi to ensure the continuity of fishing activities and enable better living standards for fishers and the continuous contribution to the national Gross Domestic Product (GDP).

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## **APPENDICES**

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## **APPENDICES**

Appendix A: Interview for fishers

## **UNSTRUCTURED INTERVIEW FOR FISHERS**

### **Effectiveness of modern fishing techniques being implemented by locals in Malawi**

1. Please outline the modern fishing techniques that you use in Malawi?
2. How effective are these modern fishing techniques regarding the extinction of fish species?

### **Prevalence of hunger among fishers in Malawi**

3. Explain the prevalence of hunger among fishers in Malawi?
4. How effectively do modern fishing techniques promote livelihoods for fishers in Malawi?
5. To what extent can modern fishing techniques threaten the achievement of food security among fishing communities in Malawi?

### **Impact of local media in attaining food security through fishing**

6. How does local media coverage promote the attainment of food security through the use of modern fishing techniques?
7. How can local media influence stakeholders to ensure the effective management of fisheries to prevent the negative effects of modern fishing techniques that can threaten food security?

### **Intervention to improve the modern fishing techniques being used by fishers in Malawi**

8. Suggest interventions you think can promote the use of modern techniques by fishers without threatening food security and the extinction of fish species?
9. How best can fisheries in Malawi be managed in line with attaining sustainability and food security for the fishing communities in Malawi?

[Thank you for your contribution]