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INSTITUTIONAL FRAMEWORK FOR MARINE MEGAFAUNA CONSERVATION IN GHANA

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INSTITUTIONAL FRAMEWORK FOR MARINE MEGAFAUNA CONSERVATION IN GHANA

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DECLARATION

I, Josephine Entsie, hereby declare that this submission is my work. To the best of my knowledge, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma in my university at Kwame Nkrumah University of Science and Technology, Kumasi, or any other educational institution, except where due acknowledgement has been made in the text.

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DEDICATION

I dedicate this work to my mother, Marian Amoah, for her prayers. To my support system, Mr. and Mrs. Nkrumah, for their constant words of encouragement, prayers and advice that have sharpened my life. To my sibling and cousins for their continuous prayers and encouragement. Finally, to my friends for all their prayers.

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ABSTRACT

The decline in marine megafauna and the resulting threat to global ocean health and human livelihoods is a critical global challenge. This decline is often attributed to anthropogenic pressures, mainly attributed to illegal fishing. Despite extensive research on the threats marine megafauna faces, the institutional systems and how they coordinate or conflict to ensure the conservation of these species is not known in most governance systems. Most non-compliance behaviours of resource users are attributed to Illegal, Unreported, and Unregulated (IUU) fishing methods but this study extends beyond these conventional discussions and delves into other aspects that could result in the drastic decline of marine megafauna due to non-compliance of conservation rules. This study investigated the interactions between customary and statutory institutions in the management of marine megafauna in coastal communities within the Western Region of Ghana. Making use of qualitative research design, the study utilizes semi-structured interviews guides administered to fishers, chief fishers, fish traders, non-governmental organisations, and officials of the Fisheries Commission to provide a deep understanding of governance challenges and community attitudes. This approach was used to analyse the interplay between statutory regulations and customary practices. The findings reveal that competition and institutional voids arise from a lack of coordination among governance bodies, resource limitations, and a disconnect between national policies and local realities. The study identifies economic pressures as a major incentive for disregarding conservation laws. The study concludes that effective marine conservation in Ghana requires a collaborative and multi-actor approach that focuses on bridging institutional voids and integrating local knowledge into co-management strategies. This study contributes to knowledge on institutional interactions by providing a detailed case study of a developing nation's marine conservation challenges, offering an avenue for crafting more effective and equitable conservation policies. The study recommends that policymakers should revise the Fisheries Act and related regulations to explicitly list all protected marine megafauna species. Also, this study focused on marine megafauna but however, future studies could apply the same institutional framework to other threatened species or natural resources.

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LIST OF ABBREVIATIONS

AIS	Automatic Identification System
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CPRs	Common-Pool Resources
EBFM	Ecosystem-Based Fisheries Management
EEZs	Exclusive Economic Zones
EPA	Environmental Protection Authority
FC	Fisheries Commission
FEU	Fisheries Enforcement Unit
IAC	Inter-American Convention for the Conservation and Protection of Sea Turtles
IAD	Institutional Analysis and Development framework
ICLARM	International Centre for Living Aquatic Resources Management
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unreported, and Unregulated
MCSD	Monitoring, Control and Surveillance Division
MoFAD	Ministry of Fisheries and Aquaculture Development
MPAs	Marine Protected Areas
NCU	Narcotics Control Unit
NGO	Non-Governmental Organization
NIB	National Intelligence Bureau
NIE	New Institutional Economics
OECMs	Other Effective Area-based Conservation Measures
RFMOs	Regional Fisheries Management Organizations
SDGs	Sustainable Development Goals
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
VMS	Vessel Monitoring System
WRC	Wildlife Rehabilitation Centres
HWC	Human-Wildlife Conflict

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the study

The ocean covers more than two-thirds of the earth's surface, supporting more than 65% of biodiversity. It generates over 50% of the planet's oxygen and absorbs 20–35% of human-induced carbon dioxide emissions (Hooker, 2018). Maintaining the health of marine ecosystems is important for preserving biodiversity and sustaining human livelihoods. Although oceans were once thought to be limitless resources, by 1983, whale conservationists Stephen Leatherwood and Randall Reeves noted in The Sierra Club Handbook of Whales and Dolphins that “the seas are by no means dead, but they are unquestionably less alive than they were when humanity discovered them” (Reeves & Reeves, 1983). This statement illustrates the pressing need for effective conservation measures, particularly for marine species, which serve as key indicators of ocean health.

All cetacean species (whales, dolphins, and porpoises), pinnipeds (seals and sea lions), sirenians, sea turtles, and large fish species like elasmobranchs (sharks, manta rays, and sawfish) are referred as marine megafauna (Estes et al., 2016; Rihan, 2010). These organisms play crucial ecological roles (Bornatowski et al., 2014; Roman et al., 2014), contribute to wildlife tourism, and even support some fisheries by serving as ecosystem engineers and links in nutrient cycles. This maintains the overall productivity and resilience of the food web that commercially important fish species depend on. Marine megafauna influence ocean ecosystems by (i) consuming substantial amounts of biomass, (ii) facilitating nutrient transport within and between habitats through excretion (e.g., the 'whale pump') thereby fuelling the phytoplankton essential for the food web, (iii) connecting marine ecosystems through long-distance migration, and (iv) physically altering habitats via their feeding, movement, and mortality (Dought et al., 2016). These species enhance primary productivity, function as natural carbon reservoirs in mitigating climate change, act as indicators of ocean health, and serve as flagship species in conservation efforts. Additionally, they provide food and economic benefits, particularly in the fishing and tourism industries (Alves et al., 2022).

Despite the continued richness of marine life, biodiversity and species abundance have significantly declined due to various human-induced pressures. The intricate ecological relationships among species form a complex web, where disruptions can have unintended consequences or even shift an ecosystem into an entirely different state. As the global

population approaches 8 billion, consuming resources generating pollution and contributing to emissions expose oceans and their inhabitants to unprecedented threats (Hooker, 2018). Nearly 3 million whales were killed in the twentieth century and now, these marine species have to cruise their way to other locations due to further menace like underwater noise pollution and ship strikes. Several studies have raised issues concerning the increased extinction faced by many marine species. Anthropogenic activities like overfishing (with annual global fish harvests reaching 1 trillion), climate change, coastal development, and invasive species, have intensified these menaces. Extensive risks are bycatch (both targeted and accidental harvest), plastic and noise pollution, vessel collisions, and entanglement in fishing gear (Campbell et al., 2020; Honda & Suzuki, 2020; Lusher et al., 2018; Mintzer et al., 2018; Ofori-Danson et al., 2019; Nelms et al., 2021).

These threats do not remain at the global level alone. Studies have shown that overfishing, driven by both commercial and artisanal fishing in Ghana, has severely depleted fish stocks and contributed to the unintended capture of marine megafauna, known as bycatch (Lewison et al., 2014). In Ghana, marine megafauna like sharks has since the 1950s, provided livelihoods for many coastal communities, particularly in the Western Region (Gelber, 2018; Seidu et al., 2022). The country has a well-established artisanal shark fishery, especially in major fishing hubs such as Tema and Sekondi, as well as other coastal communities. Several factors have contributed to the rise in shark captures in Ghana. Local consumption of shark meat plays a significant role in sustaining the artisanal shark fishery in Ghana. Beyond international demand for shark fins (Sekey et al., 2022), shark meat, locally known as "kako" is widely consumed across coastal and inland communities. It is a staple in many households and frequently sold in local markets. In regions like the Western and Central coasts, shark meat is not only a dietary staple but also embedded in local food traditions, making its consumption socially acceptable and economically viable (Choi & Lee, 2018). Shark meat serves as a cheap source of protein for artisanal coastal fishing communities, where declining stocks of small pelagic species have led fishers to increasingly target sharks (Nunoo et al., 2014). This domestic demand reinforces fishing pressure on shark populations, contributing to the commercialization of what was once a subsistence activity (Booth et al., 2019).

Institutions play a key role in shaping economic development and growth (Miguel & Gertler, 2005). Institutional theory, has been extensively applied in Western countries to examine governance and political economy but has received relatively little attention in West African contexts, including Ghana (Bánkuti & Caldas, 2018; Feola, 2017). Institutions are broadly

defined as “humanly devised constraints that structure political, economic, and social interaction” (North, 1990:97). Institutions establish rules, norms, and shared cultural values that influence actions within a community (Scott, 2013). Institutions also embody values and power dynamics, operating within interconnected systems rather than in isolation (Aoki, 2007).

Helmke & Levitsky’s (2012) typology of institutional adaptation provides a framework for analysing interactions between statutory and customary institutions. This typology categorizes statutory institutions as primary structures and examines how customary institutions adapt to them. Research indicates that customary institutions can either complement, accommodate, substitute, or compete with state rules (Azari & Smith, 2012; Bánkuti & Caldas, 2018; Grzymala-Busse, 2010). Customary institutions can strengthen statutory institutions by reinforcing established rules, resulting in complementary interactions. Likewise, sometimes, customary institutions may act as substitutes. They may pursue objectives that align with state rules and procedures but may choose to ignore or violate weak state institutions. This leads to a state of competition between the institutions (Wang & Zhai, 2019).

1.2 Problem statement

For centuries, the livelihoods of approximately 10% of Ghana’s population (2.6 million people) have been directly or indirectly tied to its rich marine resources (Adjei & Sika-Bright, 2019). The artisanal fishing industry, in particular, is a cornerstone of traditional coastal communities, accounting for the majority of the nation's fish catches (Dosu, 2017). This deep reliance has created a close relationship between people and the marine environment, leading many communities to develop cultural beliefs and taboos around species such as whales, sharks, and marine turtles (Dosu, 2017; Thomas, 1991).

However, this traditional relationship is under severe pressure. While efforts to protect marine species have increased over the past few decades, as seen in the Fisheries Act, 2002, and other state regulations, the situation on the ground remains dire. The effectiveness of these conservation efforts is compromised by a complex set of challenges (Jog et al., 2022). As preferred teleost fish stocks continue to decline, many fishers are resorting to alternative fishing methods to sustain their livelihoods, increasingly targeting vulnerable marine megafauna (Seidu et al., 2022). This situation is compounded by the high demand for products like shark fins in both local and international markets (Pereira et al., 2023).

The governance landscape for marine megafauna is fragmented, with two key systems at play. On one hand, there are statutory institutions and formal laws. On the other, there are customary rules and traditional beliefs that influence local behaviour. Despite Ghana's ratification of several international conservation agreements, enforcement and compliance remain weak (Islam et al., 2016; Mohammad, 2011). Even though coastal communities have their own customary rules for managing these species, the state authorities also perceive these practices to be fading away (Dosu, 2017). Some studies have also reported negative social attitudes towards sharks (Panoch & Pearson, 2017) and noted the minimal management of elasmobranch fisheries globally (Worm et al., 2013). Therefore, limited research on how these two distinct institutional systems, formal and informal institutions interact in the specific context of marine megafauna conservation in Ghana is minimal. The effectiveness of current management approaches is even unclear due to a disconnect between these frameworks, which apparently contributes to the continued decline of marine megafauna.

1.3 Justification

Species like sharks, dolphins, and sea turtles are apex and meso-predators who regulate the population of other fisheries to sustain food webs and maintain a balanced marine ecosystem. They do this by contributing to the health of coral reefs and seagrass beds by controlling herbivorous fish and invertebrate populations (Leurs et al., 2021). In that case, the extinction of these species may trigger trophic cascades, leading to widespread ecosystem degradation (Temple et al., 2018). Given these ecological roles, an understanding of how human activities influence the conservation of these species is important. Furthermore, as an understanding of how various human activities affect marine megafauna is being established, it is also essential to clearly understand how the governance frameworks protecting these species affect conservation efforts where multiple authority systems operate.

As highlighted in the problem statement, there is a fragmented governance landscape in Ghana where customary community-based rules and state-led statutory regulations often exist in isolation or conflict (Grzymala-Busse, 2010; Helmke & Levitsky, 2013). This disconnect is a major obstacle to effective conservation, as it creates confusion and undermines compliance. The effectiveness of any management approach hinges on a clear and functional institutional foundation. This is not simply a matter of a lack of scientific data, but rather a lack of

knowledge on how governance systems function or fail to function in a pluralistic setting. Several groups would benefit from closing this knowledge gap.

Conservation practitioners and NGOs gain deeper understanding of the on-the-ground actions and dynamics between traditional beliefs and state laws. Policymakers are provided with evidence-based foundation to develop and revise regulations that bridges the gap between customary and statutory institutions. Local communities also receive positive outcomes as this study offers a roadmap to advocate for an effective integration of traditional knowledge with modern conservation efforts. Altogether, this study enables collaborative strategies, promotes better compliance since the challenges that resource users face are known, and helps ensure the long-term sustainability of the resources they depend on. Greater institutional clarity can lead to better ecosystem management, which ultimately benefits community well-being (Roche et al., 2022). Additionally, this study contributes to the broader academic discourse on environmental governance in developing nations, providing a framework for analysing institutional pluralism and its impact on natural resource management.

1.4 Aim and objectives

The study aims to investigate the customary and statutory frameworks that govern marine megafauna conservation in Ghana

The objectives are:

1. To determine the customary and statutory institutions that guide human interactions with marine megafauna in Ghana.
2. To assess the interaction between the customary and statutory institutions protecting marine megafauna in Ghana
3. To examine the effectiveness of management approaches that regulate human activities affecting marine megafauna in Ghana.

1.5 Research questions

To guide the study and achieve the aim and objectives, the following research questions were formulated:

1. What customary and statutory institutions guide human interactions with marine megafauna?
2. How do the customary and statutory institutions interact to protect marine megafauna?
3. How effective are the management approaches in regulating human activities that impact marine megafauna in Ghana?

1.6 Organization of the thesis

This thesis is structured into six chapters. The first chapter sets the foundation by providing the background, problem statement, justification, aim, and objectives of the study. Chapter Two reviews relevant literature and concepts, as well as the theoretical framework that guided the study. Chapter Three presents the methodology, describing the research approach, study areas, data collection, and analysis, while also covering ethical considerations and limitations. Chapter Four presents the study's results. In Chapter Five, the findings are discussed and analysed in a broader context, including comparisons to previous studies. Finally, Chapter Six concludes the thesis with a summary of the findings, policy suggestions and recommendations for future research. A list of references and appendices concludes this research.

CHAPTER TWO

2.0 LITERATURE REVIEW

Introduction

This chapter reviews earlier studies on marine megafauna conservation where it delves into details the fishing activities of resource users, their interactions with these species as well as the threats marine megafauna faces in its protection. The chapter further explores the various institutional frameworks in place guiding marine megafauna, both at the community level and the national level. It ends with a review of how the institutional theory was explored using the Institutional Analysis and Development (IAD) framework as a diagnostic tool to examine how people behave towards marine megafauna and the various institutions that protect them.

2.1 Marine megafauna in Ghana

Marine megafauna consists of large marine species such as whales, dolphins, sea turtles, sharks, and rays. With an approximate coastline of 550 km, Ghana's coastal waters range across different marine habitats from mangroves to seagrass and coral reefs supporting myriad marine species. Ghana hosts a vast diversity of these marine megafaunas. This diversity forms the basis of biodiversity as they also play an essential role in the country's socio-economic development, through eco-tourism and sustainable fisheries (Kashyap et al., 2023). These species enhance marine ecosystem health, sustain biodiversity, and support local coastal livelihood communities (Sievers et al., 2019).

2.1.1 Cetaceans (whales, dolphins and porpoise)

Whales, dolphins, and porpoises together constitute the Cetacea (English: cetaceans). All modern Cetacea live in water and cannot survive out of the water (Thewissen, et al., 2009). Extant cetaceans are ecologically diverse; sizes range from under 2 m to over 25 m, and habitats range from shelf and surface water to abyssal settings in widely distributed tropical to temperate zones with some species occupying freshwater and oceanic ecosystems (Fordyce & Barnes, 1994). These species have existed for over 50 million years, evolving in response to various ecological factors such as feeding strategies, predator-prey interactions, habitat shifts, and migration routes (Fordyce, 2018). Like other mammals and unlike other vertebrates, cetaceans are mammals. They nurse their young; they have three ear bones that are involved in

sound transmission (hammer, anvil, and stirrup), and their lower jaws consist of a single bone (the dentary) (Thewissen, et al., 2009).

Recent studies have confirmed the presence of at least twenty-eight cetacean species in Ghanaian waters, including twenty-one odontocetes (toothed whales) and seven mysticetes (baleen whales). This count is as a result of enhanced monitoring efforts along Ghana's coastline, particularly through strandings, sightings, and fisheries bycatch records (Debrah et al., 2010; Van Waerebeek et al., 2009). Species documented include *Stenella longirostris* (Spinner dolphin), *Tursiops truncatus* (Common bottlenose dolphin), *Kogia sima* (Dwarf sperm whale), *Physeter macrocephalus* (Sperm whale), and *Megaptera novaeangliae* (Humpback whale), among others (Elizabeth, 2022; Van Waerebeek et al., 2009).

2.1.2 Sea turtles

The eight species of sea turtles occupy a wide range of habitats and feeding roles in the marine environment, from the oceanic leatherback (*Dermochelys coriacea*) and olive ridley (*Lepidochelys olivacea*) to the reef-dwelling hawksbill (*Eretmochelys imbricata*) and the herbivorous green turtle (*Chelonia mydas*). Most of the eight species of sea turtles surviving presently are unevenly distributed in all the three tropical oceans, except for three species. These three species have relatively restricted distributions (Pritchard, 2017). They are the flatback (*Natator depressus*) in Northern Australia, Kemp's ridley (*Lepidochelys kempii*) in the Gulf of Mexico and North Atlantic, and black turtle (*Chelonia agassizii*) in the Eastern Pacific. The loggerhead (*Caretta caretta*) and Kemp's ridley (*Lepidochelys kempi*) are coastal carnivores with a more cosmopolitan diet (Amiteye, 2002). All sea turtles have a juvenile oceanic phase, except the flatback (*Natator depressus*) which is restricted to Australia, New Guinea, and adjacent oceans. Sea turtles are classified in two taxonomic families, the Cheloniidae with six species, and the Dermochelyiidae with a single highly derived species, the leatherback turtle (Duchene et al., 2012).

Documentation of marine turtles in Ghana dates back to Irvine (1947). Five species of marine turtles are known to occur in Ghana's territorial waters. These include the Loggerhead, Green, Hawksbill, Olive ridley and the Leatherback turtles (Brongersma, 1982; Irvine, 1947; Toth & Toth, 1974). The Olive ridley turtle is known to show the highest relative abundance in Ghana (Carr & Campbell, 1995). Minor nesting of the Leatherback turtle in Ghana is recorded by Marquez (1990).

2.1.3 Elasmobranchs (sharks, rays, and skates)

Elasmobranch are part of the Chondrichthyes. The class Chondrichthyes comprises a diverse group of fishes whose common feature is the possession of a cartilaginous skeleton as opposed to the bony skeleton of the Osteichthyes or bony fishes. The chondrichtyes are grouped into two main subclasses by many taxonomists: Holocephalii (Chimaeras or ratfishes and elephant fishes) with three families and approximately 37 species inhabiting deep cool waters; and the Elasmobranchii, which is a large, diverse group (including sharks and rays) with representatives in all types of environments, from fresh waters to the bottom of marine trenches and from polar regions to warm tropical waters (Compagno, 1977; Maisey, 2012). The great majority of the commercially important species of chondrichtyes is elasmobranchs. Dulvy et al. (2014) report that there are over 1,200 species of elasmobranchs globally, comprising more than 500 species of sharks and 700 species of rays and skates, grouped into eight orders and over 60 families. This diversity reflects their evolutionary success and ecological adaptability, but also their vulnerability.

In Ghanaian waters, elasmobranchs play a significant role in artisanal fisheries. According to Seidu et al. (2022), over 30 species of sharks and rays have been documented along the Western Region coast, including the Whale shark (*Rhincodon typus*), Hammerhead sharks (*Sphyrna spp.*), and various species of guitarfish and stingrays. The Whale shark, a migratory plankton feeder and the largest fish in the world, is occasionally sighted in the Gulf of Guinea during seasonal plankton blooms.

2.1.4 Studies on marine megafauna in Ghana

Over the past two decades, empirical research on marine megafauna in Ghana has expanded, with studies addressing species occurrence, exploitation patterns, and conservation challenges. In the Western Region particularly, interactions between marine species and fishers are pronounced, and much of these works has focused on sea turtles, cetaceans and elasmobranchs.

Cetacean studies in Ghana have documented stranding events, incidental capture and species diversity in artisanal fisheries. Communities like Dixcove have been identified as hotspot sites for understanding fisher-cetacean interactions. Research by Debrah et al. (2010), Ofori-Danson et al. (2019), and Van Waerebeek et al. (2009; 2014) provide detailed accounts of cetacean

bycatch and landings. These studies call attention to bycatch as a persistent threat but largely concentrates on biological records and catch documentation.

Similarly, marine turtles research in Ghana have focused on nesting activity, threats to survival and species distribution. Five marine turtle species have been identified to occur in the waters of Ghana with the olive ridley turtle being the most frequently encountered (Amiteye, 2002; Carr & Campbell, 1995). Population decline of marine turtles has been consistently reported, with egg harvesting, incidental capture in fishing gear and coastal habitat disturbance as major drivers. Even though studies provide valuable ecological insights, they devote limited attention to the institutional factors influencing fisher behaviour and compliance.

Studies on elasmobranchs, on the other hand, have emphasized livelihood dimensions and exploitation dynamics. This is evidenced in the works of Booth et al. (2019) and Nunoo et al. (2014), which examined the drastic increased reliance on sharks within artisanal fisheries as small pelagic species stocks declined. Seidu et al. (2022) further documented species composition, catch characteristics and economic drivers of shark fishers in the Western Region, demonstrating the role of domestic consumption, local and international fin markets in sustaining exploitation.

While some research is centred on ecology and fishery-based studies, other research has covered cultural beliefs and practices associated with marine resources. Some works have documented taboos against harming certain marine species, ritual practices related to sea deities and restrictions on fishing on specific days (Adjei & Sika-Bright, 2019; Alexander et al., 2017; Kraan, 2009). Although these studies portray the relevance of customary norms in coastal communities, they are often treated as static cultural features rather than as active governance mechanisms.

Also noteworthy are studies concerning the statutory framework for marine conservation in Ghana with its focus on international conventions and national fisheries and wildlife legislation (Elizabeth, 2022; Seidu et al., 2022a). Analyses have identified gaps in legal provisions, weak enforcement capacity and limited institutional coordination as constraints to effective conservation. However, they rarely explore how statutory rules are interpreted and applied at the community level alongside customary practices. Both state rules and customary practices tend to be examined separately, and as such, there are limited studies on how these interactions shape compliance, enforcement and conservation outcomes in coastal fishing communities.

