UNIVERSITY OF CAPE COAST

ASSESSMENT OF PREMIX FUEL GOVERNANCE IN THE MARINE SMALL-SCALE FISHERIES SECTOR AND IMPLICATIONS ON THE LIVELIHOODS OF FISHERS IN GHANA

VINOLIA PITRIS PAWAR

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BY

VINOLIA PITRIS PAWAR

Thesis Submitted to the Department of Fisheries and Aquatic Sciences of the School of Biological Sciences, College of Agricultural and Natural Sciences, University of Cape Coast, in partial fulfilment of the requirements for the award of Master of Philosophy Degree in Integrated Coastal Zone Management

DECEMBER, 2022

DECLARATION

Candidate's Declaration:

I hereby declare that this thesis is the result of my original research and that no part of it has been presented for another degree in this university or another university.

Candidate's Signature..... Date 24th November 2023

Name: Vinolia Pitris Pawar

Supervisors' Declaration:

We hereby declare that the preparation and presentation of the thesis were supervised following the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature..... Date 24th November 2023

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ABSTRACT

Premix fuel is subsidised and central to the fishing operations of small-scale marine and inland fishermen in Ghana. However, its distribution and access among fishermen have always been fraught with challenges such as hoarding, and politicization thus, it is unclear if premix supply by the government correlates with fish landings. Primary data was collected through systematic random sampling of 1,151 artisanal fisherfolk in four communities namely Axim, Abandze, Kedzikope and Old Ningo using structured interviews. Secondary data was also collected from National Petroleum Authority and Fisheries Scientific Survey Division on the quantity of premix supply and fish catch by small-scale fishermen in Ghana. Thematic, descriptive, trend, regression and correlation analysis were conducted to achieve the results of the study. However, 32% of the fish catch variations is as a result of the supply of premix fuel and the total number of canoes in Ghana. In addition, there is no significant relationship between premix fuel supply, number of canoes and the quantitity of fish catch in Ghana. In addition there is a significant relationship between expenses made on premix fuel and the income generated from the sales of fish catch per trip but the relationship is very moderate (R square =18.1%; r = 0.43; p value < 0.05). It is recommended that, there should be a sequential reduction in the supply of premix in order not to jeopardise the livelihoods of fishers thus depoliticising the local distribution system to ensure equity in the coastal communities.Premix subsidisation funds should be re-channeled into other social intervention initiatives such as education of the youth in coastal communities, providing insurance for fishers at their old age, and alternative livelihood interventions.

KEY WORDS

Artisanal fishermen

Administration

Coastal Areas

Landing Beach Committee

Politicisation

Premix Fuel Subsidy

Income

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DEDICATION

I dedicate this work to my mother Mary Amoah and my confidant Francis Amoako

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LIST OF ACRONYMS

FAO	Food and Agricultural Organisation
FASDEP	Food and Agriculture Sector Development Policy
FBB	Far Ban Bo
FC	Fisheries Commission
F.G.D	Focused Group Discussion
FSSD	Fisheries Scientific Survey Division
GIS	Geographic Information System
GoG	Government of Ghana
IYAFA	International Year of Artisanal Fisheries and Aquaculture
L.B.C	Landing Beach Committee
MCEs	Municipal Chief Executives
MMDCEs	Metropolitan, Municipal and District Chief Executives
MOFAD	Ministry of Fisheries and Aquaculture Development
NAFAG	National Fisheries Association of Ghana
NGOs	Non governmental organisations
NPA	National Petroleum Authority
NPS	National Premix Secretariat
NPP	New Patriotic Party
PF	Premix Fuel
S.D.G	Sustainable Development Goal
SSFS	Small-Scale Fisheries Sector
STWG	Scientific Technical Working Group
TA	Thematic Analysis

UCC	University of Cape Coast
UN	United Nations
UNDP	United Nations Development Programme

CHAPTER ONE

INTRODUCTION

Premix fuel is a subsidised and a vital product essential to artisanal fishers in the marine and inland fisheries sector purposely to power their outboard motors for fishing expeditions in Ghana. However, its purchase and distribution among fishers have become a great challenge for the small-scale fisheries sector (Owusu & Adjei, 2021). The governance structure of premix fuel distribution at the local level in the various fishing communities continues to be a critical challenge (Ameyaw et al., 2021). Hoarding, politicisation, diversion and smuggling of premix fuel has affected the livelihoods of fishers in diverse ways (Owusu & Adjei, 2021). Moreover, it is uncertain if premix fuel supply correlates to fish landings thus, the relationship between quantity of premix supply and the quantity of fish caught by small-scale fishermen has received little conderation in literature. It is therefore expedient to subject this research to unravel the issues and propose ways to minimise the problem in other to advance small-scale fishers from the state of vulnerability to viability in Ghana.

Governance is the study of how social groups, including the government, relate to one another and make choices in a complicated world (Graham, et al 2003). It is a procedure through which societies or organisations decide what critical decisions to make, who to participate in the decision-making process, and how to account for those decisions (Renn, 2017). Governance is concerned with the laws that govern how authority is used to manage a nation's resources as well as the interactions between the state and its people, civil society, and the public sector (Khalaf, 2015).

According to Landell-Mills et al. (1991), governance is the management and regulation of state operations as well as the political organisation of a nation, including its relationships with the legal system and the public sector. Premix fuel "governance" in this context describes the processes that governs the distribution of premix fuel to fishers and how decisions are made at the local levels in the various fishing communities. It also describes how the decision makers uphold transparency in the management and distribution of the product to fishermen in Ghana.

Sustainable Development Goal one (SDG1), which aims to alleviate poverty, is achieved in part through small-scale fisheries, which are essential for the livelihoods of many people's worldwide (March et al., 2022). Fish is an important source of animal protein and income in many countries where food security is a concern (Béné et al., 2016). As one of the most consumed and traded food commodities worldwide, fish from inland and marine capture fisheries which plays a key role in sustaining livelihoods, food security, and health (Loring et al., 2019). According to Herforth et al., (2020), 97 percent of the 120 million people who rely on fisheries for their livelihoods live in developing nations, and more than 90 percent of them engage in small-scale fishing. Small-scale fishermen in Africa are distinct from large-scale commercial fisheries in their use of basic technologies. The basic technologies used by small-scale fishers in Africa differentiates them locally from the large-scale commercial fishing operations. More than 50% of the fish harvested globally comes from small-scale fisheries, and 90% to 95% of that catch is consumed locally (Pascual-Fernández et al., 2020).

Background of the Study

Globally, and especially in developing nations, worries about the marine fish stock decline in coastal communities have intensified (Nolan, 2019). About 94% of fisheries subsidies in Senegal go to capacity-enhancing activities that are regarded to be "harmful" to the environment, such as boat construction and renovation, fisheries development projects, market storage and infrastructure, tax exemptions, and fuel subsidies (Harper & Sumaila, 2019). Recently, most of the canoes used by small-scale fishers are now powered by outboard motors which solely depends on fuel to function.

Ghana, a country in west africa, with about 550 kilometer coastline and a very shallow continental shelf stretching from Aflao in the East to Half Assini in the West (Pabis et al., 2020). Small-scale (artisanal), semi-industrial (inshore), and industrial subsectors make up Ghana's marine fishing industry (Nyemah et al., 2017). Ghana has a long history of being a small-scale fishing country, dating back to the Fante fishermen who started ocean fishing off Ghana's coast in the 1700s and 1800s. Fishing is the main source of income for those who live in coastal communities in Ghana (Nyemah et al., 2017). Also, paddling was once the primary method of moving canoes on the sea. Many fishermen have adopted the use of outboard motors since its invention in 1946. Premix fuel powers the outboard motor, with an engine power up to 40 horsepower (hp) (Asiedu et al., 2022). The introduction of Outboard motors has increased productivity in the fishing industry by facilitating and accelerating travel over the water (Béné et al., 2016).

Premix fuel subsidies were implemented in Ghana's small-scale fishing industry in the 1990s to address the country's high fuel prices and lessen the

financial strain on the nation's poor and vulnerable fishermen (Okyere et al., 2020).The subsidy is paid from the country's fuel price stabilisation levy. According to Owusu & Adjei (2021), GoG spent USD 44 million on premix fuel subsidy. The subsidy on the premix fuel amounts to between 60% and 70% of the actual market price of the fuel (Owusu & Adjei, 2021). Ever since the product (premix fuel) was introduced and subsidised in the year 1992**,** its distribution has always been fraught with challenges which has affected the rationale of the subsidy and made the product costly to the fisher folks (Owusu & Adjei, 2021).

Some of the challenges include fuel being diverted to the illicit or black market, corruption, and smuggling, which prevents access for fishermen (Okyere et al., 2020). Inequality in power relations between those with and without political connections within fishing communities is a defining characteristic of access to the subsidised fishing input. This distributive inequality has had deleterious consequences on fisherfolks livelihood in terms of reduced frequency of fishing, reduction in catch, frequent damage of outboard motors and increased illegality in fishing (Turner et al., 2020).

A number of studies have hinted at the possibility that overfishing and overcapacity in the fisheries sector are exacerbated by subsidies which is undermining sustainable fishery management techniques (Ertör-Akyazi, 2020). As a result of the fuel subsidies, more people are now able to enter the fishing industry, which increases fishing effort and decreases productivity per canoe (Schuhbauer et al., 2017). Concerns over the declining marine fish stock in coastal waters, particularly in developing nations, have increased on a global scale (Nolan, 2019).

Statement of Problem

Over the past ten years, small-scale fisheries in West Africa have experienced declining fish capture and income decreases that has reached 40% per canoe as a result of anthropogenic and natural factors (Asiedu et al., 2022). In addition, the present governance structure for distributing premix fuel, for instance, encourages diversion, smuggling and hoarding of the fuel, creating artificial shortages at the various landing beaches. There is a clear circumvention of the legislatively instituted landing beach committees whose sole responsibility is the fair distribution and sale of premix fuel. Hence, canoe owners in some cases tend to buy the premix fuel at prices equivalent to or even higher than the non-subsidised prices (Okyere & Chuku, 2020). Besides, smuggling of premix fuel has remained a hard-to-battle problem in the fishery sector since the introduction of subsidy on the fuel (Okyere et al., 2020).

The distribution of premix fuel is a multi-actor process. The National Premix Fuel Committee Regulations (L.I. 2233), which were enacted in 2016, set down the national composition, tenure, scope of work, mandates, disbursement of proceeds, accountability, of the committees, as well as penalties for smuggling of premix (Okyere et al., 2020). The National Premix Committee is responsible for distributing premix fuel at the national level. Based on the size of the fishing community, the number of canoes, and the fish landing sites, distribution is a year-round activity with minor seasonal fluctuations (Normanyo et al., 2016). The L.I. 2233 provided for the creation of local Landing Beach Committees (LBCs). They are responsible for managing the premix fuel in their respective communities and to oversee the equitable supply and distribution of premix fuel to fisherfolk (Owusu & Adjei, 2021).

The LBC of each fishing community decides how much fuel each fisherman will receive. Since there are no formal rules governing how much fuel should be sold to each fisherman, the LBCs utilize their power to decide how much fuel should be distributed to each fisherman. However, studies have indicated that political party members of the consecutive ruling administrations have surpassed the LBCs in terms of importance (Okyere et al., 2020). Due to this, the government has lost revenue because, only small fraction of the subsidized fuel reaches the fishing communities due to political party members taking over the distribution of premix fuel in fishing communities (Torell et al., 2015). Furthermore, there are so many controversies surrounding fuel subsidies. Some stakeholders believe that, fuel subsidies plays an important role in promoting the livelihoods of fishermen. However, others also have the view that, fuel subsidies has a threat on fisheries resources as a result of overcapacity and overfishing (Pham et al., 2021).

The main purpose of the government subsidising premix in Ghana is to promote the livelihoods of the economically vulnerable fishermen for them to be able to purchase the fuel, and increase their landings. However, it is uncertain if premix supply leads to higher catch by the small-scale fishermen or rather promotes overcapacity in the small-scale fisheries sector (Owusu & Adjei, 2021). Moreover, there is a fish stock decline and inputs such as premix supply and number of canoes are currently not leading to a higher catch by the small-scale fishermen but rather putting more pressure on the already dwindling fishstock as a result of overcapacity (Sumaila et al., 2019).

Similarly, the relationship between the quantity of premix fuel supply, number of canoes and the quantity of fish catch in the small-scale fisheries

sector is a gap in the literature which needs to be addressed (Tobey et al., 2016). In addition, premix fuel governance in small-scale fisheries sector and the implications of the on the livelihoods (income) of fisherfolks in Ghana has received little attention in literature (Owusu & Adjei, 2021).

Purpose of Study

The main goal of this study is to assess the governance structure of premix fuel in the small-scale fisheries sector and the implications on the livelihoods of fishers in Ghana.

Research Objectives

The specific objectives of the study were to:

1. assess the governance processes of premix fuel distribution at the local level in Ghana.
2. assess the effectiveness of the legal frameworks governing premix fuel distribution in Ghana.
3. examine the relationship between the quantity of premix fuel supply, number of caoes and the quantity fish catch in the small-scale fisheries Sector in Ghana.
4. assess the contributions of premix fuel subsidies on the fish related income of fishers in Ghana.

Research Questions

1. What is the governance processes of premix fuel distribution at the local level in Ghana?
2. How effective the legal frameworks governing premix distribution in Ghana?

3. What is the relationship between the quantity of premix fuel supply, number of canoes and the quantity of fish catch in the small-scale fisheries sector in Ghana?
4. How is the premix fuel subsidies contributing to the fish related income of fishers in Ghana?

Significance of the Study

Weak fisheries governance structure encourages practices such as premix fuel diversion, hoarding and smuggling which affects the livelihoods of fishermen in Ghana (Okyere et al., 2020). This study is very important and the results of this study will be beneficial to policy makers and other stakeholders interested in fisheries subsidy reforms. Also, at the end of this study, results may be used by policy makers to make relevant decisions in the SSFS. This will advance small-scale fishers from the state of vulnerability to viability.

Strong fisheries governance promotes community organisation, minimises resource conflict, and ensures food and economic security. The best sources of information for governance in many small-scale fisheries include local knowledge, comprehensive ecosystem mapping, and participatory research. In coastal areas, the decline in fisheries resources has resulted in rising poverty, greater food insecurity, and a loss of livelihoods. Initiatives for sustainable fisheries governance, which are essential to guaranteeing ongoing access to fisheries resources, can alleviate this loss in marine fish stocks (Ameyaw et al., 2021). Moreover, the research will contribute to my MPhil Thesis and also publications will be generated from this study.

Delimitations

This research was conducted in the Western, Central, Greater Accra and the Volta Regions of Ghana. The above communities were selected based on their similarities in socioeconomic activities and unique differences such as their cultural values. Other coastal communities for instance, Elmina was not selected as a result of the high research fatigue. Moreover this study largely focused of canoe owners since they are directly impacted with the governance of premix fuel in Ghana.

Limitations

The phenomenology approach was used as the qualitative design. The phenomenological approach has been criticised for being philosophical, and challenging to understand (Wilson, 2015). Furthermore, it has been argued that it is unrealistic and oversimplified to think that the ultimate human experience can be understood by putting aside preconceived notions. This may affect the results which will be obtained from the research. Also, the convergent mixed methods used for this study was more complex to carry out since the qualitative and quantitative data has to be collected at the same time. Again, data was supposed to be collected on the use of other fuel before premix was introduced in Ghana in order to be able to compare the occations but it was difficult to get the data from the fishermen.

Definition of Terms

Premix: is a hybrid fuel comprised of oil and gasoline for outboard motorised canoes in the small-scale fisheries sector. It is heavily subsidised and supposed to be distributed to Ghana's small-scale fishermen (Owusu & Adjei, 2021).

Governance: is a form of government that places a strong emphasis on effective and responsible institutions, democratic ideals and the election process, representation, and responsible governmental structures (Zafarullah & Rahman, 2008).

"Premix fuel governance": in this context describes the processes that governs how premix is distributed to fishers and also how decisions are made at the local level in the various communities. It focoses how the decision makers are held transparent in management and distribution of the product to fishermen in Ghana.

Small-scale or artisanal fisheries: include all pre- and post-harvest activities along the value chain and are carried out by both men and women, are crucial for food security and nutrition, the eradication of poverty, equitable development, and the sustainable use of resources (Kimani et al., 2022). Although sometimes mechanized, these small-scale fishing methods often entail fishing from small boats or from the shore using hand lines, small nets, traps, spears, and other manual collecting techniques. Small-scale fishermen typically use smaller boats and gear, which results in less fish being caught than those using larger vessels (Halim et al., 2019).

Livelihood: the abilities, resources (including both material and social resources), and activities necessary for a means of subsistence are together referred to as livelihood. When a way of life is sustainable, it can withstand stress and shocks, recover from crises, and retain or improve its capacities and resources both today and in the future without compromising the natural resource base (Chambers & Conway, 1992).

Livelihood in the context of the study: describes the contributions of the fuel subsidies to the fish related (income) of fishers in Ghana.

A fisher folk: people who catch fish for a living (Watts et al., 2021).

A fish monger: is someone who sells raw or smoked seafood (fish). Fish mongers can be wholesalers or retailers and are trained at selecting and purchasing, Handing, gutting and merchandising their product (Lyon & Back, 2012).

Organisation of the Study

This study is organised according to chapter one to chapter six. Chapter one consist of the introduction which captures the background of the study, statement of problem, purpose of the study, significant of the study, delimitations, limitations, and definition of terms. In addition, chapter two consist of literature review, and the conceptual framework while chapter three focuses on research design, study area, population, sampling procedure, the data collection instrument and data collection procedures, data processing and analysis and the chapter summary. Moreover, Chapter four is made up of the presentation of results while chapter five focuses on discussion. Chapter six is made up of the summary, conclusions and recommendation.

CHAPTER TWO

LITERATURE REVIEW

Introduction

The chapter reviews literature that is pertinent to the study. Specifically, the literature review will centre on the conceptual review, theoretical review, and empirical review. Moreover, this chapter reviews the benefits of small-scale fisheries sector and the various stressors affecting the industry. In addition this chapter evaluates the governance strucures of fuel subsidies in Ghana and other countries taking into consideration the relationship between fuel subsidies and fish catch.

Theorertical Review

The political ecology theory is a theoretical framework used for this study because the study explores the variables that affect access and distribution of the subsidised premix fuel by identifying the winners and losers as well as the effects of unequal access of subsidies on the livelihoods of Ghanaian fishermen (Owusu & Adjei, 2021). Political ecology was first coined by Frank Thone in an article published in 1935. Also, socio-environmental studies has a subfield called political ecology that focuses on power dynamics in environmental governance as well as the interaction between nature and society within a larger political economy. Due to the convergence of two trends, political ecology emerged from the 1970s. The discipline initially arose as a Marxist critique of Malthusian concepts in environmental thinking. According to the idea, studies of human ecology are never neutral or apolitical rather, they always incorporate interests, norms, and power. Similarly, in order to analyse human-environment relationships and the implications of unequal resource

access, political ecology provides theoretical approaches such as the political ecology approach.

Conceptual Review

Small-Scale Fisheries in the Global Context

Artisanal or small-scale fisheries and aquaculture have no set definition. These words are frequently used to describe fisheries and aquaculture that employ medium sized production units, low inputs, low outputs, low degrees of technological sophistication, and low capital expenditures (Teh & Sumaila, 2013). They are frequently run on a family level, occasionally with a limited crew, or at a community level . The fish can be sold in national and international markets in addition to local ones. The International Year of Artisanal Fisheries and Aquaculture uses the terms small-scale and artisanal interchangeably. Also, fishing done for sport or recreation is not typically referred to as artisanal or small-scale (Canty et al., 2019).

Small-scale or artisanal fisheries has employed a lot of people world-wide (Uduji & Okolo-Obasi, 2020). Around 35 million individuals are recorded as fishers worldwide, and 90% of them are categorized as small-scale fishers (Smith & Basurto, 2019). Worldwide, the marine catch fisheries employs more than 260 million people (Teh & Sumaila, 2013). This covers both men and women who engage in direct or indirect work along the value chain for fish and in activities related to marine capture, whether they do so formally or informally, for pay or out of their own free will. In the fisheries value chains, women make up around half of the workforce, yet their contributions are not always recognized (Béné et al., 2016).

About 20 million people are reportedly employed in the post-harvest small-scale sector (Chegere, 2018). Many people around the world depend on small-scale fishing for their livelihoods, which helps to accomplish the first Sustainable Development Goal, which is to reduce poverty (Said & Chuenpagdee, 2019). Many developing countries depend heavily on small-scale fishing for both food production and income generation in their coastal communities. In 2018, the primary sector of fisheries and aquaculture engaged an estimated 59.51 million people. Nevertheless, fourteen percent of them were women (Bartley, 2022). A slight increase from 2016 showed 38.98 million persons employed in fisheries and roughly 20.53 million in aquaculture. Asia has the largest overall population of fishers and aquaculture workers (85 percent of the world total). More women work in aquaculture (19%) than in fisheries, which has a lower percentage of female employees (12 percent). Overall, women are a vital part of the entire fish value chain, providing work in both commercial and artisanal fisheries (Solano et al., 2021).

Women operate as small-scale entrepreneurs where relevant technologies and resources are available, especially in household-level cottage businesses (Patil & Babus, 2018). Also, estimates for 2019 indicated that overall trade value decreased by roughly 2%, both in quantity and value, from the previous year. In 2020, the coronavirus disease outbreak (COVID-19) had already exerted a negative influence on trade among important exporters and importers (Fernandes, 2020). An estimated 179 million tonnes of fish were produced worldwide in 2018. A total of 156 million tonnes were used for human consumption, which is equivalent to a per-capita annual supply of 20.5 kg.

Fifty-six percent of the total production and 52 percent of the fish for human consumption were produced by aquaculture (Thu, 2022).

