UNIVERSITY OF CAPE COAST

SOCIO-ECONOMIC IMPLICATIONS OF CLOSED FISHING SEASON IN THE MARINE ARTISANAL SECTOR: A CASE STUDY OF ELMINA AND APAM IN THE CENTRAL REGION OF GHANA

ELLEN NYARKO YEBOAH

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BY

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DECLARATION

Candidate's Declaration

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

Candidate's Signature …….. Date ……

Name: Ellen Nyarko Yeboah

Supervisors' Declaration

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

Principal Supervisor's Signature: ..... Date: .....

Name: Prof. Denis W. Aheto

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Name: Prof. Edward Obodai

ABSTRACT

The study determined the socioeconomic implications of the closed season policy on artisanal fisherfolk in Ghana using Elmina and Apam fishing communities as a case study. The mixed-method design was used in the data collection. Stratified random sampling of households was used to select 268 respondents made up of canoe fishers, fish processors and traders from the two most vibrant fishing communities in Central Region of Ghana. A Semi-structured interview schedule, focused group discussion and key informant interviews were used to solicit information from the respondents. The results showed that all fisherfolk (100%) knew about the closed season policy, however, 47% of them did not know the purpose of the closure. Despite the differences in their perception, most fisherfolk were unsure of the policy's success in their fishing activities. No statistically significant differences were found between fisherfolks' perception and socio-demographic characteristics like age, level of education, main livelihood and years in livelihood; except among studied communities. The policy had an overall negative effect on fisherfolks' income and livelihood. As majority of fisherfolk lost a reasonable amount of money of about $199, the policy also led to high unemployment, increased hunger and malnutrition, increased school drop-out, theft and prostitution among fishing households and communities during the closure. 14% of these fisherfolk had other income-generating livelihoods, while, 21% of fisherfolk rely on their savings as a coping strategy during closure. For effective compliance, MOFAD should ensure that the purpose of the closure is disseminated to all individuals along the fisheries value chain mainly via radio announcement.

KEYWORDS

Socioeconomic

Closed Season

Marine Artisanal Sector

Fisherfolk

Elmina

Apam

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DEDICATION

I dedicate this work to my late mother Mrs. Comfort Amankwah

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LIST OF ABBREVIATIONS

APW	Ali-Poli-Watsa’
ANOVA	Analysis of Variance
BFAR	Bureau of Fisheries and Aquatic Resources
CBFMC	Community- Based Fisheries Management Committees
GDP	Gross Domestic Product
CCRF	Code of Conduct for Responsible Fisheries
CECAF	Committee for the Eastern Central Atlantic Fishery
DOF	Directorate of Fisheries
GHS	Ghana Cedis
DGN	Drift Gill Net
ECOWAS	Economic Community of West African States
EEZ	Exclusive Economic Zone
FEU	Fisheries Enforcement Unit
FAO	Food and Agriculture Organization
FC	Fisheries Commission
FGD	Focus Group Discussion
IUU	Illegal, Unreported and Unregulated fishing
KII	Key Informant Interviews
KEEA	Komenda–Edina–Eguafo–Abirem district
MCS	Monitoring, Control and Surveillance
MOFAD	Ministry of Fisheries and Aquaculture Development
NOAA	National Oceanic and Atmospheric Administration
NAFAG	National Fisheries Association of Ghana
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
STWG	Science and Technical Working Group
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
UNDP	United Nations Development Programme
USD	United States Dollar

CHAPTER ONE

INTRODUCTION

Background of the Study

Over the last several decades, global fisheries and aquaculture have grown dramatically. They provide for a variety of worldwide needs, including food for consumers, protein for animal feed, employment and revenue for fishery workers and recreational needs for sport fishers (FAO, 2018; Burger, 2002). Fish and fishery products are still among the world's most traded foods. 67 million tons of fisheries and aquaculture production were traded internationally in 2018, accounting for 38% of total production. Global fish exports climbed from USD 7.8 billion in 1976 to USD 164 billion in 2018. Fish accounted for 20% of the average per capita animal protein consumption for roughly 3.3 billion people around the world (FAO, 2018).

Globally, fish is the main source of food or revenue for nearly one billion individuals and about 50 million individuals are directly engaged in capturing and processing marine fish products (Béné et al. 2015). In many coastal developing countries, the fisheries sector is a crucial component of the national economy with contributions to GDP as high as 5 to 10% (Kombat, Ameyaw, Asiedu & Amadu, 2018). Fish is an extremely proteinaceous food consumed by a larger proportion of the population due to its accessibility and palatability (Foran, Carpenter, Hamilton, Knuth & Schwager, 2005). Again, it is also known to have exceptional amino acid content and protein digestibility ranging from 85 to 90%, which is superior to other animal protein sources such as goat, chicken and meat (Khan, Qureshi, Nasir, Rasool & Iqbal, 2011). Fish constitutes the major source of animal protein in Africa and about 20% of global fish

production is consumed by Africans who contribute the lowest to world fish output (FAO, 2013). It has the most balanced amino acid profile and its intake cuts across cultural and religious boundaries, hence the intense demand for its consumption worldwide (Ogundiran, Adewoye, Ayandiran & Dahunsi, 2014).

Ghana is significantly endowed with valuable fish stock as well as a robust heritage and culture of fishing similar to those in other West African countries. Natural upwelling in the Gulf of Guinea provides for a highly productive capture fishery and on average, the country produces 440,000 metric tons of fish each year. Ghana is both an importer as well exporter of fish (Amponsah et al., 2020). Fisheries are essential for livelihoods and food security, job creation, revenue generation, nutrition, wealth generation and poverty reduction, aiding sustainable development of the Ghanaian economy (Odotei, 2002). FAO (2016) projected that fisheries are responsible for more than 29,300 fishing boats and 250,000 fishermen. Fish is an essential part of the Ghanaian diet, accounting for over 60% of animal protein (Hɛn Mpoano, 2013). MOFAD (2018) noted that the fisheries industry accounts for 1.2% and 6.6% of GDP and Agriculture GDP[2] respectively. The average contribution of fish to animal food consumption in Ghana tends to be among the highest on the globe, with a per capita demand in the last decade ranging from 20-25 kg, which is significantly more than the ECOWAS region's average of 14 kg. Over 2.7 million people work as ancillary workers in the sub-sector, including fishermen, processors, boat builders, boat owners and others (MOFAD 2018).

According to FAO (2016), Ghana's fisheries sector is based on marine, inland (freshwater) and coastal lagoons resources. The marine fisheries sector is the principal source of fish generating about 85% of the total catch, with the

inland sector representing the remaining 15% (Nunoo & Asiedu, 2013). The marine capture fisheries sector in Ghana comprises of three primary kinds of fishing fleets: artisanal canoes (largely but not all motorized), semi-industrial boats (wooden boats including "China" boat) and industrial boats (large-scale trawlers and tuna boats) (Hɛn Mpoano, 2013). In terms of landings and fleet capacity, the artisanal marine-capture fishery sector is the most significant of the three subsectors in Ghana. The artisanal fisheries are the most significant of all in terms of their immense contribution to production and local fish supply (Akpalu et al. 2018). It produces roughly 70 - 80% of the country's marine fish (FAO, 2007). The artisanal fishermen deploy gear such as beach seine, purse seine, drift net, gill net, hook and line, lobster net, among others. Currently, there are approximately 11,583 canoes operating on 292 landing beaches and 186 fishing villages generating about 75 and 80% of the total landed marine fish (Dovlo, Amador, Nkrumah et al. 2016).

However, fisheries resources particularly the small pelagics are highly over-exploited (ATFALCO, 2012). To this end, Ghana produces only a fraction of its yearly fish demands, despite the industry recording a dramatic fall in output in recent years (Hɛn Mpoano, 2013). At present, domestic annual fish production is projected to fall short of national demands and the deficit is balanced by annual imports of fish. While Ghana generates approximately 400,000 tons of fish every year, it imports close to 600,000 tons worth more than of US$200 million per annum (FAO, 2016). Indeed, Ghana's critically important pelagic species have been declining since the mid-1990s (Lazar et al. 2017). Total landings have declined sharply since the year 2000, reaching their highest level at 19,608 tons in 2016. This reflects 14% of the highest recorded

landings of 138,955 tons observed in 1996 (Lazar et al., 2018). This is evident by the fact that the fisheries contribution to GDP has declined since 1993 from roughly 6% to around 1.2% currently (FAO, 2016; MOFAD, 2018).

Furthermore, fisheries production in the marine artisanal subsector which accounts for the about 70 to 80% nationally produced fish has decreased for most of the period in latest years, from 230,000 mt in 2006 to 198,656.23 mt representing 13.63% reduction in 2014 and indeed to 176,398 mt accounting for 23.30% reduction in 2017 (MOFAD, 2018). Based on existing national marine fisheries data, there has been a rise in fishing effort in terms of the number of fishermen, vessels and kinds of fishing gear. Capacity for capturing fish increasingly expand as annual fish yield declines, indicating a significantly overcapitalized and overfished fishing industry. Challenges in the fisheries have persisted partly because of an open-access canoe fishery, a canoe does not need a fishing license to fish (World Bank Group, 2015). Jacques (2015) purported that the issues of overfishing and other stresses on fish populations have continued to grow in scale, from smaller to more global pressures. These pressures are found in changes in the water column, such as through warming, ocean acidification, pollution, habitat destruction, fishing effort and practices. Governance is woefully inadequate, and on the high seas, anarchy rules the waves. Technological innovation mixed with a lack of regulation, is widening the gap between rich and poor as those countries that can exploit depleting resources continue to do so at the expense of others who suffer the consequences of their actions (Global Ocean Commission, 2014).

The depletion of fisheries resources is among the most challenging problems facing humanity and alarming reports point to the severity of the crisis globally (Sumaila, 2012; Murawski, 2010; Pauly et al., 2005). The crisis and its related management failure are of acute significance in developing countries where coastal communities are increasingly reliant on marine resources, as they are the primary source of protein and livelihood opportunities. According to Beddington, Agnew & Clark (2007), finding explanations for the fisheries management failure is a complicated task and its causes are undoubtedly found in the complex interactions of the human and natural domains. Although fishery experts disagreed with the precise nature of the status of global fisheries, typically these disagreements are about "just how bad is it?". Jacques (2015) noted that, despite the fact that several articles highlight areas where fish stock rebuilding could occur, few voices of reason advocate for systematic improvement in the marine ecosystem productivity. Though there are many papers identifying where rebuilding could occur. It is fair to say that global fisheries experts continue to call attention to growing problems that threaten ecosystem services, food security, livelihoods, cultural meaning and economic welfare as the world's stocks continue to decline (Jacques, 2015).

The public perception is that fisheries are in crisis and have been so for some time. Several scientific articles have highlighted the failures of fisheries management that have resulted in this crisis (Jeghers & Alexander, 1953). These are widely recognized as overcapacity in fishing fleets, failure to enforce unpalatable but essential reduction in fishing effort on fishing fleets and communities, failure to address the ecosystem impacts of fishing and IUU fishing. Trawlers actively engaged in IUU fishing activities deplete the targeted

demersal stocks. Until recently, many trawlers fished within the inshore exclusive zones, competing with artisanal fishers over dwindling stocks of small pelagic species (Akpalu et al., 2018). However, it has been shown that fish stocks can recover when sustainable fisheries management schemes are introduced, but recovery will only be feasible if the endangered stocks are fished less intensively for several years (Murawski, 2010; OECD, 2006).

Regulatory Context of Ghana's Closed Season

The Fisheries Act 2002, (Act 625): Section 84 stipulates that the Commission may by notice in the Gazette declare closed seasons, including their duration for fishing in specified areas of the coastal waters or the riverine system (FC, 2002).

Similarly, the Fisheries Management Plan (MOFAD, 2015-2019) specifies that closed seasons must be implemented in accordance with oceanographic data (mainly from May and June between two upwelling periods when fish adults come close to shore to spawn). The strategy specifies one month for all pelagic species and two months for demersal species (MOFAD, 2015).

MOFAD in 2018 attempted to introduce a closed season policy for all fleets except for the tuna industry. The decision, as well as the policy, was based on strong scientific evidence, however, it became a contentious issue and assumed political dimensions (Ntiamoah, 2018). Government pulled back because of the widespread agitation by some industry players particularly the canoe sector who felt the announcement of the notice was too short and untimely (Ansah, 2018). The section 84, sub-section (1) of the Fisheries Act 625 states:

A declaration made under subsection (1) shall be given all reasonable publicity and, when feasible, shall be given in advance of the closed season.

Again, the agitations from the fisherfolk were in relation to their livelihoods, loss of income and the lack of job alternatives. The suspension of the policy for implementation in 2019 therefore brings to the fore the need for adequate information on the social and economic implications of such a measure on fishing communities. Given that, the majority of these communities are heavily dependent on marine fishing as a major source of their livelihoods and employment (Nunoo et al. 2014). There is a need therefore for an in-depth scientific study to inform the process and policy in order to facilitate the success of such a policy in future.

Closed fishing season

According to Rola et al. (2018) the closed fishing season provides future conservation and other spill-over benefits, but often meets with mixed perception and sometimes resistance, particularly where a significant proportion of livelihood is impacted. This is a concern since perceptions of benefits are incentive for support and success of the strategy. Seasonal closure are commonly used in fisheries as an efficient conservation measure (Rola et al. 2018). The concept of the closed fishing season as explained by Lazar et al. (2016), is based on biological returns of spawning potential, allowing fish to reproduce before being caught during the breeding season. This technique is widely used to aid effort management and reduction. The first management approach often used is seasonal closures in many fisheries and if they do not prove effective, they may be augmented or replaced with additional measures.

It is also a way of balancing concerns about conserving ecosystem function and sustaining livelihoods (Cohen, Cinner & Foale, 2013).

Statement of the Problem

Ghana has a long tradition of an active fishing industry that has made giant strides over the years (Koranteng, 2004). Conversely, the sector is faced with the challenge of declining fisheries resources culminating from weak governance that has tolerated wasteful over-capacity, conflicts and pervasive unsustainable and harmful fishing practices among others. Some fishermen have adopted the use of unsustainable fishing methods including but not limited to light fishing, Carbide, Cyanide, Dynamite fishing, use of insecticides and other obnoxious substances (Coastal Resources Centre, 2013; MOFAD, 2015). According to the CRC (2013) report, the situation has led to significant decreases in capture fisheries notably the dwindling of *Sardinella* species. Thus, IUU fishing is now an issue of concern currently attracting considerable attention in Ghana's fisheries management arena (Finegold et al., 2010). It is also increasingly recognized that, the open access fisheries i.e. unregulated fisheries with no entry restrictions in Ghana had already led to overfishing.

These depleting marine fisheries resources has become a worldwide concern, thus the United Nations Sustainable Development Goal (SDG) 14; aims to conserve and sustainably utilize the oceans, seas and marine resources in order to achieve sustainable development (UNDP, 2015). Indicator 14.4.1 stipulates that, a proportion of fish stocks must be maintained within biologically sustainable levels. It is expected that, fisheries policy makers could effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-

based management plans (such closed season) in order to restore fish stocks to levels that can produce maximum sustainable yield by 2020 (United Nations, 2016). This however, has contributed to the implementation of the Ghana's first ever closed season policy.

Nevertheless, it has been observed for some time now that the seasonal closure has an influence on fisherfolks' livelihood, income and their household food security due to scarcity of fish during this time. This scenario suggests the fisherfolk adopt coping mechanisms in order to survive. Most literature on annual fishing ban emphasize the importance of the fishing ban thereby neglecting the influence the ban has on the household of these fisherfolk. Further, there is little literature on the expected resulting coping mechanisms to be adopted by fisherfolk as a response to sustainable household food security. Failure to have adequate information makes it difficult for policy makers to know the usefulness and dangers of the closed season to the fisherfolk which can make interventions difficult to formulate.

Justification

Ghana's capacity to properly utilize its marine fisheries resources while also ensuring their long-term sustainability is severely lacking. Ghana, in particular, is faced with growing challenges in managing its marine fisheries resources which has resulted in substantial declines. Overfishing at both artisanal and industrial scales, using unsustainable fishing methods, and the pollution of coastal ecosystems, are major concerns. These problems still persist owning to the reality that Ghana operates in an open-access fishery, it is therefore necessary that Ghana moves more towards managed-access fishery given that closed season is a key issue in the fisheries law and the fisheries

management plan. Closed season policy is therefore adopted as a management measure and how it could be effectively implemented for fish stock rebuilding. In efforts to support research for informed policy making in fisheries extension and management, this study was commissioned with focus on the socioeconomic implication of the closed season policy on the direct resource dependents (fisherfolk) and their coping strategies during the period of the closure.

Aim of the Study

The main objective of this study is to assess the socio-economic implications of the fisheries closed season in Ghana's marine artisanal subsector. The specific objectives are to:

1. assess the perceptions of the fisherfolk and key stakeholders on the fisheries closed season policy.
2. examine the social and economic impacts of the closed season on fisherfolk
3. determine the alternative livelihood opportunities and coping strategies of fisherfolk.

Research Questions

1. What is the perception of the fisherfolk on closed season policy?
2. What are the social and economic impacts of closed season on fisheries value chain?
3. What are the alternative livelihood opportunities and coping strategies of fisherfolk?

Significance of the Study

This study will serve as a baseline data to inform the process and policy in order to promote the success of similar policy in future. This research is particularly relevant to the MOFAD and other policy makers. Inadequate information makes it difficult for policymakers to know the usefulness and risks of the closed season to fisherfolk, making action or interventions difficult to formulate.

Delimitation of the study

This study focused on Elmina and Apam landing beaches and gives a snapshot of the socio-economic implications of closed season policy on the fisherfolk in these communities. The study also assessed the perceptions of the fishers and key stakeholders on fisheries closed season policy, estimate the social and economic impacts of closed fishing season on fisheries value chain and determine the supplementary livelihood opportunities at Elmina- Apam, in the Central Region of Ghana.

Limitation of the Study

All research work has peculiar challenges and this study is no exception. The main limitation of this study was that most interviews were conducted during the months of no closed season. The responses that the researcher got were relied on the memories of the fisherfolk and what they remembered to have been doing or will be doing during the month of closed season is on. The other limitation was that some fisherfolk were ‘very busy’ with the fishing activities and so the interviews were done from the market or the beach which was not so conducive for an interview with accurate responses.

Definition of Key Terms

This section provides the operational definition of terms as used in this study.

Fishers/Fishermen: these are men who go to sea to fish for a living

Processors: These are mostly women who are directly engaged in processing the fish before it gets to the consumers.