2.2 Threats faced by marine megafauna

In marine ecosystems, species are increasingly threatened with extinction due to the ever-growing anthropogenic activities (Barnosky et al., 2011). These species are confronted with both natural and anthropogenic pressures that range from overexploitation, bycatch, intentional killings, pollution, degradation of habitat, incurrence of death or injury through plastic debris, human disturbances to collisions with vessels or gears. (Authier et al., 2017; Lewison et al., 2014). Likewise, extreme weather events, increasing temperatures, and ocean acidification stress marine habitats as well (Harley et al., 2006). A recent update has also proved a mishandling by human is behind the decline of over 40% of the marine ecosystems, with at least 66% already under multifarious human impacts (IPBES, 2019). Beyond affecting the survival of species, reductions in megafaunal populations are causing further ripple effects in marine ecosystems, thus altering ecological and biochemical processes (Estes et al., 2011; Temple et al., 2018).

2.2.1 Overfishing

As global population continues to rise, the demand for fish and fish products has surged. The fisheries sector is one of the fastest-growing food-producing industries, contributing to food security, nutrition, and income generation. According to FAO (2020), global fish consumption has doubled relative to population growth, with an average intake of 20.5 kg of fish per person annually. Approximately 59.5 million people are employed in the primary fisheries and aquaculture sectors, supporting the livelihoods of over 10% of the global population (FAO, 2020).

In many developing countries, small-scale fisheries play a vital role in economic development, accounting for about 50% of global fish catches and involving over 90% of fishers (FAO, 2020). These fisheries are especially critical in regions such as Africa, the Indo-Pacific, and parts of South and Central America (Temple et al., 2018). However, the absence of robust regulatory frameworks has led to widespread overexploitation of marine resources. Overfishing poses a direct threat to marine megafauna such as sharks, sea turtles, and cetaceans by reducing their populations and disrupting the ecological balance of marine ecosystems. Many of these species are unintentionally caught as bycatch, particularly in gillnet fisheries, which dominate small-scale operations in several countries. This incidental capture affects

vulnerable species including sea turtles, small cetaceans, seabirds, and various shark species (Campbell et al., 2020; O'Keefe et al., 2021; Temple et al., 2019).

Recent global assessments reveal that over one-third of all sharks and rays are now threatened with extinction, primarily due to overfishing (Pacoureau et al., 2021). Similarly, six out of seven sea turtle species are classified as vulnerable, endangered, or critically endangered, with fisheries bycatch being one of the leading causes of mortality (Thomson, 2021). These declines not only jeopardize biodiversity but also undermine the long-term sustainability of coastal livelihoods that depend on healthy marine ecosystems.

2.2.2 Pollution

High concentrations of organic pollutants in the marine environment negatively affect cetacean and seabird reproduction, cause immunosuppression, and increase susceptibility to disease. Chemical pollutants such as nitrogen and phosphorus from fertilizers contribute to harmful phytoplankton blooms and eutrophication (Anderson et al., 2012; McCauley et al., 2015). Marine litter, particularly plastics, microplastics, and abandoned fishing gear, significantly impacts marine ecosystems (Gall & Thompson, 2015). Studies in the Bay of Biscay (BoB) have found microplastics in the stomachs of common dolphins and several seabird species (Franco et al., 2019).

Ghost fishing, caused by discarded nets and lines, is an increasing problem as synthetic fibres do not decay and continue trapping non-target species (Macfadyen et al., 2009). Cetaceans are particularly affected (Stelfox et al., 2016), while seabirds are also impacted when scavenging on lost gear (Žydelis et al., 2013). Northern gannets, for example, show a 0.36% entanglement incidence along the Cantabrian and Galician coasts (Rodríguez et al., 2013).

Noise pollution from vessel traffic, sonars, and seismic activities alters cetacean acoustic communication, distribution patterns, stress levels, and foraging behaviour (Blair et al., 2016; Evans, 2006; Gomez et al., 2016). Light pollution primarily affects seabirds, causing attraction and disorientation, which leads to collisions (Rodríguez et al., 2015, 2017). Cory's and Balearic shearwaters, Atlantic puffins, and storm petrels are among the most affected species (Fontaine et al., 2011; Rodríguez et al., 2015, 2017; Wilhelm et al., 2013).

2.2.3 By-catch

Globally, incidental capture of marine megafauna surpasses direct harvesting of these species (Lewison et al., 2014). Cetaceans, in particular, face significant risks from bycatch due to their low reproductive rates (Read et al., 2006; Read, 2008). Most marine mammal species are impacted by bycatch (Read, 2013), with some, like the Vaquita porpoise, facing extinction due to entanglement in gillnets (Reeves, 2022).

Bycatch not only threatens marine mammal populations but also disrupts entire marine ecosystems by reducing essential nutrients provided by these species (Lavery et al., 2014). Although efforts to reduce marine mammal bycatch have been successful in some countries, such as the United States (Geijer & Read, 2013), many fisheries still lack adequate strategies to achieve bycatch reduction goals (Van Der Hoop et al., 2013), posing a challenge to Sustainable Development Goal 14: "Life Below Water."

Small-scale fisheries are responsible for a significant portion of marine megafauna entanglements, whether as incidental catch or targeted species (Lewison et al., 2014; Panagopoulou et al., 2017; Temple et al., 2018). Between 2017 and 2019, the total production of sharks, skates, and rays reached 3,974 metric tons (MT), primarily caught as bycatch through longline, gillnet, trawl, and set bag net fishing (DoF, 2018). Artisanal fisheries account for 86% of elasmobranch catches (DoF, 2018). Bycatch consists of non-retained landed species, including target species, and is largely unregulated (Oliver et al., 2015). With approximately half of the world's 51 million fishers engaged in small-scale fisheries, their collective contribution to global fishery landings is substantial (FAO, 2008).

The growing human population, along with technological advancements, has expanded coastal and offshore activities such as seismic surveys, drilling, shipping, and fishing. All this has led to the increase of infrastructures like oil platforms, ports, and aquaculture farms, which bear both direct and indirect consequences on marine ecosystems (Falchi et al., 2016; Kamrowski et al., 2012; Kark et al., 2015). Due to the overlap of high fishing pressure with preferred habitats of elasmobranchs, cetaceans, and marine turtles, bycatch also escalates (Queiroz et al., 2016; Žydelis et al., 2013). Altogether, these species remain highly vulnerable to overfishing and direct targeting or incidental capture (Badhon et al., 2019).

2.2.4 Climate change

Climate change has the potential to affect cetacean and seabird populations with rises in stranding events, exposure to pathogens, loss of habitat, and prey availability for fluctuations in all in ways that might compromise their survival (Albouy et al., 2020; Bryndum-Buchholz et al., 2019; Pinsky et al., 2020; Simmonds, 2016). Among several observable consequences of climate change is ocean warming thought to be inducing changes by moving thermal niches (Gregory et al., 2009), disrupting food web structure (Hays et al., 2005), and forcing marine megafauna species to migrate northwards (Hemery et al., 2007). Also, ocean acidification might set off trophic cascades (Lassalle et al., 2012; Sydeman et al., 2012) owing to changes in primary production (Duarte et al., 2013), while higher sea levels might cause the loss of breeding sites (Croxall et al., 2012).

In contrast to earlier periods, extreme weather events in recent times have tended to become more frequent and intense (Cai et al., 2014; Ummenhofer & Meehl, 2017), which increases seabird deaths by starvation, fatigue, and drowning (cachexia), as well as depressing breeding success (Zuberogoitia et al., 2016). Higher-energy shoreline conditions have also led to more cetacean strandings (Simmonds, 2017). A quantification assessed cachexia as the leading cause for seabird admission to Wildlife Rehabilitation Centres (WRCs), especially affecting common guillemots and razorbills (Garcia-Baron et al., 2019).

2.3 International convention on biodiversity

For decades, the global community has acknowledged biodiversity conservation as an important matter, evidenced in treaty formulations such as those concerning the Ramsar Wetlands (Carp, 1972), Convention on International Trade of Endangered Species (IUCN, 1973), Conservation of Migratory Species (UNEP, 1979), Law of the Sea (United Nations, 1982), and the Biological Diversity (CBD; United Nations, 1992).

In 2002, 193 CBD (Convention on Biological Diversity) member parties committed to significantly reducing the rate of biodiversity loss by the end of the decade (CBD, 2002). However, as biodiversity continued to decline, the CBD parties adopted 20 "Aichi Targets" in 2010, setting more precise conservation objectives for 2020. In 2015, global conservation ambitions expanded further when the United Nations established 169 targets categorized into 17 Sustainable Development Goals (SDGs), addressing major global challenges such as poverty, inequality, climate change, environmental degradation, peace, and justice.

Many Aichi Targets were integrated into the SDGs. For instance, Aichi Target 11 aimed for governments to conserve at least 17% of terrestrial and 10% of marine environments worldwide by 2020 through ecologically representative protected areas or 'Other Effective area-based Conservation Measures' (OECMs) (Arlidge, 2020). These objectives were incorporated into SDG 14 and SDG 15. SDG 14: Life Below Water seeks to "conserve and sustainably use the oceans, seas, and marine resources for sustainable development," covering marine area protection, fisheries management, pollution control, and knowledge sharing. SDG 15: Life on Land focuses on protecting, restoring, and promoting the sustainable use of terrestrial ecosystems, sustainable forest management, combating desertification, reversing land degradation, and halting biodiversity loss. Together, SDG 14 and SDG 15 serve as the primary biodiversity conservation goals, although their interconnected nature means they overlap with other SDGs (Arlidge, 2020).

Historically, fisheries management has had the focus on species inside geographic and time boundaries in which fishery businesses operates (Hanna, 1999). The traditional concept of fish stock management (Fisheries, 1995) allows the sustainable harvesting of target species with a single-species approach (Hilborn & Ovando, 2014). Nevertheless, with growing pressures from human population growth and climate change, more attention is being drawn toward employing a wider systems-based approach that covers biological, economic, and social factors (Arbo & Thủy, 2016; Halpern et al., 2013). This systems-based approach in fisheries is called Ecosystem-Based Fisheries Management (EBFM) (Pikitch et al., 2004). EBM refers to the application of such an approach to multiple uses in the marine environment (Christie et al., 2007). In the past 15 years, a wider application of systems thinking approaches in fisheries has evolved, with system-level ecosystem indicators being more preferable than single-species models (Fulton et al., 2019; Link, 2017). However, as management efforts expand across species, regions, and scales, guidance on decision-making tools and processes is increasingly necessary.

While EBFM is not solely intended for data-rich fisheries, its research and implementation have primarily focused on those with extensive data availability (Fulton et al., 2011: Smith et al., 2017). However, efforts to adapt EBFM for data-limited fisheries are ongoing (Smith et al., 2004; Smith et al., 2007). Often, the primary challenge is not the lack of data but the need for fisheries managers to adopt adaptive strategies and assess information across multiple factors, shifting from single-species approaches to a more holistic perspective (Patrick & Link, 2015).

One particularly complex conservation challenge is the recovery of depleted marine megafauna populations (Gray & Kennelly, 2018). Many marine megafauna species have experienced significant declines in various ocean regions (Davidson et al., 2012; Dulvy et al., 2014). Sea turtles, for example, have suffered severe global population declines, with nearly two-thirds of the 58 designated regional management units (RMUs) facing high threats, and 11 RMU populations at critical risk of extinction (Wallace et al., 2010a; Wallace et al., 2011). Similarly, elasmobranchs rank among the world's most threatened species groups (Dulvy et al., 2014), with many marine megafauna populations experiencing drastic reductions (Lewison et al., 2014).

The significant population declines of marine megafauna can be attributed, in part, to their life-history traits, including long lifespans, late sexual maturity, low reproductive rates, and extensive migratory ranges. These characteristics make them more vulnerable to direct threats such as bycatch (where captured individuals are discarded dead or fatally injured; Hall, 1996) and indirect impacts on critical habitats like nesting sites (Dutton & Squires, 2011). Managing their recovery is highly complex due to the multitude of threats they face throughout their lifetimes. Effective conservation requires long-term efforts across multiple nations, involving diverse stakeholders and sectors, particularly for transboundary species like sea turtles (Arlidge, 2020).

2.3.1 Multilateral treaties

The extensive migratory nature of many marine megafauna species, such as sea turtles, exposes them to transboundary threats from fisheries operating in multiple nations' Exclusive Economic Zones (EEZs) and the high seas, where international regulations may be insufficient (Dutton & Squires, 2011). The 1982 United Nations Convention on the Law of the Sea (UNCLOS) establishes nations' legal rights over their coastal waters, extending up to 200 nautical miles from their shores (United Nations, 1982). UNCLOS also grants all States the right to exploit resources in the high seas, provided they comply with conservation duties. Specifically, it mandates that "all States have the duty to take, or to cooperate with other States in taking, such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas" (Arlidge, 2020).

Further conservation regulations for marine megafauna are outlined in the 1995 United Nations Fish Stocks Agreement, which requires States with a "real interest in the fisheries concerned"

to engage in and cooperate with Regional Fisheries Management Organizations (RFMOs). These include entities such as the Inter-American Tropical Tuna Commission and the Comisión Permanente del Pacífico Sur (Arlidge, 2020). Looking ahead, the establishment of a legally binding international framework for the conservation and sustainable use of marine biodiversity in the high seas, under UNCLOS, presents an opportunity to strengthen legal obligations for protecting transboundary marine species.

However, the extent to which participating nations implement measures to reduce the adverse effects of their fisheries on marine megafauna varies significantly. Many countries do not adopt adequate management strategies while still benefiting from the conservation efforts of others, a phenomenon known as free-riding (Dutton & Squires, 2008). In economic terms, the failure to achieve multilateral cooperation is referred to as a transnational externality, with free-riding contributing to market failure, overexploitation, biodiversity loss, and economic inefficiency (Squires & Garcia, 2013).

When marine megafauna enters the EEZs of countries with minimal or no management measures to reduce bycatch, mortality rates can rise substantially, leading these areas to function as population sinks that contribute to species decline (Alfaro-Shigueto et al., 2011; Alfaro-Shigueto et al., 2018). The successful recovery of marine megafauna populations may therefore require multilateral cooperation or coordination through non-binding agreements, such as the Inter-American Convention for the Conservation and Protection of Sea Turtles (IAC). Additionally, lower-income nations may need financial and logistical support to implement effective mitigation measures both at sea and on land, as they often lack the necessary resources for such initiatives (Dutton & Squires, 2011).

2.3.2 Marine megafauna conservation in Ghana

Despite being legally protected due to their declining populations, marine mammals, sharks, and turtles continue to be exploited at alarming rates due to weak enforcement of regulations. Approximately 71.1% of sharks and rays, along with 51–56% of turtles worldwide, are at risk of extinction, despite international treaties such as the UN CBD, and CITES, which aim to safeguard these species (Elizabeth, 2022). Ghana, as a signatory to these agreements, has enacted laws to support their conservation. The Fisheries Act 625 (2002) mandates that marine mammals caught in fishing gear must be released with minimal harm.

Furthermore, Ghana's yet-to-be-gazetted Fisheries Management Plan (2022) includes measures to mitigate by-catch of threatened species. These provisions focus on improving data collection by artisanal fishing vessels, particularly in the drift gillnet (DGN) fishery, modifying fishing gear to reduce by-catch, and raising public awareness through education. Data collection is a crucial addition to the Fisheries Plan since Ghana lacks official national cetacean catch records, making the extent of their exploitation difficult to assess. Even when data is available, monitoring remains inconsistent.

A recent by-catch report by the Ghana Wildlife Society (2020), covering ten landing beaches, provided insight into the extent of marine mammal exploitation in the country. Currently, Dixcove is the only community that has consistently recorded marine mammal landings over the years (Debrah et al., 2010; Ofori-Danson et al., 2019; Van Waerebeek & Debrah, 2009; Van Waerebeek et al., 2014). However, since data collection on marine mammals is limited to a few communities, the true extent of their exploitation may be underestimated. Additionally, as many coastal communities in developing countries rely on fisheries for protein and income, offering alternative livelihood opportunities to fishers and fish processors could enhance earnings, reduce dependence on fishing, and alleviate poverty (FAO, 2020).

2.4 Institutions

The term "institution" encompasses an expansive variety of different entities, such as families, firms, communities, social networks, NGOs, research institutes, government bodies and legislative institutions (Lounsbury & Wang, 2023). These institutions are necessary because they structure social interaction as human activities are usually guided by explicit or implicit rules (Hodgson, 2015). Language, religion, law, and science are also part of institutionalized shared symbolic systems (Musolf, 1992). More broadly conceived, things like the market, civil society, and the state are asserted as institutions. Because of its extensive scope of application, the term institution tends to duck into that of culture; hence, it becomes difficult to separate related terms from one another (Thompson, 2018).

Given that institutions play both obstructive and facilitative roles in achieving sustainable fisheries, defining them is crucial. Various scholars have provided different interpretations. Torstein Veblen described institutions as "settled habits of thought common to the generality of man" (Veblen, 2017). George Herbert Mead characterized them as "an organization of

attitudes" that shape behaviour (Mead et al., 1934). Talcott Parsons viewed institutions as normative systems defining social relationships and obligations (Parsons, 1990). Arthur Stinchcombe linked institutions to powerful individuals and their commitments (Stinchcombe, 1968), whereas Jon Elster focused on their function as rule-enforcement mechanisms (Elster, 1989). James March and Johan Olsen defined institutions as "collections of interrelated rules and routines" that determine appropriate actions in different settings (March & Olsen, 1989). These diverse definitions illustrate that scholars do not necessarily refer to the same concept, with some offering broader interpretations, such as March and Olsen's inclusion of routines alongside rules. For this study, Douglass North's definition will be used, which conceptualizes institutions as "the rules of the game" or "humanly devised constraints that shape human interactions" (North, 1990).

Another approach incorporates organizational structures into the definition of institutions. Hayami & Godo, (2005) argued that although differentiating between institutions and organisations is useful in theory, they are practically inseparable. Organisations operate within rule systems, while rules inherently organise individuals, making them interconnected aspects of the same phenomenon. In his study of fisheries management institutions on India's Coromandel Coast, Bavinck referenced Max Weber's perspective on law as a system of rules enforced by designated authorities (Rheinstein, 1954). Based on this, Bavinck concluded that rule systems are inherently tied to an enforcing authority (Bavinck, 2001). This relationship between institutions as rule systems and organizations as enforcers is also recognized in fisheries management literature. The International Centre for Living Aquatic Resources Management (ICLARM) integrates the study of rules and organisational structures within its institutional analysis framework (Novaczek et al., 2001).

In fisheries, institutions are as fundamental as the fish and fishers themselves, as they establish norms regulating behaviour (Elsler, et al., 2023). Without institutions, industry participants would lack guidelines on expected conduct and interaction (Battista et al., 2018). Institutions support various aspects of the industry, including family life, fishing practices, training, processing and marketing fish, and consumption (Jentoft, 2004). They are vital for organising, communicating, representing, negotiating, managing, governing, and conducting research. People engage with institutions daily by working within them, following their rules, or contesting them. Institutions shape values, rights, norms, preferences, guidance, standards, perspectives, and language (Jentoft, 2004). They help individuals form social identities and provide common frames of reference (Pierides & Sewell, 2019). Institutions both restrict and

enable behaviour. While rules impose constraints, they also create possibilities for actions that would otherwise be unattainable. For example, language rules facilitate communication, traffic laws regulate road use, and legal systems enhance security (Hodgson, 2006).

Despite definitional differences, institutions are generally acknowledged as resilient and enduring. They persist over time and continue functioning even as individuals within them change. Institutions are essential to fisheries and other industries, shaping structures and operation (Battista et al., 2018). When challenges arise, institutions are often seen as both the problem and the solution. Some situations necessitate institutional reform, while others require the creation of new institutions. Even when solutions remain uncertain, institutions remain central to addressing societal challenges (Jentoft, 2004).

Institutions can essentially be classified as either formal or informal. According to Helmke & Levitsky (2012), formal institutions are those established, instructed, and enforced through official channels whereas informal institutions operate through unofficial means. In Ghana, following the classification in Gondo et al. (2019), formal institutions are referred to as ‘statutory institutions,' whilst informal institutions are also referred to as 'customary institutions'. Hence, statutory institutions can be called codified institutions where any violations are met with legal ramifications, such as prosecution or arrest (Azari & Smith, 2012; Lauth, 2015; Helmke & Levitsky, 2012). Such institutions are embedded in laws, constitutions, and policies that control social behaviour. On the other hand, customary institutions are mostly unwritten, backed by indirect enforcement mechanisms. These include customs, traditions, and taboos, with sanctions listing from social disapproval (e.g., gossip, ostracism) to extrajudicial enforcement (Lauth, 2015; Helmke & Levitsky, 2012). Since these institutions differ in nature, conflicts can arise between statutory and customary institutions. (Gondo et al., 2019). As such, Ghana exemplifies a nation with a pluralistic legal system shaped by its legal traditions, historical context, cultural heritage, and statutory regulations. As globalisation progresses, Ghana’s experience provides a relevant case study for discussions on legal pluralism, cultural identity, and the pursuit of just legal structures in an interconnected world (Addey, 2023). Legal pluralism refers to the coexistence of multiple legal systems within a society (Gachenga, 2012). In Ghana, this means state laws coexist with customary laws, particularly in areas such as family law and land tenure, reflecting the country’s diverse ethnic and cultural landscape. The roots of Ghana’s legal pluralism trace back to its colonial history, when British-imposed legal frameworks operated alongside recognised customary laws (Bond, 2008).

2.4.1 Customary institutions

Helmke & Levitsky (2012) reported that much comparative research on institutions primarily emphasises formal rules while overlooking informal ones. This oversight presents a challenge in governance studies, as disregarding these "rules of the game" means missing key incentives and constraints that shape political behaviour (Helmke & Levitsky, 2012). From a Western perspective, customary institutions are typically considered informal. Customary rules hold as much significance as statutory ones, particularly since states often struggle to enforce formal regulations (Tsai, 2007). This situation allows customary rules to be defined as traditions and norms of behaviour (Dia, 1996; Pejovich, 1999) to exert significant influence, as they are enforced through unofficial channels (Helmke & Levitsky, 2012). These rules tend to be more resistant to change through policy interventions due to their deep-rooted nature in societal conduct (North, 1990; Ribot, 2001).

Before colonial rule, traditional leaders were responsible for the daily governance of their communities (Mahama, 2009). The institution of traditional leadership remains dedicated to protecting local communities, managing communal land, maintaining law and order, providing social services, and resolving conflicts using indigenous knowledge. Importantly, this knowledge is not solely held by traditional leaders, community members also play a role in its transmission across generations (Kumar & Lakshminarayana, 2024). This body of knowledge, passed down over time, is often referred to as traditional or local knowledge, acquired through personal observations, experiences, beliefs, or perceptions rather than through formal scientific methods (Phillips, 2000).