In 2018, production from all global catch fisheries increased by 5.4 percent over the average of the previous three years to 96.4 million tonnes, the greatest level ever recorded. The increase in 2018 was mostly driven by the marine capture fisheries, whose production increased to 84.4 million tonnes in that year (Action 2020). Almost half of the entire global capture production was produced by the top seven countries which are China, Indonesia, Peru, India, the Russian Federation, the United States of America, and Viet Nam. Anchoveta catches by Peru and Chile made up the majority of the increase in catches in 2018, after this, species had seen relatively low catches in recent years, making it the leading species with over 7.0 million tonnes caught (Lєкк et al., 2023).

Alaska Pollock was second, at 3.4 million tonnes, while skipjack tuna ranked third for the ninth consecutive year, at 3.2 million tonnes. Small pelagic fish made up the majority of the overall marine catch, accounting for about 85% of the production, followed by gadiformes, tuna and tuna-like species, and small pelagic fish (Thu, 2022). Catchings of tuna and species that are similar to tuna have continued to rise year over year, peaking in 2018 at over 7.9 million tonnes, primarily as a result of captures in the Western and Central Pacific (Griffiths et al., 2020).

In many countries where food security is a concern, fish is a significant source of protein and revenue. For at least 30% of their animal protein needs, 60% of people in developing countries rely on fish, making it a significant food source (Béné et al., 2015). In comparison to other protein sources, fish is

frequently less expensive and more easily available. In some island and coastal countries, fish accounts for up to 70% of the population's protein consumption (Abane, 2015). Fish is an abundant source of nutrients and minerals that are essential for good health and the growth of the brain and body (Belton et al., 2022). Small-scale fisheries disruption has a number of detrimental repercussions on the livelihoods of fishing families, people who make nets and boats, and people who sell fish. Small-scale fishing communities are acknowledged to be among the most vulnerable due to limited institutional and human capabilities (Azmi et al., 2021).

Small-scale fishermen most frequently employ big dug-out wooden canoes along the coast of west Africa (Ameyaw et al., 2021). In West African regions, fishermen also share sociocultural and institutional traits, such as increased population growth, which are related to the high labor needs of fishing and activities closely related to fishing (Aheto et al., 2012). Developing nations like India, and Indonesia are among the top nations in the world for fish production (Raja et al., 2019).

In Central and Western Africa, there are approximately 227,000 full-time fishermen who depend on the industry for their survival. The 570,000 tonnes of catch produced each year generates an estimated profit of $295 million (Wijsman et al., 2019). Fish exports were US$85.9 billion in 2006, more than half of which came from developing nations (Massaroli et al., 2021).

Furthermore, stressors are environmental and socioeconomic changes or occurrences that endanger the fishing industry or fishermen on a local, national, or international scale (Freduah et al., 2019b). Small-scale coastal fisheries are particularly susceptible to a number of stressors, such as poor

governance, lack of alternatives to the fishing industry, overfishing, and diseases. Ineffective management, poverty and malnutrition in fishing communities, pressure from industrialization, and global developments like market shifts and climate change are just a few of the challenges that small-scale fisheries encounter (Schuhbauer et al., 2017).

Fish stocks off the coast of West Africa have been falling over the previous ten years, making small catches the norm for artisanal fishermen (Atta-Mills et al., 2004). Even though fish stocks in West African seas have recently declined, the region's waters have historically been among the most productive in the world. This decline has been attributed to overfishing and illegal fishing, especially by large foreign industrial vessels and with the support of harmful fisheries subsidies (Macusi et al., 2020). Small-scale coastal fisheries are characterised by essential traits such low income, poverty, poor governance, a lack of alternative employment alternatives, and disease, particularly in developing countries (Freduah et al., 2019b).

As a result, the SSFS is vulnerable to a variety of climatic and non-climatic stresses (Bennett et al., 2015). Examples of climatic stressors include intense storms, strong winds, and waves, as well as ocean acidification, sea-level rise, and increased sea surface temperature. Non-climate pressures include activities like overfishing, governance issues, competition with other resource users, government negligence, and apathy (Freduah et al., 2018).

Ghanaian Fisheries

Ghana is a west African country with 550 km of coastline and a very narrow continental shelf (Pabis et al., 2020). Ghana's marine fishing industry is divided into three primary subsectors: small-scale (artisanal or canoe), semi-

industrial (inshore), and industrial (Nyemah et al., 2017). Ghana has a long history of being a small-scale fishing nation, dating back to the Fante fishermen who started marine fishing off its coast in the 1700s and 1800s. The primary source of income for Ghanaians living in coastal communities is fishing (Nyemah et al., 2017). The fishing sector in Ghana, which includes both marine and inland fisheries, has contributed between 4.2% and 0.5% of the nation's GDP, or 2 to 7% of agricultural GDP, over the past 20 years (Nunoo et al., 2015). It is crucial to acknowledge Ghana's reliance on fish and fishery products for subsistence and the fight against poverty. According to estimates, 2.6 million people, or approximately 10% of the country's 26 million inhabitants, rely either directly or indirectly on fish resources (Millán, 2019).

In Ghana, artisanal fishing contributes for 70-80% of the country's yearly marine catch. The major species that are caught are burrito, mackerel, sardinella, and anchovy. There are about 124,000 artisanal marine fishermen in Ghana and 11, 200 canoes operate out of about 300 landing locations, with the exception of the improved landing facilities at Tema, Elmina, and Sekondi/Takoradi, most of these landing locations are sandy beaches without any infrastructure. The fishermen employ a variety of fishing equipment, such as drifting gillnets, set nets, beach seine nets, purse seine nets, and hook and line (Afoakwah et al., 2018). About 50% of the dugout canoes have outboard motors with up to 40 HP of engine power. Almost 90% of all landings of small pelagic fisheries each year are from the artisanal sector (Ba et al., 2017). In Ghana, artisanal fishing is organized with a gendered division of labor. Fish harvesting is done by men, but women play a major role in activities like processing, storage, and trade (Mutimukuru-Maravanyika et al., 2017).

Ghana's marine fishery has been experiencing continuous decline in landings over the last two decades (Asiedu et al., 2021). Annual landings of small pelagics, especially sardinellas which form the backbone of the fishery have currently dropped below 20% of the historical highest catch of 140,000 mt recorded in the year 1981, and risks a near-collapse (Tall & Failler, 2012). Given that the sector provides direct and indirect employment for approximately 10% of the country's nearly 30 million population, an unfortunate collapse of the sector would have a multiplicity of damaging consequences for the country and the Sub-region at large. Due to their significant contribution to the nation's 70% marine fish production, the numerous artisanal small-holder fishing communities along Ghana's 550 km of coastline stand to be the most negatively impacted by growing unemployment, loss of livelihoods, and increasing poverty (Okyere et al., 2020).

This decline has reduced the country's ability to meet local demands for fish, and has diminished the job opportunities and food security of thousands of Ghanaians, especially coastal dwellers (Freduah et al., 2019b). The governance of fisheries resources has remained particularly challenging because fishing as traditional livelihood in Ghana dates back to centuries and has evolved tremendously on the scale of operation from subsistent use of dug-out canoes to commercial industrial trawl fleets and sophisticated fishing equipment (Okyere et al., 2020).

Outboard motors have increased turnover and made the fisheries sector more efficient by facilitating and accelerating movement over the water. However, since the introduction of the heavily subsidised fuel in the 1990s, there have been a number of issues with the allocation, distribution, and sale of

premix fuel (Owusu & Adjei, 2021). The first plan was to make sure that premix fuel was readily available to fishermen at a reasonable cost. Additionally, it was to give the fishermen control over the premix fuel sales stations on the landing beaches. In Ghana, a lot of fishermen complain about the expensive premix fuel, politicisation, smuggling and inconsistent availability (Kojima, 2016).

Brief Explanations of the Conceptual Framework

The processes simply explains the steps the institutions use in making decisions in order to achieve a particular goal. Institutions according to the United Nations Development Program need to practice the principles of good governance to promote accountability and national unity (Halvorsen, 2013). The decision-making processes are examined against the indicators of good governance. Some of the principles of good governance are Transparency, effective, equity and accountability. Governance is a decision-making process through which the affairs of an institution are administered (Graham, et al., 2003)

Premix fuel "governance" in this context describes the processes that governs the distribution of premix fuel to fishermen and how decisions are made at the local level in the various fishing communities. It also describes how the decision makers are held transparent in the management and distribution of the product to fishermen in Ghana**.**

In the context of this study, these affairs include resource allocation, in this case, premix fuel to local fishers by the government through the National Premix Secretariat of the Ministry of Fisheries and Aquaculture Development. The governance institutions constituted by decision-makers include the National Premix Secretariat, the National Premix Committees, and the landing

Beach Commitees among others. Moreover access to premix fuel is influenced by social, political, and economic factors (Owusu & Adjei, 2021).

In reference to figure 1, the political factors can be explained as people who belong to the same political party hence the political foot soldiers take over premix distribution in the various communities. The social factors has to do with fishermen who are related to the LBCs in a form of family ties or friendship. Economic factors has to do with fishermen who are economically powerful and are able to bribes the L.BCs to give them more fuel than what they are supposed to get or buy (Owusu & Adjei, 2021).

Also, the next stage is the outcome stage which could be positive (more acces to premix) or negative (limited or no access). Fishers who always get more premix fuel anytime it is sold as a result of their political or social relation with the committee members spend much time on sea, which may lead to overfishing and then a further fish stock decline.

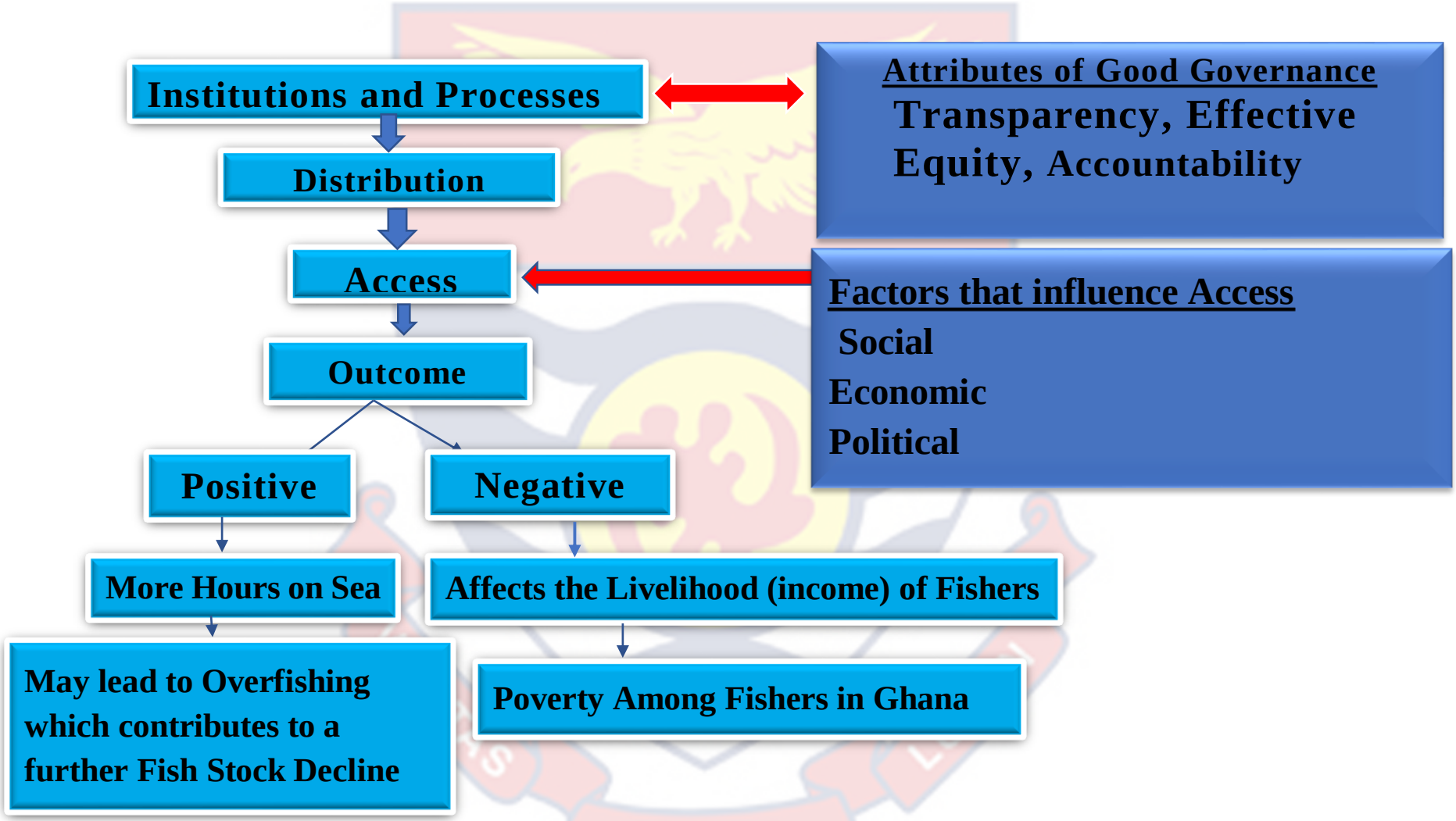

Figure 1: Conceptual Framework adapted from (Bennett et al., 2018).

Fisheries Subsidies

Fisheries subsidies refer to the practice of governments providing direct or indirect financial and non-financial support to the fishing industry (Schuhbauer et al., 2017). According to Tambutti & Gómez, (2020), a fishery subsidy is defined as "a financial contribution from the public sector that provides private benefits to the fishing sector. Subsidies can be used to fund a range of initiatives and projects, including management, research, oversight, infrastructure, tax breaks, fuel, vessel purchases, and direct remuneration supplements.

Globally, fisheries industry subsidies are reportedly worth USD38 billion as at 2018. Thirty percent (30%) are beneficial (good), 60% are capacity-enhancing (bad), 10% are ambiguous (ugly). Thus, it is generally acknowledged that global subsidies primarily cause overfishing, costing $55 billion annually in potential benefits if fisheries were managed at economically appropriate levels (Cisneros-Montemayor et al., 2016).

In order to boost production and reduce the cost of fishing operations and related activities, some countries implemented a number of subsidies in their fisheries sector. Beneficial subsidies are the kind that encourage management, conservation, fisheries monitoring, research, and science in order to boost the expansion of fish stocks. Programs that lower fishing costs and consequently improve overall fishing effort are referred to as capacity-enhancing subsidies (Sumaila et al., 2019). In an open-access fishery, fishing activity will increase until total costs and total revenues are equal. This is termed as the “Bio economic Equilibrium.” A subsidy lowers the overall cost for all levels of effort, increasing profits immediately after the subsidy is put in

place (Tobey et al., 2016). Despite the fact that government subsidies in the sector vary widely, it is estimated that the global fisheries subsidies range from USD 15 to USD 27 billion (Sumaila et al., 2019).

In both developing and developed countries, capacity-enhancing subsidies outweigh beneficial and ambiguous subsidies by a significant margin (Tobey et al., 2016). There are multiple examples of various fuel subsidy distribution methods from other countries. These consist of government rebates, distributor discounts, and user-owned smart cards (Normanyo et al., 2016).

In Australia, fuel providers can request full grant from the government in exchange for selling fuel to fishing cooperatives they have service agreements with at a discount (Johnson & Libecap, 2019). Malaysia uses an information, communication, and technology (ICT) system to distribute subsidised fuel. The Fisheries Development Authority of Malaysia, which is in charge of enhancing the socioeconomic status of fishermen and fishing communities in Malaysia, manages this system (Almeida et al., 2017). A service is offered to 80,000 qualified fisherman. Fishermen or canoe captains can purchase discounted diesel at specific places across the nation using a "e-diesel" card (Normanyo et al., 2016). There are many examples from other countries of alternative mechanisms for distributing fuel subsidies. These include rebates by governments, discounts by distributors, and smart cards held by users (Normanyo et al., 2016).

About 60% of Senegal's capacity-enhancing subsidies are allocated to the small-scale sector, which includes fuel subsidies and support for artisanal fleets that are already operating at capacity. Climate change-related shifts in species distribution and illegal fishing by domestic and foreign vessels make

the situation worse (Harper & Sumaila, 2019). The small-scale sector could experience short-term challenges in some West African nations like Senegal but long-term gains. If the government keeps providing detrimental subsidies, the supply of fish to women and processors will decline even further, putting their livelihoods and the welfare of their families at risk (Habib et al., 2014). Men would also be impacted, although their incomes are less correlated with expenditure on the education, food, and health of their children.

Subsidies were recognised as a significant concern in relation to sustainable fishing at the World Summit on Sustainable Development in 2002. The effects of subsidies should be assessed in view of how they affect distribution as well as the management and sustainability of marine resources (Sakai et al., 2019). Fisheries subsidies are a crucial source of livelihood assistance, particularly for small-scale, low-income fisheries.

However, a number of studies have hinted at the possibility that overfishing and overcapacity in the fisheries sector are exacerbated by subsidies, undermining sustainable fishery management techniques (Owusu & Adjei, 2021). More people are now able to enter the fishing business, which has led to an increase in fishing effort and a decrease in output per boat. Concerns over the declining marine fish stock in coastal areas, particularly in developing nations, have increased on a global scale (Owusu & Andriesse, 2020).

Further aggravating the problem are fluctuations in species distribution brought on by climate change and illegal fishing by domestic and foreign vessels (Harper & Sumaila, 2019). According to estimates, the GoG provides the small-scale fishing industry with premix fuel subsidies totaling approximately USD 44 million each year (Normanyo et al., 2016). In Ghana's

small-scale fisheries, premix fuel subsidies was implemented in the 1990s to alleviate the nation's high fuel prices and decrease the financial strain on the country's poor and vulnerable fishermen (Okyere et al., 2020). The subsidy is paid from the country's fuel price stabilization levy (Owusu & Adjei, 2021). The premix fuel subsidy ranges from 60% to 70% of the actual market price (Sackey-Mensah et al., 2012). For instance, the market price for a gallon of Premix fuel in 2012 was US$4.77, or US$1.06/liter, while a gallon of premix fuel was offered for US$1.32-1.42, or US$ 0.29-0.32/litre (Sackey-Mensah et al., 2012). Premix fuel costs roughly US$ 1.2 (GHS 7) per gallon as of 2020, whereas the market price of petrol is US$ 4.2. (GHS 25) (Okyere et al., 2020). The premix fuel subsidy is between 60% and 70% of the fuel's actual market price. Premix fuel sales points for people who are not fishermen are multiplying. From 2001 to 2008, the number of sales points increased from 128 to 900 (Normanyo et al., 2016).

Currently, majority of fishermen are vulnerable because of hoarding and diversion of the fuel subsidy (Owusu & Adjei, 2021). There are other subsidies related to fishing, such those for outboard motors and fishing equipment. For instance, the GoG provided 300 outboard motors at reduced prices to Ghanaian fishermen in 2020. 60% of the price was covered by the fishermen, while the government covered the remaining 40% (Tobey et al., 2016). The types of subsidies provided by the GoG have typically been referred to as capacity-enhancing subsidies because they seek to lower fishing costs and increase fishing efforts (Skerritt & Sumaila, 2021). Particularly in table 1, the scientific literature has paid more attention to the distribution of fuel subsidies

as a factor in the overexploitation of fisheries resources that results in lower fish catches and persistent poverty among coastal fishermen (Cao et al., 2017).

Table 1: *Countries with the highest fisheries subsidies with high HDIgroup in 2018 by category (USD Millions), including the European Union. Source: (Sumaila et al., 2019)*

Country	Beneficial	Capacity Enhancing	Ambigious	Total
China	432	5,886	941	7,261
EU	1,523	2,036	244	3,803
USA	2,187	1,136	106	3,429
Korea Rep.	1,635	1,500	50	3,185
Japan	534	2,111	215	2,860
Russian Fed.	294	1,162	54	1,512
Thailand	74	1,069	6	1,149
Canada	388	194	271	853
Norway	278	527	41	846
Spain	150	683	11	844
Taiwan	69	708	10	787

Table 2: *Countries with the highest subsidy within low HDI group in 2018 category (USD Millions), including the European Union. Source: (Sumaila, Ebrahim, Schuhbauer, Skerritt, Li, Sik, et al., 2019)*

Country	Beneficial	Capacity-Enhancing	Ambiguous	Total
Indonasia	309	566	61	936
Viet Nam	214	338	38	590
Morocco	78	208	10	297
Senegal	25	250	20	296
India	83	174	19	277
Pakistan	61	138	11	210
Philippines	41	140	6	187
Yemen	38	136	0	174
Bangladesh	21	91	49	161
Ghana	8	138	2	147

The increased global fishing effort and resultant deterioration of marine fish species result in 50 billion US dollars in annual economic losses. These losses (calculated using an aggregate production model) are specifically caused by the interactions of high and increasing fishing effort, declining fish stocks, stagnant or declining fish prices, and subsidies to fisheries that promote unprofitable fishing and overexploitation (Anticamara et al., 2011). According to FAO (2009), 52% of the world's fish stocks were completely exploited in 2007, 28% were overexploited or depleted, 20% were moderately exploited, and only 1% showed signs of recovery as a result of the increase in fishing activity that started in the 1970s.

Understanding fishing effort globally is crucial for proper fisheries management. Data on fishing effort are however, inconsistent absent, or unavailable for many nations. Therefore, it is important to evaluate the most recent data on fishing effort (at the national level), understand data patterns, identify and fill in data gaps, and suggest changes to the way effort data are stored. These are crucial components for reforming global fisheries, enhancing global fisheries production models, and creating a more effective worldwide fishing vessel record system (Froese et al., 2012).

There are many different types of effort, according to FAO (2015), including the number of fishing vessels, the spatial and temporal intensity of fishing, such as "days at sea," the size and characteristics of fishing gears, such as the number of hooks, pots, or total length of nets, the quantity of fuel supply, and the use of cutting-edge technological aids like fish finders.

Premix fuel in Ghana

The politics, power, and unequal access to fisheries subsidies among Ghana's small-scale coastal fishermen were examined by Owusu & Adjei (2021). Their research expands our understanding of how subsidies for the fishing industry affect the sustainability and management of fisheries. They studied the political mechanisms at work by identifying the winners and losers in the distribution of subsidized Premix fuel and the implications of unequal access to subsidies on declining fish stocks and small-scale marine fisheries governance in Ghana.