Fish trader/marketer: These are intermediaries who buy and sell fresh fish directly from the beach and sometimes trade smoked fish to consumers.

Fisherfolk: These are all the men and women who engage in fishing activities especially for a living

Organisation of the Study

This thesis is organized into six main chapters. Chapter one comprises the background to the study, the statement of the problem, the purpose of the study, significance of the study, the delimitation and limitations of the study, and the definition of key terms as used in the study. Chapter two reviews relevant literature including the marine fishery sector of Ghana, artisanal fisheries, inshore or semi-industrial fisheries, industrial fisheries, fisheries management in Ghana, economic underperformance of fisheries, dwindling fish stocks and degraded marine environment, Chapter three presents the research methodology which includes the study areas, research design, population, sample and sampling techniques, research instruments used, pilot study to pre-test the instruments, data collection and analysis procedures. Chapters four and five present the results and discussion of the analysed data respectively based on the specific objectives and research question of the study.

Finally, chapter six provides the summary, conclusions and trecommendations based on the findings of the study.

CHAPTER TWO

LITERATURE REVIEW

Introduction

The purpose of this study was to assess the socioeconomic implications of fisheries closed season at Elmina and Apam, Ghana. This chapter of the study reviews literature of relevant works which was gathered from published journals articles and books. The overview and structure of small-scale fisheries in Ghana, current challenges facing the sector, type of management strategies available for monitoring are among the topics covered. It also considers the effects of closed season to the world's fishery; success and failure stories.

Ghanaian Fishery

According to MOFAD (2018), capture, culture-based, and aquaculture are the three main sources of fisheries in Ghana. Capture fisheries involves fish harvesting from marine (the ocean), brackish (lagoons), riverine (such as Oti, Pra, Black and White Volta), lacustrine (including Lakes Volta and Bosomtwe) sources. Culture-based fisheries is mostly practiced in reservoirs, dams and dug-outs mainly in the three northern regions of Ghana whereas aquaculture is practiced in both fresh and marine water sources. Fishing is a significant economic activity in many underdeveloped countries. The importance of fishing for subsistence and economic growth differs across West Africa (Atta-Mills, Alder & Sumaila 2004).

Fisheries resources are a major source of food and economic activity in Ghana, and until recently Ghana was considered a major fishing nation in the Africa region. Fish provides about 60% of the country's low-cost but high quality protein requirements as well as essential minerals, vitamins and lipids

with the per capita consumption of fish ranging between 20 to 25 kg per year (MOFAD, 2018). Aside dietary protein, fish provides a range of livelihoods and foreign exchange (Mensah & Antwi, 2002). Fish and fishery products are now the country's most important non-traditional exports accounting for over 50% of earnings from non-traditional exports (Nunoo et al. 2014). The value of annual fish export is nearly US$ 209 million and it is increasing every year (Fisheries Commission, 2014). Fish exports to established markets in developed countries, mainly in Europe, are a vital source of foreign exchange for a developing country like Ghana, and aid the country to derive maximum benefits from its fisheries.

Ghana's fishing industry began on a small-scale in the 1700s operating close to coastal waters, lagoons, estuaries, and rivers using very basic and inefficient gear, craft and methods (FAO, 2016). The sector currently relies on marine fisheries and, to a lesser extent, inland fisheries and aquaculture. Ghana's fisheries sector encompasses a diverse and vigorous array of fishing operations. Within this vast spectrum, fish stocks are harvested from rivers, lakes, coastal lagoons and shallow seas and offshore waters in the Atlantic Ocean. (Nunoo & Asiedu, 2013). As regards marine sources, Ghana has the Gulf of Guinea with a coastline of 550 km and its exploitable marine fisheries resources include small pelagic, large pelagic and demersal species. The marine fisheries comprise the small-scale artisanal, semi-industrial, and large-scale industrial fisheries and of the three subsectors, the artisanal fisheries are the most important of all in terms of its great contribution to production and local fish supply (Dovlo et al. 2016).

Artisanal Fishery

Artisanal fishing is a dynamic activity that range from sedentary to migrant fishers or communities, from part time to full time fishing activity, from subsistence to nondifferentiated or highly differentiated and specialized fishing (Demuynck, 1994). Coastal communities engaging in artisanal fishing use traditional methods that are frequently less intense and stressful compared to modern industrial fishing techniques (Demuynck, 1994; Mathew, 2001). The activities of such communities are frequently targeted at supplying fish and fishing products to local and domestic markets and as well as household consumption (FAO, 2003). Millions of people are employed in the sector, both directly and indirectly. FAO (1998), noted that small-scale fishing accounts for 98 percent of all fishing jobs globally.

The artisanal sector is the biggest in terms of productivity among the fisheries sectors in Ghana. It contributes about 71% of the marine total catch, mainly made up of small pelagic species. The most important small pelagics include round sardinellas, flat sardinellas, anchovy, chub and horse mackerels (MOFAD, 2018). By virtue of their quantities, small pelagic contribute immensely to national fish food security. MOFAD (2018) noted that most important demersal species include sea breams, red snappers, groupers, grunts, croakers, cephalopods and shrimps; and together with the tunas, these contribute significantly to foreign exchange earnings and about 92 percent of fishery workers are small- scale artisanal fishers. This is confirmed by an assessment conducted by FAO (1991) as cited by Akyeampong et al. (2013) which indicated that, artisanal fishing accounts for around 98 percent of the 1.9 million people who engage in full-time, part-time, or seasonal fishing (Akyeampong et

al. 2013). In many developing nations, artisanal fishing provides a source of income, particularly for low-income households in rural areas. Tetteh (2007) estimated that, the artisanal sub-section of Ghana's fishery employs roughly 30,000 people. In as much as this may be true, it fails to clearly identify the subsectors involved.

In addition to nutrition, small scale fishing activities in Africa play a crucial role in some economic activities including trade (Marquette et al., 2002). The rudimentary technologies used by artisanal fishers in Africa distinguish them from large-scale commercial fishing operations. Smaller boats and gear are used by artisanal fishermen, and they land fewer fish than large-scale commercial fishing vessels. The small-scale artisanal subsector is an open access multi-gear fishery, operated from 142,001 dugout canoes (MOFAD, 2018). Artisanal fishermen deploy gears such as purse seines, beach seines, gill nets, drifting nets, lines, lobster nets, and so on. There are currently about 11,583 canoes operating in 292 landing beaches and 186 fishing villages producing between 75 to 80% of the total marine fish landed (Dovlo et al. 2016). Various artisanal gears target different resources: the purse seines and beach seines are targeting primarily small pelagics. During upwelling seasons, purse seines are used to exploit chub mackerel as these species migrate into coastal waters to spawn. This gear is used in coastal waters to catch anchovies and juvenile fish during non-upwelling periods. Mature anchovies are exploited with beach seines during the upwelling season, whereas juvenile anchovies are caught during non-upwelling seasons (Quaatey, 1997)

Inshore or Semi-Industrial Fisheries

The semi-industrial subsector comprises of 400 hp out of which 250 hp are operational. They are vessels of wood hull locally constructed and powered by inboard engines of 100 hp (MOFAD, 2018). The vessels serve multipurpose function of purse seining and bottom trawling. During upwelling seasons, the inshore vessels operate as purse seiners, then switch to bottom trawling for the rest of the year. Chub mackerel and other *Carangidae* species are targeted by the purse seiners. They fish in the same coastal waters as the artisanal fleet during the upwelling seasons. The small-sized trawlers target triggerfish (*Balistes capriscus*), while medium-sized net also exploit seabreams (mainly *Pagrus caeruleostictus*, *Pagellus bellottii* and *Dentex canariensis*), snappers (*Lutjanus fulgens and L.goreensis*), red mullet (*Pseudupeneus prayensis*), cassava fish (*Pseudotolithus senegalensis*), burrito (*Brachydeuterus auritus*) and groupers (*Epinephelus aeneus*). Bottom trawling is done in waters with a depth of more than 30 meters. The semi-industrial vessels use ice for preserving fish at sea, and a fishing trip typically lasted 3 to 5 days. The disappearance of *B. capriscus* from Ghanaian waters in the late 1980s had a significant impact on the sector's performance. Overfishing has been linked to their extinction, according to researchers (Quaatey, 1997).

Industrial Fisheries

The industrial subsector comprises 97 trawlers and 33 tuna vessels made of steel hull and are imported (MOFAD, 2018). The vessels operate out of deep-water ports in Tema and Takoradi. Demersal and semi-pelagic species are targeted by trawlers and shrimpers. As deep-sea vessels, these trawlers are required by law to operate in waters deeper than 30 m. The industrial fleet

includes onboard freezers for preserving fish and they can stay at sea for months. According to reports, the industrial fleet has grown dramatically in number since 1984, when the Ghanaian government adopted an industrial fishing program as a means of encouraging non-traditional exports (Quaatey, 1997; Nunoo & Asiedu, 2013).

Moreover, trawlers are often over 35 meters long and have engines that produce over 600 hp, whilst shrimpers are up to 30 m in length and have engines that produce over 350 hp. Originally, the trawlers fished off the west and south-west coast of Africa particularly from Sierra Leone to Mauritania and in the Angola and Namibia area. The enforcement of the 200-nautical-mile EEZ regulation by these governments has forced these vessels out of these waters (Samey, 2015). Commercial shrimpers are only allowed to operate between latitudes 1°45'W to 2°30'W and 0°15'E to 1°12'E and in waters deeper than 30 m. Pink shrimp (*Penaeus notialis*) are the primary prey of these vessels. Finfish such as red mullet, soles, seabreams, cuttlefish and cassava fish are caught as by-catch by these shrimpers. By law, industrial trawlers must operate in waters deeper than 30 m. The bottom beyond the 75 m depth contour, on the other hand, is untrawlable, restricting their operational range.

The numbers of industrial fleet have increased considerably since the start of Ghana Economic Recovery Programme in 1984. The program's goal was to encourage nontraditional export to generate foreign exchange for the country. The number of operating trawlers has increased from 10 in 1984 to 33 in 1995 (Samey, 2015). Snappers, seabreams, cuttlefish, soles, cassava fish and groupers are among the species targeted for export by these vessels. With two vessels, commercial shrimping resumed in 1986 and by 1996, there were 18

vessels. There are currently two shrimpers operating in the country (Samey, 2015). The industrial vessels feature onboard freezing equipment for preserving fish and can stay for months at sea.

Economic Underperformance of Fisheries

Fish stocks, being a renewable natural resource, can generate a sustainable flow of benefits to society (FAO, 2009). However, even if fisheries are managed effectively at their biological maximum production, they may be operating below their economic optimum. Eighty percent of the world's fish stocks that are fully exploited, overexploited, depleted or recovering are underperforming economically costing the global economy an estimated loss of USD 50 billion each year (World Bank & FAO, 2009). This deficit is due to two primary factors: depleted fish stocks mean that there are fewer fish available to catch and catching expenses are higher than they could be; and the overcapacity in the fishing fleet means that the potential benefits are dissipated via excessive fishing effort. Approximately half of the present level of fishing effort might be used to achieve the current level of marine catch. Subsidies to the worldwide fishing fleet, estimated at USD 30-34 billion per year, are an additional cost to society that, in many circumstances, continue to encourage unsustainable fishing practices and are significant contributors to overexploitation of fish stocks (Suuronen et al., 2012).

Declining fisheries

Despite the enormous importance and value of fisheries in West Africa, the combined consequences of overfishing and environmental degradation are wreaking havoc on fisheries. This problem is well-known, and there are a number of African programs aimed at improving fisheries. Ghana exports high-

value fish while importing low-value fish, and in 2007, Ghana imported nearly three times as much as it exported (Bailey et al. 2011). This implies that domestic fisheries are not meeting domestic demand. Nunoo, Asiedu, Olauson & Intsiful, (2015) noted that, fishery resources in Ghana are under stress from population pressure, rising demand of fish and fishery products and open-access regime. Several research findings including Agnew et al. (2009), FAO (2009) Garcia & Rosenberg (2010) have highlighted the increasing problems that global fisheries face. The majority of the world's fishing fleet are overcapitalized, with 28% of stocks being overexploited, depleted or recovering. Approximately 10 million tons of fish are discarded; 11–26 million tons (worth USD 10–23 billion) are lost to IUU fishing. Underperformance due to inefficient operations, Illegal, unreported and unregulated fishing (IUU), estimated at 11–26 million tons of fish worth USD 10–20 billion annually (Agnew et al. 2009), puts additional pressure on fish resources and undermines management efforts. It is difficult to hold IUU fishermen accountable when they tranship at sea. Vessels operating illegally bypass port authorities by transhipping illegal catches to another vessel at sea. Illegally caught fish can be combined with legally caught fish and then legally commercialized. In West Africa, for instance, most IUU fishing vessels do not land in countries in the region. As vast majority of catches are exported, fishers use at-sea transhipment to launder the fish and send it directly to the final destination or to ports of convenience (Martini, 2013).

Over half of all fish stocks have been fully exploited, resulting in catches that are or near their maximum sustainable limits. Only around 20% are moderately exploited or underexploited with the possibility to produce more

(FAO 2009; Garcia & Rosenberg, 2010); while 19% are overexploited, 8% depleted, and 1% recovering, yielding less than their potential (FAO 2009; Garcia & Rosenberg, 2010). Since the 1970s, the fraction of overexploited, depleted, and recovering stocks has tripled. There has been a trend of recurrent depletion of fish stocks over the last 30 years, with fleets targeting different stocks or new, previously unmarketable species such as deep-water species, estimated to contribute 4 million tons (Garcia & Rosenberg, 2010).

Fisheries Management in Ghana

The Ministry of Fisheries and Aquaculture Development (MOFAD), the Fisheries Commission (FC), and its technical division under the Directorate of Fisheries regulate Ghana's fishing industry. Since 1997, global trends and innovation in fisheries management on the other hand, have influenced the adoption of the co-management approach, resulting in the establishment and operation of Community-Based Fisheries Management Committees (CBFMC). Fisheries co-management programs are arrangements in which the government and user groups share responsibility for managing fisheries resources (Wilson et al. 2010). Currently, there are two main fishery management regimes in Ghana: formal and traditional management systems (Nunoo et al. 2015).

According to the Fisheries Management Plan (2015-2019), the formal fisheries management system aims at attaining two important objectives. The first is to limit the fishing effort of industrial vessels (particularly trawlers and shrimpers) by limiting entry into the fishery through vessel licensing; the second is to prescribe the mesh sizes to be used in any fishery to limit the exploitation of juvenile or immature fish (including shellfish and molluscs) (MOFAD, 2015). However, in order to conform to global fishing policy, this management

establishment must ensure that responsible fishing is carried out in accordance with the FAO Code of Conduct for Responsible Fisheries (CCRF). The Fisheries Enforcement Unit (FEU) of the Monitoring, Control and Surveillance (MCS) division of the DOF was established in 2013 to help ensure compliance with fisheries regulations thereby attaining responsible fisheries.

Furthermore, formal fisheries management approaches have failed to produce the expected outcomes. Traditional fisheries practices are increasingly being incorporated into formal fisheries management practices. (Nunoo et al., 2015). The traditional fisheries management regime on the other hand, aims at regulating access to marine fisheries in Ghana through local authorities. In practically every fishing community, for example, during the week, fishermen repair their gear and equipment, resolve problems, rest and engage in other social activities on a non-fishing day. For varying periods (up to two weeks) prior to and during yearly festivals, several fishing communities or ethnic groups have a total prohibition on fishing activities (Nunoo, 2009). Both management regimes lack the ability to administratively monitor fishing behavior (areas where they are supposed to fish when at sea) and fishing zones, therefore, making planning and implementation of the current laws less effective (Nunoo et al. 2015).

There is a worldwide perception that modern fisheries management strategies are failing to address the overexploitation of fishery resources. Stocks that are managed by both modern and traditional fisheries are improving globally (Hilborn & Ovando, 2014). Fisheries experts now recognize that a fishery cannot be managed effectively without the cooperation of fishers to make laws and regulations work (Yamamoto, 1995). As recognized by Nunoo

et al. (2015), there is inadequate understanding of traditional fisheries management practices in Ghana by both the formal managers, scientists, researchers, and the general populace. This has resulted in formulation of unsustainable and ineffective policies and management plans which sometimes lead to conflicts and mistrust between fisheries officers, fishers and fishing communities.

Fisheries are complex and dynamic systems, that provides a source of revenue and livelihood worldwide (FAO, 2010). Fishing impacts not only fish stocks but also marine ecosystems (Grafton, 2010), representing one of the potential threats to the integrity and sustainability of marine resources (Ye et al. 2012). However, fishing vessels, on the other hand, do not fish at random in the target species' distributional range (Ellis & Wang, 2007; Stelzenmüller et al. 2008; Poos et al. 2010); instead, they search for areas where fish concentrate (Paloheimo & Dickie, 1964). This situation therefore calls for monitoring and control of activities of fishers to enhance management. The Fisheries Act 2002 of Ghana in the quest to enhancing proper management of the Ghanaian fishery, established the Monitoring, Control and Surveillance Unit. The Unit is in charge of monitoring, controlling and surveilling all fishing operations within the Ghanaian waters using whatever means necessary, including the management and operation of a satellite base station for data transmission relating to the activities of foreign fishing vessels licensed to operate within the EEZ, as well as the enforcement of the Act, Regulations made under the Act, and any other enactment relating to the regulation (Fisheries Act, 2002).

The Act empowers the Minister to request personnel from other Departments, agencies of State and other competent authorities or organizations to assist the Enforcement Unit, which is made up of personnel from the Ghana Navy, Ghana Air Force and the Secretariat of the Fisheries Commission. Under the Act, these individuals are given police and other powers both within and beyond Ghana (Kwadjosse, 2009). They are also given full insurance coverage for the duration of their sea duties, as well as immunity from prosecution for acts committed in good faith when carrying out their obligations under the Act. (Fisheries Act, 2002). The Act establishes the duties of authorized officers of the Enforcement Unit toward masters and crews of vessels, as well as the compliance of masters and crew with authorized officers' directives and penalties for violations of the instructions (Kwadjosse, 2009).

The Concept of Closed Fishing Season

Seasonal closures or fishing bans have been used in the fishing industry as conservation measures since the seventeenth century. Over time, the closed season, also known as a seasonal fishing ban, has become a widely accepted conservation and regulatory measure in tropical and subtropical fisheries that improves fish preservation by minimizing overfishing and conserving species during their breeding season (Ye, 1998; Arendse et al. 2007; Hargraves 2011; Cohen et al. 2013). Over the last few decades, research into the use of closed seasons and areas for fisheries management has increased at an almost exponential rate (Pauly et al., 2002). Because conventional effort controls had failed repeatedly in the late 1990s, fisheries managers began to rely more increasingly on seasonal and area closures, as well as other spatial management measure (Agardy, 1997) as cited by (Nenadovic et al., 2012).