In sub-Saharan Africa, customary institutions can contribute to conservation, particularly when cultural norms, taboos, and beliefs align with management objectives (Alexander et al., 2017). Studies have demonstrated how customary institutions enhance conservation and resource management. For example, the Mahafaly and Antandro ethnic groups in southern Madagascar have protected the Critically Endangered radiated tortoise (*Astrochelys radiata*) due to taboos against touching the species, preventing its extinction (Nussbaum & Raxworthy, 2000). The West African crocodile (*Crocodylus suchus*) in Ghana is revered to be sacred and therefore, protected by the Tongo-Tengzuk communities as it is believed to embody the spirits of the ancestors (Arhin, 2008). Further, a sacred grove between Boabeng and Fiema offers protection for the Campbell's Monkey (*Cercopithecus campbelli*) and the Ursine colobus (*Colobus*

vellerosus) because of local taboos that forbid hunting (Arhin, 2008; Osei-Tutu, 2015). Oral traditions say that these monkeys are children of the gods 'Daworo' and 'Abodwo,' so a form of worship involving their protection helped to increase local numbers while numbers elsewhere experienced severe decline (Saj et al., 2006). Likewise, in the Adwenaase community forest, entry and farming is prohibited on certain days, as a violation is believed to summon severe spiritual consequences (Osei-Tutu, 2015).

Customary institutions have played a huge role of protecting marine resources in fishing communities (Seidu et al., 2024). Fishers on numerous occasions increasingly acquire knowledge of fish stocks, marine resources, and related environmental changes with time (Phillips, 2000). Many fishing communities have cultural beliefs attached to the sea, and these are upheld and practiced. For instance, the people of Ursia and Urlima in Indonesia do not consume sharks or whales because of an ancient taboo created out of a war between their tribes. The story goes that sharks came to the aid of the Ursia people, while whales assisted the Urlima people by carrying them across the sea (Jaiteh, 2017). Northeast Madagascar local communities also have traditions that forbid the capture or consumption of guitarfish (Doukakis et al., 2011).

In Ghana, many coastal communities forbid fishing on certain days like Tuesdays, Sundays, and Thursdays, all considered sacred to the sea god (Adjei & Sika-Bright, 2019; Alexander et al., 2017; Kraan, 2009). Also, the Ghanaian fishing populations of Winneba and the Dangme of Ada adhere to taboos on sea turtles (Alexander et al., 2017). This taboo is more paramount among the Ada people who believe that sea turtles once saved their ancestors in a war against the Ashanti. Despite Christian-based admonitions against offerings to spirits, many fishers continue to pour libations before embarking on fishing expeditions, for they believe the ritual serves as a protection at sea. Furthermore, while funerals in most Ghanaian societies typically occur on weekends, fishing communities often hold them on Tuesdays, especially for deceased fishers, due to the belief that Tuesdays are sacred and reserved for the sea god (Adjei et al., 2023).

The strong connection between traditional beliefs and resource management is evident in communities where cultural taboos and norms dictate interactions with the environment. In Tanzania, for example, fishers adhere to rules prohibiting fishing after engaging in sexual activity without bathing, based on the belief that this act desecrates the sea and angers the spirits residing within it (Adjei & Sika-Bright, 2019; Alexander et al., 2017; Kraan, 2009; Masalu et al., 2010). This reflects a broader spiritual perspective where the sea is viewed not merely as a

resource but as a sacred entity intertwined with cultural identity. Certain communities prohibited hurting certain sacred animals, such as the monkey, which is considered a sacred being. These taboos serve to protect the wildlife and maintain social harmony for violating such a taboo is said to bring misfortune (Adjei et al., 2023; Holden, 2000; Barre et al., 2009). Thus, in a way, the traditional taboos act as customary institutions which shape social behaviour and foster sustainable interaction of humans with nature. However, the modern world and changing societal values has brought changes in the observance of these practices (Adjei et al., 2023).

The modern economic and social considerations have replaced the coastal old beliefs in the spirituality of the sea. According to research by Seidu et al. (2024), some fishermen these days go fishing on a Tuesday, which is traditionally set aside for the spiritual cleansing and rest of the sea gods, albeit at a risk of receiving sanctions. Many community members still fear spiritual retribution for violating fishing taboos or harming sacred animals (Aye-Addo, 2013). Cautionary tales of misfortune continue to reinforce compliance with traditional rules, even as societal values evolve (Fisher, 1998). These narratives remain integral to the cultural identity of fishing communities, serving both as moral guidance and a means of preserving indigenous knowledge.

2.4.2 Statutory institutions

Formal institutions, also known as statutory institutions in this study, consist of codified and explicit rules and standards that regulate interactions among members of society (North, 1990). These institutions establish order and stability by providing authoritative behavioural guidelines, allowing individuals to form expectations about social conduct (Scott, 1995). From a Western viewpoint, statutory institutions are typically categorized as formal. In Ghana, formal state regulations influence people's behaviours through constitutional, legislative, and administrative rules (Sabatier, 2007). These rules are defined as "procedures [or regulations] that are created, communicated, and enforced through channels widely accepted as official" (Helmke & Levitsky, 2012) and are often referred to as the "rule of law." State regulations may either be derived from preexisting customary laws or created independently (Helmke & Levitsky, 2012). In Ghana and similar contexts, state institutions were seemingly established alongside these rules.

While customary institutions evolve gradually through cultural transmission across generations (Rohner, 1984), statutory institutions are more adaptable as they result from human agency (DiMaggio, 1988). They emerge as solutions to societal challenges and become entrenched as they spread and develop into recognised rules and standards that shape behaviours (Tolbert & Zucker, 1996). Once society conforms to these regulations and accepts them as routine, they are perpetuated over time (Powell, 1991) and ultimately recognised as statutory institutions (Witt & Redding, 2009). According to DiMaggio (1988), statutory institutions embody the motivations and collective actions of societal members seeking to resolve obstacles to achieving critical goals. Understanding statutory institutions, therefore, necessitates an examination of the reasoning behind the solutions developed by societal members (Scott, 2005), as this reasoning is rooted in informal institutions (North, 1990).

Ghana's marine fishery sector consists of artisanal, semi-industrial, and industrial fisheries, all of which are governed at the national level by the Ministry of Fisheries and Aquaculture Development (MoFAD). Many fishers in Ghana perceive MoFAD, via the Fisheries Commission, as the primary authority responsible for conserving and managing small cetaceans. This perception largely stems from Fisheries Commission officials being present in fishing communities, where they record bycatch landings of cetaceans and sea turtles. MoFAD delegates specific responsibilities, such as policy implementation, to the Fisheries Commission, a semi-autonomous entity tasked with ensuring the sustainable management of fishery resources. Established under the Fisheries Commission Act of 2002 (Act 625), the FC is the principal agency responsible for executing the ministry's policies and regulations. It supervises monitoring, control, surveillance, evaluation, and compliance within Ghana's fisheries sector. The Fisheries Enforcement Unit (FEU), a division of the FC, is designated to handle monitoring, control, and surveillance efforts. Despite the presence of these regulatory bodies, the Wildlife Division of the Forestry Commission is responsible for conserving wild mammals in Ghana and collaborates with the Fisheries Enforcement Unit for this purpose. However, minimal interaction between the Wildlife Division and fishers has weakened compliance with conservation measures, highlighting the necessity for improved communication (Seidu et al., 2024). Strengthening engagement with fishing communities and implementing a collaborative management strategy could promote better adherence to conservation initiatives (Ricci et al., 2021).

The legal framework for fisheries management in Ghana includes the Fisheries Act of 2002 (Act 625), the Fisheries Regulation (L.I. 1968), and the Fisheries Law (PNDCL 256, 1991)

(Seidu et al., 2022a). Nevertheless, no specific statutory regulations exist for the sustainable management of shark and ray fisheries in Ghana. Although general fisheries governance mechanisms aim to ensure the sustainability of the country's fishery resources, there is currently no dedicated regulatory framework for elasmobranch fisheries (Seidu et al., 2022b).

2.5 Interaction between customary and statutory institutions

Understanding the interaction between customary and statutory institutions is critical to analysing natural resource governance, particularly in postcolonial contexts. While customary institutions are often viewed as more aligned with local norms and practices, and continue to influence community behaviour regardless of formal recognition, their presence does not necessarily ensure effective outcomes in forest or resource management (Pomeroy & Berkes, 1997; Meinzen-Dick & Pradhan, 2009). Statutory institutions, established and maintained by the state, also serve an essential role in resource governance.

Rather than operating in isolation, statutory and customary institutions are interconnected, collectively shaping the "rules of the game" that influence individual and group behaviour (Grzymala-Busse, 2010; Helmke & Levitsky, 2012; Bendor, 1995; Pejovich, 1999). In practice, the boundaries between these two types of institutions often overlap. Historically, the distinction has been marked by pre-colonial customary systems and postcolonial statutory frameworks. Some of these customary institutions seem to have evolved from traditional systems into formal structures through local by-laws (Berry, 1989, 1993). On the opposite, statutory institutions can become informal in practice, especially when implementation differs from region to region due to administrative discretion (Osei-Tutu et al., 2015). These dynamics illustrate the hybrid and fluid nature of institutional arrangements in postcolonial governance.

These intertwining relationships between statutory and customary law are particularly dynamic where the conservation of marine megafauna in Ghana is concerned. Statutory institutions like national regulations, state agencies, and legal frameworks normally operate at broader administrative levels, whereas customary institutions regulate resource use at the community level according to established traditional rules and leadership. Research reveals that both institutions do not function alone but interact with each other in order to influence or determine compliance and governance outcomes (Helmke & Levitsky, 2012; Pejovich, 1999). Sometimes an institution may support the authority of the other; sometimes the authority of one institution may undermine that of the other (Grzymala-Busse, 2010; Helmke & Levitsky, 2012).

The typology of Helmke & Levitsky (2012) categorises institutional interactions into four types: complementary, accommodating, substitutive, and competing. These categories are based on two criteria: (1) the degree of alignment between institutional outcomes and (2) the effectiveness of statutory institutions. While their framework assumes that customary institutions are effective and focuses on their influence on statutory systems, the present study departs from this assumption. This study treats both statutory and customary institutions as equally important in governing marine megafauna in Ghana, without presuming either's effectiveness. It investigates how each institutional type influences compliance with the other. In addition to Helmke and Levitsky's typology, the study integrates two concepts from Osei-Tutu et al. (2015): void parallelism, where both institutions pursue the same objective but are ineffective, and void subversion, where they pursue conflicting goals yet remain ineffective. Both cases represent institutional voids, which can result in the absence of regulation and increased resource exploitation.

2.5.1 Complementary interaction

Complementary interaction is when customary institutions function alongside effective statutory institutions, resulting in aligned outcomes. According to Helmke & Levitsky (2012), these institutions help "fill in gaps" by addressing issues not explicitly covered by formal rules or by facilitating individual objectives within the formal framework (Lauth, 2000). From this, complementary interactions emerge when statutory and customary institutions work together, reinforcing each other's efforts. This collaboration enables both systems to leverage their strengths, enhancing conservation strategies. Statutory institutions create legal frameworks, allocate resources, and enforce conservation measures, while customary institutions contribute local knowledge, cultural legitimacy, and community-based management practices. The integration of scientific conservation practices with traditional ecological knowledge promotes a comprehensive approach to conserving marine megafauna.

Osei-Tutu et al. (2015) in their work present this form of interaction where, local foresters under formal and informal institutions carry out nearly identical activities to accomplish their common objectives. At the Boabeng–Fiema monkey sanctuary and the Ebenso–Aworapataa plantation site, state rules and customary norms encouraged positive interactions between the locals and wildlife as well as conservation of the forests. At the monkey sanctuary, individuals were dissuaded legally and culturally from causing any harm to the monkeys or their habitat. At the plantation site, the customary institution's local task force used its informal authority to

control illegal utilization, while the district forest office used its statutory power to enforce forest laws. Together, this collaboration effectively influenced how locals managed the plantation. In both scenarios, statutory and customary institutions worked intra institutionally to promote sustainable forest resource management. Their integration deepened the leverage of these institutions for accomplishing their joint goals.

Another example is community-based monitoring, in which local fishers and coastal residents have crucial knowledge on marine megafauna and ecosystems. Statutory organizations like the Environmental Protection Authority (EPA) assist this knowledge with scientific data, research, and technology to map species populations and maintain their numbers. The integration of local expertise with modern science enhances the impact of conservation initiatives (Adranyi et al., 2024).

Complementary interactions offer numerous advantages, including stronger enforcement of conservation laws, as communities are more likely to comply with regulations they have helped shape. Furthermore, this form of cooperation ensures that the cultural significance of marine megafauna and traditional practices is respected, fostering greater local support for conservation initiatives (McNally et al., 2021).

2.5.2 Substitutive interaction

Substitutive interaction is when customary institutions arise when ineffective statutory institutions coexist with compatible outcomes. These institutions “achieve what statutory institutions were designed, but failed, to achieve” (Helmke & Levitsky, 2012). They are more likely to emerge in sociopolitical settings where state structures are weak and possess limited authority. One example provided by Helmke & Levitsky is rural northern Peru in the late 1970s, where weak state institutions resulted in limited legal protection and ineffective courts. In response, citizens established informal "rondas campesinas" (self-defence patrols) for communal security and informal courts for dispute resolution (Starn, 1999; Van Cott, 2006).

In other words, substitutive interaction occurs when statutory institutions replace or bypass customary practices, often due to perceived inefficiencies or conflicts between the two systems. In such cases, statutory institutions may impose policies that override local traditions, marginalising customary authorities and practices. When local communities are not consulted in the design and enforcement of conservation policies, tensions and resistance may arise (Itani, 2020).

In Ghana, an example of substitutive interaction is at the Adwenaase community forest site in Ghana. It was observed that the no more functional customary norms were being replaced with local by-laws to achieve the same purpose of protecting the community forest from destructive use (Osei-Tutu et al., 2015). Likewise, at the plantation site in Ebenso and Aworapataa, the more functional local taskforce institution replaced the official plantation monitoring institution to establish the plantation and protect it from timber theft. Another example of substitutive interaction in Ghana was observed at two private land sites in a study by Osei-Tutu et al. (2015), where a customary-legitimate local control norm replaced official decrees, allowing local people to control access to naturally-grown trees on private lands. Local acceptance and the efficacy of enforcement have, therefore, become critical in determining which institution prevails (Nielsen & Mathiesen, 2003; Jenny et al., 2007). Because the customary institution had its local acceptance, enforcement and compliance with it were better than with state laws (Ramcilovic-Suominena & Hansen, 2012). Weak enforcement and non-compliance with tree access orders on private lands are widespread in Ghana as they have been seen in previous studies (Agyeman et al., 2021; Hansen, 2011; Marfo et al., 2006; Marfo, 2010; Ramcilovic-Suominena & Hansen, 2012). Also, the causes have been linked to the inadequacy of human resources and materials. Naturally-grown timber trees can be found on state reserves, community forests, and private lands, but the number of personnel and resources available at district forest offices is far from sufficient for monitoring and controlling efforts. Consequently, forestry personnel prioritize law enforcement in reserved areas, leading to weak enforcement of official decrees on private lands in off-reserve areas. This creates opportunities for the official decrees to be ignored and replaced by the more effectively enforced informally-legitimate local control norm.

2.5.3 Competing interaction

Competing interaction is when customary institutions arise when ineffective statutory rules produce divergent outcomes (Sarigil, 2023). These institutions are incompatible with statutory regulations, meaning adherence to competing customary institutions leads to violations of state rules. According to Helmke &Levitsky (2012), common examples of competing customary institutions include clientelism, patrimonialism, clan-based politics, and corruption.

Competing interactions occur when statutory and customary institutions pursue conflicting objectives. Such conflicts often emerge when conservation, economic development, and

resource extraction priorities clash, resulting in policy inconsistencies or outright opposition. Statutory institutions, often influenced by national or international conservation mandates, may prioritise environmental protection, whereas customary institutions focus on the sustainable use of resources for local livelihoods. An instance of competing interaction arises in coastal development projects, such as tourism and oil exploration, which can threaten marine megafauna habitats. Statutory bodies may support these projects due to their potential whereas, customary institutions may oppose them on grounds of causing harm to the environment, they may cite developmental projects causing the disturbance of marine ecosystems and threatening the sustainability of marine resources in the long run (Ahen et al., 2018).

Conflicting interests of this sort may easily lead to the fragmentation of policy and managerial inefficiencies of marine resources. Inadequate coordination between statutory and customary institutions gives rise to overlapping and conflicting laws, which may hinder enforcement. On the other hand, mistrust between local communities and statutory bodies may also hamper whole conservation efforts.

2.5.4 Accommodating interaction

Accommodating interaction is when customary institutions arise when effective statutory institutions coexist with divergent outcomes. Since the actors are opposed to state rules but are unable to change these, they come up with their own arrangements (Sarigil, 2023). Accommodating customary institutions might sometimes underpin their state's formal rules by preventing breach of the statute, while at other times they diverge with respect to substance, in that they encourage behaviour contrary to their intentions. These institutions, depending on the circumstances, either obstruct or complement state rules. For instance, consociationalism in the Netherlands and the blatt system in the Soviet Union served as mechanisms to either accommodate or circumvent state rules (Sarigil, 2023). Another instance of accommodation between statutory and customary institutions in Ghana lies in land tenure and agricultural practices. In the Nkoranza Traditional Area, there are attempts to reconcile customary land tenure systems with statutory land regimes for agricultural development and land rights (Osei-Tutu et al., 2015).

2.5.5 Institutional voids

The idea of "institutional voids" sheds vital insight into the challenges of governance, especially in developing and post-colonial contexts where statutory and customary institutions co-exist. While a legal framework or a set of customary rules may exist on paper, their ineffectiveness can create a governance vacuum, or an institutional void, that leads to unregulated behaviour and, in the context of this study, unsustainable resource use.

A void institution is generally defined as an absence of market-supporting institutions in emerging economies, be it contract enforcement mechanisms that work well, regulatory bodies, or information intermediaries. When applied to natural resource management, this concept extends to the absence or ineffectiveness of the "rules of the game" that govern human interactions with the environment (Osei-Tutu et al., 2015).

Building on this, Osei-Tutu et al. (2015) improvised the definition of an institutional void as when neither the statutory nor the customary institution is functioning in relation to a resource. During such occasions, it is exploited beyond control, often with calamitous ecological and social consequences, somehow different from that of unregulated exploitation of the resources. They then further discern this concept into two specific types of institutional voids that arise from the interface between these two spheres of governance:

- Void parallelism: This occurs when both the statutory and customary institutions share a common goal. For instance, the conservation of a resource might be rendered ineffective in both implementation and enforcement. In such a case, the failure of both systems leaves a clear vacuum in governance. As argued by Osei-Tutu et al. (2015), this situation "creates room for unregulated resource use" in spite of the concurrent interest in sustaining the resource.
- Void subversion: A more complicated case would be when state and customs conflict and are both instruments of ineffectiveness. A statutory law may attempt to prohibit an accepted fishing method, while the custom recognizes it as an economic activity essential for survival. When the conflict created between these two institutional authorities is left either by the state's failure to enforce or the community-based authority's failure to negotiate, the space that is created paradoxically fosters unregulated and often destructive activities. This is a complete failure of the governance system, with no institution-standing mechanism effectively enforcing behaviour.

The very existence of these voids may be linked with the historical context of post-colonial nations. Usually, state-centric policies are initiated without due consideration for the local and customary institutions. This can lay the groundwork for an outright clash between top-down enforced legal requirements and bottom-up realities of social and economic existence among local communities. Furthermore, as societies modernize, the customary institution may lose authority and legitimacy, thus further diminishing its ability to regulate conduct (Osei-Tutu et al., 2015). This double erosion of legitimate authority then creates ideal conditions for institutional voids, whereby resource users are left without clear and functional guidance and hence go into over-exploitation and conflict (Ostrom, 2005).

2.6 Theoretical framework

The successful management of Common-Pool Resources (CPRs) is an area which calls for a theoretical foundation capable of explaining the structured nature of human behaviour and their interaction with resources using a diagnostic framework for evaluating institutional performance. This study utilizes the Institutional Theory, which operates on the premise that individual behaviour is not dictated solely by raw self-interest but is, instead, constrained and enabled by institutions where the established rules, norms, and shared beliefs provide stability and meaning to social life (North, 1990). The Institutional Analysis and Development (IAD) framework (Ostrom, 2005) is used as a diagnostic tool to delve into how institutions influence outcomes in a specific context.

Scott (2013) categorised institutions based on their mechanism of influence. His categorisation was based on formal laws and sanctions (regulative institutions), prescriptive expectations and social obligations that function through moral obligation (normative institutions) and deep-seated, shared cultural understandings and common logic that shape interpretation (Cognitive institutions). It is necessary that, to have a better understanding of how institutions work, analysis must move beyond formal rules and rather incorporate the interplay between both statutory and customary rules.

The theory moves beyond a tapered, simplified models of utility maximisation to incorporate the historical, social, and political context that shapes human decisions and collective outcomes. This theoretical framework is understood through a two major schools of thought: New Institutional Economics and Sociological Institutionalism.

2.6.1 New institutional economics (NIE)

North (1990) defined the New Institutional Economics (NIE) as a viewpoint that forms the "rules of the game". It includes incentives, constraints, and economic choices. This school of thought argues that institutions evolve to reduce unpredictability and facilitate economic exchange in relation to stability and efficiency. NIE puts forward that the basis of effective institutions is to minimize transaction costs (Alston, 2008). These costs are separate from production expenses and associated with the process of organising exchange. This construe directly to the cost of defining and enforcing property rights. Clear, stable institutions reduce these frictions by lowering the barrier to complex collective action (such as cooperating on fishing quotas or conservation efforts) and promoting efficient resource allocation (Williamson, 1985).

Furthermore, NIE also constituent the concept of path dependence. This theory elucidates the inflexibility of institutional structures. It portrays that once a specific set of rules or arrangements is adopted, the subsequent investments and organisational structures built around them make fundamental change very difficult and costly, even if a more efficient alternative emerges later (Ménard & Shirley, 2005). This explains why outdated resource policies often persist, shackling a system to its historical origins. For this study, the NIE approach, through the work of Elinor Ostrom, provides the core theoretical and diagnostic tools for assessing the structural constraints and incentives within the governance framework.

2.6.2 Sociological institutionalism

While NIE focuses on material incentives and efficiency, sociological institutionalism (DiMaggio & Powell, 1983; Scott, 2013) focuses on legitimacy and shared cultural understanding. This school of thought argues that organisations and actors must embrace certain structures and rules not because they are economically the best, but because they must conform to external social expectations, cultural norms, and professional standards to gain acceptance and ensure survival.