About 300 household surveys and 20 in-depth interviews with relevant stakeholders made up the empirical data. Their findings showed that there are major disagreements regarding how fuel subsidies are distributed to small-scale fishermen. The local fishermen are highly asymmetrical in their power relationships. Within fishing communities, asymmetrical power dynamics between the politically connected and less connected people affect access to essential subsidized fishing input, notably premix fuel. Due to reduced fishing activity, decreased catch, frequent outboard motor damage, and increasing illegal fishing, this distributive imbalance has had a negative impact on the livelihood of fishermen. Their study urges policymakers and decision-makers interested in reforming fisheries subsidies to take vulnerable groups' impacts of unequal access to subsidies into account.

Although their study is similar to this research. It did not examine how premix fuel is managed/distributed in the various communities. The study could not look at the effectiveness of the LI.2233 and how it works in the various fishing communities. In addition, the study didn't capture how political party

faithfuls with a greater access to premix fuel were contributing to further fish stock decline in Ghana.

Moreover Okyere et al. (2020) investigated Ghana's fisheries governance. Ghana's fisheries sector is collapsing despite the numerous governance structures, regulatory frameworks, and policy frameworks that have been established for the sector's development. The Far Ban Bo (FBB) project carried out this assessment of the state of fisheries governance to understand complexity from a governance perspective and to identify difficulties and gaps in the fisheries governance systems as successful entry points for the project. The assessment focused mainly on the relationship and level of interaction between MoFAD-FC and fishers at all levels, including community, regional, and national fishers, as well as with NGOs, strategic advisory groups, donor-funded projects of development partners, and the roles these actors play in fisheries governance.

Additionally, the effectiveness of the Fisheries Management Plan (2015 –2019), which focused on influencing inputs (such as reducing fishing fleets, instituting closed seasons and closed areas), and the roles of government in supplying fishing inputs (such as fishing nets, premix fuel, and outboard motors), were evaluated. Of order to identify areas for improvement, this review covered key sections in the Fisheries Act 2002 (Act 625) and other fisheries regulatory frameworks, as well as the efficacy and implementation difficulties. This assessment primarily relied on qualitative techniques like focus groups and structured interviews, along with some quantitative indicators from an online survey. At the community level, data were collected from eight fishing communities covering all four coastal regions of Ghana. Interviews were also

conducted with NGOs, donor projects, fisher association leaderships, FC officials, Assembly members, traditional authority and leadership of other strategic group such as the STWG. Pertinent issues at the community/landing beach levels emanating from this assessment included lack of clear yearly planning by the Chief fishermen and their council of elders to address localised challenges such as poor sanitation along the beaches which was observed to be a major problem in this study. Another issue was the eroding authority of the Chief Fishermen at the landing beaches largely due to their loss of control over distribution of fishing inputs which were previously used as a conduit in exercising some authority over the fishers to control illegalities. At the institutional level, a common problem of all fisher associations including the umbrella body, NAFAG, was the lack of adherence to the constitutional tenure for national executives, leading to their undue overstay in office which have attracted complaints from the memberships.

Due to insufficient adherence to governance and management rules, open access fisheries results in overcapacity and overexploitation (Gilman et al., 2014). Subsidising the most costly aspect of fishing operations will only lead to increased fishing effort, more boats, and a faster degradation of fish stocks. Furthermore, it decreases catch in relation to effort, which lowers income per fishing vessel (Tobey et al., 2016). Actual historical data are consistent with these statements. Between 1991 and 2004, the number of motorized canoes increased by approximately 38% (4,631 to 6,405) and the amount of fuel per ton of fish caught increased from 3 liters in 1992 to 5.3 liters in 1993 (Tobey et al., 2016). By the end of 2015 there were 11,540 canoes registered that is a 45% increase from 2004.

The subsidy programme has faced various problems in Ghana, from the beginning, including fuel diversion onto the black market and hoarding, leaving fishers unable to access it. Mostly, when premix fuel is subsidized and fishermen are supposed to pay approximately 30-40% of the market value, only a fraction of the premix fuel ends up with the fishermen and the rest are diverted. This affects the livelihoods of fisherfolk in Ghana (Kojima, 2016).

According to a report from Okyere et al., (2020), the L.I. 2233 specifies the composition of the landing beach committee (LBC) with the Chief fisherman as the Chair, and while tenure members have a tenure of two (2) years, the Chief fisherman, being the Chair, has no tenure, refer to fugure 2. Surprisingly, in all communities visited, the management of premix had been taken over from the LBCs, and according to the participants of the FGDs, political party foot soldiers and other party members are now running the management of premix fuel. The Chief Fishermen who are supposed to chair the committees currently play a little or no role in premix management at the landing beaches. The action seemed to have been planned and carried out across the country. A respondent noted “It is managed by representatives from the political parties, and the membership has not been stable since it depends on the ruling party. The fishers are not aware that it is a rule or law that there should be party representatives on the premix committee in the community. Another respondent had this to say “For instance we had a landing beach committee in charge of the premix, but right now, they have given it to the NPP party officials to sell”. The fisher folk expressed concerns that this has given a lot of room to smuggling, hoarding and lack of accountability, and contrary to provisions in

the law that the LBC should submit quarterly reports (i.e. render accounts) to the fisherfolk.

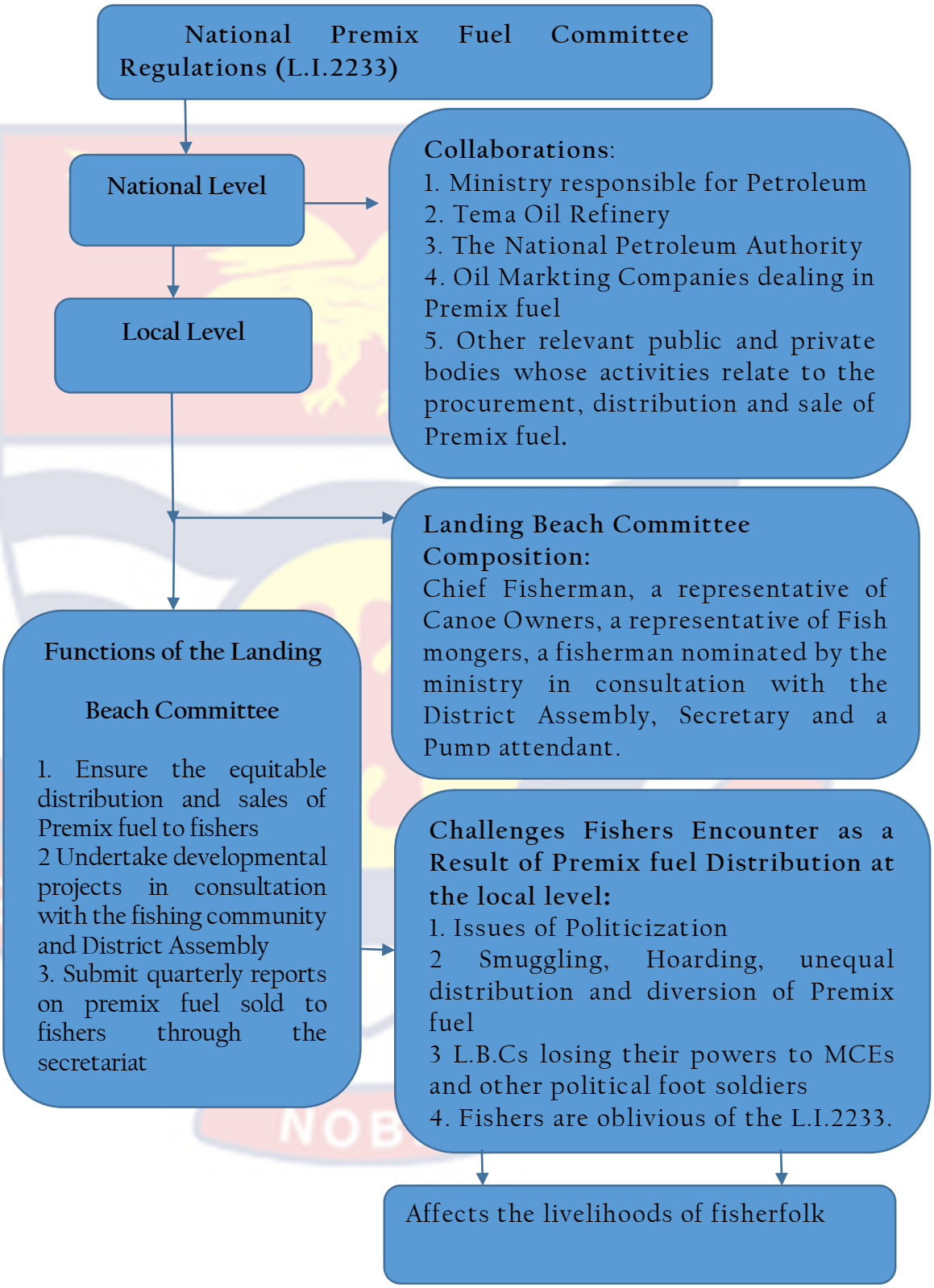

Figure 2: A Summary of the National Premix Commitee Regulations (L.I.2233). Source: (Kwao-Boateng & Gyamfi 2022).

According to a study by Stevens et al., (2013), fishermen are reported using regular petrol and engine oil as an alternative to expensive and scarce premix fuel to power their fishing canoes. However, they countered that the alternative is more expensive to use and reduces the longevity of outboard engines. These exacerbate the dwindling fisheries-based economy, driving many coastal residents into poverty (Owusu & Adjei, 2021). Fishermen also said they commute to nearby fishing locations to buy smuggled fuel, cut back on the number of fishing days, and/or take a break from fishing in order to express their concerns about the fuel situation to the government and request assistance. The government was to sell premix fuel exclusively to the fishermen as their preferred method of action. "We prefer the government to ensure frequent supply of the premix fuel and also eliminate all middle men from its distribution," said one respondent (Stevens et al., 2013).

In most communities in Ghana, the supply and distribution of fishing inputs have become a major worry to the fishers, especially Chief fishermen as they feel they have been eliminated from the processes. Instead, political foot soldiers (political party faithfuls), the MMDAs, MMDCEs and external committees have taken over administration and distribution of these inputs which hitherto were done by the Chief fishermen or with their involvement. These have sometimes resulted in conflicts between the Chief Fishermen or Landing Beach Committee members and individuals of political affiliations they perceived are taking up their roles or mandates, and either traditional authorities or MMDCEs had to step in to resolve the problems (Okyere et al., 2020).

Furthermore, the high price and limited availability of premix fuel, decreased catches, competition from the oil and gas industry, confiscation of monofilament nets, and the regular occurrence of algal bloom all contribute to a decline in fishers' capacity to support themselves (Freduah et al., 2017). In contrast to the past, today's fishermen spend up to twice as much on premix fuel to go fishing in an environment where fish stocks are declining, leading some to experience low profits from fishing while others have given up. Fishers are spending a large portion of their earnings on fuel, which contributes to the problem of low profitability in addition to declining catch rates (Anderson et al., 2019).

According to Freduah et al., (2019a), the government subsidized premix fuel as a method of assisting fishermen. However, respondents said that non-fishers would purchase and resell the fuel at inflated costs to fishermen.The following quote is descriptive: Non-fishers purchase the Premix at a lesser price from the source and keep it. They then sell to us twice as much as they originally bought it. The middlemen will charge us GHS 500.00 (US$155) for the same amount of fuel that we might purchase from the government for approximately GHC 200 (US$62). It is distressing to learn that we fishermen now pay drivers a significant price for Premix. Even the chief fisherman finds it difficult to get Premix fuel at the subsidised price (A fisher, New Takoradi, January 2015).

In the situation where the fishers do not enjoy the subsidies due to inflated prices emanating from the artificial shortage by hoarding, some fishers support the scrapping of the subsidy. On the other hand, they believe that a frequent supply of the fuel would discourage hoarding. All other stakeholders

believe the subsidy is not reasonable for a collapsing fishery. However, the major problem is the conflict between the representative of the District Assembly (a direct political appointment at the level of the presidency) and the Chief Fisherman who is the designated Chairman of the Landing Beach Committee (LBC) (L.I.2233) that oversees the sales of Premix fuel at the landing beaches. In many instances, the chief fishermen are rather subdued by the District Assembly reps who control the sale of premix fuel to fishers, and sometimes non-fishers, who are political party sympathisers who hoard and resell at higher prices. This has resulted in pandemonium and near arson at some distribution landing beaches. There is the urgent need to consider removing the subsidy on premix fuel and reconstitute the LBC to include a representative of an oil marketing company (OMC), an insurance company (IC), and the Fisheries Commission, without the District Assembly rep. The Chief Fisherman remains chair of this committee and the representatives of canoe owners, fish mongers and a nominated fisherman are maintained as well in accordance with the L.I. 2233 (Okyere & Chuku, 2020).

Furthermore, poor governance is a problem faced by small scale fishers (Jentoft & Chuenpagdee, 2015). Despite the multiple governance structures, regulatory frameworks, and policy frameworks that have been established for the sector's development, Ghana's fisheries sector is collapsing (Okyere et al., 2020). Also there are tangible reasons for persistent decline of the fish stocks have been attributed a vast array of management and governance issues including overcapacity, overexploitation, inappropriate fishing methods, non-compliance and weak enforcement, all due to weak management and governance systems (Okyere et al., 2020). The governance of fisheries

resources has remained particularly challenging because fishing as traditional livelihood in Ghana dates back to centuries and has evolved tremendously on the scale of operation from subsistent use of dug-out canoes to commercial industrial trawl fleets and sophisticated fishing equipment. Aside the governance structures, the fishery is regulated by a series of Acts of Parliament, fisheries regulations and their amendments. Historically, there have been changes in fisheries Acts and regulations since 1960. However, the current legal frameworks that govern the fishing industry are the Fisheries Act 2002 (Act 625), along with its Fisheries Regulations, 2010, Fisheries (Amendment) Act, 2014 (Act 880), and the Fisheries (Amendment) Regulations, 2015 (L.I 2217).

Although the Ghana's Food and Agriculture Sector Development Policy (FASDEP II) is one of the existing policies with focus on developing fisheries sector especially inland fisheries, the Fisheries Management Plan for Ghana – Marine Sector (2015-2019) is the most popular government fisheries sector policy in the country aimed at the sustainable development of the fishing industry and fisheries in Ghana. Ghana's fish stocks continuous to decline in a very precarious state despite the existence of all these governance structures, legal and policy frameworks, and the small pelagic fishery, which is the backbone of artisanal small-holder fisheries, is currently on the verge of collapse (Okyere et al., 2020).

Moreover, good governance involves some key principles which are transparency, accountability, adherence to rule of law, control of corruption, equitable, effective, robust, transparency and subsidiarity, thus these principles are weak in Ghana's small scale fisheries governance (management) sector (Addink, 2019). The governance structures in the small-scale fisheries sector in

Ghana are not strong enough and also not transparent as well (Jentoft, 2019). It can be challenging and debatable to define what constitutes good governance. With a few minor alterations, the United Nations Development Program (UNDP "Governance and Sustainable Human Development, 1997") lays forth a set of concepts that are found in most of the literature (Graham, Amos, et al., 2003).

The 1997 UNDP lists the following five good governance principles: Legitimacy and voice. Participation is necessary for legitimacy and voice. All men and women ought to be able to express their opinions in the decision-making process, either directly or through reputable intermediary institutions that stand in for their interests. Freedom of association and speech, as well as the ability to contribute constructively, are the foundations for such widespread participation. Consensus orientation – good governance mediates differing interests to reach a broad consensus on what is in the best interest of the group and, where possible, on policies and procedures.

Furthermore, direction is a fundamental aspect of good governance. Strategic vision leaders and the general public need to have a wide and long-term perspective on good governance and human development, as well as an understanding of what is required for such development, in order to have direction. The historical, cultural, and social complexity upon which that perspective is based is also understood.

Performance, the performance explains responsiveness thus institutions and processes and how they try to serve all stakeholders. Effectiveness and efficiency – processes and institutions produce results that meet needs while making the best use of resources.

Accountability Accountability is the evaluation of implementation or performance process of the organization to be accountable and responsible as well as feedback for the leadership of the organization. It is hoped to improve the performance of the organization in the future. The concept of accountability is distinguished into three kinds, namely accountability, responsibility and responsiveness. Accountability is a concept relating to external standards that determine the truth of an action by the state administration or public bureaucracy. Accountability assessed by outside persons or institution.

Concept of Livelihoods

The skills, resources (including financial and social resources), and activities necessary for a living are together referred to as a livelihood. When a way of life is sustainable, it can withstand stress and shocks, recover from them, and retain or improve its capacities and resources both today and in the future without compromising the natural resource base (Chambers & Conway, 1992). The resources (natural, physical, human, financial, and social capital), the activities, and the access to these resources (mediated by institutions and social connections) are collectively referred to as a person's or household's means of subsistence.Taken together, these definitions reveal that livelihood is a multi-facetted concept, being both what people do and what they accomplish by doing it, referring to outcomes as well as activities. According to Niehof, (2001), the concept of a system that may be conceptualized as containing the following parts is used to define livelihood. Resources and assets are inputs. output: a living, The goal is to have a sufficient income to cover basic expenses (Chambers & Conway, 1992). Activities: selecting the components of a portfolio of livelihoods.

Agency is the pursuit of a sufficient means of subsistence by households and individuals. Quality: The degree of the created livelihood's sustenance's vulnerability. Environment: the setting in which the livelihood system interacts with other institutions and systems. The home serves as the primary source of income.

Chapter Summary

The impact of climatic and non-climatic stressors on the small-scale fisheries industry globally have been reviewed in the literature. This chapter has also reviewed literature on the global and local fuel subsidy regimes hence, the contributions of subsidies to the livelihoods of fisherfolk. Additionally, an evaluation of the effects of fisheries subsidies on fishing efforts/activities in particular has been conducted.This will have an impact on this research by providing more insight and a better understanding of the problem.

CHAPTER THREE

MATERIALS AND METHODS

Introduction

A full description of the complete research process is given in this chapter. It gives details on the design and execution of the study. Before moving on to the research methods (mixed method), it begins with a brief assessment of the research strategy and study areas. It covers areas such as the polulation of the study sites, choosing an appropriate sample size, sampling techniques, data collection tools, ethical considerations, pretesting, how research assistants were trained, field challenges, data processing, and analysis.

Research Design

There are a lot of qualitative research design some of which are Ethnography, phenomenology, Case study and grounded theory (Singer, 2009). The phenomenology was adopted for the qualitative design since the research seeks to understand the experiences of the fishers in Ghana. The meanings of the experiences that a person or group of individuals have had with regard to a particular notion are described by phenomenology (Norlyk & Harder, 2010). Phenomenology is the study of human experience, including how things appear to us and how these things shape our perception of them (Van Manen, 2016). The qualitative research objectives for this study are to assess the governance structure of premix fuel at the local level in Ghana and also to examine the effectiveness of the legal framework governing premix distribution in Ghana. For the above objectives to be achieved, the experiences of fishers in the various fishing communities on the use of the subsidised fuel must be known. In addition, the advantage of using phenomenology for research is that, it helps in

regaining a thorough understanding of particular occurrences and offers rich information based on personal experiences. The fact that the data is subjective and it is challenging to demonstrate the accuracy of the information is a limitation of the phenomenological design.

For the quantitative approach, the cross-sectional survey design was adopted because, in a cross-sectional study, data is collected from many different individuals at a single point in time (Ning et al., 2020). Convergent mixed method approaches were used where pragmatism was adopted as the philosophical approach for the study. Pragmatism is one that is rational, logical, and centered on dealing with actual situations as opposed to abstract ideas (Kaushik & Walsh, 2019).

Pragmatism offers a path to the truth through analyzing preconceptions and notions (James, 2020). One strength of pragmatism is that, it deals with problems in a practical way rather than using theory or abstract principles (Sundin & Johannisson, 2005). The pragmatism may ethically influence the research in the sense that, it may offer a way to evaluate beliefs and to find the truth which some respondents may not be willing to open up. The variables will be measured as they naturally occur. Researchers using pragmatism are free to choose the methods, procedures and techniques of research that are more suitable for them to reach their research objectives. Pragmatism, according to researchers, opens the way for a variety of approaches, viewpoints, and presumptions, as well as various ways of data collecting and analysis (Singh, 2019).

Study Area

Ghana's Western, Central, Volta, and Greater Accra regions were the selected sites for this study. These communities were chosen for their significant contributions and strong reliance on small-scale fishing as a source of income (Owusu & Andriesse, 2020). The research areas were chosen because they have some socioeconomic activities (small-scale fishing) in common as well as their perculiar differences. The study sites were chosen based on environmental, political, and socioeconomic considerations. One of the variables considered was whether the population is a native or immigrant one.

There are concerns about declining fisheries livelihoods due to a lack of or unequal distribution of premix fuel for fishing activities, as well as the fact that fishing and its related activities constitute the main economic activity in the selected communities (Owusu & Adjei, 2021). Axim, is part of the 186 coastal fishing communities in Ghana with the most fishing activities. Axim is the capital of the Nzema East Municipality (Adjei & Overå, 2019). With 13 fish landing beaches, fishing is the people's primary industry (Okyere et al., 2020). Geographically, Axim, which is in the western region and lies at (4° 52' 11" N, 2° 14' 25" W) is also a largely migrant community. Illegal fishing and uneven premix fuel distribution were the two primary problems in Axim that were discovered (Owusu & Adjei, 2021).

In Ghana's Central Region, north-east of Cape Shore, is a small coastal commumity called Abandze which is closer to the country's Atlantic Ocean coast. Abandze falls under the Mfanteman district of Ghana. In Abandze, the two major problems reported were politicisation in the distribution of premix

fuel and massive fish stock decline as aresult of bad fishing practices and the industrial trawlers.