According to Mosquera, Cote, Jennings & Reynolds (2000), closed season and closed area management are gaining popularity due to a variety of perceived benefits for both target species and the environment. Fishery managers, for example, seek to protect areas with high fish concentration and vital habitat by implementing seasonal and area closures (NRC, 2002). Its socially acceptable and locally implementable way to balance concerns about conserving ecosystem function and sustaining livelihoods (Cohen, Cinner & Foale, 2013). Overexploitation is common among fish that aggregate at predictable locations and times to spawn. Seasonal closures have often been implemented in an attempt to alleviate such impacts but the effectiveness of these is rarely tested (Clarke et al. 2015).

The term "closed season" sometimes known as a "biological rest period", refers to the prohibition of fishing during a fish's spawning period. It is a way of reducing fishing pressure on stocks when they are at their most productive, allowing fish to lay eggs to replace the population lost due to fishing and other natural causes. Provided that a sufficient number of fish remain to breed, the closed season can, by "protecting the pregnant fish", increase the stock available for fishing in just a few years. These strategies are usually implemented to control fishing effort, to improve spawning potential by protecting adults during spawning season, or to protect juveniles from depletion during recruitment period (Gulland, 1977). Gulland (1977) stated that there is little theoretical justification for seasonal closures in most instances. Other management goals may be served by temporary/seasonal closures, which can have both direct and indirect effects. Seasonal closures are the first management

approach used in many fisheries and are later supplemented or replaced with more effective measures.

Beets and Manuel (2007) assert that seasonal closure management strategy is primarily based on effort control. Its purpose is to reduce catching power and fishing mortality by limiting the amount of fishing to a predetermined level, resulting in increased stock size. Most commonly, closures are timed to coincide with normal and generally predictable periods when the fish stocks in question are considered to be particularly vulnerable to fishing pressures, such as spawning activity, vulnerable growth periods, or migration of animals.

Works of Rola et al. (2018) indicated that, closed fishing season is just one of the many fisheries management approaches adopted by the state, local authorities and coastal communities to conserve and improve fish stocks and other marine resources. A "closed season" will be most successful when other types of fishing pressure are also controlled such as use of illegal small mesh size nets, light fishing, use of poisons and toxic chemicals, and dynamite or other explosives. This is confirmed Jennings et al. (2001) who stated that "effort controls, such as seasonal closures, are unlikely to be effective if not imposed with other measures like catch control and gear restrictions" and hence proper management for Ghanaian fisheries includes;

- Closed season for all fisheries sectors
- Moratorium on new entrants and end open access
- Additional fishing holiday
- Closed areas
- Fishing gear restrictions (net dimensions and mesh size)

- Effort control measures
- Co-management
- Enforcement

Closed fishing season as a management practice can contribute positively or negatively to the improvement of the livelihood of fishers. Nevertheless, observations and findings indicate that as closed fishing seasons are put into effect, fishers who entirely depend on fishing are affected especially low-income fishers who spend a greater proportion of their household expenditure on fish. The bigger question which remains is "whether closed fishing seasons are effective means of increasing reproductive output" as suggested by Ye (1988).

Success Stories on Seasonal Closures in Fisheries Management

Seasonal closures have been shown to enhance invertebrate fisheries, such as shrimp (NOAA, 1985). Seasonal closures have been linked to both direct and indirect benefits. According to Caddy (1984), when seasonal closures are properly implemented, economic benefits are realized. Seasonal closures can safeguard a resource when it is particularly vulnerable, improve economic return when market or resource conditions are bad, and restrict harvest when some species are toxic or unpalatable during certain seasons (Beets & Manuel, 2007). Lazar et al. (2016) noted few out of the many critical examples around the world where a closed season resulted in an increase in yield and improved economic returns to the fishing sector.

- In the U.S., almost all current fisheries management plans incorporate a form of closed fishing season for recreational fisheries or commercial or both. For example, a closed season for tautog (*Tautoga onitis*), a slow

growing demersal species, was implemented in 2001 in Narragansett Bay in Rhode Island, USA for two months during spawning season. By 2012, the stock had recovered, with the full rebuilding of the stock projected to be realized by 2016 (RIDFW, 2015).

- In the Philippines, for three years in a row, a closure during spawning season resulted in an increase in sardine catch. In just one year after establishing the closed season, the highest increase of 90,000 mt, or nearly 30%, was achieved in 2013. Fishermen bought into the process and gained the trust of the government to implement this conservation measure. In 2015, fishermen urged that the process be extended and that additional volunteers be involved in monitoring compliance (BFAR, 2015).
- In Senegal, since 2010, a two-month seasonal closure during the spawning season for octopus has resulted in a 35% increase in yield and allowed the stock to be rebuilt to sustainable levels in just three years.
- In 2015, Guinea Conakry's Ministry of Fisheries enacted a two-month seasonal closure for all fisheries, with the exception of subsistence fisheries (July-August). According to newspaper reports, this initiative was supported by stakeholders and appears to have been a success.
- Similarly, the closed season has been employed as a crucial management technique in Mauritania and Morocco to reduce fishing effort and mortality while also rebuilding small pelagic and octopus stocks. These measures aided in the reversal of small pelagic and octopus stock declines. Morocco saw an increase in landings of up to

40,000 mt of octopus valued at $8 million (Infofish.org, 2013) and a 125% rise in landings of small pelagics in 2015 (CECAF, 2015).

Failures in the Use of Seasonal Closures in Fisheries Management

Seasonal ban have a long history of failures, especially when they are utilized as the only management strategy in a fishery, as described by (Beets and Manuel (2007).

- Large temperate fisheries, such as the Pacific Halibut fishery and the groundfish fishery off the New England coast, have had the most notable failures (Sinclair & Valdimarsson 2003). Invertebrate fisheries have also experienced failures; Everson (1986) cited multiple examples of seasonal closures being an ineffective management strategy in lobster fisheries.
- Seasonal closures in the Pacific halibut fishery were established and deemed economically desirable by resource agencies. However, Skud (1985) accorded that seasonal closures, failed to reduce fishing effort and was considered to be of limited conservation value. He also stated that regulatory measures that are most effective in controlling effort are more critical than measures concerned with gear protection of young fishes.
- Seasonal closures have been in place in the New England groundfish fishery since the 1970s, but they have had little impact on the declining groundfish stocks. Other management measures (such as gear restrictions) were found to protect flatfish, skates and scallops when used in conjunction with seasonal closures (Sinclair & Valdimarsson, 2003).

- In some circumstances, seasonal closures are regarded ineffective strategies and alternative measures are implemented. The abolition of the closed season in the Hawaiian longline swordfish fishery, for example, was regarded more advantageous for the conservation of threatened and endangered species (sea turtles) than other measures (Federal Register, 2004). Seasonal closures and other management measures in the multi-species snapper-grouper fishery in the US South Atlantic region failed to reduce overfishing, thus they were replaced with a complement of strategies (Federal Register, 2004).

Historical and Scientific Philosophy behind Ghana's Closed Season Policy

In Ghana, the main peak spawning or reproduction period for small pelagics is August based on recent studies (FAO, 2010). A time where fish aggregate and move in large schools close to shore to spawn. During their movement, they become vulnerable and are easily caught as they feed on the surface waters (FAO, 2010). This same period is known as the period of the "bumper" harvest by local fishermen. It appears that the peak has shifted from June-July in early to August in recent years. Quaatey (1993) observed mature stage fish throughout the year, with the highest peak in June and July and a lower concentration in November, both induced by upwelling cycles (Figure 1).

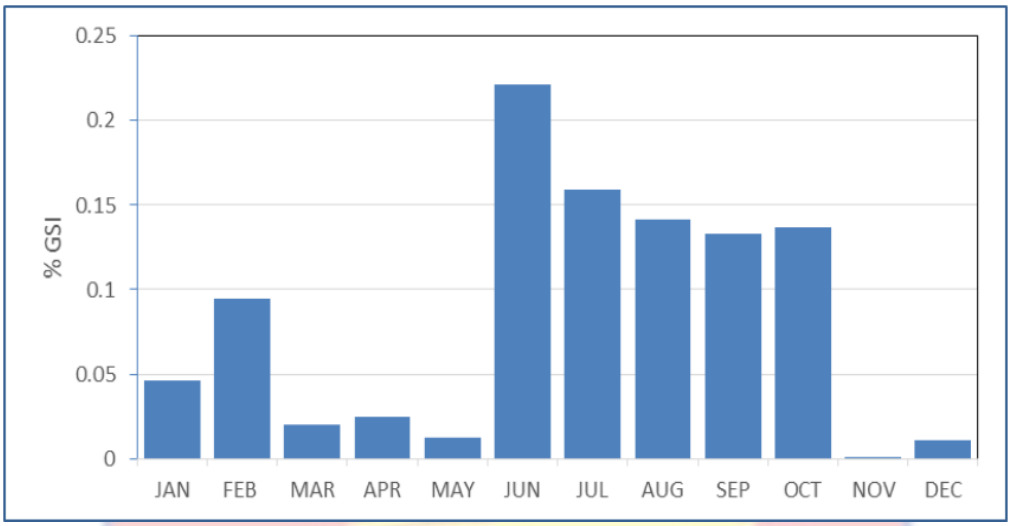

Figure 1: Monthly percent gonadosomatic index of *Sardinella aurita* (Source: Quaatey, 1993)

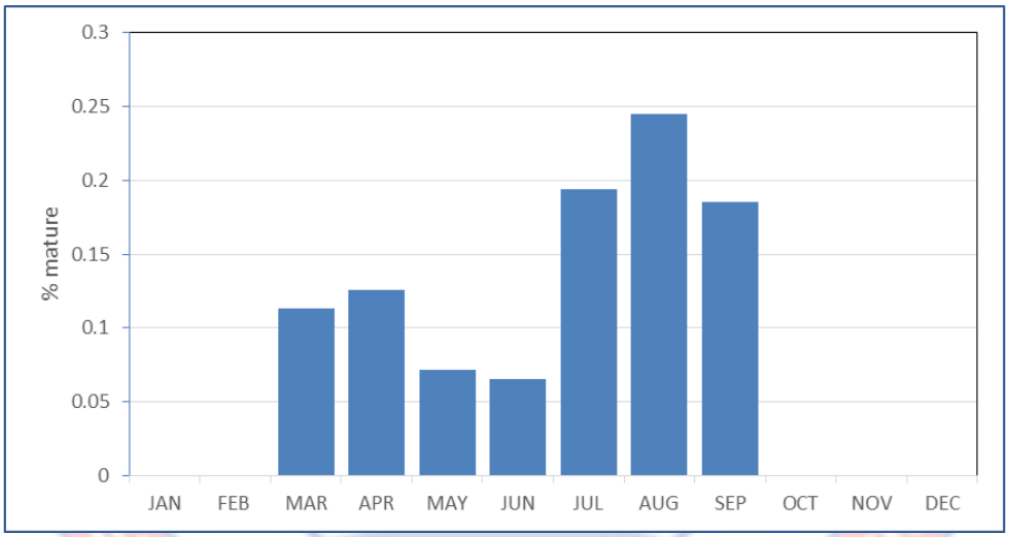

Figure 2: Monthly occurrence of mature male and female *Sardinella aurita* (Source: Osei, 2014)

According to Osei (2014), *Sardinella aurita* spawned throughout a seven-month period, with a minor spawning season in April and May and a significant spawning season in August (Figure 2). According to Wiafe (2008), the upwelling index peaks in August which results in high landings. The abundance of food (plankton) available for adult and juvenile fish also peaks in August which enhances survival and viability of juvenile fish (Wiafe et al. 2008;

Quaatey, 1993). Fishermen in the studied communities confirmed the presence of large percentage of gravid (pregnant) females in August, furthermore fish processors also complain of low value smoked fish during this month because the fish are full of eggs, oily and burst open and lose shape during smoking. This results in drop in profit margin.

In response to the decline in fish stock for small pelagic species, the Government of Ghana planned a closed fishing season in August 2018, which is also the month for maximum spawning period for the small pelagics, preferably the bumper season. However, Government of Ghana backed away from the 2018 closed season due to strong political pressure from the fishing industry and communities, who raised arguments about lack of preparation and insufficient alternative livelihoods, short notice and unresolved conflicts between the fishing industry regarding the timing of the closure and its impact on cultural festivals. Due to this, a number of options were discussed at the Science and Technical Working Group meeting which resulted in final recommendation that was discussed by representatives from government (MOFAD, FC, MSC, Regional Directors), academia, NGOs, artisanal, semi-industrial, industrial, women processors and the National Association of Fisheries of Ghana (NAFAG).

The final recommendation took into consideration the need for a balance between cultural, socio-economic and biological needs of fishers while maximizing benefits for small pelagic stock rebuilding. It was approved by the STWG to close the fisheries for all fleets at the same time (except tuna) from July 1 to 31, 2019. After further consultation, the MOFAD selected an alternative period for the closed season from May 15 to June 15, 2019 to protect

artisanal fishing. This decision was reached through prior consultations with the National Fisheries Association of Ghana (NAFAG), who preferred this period over the July closure because it was outside of the bumper season (July-August) and they believed would ease the economic burden on artisanal fisherfolk. It was after years of deliberations that the first ever closed season was implemented since the country adopted the National Fisheries Management Plan after the recommendation made by the STWG in 2015 (STWG, 2015). A second closed season for industrial trawlers was to run from August 1 to August 31, which in anyway coincides with the spawning season for small pelagics.

Currently, the planned closed season is only one measure in the National Fisheries Management Plan therefore all other measures must be implemented to ensure fish remain a part of Ghana's future economy, and importantly the livelihoods, health, nutrition and food security of those estimated people who directly and indirectly depend on this industry around the 'people's fish'. Once the closed season becomes a regular annual rest period to allow pregnant fish to spawn, and illegal means of fishing are controlled or eliminated, the landing of the 'people's fish' and other fish species can be expected to increase and also prevents the kind of high supply but low price of fish situation that happens every August in Ghana.

Theoretical Framework of the Study

The Theory of Change: Societal Impacts of Closed Season Policy

The theory of change, as shown in Figure 3, can be used to guide the analysis of the impacts of the closed season policy. Situations that usually leads to the closed season policy include; the open access multi-geared nature couple with the weak enforcement regime of Ghanaian fishery causing fleet

overcapacity and hence overfishing (catching more juvenile and spawning fishes then the system can produce). The depletion could be attributed to overexploitation to feed an ever-increasing human population and biophysical factors such as changes in ocean water temperature.

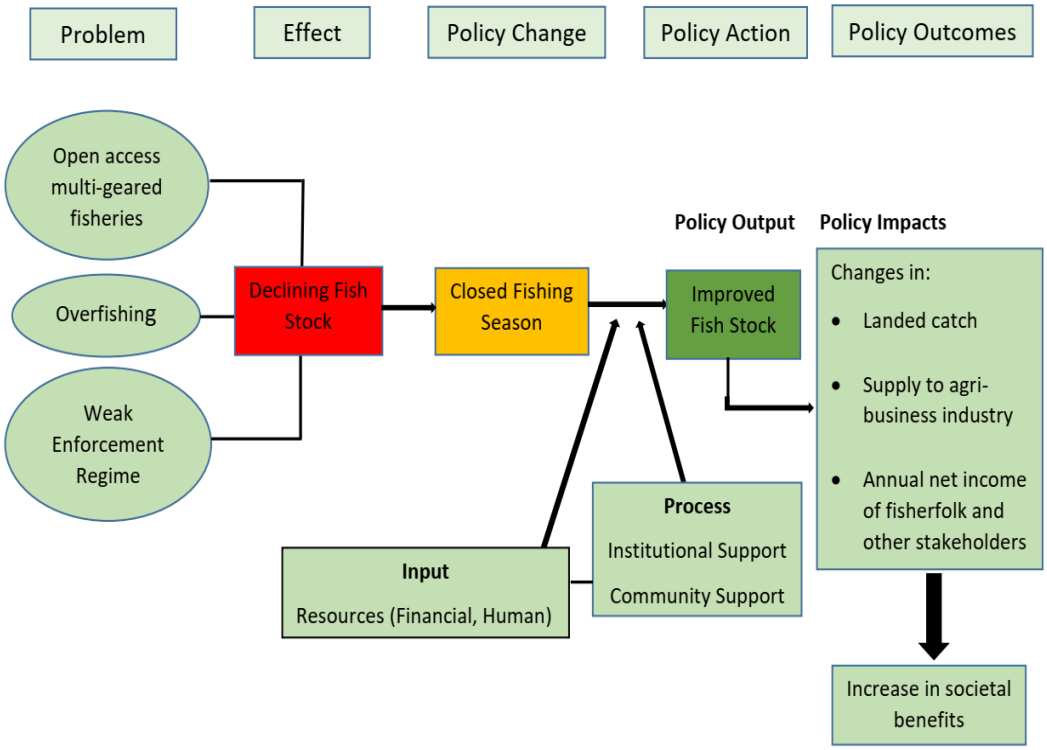

Figure 3: Theoretical framework of the study

The policy intervention was the declaration of a closed fishing season, which prohibits harvesting sardinellas during their spawning season. It is expected that there will be improvement in the fish stocks and thus increase in societal benefit.

Chapter Summary

The chapter began with the overview of Ghana's fisheries industry, fisheries Management in Ghana, closed season policies, conceptual framework that explained the study area to be able to project concrete findings. It

highlighted the Theory of Change; Societal Impacts of Closed Season Policy. The empirical review sought to review the appropriate literature that was of the essence to the study.

CHAPTER THREE

METHODOLOGY

Introduction

This chapter describes the procedures and techniques used to collect and analyze data for this study. It captures the study area, research design, the population, the sampling procedure, the sample size, the research instrument, data collection, data processing and analysis that were used as well as the rationale behind choosing these techniques for the study.

Research Design

This study follows pragmatic paradigm and employed the explanatory concurrent mixed research approach (qualitative and quantitative) using cross-sectional survey design. The approach was deemed to be better based on the objectives of this study. Quantitative research, according to Muijs (2004), is gathering numerical data and analyzing it using mathematically based approaches (in particular statistics) to explain phenomena. Qualitative research, on the other hand, involves the collection of extensive narrative data (i.e., non-numerical data) on many variables across time in order to get insights into phenomena of interest (Muijs, 2004).