Compliance, from this perspective, is driven by the desire for social acceptance rather than a fear of punishment. This mechanism is elaborated through isomorphism. Isomorphism is the process by which organisations or institutions come to resemble one another through social pressure. This can be coercive, mimetic, or normative (Frumkin & Galaskiewicz, 2004). Sociological institutionalism serves as a roadmap for understanding customary institutions (the

customs, cultural beliefs, and unwritten norms) that imbue rules with social meaning and drive voluntary, self-enforced compliance within close-knit communities (Beckert, 2010). The sociological institutionalism focuses on customary norms and collective perception for understanding the social attributes that feed into successful resource management.

2.7 The Institutional Analysis and Development (IAD) framework

To operationalise the theoretical principles of institutionalism and systematically diagnose marine conservation efforts, this study employed the Institutional Analysis and Development (IAD) framework. Developed by Elinor Ostrom and her colleagues, the IAD framework is not a substantive theory that predicts a specific outcome, but a rigorous, structured diagnostic meta-tool used to analyse how institutional arrangements affect participant behaviour and outcomes in complex settings, particularly Common-Pool Resources (Ostrom, 2008).The distinction between customary and statutory institutions has gained increasing interest in political studies (Helmke & Levitsky, 2012; Lauth, 2000), where both systems coexist and enforce separate sets of rules. The flexibility of the IAD framework has allowed its utilisation in many fields like land tenure reform (Clement & Amezaga, 2013), decentralised natural resource governance (Andersson, 2006), and community-based environmental management (Ratner et al., 2013).

Fundamental elements of the IAD framework constitute the arena for joint action, patterns of interaction (in this study referring to the interactions between statutory and customary institutions), contextual factors (such as biophysical conditions, community attributes, and rules-in-use), outcomes, and evaluation criteria (Ostrom, 2009). These elements can be used as a holistic structure for deep inquiry into the institutions that shape people and collective behaviour. Therefore, this study adapts the IAD framework by integrating the typology of institutional interaction developed by Helmke & Levitsky (2012). This combination sought to clearly define and analyse how statutory and customary institutions affect one another's performance. This typology includes interaction terms such as complementary, accommodating, substitutive, and competing. Major revisions were done on the framework to make it suitable for the study's needs, resulting into an adapted version as presented in Figure 2.1, while retaining its original analytical purpose.

The central organising component of the framework is the action arena, which represents the social space where actors interact, make decisions, and influence outcomes. The action arena itself is intrinsically linked to, and shaped by, three broader sets of contextual variables. They

are the attributes of the physical world, the attributes of the community and the rules-in-use (Ostrom et al., 1994). These rules are into three parts. They are operational rules which govern day-to-day decisions, collective-choice rules which govern how operational rules are made and modified, and constitutional rules which determine who is eligible to make the collective-choice rules (Ostrom, 2009). This structured approach provides the IAD framework as a diagnostic tool. It mandates a systematic deconstruction of the governance system, moving beyond generic observations to precise, rule-based analysis. Alongside racing a suboptimal outcome back to the specific interaction between the attributes of the community and specific rules-in-use, the framework allows the researcher to pinpoint exact non-functionality of rules (Osei-Tutu et al., 2015) and instances of misalignment. The application of the Institutional Theory and the IAD framework is subject to several key limitations. The IAD is described as a diagnostic tool which is not a full-fledged predictive theory. Its limitation lies in its general a-theoretical nature. It does well at providing a structured explanation of why a particular institutional failure occurred, but it does not inherently possess the predictiveness to forecast which specific institutional arrangement will emerge or succeed under new conditions (Ostrom, 2005). To move from diagnosis to prediction and prescriptive action, the IAD must always be supplemented by other theoretical inputs, such as collective action theories or the specific design principles, which offer hypotheses about successful institutional configurations. The IAD framework further tends to be more effective at analysing institutional stability (the persistence of existing rules) than at explaining rapid institutional change (how, why, and when new institutional configurations emerge) in response to crisis or political shocks.

The next section goes on to explain, in detail, the variables used in this adapted framework and also shows the manner in which the framework was applied to achieve the objectives for this study.

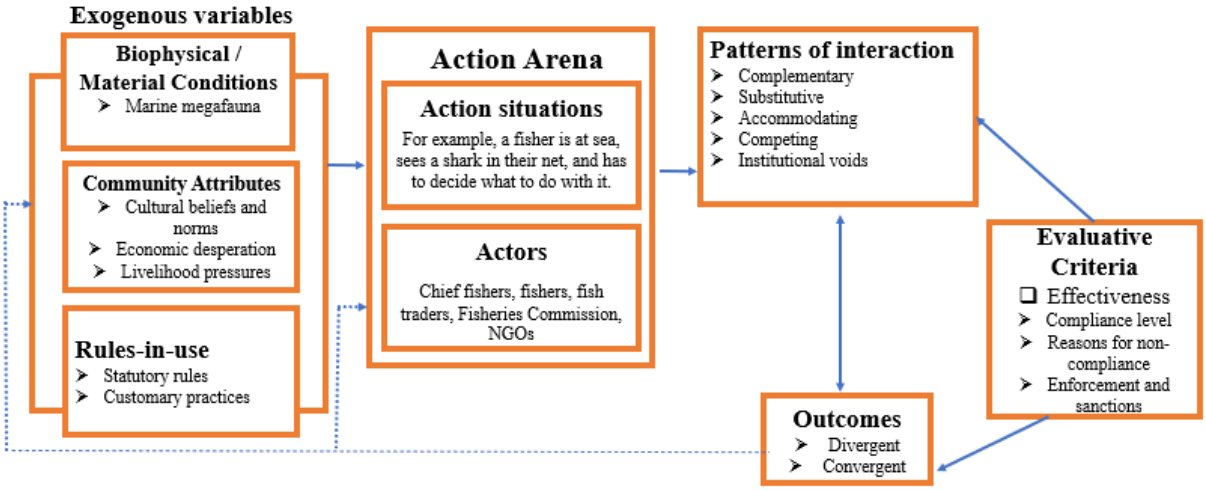

Figure 2. 1: Conceptional framework for the study

Adapted from Helmke & Levitsky (2012); Osei-Tutu et al. (2015); Ostrom (2005)

2.7.1 Action arena

The IAD framework centres on the action arena, which is a social area where action situations take place. These situations encompass interactions, exchanges, power dynamics, and problem-solving processes among various actors, each acting based on their perceived incentives (MacKenzie & Gibbons, 2019). Such incentives are shaped by the actors' preferences, the information accessible to them, their expectations about others' behaviour, and the perceived costs and benefits of different choices (Rudd, 2004). Within the context of this study, the action arena comprised the various forms of interaction between customary and statutory institutions in their efforts to protect species such as sharks, dolphins, rays, sea turtles, and whales. Decisions made in this arena are often related to fishing practices, enforcement of conservation measures, implementation of legal protections for endangered species, and the resolution of conflicts among different actor groups.

The action arena consists of both action situations and actors (Ostrom, 1990). Action situations address questions such as *"what is happening?"* and *"what are the issues or decisions being made?"*, while the actors represented the individuals or groups involved in those making decisions or participating in specific actions. It functions much like a theatrical stage, where the action situation symbolises the plot or scene, and the actors represent the characters performing various roles and making decisions.

The actors involved in the action arena included all individuals or groups engaged in decision-making, rule enforcement, or direct action. Each actor brought their own roles, interests, and viewpoints, all of which influenced how marine megafauna conservation was approached in Ghana. The primary actors in this study were Chief fishers, fishers, fish traders, the FC, and NGOs. In simple terms, the action arena resembled a busy marketplace where constant negotiation, bargaining, enforcement, and decision-making take place over fishing activities and marine conservation efforts.

2.7.2 Patterns of interaction

In this study, Helmke and Levitsky's (2012) typology of institutional adaptation serves as a useful analytical lens for examining interactions between customary and statutory institutions within the action arena of the IAD framework in the context of marine megafauna conservation in Ghana. The action arena, as defined by Ostrom (2005), refers to the space where actors interact, negotiate, and made decisions concerning the use and protection of marine species. The IAD framework emphasised how these interactions in specific decision-making contexts (action situations) are shaped by underlying institutions. However, institutions varied in formality and enforcement, which is where Helmke & Levitsky's typology proved particularly valuable.

The IAD framework emphasise that understanding of the rules structures interactions among actors. In this sense, an application of Helmke and Levitsky's typology allowed for a study of how institutional dynamics within action situations conditioned resource governance, actors engagement, and conservation outcomes. Complementing and accommodating relationships tended to promote sustainable resource management, whereas competing and substitutive relationships often acted against good governance, giving rise to resource conflicts and reducing local adaptation capacity (Dau et al., 2022; Hodgson, 2025). Recognising these patterns offered insights to policymakers and researchers presenting themselves to improve governance systems integrating statutory institutions with customary ones (Sarigil, 2023).

2.7.3 Exogenous variables

The IAD framework views the exogenous context as the external factors that affect action situations, where individuals and groups interact (Ostrom, 2005). It basically includes three categories: biophysical conditions, community attributes, and the rules-in-use. Central to this

study are these rules-in-use, which are statutory and customary institutions. They are critical for understanding how rules influence interactions and governance outcomes (Glückler & Lenz, 2016). Biophysical conditions refer to the ecological and physical features of the resource system. In this context, they include Ghana's coastline, the migratory behaviour of marine megafauna (e.g., sea turtles, sharks, rays, and marine mammals), and the ecological dynamics of marine ecosystems. These factors influence species vulnerability, user access, and the nature of governance required. For example, the migratory nature of some species necessitates cross-boundary cooperation, and landing beach conditions can affect enforcement capacity (Seidu et al., 2022).

Community attributes relate to the social and cultural characteristics of resource users (Ostrom, 2005). In Ghana, coastal communities often maintain strong socio-cultural ties to marine environments, with traditional beliefs and practices shaping interactions with marine resources (Adjei & Sika-Bright, 2019). Trust, shared values, and the legitimacy of traditional authorities can foster cooperation and compliance with conservation norms. However, challenges such as weakened traditional authority, divergent interests, and market pressures may undermine these informal governance systems (Arhin, 2008).

Among the exogenous variables, rules-in-use are the most critical for this institutional analysis. They represent shared understandings that define what actions are permitted, prohibited, or required (Sabatier & Weible, 2014). All rules aim to establish predictability by assigning roles and regulating behaviour in specific contexts (Crawford & Ostrom, 2005). In this study, rules-in-use refer to the statutory and customary rules that structure behaviour within the action arena (Ostrom, 2011; North, 1990). These rules determine participation, decision-making procedures, and sanctions for violations (Gondo et al., 2019). Working rules are the rules individuals refer to in practice to justify their actions. Although they may become habitual, they are shaped through interaction and problem-solving, often without formal processes (Harré, 1982; Shimanoff, 1980; Toulmin, 1974). These shared understandings guide behaviour and emerge from the need for order in human interactions. In democratic and rule-of-law systems, these rules may be formed informally but still align with formal legislation (Sabatier & Weible, 2014; Sproule-Jones, 2002). However, misalignment can lead individuals to bypass statutory rules. Since rules are language-based, they are subject to interpretation and change, with their stability depending on shared meanings (Ostrom & Ostrom, 2014).

2.7.4 Outcomes

In the IAD framework, outcomes refer to the results generated through the interaction of actors within institutional settings. These outcomes indicate the effectiveness and efficiency of existing rules, the distribution of costs and benefits, levels of compliance and enforcement, and the system's ability to promote sustainability and equity. They also offer feedback for potential institutional reforms (Ostrom et al., 1994). This study focuses on understanding how institutional arrangements, particularly the interaction between statutory and customary rules, shape the governance and conservation of marine megafauna in Ghana. To achieve this, the study combines the IAD framework with Helmke & Levitsky's typology of institutional adaptation, enabling a comprehensive analysis of institutional dynamics and their impacts on conservation policy and practice.

Depending on the structure of the action situation and the assumptions about actor behaviour, analysts may draw strong or weak conclusions about outcomes. In tightly constrained, one-time interactions under conditions of complete information, it is possible to make stronger predictions about behaviour and outcomes (Teye, 2008). However, in real-world contexts, the assumption that dialogue or a few meetings can yield improved governance outcomes is insufficient. Multiple factors influence long-term resource governance.

In evaluating outcomes, the study also considered alternative institutional arrangements and the outcomes they may produce. Evaluation is based on key criteria including (1) efficiency, (2) equity, (3) effectiveness, (4) accountability, and (5) adaptability. Within the IAD framework, these criteria are applied both to outcomes and the processes by which they are achieved. In the context of this study, only effectiveness will be evaluated in relation to the conservation of marine megafauna. Effectiveness refers to whether the governance system has met its conservation objectives, such as reduced harvesting or increased protection of sea turtles, sharks, and rays (Teye, 2008).

A key contribution of the study is to establish causal and correlational links between the type of institutional interaction and conservation outcomes, as assessed through IAD criteria. This approach helps identify combinations of governance arrangements that produce desirable outcomes, such as high compliance, strong community support, and effective species protection. By joining the institutional types with outcomes, the study stands to render evidence on which marine conservation policies should possibly be designed with respect to the socio-institutional context of the coastal areas of Ghana (Espinoza & Barozet, 2018; Frantz & Siddiki,

2021). The achievement of the objectives of this study hinges on the conversion of such results into actionable policy recommendations with inherent contexts.

2.7.5 Evaluation criteria

Evaluative criteria serve as a test instrument to identify the strengths and weaknesses of institutional arrangements (McGinnis, 2011). Under the IAD framework, a more methodological approach can be taken toward assessing institutional performance when it concerns marine megafauna conservation in coastal Ghana. This section, therefore, describes how the third objective of this study will be achieved through the operationalization and measurement of effectiveness-evaluative criteria by the IAD framework, to provide a thorough understanding of governance outcomes.

2.7.5.1 Institutional effectiveness

The effectiveness of any natural resource management system is inextricably linked to the concepts of compliance and enforcement. Compliance refers to the degree to which resource users adhere to established rules and regulations, whether they are statutory laws or customary norms. Enforcement, on the other hand, comprises the mechanisms and actions taken by institutional authorities to ensure that these rules are followed and to apply sanctions when they are not (Ostrom, 1990). The relationship between the two is symbiotic: effective enforcement typically fosters higher rates of compliance, while widespread non-compliance can signal a failure of the enforcement system.

2.7.5.2 The role of compliance in institutional effectiveness

Compliance is often considered a primary indicator of institutional effectiveness. A high degree of compliance suggests that the rules are not only known but also respected and followed by the target population. However, the decision to comply is a complex one, influenced by a multitude of factors, including the perceived legitimacy of the governing institution, the socio-economic drivers of resource users, and the effectiveness of enforcement mechanisms (Sutinen & Johnston, 2003).

In resource-dependent communities, such as the coastal areas of Ghana, economic pressures and livelihood security are significant determinants of compliance. As Osei-Tutu et al. (2015)

highlighted, non-compliance can stem from a fundamental conflict between statutory conservation goals and the customary goal of economic survival. This suggests that a management system's effectiveness cannot be measured solely by whether a rule exists, but by its ability to address or accommodate the underlying motivations that compel individuals to break it. The erosion of traditional beliefs and norms can also undermine compliance, as the moral authority that once encouraged adherence to customary rules is diminished (Agrawal, 2001).

2.7.5.3 The role of enforcement in institutional effectiveness

Enforcement is the critical mechanism that links the existence of a rule to its practical application. Effective enforcement is characterized by consistency, fairness, and a credible threat of sanctions that are sufficient to deter non-compliance (Sutinen & Johnston, 2003). In the context of fisheries management, enforcement can be carried out by a range of actors, from state agencies like the FC to community-level leaders (Ostrom, 1990).

The effectiveness of enforcement is compromised when these mechanisms are perceived as weak, inconsistent, or risky to implement. For instance, when sanctions are not deterrent enough, the fines are too low or the violators can very quickly resume illegal activities which leads to authority erosion and governance breakdowns (Bavinck, 2001; Lien et al., 2023). Similarly, if the state actors have to risk their lives to enforce, or selective enforcement takes place, it is just another signal of the weakness of the system that further pushes erosion of compliance. A lack of institutional harmony between statutory enforcement and customary enforcement actors can also lead to gaps used for exploitation by non-compliant actors (Osei-Tutu et al., 2015).

CHAPTER THREE

3.0 METHODOLOGY

Introduction

This chapter presents the methods adopted for this study. It begins by describing the study area which gives the rationale behind the selection of specific locations. Subsequent sections outline the research design, the sampling techniques employed, and the various data collection methods used. The chapter also details the analytical methods applied, as well as the underlying research paradigms and approaches.

3.1 Study area

The West Coast of Ghana, located within the Western Region, was the geographic area focus for this study. This area was selected due to its ecological significance, where documented adequate occurrences of marine megafauna species have been spotted (Van Waerebeek et al., 2009). The coastal zone, though comprising only 6.5% of the national land area, is home to about 25% of Ghana's population and is divided into three geomorphic units: the West Coast, Central Coast, and East Coast (deGraft-Johnson et al., 2010; Seidu et al., 2022).Ghana, a country in West Africa, is bordered by Burkina Faso to the north, Côte d'Ivoire to the west, Togo to the east, and the Gulf of Guinea to the south. The country lies between 3°5′W and 1°10′E, and 4°35′N and 11°0′N, covering approximately 239,000 km².Its coastline, measuring around 550 km, features about 90 lagoons and wetlands. Ghana's marine ecosystem is over 347 fish species across 82 taxonomic families (deGraft-Johnson et al., 2010).

Having considered a number of coastal communities, the West Coast was selected because it served as a primary baseline for most marine species studies as well as its management. That said, three coastal communities from the West Coast in the Western Region were found to be the best for this study, which included Sekondi-Takoradi, Dixcove and Shama. Apart from having relatively high occurrence of marine megafauna sightings and landings, it was reported by Seidu et al. (2022) that most fishers and fish traders migrate to these coastal communities to fish and be involved in fish trading. Other criteria for selecting these sites were the predominance of artisanal fisheries, frequent reports by fishers and traders regarding marine megafauna catches, and the willingness of local fishers to participate in interviews.

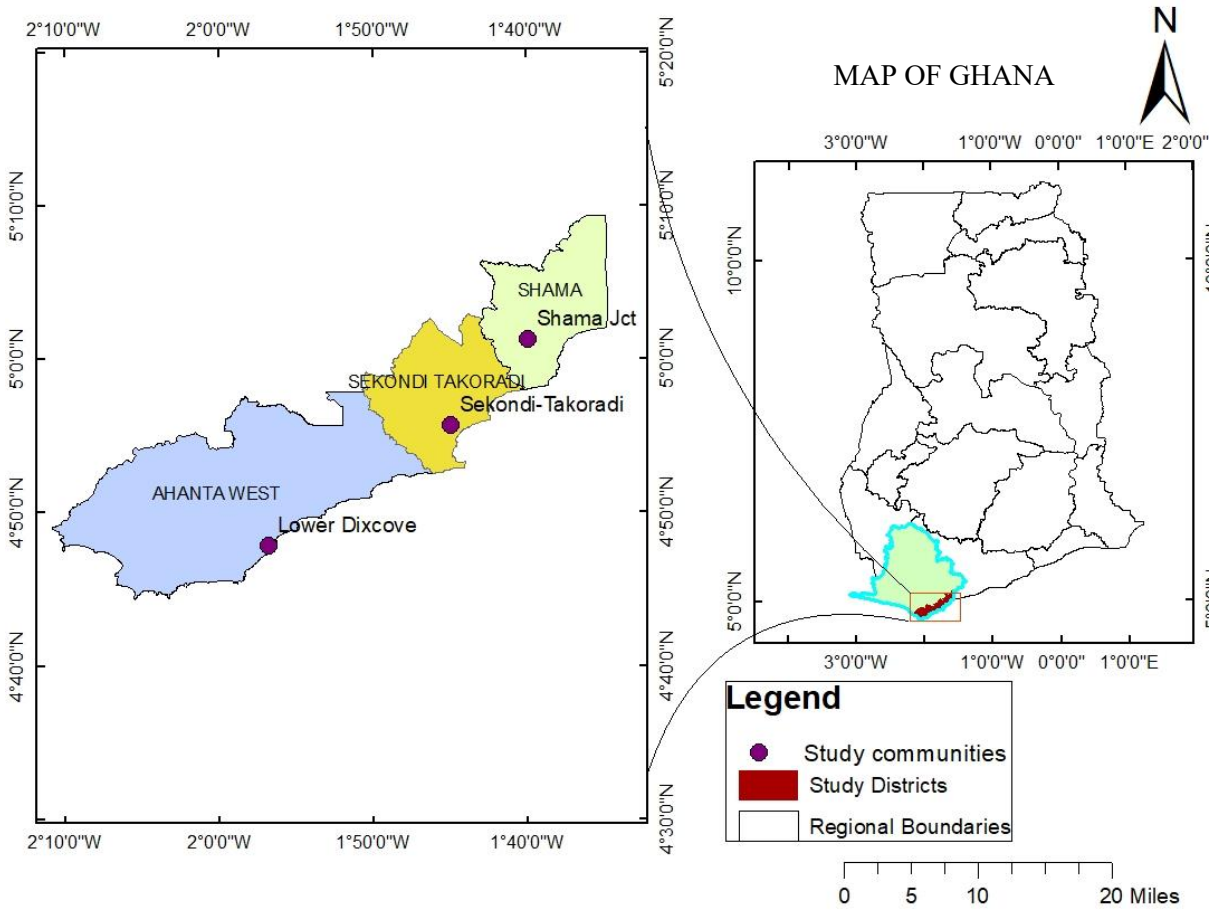

Figure 3. 1: Map of the Western Coast of Ghana showing the study communities

Shama, a town in the Shama district is characterised by a mixture of hilly and flat landscapes with an approximated shoreline of 27.4 metres. Shama is divided into two communities which is the Shama Apo and Shama Bentsir. The Shama District had a total population of 116,712 as of the 2021 Population and Housing Census (PHC) (GSS, 2021). The dominant ethnic group remains Fante. Majority of people inhabiting this area are involved in fishing and fish trading (Elizabeth, 2022). About 2,332 fishers live in this community of which 432 use canoes with drift gillnet being the commonest fishing gear (Coastal Resources Centre / Friends of the Nation, 2010; Dovlo et al., 2016).