Old Ningo is around 40 kilometers from Accra, the capital of Ghana, and about 15 kilometers east of Tema. Geographically, Old Ningo is located at 5.7149° N and 0.1062° E. Also, Kedzikope is a fishing community in Keta, Ghana. The location of the community is 5°55'00.0"N 0°59'00.0"E. The people of Kedzikope are largely natives. For Old Ningo, the major problems reported were inadequate supply of premix fuel to the community and also massive politicisation in the distribution of the fuel. The people of Old Ningo constist of noth natives and migrants.

Kedzikope is a small fishing community located very close to Keta, in the volta region of Ghana with coordinates of 5°55'00.0"N 0°59'00.0"E. The people of kedzikope are indigenous people. The community is a small-scale fishing community and the major problems reported were high tidal waves and scarcity of premix fuel in their community.

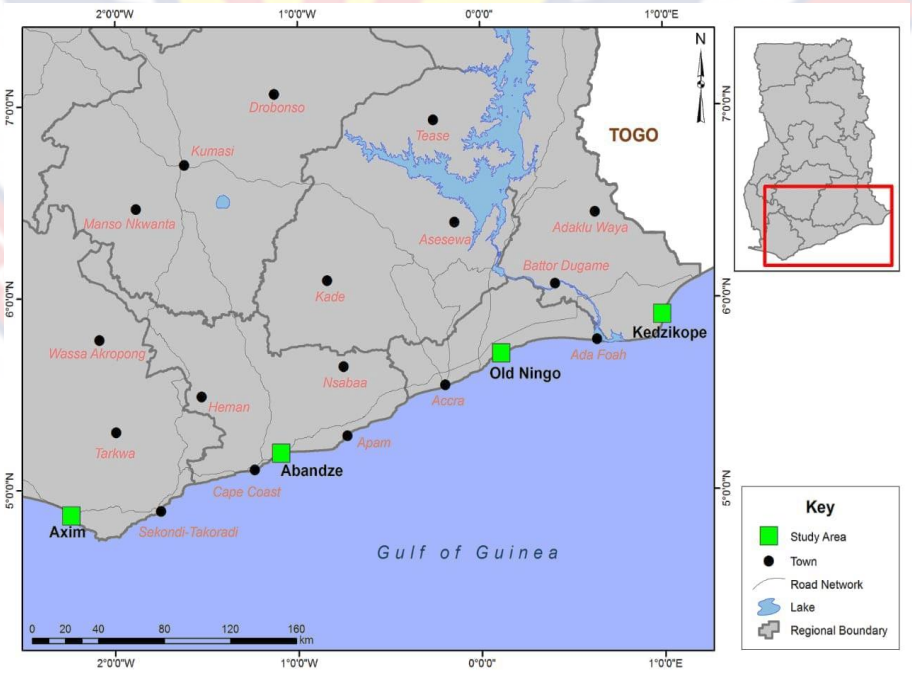

Figure 3: Map of the study area

Population

The quantitative part of this study focused on fishermen, specifically household heads and fishmongers who had canoes. This is because, they have more experiences on the use of the subsidised premix fuel. The qualitative phase of this study focused on Canoe owners as well as Captains, crew members, fishmongers, assembly men and the stakeholders at National Premix Secretariat of Ghana. These people were selected for the qualitative study because, they have more experiences on the governance structure or processes of premix distribution in Ghana.

Abandze is one of the study areas selected for the study. The town's population was 3,632 in 2010. There are 1,741 males and 1,891 females. There are about 981 household in the community. Most of inhabitants in the Abandze community have lesser educational backgrounds. For example Secondary and primary level of education. The majority of residents in Abandze engage in the fishing and fish-related activities. The people of Abandze are indigeneous people (Anim & Nyarko, 2017).

Axim is a coastal town and the administrative center of the Nzema East Municipal district. West of Cape three Points, 64 kilometers away from the port city of Secondi-Takoradi. Axim had a population of 27,719 people as at 2013. There are about 5,001 household at axim. The main occupation of the people is fishing and fish related works, also the people of Axim are both migrants and indigenous people or local indigens (Owusu & Adjei, 2021).

Old Ningo is part of Shai Osudoku district and a coastal community in Ghana. Old Ningo has a population of 204,673 as at 2021. The age groups of the area is from 0-14 years which has a population of 34,185, 15-64 years has a

population of 50,972 and 65years and above, 4,230. The occupation of the people in Ningo prampram is farming, fishing and trading (Ning et al., 2020).

Kedzikope is a fishing community in the Keta Municipality of the volta region. Keta has a population of about 23,207 as at 2013. The majority of people living in Kedzikope work in the fishing and fish-related activities (Okyere et al., 2020).

In addition, the total number of registred canoes for the study communities were derived from the Fisheries Commission located at Axim in the western region of Ghana. Moreover, the respondents used for the quantitative survey were not selected for the qualitative study so as to avoid homogenity. Also the accessibility population reflects the characteristics of the target population but limited most of the population from 0-14 years since most of them are school children thus not fishermen.

Sampling Procedure

The sample size was determined using the Taro Yamane formula (1967). The formula is $\mathbf{n} = \frac{\mathbf{N}}{(\mathbf{1+N(e)2}}$. The n, signifies the sample size, N signifies the population under study, (e) is the margin of error (95 percent confident interval) which is 0.05.

Also, the larger the sample size, the smaller the margin of error. Larger and a representative sample sizes allow researchers to control the risk of reporting false-negetive findings (Hospital, 2015). The probability sampling method specifically the systematic sampling method, was used for the quantitative phase of the study. The systematic sampling was selected to obtain a good interval length results, minimize errors and also avoid data manipulation. Correspondingly, a household head was interviewed in every

fourth house in the study communities. In addition, the systematic sampling procedures are based on precisions and free from favoritism (Marchi & Taylor, 2018).

With reference to Table 3 and 4, the sample size obtained from the selected communities were guided by the number of registred canoes in the various communities under investigation. There are big and small canoe types in the fishing communites. To get the total number of fishermen, the total number of fishers a canoe loads per trip for a fishing expedition was multiplied by the total number of registred canoes in the community. For example the bigger canoes are able to contain about 15-18 fishermen for a fishing trip while the small canoes take from 3-4 people. The registered Canoes was used because, it was difficult to obtain the total number of fishers in the communities since fishing is an open access venture and anyone could join provided one has the requisite experience and fishing tools to work with (Owusu & Andriesse, 2020). In all, out of 8,723 fishers, a total sample of 1,161 was derived as the sample size for the four study communities namely (Axim, Abandze, Kedzikope and Old Ningo).

Table 3*: Sample size determination for the selected fishing communities*

Communities	Registered Canoes	Total Number of Fishermen	Sample Size (Taro-Yamane1967)
Axim	613 Big Canoes: 367 Small Canoes: 246	5,896	374
Abandze	156 Big Canoes: 46 Small Canoes: 110	1,768	325
Kedzikope	53 Big Canoes : 35 Small Canoes: 18	600	240
Old Ningo	87 Big Canoes: 46 Small Canoes:41	500	222
Total			1,161

Table 4*: Sample size calculations using the Taro Yamane (1967)*

Study Site		Sample Size (n)
Axim	$5,896/1+5,896(0.05)^2$	374
Abandze	$1,768/1+1,768(0.05)^2$	325
Old Ningo	$500/1+500(0.05)^2$	222
Kedzikope	$600/1+600(0.05)^2$	240

Data Collection Instruments

The focused group discussion guide and the in-depth interview guide were used for the qualitative study while the structured interview was used for the quantitative study.

The instruments were deleveloped by the researcher based on the study objectives as shwn in appendix A. Literature such as Normanyo et al., (2016) also informed the content of the research instruments. The instruments were structured into various sections based on the study objectives. The first section was on the socio-demographic information. The second section looked at the general knowledge on premix fuel subsidies in Ghana. The third section was about the relationship between premix fuel use and fish catch. The last section focused on the contribution of the subsidies on the livelihood (income) of fishers which is the last objectives of this study.

Ethical Consideration

To ensure confidentiality, participants were not asked to give any information that could reveal their identity. The identity of the participants were not included in the report. The consent form was read to the participants to indicate their willingness to participate in the research. Also, participants were allowed to withdraw from the research on their own will at any time. The taking of still images was used to capture the real situation in an unbiased way (Yeboah, 2008). Prior to commissioning the study, the University of Cape Coast Institutional Review Board's (UCCIRB) ethical permission was requested for all research protocols. The research was reviewed for ethical soundness and approved with the clearance Identification (ID) number as (UCCIRB/CANS/2022/11).

Pre-Testing

The structured interview was pre-tested with some few fishermen and fish mongers who were picked randomly at Esikado in the Western region of Ghana. The community was chosen because, it is very similar to the population

of the study communities. During the pre-testing, it was noted that the options provided for some questions were either inadequate for inappropriate. The results were then coded and imputed into the SPSS software to determine the reliability. The reliability was determined in order to check the extent in which the structured interviews were related to each other. A reliability of 0.7 was achieved which explains that, the structured interview was adequate for the study. All the necessary corrections were made before embacking on the field work.

Training of Research Assistants for the Study

The role of a research assistant is to help collect research data organize information or maintain records for a project (Bell & Waters, 2018).

The main purpose of hiring research assistants for this study was to help conduct field activities, for example to assist in data collection and support with logistic errands. Four research assistants were hired for the entire study. Three of the research assistants were hired from the University of Cape Coast, and one was recommended by an assembly man in one of the communities. Each of the assistants had a tertiary education. The assistants were trained for a week on how to collect data using the Kobo collect technology, how to relate to respondents, and the various ethical issues and considerations in research.

Data Collection Procedures

The data collection for this study started from 1st june and ended on 25th of July 2022. Mixed methods specifically the convergent approach, was used where the qualitative and quantitative data were all collected and analysed at the same time. The study used the mixed because, the research seeks to understand and explain the key issues related to the governance structure of

Premix fuel in the selected communities in Ghana. An advantage of the convergent mixed method is that, it saves time and resources. With reference to table 5, the study used 1,151 respondents for the structured interviews nineteen Focus Group Discussions (FGD's), and ten in-depth interviews to solicit information from respondents. The study employed the structured interview technique because, most of the people in the fishing communities are semi- literates hence the instrument was read to respondents for them to answer. Researchers answered the questions word for word from what the respondents said (Kallio et al., 2016). The Focus Group Discussion Guide was also used for the various focused group discussions. An in-depth interview schedule was used for institutional leaders and (key informants) to help derive relevant information for the study (Wilson et al., 2016).

Furthermore, the non-probability sampling technique specifically the purposive and snowballing technique, were used to select key informants for the study. The purposive sampling was adopted to identify fishermen and other stakeholders who had in-depth knowledge on the premix fuel governance structure in Table 5. The snowballing was also used to help identify the fishers who could provide more information about the study.

Table 5: *A summary of the number of interviews held in the selected communities*

Study Area	Approach	Total Number of Interviews Held	Purpose of Approach	What Informed the Sample Size
Axim	In-depth Interviews and F.G.Ds	In-depth interviews=5 F.G.Ds=6	To assess the governance processes of premix distribution	Saturation point
Abandze	In-depth interviews and F.G.Ds	In-depth interviews=4 F.G.Ds=4	To assess the effectiveness of the L.I.2233	Saturation point
Kedzikope	In-depth Interviews and F.G.Ds	In-depth=5 F.G.Ds=4	To assess the governance Processes of Premix fuel distribution in Ghana	Saturation point
Old Ningo	In-depth and F.G.Ds	In-depth=5 F.G.Ds=5	To assess the effectiveness of the L.I2233 and the contributions of the subsidy to the income generation of fishers	A point at which no new information arises.

Challenges on the Field

Some challenges were experienced on the field, some of which included the inability of fishermen to read and write. So the structured interview was read to fishers where resposes were typed accordingly. Also, most of the

fishermen have an area they meet and converse almost every morning. So, the systematic sampling was quite difficult because, it was not easy to meet some of them in their houses. Some of the fishmongers were not ready to participate in the research. Their excuses were that, many students come to their communities to conduct research but they don't see any improvement in their situations. This presuppose that, research fatigue has set in.

Data Processing and Analysis

In assessing the governance processes and the effectiveness of the L.1.2233, the thematic analysis was adopted for the qualitative approach. Thematic analysis is a method for systematically identifying, categorizing, and offering insights into the recurring themes and patterns (theme) in a dataset. TA, which concentrates on meaning across a dataset, allows the researcher to see and comprehend communal or shared meanings and experiences. Finding particular and peculiar interpretations and sensations that can only be found in a single data item is not the goal of TA (Braun & Clarke, 2019). Thematic analysis was used for the qualitative analysis in this study because it provides a method for conducting qualitative research that teaches how to systematically code and analyze qualitative data, which can then be connected to more general theoretical or conceptual concerns (Clarke et al., 2015).

Another important reason for choosing the thematic analysis for the qualitative study is that, where appropriate, TA provides a means of separating qualitative research from these broader debates and making the findings of the research more widely accessible. TA can be done in a variety of ways since it is adaptable. The three main stages along which qualitative research approaches can be located are inductive versus deductive or theory-driven data coding and

analysis, an experimental versus critical orientation to data, an experiential versus critical orientation to data, and an essentialist versus constructionist theoretical perspective (Clarke et al., 2015).

According to Braun & Clarke, (2019), there are six steps in conducting thematic analysis. Familiarising oneself with the material is the initial stage in the thematic analysis. Immersing oneself in the data requires reading and rereading textual data (such as interview transcripts or qualitative survey responses), as well as listening to audio recordings or watching video data. The interviews were made in the local dialects of the people. These dialects are Twi, Ga-Adangbe, Fante and Ewe. The interview was listened and transcribed back into English for the thematic analysis.

The generation of codes is the second stage. A code is a word or short phrase that symbolically gives a summative, prominent, essence-capturing, and advocative attribute to a segment of language-based or visual data. Coding is defined as the easy process of finding meaning-filled sections in data and labeling them with codes.There are two types of coding which are the inductive and the deductive coding. Inductive coding refers to a process whereby the researcher reads and interprets raw textual data to develop concepts or themes.

When a researcher uses deductive coding, they begin with a predetermined set of codes and then apply those codes to newly discovered qualitative data (Rogers, 2018). However, this research adopted the inductive style of coding. The third stage is the searching for themes. Themes captures the very important aspect of the transcribed data. The themes are the very frequent appearing words or phrases relevant to the study. The fourth stage has

to do with reviewing potential themes.The derived themes has to be reviewed by the researcher. The reviewing shouldn't change the meaning of the themes.

The fifth theme is defining and naming themes, which is not far from the fourth stage, while the last phase has to do with producing the report or write up.

Moreover, seven themes were generated at the initial stage of this study but some were similar so were fused together as one theme. Three themes were finally generated in all. Practically for example the role of the chief fisherman, the quantity and quality of premix fuel delivered to the fishing communities were all fused together to obtain inspection of premix fuel as one theme. Hoarding, the issue of politics, transparency, and selling of premix fuel to the middle men all fall under the distribution of fuel among fisher folks. However, handing over to the Landing beach committees is the third theme which was generated.

The second research question for this study is to assess the effectiveness of the legal framework governing premix fuel distribution in Ghana. This objective adopted the qualitative approach specifically the thematic analysis as explained above to obtain the results thus, six themes were generated, which are as follows: fishers oblivious of the L.I.2233, party foot soldiers take over premix fuel distribution, accountability and transparency challenges with regards to premix fuel distribution, smuggling, hoarding and diversion of premix fuel, improper way of handing premix fuel and the proposal from stakeholders in the selection of the LBCs.

Also, secondary data was collected to achieve research objective three (3) which is to assess the relationship between the quantity of premix fuel

supply, number of small-scale fishing canoes and the quantity of fish catch in the small-scale fisheries sector in Ghana. Secondary data was collected from the National Petroleum Authority (NPA) and Fisheries Scientific Survey Division (FSSD) on the quantity of premix supply, quantity of fish catch and number of canoes. Excel was used to run a correlation, regression, and a trend gaph purposely to know the relationship between premix supply and the quantity of fish catch.The research objective four (4) is to assess the contributions of premix subsidy on the livelihoods (income) of fishers in Ghana. The SPSS was used to run correlation and a regression to know the relationship between the expenses made on premix fuel and the corresponding income from fish catch per trip.

The target population for the fourth objective is canoe owners which is fishermen and fish mongers. Some descriptive statistics were also generated with the Excel to support the results of the objectives. Furthermore, the quantity of fish catch was measured in Pans where a Pan weighs about 60 -70 kilogram. Pans were used as a unit of measurement because, it is mostly used in Ghanain fishing communities to weigh and measure the quantity of fish catch (Finegold et al., 2010). Moreover, indepth and F.G.D interviews were conducted to ascertain fisherfolks perception on the use of the premix fuel in Ghana.

Also, the Kobo software was used to collect data. However, the data was imported in to SPSS for cleaning and analysis so data entry errors are very minimal. For easier references, the transcribed Focused group discussions were given some labels. This will provide easier references in the study when the statements of the participants are directly quoted. For example KOP, OLA, BAN and AME.

Chapter Summary

This chapter covered the research materials and methods that were employed in this study. It includes the study areas, the research philosophies, the research design, the data sources, the target population, the sample size, the sampling method, the research instrument, the preliminary survey, data processing and analysis, and ethical clearance concerns. The research limitations are clearly stated in the chapter one of this study.

CHAPTER FOUR

RESULTS

Introduction

The main aim of this study is to assess the governance structure of premix fuel in the small- scale fisheries sector and the contributions of the subsidy to the fish related income of fishers in Ghana. This study also sought to assess the effectiveness of the legal framework governing premix fuel distribution as well as the relationship between premix supply, number of canoes in the small-scale fisheries sector and fish catch.The mixed method approach specifically the convergent design was employed to conduct this research.

Results of Sociodemographic Characteristics of Respondents:

A total of 1,151 fisherfolk were interviewed (quantitative) in this study. In addition, 78.2% were males whilst 21.8% were females. 5% of the respondents were young adults between the ages of 18-27. Also, 16.2% of the respondents were between the ages of 28-37 whilst 43.2% were middle age adults between 38-47 years, whilst 35.6% of the respondents were adults and the age groups were 48-57, 58-67 and 68-77.

In terms of education majority of the respondents 56.6% had primary/JHS of education. Approximately 41.4% of the respondents had no formal education. Moreover, about 2% of the respondents had secondary and higher level of education. Considering the religious affiliations, 92.2% of the respondents were Christians, 4.5% of the were traditionalists, 1.1% were Muslims/Islam whilst 2.2% belong to other religious affiliations. Furthermore, 78.2% of the respondents were fishermen. While 21.8% were fishmongers

(who are all canoe owners). Also for ethnicity, 52.6% of the respondents were Fantes, 22.5% Ga Adangbe, 19.5% of the respondents were Ewes, 4.5% were Nzemas. Also, 0.9% of the respondents belong to the other ethnic groups for example Ga. For marital status, 89.1% of the respondents were married, 5.5% were not married, 2.6% were divorced and 2.7% were widowed. Approximately 29.7% of the respondents were residence of Axim, 28.6% reside at Abandze in the Central Region of Ghana, 21.5% were residents of Kedzikope in the Volta region whilst 20.2% were residents of Old Ningo in the Greater Accra region.

Also, for the number of years respondents had worked in the fishing business, 33.1% of the respondent had worked between 1-9 years, 21.5% of them had worked between the years of 10-19, whilst 23.3% of the respondents had worked between the years of 20-29. Besides, 16.5% of the respondents had worked between the years of 30-39, 4.3% of the population had worked between the years of 40-49 whilst 1.3% had worked for about of 50 years and above. With reference to Table 6, all the 1,151 respondents were household heads. Also, for the number of people who lived in their households, 56% of the respondents had about 1-5 people living in their household, 38% of the respondents had households of about 6-10, whilst 5.7% of the respondents had households of 10-15 people.

Table 6: *The socio-demographc charateristics of responents*

Variables	Frequency	Percentage
Gender		
Male	900	78.2
Female	251	21.8
Age		
18-27	57	5.0
28-37	187	16.2
38-47	497	43.2
48-57	300	26.1
58-67	82	7.1
68-77	28	2.4
Level of Education		
No formal education	477	41.4
Primary/JHS	651	56.6
Secondary	22	1.9
Higher	1	0.1
Marital status		
Married	1026	89.1
Not married	63	5.5
Divorced	30	2.6
Widowed	32	2.7
Religious affiliation		
Christianity	1061	92.2
Islam	13	1.1
Traditional	52	4.5
Other	25	2.2
Occupation		
Fishermen	900	78.2
Fishmongers	251	21.8

Table 6: Continuous

Ethnicity of fishers		
Ga	7	0.6
Fante	606	52.6
Nzema	52	4.5
Ewe	225	19.5
Ga Adangbe	259	22.5
Other	4	0.3
Place of Residence		
Kedzikope	248	21.5
Axim	342	29.7
Abandze	329	28.6
Old Ningo	232	20.2
Number of years in the fishing business		
1-9years	381	33.1
10-19years	248	21.5
20-29 years	268	23.3
30-39 years	190	16.5
40-59 years	50	4.3
50 years and above	14	1.2

Source: Field survey (2022)

Research Objective One

Assess the governance processes of premix fuel distribution at the local level in Ghana. This research question seeks to understand the structure and procedures that govern premix fuel distribution at the local level (in the selected various fishing communities). From the coding stage, three themes, Inspection of Premix fuel, Handing over to the landing beach committee, and Distribution of fuel among fisher folks in Ghana were generated**.**

Inspection of Premix fuel

Inspection of premix fuel involves checking the quantity and quality of the premix fuel delivered to the various fishing communities by the National Premix Secretariat. Checking or inspection of the premix fuel is done by different categories of people in the various fishing communities. The Chief Fisherman and in some instances the Municipal Chief Eexecutives (MCEs) are responsible for the inspection. In most fishing communities, the chief fisherman is the first point of contact anytime the premix fuel tanker arrives in the community from the National Premix Secretariat. The Chief Fisherman is called to check if the tanker driver brought the right quantity.

One of the fisherfolk had this to say about the governance procedures of premix fuel distribution at the local level:

> *"Anytime Premix fuel tanker arrives in this community, the chief fisherman is the first person to be called to do the necessary checks before the fuel tanker is offloaded and handed over to the landing beach committee for it to be distributed to the fisher folks in this community"* (**AME1**).