However, Sarandakos (1993) asserted qualitative research involves non-quantitative data collecting and analysis procedures aimed at exploring social relations, attitudes, knowledge and practice of a group of respondents regarding certain subjects; and is conducted under clear methodological approaches based on various theoretical principles. Its fundamental goal is to describe the variation in a phenomenon, situation or attitude that respondents have experienced. These two approaches were used because the study sought to

collect both qualitative and quantitative data. Usually, surveys gather data at a particular point in time with the intention of describing the nature of existing conditions; or identifying standards against which existing conditions can be compared; or determining the relationships that exist between specific events (Cohen, Manion & Morrison, 2005).

Study Areas

This research was carried out in Elmina and Apam, the two most active commercial fishing communities in the Central Region of Ghana. The study focused on the artisanal marine subsector. The Elmina (5.1053° N, 1.3421° W) is the district capital for Komenda–Edina–Eguafo–Abirem (KEEA). Elmina has a long history as a key commerce center during colonial times, as well as a fishing community with fishing dating back to the 1400s (Odotei, 2002). Apam (5.2941° N, 0.7390° W) is the district capital of Gomoa West, located around 45 km east of Cape Coast, the Central Regional capital. Fort Patience, a Dutch-built fort erected in 1702, is located in Apam (Nunoo et al. 2009). It was an important port prior to independence, but after Tema was created, shipping ceased. It has a lot of fishermen as fishing is the main industry. Over the years, these two communities have witnessed a great deal of western civilization and influence, as well as various commercial activity. In terms of beach area, number of vessels, number of fishermen, and quality of fisheries support services, Elmina beach is the larger of the two. In 2016, a canoe frame study discovered that whereas Elmina had 2,006 fishermen and 97 purse seine nets, Apam had only 1,437 fisherman and 68 purse seine nets (Dovlo, Amador & Nkrumah, 2016).

Again, Semi-industrial (inshore) and artisanal marine fishing occur at both landing beaches. While the semi-industrial fishers utilize locally manufactured wooden-hulled crafts with in-board engines, the artisanal fishermen employ wooden dug-out canoes that may be either motorized or not. More than half of these canoes are known to be powered by outboard engines of 25 or 40 hp. The semi-industrial fishers mostly utilize trawling gear to target demersal fishes such as seabreams and groupers, as well as locally known purse seine gear, 'Ali-Poli-Watsa' (APW), which captures small pelagic mackerels and sardines among others. Artisanal fishermen use a variety of gillnet designed for small and medium-sized pelagic fish, a drift gill net (DGN) for large pelagic fish such as tunas, dolphins, sharks, sailfish, swordfish, and marlins, set nets for invertebrate species such as crabs and lobsters, hook and line, APW and beach seine gear for both demersal and pelagic species such as croakers. Elmina and Apam were purposively selected, because they have a thriving fishing sector and a huge number of canoes without-board motors lining their beach areas. The major fishing season in the waters of these communities are between August and December. The fishermen have a well-established association, a branch of the Ghana National Canoe Fishermen Association. The women in these communities are mostly fish processors.

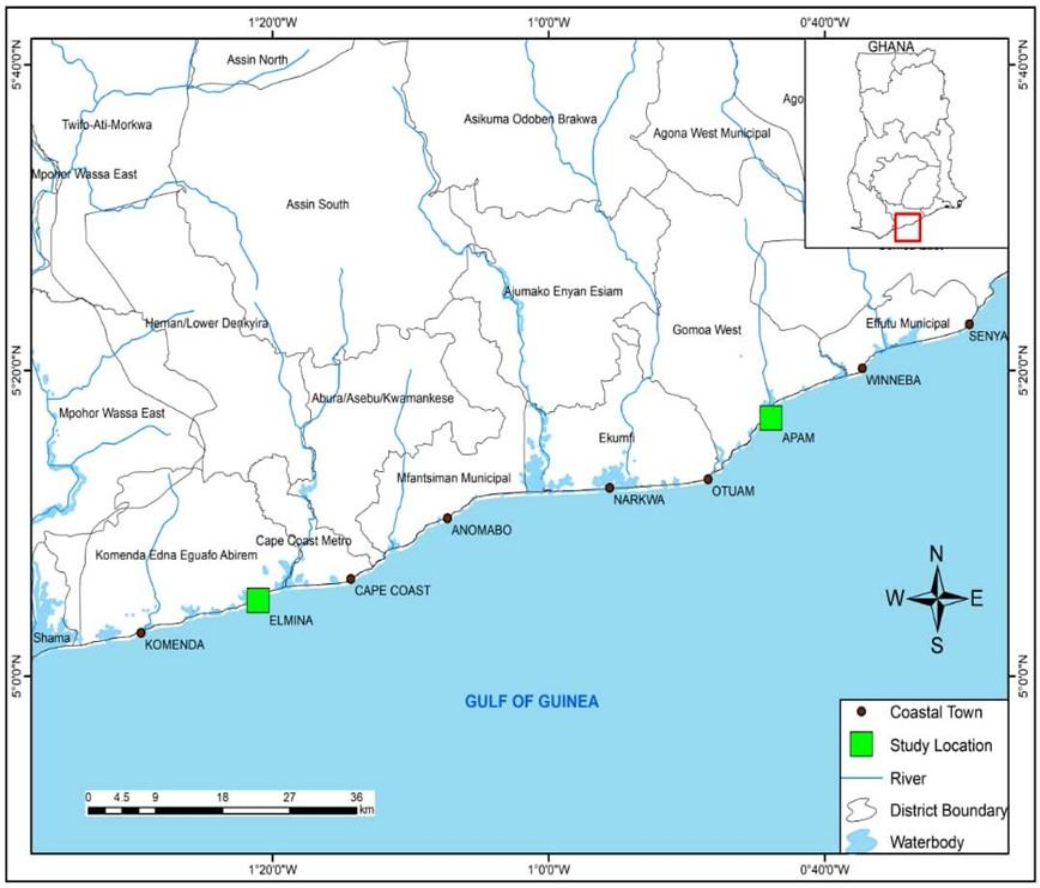

Figure 4: Map of a portion of Southern Ghana, showing the study area

Population

The target group about which the researcher is interested in gaining information and drawing any conclusion is what defines a population. Hence the target population used in this study were of three (3) different sets. They included:

1. All artisanal fishers in Elmina and Apam who are currently into effective fishing. It was realized some of the fishers in the study area have been inactive for a while and so the study needed the responses of only fishers who were actively fishing. The reason for this decision is that those who were still in active fishing business were perceived to have felt the

impact of the close season and hence may have enough information needed to enrich the study.

2. All fish processors in the study areas who either buy fishes from the fishers or get them from their husbands and process them for the final consumers.
3. All fish traders/marketers in Elmina and Apam who either trade fish from the fishers or buy/ sell for their husbands or buy directly at the beach and sell to a fellow processor or at the market or to the final consumers without processing, others also trade smoked fish. This was deemed appropriate to find out what they also know about closed fisheries season policy in order to get a holistic view on the study topic.

Sample and Sampling Procedures

Purposive sampling (maximum variation sampling) technique based on 2016 Ghana Canoe Frame Survey Dovlo et al. (2016) was used to select the landing beaches. This was proceeded by stratified random sampling of the household (respondents) at the various study sites. The sampling unit was household. At the end, 95 households constituting about 268 fishermen, fish processors and fish traders were encountered at the two communities. Exactly 51 and 44 households were sampled at Elmina and Apam respectively.

Data Collection Instrument

The major instrument for the study was the semi-structured interview protocol and observation guide. The interview-schedule was used because most people in the target group were illiterates or did not have any formal education. This was also to enable the researcher explain the instrument vividly to get relevant detailed information. The instrument contained both open and close-

ended questions. The questions were based on the specific objectives of the study to ensure that the relevant variables were included. Here, one main structured interview-schedule instrument was used for all the three different groups along the fisheries value chain with specific questions targeting a specific group (fishers, processors and fish traders). The instrument for these three main groups was divided into six sections.

The first section covered the socio-demographic characteristics of the respondents; second section addressed the fishery; whereas social indicators were captured in section three. Section four addresses economic indicator while section five on the other hand, comprised of livelihood assets with the sixth section covering the perception of fisherfolk on closed fishing season. A pilot test of the structured interview schedule was conducted using sixty-five (65) respondents from Biriwa and Moree landing beaches with similar characteristics such as age, gender, knowledge and experience. The use of the sample size of 65 was in line with the view suggested by Baker (1994) who recommended a range of 10 - 20 percent of the total sample size for a pilot testing. The pilot testing was done to enable respondents to provide feedback about whether the questions and responses categories were clear and also to assess the time it takes them to complete the questionnaire. It was discovered during the pilot that some respondents did not respond to a few statements, perhaps, they did not understand them because they felt they were slightly ambiguous. Such statements were noted and later restructured. The data gathered through the use of questionnaire were coded into the Statistical Package for Social Science (SPSS 25.0).

Data Collection Procedure

The respondents were also given assurance of anonymity as research ethics demand.

Interview

Face-to-face interviews were conducted after the researcher had met the respondents to explain the purpose of the study. Individual fishers, fish processors and fish traders were interviewed using the structured interview schedule. The interview was conducted by literal translation of the questions into the local dialect (Fante/Twi) common to the respondents since most of the respondents could neither speak nor understand English language. This was done to ensure better communication and retrieval of reliable and accurate responses. The data were collected by the student researcher and another trained field assistant at each community.

The assistants were trained in order to understand what was meant by every aspect of the instrument. Individual fishers, processors and traders who agreed to be part of the study were interviewed upon agreeing to respond to questions the researcher asked. All interviews were conducted in their households. Most respondents were interviewed while mending their nets while others were processing, some relaxing at home or just returning from fishing. Appointments were scheduled to meet them in a group at the community centers. Each interview lasted for approximately one hour. The data was collected from April 2019 to October 2019. This method of data collection was considered appropriate since it gave room to elicit more responses from the respondents for further explanation to the opened and/or closed-ended items.

Focus Group Discussion (FGD)

Two community level focus group discussion were conducted in each community. The two-level groups were fisherman to fisherman group and processor to trader group. Each group comprised of odd number members which ensured certainty and effective decision making especially when issues that came needed to be voted on. 9 members attended the FGD at Elmina for fisherman to fisherman yet no processor and/or traders showed up at the meeting or was willing to participate in the exercise. In Apam however, 9 members attended the FGD for the two groups. This aspect of the survey brought up genuine issues and more information which went a long way to confirm issues raised at the individual levels.

Key Informant Interviews (KII)

In all, 6 key informants consisting of 2 fisheries officers, regional fisheries director, NGO and 2 chief fishermen were involved in an in-depth interview in order to generate additional data to explain the quantitative data collected in the first phase. In-depth interviews provide a number of advantages over other data collection methods, such as surveys, in that they provide far more specific and detailed information. This was used to complement data gathered from the questionnaire. Details of the interview guide can be seen in Appendix B.

Observation

Observation is one of the instruments often used to collect qualitative data. According to Denscombe (2008) using this instrument gives researchers the opportunity to interact with participants in their natural settings, see things for themselves and determine the data to collect on them. Bell (2008) believes

that observation is useful in determining what people actually do or how they actually behave in their context. Looking at these benefits associated with observation, it was necessary to employ that in assessing the sites of fishing operation, the processing methods used, how work is done, those involved in the fisheries activities that maybe impacted directly by closed season policy.

Data Processing and Analysis

The data collected from the survey were thoroughly cleaned to free them from any unwanted material or information after which the coding manual was developed. The carefully cleaned data were critically organized and coded for statistical analysis. Using the Statistical Package for Social Science (SPSS) computer software, version 25.0, the data were then analyzed according to the research objectives or questions as follows; the socio-economic characteristics of the respondents were analyzed using descriptive statistics such as central tendencies, frequencies, and percentages, ranges results and presented in tables and figures. The qualitative data were transcribed and analyzed thematically. Following these steps; logical and comprehensive outcomes were obtained which helped to explain the quantitative data.

Ethics Consideration

When doing research, one should always look at the ethical dimensions and pitfalls. In this research ethics are of even greater concerns due to the contentious nature of closed season policy implementation which later assumed a political dimension. In this research, some ethical principles were followed. The first is that participant will not be harmed in any way. This includes, but is not limited to, physical harm, harm to participants' development, loss of self-esteem, and stress (Bryman, 2012). However, in practice, one must

acknowledge that this is sometimes beyond the reach of the researcher. Because a researcher has no control over how people will utilize the research findings, it has the potential to hurt participants. During the fieldwork, the assurance was given to respondents that, the information solicited would not harm participants in anyway. This in theory could generate consequences by some fisheries stakeholders, industrial players and fishermen-processors associations. Furthermore, the participants in this study were not named in the research or appendix due to the sensitive nature of the study. The full disclosure of reasons, motives and/or observations to respondents is the second ethical norm (Bryman, 2012). This helps respondents to make an informed decision about whether or not to participate in the study. Invasion of privacy is the third ethical principle that has been considered. It was recognized and respected when responders declined to answer any question for any reason they believed was justified. Deception is the fourth ethical principle. The goals and techniques were clearly explained before the respondent consented to participate with special emphasis paid to the genuine underlying goals and methods.

Chapter Summary

This study follows pragmatic paradigm and adopted the explanatory concurrent mixed method design which best suits studies that aim at finding out the prevalence of a phenomenon, problem, attitude, situation by taking a cross-section of the population at the time of the study. Population, data collection instrument, data collection procedure, test for validity and reliability of the instrument and data processing and analysis followed respectively.

CHAPTER FOUR

RESULTS

Description of Respondents

This part of the chapter presents the demographic characteristics of respondents. These characteristics include the respondents' ages, education level, origin, main livelihood, marital status, level of dependency and duration in business. Table 1 shows that 35.5% of the respondents were within the ages of 39 - 49 years. Respondents within ages of 28-38 constituted 30.2% whiles those aged 61years and above were the least (12.2%).

Table 1: Demographic Characteristics of the Respondents from Elmina and Apam

Variable	Subscale	Frequency	Percentage
Age (years)	17-27	40	14.93
	28-38	81	30.22
	39-49	95	35.45
	50-60	46	17.16
	61 and above	6	2.24
Education Level	None	164	61.89
	Basic	90	33.96
	Secondary	11	4.15
Marital Status	Single	20	7.52
	Married	154	57.89
	Divorced	39	14.66
	Widowed	7	2.63
	Cohabitant	46	17.29
Dependency Level (persons)	Less than 5	75	28.0
	5-10	164	61.2
	More than 10	29	10.80

Table 1: Demographic Characteristics of the Respondents from Elmina and Apam (Cont'd…)

Variable	Subscale	Frequency	Percentage
Sampling Communities	Elmina	136	50.75
	Apam	132	49.25
Place of Origin	Elmina	121	45.15
	Migrant at Elmina	14	5.22
	Apam	71	26.49
	Migrant at Apam	60	22.39
	Foreigner	2	0.75
Main Livelihood	Canoe Fisher	103	38.4
	Fish Processor	91	34.0
	Fish Trader /Marketers	74	27.6
Years in Livelihood	2-8	58	23.48
	9-15	58	23.48
	16-22	56	22.67
	23-29	30	12.15
	30-36	32	12.96
	37-43	10	4.05
	44-50	3	1.21
Month for Festival	January	2	0.78
	February	1	0.39
	July	118	45.91
	September	136	52.92

Source: Field Survey (2019)

This implies that significant proportion of the sampled fisherfolk (65.7%) were within the active working ages. The results show that a significant percentage of fisherfolk interviewed had no formal education (61.9%) whilst 34.0% basic and 4.2% had secondary education respectively. This can be inferred that most of these fisherfolk had no formal education. Most of the fisherfolk (57.9%) were married with 17.7 percent cohabitating, 14.6 percent being divorced and 7.5 percent single widows make up 2.6 percent. This implies that majority of these fisherfolk were family men and women with dependents who rely on the fishing business.

It was also revealed that majority of the fisherfolk were natives of Elmina (45.2%) whilst indigenes of Apam make up 26.5%. This was followed by migrants at Apam (22.4%) and Elmina (5.2%) respectively who were believed to be originating from Abandze, Akwatia, Axim, Biriwa, Cape Coast, Chorkor, Ekumfi Akra, Koforidua, Moree, Mumford, Nyanyano, Oshiee-Bortimor, Shama, Tarkwa, Tema and Winneba. Due to the search for livelihood foreigners (0.8 %) from Benin and Coted'Ivoire were encountered at the sampling communities. This result portrays the heterogeneity of Ghanaian fishery.

Looking at the fisherfolks' main livelihood, it revealed that majority of these fisherfolk were canoe fishers (38.4%). Meanwhile, fish processors constituted 34.0 percent of the fisherfolk, whiles fish traders / marketers were the least (27.6%). This implies that fishermen dominate the artisanal fishery and hence any policy that impede fishing activities has the tendency of affecting majority of the fisherfolk who happen to be providers for their families' welfare.

Furthermore, the result shows that most of the fisherfolk have been in this fishing business for about 2 to 22 years, whiles the remaining fisherfolk have been engaging in the business for not less than 50 years. The result elucidates that, most of the fisherfolk have been in the fishing business for long and are experienced enough to provide relevant information for the study. This implies that most respondents have witnessed the two phases of the fishery; open-access and period of closed season.

The dependency ratio of fisherfolk in these coastal communities shows that majority 61.2% of these fisherfolk had between 5 to 10 persons as dependents. Also, 28% of the sampled fisherfolk had less than 5 persons depending on them for a living, whereas, fisherfolk with more than 10 dependents constituted 10.8% of the sampled respondents. This signifies that the fisherfolk have substantial number of dependences, which they have to provide for via the fishing business.

The results again show that most of these communities celebrate their festivals in September (50.7%), followed by July (44.0%), January (0.7%) and February (0.4%). This indicates that the proposal by the STWG to close the sea in August could not impede the celebration of festivals in the two most vibrant fishing communities in the Central Region of Ghana.

Awareness and Perception on Closed Season Policy

The first objective of the study sought to assess the perception of fisherfolk on the closed season policy. To achieve this objective, the study examined the awareness and purpose of the closure.

Knowledge and awareness of closed season

To ascertain fisherfolks' knowledge and awareness on closed season, respondents were asked if they have heard about the closed season policy by the government. The result indicates that all the fisherfolk were aware of the closed season policy; however, the variation in their sources of awareness were immense. From the results, most of these fisherfolk became aware of the closed season policy via radio (33.0%). Others also indicated that they got to know about the policy through television (22.6%), family/friends (19.3%), traditional leader (15.3%), information centers (7.0%) and Fisheries Commission (1.8%). This makes radio the best means of communicating to the fisherfolk.