Dixcove is a commercial town in the Ahanta West District. It shares boundaries with Busua to the East, Achowa to the west and Sunkoe to the north. The Ahanta West Municipal Assembly had a total population of 157,084 as of the 2021 PHC (GSS, 2021). Dixcove itself is a major town within this municipal area, with a high concentration of fish mongers and fishermen; approximately 1,081 fishermen using 233 canoes and drift gillnet as the main fishing gear are

documented in this community (Dovlo et al., 2016). The dominant ethnic group in this area is also Fante (Dovlo et al., 2016).

Sekondi-Takoradi is a major urban and industrial centre in the Western Region of Ghana, comprising the twin cities of Sekondi and Takoradi (Yankson et al., 2017). As of the 2021 PHC, the Sekondi-Takoradi Metropolitan Assembly (STMA) had a total population of 245,382 (GSS, 2021). This figure makes it the largest city in the region. Fishing is a significant occupation within the Sekondi-Takoradi Metropolitan Assembly (Aduah et al., 2023). The artisanal fisheries sector is prominent, utilising various gears such as purse seine nets, beach seine nets, set nets, drifting gillnets, and hook and line, operated from dugout canoes (Dadson et al., 2016; Okyere et al., 2016). The main ethnic groups found in Sekondi-Takoradi are the Fante (46.5%), Ahanta (12.2%), Asante (12.2%), and Nzema (3.8%). The Fante and Ahanta people specifically occupy the coastal zone from Shama to Sekondi, with Fantes specializing in purse-seine and drifting gillnet fishing (Halawayhi et al., 2024).

3.2 Research design

Research designs refer to the specific strategies employed to collect data, analyse it, and interpret findings, based on the research approach adopted (Dawson, 2019). This study utilised a qualitative research design to examine the institutional dynamics in shaping marine megafauna conservation in fishing communities in Ghana. The rationale for employing this approach lies in its capacity to offer a comprehensive understanding of actors' practices, perceptions, experiences, and interpretation of rules governing marine resource use.

Qualitative techniques like interviews, participant observations and document review, were used in determining interests of various actors. Data for the study were obtained from both primary sources and document review. Primary data were collected through site visits using interviews guides and participant observation whiles document review examined and interpreted existing printed and digital materials on marine megafauna protection. Reviewed documents were from reports, policy papers, memos, journal articles, news publications, and other written sources. The use of both primary data and document review ensured triangulation to strengthen the reliability and credibility of the study's findings (Olsen et al., 2004).

The research instruments were pretested in Axim, which is a coastal town located in the Western Region of Ghana on March 2025. Selecting Axim ensured that the interview guides about fishing activities, megafauna sightings, and fisher willingness to participate were tested

in a community that is geographically and functionally identical to the sampled locations, therefore validating the research instruments before they were used on the main study population.

3.3 Sampling methods

The study participants comprised key actors involved in, or affected by marine megafauna conservation and fisheries governance within the selected communities. Participants were drawn from fishers, fish traders, Chief fishers, representatives of non-governmental organisations (NGOs) and Fisheries Commission (FC) officials. These participant categories were selected because they represent distinct institutional roles related to rule-making, compliance, enforcement, and conservation intervention. Purposive sampling was used to select participants (Bryman, 2016; Patton, 2015). This strategy involved the selection of individuals based on their roles, experience, and relevance to marine conservation. Purposive sampling was appropriate because institutional authority, knowledge, and decision-making responsibilities are distributed across actors. The study required information-rich participants capable of providing informed insights (Patton, 2015).

In relation to their roles, fishers and fish traders were selected due to their direct interaction with marine megafauna through fishing and post-harvest activities (Seidu et al., 2022; 2024). Chief fishers were selected because they serve as custodians of customary fishing practices and exercise traditional authority within fishing communities. Fisheries Commission officials were selected because of their responsibility for implementing and enforcing statutory fisheries regulations. NGO representatives were selected due to their involvement in conservation initiatives and community-level engagement. Chief fishers, FC officials and NGO representatives were selected as key informants for this study. Their selection was based on the assumption that they are leaders and enforcers with firsthand information and knowledge of institutions governing their sectors (Naderifar et al., 2017; Newing, 2010). In some cases, access to participants was facilitated through availability at landing sites and through referrals from key informants (Parker et al., 2019). These approaches were solely used as access mechanisms and did not replace the purposive criteria guiding participant selection.

The number of participants in the study was guided by the qualitative nature of the study and the principle of saturation (Creswell, 2009; Guest et al., 2006). Participant numbers varied across categories to reflect differences in institutional roles and diversity of experiences. One

chief fisher was selected from each community because the position is singular and centralised. One FC official was also selected per community based on jurisdictional responsibilities. NGO representatives were limited in number because only a few organizations were actively involved in marine megafauna conservation within the study area. Fishers and fish traders were heterogenous and experience institutional rules in varied ways therefore, sampling within these categories continued until additional interviews no longer generated new themes relevant to the study objectives. This indicated that thematic saturation had been achieved (Saunders et al., 2009). The selected participant numbers were therefore considered adequate for addressing the research questions.

3.4 Data collection instrument

Data collection was a face-to-face interaction with participants on May, 2025. Semi-structured interview guides were used during data collection. Data collection instruments were tailored to the institutional roles of participants. The interview guides administered to all respondent groups contained a combination of open-ended and closed ended questions, consistent with standard qualitative research practice (Creswell, 2009; Bryman, 2016). The closed-ended questions were used to capture descriptive information such as awareness of rules, presence or absence of practices, encounters with marine megafauna, and general response patterns across actor categories. The open-ended questions elicited explanations, experiences, and interpretations of customary practices, statutory rules, and conservation challenges. As noted by Saunder et al. (2019), the inclusion of limited closed-ended questions in qualitative instruments can enhance clarity and comparability without transforming the study into a quantitative design. Responses to closed-ended questions were therefore used descriptively to support qualitative interpretation and were not subjected to statistical analysis. All data generated were treated as qualitative in nature.

Interviews with Chief fishers, fishers (Plate 3.1), and fish traders (Plate 3.2) focused on their customary practices, their knowledge of fisheries laws, their participation levels in policy formulation and implementation, as well as their interests, power dynamics, and collaboration issues. Conversely, interviews with NGOs and FC officials addressed fisheries laws, customary practices as they perceived them, their organizational interests and activities, and, most importantly, their interactions and relationships with fishers, Chief fishers, and fish traders. Given the diverse backgrounds of participants, distinct interview guides were tailored for each

group, whiles minor adaptations were made to align with their roles in the use of the resource. Interviews were conducted in English or local languages depending on respondents' preferences and audio-recorded with participants consent.

For deeper understanding of the study, participant observation was also employed. This approach was adopted to understand the social dynamics of the study areas. Particularly to familiarise with local activities, fishing operations, and community practices. This involved informal conversations with participants, active listening, and meticulous recording of field notes throughout the data collection period. The study also incorporated the review of documents where policy papers, reports, and academic literature concerning the study's objectives were examined. More specifically, review was done on the Ghana's fisheries laws like Fisheries Act, 2002 (Act 625), Fisheries Regulation (L.I. 1968) and Fisheries Law (PNDCL 256, 1991). This approach was employed to discover the specific laws that governed marine megafauna conservation that has been enacted by the state. The document review was instrumental in identifying patterns, trends, and gaps in current policies, thereby informing subsequent recommendations for improvement.

Plate 3. 1: An interview and questionnaire session with a fisher

Plate 3. 2: An interview and questionnaire session with a fish trader

3.5 Ethical considerations

The aim and objectives of the study were explained to all participants before the commencement of every interview. Participants were made aware that they were at liberty to discontinue the interview at any point they wished. Due to the sensitivity of the data to be collected, the study made sure that every participant's confidentiality regarding material that could hurt them or their surroundings was secured. Although the researcher originally intended to record all interviews, the recording only took place after participants' explicit consent was sought. Pictures taken during the study were used with the participants' permission for inclusion in the thesis.

In addition, attention was given to the validity and trustworthiness of the data. Credibility was enhanced through the inclusion of multiple respondent categories (fishers, chief fishers, fish traders, FC officials and NGO representatives), which allowed for triangulation of perspectives across different institutional actors. The use of semi-structured interview guides also ensured consistency across participants to allow flexibility for in-depth explanation.

Dependability was supported through clear documentation of data collection and analysis procedures, providing transparency in how findings were generated. Reflexivity was maintained throughout the research process with attention to potential biases arising from positionality and field interactions. Though the study does not claim generalisability, these measures enhanced confidentiality in the interpretive validity of the findings within the specific study context.

3.6 Data analysis

Data from the interviews with participants responses were manually transcribed verbatim and responses were compiled and reviewed. The manual transcribing was done because participants spoke in their native languages which were Fante, Ahanta and Nzema, thereby transcribing into English was deemed important. Coding was conducted to identify recurring ideas, concepts and patterns, guided by the study objectives. As such, the qualitative data gathered from the interview guides were grouped into themes which involved the use of a comparative thematic approach. Comparative thematic analysis is a qualitative method that involves identifying, analysing, and interpreting patterns of meaning (themes) that emerged across the different datasets (Braun & Clarke, 2006). This comparative thematic analysis allowed for the exploration of perspectives and identified key insights across participant groups and study communities (Elo & Kyngäs, 2008). The focus was to identify patterns related to institutional rules, rule awareness, compliance behaviour, roles of institutions, enforcement strategies and the interaction between customary practices and statutory rules. Themes compared across participant categories and study communities helped to identify similarities and differences in institutional dynamics.

3.7 Limitations of the study

A major challenge involved the recruitment and scheduling of interviews with participants. Access and availability of these participants was difficult to reach as their profession was highly mobile and time-sensitive. This was further complicated and escalated by a perceived expectation of incentives from researchers to participants, which is a common challenge in community-based research. This limitation was mitigated by adopting a flexible and

opportunistic approach to data collection which was, conducting interviews based on the availability and willingness of participants.

Furthermore, the sensitive nature of the study posed a challenge to data collection. Many participants were reluctant to open up about topics centred on illegal fishing activities, as they were well aware of the statutory laws and customary practices concerning marine megafauna. Also, institutional dynamics are complex and may evolve over time, meaning that the findings reflect conditions at the time of data collection. Finally, as with many case-study approaches, the findings may be limited in their relevance to other contexts. The detailed insights gathered from the specific coastal communities of Shama, Dixcove, and Sekondi-Takoradi may not be directly generalised to the broader community of fishers and fish traders in Ghana or other regions.

CHAPTER FOUR

4.0 RESULTS

Introduction

This chapter presents the findings through the lens of the study's objectives. It draws on data generated from multiple respondent groups across the three study communities. The chapter reveals the experiences and perceptions of fishers, fish traders, Chief fishers, FC and NGOs and how they relate and interact with marine megafauna. What emerges are consistent patterns across communities on an understanding of how customs, laws, environmental awareness, and the relentless pursuit of livelihood intersect the daily lives of Shama, Dixcove and Sekondi-Takoradi fishing population.

4.1 Socio demographic characteristics of respondents

Interviews were conducted with 68 individuals from the three coastal communities. From each community, fifteen fishers, five fish traders, one Chief fisher, five FC officials and two project officials from Hen Mpoano were interviewed for this study. Fishers from Shama were primarily engaged in artisanal fishing whiles fishers from Sekondi- Takoradi and Dixcove were either into artisanal, semi-industrial, industrial or tuna fishing.

Table 4.1 represents the socio demographic characteristics of the respondents. Majority of the respondents were between the ages of 41 to 60 years representing 44.1 % of all responses, followed by 21 to 40 years (33.8 %) and respondents over 60 years (14.7 %). Chief fishers were older with two of them ranging between 50 to 60 years and with one exceeding over 60 years.

Respondents also indicated varying years of experience in the fishing industry. About 32.4 % had worked for over 16 years in the fishing industry, 22.1 % between 11 to 15 years, 30.9 % between 6 to 10 years and 7.4 % below 5 years.

Majority of the respondents were mostly Fantes, followed by Ahantas which was notably present in Dixcove and Shama among fishers and fish traders. A small number of respondents were Ewes and Nzemas which was also notably among the fishers and some fish traders.

The fishing landscape consists of both indigenes and migrants. Majority of the respondents from the three communities were indigenes representing 64.7 % of the total respondents and 27.9 % being migrants.

Table 4. 1: Socio demographic characteristics of respondents

Variable	Dixcove	Sekondi-Takoradi	Shama	Number of respondents (n= 68)	Percentage of respondents (%)
Gender					
Male	16	16	16	48	70.6
Female	5	5	5	15	22.5
Age					
21-40	6	7	10	23	33.8
41-60	13	11	6	30	44.1
Above 60	2	3	5	10	14.7
Ethnicity					
Fante	15	20	10	45	66.2
Ahanta	4	1	5	10	14.7
Nzema	0	0	3	3	8.8
Ewe	2	0	3	5	7.4
Origin					
Indigene	15	12	17	44	64.7
Migrant	6	9	4	19	27.9
Experience					
0-5	3	0	2	5	7.4
6-10	6	7	8	21	30.9
11-15	5	6	4	15	22.1
16+	7	8	7	22	32.4

Source: Field survey, May, 2025

4.2 Customary institutions and norms influencing behaviour towards marine megafauna

Throughout the three coastal communities, customary institutions and norms have shaped how people behave towards marine megafauna. Several traditional rules, cultural beliefs and social practices have been established by coastal communities to ensure the survival of these species. This section details the norms, practices, taboos and beliefs that the three coastal communities adhere to regarding marine megafauna.

4.2.1 Customary beliefs, taboos and practices

In all the three coastal communities, marine megafauna like whales, sea turtles, dolphins, rays and sharks have local names which they are referred to. Whales are locally known as “Bonsu”, sea turtles as “Apuhur”, dolphins as “Etui”, rays as “Mbadɛe” and sharks as “Semi, Gogorow, Polley, Anto, Epo egyinamowa and Ewiabre”. Customary beliefs, practices and taboos play an

important role in fishers, fish traders and Chief fishers' interactions with marine megafauna. All fishers, Chief fishers and fish traders acknowledged that the sea is not merely a source of livelihood but a sacred space imbued with spiritual meaning and ancestral tradition. They indicated that customary practices, beliefs and norms shape their attitudes and behaviour towards marine species. More specifically all fishers, fish traders and Chief fishers characterised whales as "sea gods" and stated that it was a taboo to catch, land or kill them. One fisher explained:

> "It is a taboo to land whales. Whales are gods of the sea and they are very scary animals. We worship them when we see that they have passed or are beside our boats. You cannot even land them because of its size and how scary it can sometimes be. We sometimes even pour libation for them at sea when we see them. Since our forefathers' time, no one has ever landed a whale" (Fisher, 05, Shama, 02/05/25).

Dolphins, sea turtles, sharks and rays were excluded from such beliefs. Fishers, fish traders and Chief fishers regarded sharks and rays as a delicacy. A fisher stated, *"For sharks and rays, we land them often because there are no customary practices we have to follow regarding them"* (Fisher, 18, Shama, 04/05/25). Another fisher further explained what the capture of sharks and rays were used for:

> "Sharks are what we use for kako (a local fish used to make dishes like plantain and garden egg stew in the Ghanaian society). Rays are part of the normal fishes we use for soup which we eat every day. As such, there are no customary practices on sharks and rays that I am aware of" (Fisher, 06, Shama, 04/05/25).

One fisher also stated, *"We eat dolphins and sea turtles all the time. For them, there are no customary practices protecting them"* (Fisher, 12, Shama, 04/05/25).

4.2.2 No fishing on Tuesday rule

Another customary practice is the no fishing on Tuesday rule. Majority of the fishers indicated that Tuesdays was a sacred day for the sea and as such they were not supposed to go for fishing on Tuesdays. They regard Tuesdays as a day for no fishing and for the sea to rest. As such they refer to the sea as "Epo Abena". A fisher explained the reason for the rule:

> "On Tuesdays, we do not go to fish. Our forefathers were not going to sea on Tuesdays. They said that on Tuesdays, the gods come around to play and eat the sacrifices we

offer for them on this day. The gods eat our sacrifices then replenish and bless the sea with a lot of fishes" (Fisher, 25, Dixcove, 13/05/25).

This practice is however fading out and is widespread in all the three communities with one fisher stating, *"Tuesdays is for the sea. If you go fishing, the gods will punish you. But now, we do not follow the rule anymore because sometimes, we go to sea on Tuesdays and nothing happens to us"* (Fisher, 13, Shama, 07/05/25). Another fisher from Dixcove also backed his response by stating:

> "We are not supposed to go to the sea on Tuesdays, distribute and sell our catch even when we land on Tuesdays. However, it is not like that nowadays, as we sometimes land and sell our catch on Tuesdays. Most fishers also use Tuesdays to fix their nets and prepare for their next fishing trip" (Fisher, 17, Dixcove, 12/05/25).

4.2.3 Traditional ban on light fishing

The traditional ban on light fishing was a ban which was greatly discouraged among fishers especially at Dixcove. Reason being that, the use of the light fishing methods for fishing disrupts fair catch shares of fishes among fishers. This is because, fishers are able to catch more fishes when they use light fishing methods to fish as compared to fishers who do not use light fishing methods to fish. A Chief fisher stated, *"Light fishing is not allowed here. It is a strict ban that everyone follows here"* (Key Informant, 07, Dixcove, 13/05/25). A fisher further elaborates the reason for this ban:

> "Light fishing puts some fishers at a disadvantage. For instance, if a fisher uses light to fish, he will get a lot of catches as compared to another fisher who does not use light to fish. This is because light attracts fishes to it, even with the smaller fishes. In that case, the fisher who does not use the light to fish gets very little fishes to bring home. Meanwhile we all bought the same amount of petrol to go to sea with. Our fathers then decided that it is a cheat for some fishers especially if they are not able to buy the equipment to use for the light fishing method so they banned it" (Fisher, 45, Dixcove, 15/05/25).

An NGO official provided insight into its adoption, stating, *"Someone tested light and then fishers saw that the fisher had bumper harvest, and that is how it was adopted"* (Key Informant, 01, Hen Mpoano, 23/05/25). However, the observance and adherence to this ban varies due to

the perceived effectiveness in increased catches and livelihood support. In Shama, a fisher reported that explained:

> "Yes, the wakye people (fishers who use the ring nets to fish) use light in combination with dynamite to fish. They do this because the sea is not like it used to be before and all fishers want bumper harvest but we are not getting them like we used to get 30years ago. What they do now is that, they use light to attract the fishes from afar to come into their nets. The community does not support this practice but we also have to make money to support ourselves and our families" (Fisher, 34, Shama, 08/05/25).

On the contrary, in Dixcove the light fishing ban was strictly observed. A fish trader confirms the consequences of not adhering to this ban:

> "The light fishers cannot even come here because the Chief fisher will not allow it. And if you do not know and you come here with light fishing equipment, the Chief fisher will make his fishers scatter your catch and you will be left with nothing. Light fishing is not tolerated here at all" (Fish trader, 08, Dixcove, 13/05/25).

4.3 The role of the Chief fisher (Apofohene)

The Chief fisher locally known as the Apofohene is the head of all fishers in each coastal community. Fishers acknowledged that the Apofohene serves an important role in regulating the behaviour of fishers and fish traders through established customary authority. His responsibilities span around enforcement of customary rules and ensuring adherence (particularly concerning sea turtles, dolphins and whales), settling of disputes between fishes, community communication and education and sanctioning violators of rules. A Chief fisher stated some of his roles, stating, *"I am mostly on the lookout for fish landings. My role is to make sure that fishers do not bring to land/shore fishes they are not supposed to bring"* (Key Informant, 05, Shama, 10/05/25). Another Chief fisher from Dixcove also stated his roles he plays as the Apofohene:

> "I, as the Apofohene settle quarrels between fishers when they go to sea and have misunderstandings and if care is not taken, may end up in a fierce fight. The matter is usually brought to me and I call all the parties involved to settle the issue. When the issue is discussed and a fisher is found to be at fault, he is asked to pay money to compensate the other. The offender pays money known as "mpata sika" (compensation

money) to both I the Apofohene and the fisher who was offended" (Fisher, 21, Dixcove, 19/05/25).

In addition, the Apofohene serves as a channel for disseminating information and educating fishers and fish traders on practices, established rules and norms. A Chief fisher reported:

> "I meet my people to announce and educate them on the rules they are to follow when they are at sea. Mostly, it is through announcements within the community. When the need arises, I have several discussions concerning the rules and norms that they are to follow. I listen to their concerns and forward them to the traditional authorities in the community" (Key Informant, 05, Sekondi-Takoradi, 23/05/25)

Majority of the respondents also indicated that the Apofohene has the authority to impose sanctions on violators of practices, taboos and norms. These sanctions can be in a form of fines, fishes and schnapps but it is based on the extent of the offense and demeanour of the violator towards the Apofohene. A Chief fisher from Shama stated, *"Violators are mostly fined an amount of money but it depends on your reason for violating the rules"* (Key Informant, 04, Shama, 10/05/25). Another fisher also echoed, *"In cases where offenses are paid in fishes, your catch from your fishing trip will be divided and a portion of it given to the Apofohene"* (Fisher, 23, Dixcove, 18/05/25). A Dixcove fisher also mentioned, *"You are fined an amount of money and it is not so much that you cannot pay. In instances where the offenses are serious, you will be asked to provide schnapps for libation"* (Fisher, 14, Dixcove, 16/05/25)

A reoccurring theme across respondent responses was that the Apofohene does not operate in isolation but works closely with a council, referred to as "cabinet or elders". A Chief fisher confirms by stating that:

> "I as the Apofohene work with my cabinet. They are seven in number and they make sure that fishers obey the norms, rules and practices. My cabinet does this by regularly checking the landings of fishers and for that, they are always around" (Key Informant, 07, Dixcove, 13/05/25).

Similarly, the Chief fisher of Sekondi-Takoradi affirmed*, "I do not work alone. I work together with my cabinet. They help me to ensure that people follow the rules"* (Key Informant, 08, Sekondi-Takoradi, 23/05/2025).

4.4 Statutory institutions regulating marine megafauna

The conservation and management of marine megafauna in Ghana is governed by a network of statutory institutions who play distinct yet collaborative roles in ensuring sustainable fisheries and marine biodiversity protection. The FC is the key regulatory body in this sector. They are responsible for issuing licenses, registering fishing vessels, regulating the use of fishing and enforcing adherence to national fisheries laws (Key Informant, 06, Shama, 22/05/25). The FC is also crucial role in managing the fishing industry by monitoring the exploitation of endangered and protected marine species. They help promote sustainable fishing by implementing closed seasons and ensuring that species like dolphins, sea turtles and whales are not harvested. Also, the FC support data collection efforts of marine species, policy development and resource management by collaborating with other institutions and agencies within the fisheries sector (Key Informant, 02, Dixcove, 13/05/25; Key Informant, 05, Sekondi-Takoradi, 24/05/25).