Another respondent also had this view to share:

> *"The chief fisherman is the first person to be called anytime the premix fuel tanker arrives in this community, he checks if the driver brought the right quantity of fuel which is 60 drums (3, 000, gallons) where each gallon is 4.5 liters. After, he signs his signature on the approval form, the tanker driver offloads the fuel from the tanker before the chief fisherman hands over to*

the landing beach committee for sales/ distribution of the fuel" **(AME2).**

Also, in other communities, the MCEs are called to make the background checks anytime the premix fuel tanker is sent to the communities. A fisherman who participated in the focused group discussion had this to say:

> *"Anytime the premix tanker arrives in this community, the MCEs are the first people to check the quantity and quality of the premix. The MCEs then write a short note with a signature to show the tanker was delivered at the appropriate destination. The MCEs then make a photocopy of the short note for the driver to send it to the National Premix Secretariat".* **(BAN1)**.

Handing over to the Landing Beach committee for Distribution

The Landing Beach Committee have specific functions in which they perform. Some of these functions are to ensure the equitable distribution and sale of premix fuel to fishers. The landing beach committee are responsible for the distribution and sales of the premix fuel in the fishing communities. The chief fisherman is the chairman of the landing beach committee. The members of the landing beach committee consist of five members namely the Chief fisherman, a representative of the fish mongers, secretary, a pump attendant and member of the canoe owners (fisherman).

The main function of the L.B.C is to ensure the premix fuel is distributed fairly to the fisher folks in the fishing communities. Some participants shared their views the distribution of the fuel by the L.B.C:

> *"The landing beach committees are in charge of the fuel distribution in this community. They sell the fuel to us the fishermen and canoe owners. What they do is that, they have the list of all the canoe owners in an exercise book, they mention the names of the canoe owners based on the order written in the exercise book. The fuel is first distributed to the small canoe owners before it is sold to the big canoe owners"* **(AME3).**

Another Focused Group Discussion Participant stated that:

> *"The landing beach committees are in charge of the fuel distribution in this community. The landing beach committee are in charge of the premix fuel distribution and the establishment of developmental projects"* (**BAN2)**

A Focused Group Discussion Participant:

> *"The landing beach committee are in charge of fuel distribution in this community. The landing beach committee consist of the chief fisherman who is the chair"* **(AME 4)**.

Distribution/Sales of Premix fuel to FisherFolk in Ghana

The premix fuel subsidy was introduced by the government of Ghana in the year 1992 to be solely distributed to small-scale fisher folks in order to reduce the economic burden of vulnerable fishermen as explained in chapter two. According to the L.I 2233, fuel distribution in the community is to be done by the landing beach committee. The committee was formed to minimize the issues of hoarding, smuggling, political issues and diversion. The committee was formed to promote transparency and accountability of the distribution of

the premix fuel but there are so many factors which is influencing accessibility of the fuel at the local level or at the fishing communities. Some of these factors are political, economic and social factor. Political factors in this context explains how distribution is associated with partisan politics (Owusu & Adjei, 2021). For example the L.B.Cs selling premix fuel to members of the district assembly/MCEs who are not even fishermen. They hoard the fuel and resell it to the fisher folk about three times the original price. Some of the fishermen also buy from these middlemen because they do not regularly get the subsidised premix regularly to fish. They either buy from the fuel station or from the connection men until another tanker of premix is delivered to their community.

Some participants shared their views on distribution of fuel among fishers:

> *"Currently, distribution of the fuel is associated with politics. I am not happy with how the committee is formed. Most of the committee members are not even fisher folk but they are part of the committee because they strongly belong to the ruling party"* **(OLA1).**

A Focused Group participant's view:

> *" Honestly, the fuel they bring to this community is not enough for all the fishers so, distribution of the fuel is about partisan politics. There is no transparency in the distribution of the fuel. The current party members tend to benefit more than the opposition party members. This is because, the current party people are favored by some of the landing committee members"* **(AME5).**

A Focused Group participant's view:

> *'There is unequal distribution of the premix fuel. We receive 60 drums of fuel at each landing beach but anytime it comes, the MCES and the L.BCs deduct 20 drums from it leaving 40 drums for all the fishermen. Under normal circumstances, even if we are to share the 60galllons among all the canoe owners, it wouldn't even be enough. As a result of that a lot of us don't get the fuel anytime it is distributed. So distribution is associated with corruption now"* **(AME6).**

A Focused Group participant's view:

> *"There is no transparency in the distribution of the fuel. Anytime the distribution starts in this community, "someone" will just arrive at the distribution center and say one of the big men" is requesting for one full drum of premix fuel. Mostly it is the MCES who do that. They do that to hoard the fuel and resell it at three times the actual price"***(KOP1).**

From the above analysis, it was evident that, participants view about the procedures of premix fuel distribution in the various fishing communities in Ghana included Inspection of Premix Fuel, Handing over to the Landing Beach Committee and the Distribution of Premix Fuel to Fisher Folk in Ghana. It was also deduced that, there are different ways in which premix fuel is distributed to fishers in their various communities. In most communities, the Chief fishermen are in charge of premix fuel inspection anytime the tanker is delivered to their community. In other communities also, it is the MCEs who are in charge of Premix fuel Inspection. The findings of the first objective shows

that, the landing beach committees are in charge of premix fuel distribution however, most of the L.B.C members all belong to the present ruling government which is causing a lot of management and governanace challenges like hoarding, the issue of politicisation, and unequal distribution among fishers.

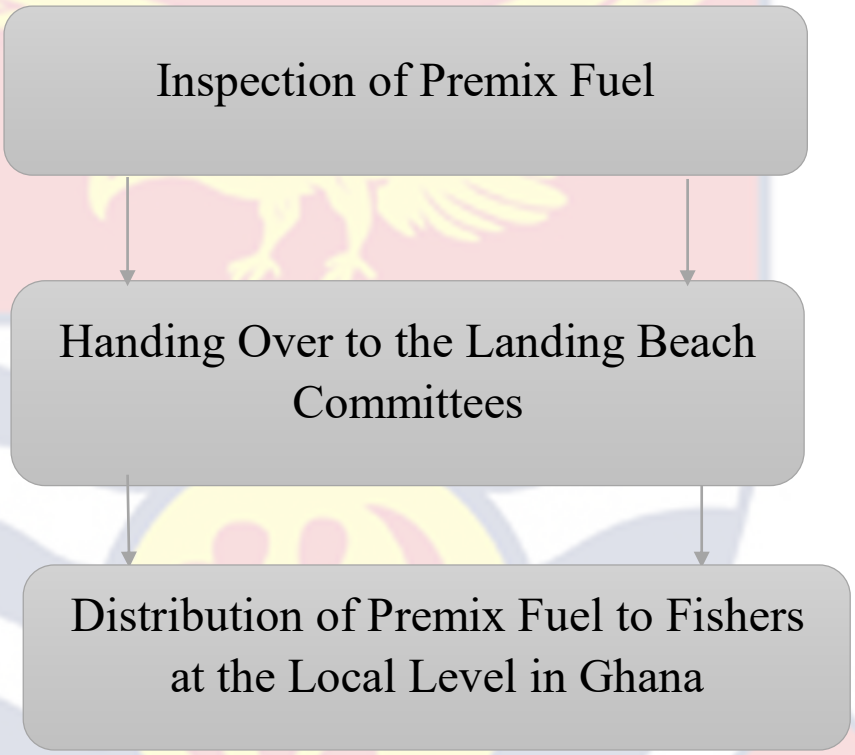

Figure 4: The governance structure of premix fuel distribution at the local level in Ghana.

Likewise, fisherfolk were asked the governance challenge they encounter as a result of premix fuel distribution as well as the efforts being made to resolve the challenges in their communites as shown in figure 5 and 6:

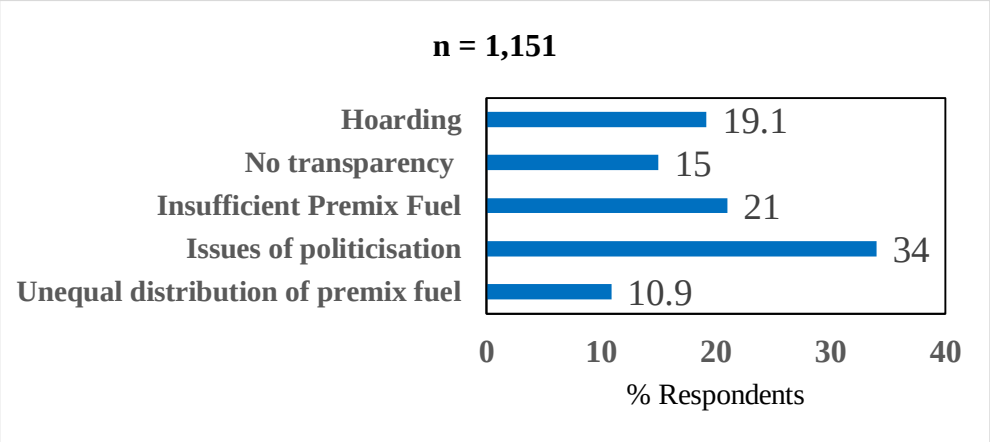

Figure 5: Challenges fishers encounter with regards to premix distribution in Ghana.

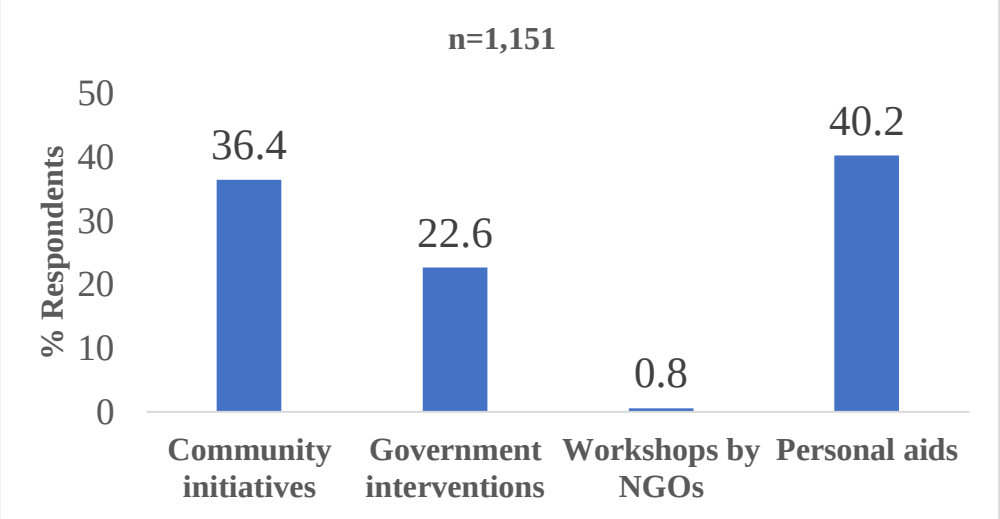

Figure 6: How efforts are being made to resolve the premix fuel distribution challenges over the years

Research Objective Two

To examine the effectiveness of the legal framework governing premix fuel distribution at the local level in Ghana.The main purpose of this objective is to investigate the efficiency of the L.I.2233 governing premix fuel distribution in the communities as well as to explore fisher folks understanding and knowledge of the law.

To control the distribution of premix fuel to fisherman, the National Premix Fuel Committee Regulations (L.I.2233) were published and gazetted on March 17, 2016. The NPC makes sure that some percentageof the money made from the sale of premix fuel is put toward improving the fishing communities. Moreover,the main purpose of this objective is to identify the gaps and lapses, identify areas for improvement and also to make recommendations to inform policy makers about the L.I.2233.

A Summary of the L.I.2233

In establishment of the National Premix Fuel Committee, to operate under the ministry responsible for fisheries. To control the Handing and distribution of premix fuel to fisherman, the National Premix Fuel Committee Regulations (L.I.2233) were published and gazetted on March 17, 2016. The NPC's mandate is to oversee the effective and efficient administration of premix fuel distribution. The government has heavily subsidised premix fuel, therefore the NPC are to make sure that monitoring is enforced to prevent diversion. The NPC also makes sure that some percentages of money made from the sale of premix fuel is put toward improving the coastal towns. Moreover, the committee shall in the performance of its functions collaborate with the ministry responsible for petroleum, Tema oil Refinery, National Petroleum Authority,

Oil marketing companies dealing in premix fuel and other relevant public and private bodies whose activities relate to the procurement, distribution, and sale of premix fuel.

The committee is made up of a chairman nominated by the minister, representatives from the National Inland Canoe Fishermen Council, Ghana National Canoe Fishermen Council, National Fisheries Association of Ghana, and the ministries in charge of fisheries, petroleum, and the fisheries commission.

In addition, a member of the committee other than the association of Oil Marketing Companies' industry coordinator will serve a two-year term before being eligible for reappointment for another term. Any time, in writing to the minister, a committee member may resign from their position. During committee sessions, the group will convene once every three months to conduct business at times and locations chosen by the chairperson. A member of the committee who has an interest in an issue under discussion must declare that interest, and the disclosure must be included in the record of the matter's consideration. Again, the government established the National Premix Secretariat in July 2009 to regulate the administration and distribution of premix fuel. The secretariat has several functions they perform some of which are to categorize the landing beach committees into groups and estimate what their liftings should be. The National Premix Fuel Secretariat develop a register for all L.B.Cs , monitor, evaluate and reconcile premix fuel requested by the secretariat and supplied by the Tema Oil Refinery or any other licensed operator and lifted by Oil Marketing Companies with premix fuel received by the L.B.Cs.

Furthermore, the landing beach committee was established to perform some particular functions. The committee shall in consultation with the District Assembly establish a Landing beach committee for each premix fuel sale point. The L.B.Cs are also at the local level. A chief fisherman, a canoe owner representative, a fishmonger representative, a fisherman chosen by the ministry in collaboration with the district Assembly, a secretary, and a pump attendant make up a landing beach committee.

The functions of the LBCs are to ensure equitable distribution and sales of premix fuel to fishers, to undertake developmental projects in consultation with the fishing communities and also to submit quarterly reports on premix fuel sold to fishers through the secretariat. For the tenure of office of a LBC, a member of the L.B.C other than the chief fisherman and the headman shall hold office for a period of two years and is eligible for re-appointment for another term only. Each landing beach committee shall have a secretary responsible for, initiating orders for the supply of premix fuel to the secretariat in consultation with the other members of the committee. The secretary is also responsible for initiating orders for supply of premix fuel to the secretariat in consultation with the LBC.

The pump attendant of the LBC is responsible for selling premix at a sale point, gauging of premix fuel stock on a regular basis, estimating demands for premix fuel and ensuring that, storage tanks are kept clean.The LBC shall distribute the proceeds of margins from the sale of Premix in the following manner, a fifty three percent to the fishing community, twelve percent to the office of the Chief Fisherman, eighteen percent to the other members of the committee, ten percent to the secretary and seven percent to the pump attendant.

Moreover, each landing beach committee shall open a bank account for the fishing community into which the fifty three percent of the proceeds of margins from the sale of premix fuel, where the chairperson, the secretary and a member of the L.B.C shall be signatories to the bank account.There are offenses for people who go contrary to the law. Persons who divert Premix fuel to an unapproved destination, selling of premix fuel above the government approved prices, and hoarding of premix fuel commit an offence and is liable on summary conviction to pay to the National Petroleum Authority established under the National Authority Act, 2005 (Act 691) an administrative penalty of two thousand penalty units or to a term of imprisonment of not more than two years or to both.

In addition, comparing what the L.I.2233 says and what actually happens in most of the fishing communities, there are some differences and similarities. In most of the of the fishing communities in Ghana, there are L.B.Cs whose responsibility is to ensure equitable distribution and sales of premix fuel to fishers, to undertake developmental projects in consultation with the fishing communities and also to submit quarterly reports on premix fuel sold to fishers through the secretariat.

Furthermore, below are the themes generated in assessing the effectiveness of the L.I.2233 in Ghana:

Fishers are Oblivious of the L.I.2233

Most fishers do not know much about the L.I.2233. Interestingly, the extent of knowledge was found to be high at the top level (Some Chief fishermen, Assembly Men and MCEs), and declines rapidly as it reaches the bottom (Local fishermen, and fishmongers). With exception of Axim and

Abandze where the Chief fisherman showed a copy the L.I.2233, the other Chief fishermen demonstrated that they did not know anything about the law. This knowledge gap of the L.I.2233 for the masses at the grass roots is serious because these are the regulations governing premix distribution, and not surprising that illegalities and infringements on laws, are still highly prevalent in the communities.

According to the fisherfolk, education on the L.I.2233 in the communities has not been carried out by any organisation. Inadequate involvement of the fishers in decision making was a major issue raised in the communities and this was evident in the fact that most of the fishers lack knowledge on the premix laws. On a scale of 1 (lowest) to 10 (highest), the average fisherfolks knowledge on the L.I.22233 is as follows:

The average fisher folk knowledge in premix fuel law (L.I.2233) was about $= \frac{3}{10}$.

In summary, the L.I2233 does not clearly state how fishers should be educated on the L.I.2233. As a result of that, majority of fishermen in Ghana do not have much knowledge about it.

Some fishers had this to say about their knowledge of the L.I 2233:

> *"I don't know anything about the LI.2233. I don't even know there is a law about premix fuel distribution. The only thing I know is that, the chief fisherman is the chairman of the L.I.2233"(**KOP2**).*

A member of the F.G.D also had this to say:

*"I don't know anything about the L.I.2233. For all this while, I didn't even know there is a law backing premix fuel distribution in Ghana" (**AME7**).*

Party Foot Soldiers (party faithfuls) Take Over Premix Fuel Distribution at Various Landing Beaches

In all communities the supply, management and distribution of fishing inputs such as premix fuel has become a major worry to the fishers, especially Chief fishermen as they feel they have been eliminated from the processes. Instead, political foot soldiers, the MCEs and external committees have taken over administration and distribution of these inputs which hitherto were done by the Chief fishermen or with their involvement. These have sometimes resulted in misunderstanding between the Chief Fishermen or Landing Beach Committee members and individuals of political affiliations they perceived are taking up their roles or mandates, and either traditional authorities or MMDCEs had to step in to resolve the problems.

In all communities visited, the management of premix had been partially taken over from the LBCs, and according to the participants of the FGDs, political party foot soldiers and other party members are now running the management of premix fuel. The Chief Fishermen who are supposed to chair the committees currently play a very little role in premix management at the landing beaches. The action seemed to have been planned and carried out across the country.

The fisherfolk expressed concerns that this has given a lot of room to smuggling, hoarding and lack of accountability, and contrary to provisions in the law that the LBC should submit quarterly reports (i.e. render accounts) to

the fishers, there has been no accountability in some communities over the past three years.However, L.B.Cs exist in almost all fishing communities in Ghana but almost all the members are composed of or belong to the current/successive ruling government.

Though the district assembly selects the members of the LBCs, selecting people who belong to the same political party of the ruling government always creates unequal distribution of premix fuel in the various communities. This is because, LBCs of the same political affiliation may always favor fishers (ie in terms of distribution) who belong to the same political party (Owusu & Adjei, 2021). This results in hoarding, leading to artificial shortage.

In summary, the L.I.2233 doesn't have any section clearly that captures how the selection of the LBC members should be devoid of political affiliations. Likewise, selecting members of the L.B.Cs by the MCEs may always promote the issue of politicisation.

Accountability and Transparency Challenges with Regard to the Sales of Premix Fuel in Ghana

According to the Section 27 of the L.I.2233, about 53% of the sales of premix shall be used for developmental projects and each LBC shall open a bank account for the fishing community into which the fifty three percent of the proceeds of margins from the sale of premix fuel shall be paid. Though some fishing communities in lower Axim (Western Region) and Abandze (Central Region) have hospitals and community centers as a result of the sales of the premix fuel which benefit fishers in the communities. Other communities lack basic facilities like the toilet, CHPS compounds, schools and many others. This

is as a result of limited accountability by the various L.B.Cs. There is very little or no sanctions for the L.B.Cs when they fail to render accounts.

In conclusion, the secretary is only accountable to the LBCs. Therefore the executives may influence the secretaries which may also have an impact on various accountability and control systems put in place to ensure successful local development.

Smuggling, Hoarding and Diversion of Premix Fuel still pervasive in the Various Fishing Communities in Ghana.

Smuggling of premix fuel has remained a challenge in the fishery sector since the introduction of subsidy on the fuel. The fuel is basically smuggled and purchased at the subsidised price and hoarded to create artificial shortage, and then sold at about three times the subsidised price. There were mixed views on how the challenges of premix supply could be resolved. While some fishermen think there should be regular supply to render that of the hoarders redundant, others suggested that the subsidy on the fuel could be taken off so as to allow a regular flow of the fuel, this is evident from a respondent who noted that "government should supply the premix regularly even if it would be sold without subsidy (at the price of a normal petrol from shell and others) to avoid shortage".

Presently, access of premix fuel is determined by political, social and economic factors. The Chief Fishermen and council of elders are generally displeased about the situation as they deem it illegal (Okyere et al., 2020). Though Section 28 of the L.I.2233 defines the offences for persons who hoard and divert premix, such people are mostly not punished in the various fishing communities however, it has rather become a way for the middle men to make

more money. Most of the middlemen are not even fishermen but purchase premix from the L.B.Cs, hoard the fuel and resell it to fishers at exorbitant prices. This affects the livelihoods of fishers in Ghana.

In summary, as mentioned earlier, though there are stated punishments for the various offences with regard to premix fuel distribution, most of the offenders in the fishing communities are not punished. This promotes the act of hoarding smuggling and premix fuel diversion.