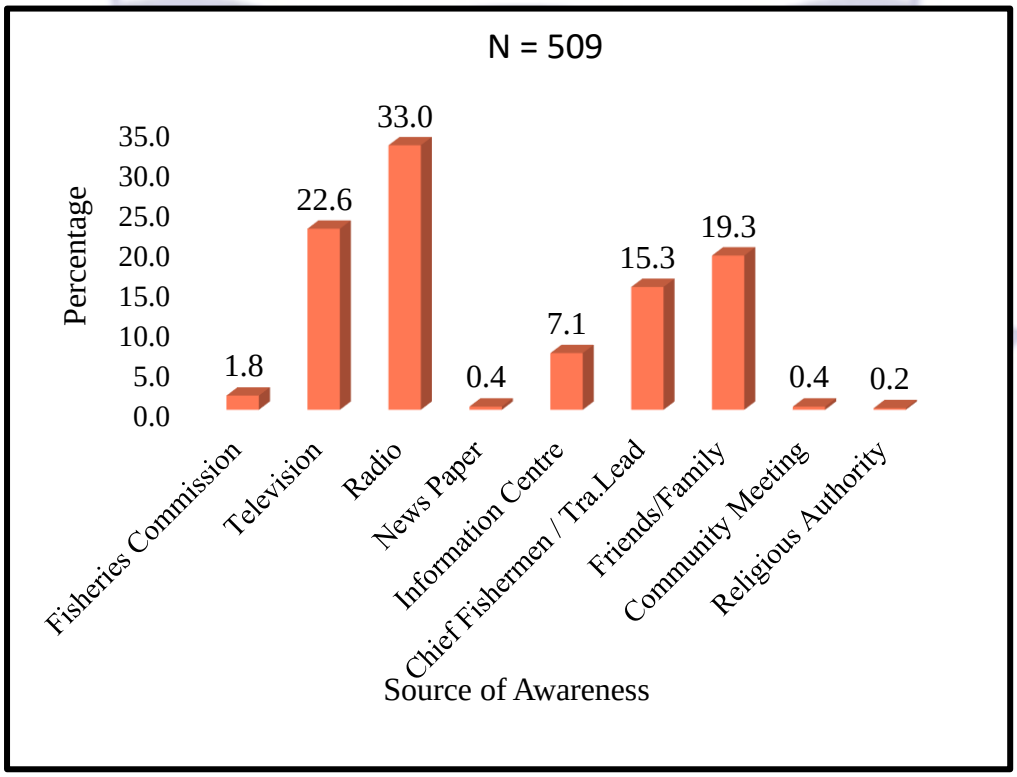

Figure 5: Source of awareness on closed season policy

Note: Multiple responses

Source: Field Survey (2019)

In the quest to obtain a deeper understanding on the season closure, the researcher also conducted an in-depth focus group discussion to explore their awareness on the closure. The qualitative results indicates that the fisherfolk were well informed about the closed season. They indicated that they became aware through TV, radio and internet. Some participants had this to share;

> *"Yes! My dear sister, the fact is that we are much aware about the well talked about closed season. However, we are not just happy with that decision. The issue was publicized on radio stations, TV Stations, on the internet. On these platforms, we were told that the closed season is to help fishermen to get more harvest". (**In-depth interview with the FGs**……**01**).*

Speaking of the same issue, key informant (Fisheries Director) added:

> *"We are aware of the closed season policy. We ensured that there was enough sensitization and awareness. We used community center, chief fisherman, Konkonhene/hemaa as a medium of communication to create awareness to all the immediate groups along fisheries value chain". (**Key Informant 01**)*

The Purpose of closed Season

The respondents were asked on the purpose of the closed season. The result from table 2 show that a significant proportion of the respondent maintain that they did not know the purpose of the closed season policy (46.9%). The 25.4 percent respondents who knew the purpose of the policy asserted that the policy was implemented to allow fishes to mature and ensure reproduction. It was further revealed that fisherfolks' perceived purpose for the closed season included; to regulate illegal fishing activities (7.7%), to improve on the fishing

industry (6.2%), due to the dwindling rate of fish stock (5%), and to allow fisherfolk to attain enough rest (1.5%). This indicates that most of these fisherfolk lacked the main thrust for the implementation of the closed season policy. As a result, this could impede their understanding and compliance on the policy.

Table 2: Fisherfolks' Understanding of the Purpose of the Closed Season

Variable	Frequency	Percentage
Due to dwindling rate of fish stock	13	5.00
To regulate illegal fishing activities	19	7.31
To allow fishes mature and reproduce	66	25.38
To fulfill government policy	20	7.69
To improve the fishing industry	16	6.15
To allow fisherfolk to rest	04	1.54
Don't know	122	46.92
Total	260	100.00

Source: Field Survey (2019)

Similarly, the qualitative findings indicated that some participants knew of the purpose of the closure. They indicated that the purpose of the closed season was to allow spawning and growth of fish. Below are some of their responses;

"...we were told that the closed season will help spawning to take place for we the fishermen to enjoy some years to come. We further believe that the closed season will allow fish to reproduce and create an enabling environment for the juvenile fishes to grow and safeguard the fish

reproduction process and allow fish to spawn and multiply ***(In-depth interview with the FGs……..02).***

Perception of Fisherfolk on the Closed Season Policy

The study also sought to find out the respondents' perception on closed season policy. The statements were graded on a five-point Likert scale, with 1 representing strong consensus and 5 representing strong disagreement. Table 3 computes and summarizes the responses. The results show that fisherfolk agreed that closed fishing season will improve the abundance of fish in the sea, with a mean (m) of 3.71 and standard deviation (SD) of 0.84. This result revealed that respondents believe that closing the sea will help increase fish stock. To determine the effect of the sea closure in the next seasons fishing, respondents were asked whether seasonal closures will improve fish catch in subsequent years. With a mean of 3.56 and SD of 0.83, fisherfolk agreed that seasonal closures will improve fish catch in some year to come. Implying that respondents moderately agreed to the assertation that seasonal closures will improve fish catch next year.

When were asked whether the closed season policy will have positive impact on their asset holdings, the fisherfolk disagreed (m = 2.27, SD = 1.06) to the assertation that the closed season policy will have positive impact on the asset holdings of fisherfolk. They indicated that the policy would have a negative impact on their asset holdings, implying that the season closure will not only affect their day-to-day activities but also could have detrimental effects on their asset holdings.

Respondents openly indicated that they disagreement with the assertation that closed season policy will facilitate traditional festival in the coastal communities.

Table 3: Descriptive Results on the Perceptions of Fisherfolk at Elmina and Apam on Closed Season Policy

Construct	*M*	*SD*
Closed fishing season will improve abundance of fish in the sea	3.71	0.84
Seasonal closures will improve fish catch next year	3.56	0.83
Closed season policy will have positive impact on the asset holdings of fisherfolk	2.27	1.06
The policy will facilitate traditional festival in the coastal communities	2.88	1.11
The policy will cause fisherfolk to stay in the country for fishing activities	1.97	0.96
Closed season will have greater negative economic (income / livelihood) effect on my family	3.96	1.04
The policy will have an overall positive impact on the fisherfolk	3.11	1.16
Mean of Means/Average Standard Deviation	3.07	1.00

Scale: 1.00-1.49 (SD); 1.50-2.49 (D); 2.50-3.49 (U); 3.50-4.49 (A); 4.50-5.00 (SA)

Source: Field Survey (2019).

The study also revealed that respondents disagree (M = 1.97, SD = 0.96) to the assertation that seasonal closure will make fisherfolk stay in the country until they resume fishing activities. This result implies that the policy could cause fisherfolk to migrate outside Ghana for fishing activities.

On the other hand, respondents agree to the assertation that the closed season will have greater negative economic (income / livelihood) effect on their families, with a mean of 3.96 and standard deviation of 1.04. This indicates that fisherfolk believe the closed season policy could have immerse negative effect on the livelihood and welfare.

The result portrays that respondent were uncertain that closed season policy will have an overall positive impact on fisherfolk. It had a mean of 3.11 and a standard deviation of 1.16. The results indicate that the fisherfolk were not sure as to whether the closure will have an overall positive impact or negative on them.

Generally, the results show that fisherfolk were unsure about the success of the policy to their fishing activities with an overall mean value of 3.07 and a standard deviation of 1.00. From the findings it can be concluded that the fisherfolk were generally uncertain about the success of the policy to their fishing business.

The qualitative results revealed that some participants perceived that the sea closure will enable them attain bumper harvest and mitigate illegal fishing in their locality. Below are some narratives from participants in the group;

*"…to us as fishermen, we believe that the closed season will help us to get more landings during bumper harvest and as well regulate illegal fishing activities" (**In-depth interview with the FGs….03**).*

Differences in Fisherfolks' Perception on Closed Season in relation to some Selected Demographic Characteristics

At an alpha level of .05 confidence, the researcher tested to find out whether differences exist between the perception level and some demographic parameters. To obtain the scores for the analysis, the responses on the perception of fisherfolk were transformed into a single variable using the SPSS Software, V.25.0. The transformed data were classified as the dependent variable (perception level of the fisherfolk). The independent variables were Age, level of education, main livelihood, years of livelihood and their communities.

Normality Test

To ascertain the normality level of the perception variable, the study conducted the Q-Q plot to direct the selection of the best statistical tool for the test. The results obtained is presented in Figure 6.

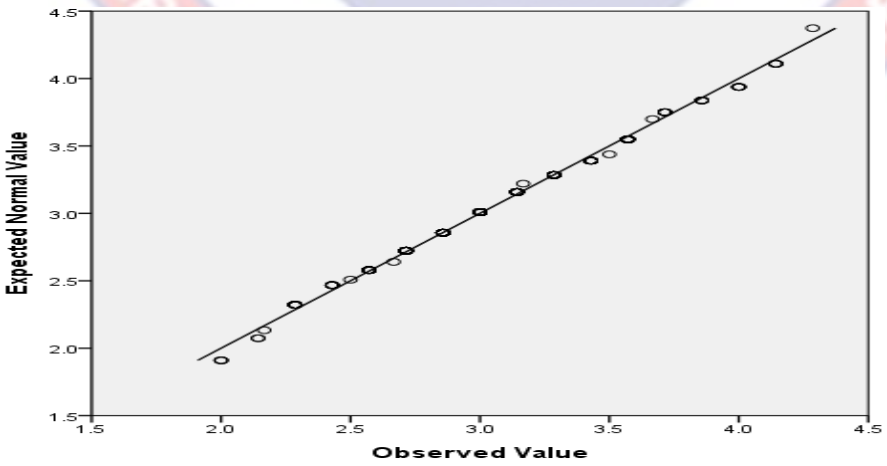

Figure 6: Q-Q plot for normality of fisherfolks' perception

The Q-Q plot shows that the observations are diagonal and closed to the theoretical normal distribution line. This means that the perception variable is approximately normally distributed. Therefore, parametric statistics can be used in determining differences of the fisherfolk on the perception variable.

The ANOVA test was conducted to compare differences in the perception of the fisherfolk based on age, level of education, main livelihood and number of years in livelihood. No statistically significant difference was found in the perception of the fisherfolk based on age, $F(4, 242) = 1.762$, $p = .137$; level of education, $F(2, 241) = .260$, $p = .772$; main livelihood, $F(2, 244) = 2.651$, $p = .073$; and years in livelihood, $F(6, 223) = 1.051$, $p = .393$. This means that the perception of the fisherfolk was not sensitive to these characteristics (age, level of education, main livelihood and years in livelihood).

Table 4: ANOVA and Independent Samples T-test Results for Differences in Fisherfolks' Perception Based on their Characteristics

Demography	Subscale	Mean	*SD*	Df	F/t	Sig
Age				4, 242	1.762	.137
Level of Education				2, 241	.260	.772
Main livelihood				2, 244	2.651	.073
Years in livelihood				6, 223	1.051	.393
Communities	Elmina	2.92	.37	238.44	-4.736	0.001
	Apam	3.19	.51			

Source: Field Survey (2019)

However, the fishing community created differences in their perception. This is evident in the independent samples t-test which shows that there were statistically significant differences in the perception of the fisherfolk coming

from Elmina (M = 2.92, SD = .37) and those from Apam (M = 3.19, SD = .51); t (238.44) = -4.736, p < .001. The perception of the fisherfolk coming from Apam was significantly higher than those from Elmina.

Economic and Social Implications of Closed Season Policy on Fisherfolk

The second objective sought to evaluate the social and economic implications of the closed season policy on direct resource dependents (fisherfolk) in Elmina and Apam. To achieve this objective, the study examined the main sources on income of respondents, their monthly income, and social impact of the closure of fisherfolk and their livelihood.

Main Sources of Income of Fisherfolk

To ascertain fisherfolks' sources of income, respondents were asked about their main income generating activities. The result shows that, fishing (45.5%) was undoubtedly the most frequent income generating activity for respondents. This was followed by fish processing (28.6%) and fish trading (25.2%).

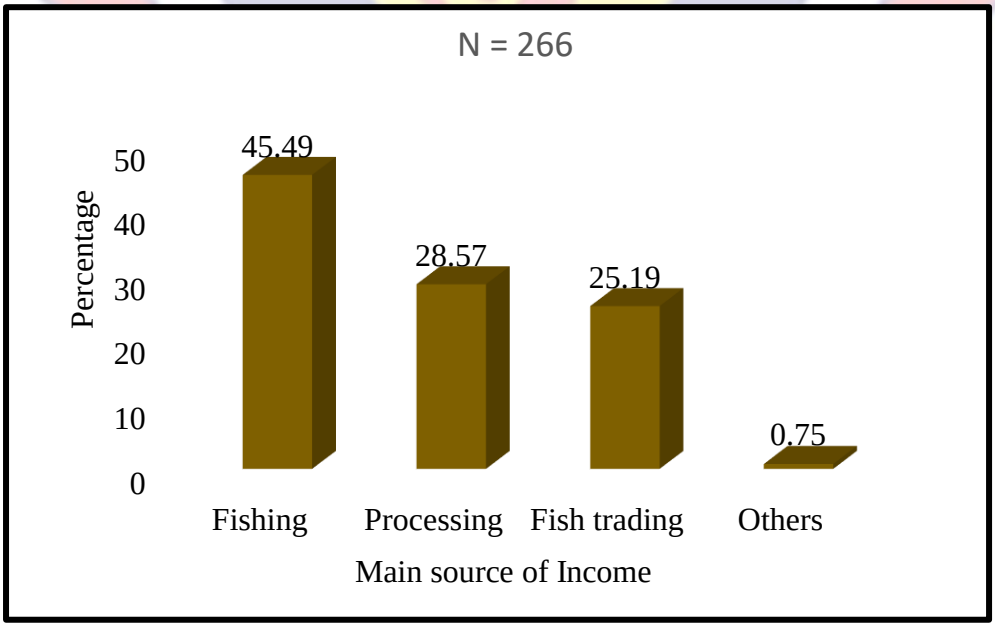

Figure 7: Sources of income for respondents

Source: Field Survey (2019)

A similar pattern was observed for the main livelihood. This suggest that, fisherfolk depend mainly on these fishing activities because it is their main source of income for their household.

Income Category of Respondents from Fish Sales

In order to extrapolate the approximate amount of money fisherfolk lost during the seasonal closure, respondents were asked about the probable income they will lose during the closed season. This was based on income generated from their fishing activities in the immediate month before the closure. Figure 8 shows that more than half of the fisherfolk lost about $199 per head during the period of closure.

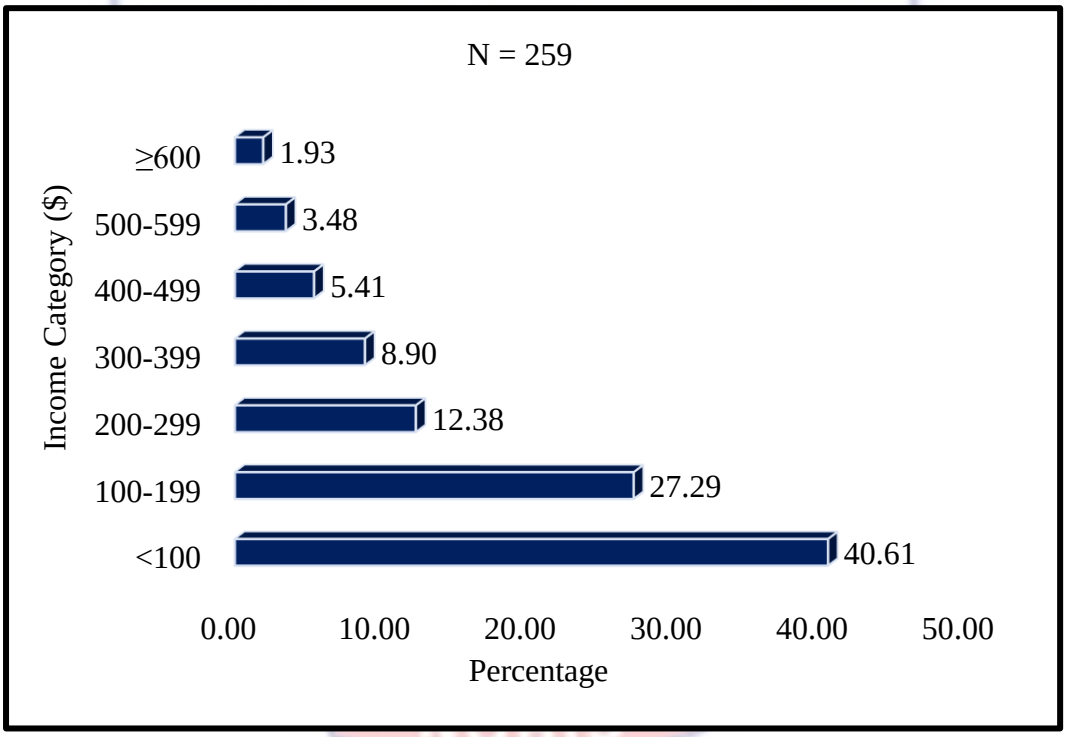

Figure 8: Income categories of fisherfolk (month)

Source: Field survey (2019)

Exchange rate at September 2019; $1 = GHS 5.5074

It was revealed that a significant proportion of the respondents had income below $100 (40.61%), 27.3% of respondents had income range of $100

to $199 with the least being $600 and more. Thus, an average fisher, processor or trader lost a reasonable amount of money during the closure. However, is the income lost the same among these fishermen, processors and traders?