In addition to the FC, the Wildlife Division of the Forestry Commission plays a role in the protection of marine megafauna, particularly marine mammals. Under the Wildlife Conservation Regulation, 1971 (L.I. 685), species such as dolphins, whales, and sea turtles are classified as protected wildlife. The Wildlife Division is tasked with enforcing these protections, conducting ecological assessments, and supporting conservation initiatives that align with Ghana's broader environmental policies. Their mandate complements the work of the FC by extending legal protection to marine species beyond fisheries regulations, ensuring a more comprehensive conservation framework (K.I, 01, S, 22/05/25; K.I, 08, ST, 22/05/25).

The FC consists of units and one of them is the Fisheries Enforcement Unit (FEU). The FEU is a task force made up of the Marine Police Unit, Ghana Navy and the Ghana Armed Forces. These task forces are mandated for implementing fishing regulations at sea and along the coast. They inspect vessels, monitor fishing gears, prevent the use of illegal fishing methods like dynamite and light fishing and arrest violators of the fisheries laws. The FC focuses on regulation and biological monitoring of marine species whiles the FEU ensures direct enforcement and surveillance (Key Informant, 01, Shama, 22/05/25; Key Informant, 08, Sekondi-Takoradi, 24/05/25).

The Monitoring, Control and Surveillance Division (MCSD) is another unit under the FC. They are responsible for ensuring compliance with national and international fishing laws by monitoring the operations of both foreign and local fishing fleets. The MSCD use tools like the

Vessel Monitoring System (VMS) and the Automatic Identification System (AIS) to monitor the activities of vessels when they are at sea. They also conduct beach patrols, sea and lake inspections, and harbour checks to detect and deter IUU fishing activities. This division is also responsible for monitoring the adherence of fishing vessels during closed seasons rules as well as supervising transshipment activities (Key Informant, 01, S, 22/05/25; Key Informant, 08, Sekondi-Takoradi, 22/05/25).

Other statutory bodies like the Ghana Immigration Service, the Narcotics Control Unit (NCU) and the National Intelligence Bureau (NIB) also contribute to conservation efforts. The NCU and the NIB support enforcement efforts by investigating and intercepting trafficking illicit goods such as narcotics and weapons, which are sometimes concealed in fishing vessels whiles the Ghana Immigration Service regulate the presence and activities of foreigners abroad fishing vessels which helps to curb illegal unauthorized operations (Key Informant, 08, Sekondi-Takoradi, 24/05/25). Below is a table showing the statutory rules that protect marine megafauna in Ghana.

Table 4. 2: Statutory rules and regulations that protect marine megafauna and the awareness of fishers, fish traders and Chief fishes in the fishing landscape

Regulation/ provision	Regulatory instrument	Enforcement authority	Penalties for violation	Awareness of respondents
Prohibition on capturing, retaining or landing marine mammals	Fisheries Act, 2002 (Act 625), Section 90 (1)	FC officials Marine police Navy	1. Local industrial or semi-industrial and foreign vessels: A fine of not less than ¢605,310.00 and not more than ¢12,106,200.00 2. For other offenders: A fine of not less than ¢6,000.00 and not more than ¢24,000.00	"Government says we should not land whales, sea turtles and dolphins" (85 % of total respondents are aware)
Incidentally caught marine mammals must be released immediately with least harm	Fisheries Act, 2002 (Act 625), Section 90 (3)	FC officials Navy Marine police	1. Local industrial or semi-industrial and foreign vessels: A fine of not less than ¢605,310.00 not more than ¢12,106,200.00 2. For other offenders: A fine of not less than ¢6,000.00 and not more than ¢605,310.00	"I have to let the sea turtle go if it is entangled in my nets because I know that if I land it and I am caught by the FC, I will be arrested" (66 % of respondents are aware)
Ban on the use of explosives, poisons and noxious substances for fishing	Fisheries Act, 2002 (Act 625), Section 88 Fisheries Regulations, 2010 (L.I. 1968) Section 11	FC officials Marine police	1. Local/ industrial and foreign fishing vessels: fines range from ¢3,026,550.00 and not more than ¢24,212,400.00 2. Any other cases: fines range from ¢300.00 and not more than ¢6,000.00 3. Any catch, fishing gear, or other apparatus used in the commission of the	"Yes, we sometimes use the carbide, dynamite and other chemicals to fish even though the government strictly forbids it. If we do not use it, we will not get the fish stock we want" (78% of respondents are aware)

Regulation/ provision	Regulatory instrument	Enforcement authority	Penalties for violation	Awareness of respondents
			offense can be forfeited to the Republic	
Prohibition of illegal trade in protected marine species	Wildlife Conservation Regulations of 1971 (L.I. 685) Wildlife Resources Management Act, 2023 (Act 1115)	FC officials Marine police	1. Violations can result in a fine between ¢3,000.00 and ¢6,000.00 2. Imprisonment depends on the severity of the offense 2. Any marine species or their parts (trophies) that are illegal traded will be confiscated	"The government says that the fishers should not land sea turtles…… The fishers hide it and go and give the caught sea turtles to particular fish traders to sell them" (63% of respondents are aware)
Closed season for all industrial and semi-industrial vessels and canoes	Fisheries Act (625), Section 84(4)	FC officials, MCSD officials	1. For canoes, the penalty ranges from ¢1,200.00 and ¢6,000.00 2. For industrial, semi-industrial or foreign vessels, the penalty ranges from ¢6,053,100.00 and ¢24,212,400.00 3. The catch, fishing gear and any other equipment used in the fishing activity will be forfeited	"For here, we strictly obey the rule on the close season mainly because it is a rule from the government" (94% of respondents are aware)
Mandatory licensing of fishing canoes	Fisheries Act, 2002 (Act 625), Section 47 (1), 52 (1)	FC officials	1. For canoes, the penalty is a fine of ¢1,200.00 2. All fish and fish products found on bound the unlicensed canoe will be forfeited to the Republic	"FC are responsible for the registration of canoes. If you do not do it and you go to sea and the navy see you, you will be arrested" (78% of respondents are aware)

Regulation/ provision	Regulatory instrument	Enforcement authority	Penalties for violation	Awareness of respondents
Ban on light fishing, use of bamboo or electrical contraptions for fish aggregation	Fisheries Regulations, 2010 (L.I. 1968) Section 11	FC officials Marine police Navy	1. For local industrial or semi-industrial vessels or foreign vessels, the fine can range from ¢605,310.00 to ¢12,106,200.00 2. For other cases, the penalty is ¢6,000.00 3. A prison sentence of not more than three months	"It is true. The government says that we are not supposed to use light to fish. From time to time, the FC come around to educate us on the dangers for using light to fish. They even show us videos on them. So yes, we know that the government prohibits us from using light to fish" (88% of respondents are aware)
Ban on unauthorized net mesh sizes or illegal gears	Fisheries Regulations, 2010 (L.I. 1968)	FC officials	1. A fine of up to ¢1,800.00 or imprisonment of up to 12 months or both 2. Cancellation or suspension of fishing licenses for those who violate regulations	"The government have given us particular net mesh sizes that we are to use. They tell us all the time not to use the small net mesh sizes ($3^{1/2}$, 1, $1^{1/2}$, 4, 3) or we will be arrested. This is because those sizes end up trapping the small fishes who have not grown to their matured stage" (68% of respondents are aware)

4.5 Interactions between customary and statutory institutions protecting marine megafauna

4.5.1 Complementary interactions

Instances of complementary interactions were observed where customary norms and practices supported statutory regulations. An instance was when respondents indicated a rule on the traditional prohibitions against harmful fishing practices, such as the use of light to fish. This practice is complemented by state regulations which ban the use of light, bamboo, or electrical contraptions for fish aggregation, and also prohibit the use of explosives, poisons, and noxious substances for fishing. This was evident in some of the responses respondents gave. According to a Chief fisher:

> "Fishing with light or chemicals is prohibited as it hurts both the fish population and our future sustainability. All my fishers know that it is prohibited here. If a fisher from a different coastal area comes here to land and we realise that the fisher used light and other chemicals to fish, I make a quick announcement for all my fishers to 'Fuga' (a call for fish scatter) his fishes and take whatever fishes they can carry" (Key Informant, 04, Dixcove, 13/05/25).

At the same time from the Fisheries law particularly in the Fisheries Regulations, 2010 (L.I. 1968) Article 11 and Fisheries Act, 2002 (Act 625), Section 88, states that:

> "It is prohibited for any person to use any fishing method that aggregate fish either by light attraction (the use of portable generators and bulbs exceeding 500 watts and long cable to facilitate light production), use of bamboo for purposes of aggregating fish. A person shall not, permit to use or attempt to use an explosive, a poison or any other noxious substance for the purpose of killing, stunning, disabling or catching fish, or in any way rendering fish more easily caught" (Fisheries Act, 2002; Fisheries Regulations, 2010).

In this context, compliance is shaped by the combined presence of customary sanctions and awareness of statutory prohibitions. Fishers recognise that both customary authority and state enforcement mechanisms govern acceptable fishing behaviour. This reflects complementary interaction, as adherence to conservation rules is reinforced by both institutional systems operating simultaneously.

Another instance that also showed how the rules and enforcement were supporting each other was when a Chief fisher recalled, that, *"The FC has granted authority to the Apofohene to ensure that no one captures marine species like dolphins, sea turtles and whales"* (Key Informant, 06, Sekondi-Takoradi, 23/05/25). This delegation of authority to protect these marine species is in line with the statutory rule from Fisheries Act, 2002 (Act 625), Section 90 (1) which states:

> "A person shall not capture, retain or land a marine mammal whether dead or alive, or part of a marine. This clearly shows how both enforcement units in the customary and statutory institutions work together to ensure that marine megafauna is protected" (Fisheries Act, 2002).

In this instance, customary authority operates with explicit recognition from the statutory institution and enforcement is mutually reinforcing. Compliance therefore results from both statutory legitimacy and customary enforcement, demonstrating a complementary interaction.

In addition, an FC official also noted this cooperative trend with the customary authorities. The FC officer stated:

> "The Chief fishers assist in alleviating tensions during our community engagement sections with the fishers and fish traders. Mostly, the fishers and fish traders may not agree with some of the rules from the government so the Chief fisher steps in and talks to his people to establish a deeper understanding of the government rules. The Chief fisher acts a mediator between the fishers and fish traders and the government" (Key Informant, 07, Sekondi-Takoradi, 24/05/25).

In other instances, the customary and statutory institutions showed some level of coexistence and collaboration. This was particularly evident in Shama as a fisher noted, *"Whales are our sea gods. So, we do not target or catch them at all"* (Fisher, 44, Shama, 11/05/25). This customary practice is in line with the Fisheries Act, 2002 (Act 625), Section 90 (3) which explicitly states that, *"A person who incidentally captures marine mammal shall release it immediately without causing it harm and shall not retain it"* (Fisheries Act, 2002). Although cultural beliefs provide the motivation for compliance, awareness of state prohibitions further reinforces this behaviour. The convergence of customary reverence and state rules strengthens compliance outcomes, thereby classifying this interaction as complementary.

4.5.2 Competing interactions

Respondents revealed competition between the customary and statutory institutions. Officials from the FC and NGO characterised both regulatory bodies as fragmented. An FC official stated, *"At times there are contradictions in the rules where local leaders may assert one position while the law presents an opposing view"* (Key Informant, 03, Dixcove, 13/05/25). This was evident when a Chief fisher echoed:

> "The dolphins and sea turtles are fishes we eat. It is not bad and neither does it cause harm when we consume them so I do understand why we should not land them. For us, we eat the dolphins and sea turtles" (Key Informant, 03, Dixcove, 15/05/25).

This statement from the Chief fisher is contradictory to the government's rule in the Fisheries Act, 2002 (Act 625), Section 90 (1) which states, *"A person shall not capture, retain or land a marine mammal whether dead or alive, or part of a marine"* (Fisheries Act, 2002). This shows a competing interaction where customary acceptance of certain species directly conflicts with statutory prohibitions, therefore resulting in weakened compliance.

This confusion is further exacerbated by inconsistent conflicts between the institutions where there is no clear coverage on the particular marine megafauna not to be caught. A fisher enquired:

> "The government says we should not land dolphins, whales and sea turtles. We understand but why should they further tell us not to land sharks and rays. We use sharks for making "kako" and we eat rays all the time. We even get a lot of money from selling the shark fins to the Chinese people. Why are they telling us to stop landing something we eat. It is not even in our customary practices that we should not eat or not catch sharks and rays. We do not understand why we should follow government rules on not landing sharks and rays" (Fisher, 34, Dixcove, 17/05/25).

In certain contexts, there were weakening management approaches where the systems operated concurrently. A Chief fisher recognised the non-interference stance of both institutional systems. He stated, *"We allow our fishers to land the dolphins and sea turtles even though the FC prohibits it. They are normal fishes we eat so I do not see the need for this prohibition"* (Key Informant, 03, Dixcove, 12/05/25). This functional separation of responsibilities results in a fragmented governance where both institutions can independently issue rules or enforce norms without mutual rein enforcement. This apparently leads to "forum shopping" among

fishers and fish traders. Respondents indicated instances of forum shopping where they decided to adhere to rules based on convenience or the apprehension of sanctions. A fisher commented:

> "We would rather prefer to pay fines to our local leaders than to pay heavy fines to the FC. Our Chief fisher will ask you to pay an amount of like 200-500 Ghana cedis when you violate a rule but when you are arrested by the FC, your case becomes worse because they will fine you heavily. It is only the Chief fisher who can speak on your behalf for them to reduce the fine for you" (Fisher, 01, Shama, 06/05/25).

However, this duality is sometimes exploited as a fish trader noted:

> "Because our fishers know that the elders will go and speak on their behalf when they are arrested, they also land the sea turtles anyhow. Even though it is part of our customary practices that we cannot eat sea turtles, now the sea has changed and we are not getting the fishes like we used to get twenty years ago. So now our fishers will land the sea turtles so they can get enough money to pay for their premix fuel" (Fish trader, 08, Sekondi-Takoradi, 20/05/25).

Apart from competing interactions occurring between institutions, respondents also indicated competitions between an institution (either customary or statutory) and the desperate need for economic survival. A fisher from Sekondi-Takoradi encapsulated this conflict perfectly:

> "I have spent money to buy petrol and other things to go to sea and the government is telling me not to catch the marine species when they are caught in the nets. They even destroy the nets in addition when they are caught up in them. Is the government the one going to pay my debts on the petrol and the nets for me? So, I do not follow the rules because I need to survive to take care of my family" (Fisher, 09, Sekondi-Takoradi, 21/05/25).

This response from a fisher indicates direct competition between a statutory rule and a fisher's immediate economic reality. This was further supported by a fish trader from Shama who when asked about buying and selling fish caught with illegal methods stated:

> "Yes, I will know when the fishers use illegal methods like poisonous substances to fish and they come to sell them to us. What will make it show is that, when you are working on the fishes after buying them, your hands begin to swell and it begins very big. That is how you will be able to tell. Even though I know that our practices do not

allow fishers to use those illegal means, but what am I going to buy and sell if I do not buy what the fishers bring like that?" (Fish trader, 15, Shama, 10/05/25).

4.5.3 Accommodating interactions

Respondents indicated instances where accommodating interactions occurred. Accommodating interactions was evident when a customary practice, norm or taboo changes or adapts its rules and practices in response to statutory rule, economic or external pressures. A fisher indicated that the "no fishing on Tuesdays" which is a traditional rule has been weakened over time and now economic gains has become the priority of fishers. The fisher explained:

> "Sometimes, some people do not follow it. This is because they consider it as not important anymore. He further attributed this to the influence of Christian practices and a changing work ethic. I remember in those days, you will not see fishers going for a trip on Tuesdays but in our time now because we all want money, we break the rules and still go to fish on Tuesdays" (Fisher, 25, Sekondi-Takoradi, 23/05/25).

This shift is a clear change of cultural value to economic opportunities where customary institutions adjust their enforcement and significance in response to external economic and social influences.

4.5.4 Substitutive interactions

Respondents reported instances of substitutive interactions where there was a complete replacement of one institution's function by another. A notable example was the disempowerment of the Kokohemaa (fish mother). The role of the Kokohemaa is to negotiate with fishers in setting the prices of fishes before the fish traders come to buy them. This provided order and stability in the market but however, it was been entirely substituted by the changes of a market-based economy. A fisher attributed rejections of the authority of the Kokohemaa to the desperation for economic gains. He stated:

> "The Kokohemaa does not know what we go through at sea and she does not buy petrol for me so I do not see the reason why the Kokohemaa should come and negotiate with me on the prices of fishes that I used my own money to go to sea to catch" (Fisher, 38, Dixcove, 14/05/25).

Another substitutive interaction which was revealed by respondents was the formal regulation on the registration of canoes. This statutory process has replaced the traditional way of organising fishers and their vessels. A fisher from Sekondi- Takoradi explained this substitution, saying:

> "The FC is responsible for the registration of canoes. It used not to be like that. You only had to inform the Chief fisher of your intention to start working in this business, then the rest is up to you to get the canoe and the other equipment. Now it is not like that. A representative of the FC has to lead you to do canoe registration to the FC office" (Fisher, 02, Sekondi-Takoradi, 21/05/25).

An FC official stated the consequence of not following this rule:

> "If you do not register your canoe and something happens to you whiles you are at sea, no one will mind you especially the navy. The first thing they will ask if in case your vessel is damaged and you need help is your vessel's registration number. You even need the registration number of the vessel before you will be allowed to cross the boarders of Ghana to fish. Without it, you will not be allowed" (Key Informant, 08, Sekondi-Takoradi, 24/05/25).

A fisher affirms this, *"Yes, if you do not register your vessel, you will not be allowed to go to sea or even go beyond the borders of Ghana to fish"* (Fisher, 41, Shama, 08/05/25). In these cases, market mechanisms and state rules substitute for customary institutional functions, illustrating substitutive interactions.

4.5.5 Institutional voids: parallelism and subversion

Several instances in the respondents' responses indicated void parallelism in marine megafauna protection. The pervasive use of illegal fishing methods demonstrated an instance of void parallelism. Particularly, statutory regulations prohibit destructive methods like light fishing, dynamite and poisonous chemicals and customary practices such as the ban on using the light fishing methods and dynamite to fish promote sustainable fishing. However, both state regulations and traditional prohibitions are failing. This was evident when a fisher openly admitted to using light and dynamite for higher fish catches. He stated:

> "The sea is not like what it used to be where we would get a lot of fishes without going very far on sea. Today, we go very far to catch fishes and even with that, if I do not use

the light to attract them, they will not come. So, I use the light to attract them then the carbide chemical to confuse them before they run away. Otherwise, I will not get anything" (Fisher, 30, Shama, 05/05/25).

A fish trader affirmed the use of illegal methods for fishing. She stated, *"The fishers use chemical to fish all the time. You can be able to tell when the fish looks very shiny and the slimy feel of the fish when you touch it"* (Fish trader, 11, Sekondi-Takoradi, 19/05/25).

These instances demonstrate a void where statutory and customary rules exist but are rendered ineffective due to economic pressures, enforcement limitations and vulnerable species remaining largely unprotected.

Respondents indicated instances where void subversion occurred within the customary and statutory institutions. This was evident when fishers and fish traders did not see reason as to why the FC set a rule on sharks and rays because sharks and rays were regarded as commodities. An FC official, stated, *"It is in the Fisheries Act that marine mammals should not be caught and sharks and rays are part of the marine mammals. So, it is an offense for fishers to catch and sell sharks and rays. It is against the laws according to the Fisheries Act"* (Key Informant, 05, Shama, 10/05/25). However, a fisher reprimanded saying, *"But sharks are what we use for kako and rays are part of the normal fishes we eat. It is not part of our customary practices that we should not catch sharks and rays because we eat them every day. We even sell the fins of the sharks for money"* (Fisher, 29, Sekondi-Takoradi, 19/05/25). This contradiction clearly indicates an instance of void subversion where both institutions have different goals and they are both ineffective.

4.6 Effectiveness of management approaches regulating human activities affecting marine megafauna

4.6.1 Level of compliance to statutory rules and customary practices

Fishers and fish traders indicated their compliance levels to both customary and statutory institutions in protecting marine megafauna. To gauge this, respondents were asked to indicate whether they were compliant or non-compliant to the customary (Table 4.3) and statutory (Table 4.4) institutions and to give reasons for their responses. The customary practices, beliefs and norms included the taboo on landing whales, the no fishing on Tuesday rule and the no light fishing traditional ban. The statutory rules included the returning of incidentally caught marine species, the ban on light fishing, the capture of marine mammals, the ban on the use of

explosives for fishing and the illegal trade of marine species. Fishers gave responses based on their activities at sea whiles fish traders gave responses in relation to their trading activities in dolphins, sea turtles, rays, whales, and sharks.

Table 4.3: The compliance level of respondents and reasons for complying or not complying to customary institutions

Customary institutions	Level of Compliance		Reasons	
	Fishers (n= 45)	Fish traders (n= 15)	Fishers' reasons	Fish traders' reasons
Taboo on landing of whales	100% compliant to this rule	100% are compliant to this rule	Fear of wrath and calamity from the sea gods when violated	Fear of wrath and calamity from the sea gods in the trading of whales
No fishing on Tuesday rule	66% are non-compliant to this rule 34 % are compliant to this rule	60% are non-compliant to this rule	Erosion of rule due to economic desperation Compliance to this rule is to serve as a resting day for fishers to repair their boats and mend their nets for the next fishing trip	No regard for the Tuesday rule as a rule for fish traders
Traditional ban on light fishing	68% are non-compliant to this rule	67% are non-compliant to this rule	Greed of fishers for high catches and gradual fading of the rule due to economic pressures	Unavailability of other sources to acquire fishes

All fishers and fish traders indicated their adherence to the customary practice on the landing of whales. They reported that it was because of the fear of attracting the wrath of the gods and the reverence of whales as sea gods. A fisher stated:

> "Whales are sea gods. They are very big animals. You cannot even catch them in your nets because if you do, a disaster will happen to you. From our forefathers' time, I have not heard of anyone landing whales. Whales wash down to the shore themselves and

we have to even perform some cleansing rituals for them when that happens" (Fisher, 03, Sekondi-Takoradi, 23/05/25).

Fishers and fish traders had varying responses as to why they complied or not to the Tuesday rule. A fisher from Dixcove echoed his adherence to this rule. He stated, *"I do not comply to the Tuesday rule because I land and sell my catches on Tuesdays and I get a lot of money too"* (Fisher, 18, Dixcove, 16/05/25).

A fish trader from Dixcove gave her reason for the disregard of the Tuesday rule. She reported:

> "I am not a fisher. I do not go to sea like they do. So, if a fisher lands on Tuesday and wants to sell his catch to me, I will go and buy it. I are not part of the Tuesday fishing rule so I still buy and sell from fishers on Tuesdays" (Fish trader, 18, Dixcove, 16/05/25).