A National Premix Fuel Secretariat Official had this to say:

> *"For the various illegalities such as hoarding, we are very much aware and some few people have been arrested as a result of engaging in such activity. The government of Ghana is planning to introduce digitisation to reduce or minimize the issue"(**OLA3**).*

Some fishers had this to say about the issue of hoarding and smuggling:

> *"The fuel is mostly sold to people who don't even have canoes and are not fishermen. What they do is that, they hoard the fuel and resell it fishermen at a very exorbitant prices. Most fishermen buy from the middle men because, they don't get premix fuel regularly in their community"(**BAN4**).*

Improper Way of Handling Premix Fuel by Fishers in Ghana

Like the other fuel sold at the fuel stations, premix is also a highly inflammable petro-chemical product capable of causing a serious disasters if appropriate safety measures are not observed in dispensing and Handling the fuel at the landing beaches. Crowding around the fuel discharge point and careless Handling of the fuel were commonly observed at the landing beaches,

and no serious safety measures were seen to have been instituted. An example of the unexpected consequence of mishandling of premix occurred recently when fuel hoarded in a room at Elmina got inflamed resulting in injuries and deaths of some fishers**.** In summary, the L.I.2233 did not state the safety precautions to be observed when Handing of premix fuel at the various sales points.

Chief fishermen and other Canoe Owners proposed that the L.B.Cs should be composed of canoe owners elected by the chief fisherman, some other canoe owners and MCEs in the fishing communities. In this composition the chief fisherman will be the chairman as it has always being. Fishers emphasised that, when members of the L.B.Cs are solely elected by the chief fisherman and other stakeholdersin the communities it may help address most of the challenges such as hoarding, and politicisation. Fishers explained that, the position of a chief fisherman is acquired by inheritance and elections as a result of that, most chief fishermen are well trusted in the fishing communities. Stakeholders emphasized that, it is good to conduct an election in choosing members of the L.B.Cs because, it is a freedom given to fishers to pick leaders of their choice instead of only the MCES selecting the LBCs. According to the chief fishermen and other canoe owners, to address the premix fuel distribution challenges the LBCs should be elected as proposed in Table 7**.** Morever, Table 8 also explains the functions of the LBCs and what actually happens in the fishing communities in Ghana.

Table 7*: A proposal from stakeholders on the eletion of L.B.Cs*

Current Composition	Proposed Composition
Chief fisherman (Chairman)	Chief fisherman (Chairman)
A representative of Canoe Owners	A representative of Canoe Owners elected by the chief fisherman and other Canoe owners, MCEs and Assembly men.
A representative of Fish Mongers	A representative of Fish monger should be elected by the Chief fisherman, some canoe owners, MCEs and Assembly men.
A fisherman nominated by the ministry in consultation with the District Assembly.	A fisherman (Canoe Owner) elected by chief fisherman and other stakeholder as stated earlier.
Secretary nominated by the district Assembly.	A secretary nominated by the Chief fisherman, MCEs and the Assembly man.
Pump attendant nominated by the District Assembly.	A pump Attendant nominated by the Chief fisherman and the district assembly.

Table 8*: Functions of the LBCs and what actually happens in most fishing communities*

Functions of L.B.Cs	What happens in Most fishing communities in Ghana
To ensure equitable distribution and sales of premix fuel to fishers.	Presently fishers encounter issue of hoarding, smuggling and politicisation which is a hindrance in the access of the product.
To undertake developmental projects in Consultation with the fishing community and District Assembly	Some fishing communities such as Abandze, and some other landing sites at Axim have developmental projects such as Hospitals, CHIPS compounds, community centers and schools as a result of the fifty three percent sales of premix fuel. Other fishing communities like Old Ningo and Kedzikope lack developmental projects.
Submit quarterly reports on premix fuel sold through the secretariat	Presently, quarterly reports are submitted by the MCEs and other political foot soldiers through the secretariat.
Secretary	Presently, the roles of the secretary are partially taken by MCEs for example, it is the responsibility of the secretary to maintain record on the supply and sale of premix but this role is mostly performed by the MCEs in the various fishing communities in Ghana.
Pump attendant	The Pump attendant is responsible for selling premix fuel at the sale points. Therole of the pump attendants is partially taken by the political foot soldiers in most fishing communities in Ghana.

In conclusion, in assessing the effectiveness of the legal framework governing premix fuel distribution in Ghana, five themes were generated namely fishers oblivious of the L.i.2233, party foot soldiers take over premix fuel distribution, accountability and transparency challenges with regards to premix fuel distribution, smuggling hoarding and diversion of premix fuel, improper way of handling premix and also proposal of the L.I.2233.

Research ObjectiveThree

To assess the relationship between the quantity of premix supply, number of canoes and the quantity of fish catch in the small-scale fisheries sector in Ghana. Moreover, respondents were asked the major fishing items subsidised by the government in figure 7. Ninety five percent of the respondents said premix fuel, 3.4% said Outboard motor and 1.6% said fishing nets. Premix fuel is the major fishing input subsidised by the Government of Ghana (Owusu & Adjei, 2021).

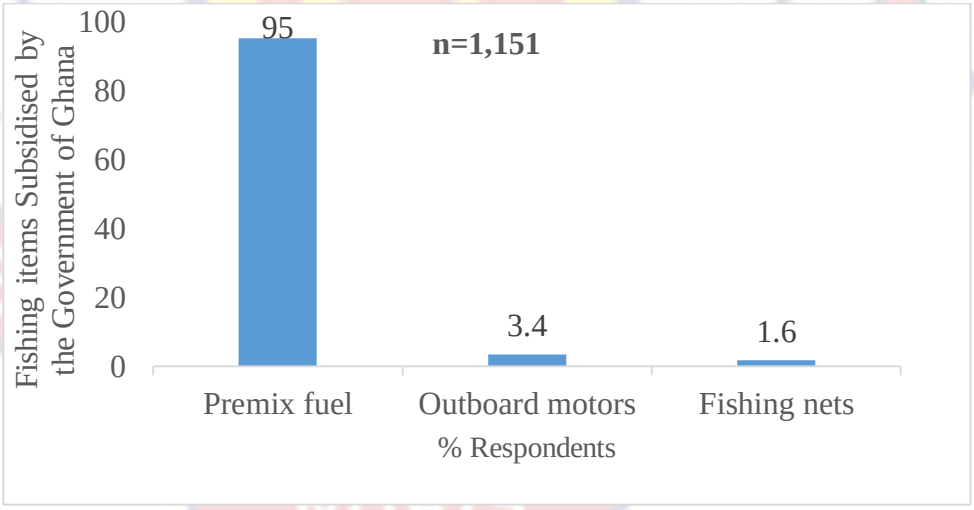

Figure 7: Fishing items subsidised by the government of Ghana

Also, a trend analysis was run on the quantity of premix fuel supply and quantity of artisanal fish landings (*Sardinella maderensis, Mackerel, Anchovies and Aurita*) in Ghana. As shown in Figure 8, the quantity of small-scale pelagic

landings has decreased considerably from 90,000 tons in 1999 to 40,000 tons in 2019. However, the trend of the quantity of premix fuel supplied from 1999 to 2019 has been fluctuating.

The interpretation of the trend analysis shows that, more premix fuel subsidised by the government does not necessarily leads to a greater fish catch by the fishermen. Though some fishers still land some quantity of fish anytime they go to sea but they do not land a greater quantity as they used to in the past years. The reason could be that, there is a massive fish stock decline in Ghanaian waters as a result of some factors such bad fishing practices like "Saiko", and illegal, unreported and unregulated fishing (IUU). Therefore, premix supply is not necessarily yielding greater catch but rather decreasing the quantity of catch by the SSFS due to the existing pressure on the already dwindled fish stock.

In the graph the year 2000, 2003, 2004, 2008 and 2014, recorded the highest quantity of fish catch as compared to 1999, 2001, 2002, 2018 and 2019. However, 2009, 2012 and 2017 had more quantity of premix fuel supply but the quantity of fish catch in these years were rather declining. This evidently explains that, premix subsidised by the government is not a yardstick for more fish catch/landings but rather decreasing the quantity of fish catch by small-scale fishers in Ghana.

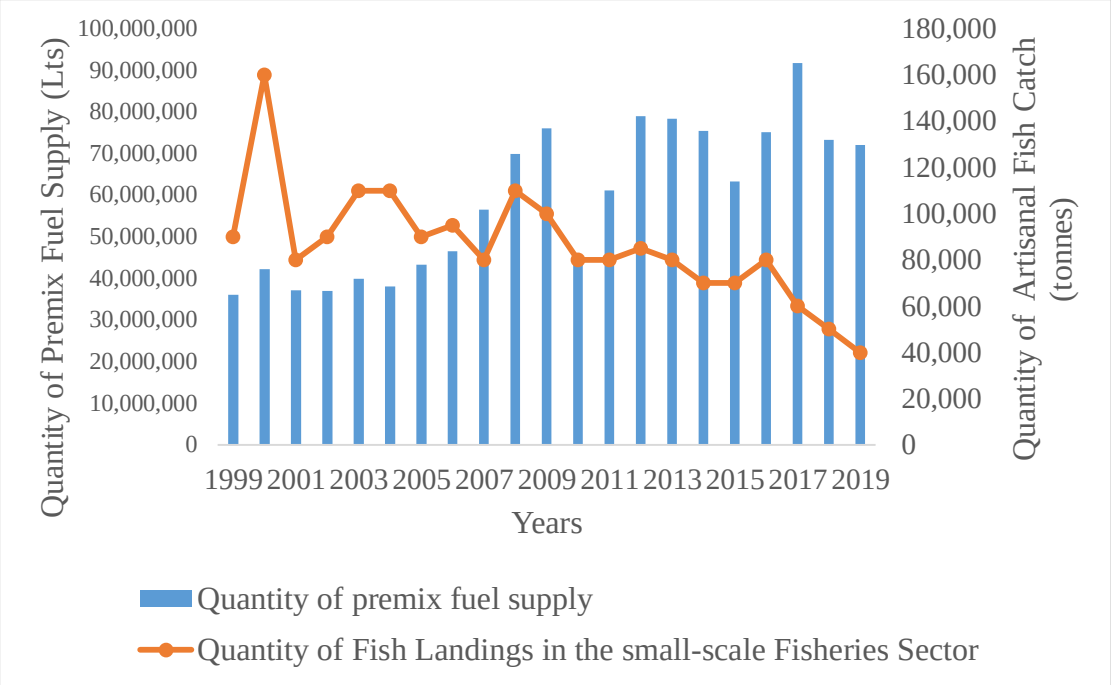

Figure 8: The trend of quantity of Premix fuel supply and the quantity of small Pelagic landings from 1999-2019 in Ghana.

Source: Secondary data from FSSD and NPA (1999-2019) Ghana.

Furthermore, a correlation between the quantity of premix fuel supply and the quantity of fish catch was conducted in figure 9. The relationship clearly shows that, the increase in premix fuel supply does not necessarily influence fish catch. The $\mathbf{r^2}$ tells us that, 24% of the fish catch variations is as a result of premix supply. The Quantity of premix fuel supply only explains 24% of the differences in the quantity of fish catch over the years which is 1999 - 2019. This means that, the continuous supply of premix fuel to fisher folk does not necessarily lead to a higher fish catch.

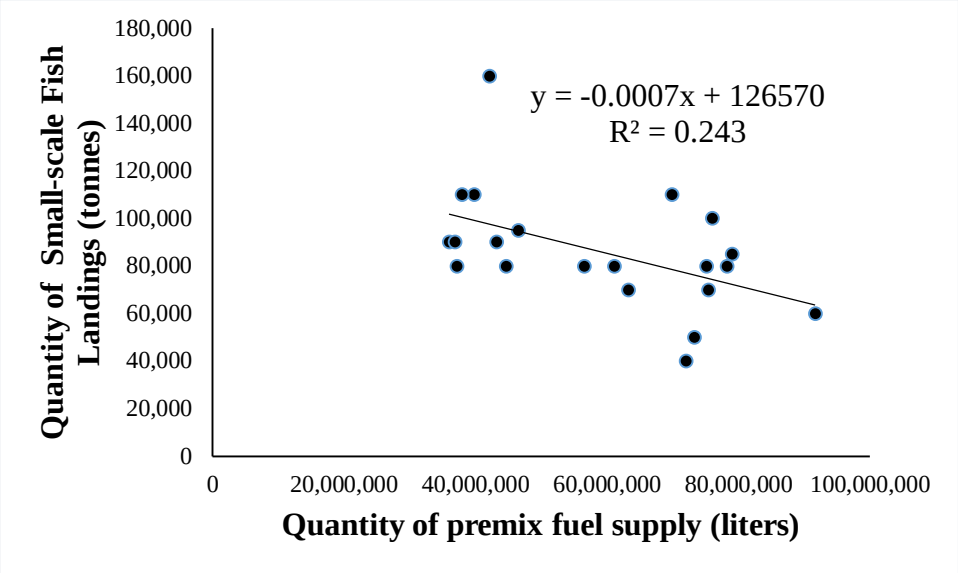

Figure 9: Relationship between the quantity of premix fuel supply and the quantity of fish catch in the SSFS in Ghana.

Similarly, multiple regression was run to determine if the independent variable (quantity of premix fuel supply and number of canoes from (1999-2019) has an impact on the dependent variable (quantity of fish catch/landings) in the Small-scale fisheries sector from in Ghana.

Though there is relationship between quantity of premix supply, number of canoes and quantity of fish catch, the association is moderate. Table 15 in appendix shows that, a unit increase in the quantity of premix supply decreases the quantity of fish catch by 0.000194 but the relationship is not significant at a p-value of 0.05. Similarly, a unit increase in number of canoes decrease the quantity of catch by 9.0135 equally the relationship is not significant at the p-value of 0.05. The R square which is 0.32, explains that 32% of the variations in fish catch is as a result of premix supply and the number of canoes.

This means that, number of canoes and premix fuel subsidised by the government does not necessarily lead to higher fish catch by the fishermen

hence, there are other factors contributing to the pattern of fish catch variations in Ghana.

Respondents perceptions on the factors contributing to fish stock decline in the Ghanaian waters were also measured in figure 10. Fifty two percent of respondents said Saiko illegal fishing, 22% said light fishing,13% said illegal nets, 2.6% said climate change impacts, 1.7% over fishing with premix fuel, while 8.7 of the respondents said there is a decline in fish catch because of the use of DDT, dynamite, gun powder and washing powder in fishing.

In addition, Saiko illegal fishing recorded the highest percentage while Premix fuel recorded the lowest. From the graph, it can be deduced that, other major factors are contributing to fish stock decline in Ghanain waters. Some of which are 'Saiko"(industrial trawlers), light fishing, illegal nets, the use of DDT, and climate change impacts. These activities are contributing to overfishing hence leading to a decline in fish stock. However, fishers explained that, there is a major fish stock decline which is affecting their catch/ landings. This is affecting the livelihoods of fishers in Ghana.

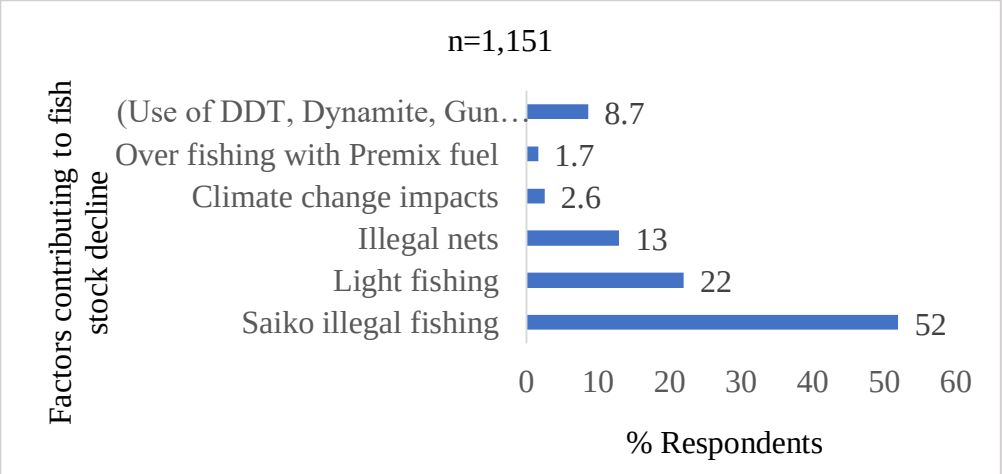

Figure 10: Factors contributing to fish stock decline in Ghana.

Comparatively, a linear regression was conducted to determine the association between hours spent on sea and the quantity of fish catch per trip using the subsidised premix fuel. With reference to Table 16, the P-value is 0.037 which is significant. Taking the unstandardised coefficient into consideration, it explains that, hours spent at sea is associated with a decrease fish catch.This implies that, the more hours fishers spend on sea, the less likelihood of catching more fish. However, this can be used to buttress the point made earlier that, the major fishing inputs such as premix is currently not yielding a greater catch because of the massive fish stock decline in Ghanain waters. These inputs are rather leading to a further decline in landings.

In conclusion, in assessing the relationship between quantity of premix supply, number of canoes and quantity of fish catch, it was deduced that more premix fuel subsidised by the government does not guarantee an increased in fish catch but rather, greater fishing inputs may rather puts pressure on the already dwindling fish catch. This will yield a further decline in fish catch by fishermen as showed in the results above.

Research Objective Four

To assess the contributions of premix fuel subsidy on the fish related income of fishers in Ghana. Respondents were asked, if the fuel subsidy was contributing to their monthly income generation. The results is as follows:

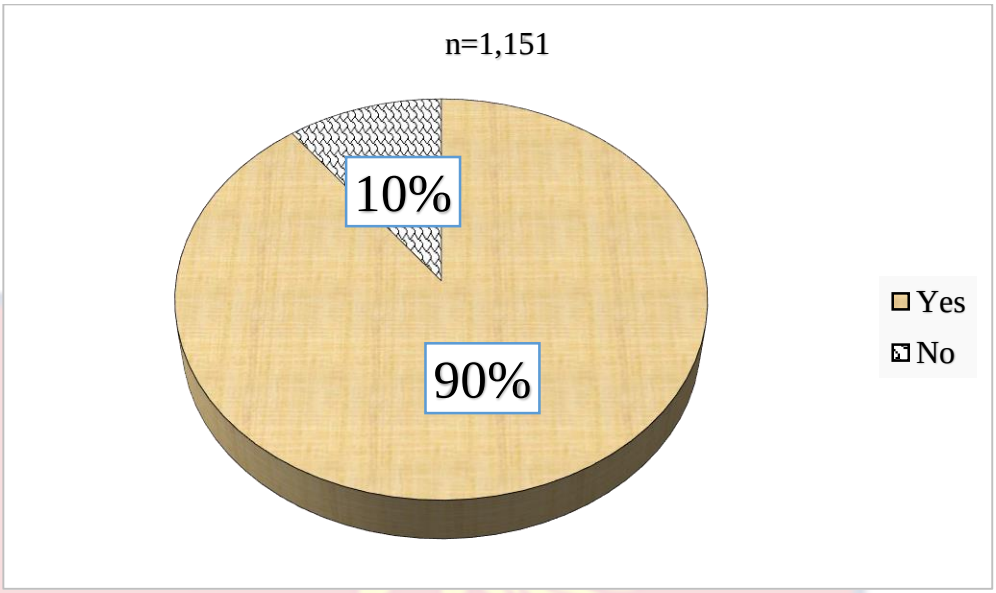

Figure 11: Perceptions on the contributions of the premix fuel on the income generation of fishers in Ghana

Most of the fishers whose responses were Yes (90%) had their reasons and explanations to how the fuel subsidy is contributing to their fish related income. The fishers who said No (10%) also had their reasons and explanations. Some of their responses are quoted below.

Table 9*: Gender division on the contributions of premix fuel subsidies to the income generation of fishers in Ghana*

		Yes	No	Total
Gender	Male	911	109	1020
	Female	118	13	131
Total		1029	122	1,151

Table 10*: Contributions of premix fuel subsidies to fishers based on the selected communities*

		Yes	No	
Place of residence	Kedzikope	14	236	250
	Axim	41	300	341
	Abandze	19	309	328
	Old Ningo	7	225	232
Total		81	1070	1148

A key informant (Chief fisherman) expressed his view as:

"The premix fuel subsidy is helping me and other fishermen because, the premix is not expensive as compared to buying from the Goil filling station. Currently, there is a fish stock decline which has affected our landings. We don't get much profit as compared to the past years but more often, I am able to get back the expeses I made on the premix fuel. So, I think the Premix fuel is just keeping us in business and not helping us to make any extraordinary profit" (KOP3).

A participant of the structured interview had this statement to make:

"I benefit a lot from the subsidised fuel. This is because, it is cheap and as a Canoe Owner I pay 450 Ghana cedis for 60 gallons for my big canoe. The 60 gallons is not enough for me to fish for even a week so what I do is, I buy some extra few gallons from the fuel station which is expensive. There are times I don't even get enough fish to catch and sell. So assuming I bought all my 70 gallons from the fuel station and I don't get enough fish I would have been making huge loses

all the time. 4.5 litre of petrol at the fuel station is 50 Ghana Cedis while Premix is 7.50 Ghana cedis per litre" **(OLA4).**

Another participant of the structured interview made this statement:

"I benefit from the fuel subsidy because it is not expensive as compared to the fuel sold at the filling station. I just have to buy with some small amount of money. If I am able to get more fish, I make more profit after deducting the expenses made for the fuel." **(BAN5)**

A Fishmonger made this statement:

"I benefit a lot from the fuel subsidy because, it is not expensive. Anytime the fishermen use the premix fuel to fish, the prices of the fish are always moderate and we are able to afford. When there's no subsidised Premix and fishermen have to buy from the filling station, it affects the prices of the fish. The fishermen increase the prices of the fish so they can get back their expenses made for the fuel" **(KOP4).**

Some respondent said the fuel subsidy is not contributing to their income monthly. Few respondents are quoted below:

*"The fuel tanker is not delivered to this community regularly. So I don't always get the subsidised fuel to fish often. There is a major fish catch decline and I don't get fish as compared to some years ago. There are times I don't even get any fish. So in this case, I make loses.. So I don't see any contribution from the subsidy to my monthly income geration because the stock has declined "(***AME8***).*

Another participant of the structured interview who said he doesn't benefit from the subsidy also had this to say:

> *"The fuel subsidy does not contribute to my monthly income generation because the Premix tanker is not delivered to us regularly, so I don't get the subsidised fuel to buy and fish often. There are times I have to buy from the fuel station which is very expensive to purchase. I buy a gallon of the subsidised fuel for 7.50 Ghana cedis but it is sold at almost 50 cedis at the filling station"(***OLA5***).*

A participants view on the benefits of the Premix fuel subsidy:

> *"I am not benefiting from the premix subsidy because, the fishing business is almost collapsing and my total landings has totally declined. I always make huge loses.There are times I am not able to retrieve my premix fuel expenses"(***KOP5***).*

In addition, participants were asked about the removal of the fuel subsidy. A greater percentage of the fishers were against the removal of the fuel subsidy.