The researcher then probed further to ascertain whether differences exist between the incomes lost by these fisherfolk during the closure. The result elucidates that those with below $100 monthly income were predominately canoe fishers (41%), followed by fisher traders (31.4%) and then fish processors (27.6%). Among those who recorded the minimum monthly income, it appears that canoe fishers constituted more than half of the respondents (60%), whereas fish processors and fish traders recorded same percentage (20%).

Table 5: Cross-tabulation of Income Category by Main Livelihood

	Main livelihood			
Income Category ($)	Canoe Fisher	Fish Processor	Fish Trader	Total
<100	43	29	33	105
	40.95	27.62	31.43	100
100 – 199	17	31	23	71
	23.94	43.66	32.39	100
200 – 299	10	17	5	32
	31.25	53.13	15.63	100
300 – 399	10	5	8	23
	40	24	36	100
400 – 499	9	4	1	14
	64.29	28.57	7.14	100
500 – 599	4	2	3	9
	44.44	22.22	33.33	100
≥600	3	1	1	5
	60	20	20	100
Total	103	91	74	268
	38.43	33.96	27.61	100
Pearson chi^2 (12) = 31.1746 Pr = 0.002				

First row has *frequencies* and second row has *row percentages*

Source: Field survey (2019)

Exchange rate at September 2019; $1 = GHS 5.5074

The chi-square test of independence sought to determine whether there is a statistically significant relationship between level of income lost and main livelihood of fisherfolk. Based on the Pearson chi² (12) = 31.1746 (Pr = 0.002), the researcher therefore concluded that there exists a significant difference between level of income lost and main livelihood of fisherfolk. This implies that respondents within these groups (fisherman, processors and trader) of fisherfolk did not lose the same amount of money in the closed season.

Impact of Closed Fishing Season on the Livelihood of Fisherfolk

The study sought to ascertain whether the closed fishing season has impacted the fisherfolks' livelihood either positively or negatively. Figure 9 shows that majority of the fisherfolk (94.5%) indicated that the closed season had affected their livelihood negatively while 5.5% asserted that the closure exerted a positive effect on their livelihood.

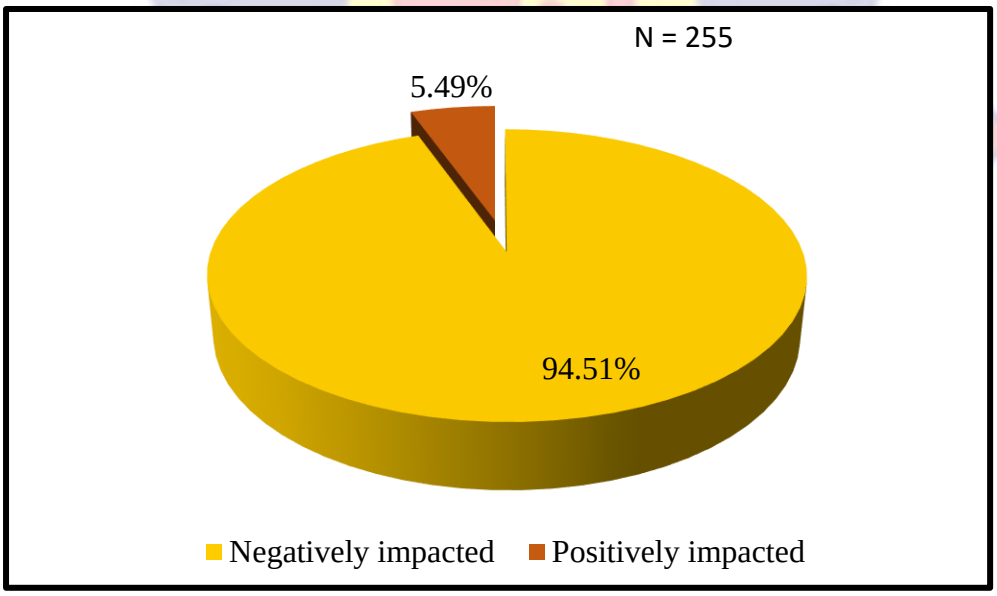

Figure 9: Closed season impact on the family of fisherfolk
Source: Field survey (2019)

To assess the quantum of impact on the welfare of these fisherfolk, respondents were required to indicate their agreement to the construct on the

social impact of the closed season on their livelihood on the 5-point Likert scale responses. Using means, the scales were scored as (Strongly Disagree = 1, Disagree =2, Unsure = 3, Agree = 4, Strongly Agree = 5). The results in Table 6 give indication that generally, most fisherfolk in the selected coastal communities hold some level of opinion towards the closed season. However, the mean values for the items varied in magnitude and as such they were ranked.

Table 6: Social Impact of Closed Season Policy on Fisherfolk

Social Impacts	Mean	Std. Deviation	Mean Rank
High unemployment levels	4.891	6.464	1st
Rise in hunger and malnutrition	4.790	5.757	2nd
Increase school drop-out	4.231	1.083	3rd
Deprive health condition	4.037	0.902	4th
Migration	3.992	1.038	5th
Rampant stealing and prostitution	3.869	1.224	6th
Increase suicidal thought	3.716	2.150	7th
No impact on fisherfolk	2.238	1.330	8th
Overall Mean of Means	3.971	1.186	

Scale: 1.00-1.49 (SD); 1.50-2.49 (D); 2.50-3.49 (U); 3.50-4.49 (A); 4.50-5.00 (SA)
Source: Field Survey (2019).

Table 6 shows that most fisherfolk strongly agreed to the assertion that there were high levels of unemployment during the period of closed season (*M* = 4.891, *SD* = 6.464). This implies that most of them accepts that closure will make them lose their immediate livelihood and remain jobless in the interim. It

was also found that most of the fisherfolk believe that the closed season will lead to a rise in hunger and malnutrition (M = 4.79, SD = 5.757). By inference, the results suggest that many fisherfolk fear that the closed season will adversely affect their daily food intake and probably their protein (fish) intake leaving them malnourished.

In furtherance to the above, it was asserted by majority of the fisherfolk who agreed that the closed season will cause a drastic increase in school drops out (M = 4.231, SD = 1.083) and deprive them of their health obligations (M = 4.037, SD = .902). Their responses may imply that such policy could render most fisherfolk economically handicapped and hence may not be able to perform their basic responsibilities as parents most importantly in relation to their children's education and the families' heath conditions.

Again, majority of respondents affirmed that the seasonal closures will cause them to migrate to neighboring countries to seek related opportunities (M = 3.992, SD = 1.038). This implies that most of them perceive the closure will make them lose their immediate livelihood by migrating in search for the same livelihood in nearby countries.

Similarly, most fisherfolk pointed out that the closed season will lead to rampant stealing and prostitution (M = 3.869, SD = 1.224) and as well increase suicidal thought (M = 3.716, SD = 2.150). This may suggest the inability of parents to provide the basic needs of their children during closure could cause their male child to engage in stealing and probably the female child in prostitution as most children had dropped out of school. Also, the parent on the other hand may be depressed because they are jobless and broke and may be

suicidal. They could also be suicidal as a result of the obnoxious behaviors of their children.

The fisherfolk were again of the view that the closed season will have adverse impact on the fisherfolk (M = 2.238, SD = 1.1330). Despite these apparent certainty in their responses, they strongly disagree to the assertion that the closed season policy had no impact on the fisherfolk. This could mean that, to a large extent, the closed season could be a good policy for the fisherfolk, however, the policy may render them jobless and economically handicapped in the interim and as such they do not support the policy due to their conditions and dependency levels.

The results indicate that generally the fisherfolk were (during the time of the study) in agreement with the assertion that closed season policy will affect (negatively impacted) the livelihood of fisherfolk. In the aforementioned views, respondents highlighted on the various areas of the impact to buttress their opinions. The dispersion estimates which represented some of their views communicate that some of them saw that the closed season policy could positively impact their livelihoods in the long term.

Looking at the socio-economic impact of the closed season, the qualitative results similarly confirmed that the policy had ruined some negative impact on the fisherfolk. The following are some of the comments made by the participants:

> *"...we must be frank with you. We do not agree with the implementation of the closed season, unlike government workers, if we don't go to sea for one day, we will starve."* (***In-depth interview with the FGs….04)***

*"…Our diet has been greatly affected. Yes, it is true that we do not use fish for food always but we do sell some and use the money to buy food. If we do not work for this period our diet and finances will be a problem." (**In-depth interview with the FGs**….**05**)*

*"…when we don't get fish, people take to stealing. Some parents even commit suicide. The little girls take to prostitution with men who are old enough to be their fathers just because there is no money to send them to school." **(In-depth interview with the FGs….06)***

Speaking on the same issue one key informant (Fisheries officer) added:

"*To me as a leader, I share in the idea that the policy may have serious national security implications. Imaging our girls and boys who are engaged in this business are made to stop their work for months. It means that some will have difficulty in surviving and as such some will be going into prostitution and drugs, robbery cases etc." **(Key Informant 02)***

Alternative Livelihood Opportunities

The third objective of the study examined the supplementary livelihood opportunities and coping strategies fisherfolk adopted amidst this sea closure. To achieve this objective, the study investigated whether fisherfolk engage in other sources of income generating activities. Results from figure 10 indicate that majority of the fisherfolk (86%) had no alternative livelihood.

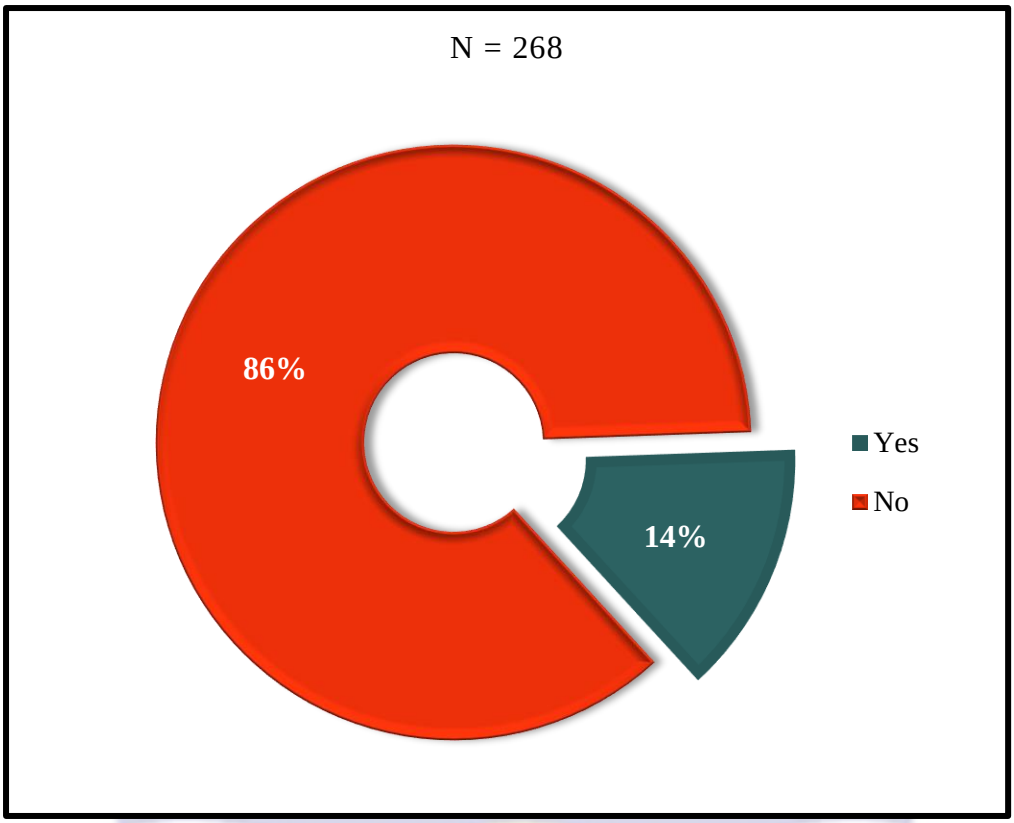

Figure 10: Fisherfolks' engagement in other livelihood activities
Source: Field survey (2019)

On the other hand, 14 percent stated that they are engaged in other activities to support themselves aside the fishing business, hence a significant proportion of the fisherfolk had no other means of generating income for their household and thus depend solely on the fishing activities.

Again, the researcher went further to find out the alternative livelihood that these fisherfolk were into. This result affirms that most of the fisherfolk (26.4%) that engage in other livelihood activities were farmers.

Table 7: Alternative Livelihood Activities by Fisherfolk in Elmina and Apam

Variable	Frequency	Percentage
Farming	9	26.47
Dress making	2	5.88
Provision shop	3	8.82
Food vendering	6	17.65
Masonry	4	11.76
Commercial labour	3	8.82
Soap making	2	5.88
Petty trading	5	14.71
Total	34	100.00

Source: Field survey (2019)

The other supplementary livelihood activities included; food vendering (17.7%), petty trading (14.7%), masonry (11.8%), provision shop (8.8%), commercial labour (8.8%), dress making (5.9%) and soap making (5.9%). From the results it can be inferred that majority of the fisherfolk that engaged in other livelihoods were pre-dominantly farmers and then food vendors.

Additionally, the researcher asked the respondents whether their alternative livelihoods were more lucrative than their main livelihood. From the result, a higher percentage of fisherfolk (97.6%) asserted that their main livelihood (fishing activities) is more lucrative than that of their supplementary activities.

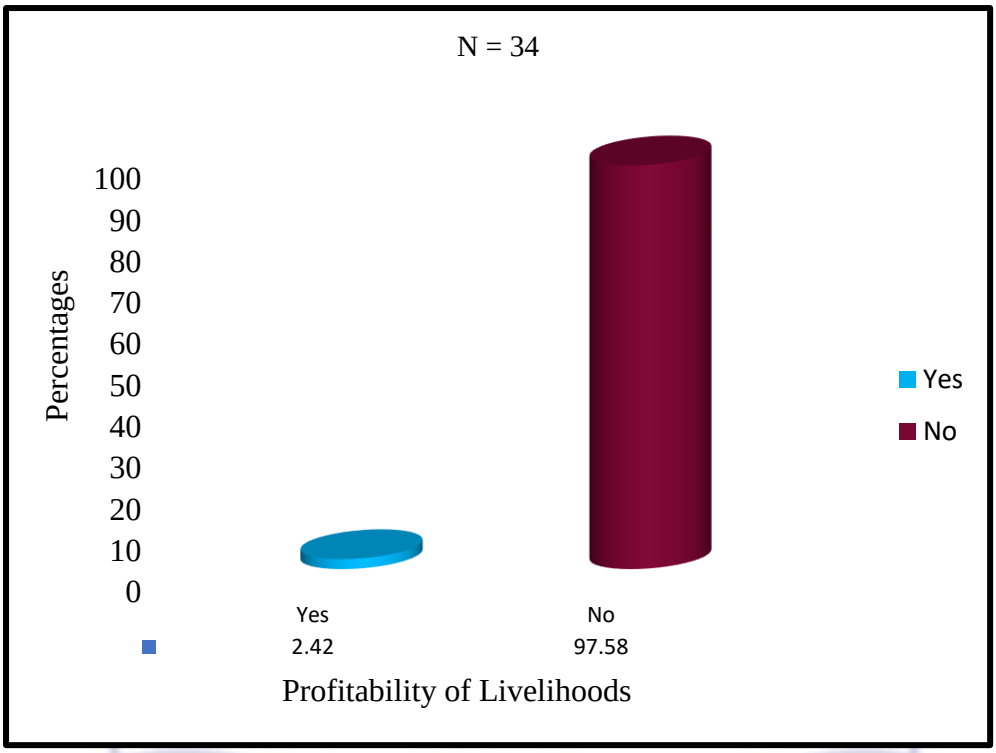

Figure 11: Profitability of alternative livelihood in relation to fisherfolks' main livelihood

Source: Field survey (2019)

It can thus be deduced that; the lucrative nature of the fisheries activity has compelled most coastal dwellers to venture into the fishing business and hence accounting for the severe deterrent impact of the sea closure on such livelihood as many entirely depend on the fisheries resources for survival.

Fisherfolks' Alternative Livelihood Income

Based on the above listed alternative livelihoods, the study aimed to bring to the fore the average monthly income generated by fisherfolk from their supplementary activities. The result shows that majority (38.2%) of fisherfolks gained between $50 to $99 income every month. This is followed by those between the income brackets of $100 to $199 (29.4%), below $50 (17.7%), between $200 to $299 (8.8%), whiles those between $300 to $399 and $400 or above both recording 2.9% each month respectively.

Table 8: Alternative Livelihoods Income of Fisherfolk at Elmina and Apam

Income Category ($)	Frequency	Percentage
<50	6	17.65
50 – 99	13	38.24
100 – 199	10	29.41
200 – 299	3	8.82
300 – 399	1	2.94
≥400	1	2.94
Total	34	100.00

Source: Field survey (2019)

Exchange rate at September 2019; $1 = GHS 5.5074

These findings imply that most of the fisherfolk generated around $50 to $99 monthly via their engagement in supplementary activities. This therefore highlights the point that most of the fisherfolk that indulge in these other activities do not make much income compared to their main livelihood.

Coping Strategies Employed by Fisherfolk during Closed Season

The study sought to investigate the coping strategies that fisherfolk adopted during the sea closure. Table 9 shows that regardless of the challenges that came with the closed season, a significant proportion of the fisherfolk indicated that they will live on savings (20.8%) and about 18 percent asserted that they look up to God as their only hope during this moment.

Table 9: Coping Strategies by Fisherfolk in Elmina and Apam during Closed Season

Variable	Frequency	Percentage
Take loan	38	14.90
Live on savings	53	20.78
Rely on other family members	8	3.14
looking up to God	45	17.65
reduce expenditure	14	5.49
Purchase on credit	23	9.02
Depend on meat and other protein sources	7	2.75
Depend on alternative livelihood	34	13.33
Government support	13	5.10
No idea	20	7.84
Total	255	100.00

Source: Field survey (2019)

On this issue, some respondents indicated that they will take a loan for survival (14.9%), depend on their alternative livelihood (13.3%) or purchased goods and services on credit (9.02%) during the closure. In addition, other fisherfolk opined that they had no idea in mind as to how they would survive amidst the closure (7.8%), some also indicated that they will reduce their expenses (5.5%), relied on government support (5.1%), relied on other family members for survival (3.1%), and lastly depended on meat and other protein sources (2.8%) during the closure. This results suggest that most of the fisherfolk seem prepared for the closed season despite its immense impact on their livelihood.