Whiles some indicated non-compliance to the Tuesday's rule, others also indicated that they complied with the Tuesday rules. A fisher from Dixcove stated, *"I always obey the rules on no fishing on Tuesdays. I do not go to fish. I use that time to repair my boat and mend my nets"* (Fisher, 13, Dixcove, 18/05/25).

Fish traders were non- compliant to the traditional ban on light fishing due to the unavailability of other sources to acquire fishes. She stated:

> "I do not follow the rule on trading in fishes caught by using light fishing methods because that is what the fishers always bring to us. If you do not buy them, you will not get fish from anywhere to buy. The fishers always use ways and mean to make sure that they get a lot of fishes to shore. So, you will not have a choice but to buy them like that" (Fish traders, 03, Sekondi-Takoradi, 23/05/25).

Table 4.4: The compliance level of respondents and reasons for complying or not complying to statutory institutions

Statutory institutions	Level of Compliance		Reasons	
	Fishers (n= 45)	Fish traders (n= 15)	Fishers' reasons	Fish traders' reasons
Prohibition on capturing, retaining or landing marine mammals	71% are non-compliant to this rule	67% are non-compliant to this rule	Economic desperation to make more money	For more profits on sold fishes
Incidentally caught marine mammals must be released immediately with least harm	68% are non-compliant to this rule	73% are non-compliant to this rule	Economic desperation to pay debts	For more profits on sold fishes
Ban on the use of explosives, poisons and noxious substances for fishing	58% are non-compliant to this rule	67% are non-compliant to this rule	Greed for high catches of marine megafauna	Unavailability of other sources of fishes
Prohibition of illegal trade in protected marine species	73% are non-compliant to this rule	67% are non-compliant to this rule 20% are compliant to this rule	Non- Compliance was due to profitability in selling marine megafauna Compliance to this rule was because of the strange blood of dolphins and sea turtles similar to that of humans	Economic desperation to make more money
Ban on light fishing, use of bamboo or electrical contraptions for fish aggregation	62% are non-compliant to this rule	67% are non-compliant to this rule	Greed for high catches of marine megafauna	Unavailability of other sources of fishes

Fishers and fish traders further elaborated on their reasons for complying or not complying with the statutory rules. Majority of the response's fishers indicated that it was not because they were ignorant of the rules but it was because of economic desperation. A fisher from Sekondi-Takoradi recounted his non-compliance to the capturing, retaining or landing marine megafauna that:

> "I have spent money to buy premix (fuel for powering his boat) and other things like foodstuffs for myself and my crew to go to sea. The government is now telling me not to catch dolphins and sea turtles when they come into my nets or if I see them. Is the government or Chief fisher the ones going to pay my debts for me? How will I take care of my family if I only bring fishes that are of low prices to sell in the market? The sea turtles and dolphins are expensive and I get a lot of money like about 1,000 Ghana cedis for each if I am able to bring three of them home". (Fisher, 23, Dixcove, 16/05/25)

Another fisher also expressed his reason for non-compliance of incidentally caught marine megafauna:

> "Dolphins and sea turtles are normal fishes in the sea. I do not see the reason why the government is telling us not to catch them. As for me, I bring them to land when my net catches them. Will the government pay my premix debts for me? I even had to go for a loan to buy the premix. Will the government pay for that for me? I catch them when I see them, bring them home and sell. Dolphins and sea turtles are delicious and lucrative so that is why I disobey and still bring them to shore". (Fisher, Shama, 05/05/2025)

Likewise, the use of illegal methods of fishing was seen as a necessity to secure fish catches. A fisher from Shama stated, *"At first, you do not even need the light to fish but now the fishes in the sea have moved further away and they have changed too. In order to catch them, we need to use the light to attract them because we want money to survive"* (Fisher, 33, Shama, 01/05/25). This shows a clear depletion of fish stocks for monetary gains. A fish trader from Sekondi-Takoradi also revealed the profitability of selling illegal catches, stating that, *"Most fishers do not return these marine species when their nets catch them. It is lucrative to sell them. You can sell one sea turtle for about 300-500 Ghana cedis"* (Fish trader, 10, Sekondi-Takoradi, 19/05/25).

A fish trader from Sekondi-Takoradi characterised her compliance level to state laws as non-compliant. She stated:

> "I do not follow the rules that the government has given us especially the one the government says that we should not sell sea turtles. If the fishers bring them to land, I go and buy them. I get a lot of money when I sell them. I have a particular customary who likes to buy them". (Fish trader, 03, Sekondi-Takoradi, 23/05/25).

4.6.2 Enforcement and sanctions of institutions

The enforcement of customary practices, beliefs, taboos and norms are enforced and managed by the Apofohene and his cabinet. Fishers, fish traders, FC officials and NGOs stated that the Apofohene does this by either conducting inspections or by always making sure that he is at the coastal area just to monitor the activities of fishers and fish traders. A fisher explained how local enforcement is done:

> "The Apofohene has selected people within the fishers who ensure that their fellow fishers follow the rules……. The selected people report everything that happens either on the sea or when fishers land to the Apofohene. So, for those people, they are always around" (Fisher, 17, Shama, 01/05/25).

Both customary and statutory institutions have sanctions attached to them if rules are violated. For customary institutions, fishers and fish traders reported that sanctions for violating the rules were in a form of money, fishes and in severe cases, providing schnapps for libation. A fisher explained an instance when fishers landed on Tuesdays. He recounted:

> "We know that we are not to go to sea or even land on Tuesdays, but sometimes fishers land on Tuesdays. We are aware of this rule so even before we land, we already have our money ready to pay the fine and some fishers to give to the Chief fisher" (Fisher, 32, Dixcove, 03/05/25).

A fish trader also affirmed, *"You will be asked to pay fines if you use light to fish and you are caught red handed. The fines are in the form of money usually between 100 to 300 Ghana cedis"* (Fish trader, 12, Dixcove, 24/05/25).

However, a fisher indicated the high reverence fishers give to whales and as such, no one violated this taboo. He stated:

> "We see whales to be our gods. No one dares to even catch a whale. It is a big taboo. It has never happened before that someone has landed a whale. Whales mostly wash to shore on their own and we fishers and the community have to perform some rites for them" (Fisher, 23, Shama, 02/05/25).

Table 4.5 Customary institutions protecting marine megafauna and their sanctions for violating them

Customary institutions	Sanctions
Taboo on landing of whales	Performance of rituals (pouring libations)
No fishing on Tuesday rule	Fines Fishes
Traditional ban on light fishing	Fines Fishes

For statutory rules, enforcement is by the FC officials, Ghana Marine Police and the Ghana Navy. An NGO official acknowledged the FC as the enforcement body of statutory marine rules, stating that, *"The FC officials are the ones who make sure that fishers follow the established government rules. Rules like registering canoes, boats and other vessels is their duty. They make sure that every fisher's vessel is registered and they are doing well with that"* (Key Informant, 02, Hen Mpoano, 24/05/25).

A Chief fisher also affirmed the role of the FC:

> "The FC and the marine police come around all the time. Mostly, they come unannounced when they get the hint that someone has landed a sea turtles or dolphins. They just come and arrest. No matter the excuse you give, if they catch you, they will arrest you" (Key Informant, 07, Sekondi- Takoradi, 23/05/25).

Statutory institutions sanctions are formal and punitive. The sanctions for statutory violations are fines, forfeiture of assets (fishes and equipment), and imprisonment/prosecution. An FC official confirmed the legal process, *"You will be arrested and sent to the court to be prosecuted by a judge. Violators are usually fined an amount of money"* (Key I, 06, Sekondi-Takoradi, 19/05/25). Fishers also indicated the consequences of indulging in illegal fishing methods. A Shama fisher recalled an event, saying, *"The Navy caught someone who used light and other illegal chemicals to fish. The Navy took his fishing equipment and burnt them together with the fisher's canoe"* (Fisher, 45, Shama, 04/05/25). Another fisher from Dixcove

confirmed the seizure of equipment as a punishment, stating that, *"If you are caught, your equipment is seized and will not be returned to you"* (Fisher, 29, Dixcove, 12/05/25).

Table 4.6 Statutory institutions protecting marine megafauna and their sanctions for violating them

Statutory institutions	Sanctions
Prohibition on capturing, retaining or landing marine mammals	Fines
Incidentally caught marine mammals must be released immediately with least harm	Fines
Ban on the use of explosives, poisons and noxious substances for fishing	Fines Forfeiture of assets (fishing gear, catch and other apparatus)
Prohibition of illegal trade in protected marine species	Fines Imprisonment Confiscation of marine species
Ban on light fishing, use of bamboo or electrical contraptions for fish aggregation	Fines Imprisonment

CHAPTER FIVE

5.0 DISCUSSION

Introduction

This chapter will interpret the results through the lens of the theoretical frameworks, the IAD. It accentuates how socio-economic factors, community perceptions and the interplay between customary and statutory institutions collectively influence conservation outcomes on marine megafauna.

5.1 Customary and statutory institutions guiding human interactions with marine megafauna

The findings from this study demonstrate that customary institutions play a key role in shaping people's behaviour in conservation. From the three coastal communities, the sea was not merely regarded as a resource but a sacred space with spiritual significance. This spiritual connection is portrayed by fishers, fish traders and Chief fishers' attitudes towards marine megafauna like whales, where they are regarded as "sea gods". They have a belief that capturing, killing or harming marine species like whales will result in attracting consequences which does not only affect the individual offender of the taboo but may extend to the entire community depending on the severity of the violation. This finding creates a natural and informal conservation mechanism. This resonates with the literature on Traditional Ecological Knowledge (TEK) by Folke et al. (2005; 2007). Their works illustrated that a collective belief system serves as an informal deterrent and at the same time, functions as a self-enforcing conservation mechanism driven by moral responsibility and apprehension of spiritual retribution. This can be seen from the reverence given to whales. Berkes (2006; 2009) found similarly that TEK, passed down through generations, promotes compliance by linking customary taboos to spiritual repercussions and moral responsibility. Adom (2016) further confirms the findings of this study that, TEK manifests as species-specific spiritual beliefs that directly influence conservation outcomes in ecosystems across Africa.

However, a more subtle theme emerged that complicates these customary practices. Respondents indicated that some marine megafaunas are protected by deep-rooted beliefs and taboos, while others, such as dolphins, sea turtles, sharks and rays, are not. They further

explained that these marine species are captured and landed on regular basis for commercial use. This creates a dual de facto conservation system which demonstrates that traditional knowledge is not a monolithic force but a selective influence on conservation. This finding is not direct and straightforward as it both relates and at the same time contracts to existing literature. It validates the premise that TEK can be effective and serve as a community-enforced tool, yet also be discriminating. This shows from the findings that the application of customary practices is partial, depending on the type of marine species, its significance and use. This creates a governance void for species that luck such cultural significance.

Comparable to customary practices and norms, Ghana's statutory institutions for marine conservation are governed by national laws and regulations enforced by the FC. The findings show that statutory rules and regulations are comprehensive in their purpose, providing clear laws against illegal fishing and protection of endangered species. The presence of these state rules and sanctions for violation indicates that a formal governance structure exists. Notwithstanding this legal framework, a key finding was that the execution of statutory regulations is a recurring challenge. The study noted instances of weak enforcement and a lack of specific, tailored regulations for all marine megafauna. For instance, the statutory laws do not specifically state which marine species should not be caught or killed and as such, laws do not strictly regulate sharks and rays' fisheries, leaving a significant gap. This stipulates that the statutory system operates with practical limitations that affect its overall effectiveness on the ground. The state's legal governance struggles to address the complex threats to all marine megafauna leads to a gap between policy and practice. This finding supports Humber et al.'s (2017) work in Madagascar, which similarly found that existing laws were insufficient to protect marine megafauna due to poor enforcement. This implementation gap in environmental policy highlights the disconnect between what a government legislates and what is actually enforced on the ground, as seen in the work of Osei-Tutu et al. (2015).

Based on a synthesis of the findings, there is an institutional void for marine megafauna conservation from the existing institutional arrangements due to a fragmented governance. This view is informed by the IAD framework, which postulates that the "rules in use" within an action arena determines behaviour outcomes (Ostrom, 2009). The findings reveal that customary practices protect species with deep-rooted cultural significance but however, their application is partial and does not extend to vulnerable marine megafauna like dolphins, sea turtles, sharks and rays. This selectivity leaves a significant gap that the statutory institution is intended to fill, yet it does not. As the findings reveal, the statutory framework in itself is

ineffective by its own limitations, such as weak enforcement. The work of Osei-Tutu et al. (2015) highlighted this kind of institutional gap as a void parallelism, where both institutions are unable to achieve the shared conservation objectives for all species.

5.2 Interactions between customary and statutory institutions protecting marine megafauna

The findings of the study revealed a complex and strained relationship between the customary and statutory institutional systems. This complexity can be described more as an "institutional rivalry". The study found out that though both institutions may aim for conservation goals, their interactions are mostly different in an opposition mixture of accommodating, substitutive and competing interactions. This rivalry creates governance gaps and contributes directly to institutional voids.

5.2.1 Complementary interactions

The study found instances of complementary interactions where the two institutions work together to fortify a shared conservation goal. The traditional practices against harmful fishing practices, like the use of light to fish, align with the provisions outlined in the fisheries regulations. This was especially seen in Dixcove, where a Chief fisher leads community efforts against illegal practices. The Chief fisher calls for a fish scatter when he realizes that a fisher had used illegal means, like light and dynamite fishing methods to fish. This serves as a deterrent to the fisher because he is more likely to be in debt after the scatter. All his efforts to go to sea and investment into fuel for his generator would amount to nothing due to loss of fishes. This directly boosts the effectiveness of statutory regulations against illegal fishing methods. Berkes (2009) and Folke et al. (2005)'s works are in line with this concept as they directly emphasized that TEK and community frameworks are to be combined with legal regulations to bolster management practices. McNally et al. (2021) also argued that this type of collaboration, in which both systems support one another, is essential for enhancing and building support for conservation efforts.

5.2.2 Accommodating interactions

In other cases, the findings demonstrated instances of institutional dynamics in the form of accommodating interactions where customary practices adapt in response to external pressures. This form of interaction is not reciprocal where the two systems work together but rather, from this findings, traditional rules are a subordinate to dominant economic drivers. The findings of this study provide evidence that demonstrated a shift, where the immediate need for livelihood and changing cultural values override long-standing customary practices. An example is on the "no fishing on Tuesdays" rule. This rule has been weakened over time, with economic gain becoming the new priority. This finding corroborates North's (1990) "Theory of institutional change" that, institutions are not stable but evolve in response to external and internal forces. New work ethic and value system has replaced conservation-oriented taboo. The change in the "rules-in-use" reflects a response to the economic incentives that have emerged in the community.

The observed erosion of customary beliefs due to overwhelming economic pressure is not isolated to the fisheries sector but is a phenomenon across the natural resource management landscape, particularly in African forestry. Studies concerning forest management in Ghana and other West African nations have demonstrated similar patterns of institutional accommodation. Traditional taboos and sacred grove protections, once strictly upheld by local authorities (such as Chiefs and traditional elders) for spiritual or biodiversity reasons, have been gradually weakened by the intrusion of commercial logging, mining, and agricultural expansion. Lebbie & Guries (1995) documented how sacred groves among the Kpaa Mende in Sierra Leone, once protected by strong cultural taboos, have been increasingly encroached upon due to economic pressures and land-use change. Similarly, Kokou & Sokpon (2006) observed that sacred forests in the Dahomey Gap region of West Africa are being degraded as traditional protections erode under the influence of commercial interests.

Specifically, economic drivers such as the high demand for timber and the need for new farmland due to population growth, acted as powerful external forces that incentivize traditional leaders and community members to accommodate the violation of old rules. The conversion of a sacred forest into a cocoa farm for immediate profit mirrors the conversion of a once observed scared day into a lucrative commodity for immediate financial gain in the fisheries sector. In both cases, the long-term conservation ethic enshrined in the customary institution is compromised by the short-term economic incentive of the external market. This

reinforces the finding that vulnerable customary practices subordinate themselves to powerful economic incentives, validating the observed institutional change in the coastal communities.

5.2.3 Substitutive interactions

The study also found instances of substitutive interactions where one institution attempts to fill the void created by the weakness of another. The findings show that the role of the "Kokohemaa" has gradually diminished due to personal economic interests of fishers. The "Kokohemaa's" function has been supplanted by a market-based economy driven by individual economic pressures. This finding is in synergy with the work of García-Cruz et al. (2024) who reported the disempowerment of traditional institutions when faced with strong dominant market forces. Likewise, Ahmed et al. (2022) also identified similar findings where institutional substitution was driven by the perceived legitimacy of individual economic gain. Their work illustrated how market-based systems can disrupt and erode customary practices.

In another case of institutional substitutions, it was observed how canoe registration shifted from the authority of the Chief fishers to the FC. This substitution was enforced by the statutory system's ability to provide benefits and apply consequences that the customary system cannot. The traditional institutions have not been simply undermined but their function have been rendered obsolete by the more powerful institution. The traditional method of organizing fishers was replaced by the statutory enforcement power of the FC. This highlights the fact that some institutional interactions are not coexistent or even in conflict, but it is more about outright replacement. These findings support the work of Henn (2022) who show that whether traditional authorities are complements or substitutes the state is determined by the context and the its capacity to enforce its rules.

5.2.4 Competing interactions

The findings illustrate a prevalent pattern of competing interactions between statutory and customary institutions which was seen as the dominant interaction in all the types of institutional interactions. Notwithstanding that alone, competition was revealed between institutional rules and immediate economic needs of actors. This competition is not only a theoretical concept but demonstrated in direct contradictions between institutions leading to a breakdown of governance and creating a palpable tension between conservation goals and livelihood needs. The findings of the study demonstrated circumstances of pluralistic

governance, where there were contradictions between state laws and customary practices. The ambiguity is heightened by the absence of clear statutory guidelines on the particular marine mammals not to be caught and killed.

The study suggests that compliance is achieved not primarily through voluntary adherence but through the imposition of extremely high transaction costs for non-compliance, effectively creating a system driven by deterrence. This highlights the difficulties of legal pluralism, where the presence of state and customary systems lacks harmonisation, resulting in confusion and selective compliance, as noted in the works of Scholtens & Bavinck (2014). This finding also aligns with the work of Fabricius et al. (2015), who argue that such mismatches are common when state rules are not sensitive to local values and ecological knowledge.

This fragmentation further allows for "forum shopping" as fishers and fish traders choose to follow the authority that provides the greatest convenience. The concept from legal and political science describes how actors choose the institutional arena most favourable to their interests (von Benda-Beckmann, 1981). Not only is competition created with the customary and statutory rules but also competition between enforcers or authorities of the institutions. From the findings, it was noted that fishers in Dixcove especially, prefer paying fines for violating a rule to their Chief fishers, as they view it to be less severe as compared to those enforced by the FC. This gap further escalates to an institutional void as there is a lack of robust enforcement encouraging non-compliance to flourish and economic survival takes precedence over conservation goals. The duality is often exploited, as a fish trader from Sekondi-Takoradi explained that fishers take advantage of the leniency of the Chief fishers to dodge heavy fines imposed on them. This situation not only undermine the authority of both systems but also leads to a weakening of overall conservation efforts.

Furthermore, beyond competition between institutions, the findings revealed a powerful competition between institutional rules and the desperate need for economic survival. This situation is described as a human-resource conflict driven by livelihood necessity, where the struggle emerges when resource protection policies threaten human well-being. This conflict is so strong that it even overrides customary practices, as reported in the finding that fish traders expressed a willingness to buy fish caught with illegal methods, prioritizing the necessity of maintaining their market livelihood over adherence to either statutory rules or customary practices. This demonstrates that economic pressure can be a more powerful driver of behaviour than even deeply ingrained social norms. This lack of cohesion creates a vacuum

that non-compliant behaviours readily filled (Osei-Tutu et al., 2015). Similar to the work of Osei-Tutu et al. (2015) the study has discovered that when the goals of statutory and customary institutions diverge, a state of competition can arise. This leads to conflict and ineffective outcomes. The findings show that in such scenarios, the more "functional" institution tend to outcompete the other, often to the detriment of the natural resource. This calls attention to critically address the need for participatory and inclusive approach to policy design which integrates community values and norms from the outset.

5.2.5 Institutional voids

5.2.5.1 A case of void parallelism

The findings of the study identified instances of institutional voids where these voids are not because of the absence of rules, but a state of non-functionality of existing rules, thereby rendering them ineffective. Void parallelism occurs when both customary and statutory institutions share similar goals but at the same time fail to achieve their goals. This parallelism was seen in the prohibition of illegal fishing methods like light, dynamite and chemical fishing. The desperate need of fishers for higher catches results in a general non-compliance of both customary and statutory rules. This led to a drastic erosion of both customary and statutory rules and norms as confirmed by respondents. The use of these illegal fishing methods to harvest marine megafauna is a direct manifestation of IUU fishing. The study's findings corroborate existing literature that highlight the significant bycatch threat from small-scale artisanal fisheries (Alfaro-Shigueto et al., 2018). This can be seen through the lens of the institutional theory particularly through the IAD framework, where an individual's actions are a product of the interplay between the community's characteristics and the "rules in use". In this study, "the relentless pursuit of livelihood" is identified as a socio-economic driver that influences fishers and fish traders' behaviour. This economic pressure serves as a community attribute in the IAD framework where it outweighs conservation rules, leading to selection of non-compliant actions. Scott (2014) similarly identified how rules and norms can gradually lose their authority due to non-compliance and a lack of enforcement. In the long run, due to the desperate need for higher catches, certain marine species begins to go extinct. This, therefore, is not a random occurrence but a predictable consequence of systems where regulatory mechanisms fail to function as intended in the face of intense livelihood pressure. The study's findings confirm the argument by Berkes (2011), who noted that a failure to

integrate local knowledge and social realities into top-down management creates a governance vacuum.

Drawing upon the theoretical framework provided by Scott's institutional pillars, this study demonstrated that the failure of marine conservation is rooted in the lack of coherence between institutional mechanisms. The key lesson from this study is that, successful environmental governance is predicted on the mutual interaction between statutory and customary institutions. This mutual interaction is necessary to bridge the gap between competing institutional logics (Hassan & Gil-Garcia, 2008; Meyer et al., 2015) and move toward a polycentric system where compliance is driven not just by the threat of sanctions, but by culturally integrated values and social obligation. The proof presented in the findings demonstrates that top-down, state rules such as government regulations and legally designated protected areas are insufficient on their own. Instead, their efficacy is amplified when they are complemented by robust bottom-up customary institutions such as traditional knowledge and social networks. An important finding was that when statutory and customary institutions share common goal, they can be mutually reinforcing. This system creation is consistent with the findings of Fabricius et al. (2015) who argue that linking local and state institutions is pivotal for adaptive and effective natural resource management. It also supports the argument that devolving management rights to local communities does not fully guarantee success, but rather, requires an alignment of state policy with the pre-existing customary rules of the community.