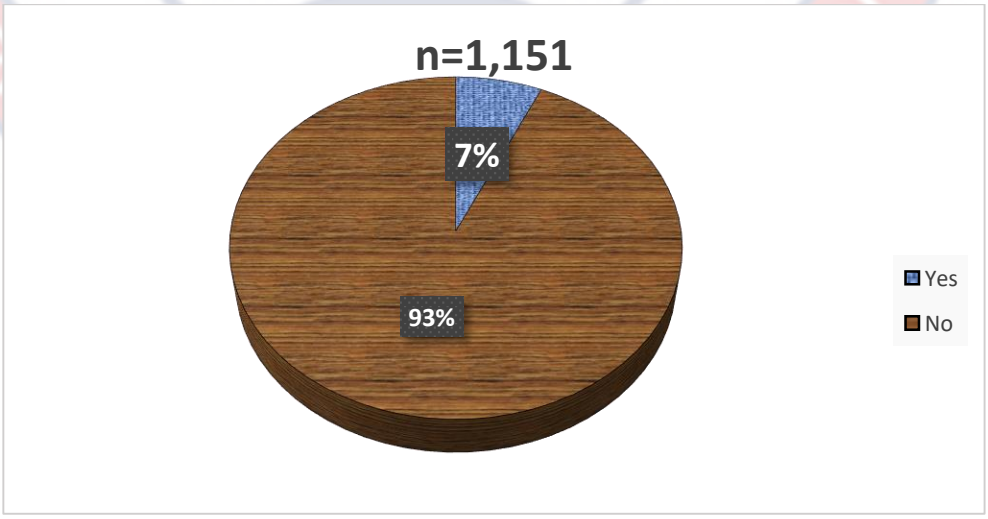

Figure 12: Reactions on the removal of the premix fuel subsidy.

Most of the respondents were against the idea of the subsidy removal by the government as shown in Table 11 and 12.

Table 11: *Fishers reaction on the removal of the premix fuel subsidy (based on gender division)*

		Yes	No	Total
Place of residence	Kedzikope	14	236	250
	Axim	41	300	341
	Abandze	19	309	328
	Old Ningo	7	225	232
Total		81	1070	1,151

Table 12: *Fishers reaction on the removal of the premix fuel subsidies based on selected communities*

		Yes	**No**	Total
Gender	Male	74	950	1,024
	Female	9	118	127
Total		78	1068	1,151

Fishers had their reasons and explanations for choosing Yes or No which is quoted below:

An indepth-interview Participant (Key informant):

> *" I am able to buy the exact quantity needed for my outboard motor because, it is subsidised and not expensive. I have a big canoe and I get 60 gallons which is about 450 Ghana cedis. However, buying 60 gallons of petrol at the filling station may cost over 1000 Ghana cedis. There are times we go to sea and we don't get any fish, so assuming I bought my fuel at the filling station, I would have made very huge loses. So the subsidy should not be removed by the government"(***KOP5***).*

Another respondent of the structured interview had this to say on the removal of the fuel subsidy:

> *"The fuel subsidy should not be removed, else the fuel will be too expensive to afford and I may not be able to fish again. This may have a huge impact on my livelihood"(***AME8***).*

Some of the respondents were of the support of the removal of the fuel subsidy. Their reasons are quoted as follows:

> *"I support the removal of the fuel subsidy because, distribution is now associated to partisan politics. Anytime the fuel tanker arrives in this community, the political leaders and the MCES hoard a greater percent of the fuel. There are times we go and join the queue to buy premix but anytime it gets to our turn, they tell us it is finished. I believe all these issues are arising because it is subsidised. So the middle men hoard it and resell it at a very expensive prices. I believe removal of the fuel subsidy will minimize all these challenges"(***BAN6***).*

A canoe owner was in support of the removal of fuel subsidy by the government. His reason is quoted as follows:

> *"I think the fuel subsidy should be removed by the government. This is because, distribution is now associated with politics and hoarding. I know the subsidised fuel is to be distributed to small-scale fishers but it is now sold to people who don't even have canoes. They buy a large quantity of the fuel, hoard it and resell it at a very expensive prices. This is affecting our*

*livelihoods because, we don't even get the right amount to buy anytime it is distributed to this community"(***BAN7***).*

Moreover, respondents were asked the different kind of support th at they would like the government invest the subsidy amount in as an alternative to premix subsidy. A greater percentage of the participants explained that, they do not want any alternative hence, the premix fuel is the only option and the results is as follows including (table 13 and 14):

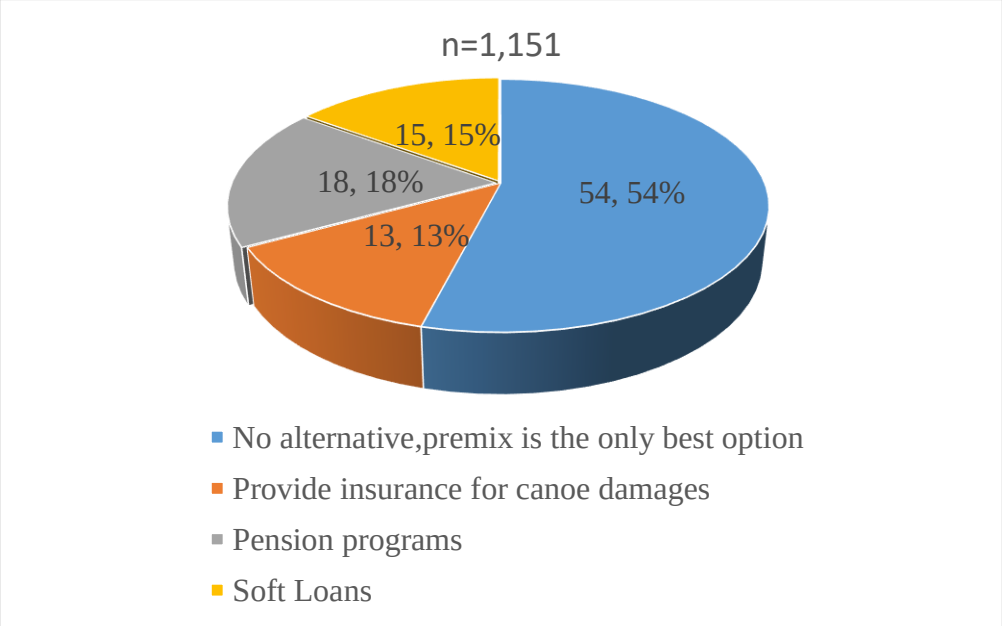

Figure 13: Preferences for alternatives to premix fuel supply.

Table 13*: Fishers preferences for alternative to premix supply based on gender division*

		No alternative, premix subsidy is the only best option	Provide insurance for Canoe damages	Pension program for fishermen	Soft Loans	Total
Gender	Male	574	115	196	135	1020
	Female	53	29	9	40	131
Total		627	144	205	175	1,151

Table 14: *Fishers preferences for alternative to premix supply based on the selected research communities*

		No alternative, fuel subsidy is the only best option	Provide insurance for Canoe damages	Pension packages for fishermen	Soft Loan	Total
Place of residence	Kedzikope	4	28	175	45	252
	Axim	206	94	12	30	342
	Abandze	320	3	3	4	328
	Old Ningo	97	22	14	98	231
Total		627	145	204	177	1,151

Furthermore, a scatterplot was used to determine the correlation between expenses made on premix fuel and income generated from fish catch per trip. The result is as follows:

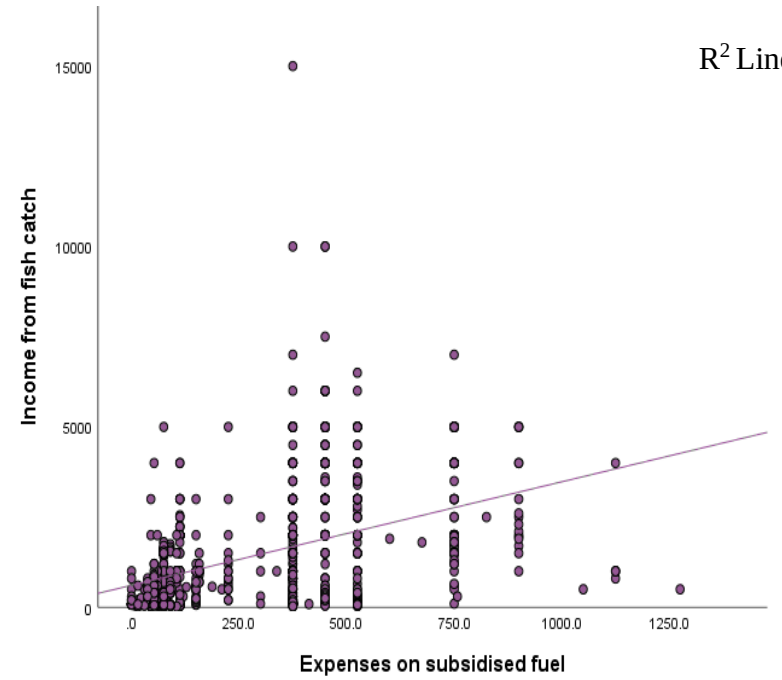

Figure 15: Relationship between expenses made on the subsidised fuel and income from fish catch per trip.

Though most fishers in Ghana have the perception that, they benefit a lot from the fuel subsidy, the R-squared linear (0.181) means that the independent variable (expenses made on subsidised fuel per trip) explained 18.1% of variation in the dependent variable (income from fish catch per trip). Though, there is a positive relationship between the expenses made on the subsidised fuel and the income made from fish catch, the relationship is moderate.

Most of the fishers explained that, though there is a fish stock decline but because the fuel is subsidised, they don't feel much of the impact even when they make loses they are able to manage or cope with the situation and remain

in the business because the premix fuel is not expensive as compared to buying the unsubsidised fuel from the filling station.

Equally, a regression was conducted to show the relationship between expenses made on premix fuel and income derived from fish catch per trip, refer from in Table 17 in appendix. The Table shows that, the independent variable explained (18%) of the variations in the dependent variable. There is a significant relationship between expenses made on premix fuel and the income generated from the sales of the fish catch per trip ($r = 0.43$; p-value < 0.05). However, the **r** in the regression table shows a significant moderate relationship between expenses made on premix fuel and income generated from fish catch per trip. The strength of the relationship figure ($r = 0.43$) was informed by Akoglu, (2018).

CHAPTER FIVE

DISCUSSION

This study contributes to the nascent body of premix fuel governance at the local level in Ghana. It empirically assessed the governance procedures of premix fuel distribution at the local level. The effectiveness of the legal framework governing premix fuel distribution and the contributions of the premix subsidy to the fish related income of fisherfolk in Ghana. The relationship between premix fuel supply, number of canoes and the quantity of fish catch in the small-scale fisheries sector was also assessed. The convergent mixed methods were used to collect data for this study where the qualitative and quantitative data were collected and analysed at the same time.

The first research question was to assess the governance processes of premix fuel distribution at the local level in Ghana. This was to unravel the actual procedures for premix fuel distribution at the local level and the various management challenges that fishermen encounter as a result of premix fuel distribution in the coastal communities of Ghana.

The findings (themes) generated from the first research question includes inspection of premix fuel, handing over to the Landing Beach Committee and the Distribution of Premix Fuel to Fisher Folk in Ghana.

In addition, inspection of premix fuel entails the stages the premix fuel tanker goes through anytime it is delivered by the NPS to the various fishing communities before it is distributed to the fishermen. Inspection of the fuel is necessary in the various communities in order to check superiority and also make sure that, the fuel is not mixed with other chemicals which can destroy the outboard motors of the fishermen (Owusu & Adjei, 2021).

In communities like Axim, Kedzikope and Old Ningo, anytime premix fuel arrives in those communities, the first point of contact to check the quantity and the quality of the fuel is the chief fisherman who is the chairman of the LBC. In other communities like Abandze in the Central region, the MCEs are in charge of the inspection of premix fuel in the community. This implies that, though political foot soldiers are gradually taking over the responsibilities of the LBCs, some chief fishermen still have power in premix fuel administration as indicated by Nolan, (2019). It is particularly surprising as studies indicate that, other members of the LBC have almost lost their roles to the political foot soldiers while most chief fishermen are still in power. This may be as a result of their position as chairmen of the LBC for two with no tenure. For instance Torell et al., (2015) found out that, chief fishermen are still powerful in most coastal communites as a result of their years of tenure and how they are selected (based on merit) and their impactful works in the coatal communites.

Furthermore, the second theme for the first research question is handing over to the landing beach committee. After inspection of the premix fuel, the chief fisherman who is the chairman of the landing beach committee hands over the fuel to the landing beach committee for distribution. It was evident that, the LBCs are partially losing their powers to the political foot soldiers therefore, most of the members are currently not fishermen but are part of the LBC. The politicisation of the committee could be as a result of the MCEs who select people to be members of the LBCs in the various communities (Kwao-Boateng & Gyamfi, 2022).

Again, the third theme of the first objective is the distribution of the premix fuel to fishers in Ghana. This explains how the fuel is distributed to

fisher folk in their various communities. In most of the fishing communities visited, the landing beach committee are in charge of the distribution of the premix to fishers. They have a procedure they follow, they have the list of all the canoe owners a in a book where the names are mentioned in order for distribution (Owusu & Adjei, 2021). The findings showed that fishers encounter a lot of challenges from the distribution of the premix fuel some of which are politicisation, hoarding, smuggling and unequal distribution of premix fuel in the various fishing communities (Normanyo et al., 2016). This implies that, significant dissensions exist in the distribution of premix fuel among small-scale fisher folks in Ghana. According to Owusu and Adjei, (2021), power imbalances are present while gaining access to premix fuel. Those with more power in politics and business have taken over control of the resource distribution and access (Kwao-boateng & Gyamfi, 2022).

Biased distribution of the fuel could play a contributing role in many ways. Some of which are decline in livelihood of economically vulnerable fishers and overfishing by beneficiaries which is leading to a further decline of fish stocks in Ghanaian waters as indicated by Owusu & Adjei, (2021). The findings of this objective is in line with the findings of Schuhbauer et al., (2017) which indicated that, politically connected fishermen spend more time offshore which may contribute to a further decline fish stock. This supports the claim that capacity-enhancing subsidies could be a factor in overfishing (Sackey-Mensah et al., 2012).

Even though the politicisation of the fisheries subsidy is a serious issue, it might be very challenging to eliminate political party representatives from the subsidy distribution committee considering that previous political parties have

influenced fishermen to gain their support by using the premix fuel subsidy as a political tool (Owusu & Adjei, 2021). The unequal power relations between the politically connected fisherfolk and the less connected creates unequal ground for fishers to have equal access of the fuel subsidies however, this challenge has diverse effects on the livelihoods of fishers in Ghana (Tanner et al., 2014).

Also, fishers were asked how the premix distribution challenges have been resolved over the years. Most fishers said they resolve the challenges themselves and in some instances through community initiatives. This means that, the government is not making much efforts in resolving challenges in the SSFS at the local level. This could be one of the reasons why small scale fishers are vulnerable (Torell et al., 2015).

The second research question is to assess the effectiveness of the legal framework governing premix distribution in Ghana. The objective sought to explore how effective the National Premix Committee regulations (L.I.2233) are in the selected coastal communities. It was to determine if the law is being implemented in the various fishing communities hence, identify the possible gaps in the L.I.2233.

The first theme under the assessment of the L.I.2233 is fishers are oblivious of the L.I.2233. Most fishers in Ghana do not know much about the L.I.2233. Interestingly, the body of knowledge is found to be high at the top (some Chief fishermen, Assembly Men and MCEs), and declines rapidly as it reaches the bottom (local fishermen, and fishmongers) as clearly stated by (Okyere et al., 2020). A lot of fishers are oblivious of the law because, there is lack of awareness creation in most of the coastal communities.This implies that,

fishers being oblivious about the L.I.2333 may be a hindrance or challenge to premix fuel distribution among fishermen in Ghana. However, most fishers encounter a lot of challenges with regards to premix fuel distribution because they do not know much about the law. Studies have also found out that, poverty level increases when fishers are oblivious of the management or fisheries laws (Akongyuure et al., 2017).

Secondly, Party foot soldiers take over the premix fuel distribution in Ghana is the second theme on assessing the L.I.2233. The distribution of premix fuel in small-scale fishing communities are associated with partisan politics as mentioned earlier. According to the interviews with the fisherfolk, LBCs have partially lost their powers to political party members in the various fishing communities and the membership have not been stable since it depends on the ruling party/government therefore, access of the product is influenced my political, social, and economic factors (Okyere et al., 2020).

Accountability and Transparency challenges with regard to the sales of Premix fuel in Ghana is the third theme in assessing the effectiveness of the L.I. 2233. Most fishers in Ghana face the challenges of accountability and transparency in their various fishing communities especially with respect to premix fuel distribution. Most of the LBCs are not accountable to the local fishers in terms of the sales of the premix fuel where fifty three percent of the premix proceeds are supposed to be used for developmental projects in the various communities as indicated by Okyere et al., (2020).

However, a lot of communities lack developmental projects such as schools and toilet facilities because, the fifty three percent of the premix proceeds have not being used for these projects (Owusu & Adjei, 2021). From

the findings, it is clear that, chief fishermen and council of elders are generally discontent about the situation as they deem it illegal and may have a negative impact on the community development as in line with the findings of Okyere et al., (2020).

Furthermore, hoarding smuggling and diversion of premix fuel are still pervasive in the various fishing communities in Ghana. Smuggling of premix fuel has remained a major challenge in the SSFs since the introduction of the premix fuel subsidy. The premix fuel is smuggled by some political party members (faithfuls), LBCs and MCES. The fuel is mostly purchased at the subsidised prices and hoarded by the smugglers to create artificial shortage. It is then resold at three-five times the actual price (Normanyo et al., 2016). Studies have showed that, the major reasons why some people hoard or smuggle premix fuel is that, fishers do not regularly get premix from the NPS to fish therefore, the fuel is hoarded so that, it will be resold when there is no fuel in the coastal communities (Kwao-Boateng & Gyamfi, 2022). The implications of smuggling is that, it always leads to premix fuel shortage in the various fishing communities which affects the economically vulnerable fishers because, buying the unsibsidised fuel or from the middlemen is very expensive to purchase as clearly indicated by (Freduah et al., 2019b).

Premix fuel is a highly inflammable product capable of causing a serious disasters if appropriate safety measures are not observed in dispensing and handling. A lot of fishermen get crowded at the premix discharge points because they want to get some of the fuel to purchase for their fishing expeditions hence, in most fishing communities in Ghana, premix fuel is sold to fishers by fetching from storage tanks with buckets which is a very dangerous

act as indicaed by (Okyere et al., 2020). Studies have shown that, a lot of fisherfolk have lost their lives as a result of mishandling of premix fuel which ended up in explosion (Adams et al., 2016).

In addition, there was a proposal in the selection of the LBCs by stakeholders in the various communites. Stakeholders like the chief fisherman and assembly men suggested that the LBC members should be elected rather than being selected soley MCEs. They suggested that, since there are many challenges associated with premix fuel distribution, the chief fisherman, assemblyman, members of the canoe owners among others should be given the power to elect the members of the landing beach committees. Fishers emphasised that, when the the LBCs are elected, it may go a long way to minimize the issues of politicization because election gives the opportunity for people to choose leaders of their choice as indicated by (Frank & Coma, 2017). The various distribution challenges could be happening because of how the LBCs are selected by the MCEs.

The third objective for this research was to assess the relationship between the quantity of premix fuel supply and the quantity of fish catch in the small-scale fisheries sector in Ghana. A trend graph was used to show the relationship between quantity of premix supply and quantity of fish catch which indicated that, there is fluctuation in the quantity of premix fuel supplied from 1999-2019 however, fish catch was declining considerably as well. For instance as explained earlier in the results section, the graph shows that, the year 1999 was the least year of premix Fuel supply but recorded a fish catch of 90,000 tons, whilst 2017 recorded the highest premix supply but recorded a quantity of fish catch of 60,000 tons. In interpreting and discussing this findings, there

is a massive fish stock decline in Ghanaian waters however the quantity of catch by small-scale fishermen are also declining (Asiedu et al., 2021). This means that, premix fuel supply by the government does not necessarily yield a higher fish catch by the artisanal sector Anticamara et al., (2011).

Furthermore, multiple regression was used to determine the impact of the quantity of premix fuel supply and the number of canoes on the quantity of fish catch. As stated in the results section, the reported P-value was 0.6 which means that though, there is an association between quantity of fuel supply, number of canoes and quantity of fish catch but, the relationship is not significant at (P> 0.05).This implies that, the quantity of premix supply and the number of canoes does not always have an effect or yield a greater catch as further explained by Schuhbauer et al., (2020). This could be as a result of the stock decline as mentioned earlier. According to Mallory, (2016), when there is a massive fish stock decline, greater fishing inputs like fuel use, and fishing gears does not yield greater catch but rather puts more pressure on the already dwindling stock.

Again, a correlation graph was also used to show the relationship between the quantity of fuel supply and the quantity of fish catch in the small-scale fisheries sector. In discussing the findings, the $\mathbf{r}^2$ of the correlation graph was 24%. This explains that, 24% of the variations in fish catch is as a result of the subsidised premix fuel. Surprisingly, the remaining 76% could be as a result of climate change and illegal, unreported and unregulated fishing (IUU). This implies that, other factors as indicated are causing massive variations in the quantity of fish catch as indicated by Asiedu et al., (2021).