Forms of Assistance Fisherfolk need from the Government

In the quest to mitigate the impact of the closed season policy on the fisheries value chain, the researcher inquired from the respondents the type of support they would need from the government amidst the closure. Figure 12 shows that most of the respondents stated that the state should provide/support them with money (51.3%) to enable them undertake their daily activities during the closure.

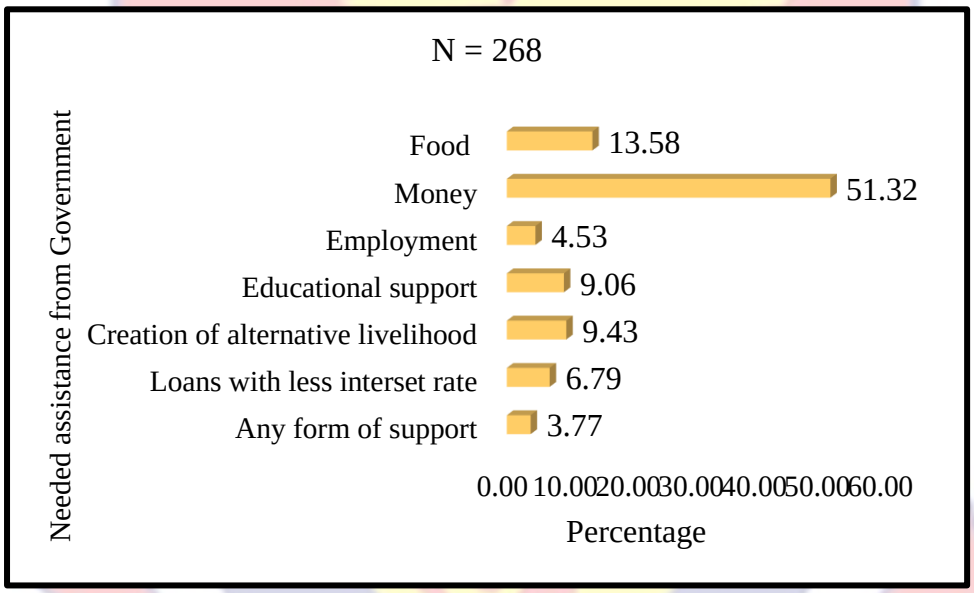

Figure 12: Forms of support needed from the government
Source: Field survey (2019)

They further indicated that food (13.6%), creation of alternative livelihood (9.4%), support in educational expenses (9.1%), provision of loan with reduced interest rate (6.8%), employment (4.5%), any other form of support (3.8%) and equipment to support them in their alternative livelihood (1.5%) are the key assistance they require from the government during the season closure. This implies that majority of the fisherfolk preferably needed financial support from the government during the closure.

In conformity to the aforementioned forms of assistance, the qualitative results indicated that these participants attest to the relevance of the closed season to the community and the nation at large. Nevertheless, they added that they lack economic and social support from the government. Below are some of their views;

> *"...we do agree and understand the importance of the closed season, but what we do not agree is when the government is adamant about our livelihoods. Our survival is very important so, the government should not just educate but should also draw a road map on how to sustain we the fisherfolk"* ***(In-depth interview with the FGs….07)***

On the same issue, other key informant (NGO manager) added:

> *"… this closed season is undoubtedly a good policy, however, there is the need for the government to provide us with financial and other relevant support during this period since this is their main livelihood."*
>
> **(*Key Informant 03*)**

CHAPTER FIVE

DISCUSSION

Introduction

This chapter discusses the findings of this study. The chapter is organized into five sections. Following this introduction, the second section deals with the demographic characteristics of the respondents, while the third section assesses the perception of fisherfolk and key stakeholders on closed season. In the fourth section, the social and economic implications of the closed season were estimated. The final section focuses on supplementary livelihood opportunities and the coping strategies employed by fisherfolk in the two most "vibrant fishing communities in the Central Region of Ghana".

Profile of Respondents

The study revealed that fishermen (all males) dominate the fishing industry whilst the women in most cases were involved in fish processing and trading. This finding is consistent with the findings of Napata et al. (2020) who noted that most fishers are male, while most traders and processors are female. This implies that any policy that impedes fishing activities tends to affect fishermen which forms majority of the fisherfolk who may be providers for their families.

The age of respondents depicts that a greater proportion of the fisherfolk were aged between 17 and 60 with the majority within the 39 to 49 bracket. This means that most of the people in the fishing business are within their active working age. However, Hen Mpoano (2015) reported that the ages of the fisherfolk in Elmina ranged from 41 to 69 years, whiles those at Apam ranged from 39 to 79 years. The results here confirm the findings of Nsiah (2012) and

Mbroh (2014) who found that majority of the fishers in Axim and Saltpond were in their active years (between the ages 15 and 55). Similar studies conducted by Napata et al. (2020) indicated that a large number of the respondents belong to the 41-60 age group.

Generally, fisherfolk in the study areas on the whole, lacked higher educational qualifications but were skilled in their activities. The findings indicated clearly that the literacy rates among the people engaged in the fishing activities at Elmina and Apam landing beaches were very low. More than sixty percent (60%) of the fisherfolk interviewed had no formal education with only thirty-four percent (34%) having up to basic education. This may suggest that fisherfolks' lack of formal education could influence their cognitive ability, which could affect their understanding of issues, especially pertaining to the closed season policy. The result obtained is similar to the findings of Nsiah (2012) who indicated that fishermen in the Central and Western Regions have low forms of formal education which he attributed to several reasons including teenage pregnancy, child labour, etc. Again, the result confirms the findings of Musiello-Fernandes et al. (2017), who stated that, on average, Atlantic seabob fishermen are men, 40 years old, and had low levels of formal education in the communities then surveyed. The author claimed this represents the situation of all fishermen along the Brazilian coast. They ascribed the high illiteracy rate to the fact that fishing operations can provide a family with an income relatively rapidly, which attracts people of fishing communities, but performing such an unsteady daily profession can impair one's potential to obtain an education.

Marriage is an important institution that forms part of our social life. The study confirms there are more married people among the respondents. Nonetheless, a few were cohabitants while a sizable number were divorced. In Appendix A, 234 respondents accorded that have they children which may imply that majority of these fisherfolk were family men and women with dependents who rely on the fishing business.

The study indicated that most (61.2%) of these fisherfolk have 5 to 10 persons as dependents whereas 28 percent had less than 5 persons depending on them for a living. This may suggest that the high dependency levels could be their motivation to venture into a lucrative business like fishing and as such these dependents may directly or indirectly rely on the fishing business for survival. This mirrors the situation at the national level where an appreciable proportion of the Ghanaian population (about 10 percent) is estimated to depend on coastal fishing for their livelihoods (FAO, 2004). The large household sizes of the respondents may be due to low literacy levels among the fisherfolk and also ignorance of the consequences of having many children.

On the respondents' place of origin, it was observed from the study that a higher proportion were natives of Elmina and Apam. However, more migrants were recorded in Apam than Elmina. The findings on the place of origin of the respondents revealed that 28 percent of the respondents were settlers at Elmina and Apam which included foreigners. As the current findings portray the heterogeneity of Ghanaian fishery, it also suggests that more fishers are likely to migrate to destinations where there are abundant landings and possibly where illegal fishing takes place.

The number of years in one's occupation often translates to experience in the field. Averagely, most fisherfolk along the Elmina-Apam beaches have been engaging in the fishing business for approximately two to fifty years. The study clearly shows that about 70 percent of the respondents have been in this livelihood for about 2 to 22 years. This implies that most respondents have witnessed the two phases of the fishery (open access and period of closed season) and are capable enough to bring their perspective of the policy and its implication on their livelihood to the fore.

Works by Beets and Manuel (2007) revealed that seasonal closures may be seen unfavorably in some areas, particularly in traditional cultures due to cultural and ceremonial obligations that would be disrupted because of the timing and level of effort for fishers. The study tried to investigate month(s) for festivity in the sampling communities where all respondents agreed to celebrate festivals in their respective communities. September appears to be the dominant month in which most festivals are held in the fishing communities. Some indicated that July is their festive month. This elucidates that the proposal by the STWG to close the sea in August might affect their day-to-day survival but could not impede the celebration of festivals in the two most vibrant fishing communities in the Central Region of Ghana. This may, however, differ from coastal communities as objected by some key industrial players in other communities.

Awareness and Perception of Fisherfolk and Key stakeholders on Closed Season Policy

Knowledge and awareness of closed season

Radio was seen as the most effective means of communicating information to fisherfolk. It was noted that fisherfolk are best informed through

radio compared to other means. The results of the study would be useful in future implementation where the above medium of awareness could be prioritized for effective dissemination of information. Similarly, most focus group members and key informants became aware through publicity on radio and Television stations. These findings are consistent with the quantitative results from Macusi et al. (2021) who concluded that keeping the fisheries value chain informed about a particular policy is relevant in achieving its goal.

The Purpose of closed Season Policy

The study shows that a significant proportion (46.9%) of the respondents did not know the purpose of this closed season. This may be attributed to the fact that, either fisherfolk had preconceived purpose as to why the sea should be closed or education on the purpose of the closure did not get to the grass root of the fisheries value chain. The 25.4 percent of respondents who knew about the purpose of the policy asserted that the policy was implemented to allow juvenile fishes to mature and reproduce. It was further revealed that fisherfolks' perceived purpose to ban fishing was to regulate illegal fishing activities, improve the fishing industry due to the dwindling rate of fish stock in the sea, and allow fisherfolk to attain enough rest. This indicates that, although all fisherfolk were much aware of the closure, the main thrust of 'WHY' the policy was implemented was not known. As a result, this could impede their understanding and compliance with the policy.

During the Focus Group Discussion (FGD), the fishermen indicated that they were informed that the closed season was implemented to aid spawning. This is because the closed season policy is thought to allow fish to breed and create an enabling environment for juvenile fish to grow, therefore safeguarding

the fish reproduction process and allowing fish to spawn and multiply. This implies that the main purpose for the closed season was to protect fish during the spawning period and allow them to reproduce before being caught and that their understanding improved over time. This indicates that the biological purpose of closed season is getting known within the fishing community. This finding is in line with those of Napata et al. (2020) who noted that seasonal closure purposes should be known by all the stakeholders in the Philippines to ensure rightful closure and prevent any adverse effect on welfare.

Perceptions of Fisherfolk on the Closed Season Policy

Generally, fisherfolk were unsure or uncertain about the success of the policy in relation to their fishing activities. The study shows that respondents were of different opinions and their views communicated that some saw something good about the closed season policy. This is confirmed by Musiello-Fernandes et al. (2017) where fishermen interviewed at Anchieta, Barra Nova, and Santa Cruz Cabralia were opposed to the shrimp fishing ban, claiming that the period did not correspond to the species' reproductive season or recruitment. Fishermen at the Barra de Caravelas, on the other hand, were in favor with the existing timeframe of one month and two weeks.

Interestingly enough, it was extrapolated that even though the fisherfolk were not in agreement with the closed season yet they liked the benefits thereof. This was evident after majority of them affirmed that the seasonal closures will improve the abundance of fish. Similarly, the study recounted that fisherfolk pointed out that the closed season will improve the fish landings in the subsequent years.

The study also alludes that, they were uncertain as to whether the policy will impede or facilitate traditional festivals in the coastal communities. This could mean that the fisherfolk believe that the traditional festival serving as economic and social activities could be impeded due to the policy to ban fishing. It can therefore be inferred from the study that fisherfolk are not likely to reject their festivity due to some policy considerations which they had not even assessed and ascertained its viability because they are people who highly cherished festive activities in their various communities. It was, therefore, not surprising that they were indifferent about the overall impact of the policy on them. This could mean that, to a large extent, the closed season could be a good policy for the fisherfolk, however, the policy may render them jobless in the interim and as such, they do not support the policy due to their conditions and dependency level.

Despite this apparent confusion in the minds of the fisherfolk, the study suggests quite a high level of heterogeneity in their responses as some agreed that the policy will have greater economic effects on their family in the interim. By inference, the study affirms that most have the fear that the closed season will adversely affect the living standards of their families since most families depend entirely on the fishing business. This creates the impression that some of fisherfolk might appreciate the policy if they are highly informed. Nonetheless, Joseph (2006), realized that fishers' income will increase if they comply with the closed season. The indifferent nature of the respondents could be explained further by some reservations they held about the policy. They indicated that the policy would have a negative impact on their asset holdings and might cause them to migrate outskirt the country for fishing activities.

Comparatively, the fisherfolk were highly homogenous in their responses on the issue of their migration outside Ghana than that of the impact of the policy on their assets holding. Again, this may mean that most of them perceive that the closure will make them lose their immediate livelihood hence migrating in search of the same livelihood in nearby countries which suggests that fisherfolk are likely to vehemently oppose the policy if they are not sensitized and informed about it.

In conclusion, the fisherfolk held different views about the closed season policy. As they saw the policy to provide some benefits to them, they also saw that it was going to create challenges for their fishing business. These challenges seem to have created confusion in their minds as to the overall viability of the policy and hence their uncertainty about the full adoption of the policy. This however contradicts the studies conducted by Joseph (2006) where everyone recognizes the importance of the closed season and understands why it is necessary. Some argue that the closed season should last longer than three months citing examples of other countries, such as Hawaii and Jamaica, where the lobster fishery collapsed and a closed season was established for years.

Differences in Fisherfolks' Perception on Closed Season policy in relation to some Demographic Characteristics

The study unveils that, no statistically significant differences existed between the perception of the fisherfolk based on level of education, main livelihood, and years in livelihood. This means that the perception of the fisherfolk was not sensitive to these characteristics (age, level of education, main livelihood, and years in livelihood). Thus, how people perceive the closed season policy was devoid of the fact that: (i) one has been to school or not (ii) one was

a fisherman, processor, or trader or (iii) one has been in the fishing business for a long period or not. This suggests that the fisherfolk have similar or comparable experiences and therefore, their experiences and perceptions do not differ with respect to closed season.

However, the fishing community had differences in their perception. The perception of the fisherfolk coming from Apam was significantly higher than those from Elmina. This can be juxtaposed that the community a respondent is coming from or staying has a direct correlation with how they perceive or see the closed season policy.

Economic and Social Implications of Closed Season Policy on Fisherfolk

According to Vivekanandan et al. (2010), seasonal fishing ban (SFB) has both positive and negative impacts on the socio-economic conditions of the fisherfolk. Thus, good or bad policies may have complications on socioeconomic implications. This section looks at the economic and social impact of the closed season on the direct dependents of the fisheries resources focusing on fishermen, processors and traders. From the study, fishing was undoubtedly the foremost income-generating activity followed by fish processing and fish trading, respectively. A similar pattern was seen from the main source of livelihood. This can be explained by the fact that, fisherfolk depend mainly on these fishing activities because they are their main sources of income for the family.

Estimated Income Loss during Closed Season

Though majority of the fisherfolk do not gain a substantial amount from the ban, nevertheless, the loss of money during the closure will negatively affect their living conditions. This is because most of the fisheries value chain

households are mostly low-income earners, so losing such an estimated amount during this closure affected their finances. The study indicates that on average, a fisherman, processor or trader lost about $199 per month. This financial contraction has a significant bearing on their socio-economic well-being.

The adverse effect of the fishing ban on canoe fishers could be because they form a significant proportion of the fisheries industry. The study elucidates that those with monthly income loss below $50 were predominately canoe fishers (41%). This is not surprising as most of these fishermen are crew members who do not generate huge amounts from their fishing activities. Meanwhile, these canoe fishers also form the majority of those estimated to lose huge money ($600) during the closure. The closed season can therefore have an adverse effect on their income and welfare at large since fishing is their main livelihood.

The chi-square test (table 5) also indicated that there is a substantial difference in the income lost among the fisherfolk. This means that the people along the fisheries value chain do not lose the same income and as such any support that comes need not be shared equally but rather based on differentials in income generated from fishing activities.

Impact of Closed Season on the Livelihood of Fisherfolk

The closed fishing season can contribute negatively or positively to the livelihood of fisherfolk. The results indicated that the closure had affected their livelihood negatively. This shows that the policy comes with a detrimental effect on the life of the fisherfolk. This is not surprising because most of the fisherfolk depend mostly on the fishing business to survive. In this case, the closed season policy was a shock to the fisherfolk, the effects of which were felt

at the household level – food, income and livelihood of fisherfolk. The World Fish Centre (2005) also reported that the closed fishing season had adverse socio-economic impacts on the livelihood of fishers. Specifically, they noted that the sea closure led to a high level of unemployment, increased hunger and malnutrition, increase in school dropouts, stealing and prostitution. This sea closure rendered most individuals along the fisheries' value chain jobless since fishing is their main livelihood. Most of the fisherfolk contend that taking their main livelihood from them will lead to a rise in hunger and malnutrition. This is because these fisherfolk depend on fish for food and also as their main source of protein, so the sea closure turns to threaten their daily food intake of fish leaving them malnourished. Likewise, Lungu and Hüsken (2010) argued that a closed fishing season can have socio-economic impacts on the livelihoods of fishers, fish traders, and fishing villages/camps at large. At the same time, food security is threatened, as fish provides one of the cheapest sources of animal protein to the poor. They again believed that the policy could affect their economic well-being as it rendered most fisherfolk economically handicapped and hence unable to perform their basic responsibilities as parents. These findings are in accordance with Chimba and Musuka (2014) asserted that during the closure, fishermen were economically shut off from fishing, which was their sole source of income and livelihood. It was further observed that poverty levels and malnutrition increased among the local communities who were deprived of their main source of employment and income. The inability of parents to provide for the basic needs of their children during closure could cause their male child to engage in stealing and probably the female child into prostitution as most children had dropped out of school. This is because they see engaging

in such activities as a means of survival, which then affect the community, region, and country at large. Contrary to similar studies conducted by Joseph (2006) which focused on the socio-economic impact of lobsters closure in Corn Island, he purported that because of the reduction in their income, the islanders have to change their lifestyle completely. Families whose children attended school off the island were unable pay the fee. They buy the necessary things needed and limit themselves to other things; instead of sipping coffee with milk, they drink black coffee.