A linear regression was used to show the impact of the hours spent on sea on the quantity of fish catch.The findings indicate that, the more hours spent on sea, the less likelihood of catching more fish. This implies that, there is a fish stock decline and more hours spent on sea is not yielding a greater catch as indicated by (McCluskey & Lewison, 2008).

Furthermore, the fourth objective of this research is to assess the contributions of the premix fuel subsidies on the livelihoods of fishers in Ghana. This objective sought to explore the benefits and perceptions of the premix fuel subsidies on the fish related incomes of fishers in Ghana. Fishers were asked in interviews if they were benefiting from the premix fuel subsidy introduced by the government. Almost 90% of the population said they benefit from the fuel subsidy. Most of the fishers emphasised that, the subsidised premix fuel is not expensive as compared to the unsubsidised fuel hence, they are able to buy more and go for their fishing expeditions.

Fishers explained that, though there is fish stock decline, they do not catch much fish as they used to in the past, but do not feel much of the impact because the fuel they use in fishing is subsidised so even if they go for fishing and they do not get any fish and make losses, they are able to cope and manage the situation other than using unsubsidised fuel to fish. This implies that, the premix fuel subsidies is contributing to the livelihoods of fishers by minimising the expenses they make on fuel. This could be the major reason why fishers want premix supply as a preference to other alternatives. Though some fishers still make loses, others are able to make a break even (Kwao-Boateng & Gyamfi, 2022).

Similarly, fishers were asked for their opinion on the removal of the fuel subsidy by the government. More than eighty percent of the population said they were against the removal of the fuel subsidy by the government. Most fishers emphasised that, when the fuel subsidy is removed by the government, it will make the fuel very expensive and they would not be able to afford it. As fishers explained, the complete subsidy removal may worsen their conditions since fishing with unsubsidised fuel can be expensive hence, most of them claimed they would stop the fishing business. As Markus (2010), and other authors have rightfully argued there is decline in catch but most fishermen are still in the fishing business because of the fuel subsidy which reduces the operational cost of fishing.

Again a scatterplot was used to determine the relationship between expenses made on premix fuel and the income generated by fishers per trip for the fouth objective. This implies that, the independent variable (expenses made on fuel) explained 18.1% of the variations in the dependent variable (income from fish catch. This implies that, expenses made on premix fuel does not always guarantee a greater or lower income (Kwao-boateng & Gyamfi, 2022).

Also, the linear regression output reported that, there is a significant relationship between the expenses made on premix fuel and income generated per trip (Sig.0.00 and an accepted p-value of 0.05). This implies that, though there is a positive relationship between expenses made on premix fuel and income earned from fish catch per trip, the relationship is moderate as indicated in the results section (r=0.425). However, more or less expenses made on premix fuel does not always influence the fish related income per trip as indicated by Owusu & Adjei, (2021). Studies have shown that there are several

factors that influences the income generation from fish catch per trip. Some of which are the type of fish cought and the amount in which the fish was sold (Schuhbauer et al., 2017). Though, premix subsidies is not significantly influencing the fish related income of fishers, a lot of them are still in business because premix is subsidised and not expensive as compared to other sources. This is still keeping them in business by (Asiedu et al.,2021).

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Premix fuel is a highly subsidised product purposely to be distributed to Ghana's small-scale fishermen. The main purpose for the introduction of the fisheries subsidy (premix fuel) is to reduce the burden of the economically vulnerable small-scale fishers in Ghana (Owusu & Adjei, 2021). However, its acquisition and distribution among fishers has become a great challenge in the small-scale fisheries sector (Okyere et al., 2020).

The governance structure of premix fuel distribution at the local level in the various fishing communities continues to be a challenge. Hoarding, politicisation, diversion and smuggling of premix fuel has affected the livelihoods of fishers in diversed ways. Also, the relationship between the quantity of premix supply and the quantity of fish catch has received little attention in the literature.

The main aim of this study was to assess the governance processes of the subsidised premix fuel in the small-scale fisheries sector and its implications on the livelihoods (income) of fishermen and fish mongers in Ghana. The study also sought to assess the effectiveness of the legal frameworks governing premix fuel distribution in Ghana and to assess the relationship between quantity of premix supply and the quantity of fish catch in the small-scale fisheries sector in Ghana. This research employed the mixed methods specifically the convergent mixed method design, where both the qualitative and quantitative data were collected at the same time.

Furthermore, the themes generated for the first objective were inspection of premix fuel, handing over to the landing beach committee and distribution of premix fuel to fishers in Ghana. Moreover, the second research question was to assess the effectiveness of legal framework governing premix fuel distribution in Ghana. Six themes were generated for this objective which are fishers are oblivious of the L.I.2233, party foot soldiers take Over premix fuel distribution, accountability and transparency challenges, smuggling hoarding and diversion still pervasive, and improper way of handling premix fuel. The L.I.2233 was reviewed and some gaps were identified. Some of these gaps are that, the L.I.2233 did not capture the safety precautions in handling premix fuel and the punishment for LBCs who are not accountable.

In addition, the third objective was to assess the relationship between the quantity of premix supply, number of canoes and the quantity of fish catch in the small-scale fisheries sector. The results indicated that, there was no significant relationship between premix fuel supply, number of canoes and the quantity of fish catch. This means that, more fuel subsidised by the government, and number of canoes does not necessarily lead to a greater fish catch. This could be as a result of the massive fish stock decline in Ghanaian waters hence, inputs such as fuel use and more canoes are not yielding greater catch but may rather put more pressure on the already declining fish stock.

Lastly, the forth objective for this research is to assess the contributions of the premix fuel subsidies on the fish related incomes of fishers in Ghana. A lot of fishers have the perception that, premix fuel subsidies contributes a greater percentage to their income generation. However, there is a significant relationship between expenses made on premix fuel and income generated from fish catch per trip, the relationship is moderate.

Conclusion

It was obverved that, premix distribution challenges cuts across almost all the coastal communities in Ghana. The economically vulnerable fishers are largey affected by politicisation and unequal distribution of premix. Some have left the fishing business, others have remained poorer. A good strategy to prevent hoarding, smuggling, and unequal distribution is to put metered and digitalised fuel dispensers at the landing beaches together with fisherman identification cards. To act as a deterrent for those who indulge in premix hoarding and diversion should face harsh punishment. Additionally, this might ensure that the distribution of premix to fishing communities is properly accounted for (Owusu & Adjei, 2021).

The L.1.2233 is not been enforced in most fishing communities because, a lot of middlemen who engage in illegalities such as hoarding and smuggling are not punished. Again, though the L.1.2233 states that, 53% of the premix proceeds are supposed to be used for developmental projects but a lot of communites lack such projects because of accountability challenges (Asumda, 2023).

Furthermore, premix fuel subsidised by the government does not neccessarily lead to a greater fish catch by fishermen in Ghana. There is

currently a massive fish stock decline in Ghanaian waters as mentioned and greater fishing inputs like the subsidised fuel puts a greater pressure on the already dwindled stock hence leading to a further decline in the quantity of fish catch (Anticamara et al., 2011). Furthermore, premix fuel supply is not significantly contributing to the income generation of fishermen in Ghana.

The study's general insights are that the current level of fishing inputs and catches are unsustainable. In order to prevent future stock depletion, inputs such as premix fuel subsidies has to be reduced to minimize overcapacity of canoes in the small-scale fisheries sector. Though premix supply is currently not yielding greater landings but it encourages overcapacity which may further put pressure on the dwindling fish stock.

This study has contributed to a better understanding of premix fuel governance and its implications on the livelihoods (income) of fishers in Ghana. As much as the premix fuel subsidy is moderately contributing to the income generation of fishers, others continue to break-even and even make losses because, more expenses made on premix fuel does not always yeilds a greater income fishermen. Though there is a fish stock decline and fishermen are not currently getting greater catches, a lot of them are still in the business because the fuel is subsidised and not expensive as compared to the unsubsidised one.

Recommendations

In addition, there should be a sequential reduction in the supply of premix fuel subsidy in order not to jeopardise the livelihoods of small-scale fishermen hence depoliticising the local distribution system to ensure equity in Ghana.

As a matter of fact, this study calls on government and policy makers interested in fisheries subsidy reforms to consider that, there is a massive fish stock decline and subsidising more premix does not lead to a greater fish catch. Some of the premix subsidisation funds should be re-channelled into other social intervention initiatives which would fully benefit the fishermen, such as education of the youth in coastal communities, insurance for fishers at their old age and supplementary livelihood interventions.

Furthermore, fishermen and other stakeholders should be well educated on the L.I.2233 to minimise premix distribution challenges since majority of fishers were oblivious of the law (Owusu & Adjei, 2021).Again, innovative measures such as tracking systems should be put in place to monitor activities on sea since the findings indicate that, saiko and light fishing still persist in Ghanaian waters. This may reduce bad fishing practices in Ghana.

Suggestion for Future Research

In addition, future studies should broaden the scope of the analysis taking into consideration the years of premix supply perhaps from 1994-2023 and the number of Pelagic fish species cought by the SSFS. This will give a comprehensive understanding of the trend and the relationship between premix supply and fish catch in Ghana.

Similarly, the analysis should be extended to include the relationship between expenses made on fuel and income generated from the sales of fish before and after the introduction of the premix fuel subsidy.This will better explain whether the subsidy is contributing to the fish related income of fishers in Ghana.

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APPENDICES

APPENDIX A: STRUCTURED INTERVIEW

UNIVERSITY OF CAPE COAST

SCHOOL OF BIOLOGICAL SCIENCES

DEPARTMENT OF FISHERIES AND AQUATIC SCIENCES

TITLE:

Assessment of Premix fuel Governance in Small-scale Fisheries Sector and the Implications on the livelihoods of fishers in Ghana.

Date……

SECTION A

Socio-demographic characteristics of respondent

1. The sex of the respondent……..

a) Male b) Female

2. Age of the respondents…….

3. Respondent's level of education

a) No formal education b) Primary/JHS C) Secondary e) Higher

4. Are you a household head? ……

a) Yes b) NO

5. How many individuals reside in your household?…….

6. Religious affiliation of household head…….

a) Christianity b) Islam c) Traditional e) Other

7. What is the occupation of the respondent?

a) Fisherman b)Fish monger c) Crew member d) Captain

8. Ethnicity …….

a) Ga b) Fante c) Nzema d) Ewe e) Ga Adangbe e) Other

9) Are you a canoe owner?

a) Yes b) No

10. Place of residence……

a) Kedzikope b) Axim c) Abandze d) Ningo Prampram

11. How long have you being a fisherman/fishmonger?.....

12. What is your marital status?

a) Married b) Not married c) Divorced d) Widowed

13. If married, what work does your spouse do? .....

SECTION B

GENERAL KNOWLEDGE ON PREMIX FUEL SUBSIDIES IN GHANA

14). What are some of the fishing items subsidised by the government in your community?

i) Premix fuel ii) outboard motors iii) Fishing nets iv) Other…….

15). Do you have any fishermen union in which you are part?

a) Yes b) No.

16). Are you benefiting from the premix fuel subsidies by the government?

A) Yes b) No

17). If YES to question **16**, how many times in a week do you get to purchase the fuel fisherfolk in your community?

a) Once a week b) Twice a week c) Three times a week d) Other…….

18) How many days in a week do you fish with the subsidised fuel when you purchase it in your community?

a) one day b) Two days c) Three days 4) Other……..

19) What type of vessels are usually used in fishing?

A) Canoe with Outboard Motor B) Canoe without Outboard Motor

20) If premix fuel is not available from the regular source for a month, does it change how often you fish?

a) Yes b) NO

21) Give your possible reasons to question 20 for selecting **YES** or **NO**.

……

……

……

……

……

SECTION C

PREMIX FUEL GOVERNANCE AND IMPLICATIONS OF THE SUBSIDIES ON THE LIVELIHOODS OF FISHERS IN GHANA.

22). Do you think the premix fuel **subsidies** is causing most of the distribution Challenges?

a) Yes b) NO

23). what are some of the governance or management issues you encounter from the sales of the fuel in your community? ……

24). What do you think are the main causes of fish stock decline in your community?

i) Saiko illegal fishing

ii) Light fishing

iii) Illegal nets

iv) Climate change impacts

v) Over fishing with the subsidized item such as premix fuel

vi) Other……..

25) How has some of these challenges facing fishers been addressed over the years?

a) Community initiatives b) Government policies c) Workshops d) Personal aids.

26) Do you think the distribution of the premix fuel in your community is fairly done?

a) Strongly Agree b) Moderately Agree c) Agree d) Disagree e) Strongly Disagree

27) What percentage of your fishing trips are made without the subsidised premix but with 'Super' fuel from the filling station and added oil?

A) Less than 10% b) 20-40% C) 50-70% D) 80-100%

28). Do you think premix fuel accessibility is an issue in your community?

a) Yes b) No

29) what are your taughts about the prices of premix fuel used in outboard motors?

A) Cheap B) Optimum C) Expensive D) Very Expensive

30) How frequent do you get premix fuel when you need it?

A) Very Frequent b) Frequent c) Not Frequent d)Other……

31) Do you think the the premix fuel subsidy is contributing to your income generation/livelihood monthly?

a) Yes b) NO

32) Give your reasons to question 31 for the selection of your answer …….

33) As an alternative to a premix subsidy, is there any type of help that you, your family, or your fishery would like to see the government put the subsidy money toward? Choose one of the following:

a) No alternative, fuel subsidy is the only and best option

b) Provide insurance for canoe damages and health insurance

c) Pension program

d) Soft Loans

34) How much do you earn per trip using the subsidized premix fuel? (State the number of fuel gallons used per trip and the corresponding revenue/income you get.....

35) What is the quantity (in gallons) of premix you use per trip and what is the quantity of fish you land per trip using the stated fuel? Quantity in pans……

39) How many hours do you spend per trip with the subsidized premix fuel?

……..

APPENDIX B: INTERVIEW GUIDE FOR A FOCUS GROUP DISCUSSION

INTRODUCTION SECTION

Dear participants,

My name is Vinolia Pitris Pawar, and the interpreter for this discussion is ……, this instrument has been designed in order to generate the primary source of data the MPhil Research thesis at the University of Cape Coast. The purpose of the study is to assess premix fuel governance in the small-scale fisheries and its implications on fishermen' livelihoods. It is voluntary to take part in this study. Participating in this study has no direct personal benefits, but it is likely that the findings will help the government, local authorities, community organizations, and civil society organizations take additional necessary activities. Your right to an anonymous participation in the study will be protected, and your information will be kept absolutely private. Your information will only be utilized for academic reasons. The FGD will take between 60 and 90 minutes.

I will be recording the discussions so that I won't forget anything you say but no names or identifying information will be included in the transcript of this recording. Your co-operation play a key role in the successful completion of this study and will be highly appreciated.

CONFIDENTIAL STATEMENT:

The information you will provide for this research will be kept strictly confidential. By completing this interview, you will be providing the researcher

with an information. Participation in this research is voluntary and one can decide not to participate if not willing to do so.

A. Details:

Date of F.G.D ……..

Number of males …….

Number of females ……

Place of interview …….

B. Rules

1. The moderator should set the ground rules of the engagement i.e:
   a. No answer is wrong/All answers are right
   b. Active participation is necessary
   c. No room for one person to dominate the discussion
   d. Nobody should prevent anybody from talking etc.

General Information:

ASSESSMENT OF THE GOVERNANACE OF PREMIX FUEL IN GHANA

A) What is the governance structure of premix fuel distribution in this community?

b**)** Who are the leaders in charge of premix fuel distribution in this community? How long have they performed this duty?

c) How do the leaders perform their roles? How do you see the roles they perform?

d) How often is the fuel distributed in a week/Month? Do all fishers get the required quantity they need for fishing?

e) What are some of the management issues you face in the distribution of the fuel? Probe further for effective distribution and transparency. The challenges.

f) Why do you think you are facing all these distribution challenges?

g) Do you think most of the issues are caused by the management?

h) How are the principles of good governance like transparency, inclusiveness, accountability, rule of law, equity, responsiveness, effectiveness, capacity and coordination implemented in premix distribution?

Policies and legal frameworks of premix fuel distribution:

I) Do you know what the National Premix Committee Regulations (L.I 2233) says about fuel distribution?

j) What are the policies and legal frameworks for premix fuel management in your community? Probe to see if they actually know the L.I.2233.

k) How do you see the policies, and legal frameworks (L.I. 2233) governing the fuel distribution/management? Probe further to see the various gaps in the premix law causing the various issues.

l) Does the Landing Beach Committees work in this community? Probe further to know if the chief fisherman has lost his power or not.

m) What is good and what is not good (like/dislike) about the premix fuel program?

IMPACTS OF SUBSIDISED PREMIX FUEL ON FISHING ACTIVITIES

n) Have/are you benefiting from the subsidized premix fuel? Probe further to know how.

o) How many times in a week is the fuel distributed to you as a fisher?

p) How many gallons/ drums are you supposed to get after distribution or sales? Probe to know if they get the requited amount. Also state the quantity of fish you catch with the number of fuel gallons you get (Quantity in pans).

q) Should the subsidy be taken off or maintained by the government? Give reasons for your answer.

r) Do you think the fuel subsidies has an impact on fishing activities? Probe further on how often they fish in a week with the subsidised fuel. Also if they will still fish that number of times without a subsidized fuel.

s) How many hours do you spend at sea roughly in a week when you have access to the subsidized fuel?

t) Do you buy fuel from other sources to fish when there is a shortage of premix fuel in your community? If Yes how often?

(u) If there is a shortage of premix fuel in your community, and fishers have to buy fuel from the fuel station, do you believe that the canoe owners will fish less? Probe further

(v) What are the processes a fisherman has to go through before getting the subsidised fuel in the community?

w) Is there other information on the governance or subsidy which you want to prompt me On?

APPENDIX C: INDEPTH INTERVIEW GUIDE

My name is Vinolia Pitris Pawar, and the interpreter for this discussion is ……,. This instrument has been designed in order to generate the primary source of data for MPhil thesis at the University of Cape Coast. The study intends to assess premix fuel governance in Ghana's small-scale fisheries sector and its implications on fishermen' livelihoods. It is voluntary to take part in this study. Participating in this study has no direct financial or personal benefits, but it is likely that the findings will assist local government entities, neighborhood associations, civil society organizations, and international organizations in taking additional necessary activities. Your right to an anonymous participation in the study will be protected, and your information will be kept absolutely private. Your information will only be utilized for academic reasons. The interview should take between 60 and 90 minutes.

I will be recording the discussions so that I won't miss anything you say but no names or identifying formation will be included in the transcript of this recording. Your co-operation play a key role in the successful completion of this study and will be highly appreciated.

Questions for a stakeholder at the National Premix Secretariat

1. How much premix fuel is subsidised yearly by the government?

2. How many fishers are currently benefiting from the subsidy ? Probe further to know the number of canoes.

3. Who are those officially in charge of distribution of the fuel at the local level?

4. What are the possible reasons for the premix fuel distribution challenges at the local level? Comment on your reason.

5. How has the challenges been addressed over the years?

6. How are the principles of good governance like transparency, inclusiveness, accountability, rule of law, equity, responsiveness, effectiveness, capacity and coordination been implemented in premix distribution at the local level?

Other Stakeholders (ie Chief fisherman, queen fish processor and canoe owners):

1) Who are the leaders in charge of premix management/distribution in your community? Probe further to see if the Landing Beach Committees have lost their power.

2) How is premix fuel distributed in this community (procedure)?

3) What are some of the governance/management issues you encounter from distribution?

4) Do you think the subsidies should be taken off or removed by the government? Probe to know the reasons.

5) What is currently the number of Canoes at sea? The number of canoes at sea

7) A question to the queen fish processors; How does unequal supply of premix affect your livelihoods? Probe further to know the various impacts.

Assessing the winners and loosers along the distribution chain, from the point of delivery to the point of sales.

6. How much/quantity of fuel is landed in a month in this community?

7. How many drums/gallons does each fishermen get? And how much do they pay for it?

8. What are some of the developmental projects derived from the sales of the premix fuel? Who are the people benefiting from the project?

Fishing Communities	Quantity of premix fuel in litres (weekly/ monthly)	The number of fishers in the Community that benefits.
1.Axim		
2. Abandze		
3.Old Ningo		
4.Kedzikope		

APPENDIX D

MULTIPLE REGRESSION

Table 15: *The relationship between quantity of premix supply, number of canoes and the quantity of fish catch.*

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.567634942
R Square	0.322209427
Adjusted R Square	0.24246936
Standard Error	20072.03753
Observations	20

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	3255926262	1.63E+09	4.0407469	0.03667009
Residual	17	6849073738	4.03E+08		
Total	19	10105000000			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	203316.0254	52824.9768	3.848862	0.0012869	91865.0665	314766.984	91865.06645	314766.984
Quantity of premix fuel supply	-0.00019416	0.000363299	-0.53443	0.5999611	-0.0009607	0.00057233	-0.00096065	0.00057233
Number of Canoes in the SSFS in Ghana	-9.013537008	5.709720099	-1.57863	0.1328465	-21.059993	3.0329194	-21.0599934	3.0329194

Table 16: *The relationship between hours spent on sea and quantity of fish catch per trip (quantity of fish catch in Pans).*

Output summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.062[a]	.004	.003	50.3828

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11029.863	1	11029.863	4.345	.037[b]
	Residual	2832878.431	1116	2538.422		
	Total	2843908.293	1117			

Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	46.710	2.390		19.542	.000	42.020	51.400
The number Of hours spent On sea per trip with premix fuel.	-.101	.049	-.062	-2.085	.037	-.197	-.006

Table 17: *Relationship between expenses made on premix fuel and income derived from fish catch per trip.*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.425[a]	0.181	0.180	1423.944

a. Predictors: (Constant), EXPENSES

ANOVA[a] (Expenses on fuel and Income from fish catch)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	502838870.572	1	502838870.572	247.995	.000[b]
	Residual	2274987202.932	1122	2027617.828		
	Total	2777826073.504	1123			

a. Dependent Variable: INCOME
b. Predictors: (Constant), EXPENSES

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	609.601	66.482		9.169	.000
	EXPENSES	2.870	.182	.425	15.748	.000

a. Dependent Variable: INCOME