In addition, results from the FGD affirmed that since most fisherfolk do not have a regular stream of income other than fishing activities, the closure might cause them to starve, which will in turn affect their diet intake and possibly other relevant needs. Inability to access these resources could lead to stealing and prostitution as indicated in the quantitative results. A key informant attested that this closure will lead to living hardship and as such some will venture into prostitution, drugs and robbery. This is confirmed by Churchill (2010) who attest that these rules impose extreme hardship on the fisherfolk, their household as well as larger towns where fish are the staple diet, notwithstanding the fact that weak enforcement of the closed fishing season mitigates the hardship considerably. As the closed fishing season is in effect, these fishers who rely solely on fishing were impacted especially those low-income fisherfolk who spend a greater proportion of their household budget on fish because fish provides the cheapest source of animal protein and income source.

Fisherfolks' Alternative Livelihood Opportunities

Providing alternative livelihoods to coastal communities could reduce their vulnerabilities during closed season. Because the majority of fisherfolk still prefer to fish despite the depleted fish stock, it is important to view these alternative livelihoods as a supplement to their income rather than a total substitution for another job. The search for supplementary livelihood indicated that few fisherfolk engage in other forms of revenue-generating activities, meaning that majority of these fisherfolk have no supplementary livelihood activities. This suggests that their displeasure with the closed season policy may be due to the lack of supplementary livelihood opportunities for majority of these fisherfolk, which makes it impossible for them to subsist during the month of the ban on fishing. This is in accordance with the results from Chunga and Phiri (2008) who equally noted that violations of the 'fishing ban' and other fishery management practices were high partly due to the absence of adequate alternative livelihoods which seemed limited.

The study revealed that most of the fisherfolk venture into farming and food vendering as a means of livelihood. Nonetheless, other fisherfolk indicated that they engaged in petty trading, masonry, provision shops, commercial labour, dressmaking and soap making. This implies that majority of the fisherfolk do not have any requisite skills that could aid them earn a living aside fishing activities. Similar findings are confirmed in a study conducted by Owusu (2019) on the impacts of the petroleum industry on the livelihoods of fisherfolk in the Western Region of Ghana. Farming (cassava, plantain, banana, and oil palm plantations) and small businesses (provision stores, carpentry, masonry,

driving and welding) are the two main non-marine economic activities that fisherfolk engage in.

Evidently, it was not surprising when some canoe fishers, processors and trader/marketers asserted that their main livelihood (fishing activities) is more lucrative than that of their supplementary activities. It can therefore be deduced that; the lucrative nature of the fishery has attracted many coastal dwellers into the fishing business and thus accounting for the severe detrimental impact of the closure on such individuals that depend entirely on the fisheries resources for survival. Diversification into other sources of income-generating activities may help minimize pressure on fisheries resources while also providing income security during periods of poor fish harvest and off-season. Diversification into marine and non-marine-based livelihoods, on the other hand, does not guarantee income gains, according to Andriesse (2018), because incidences of pests and diseases can affect the productivity of crops and plants.

Furthermore, the study brought to bear the paucity of monthly income fisherfolk generate from their alternative livelihoods. The study found that on the average, a fisherman, processor or trader makes between $50 to $100 per month. This indicates that comparable to their main livelihood, their supplementary activities do not fetch them much money making it difficult for them to solely rely on this alternative livelihood to support their families during closed season. Also, Owusu (2019) discovered that fisherfolk generate a monthly income of around $150 in Sekondi-Takoradi. This finding is in line with Ferrer (2005) who observed that alternative sources of income and chances to diversify income sources were very limited. He added that the lack of a

substantial avenue for supplementary livelihood has adversely affected fisherfolk welfare.

Coping Strategies Employed by Fisherfolk during Closed Season

The various strategies employed by fisherfolk during the closure, are indications of how prepared they are for the closed season despite its immense impact on their livelihood. This is in line with Salas, Bjørkan, Bobadilla and Cabrera (2011) who stated that savings is a key strategy developed by fishers to mitigate crisis such as off-season. They indicated that they save money to be able to invest in complementary activities to maintain their welfare during periods of low catches. Savings was also mentioned by other fishers as a plan for sending their children to school outside of town. Similarly, Thorpe et al. (2007) opined that fishing is only one component of the portfolio of activities to sustain the livelihoods fisherfolk. Within this scheme, undertaking complementary or alternative activities (ranching, tourism, aquaculture, or setting up a grocery store) was found as a common strategy among fishers who develop ex-ante and ex-post coping strategies.

Forms of Assistance Fisherfolk need from the Government

The diverse forms of assistance required from the government, implies that majority of the fisherfolk preferably needed financial support from the government during the closure. In conformity to the aforementioned forms of assistance, results from the FGD affirm that they lack economic and social support from the government. These findings are in agreement with those of Aghamtao (2017) who found that in the triangulation of the fisherfolks' life assistance from governmental and non-governmental agencies during crisis could be helpful.

CHAPTER SIX

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter presents the summary, conclusions and recommendations of the study. A summary of the study and conclusions have been organized based on the specific objectives and the research questions of the study. This section also presents some recommendations based on the conclusions drawn from the study and suggested areas for further research.

Summary

Depleting marine fisheries resources is of global concern. The SDG 14 aims to protect and sustainably utilize the oceans, seas and marine resources in order to achieve sustainable development. Indicator 14.4.1 stipulate that proportion fish stocks must be maintained within biologically sustainable levels. The goal is to effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management strategies to recover fish stocks in the shortest time feasible.

The fisheries sector in Ghana is critical for national economic development, sustainable livelihoods, and poverty reduction in a variety of households and communities. Scientific evidence has continuously proven that Ghana's marine fisheries, particularly the Sardinella, are in crisis, with a decline in fish landings over the previous decade, demonstrating a clear case of unrestricted access multi-gear fisheries, overfishing, and a weak enforcement regime. As a result, the Ministry of Fisheries and Aquaculture Development (MOFAD) set out to enforce the closed season policy, which had been neglected

for many years despite the fact that it was an important component of the Fisheries Act, 2002 (Act 625) and also key to the Fisheries Management Plan.

Few empirical studies have assessed the impacts of closed season in Ghana. There is the need to fill the research gap by focusing on the socio-economic impact of closed season policy in Ghana's marine sector. The purpose of this study was to assess the socio-economic implications of closed fishing season in artisanal subsector: a case study of Elmina and Apam, Central Region. Specifically, the study sought to:

- assess the perceptions of the fishers and key stakeholders on fisheries closed season policy.
- examine the social and economic impacts of closed fishing season on fisheries value chain.
- determine the alternative livelihood opportunities and coping strategy of fisherfolk.

In review of relevant literature, the study covers the overview of the Ghanaian Fishery, Fisheries Management and Closed Fishing Season, as well as empirical works in the context of their focus, methodology and findings on the impact of closed season on fisherfolk. The concurrent mixed-method design which follows the Pragmatists philosophy is adopted. The study used the purposive sampling technique to obtain 268 respondents along the fisheries value chain in Elmina and Apam. To achieve the set objectives, the quantitative data were analysed using inferential statistics (One way analysis of variance-ANOVA, student T- test, Chi-square Test and descriptive statistics (means, standard deviations, frequencies, and percentages). The qualitative data were transcribed and analysed thematically.

The findings on the socio-economics characteristics revealed that fishermen (all males) dominate the fishing industry; a greater proportion of the fisherfolk were within their active working age with majority within the 39 to 49 bracket; low literacy rate among respondents; more married people among the respondents with few cohabiting; family size ranges from one to ten members; majority were natives of Elmina and Apam, however, more migrants were recorded in Apam than Elmina; most fisherfolk have been in the fishing business for approximately two to fifty years with about 70 percent of the respondents being in the livelihood for about 2 to 22 years; September and July appears to be the dominant month in which most festivals are held in the fishing communities.

Radio was the most effective means of communicating information to fisherfolk. It was noted that fisherfolk are best informed through radio compared to other means. The study shows that a significant proportion (46.9%) of the respondents did not know the purpose of the closed season. The 25.4 percent of respondents who knew about the purpose of the policy asserted that the policy was implemented to allow juvenile fishes to mature and reproduce. Fishermen from FGD indicated that they were informed that the closed season was implemented to aid spawning. Generally, fisherfolk were unsure or uncertain about the success of the policy in relation to their fishing activities. Respondents were of different opinions and their views communicated that some saw something good about the closed season policy. No statistically significant differences existed between the perception of the fisherfolk based on level of education, main livelihood, and years in livelihood; however, the fishing community had differences in their perception.

Fishing was undoubtedly the foremost income-generating activity followed by processing and trading. An average fisherman, processor or trader lost about $199 per month during the closure. This financial contraction has a significant bearing on their socio-economic well-being. The study elucidated that those with monthly income loss below $50 were predominately canoe fishers (41%); these same canoe fishers form the majority of those estimated to lose huge money ($600) during the closure. There was a substantial difference in the income lost among the fisherfolk. The closed season affected the livelihood of fisherfolk negatively. Results from the FGD affirmed that because most fisherfolk do not have a regular stream of income other than fishing activities, the closure brought a detrimental effect on the life.

Few fisherfolk engaged in other forms of revenue-generating activities. The study revealed that most of the fisherfolk venture into farming and food vendering as a means of livelihood. The respondents asserted that their main livelihood (fishing activities) is more lucrative than that of their supplementary activities. The study found that an average fisherfolk makes between $50 to $100 per month from their supplementary activities. Savings was the key strategy developed by fishers to mitigate crisis during the off-season. Majority of the fisherfolk preferably needed financial support from the government during the closure, FGD members affirmed that they lack economic and social support from the government

Conclusion

The following conclusions were drawn from the findings based on the specific objectives:

The study concludes that most fisherfolk are aware of the closed season policy, predominately through radio and television. Nonetheless, majority of these fisherfolk did not know the purpose for which the closed season was implemented. Despite the difference in their perception pertaining to the closure, most fisherfolk were unsure about the success of the policy in relation to their fishing activities. No statistically significant differences were found in the perception of the fisherfolk based on age, level of education, main livelihood, and years in livelihood. However, differences existed in the perception and the fishing community studied.

The study also concluded that fisherfolk lost a reasonable amount of money since most of these fisherfolk depended solely on fishing activities for survival. Nevertheless, there is a substantial difference in their income loss. The closed season impacted fisherfolk negatively, i.e., high level of unemployment, increased hunger and malnutrition, increased school dropouts, stealing and prostitution among fishing household and communities.

Lastly, the study concluded that few fisherfolk engaged in other income-generating activities, predominately farming and food-vendering. To mitigate against the challenges that came with the closed season, most fisherfolk depended on their savings as a coping strategy during the period of the closure. They suggested that the government should assist them in provision of food, creation of alternative livelihoods, educational support, loans with a reduced

interest rate, employment and any other form of support during the closed season.

Recommendations

Based on the research findings, this study makes the following recommendations:

Government through the Ministry of Fisheries and Aquaculture Development (MOFAD) should ensure that the purpose of the closure is well disseminated to those along the fisheries value chain as a motivation for effective compliance.

MOFAD, NGOs, donors, civil society organizations and international agencies should collaboratively encourage and equip fisherfolk to engage in other supplementary livelihoods geared towards offsetting the effort pressure on fisheries resources to relieve them economically during the period of closure. Compliance with the policy can be improved by providing livelihood options to those directly impacted by the closure. National Board for Small Scale Industries may be consulted for direction in the development of appropriate alternative small-scale businesses appropriate for each community.

Government should work with other stakeholders to build and also strengthen mechanisms of better savings, credit and financial literacy within the fishing community, such as promotion of Village Savings and Loan Associations or targeting government discounted low interest loans through MASLOC. Also, government should consider cash compensation for fisherfolk during closures.

A critical review of the timing and duration of the period of the closed season is needed. The closed season policy should be implemented in the STWG proposed month (August) and along with other management strategies that will reduce fishing effort even after the closure.

Suggestion for future Study

Future studies should consider more fishing communities, less vibrant fishing communities and other groups along the fisheries value chain.

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APPENDICES

Appendix A: Other Demographic Characteristics Results

Table A1: **Do you have children?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	234	87.3	87.3	87.3
	No	28	10.4	10.4	97.8
	99.00	6	2.2	2.2	100.0
	Total	268	100.0	100.0	

Table A2: Have you heard about the closed fishing season?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	268	100.0	100.0	100.0

Appendix B: Questionnaire

SOCIOECONOMIC IMPLICATIONS OF CLOSED FISHING SEASON IN THE MARINE ARTISANAL SUBSECTOR: A CASE STUDY OF ELMINA AND APAM IN THE CENTRAL REGION, GHANA

INTERVIEW PROTOCOL

SECTION A: DEMOGRAPHIC CHARACTERISTICS

1. Age: …….. 2. Education level: …… 3. Place of origin: …….
4. Main livelihood i. Canoe fisher [ ] ii. Fish processor [ ]
   iii. Fish trader / marketer [ ]
   a. How long have you been engaging in this livelihood?
   .....
5. Marital status Single [ ] Married [ ] Divorced [ ] Widowed [ ] Cohabitant [ ]
6. Do you have children? Yes [ ] No [ ]
   a. How many persons depends on you for a living?
   ……
7. Do you celebrate any festivity in this community? Yes [ ] No [ ]
   a. If Yes, which month?.....

SECTION B: THE FISHERY

6. What fishing / processing method do you use?.....
7. What type of fish do you often encounter? **[** catch / process / buy / sell etc.]

   [ ] Small pelagics: anchovy, herring, sardine, mackerel etc.

   [ ] Large pelagics: tuna, marlin, shark etc.

   [ ] Demersals: cuttlefish, grouper, snapper, cassava fish etc.

   [ ] Don't know

8. Did you observe bumper harvest last year August?

   Yes [ ] No [ ]

   a. What has been the trend of recent fish landings / price of fish?

   ……..

9. How many times in a week do you engage in fishing activities?.....
10. Which type of labour do you employ in your work?
11. Self [ ] Family labour [ ] Hired labour [ ] Friends [ ] [ ] Others, specify……
12. In case you hired labour, how do you pay them? Cash [ ] Kind [ ] Both cash and kind [ ] [ ] Other, specify……

    a. If cash, how much do you pay a labourer per day?.....

SECTION C: SOCIAL INDICATORS

13. Do you think the closed season will cause your household to go to bed hungry? Yes [ ] No [ ] don't know [ ] No answer [ ]
14. Will the closed season make your fishing business better / worse / no effect / don't know?
15. What do you think will be the major impact of the closure on your family?.....
16. Do you think your livelihood will be/has been affected by the closed season? Yes [ ] No [ ]
    a. How has the closed season affected your livelihood?

       Positively impacted [ ] Negatively impacted [ ]

Indicate to what extent you agree with the following statements on the social impact of closed season on fisherfolks (S/D (Strongly Disagree) - 1, D (Disagree) - 2, U (Uncertain) - 3, A (Agree) - 4, SA (Strongly Agree) – 5

Statement	SD	D	U	A	SA
High unemployment levels					
Rise in hunger and malnutrition					
Increase school drop-out					
Deprive health condition					
Migration					
Rampant stealing and prostitution					
Increase suicidal thought					
No impact on fisherfolks					

SECTION D: ECONOMIC INDICATORS

6. What led you into the fishing activity?

   [ ] Lack of employment

   [ ] Family background

   [ ] Personal interest

   [ ] Encouraged by friends

   [ ] Others, specify, ……

7. How do you acquire your fishing inputs?

   [ ] Outright purchase

   [ ] Credit

   [ ] Other specify…….....

8. How much do you spend on one fishing trip? **[canoe fisher /crew]**…….....

9. How much do you spend on daily fish purchase? **[Processors & traders only]** ……..

10. How much income do you generate from daily fish sales?

    ……..……

11. What is your **regular** source of income?.....

    a. What is your **current overall** weekly income including remittances?.....

    b. Out of this income, how much do you make from fishing activity?.....

    c. How much do spend in a week?.....

12. How do you utilize your income generated from the fishing activities?

Food [ ] Education [ ] Health [ ] Building [ ]

Social contributions [ ] [ ] Others, specify…….

13. Do you save? Yes [ ] No [ ]

a. Where do you save? Bank [ ] Credit union [ ]

Susu [ ] Home [ ] [ ] Others ……...

14. Where do you invest your surplus money?.....

15. Do you take a loan? Yes [ ] No [ ]

16. What do you use the loan for? ……..……

SECTION E: LIVELIHOOD ASSETS

17. Do you own any asset? Yes [ ] No [ ]

a. Name the asset(s) If Yes, …….

b. How much did you spend on the asset(s)? …….

c. How is this asset(s) useful in your fishing activity? ……..……

18. Are you engaged in other livelihood other than fishing activities?

Yes [ ] No [ ]

a. If Yes, name them ……

18. Do you think these other livelihoods is/are more lucrative than fishing activities? Yes [ ] No [ ]

a. How much do you make daily on this other livelihood?

…….…….

19. Do you have another activity(s) in mind aside the other livelihood?

Yes [ ] No [ ]

a. If Yes, name it/them ……

20. How would you and your family cope during the closed season / what will you be doing?.....

21. What type of assistance would you need if the Government was to provide assistance to fisherfolks?……

SECTION F: PERCEPTION ON CLOSED SEASON

30. Have you heard about the closed fishing season? Yes [ ] No [ ]

a. Where did you hear it? FC [ ] TV [ ] Radio [ ] Newspaper [ ] Information centre [ ] Community meetings [ ] Religious authority [ ] Traditional leader / Chief fisherman [ ] Family / friend [ ] [ ] Others, specify, ……

22. What do you think is the purpose of closed season?.....

23. Which month(s) would you suggest for the closed season if given the chance? …….

a. Why the(se) months?……

24. Do you think the annual closed season should be for all fishing fleet? [canoe, trawlers and inshore]

Yes [ ] No [ ]

a. Reason for answer……

…….

Indicate to what extent do you agree with the following statements on closed season implications (S/D (Strongly Disagree) - 1, D (Disagree) - 2, U (Uncertain) - 3, A (Agree) - 4, SA (Strongly Agree) – 5)

Statement	SD	D	U	A	SA
Closed fishing season will improve the abundance of fish in the sea					
Seasonal closures will improve fish catch next year					
Closed season policy will have negative impact on the asset holdings of fisherfolk					
The policy will impede traditional festival in the coastal communities					
The policy will cause fisherfolk to migrate outskirt Ghana for fishing activities					
Closed season will have greater economic (income / livelihood) effect on my family					
The policy will have an overall positive impact on the fisherfolk					

25. Do you think adequate sensitization is needed before any closure?

Yes [ ] No [ ]

26. What will be your advice to the Government? ……

Appendix C: Pictorial Evidence of Field Survey

C1: Semi Structured Interview with Respondents (fisherfolk)

C2: Focus Group Discussion

C3: Key Informants