5.2.5.2 A case of void subversion

Contrarily to parallelism, there are instances where the rules of both institutions have different goals and they are at the same time ineffective. This instance is an institutional void subversion. The findings on dolphins, sea turtles, sharks and rays are an example of void subversion. This situation is defined by a direct institutional incompatibility where statutory enforcers classify dolphins, sea turtles, sharks and rays as part of the broader group of marine mammals subject to prohibition, while local coastal fishers see them as a non-customary-protected, food source, exemplified by their use as a local delicacy, “kako”. This incompatibility challenges the legitimacy of statutory rules. This opposition creates a vacuum where neither rule nor practices can be effectively enforced, thereby, leading to a state of confusion and disregard for the law.

Research on fisheries co-management, for instance, has constantly proven that relying solely on the state laws is insufficient. However, success is contingent on engaging local communities

and granting them a share of management rights (Pomeroy & Berkes, 1997). Enforcement fails to fully integrate with the continuous, on-the-ground reality of fishing communities. This lack of synergy creates a dysfunctional plurality that allows for the persistent exploitation of institutional gaps. The findings of this study provide a framework for understanding the conditions under which this integration is most likely to succeed by pointing out the importance of goal alignment and functional roles. As such, this study reveals a unique case study that supports the assertion by Glaser et al. (2018) that in many developing nations, the weak linkage between statutory and customary institutions is a primary cause of governance failures. Therefore, effective conservation requires a strategy that goes beyond acknowledging both systems and actively working to create a robust and mutually reinforcing governance framework.

5.3 The effectiveness of management approaches

5.3.1 Level of compliance to statutory rules and customary practices

The compliance level of respondents to institutional rules was not a simple binary adherence but varies by actors and the nature of the rule itself. Respondents gave varying responses which indicated that compliance is not just about the existence of a rule but about its recognised legitimacy, enforcement and its relevance to a respondent's socio-economic circumstances. It was seen that actor's level of compliance was connected to their economic needs. For instance, a Dixcove fisher's reason for his "non-compliance" on the "no fishing on Tuesdays" customary rule was because he sometimes lands and has to sell his catch on Tuesdays. This directly reflects economic pressures which overrides traditional norms. In the same way, a fish trader rated her compliance to state laws as "non-compliant" in relation to the sale of protected species. Her reason being that, the species are profitable. A similar context can be seen from Garcia (2024)'s work where formal sanctions failed to curb non-compliance due to the overweight of economic needs.

In some cases, some respondents indicated compliance to rules and practices. A fisher from Dixcove admitted that he always obeyed the rules on the no fishing on Tuesdays. His reason being that, he uses that time to repair and mend his nets to prepare for his next fishing trip. This rule, which guarantees boat, canoe and net maintenance, is likely not seen as a restriction but a shared practice that contribute to long-term sustainability. Ostrom (2005) argues that rules

embedded in local culture are more likely to be adhered to as compared to externally imposed regulations.

The findings revealed a fundamental conflict where the immediate need to pay for fuel, provide for family, and secure a daily livelihood directly competes with long-term conservation goals. Likewise, the profitability of selling a single sea turtle for 500 Ghana cedis far outweighs the perceived risk of punishment. This is in alignment with Breslow et al. (2017) and Musimbi (2013) work on deterrence failure where punitive approaches like fines are not substantial enough to curb or reduce illegal activities. A fisher also commented that, "dolphins and sea turtles were delicious and lucrative". This comment reinforces the findings of this study and Garcia (2024)'s point that the economic value of these marine megafauna transforms them from protected species into a commodity for survival.

Gradually, the justification of economic gain from fishers and fish traders for non-compliance leads to institutional erosion. From the findings, it is illustrated that customary practices are actively being discarded in the face of economic pressures as per fishers' submission on no fishing on Tuesday's rule. The erosion is an indication of an institutional void as noted by Osei-Tutu et al. (2015) where rules, beliefs and norms are ineffective despite their existence. In addition, the use of illegal fishing methods like light, dynamite and chemical fishing, described as "necessity to secure fish catches" illustrates a desperate response to a depleted resource base. This has created a cycle where a lack of fish stocks drives fishers to use illegal methods for survival. It can be seen that, this was not a matter of law and order but a failure of customary and statutory institutions undermining economic pursuits.

However, the statutory system appears to violate the core principle of collective-choice arrangements. The evidence points overwhelmingly to a coercive, rather than participatory, rule environment. The emphasis on arrest and top-down prosecution, without mention of formal fisher participation in drafting the relevant marine regulations, suggests the rules are imposed rather than co-produced. Ostrom (1990) argues that resource users must be involved in modifying their own operational rules for the rules to gain legitimacy and encourage long-term, voluntary compliance. This corroborates the assertion that conservation efforts that do not address livelihood security are likely to fail (Sok & Yu, 2021). This is in accordant with studies by Sarr et al. (2022) that demonstrate how conservation projects offer direct livelihood benefits which lead to higher rates of compliance and greater long-term success.

5.3.2 Enforcement and sanctions of institutions

From the findings, enforcement and sanction mechanisms of both institutions demonstrated a stark contrast in their approaches to governance. Statutory institutions relied on a punitive and formal system, more like a "command-and-control" approach whiles customary institutions relied on a proactive and socially-embedded approach. Sanctions for violation of statutory rules are in the form of imprisonment, forfeiture of asserts and fines which are non-negotiable as stated in the laws. Statutory institutions violations are effective in its context but they are also quite severe, which can create a sense of institutional illegitimacy especially when it does not consider the economic needs of fishers and fish traders. This made the fishers emphasize on the severity and often economically devasting nature of statutory sanctions. This may push fishers and fish traders deeply into the cycle of non-compliance, as it was reported in some of their responses (Garcia, 2024).

In contrast, the customary system is managed and enforced by the Apofohene and his cabinet who employ a proactive and socially-embedded approach. Monitoring of adherence to practices and norms are done by a team of fishers (cabinet of the Apofohene) who ensure a continuous, on-the-ground presence and a state of peer-to-peer accountability that is absent in the statutory system. Ostrom (2005) identified a successful self-governance system where enforcers of the laws were part of the community. This was revealed in this study where enforcers of rules, norms and practices are part of the community thereby, customary enforcers possess a level of authority and legitimacy that external actors lack.

The sanctions of customary institutions are distinct as compared to statutory institutions. Sanctions for violating customary practices or norms include the paying of fines, provision of fishes and schnapps for libation (severe cases). As compared to statutory institutions, customary sanctions are quite flexible and this confirms why fishes and fish traders prefer to violate customary rules and pay for violations as compared to statutory rules.

From the findings, it is seen that there is a form of a pluralistic governance structure that exist, both within the rules and the enforcers of the rules. The two institutions operate in parallel with minimal level of synergy (as seen from the interactions section). In addition, the FC's approach to sanctions imposed on violators and the Apofohene's approach do not appear to be working in a concert to reinforce conservation goals. This creates an institutional void where the lack of functional systems allows non-compliant behaviours to flourish. However, the problem is not lack of rules or enforcement but rather, a failure of customary and statutory institutions to

operate as a cohesive system. Pomeroy & Berkes, (1997) work called for the sharing of authority between state bodies and local communities to achieve conservation goals. This calls for a move towards co-management models where both the strengths and weaknesses of both institutions are leveraged on to create a unified and effective approach to governance.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This study investigated the customary and statutory institutional frameworks that protect marine megafauna in Ghana. It further assesses how these institutions interact and influence conservation outcomes by delving into the roles, relationships, and effectiveness of both customary and statutory institutions in Shama, Dixcove, and Sekondi-Takoradi.

The findings revealed that Ghana's marine governance is characterised by a dual system. The statutory institutions consist of rules and regulations laid out by the state and enforced by the FC, FEU and the Wildlife Division. Customary institutions on the other hand, consists of practices and norms that people follow and this enforced by the Chief fishers of coastal communities. While statutory bodies provide legal mandates and enforcement mechanisms, customary institutions offer cultural legitimacy and localized knowledge. However, the scope of customary protection is selective, often excluding species like dolphins, sea turtles, sharks and rays, which are widely landed on regular basis and traded, leaving whales strictly protected by customary practices.

Five types of institutional interactions namely; complementary, accommodating, substitutive, competing, and institutional voids were identified in the management of marine megafauna. Although some complementary interactions were observed, particularly in the protection of whales, competing interactions and institutional voids were more prevalent. These were marked by contradictions between state laws and traditional practices, weak enforcement, and selective compliance. Economic pressures and unclear statutory guidelines further exacerbated these tensions, leading to fragmented governance.

The study found that conservation efforts are undermined by institutional misalignment and the erosion of traditional norms. Compliance is often driven by deterrence rather than shared conservation values, where fishers and fish traders frequently engage in "forum shopping," choosing the institution (customary or statutory) that imposes the least cost. Non-compliance to a rule like prohibition of illegal fishing methods resulting in bycatch and overfishing of protected species is not a lack of the absence of rules but rather the profuse pressure of livelihoods. The motivation for these practices, as articulated by the fishers and fish traders, is the "relentless pursuit of livelihood." This confirms that fishers and fish traders would rather exhibit an act of ignorance to satisfy their economic desperation. This is particularly crucial as

it draws away from the issue of mere non-compliance to one of economic desperation, an important consideration for policy design. This behaviour not only weakens both systems but also facilitates resource depletion.

The conservation of marine megafauna in Ghana is hindered not by a lack of institutions, but by the disconnect between them. The erosion of customary practices, coupled with the limitations of statutory enforcement, has created institutional voids that allow unsustainable behaviours to persist. The application of state rules alone is insufficient to govern the management of marine megafauna. This leads to a loophole in the institutional frameworks, rendering both systems ineffective. This was portrayed in void parallelism situations, where both statutory and customary rules fail at the same time and void subversion, where the two systems are in direct opposition and actively undermine each other.

Pragmatically, the study serves as a roadmap for policymakers and practitioners. From the findings of the study, it can be seen that the use of a punitive approach is not what will hinder non-compliance but rather, it has a lot to do with a transition towards co-management strategies where actors or resource users have a voice in policy making. This however, ensures that established "rules of the game" does not affect the attributes (socio-economic situations) of resource users which will promote effective and equitable conservation measures for resource management. The study advocates for a more durable solutions built on the foundation of local and state understanding to incorporate a collaborative action towards the establishment of rules and practices which does not end up competing or creating voids within both institutional systems.

6.2 Recommendations

- Policymakers should revise the Fisheries Act and related regulations to explicitly list all protected marine megafauna species, including sharks and rays.
- Policymakers should also harmonize statutory and customary rules through localized by-laws that reflect both ecological priorities and cultural values.
- Policymakers should establish local conservation committees that include both statutory and customary representatives to foster collaboration and shared accountability.
- Policymakers should also develop formal co-management frameworks that integrate Chief fishers and traditional councils into statutory conservation efforts.

- Future studies should duplicate this study in other coastal regions of Ghana to determine if the identified institutional voids and dynamics are consistent across the country.
- Future studies should track the effectiveness of existing and newly established co-management strategies to know where readjustment and synergy of rules and practices need to be done. This will help to evaluate the impact of institutional crafting on conservation outcomes.
- Researchers could use more robust quantitative methods to measure the impact of economic drivers on non-compliance (where updates on fish decline are made known to the public) and to assess the cost-effectiveness of different enforcement mechanisms.
- This study focused on marine megafauna but however, future research could apply the same institutional analysis framework to other threatened species or natural resources in Ghana or other developing nations.

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APPENDICES

Appendix 1

Kwame Nkrumah University of Science and Technology,

Kumasi

College of Agriculture and Natural Resources

Department Of Silviculture and Forest Management

Interview Guide on Institutional Framework for Marine Megafauna Conservation in Ghana

Name of target respondents: Fishers

Introduction

I am Josephine Entsie, a postgraduate student of the Kwame Nkrumah University of Science and Technology, Kumasi offering MPhil Natural Resource and Environmental Governance. I am undertaking a study on Institutional Framework for Marine Megafauna Conservation in Ghana. The aim is to investigate the customary and statutory framework that govern marine megafauna conservation in Ghana. The objectives are:

1. To determine the customary and statutory institutions that guide human interactions with marine megafauna in Ghana.
2. To assess the interaction between the customary and statutory institutions protecting marine megafauna in Ghana.
3. To examine the effectiveness of management approaches that regulate human activities affecting marine megafauna in Ghana.

Every information provided will be used for research purpose only. The identity of respondents will not be disclosed. Respondents have the right not to respond to questions they are uncomfortable with and can withdraw at any time in the interview. The interview would last for about 30 – 45 minutes.

Please indicate your willingness to participate in the study Yes [] No [ ]

Community…… Date ……...

Personal and demographic information of respondents

1. Name (Optional): .....

2. Age: .....

3. Gender:

- [ ] Male - [ ] Female

4. Role/Position:

- [ ] Fisher - [ ] Other: .....

5. Years of experience in marine fishing:

- [ ] 0-5 years - [ ] 6-10 years

- [ ] 11-15 years - [ ] 16+ years

6. Ethnicity:.....

7. Residence status:

- [ ] Indigene - [ ] Migrant

Knowledge of customary and statutory institutions

1.What customary practices (rules, norms and taboos) are used to regulate marine megafauna (whales, sharks, rays, dolphins and sea turtles) fishing in your community?

2. Who are the key individuals or groups responsible for upholding these customary practices?

3. What roles do they play to uphold these customary practices and how are these enforced within the fishing community?

4. How well are the enforcement of customary practices working in protecting marine megafauna? Please tick:

- [ ] Not working at all - [ ] Slightly working

- [ ] Working well - [ ] Working very well

5. Do people break these customary practices? Why or why not?

6. What penalties or sanctions are imposed on individuals who violate the customary practices on marine megafauna (whales, sharks, dolphins, rays and sea turtles) fishing?

7. Can you provide examples of recent violations and the consequences faced by those involved?

8. How important do you think customary practices are in your fishing activities?

- [ ] Very important - [ ] Important

- [ ] Somewhat important - [ ] Not important

9. Can you explain why you think this way?

10. What are the statutory rules that protect marine megafauna (whales, dolphins, sharks, rays and sea turtles) in this community?

11. Do fishers respect and obey the statutory rules related to marine megafauna (whales, dolphins, rays, sharks and sea turtles) conservation? Why do they or do not respect and obey the rules?

Please rank how often you personally follow the rules:

- [ ] Always

- [ ] Sometimes

- [ ] Never

12. Who are the key individuals or groups responsible for upholding these statutory rules?

13. What roles do they play to uphold these statutory rules and how are they enforced within the fishing community?

14. How well are the enforcement of statutory rules working in protecting marine megafauna? Please tick:

- [ ] Not working at all - [ ] Slightly working

- [ ] Working well - [ ] Working very well

15. What penalties or sanctions are imposed on individuals who violate the statutory rules on marine megafauna (whales, sharks, dolphins, rays and sea turtles) fishing?

16. How important do you think statutory rules are in your fishing activities?

- [ ] Very important
- [ ] Important
- [ ] Somewhat important
- [ ] Not important

17. Can you explain why you think this way?

18. How has religious (Christianity, Islam and Traditional) teachings influence your approach to marine megafauna conservation?

- [] Strong influence
- [ ] Little influence
- [ ] No influence

19. Can you provide examples of Christian or Islam values that has changed or influenced your fishing practices?

20. Do you notice any differences in conservation practices between Christians and Muslims in your community? If yes, what are some of these differences?

21. How diverse is your community in terms of backgrounds (e.g., ethnicity, culture)?

- [ ] Very diverse
- [ ] Somewhat diverse
- [ ] Not diverse

22. How does this diversity affect the way people in your community follow customary practices?

Interaction between customary and statutory institutions

From the Fisheries laws, a person shall not use a canoe for fishing in the fishery waters unless a licence has been issued for the canoe for the purpose of fishing.

1. Are the canoes used for fishing registered under the law?

- [ ] Yes - [ ] No

2. Why do you or do not comply with the laws on canoe registration?

3. Who does the registration and how does one obtain a canoe for fishing?

From the Fisheries laws, a closed season declared by any international body of which Ghana is a member shall be regarded as a closed season declared under this Act. A person who engages in fishing during a closed season declared in accordance with this section commits an offence and is liable on summary conviction to a fine of not less than $500,000 and not more than $2 million in respect of a local industrial or semi-industrial fishing vessel or a foreign fishing vessel.

4. Do people engage in fishing activities during the closed season? Why or why not?

5. Are violators fined, by how much are they fined and to whom do they pay the fines to?

6. What alternative jobs do you involve in during the closed season?

From the Fisheries laws, the Minister acting in accordance with the advice of the Fisheries Commission by regulations prescribe the types and sizes of or devices that may be used for fishing including prohibited nets and the relevant fishing activities.

7. What types of nets do you use for fishing:

-[ ] Ring net gears -[ ] Beach seine gears

-[ ] Purse seine gears -[ ] Gillnet gears

8. What is your mesh size:

[ ] Large sizes -$18^{1/2}$, $15^{1/2}$, $15^{1/4}$, $12^{1/2}$, and $12^{1/4}$ inches

[ ] Small sizes – $12^{1/4}$, $9^{1/2}$, and $9^{1/4}$, $9^{1/5}$, $9^{2/5}$ inches

Other sizes .....

9. What species do you mostly target and why?

From the Fisheries laws, a person shall not be permitted to use or attempt to use any explosive, poison or other noxious substance for the purpose of killing, stunning, disabling or catching fish, or in any way rendering fish more easily caught

10. Do you use dynamite and other explosives in your fishing activities and why?

11. Do you use poison or other noxious substance for killing and catching fish and why?

From the Fishers laws, no person shall fish for marine mammals (whales, dolphins, sharks, rays and sea turtles) in the fishing waters. Any marine mammal caught incidentally shall be released immediately and returned to the waters which it was taken with the least possible injury.

12. Do you return marine megafauna (whales, dolphins, sharks, rays and sea turtles) back into the waters when caught incidentally, why or why not?

13. What sanctions are imposed on violators?

From the Fishers law, a person shall not within the fishery waters of this country use any fishing method that aggregates fish by light attraction and the use bamboo including use of portable generator, switchboard, bulbs beyond 500 watts or bulbs whose cumulative light intensity attracts fish and long cable to facilitate light production or any other contrivance for the purpose, of aggregating fish by light

14. Do you use light attraction and bamboo as a fishing method to catch fish, why or why not?

15. Rank your catch if you use this method:

-[ ] Very high -[ ] High

-[ ] Normal -[ ] Low

-[ ] Very low

From the Fisheries laws, a foreign fishing vessel shall not fish or attempt to fish within the fishery waters of the Republic except under a licence issued under this Act, or as may be otherwise authorised under an agreement between the Government and the government of the country in which the fishing vessel is registered or otherwise belongs

16. Do foreign fishing vessels engage in illegal fishing activities, what are those activities?

17. Are violators held responsible for their actions and what sanctions are imposed on them?

18. Do the activities of foreign vessels affect the catch of fisheries, how?

Appendix 2

Kwame Nkrumah University of Science and Technology,

Kumasi

College of Agriculture and Natural Resources

Department of Silviculture and Forest Management

Interview Guide on Institutional Framework for Marine Megafauna Conservation in Ghana

Name of target respondents: Fish Traders

Introduction

I am Josephine Entsie, a postgraduate student of the Kwame Nkrumah University of Science and Technology, Kumasi offering MPhil Natural Resource and Environmental Governance. I am undertaking a study on Institutional Framework for Marine Megafauna Conservation in Ghana. The aim is to investigate the customary and statutory framework that govern marine megafauna conservation in Ghana. The objectives are:

1. To determine the customary and statutory institutions that guide human interactions with marine megafauna in Ghana.
2. To assess the interaction between the customary and statutory institutions protecting marine megafauna in Ghana.
3. To examine the effectiveness of management approaches that regulate human activities affecting marine megafauna in Ghana.

Every information provided will be used for research purpose only. The identity of respondents will not be disclosed. Respondents have the right not to respond to questions they are uncomfortable with and can withdraw at any time in the interview. The interview would last for about 30 – 45 minutes.

Please indicate your willingness to participate in the study. Yes [ ] No [ ]

Community…… Date ……...

Personal and demographic information of respondents

1. Name (Optional): .....

2. Age: .....

3. Gender:

- [ ] Male - [ ] Female

4. Role/Position:

- [ ] Fish trader - [ ] Other:.....

5. Years of experience in marine trading:

- [ ] 0-5 years - [ ] 6-10 years

- [ ] 11-15 years - [ ]16+ years

6. Ethnicity:.....

7. Residence status:

- [ ] Indigene - [ ] Migrant

Knowledge of customary and statutory institutions

1. What customary practices (norms, rules, taboos) do you use to regulate marine megafauna (sharks, rays, dolphins, whales and sea turtles) sale and trade in your community?
2. Who enforces these trading practices within the trading community?
3. What roles do they play to uphold these practices and how are they enforced within the trading community?
4. Are there any regular meetings or gatherings to discuss compliance and enforcement and how is compliance monitored in your trading activities to protect these marine megafaunas.

Please rank how well compliance and enforcement of the customary practices are working

- [ ] Not working at all - [ ] Slightly working
- [ ] Working well - [ ] Working very well

5. How are violations reported, and what sanctions are imposed on traders who fail to comply with established rules? Can you provide examples of recent violations and the consequences faced by those involved if any?

6. How do you see the role of these customary practices in your trading activities? Please rank and why do you believe that?

- [ ] Very important
- [ ] Important
- [ ] Somewhat important
- [ ] Not important

7. What customary practices have had impact on your trading activities and what are the consequences of the impact?

8. What state rules do you follow or adhere to regarding protection of marine megafauna (whales, dolphins, sharks, rays and sea turtles) in your trading activities?

9. Do fish traders respect and obey these state rules for selling and trading marine megafauna? Why or why not?

Please rank the extent to which you comply with the rules to protect marine megafauna (whales, dolphins, sharks, rays and sea turtles)?

- [ ] Very low compliance
- [ ] Low compliance
- [ ] Moderate compliance
- [ ] High compliance
- [ ] Very high compliance

10. Who enforces these state rules within the trading community?

11. What roles do they play to uphold these state rules and how are they enforced within the trading community?

12. How are violations reported, and what sanctions are imposed on traders who fail to comply with established rules?

13. Can you provide examples of recent violations and the consequences faced by those involved if any?

14. How has government rules about selling marine megafauna (whales, dolphins, sharks, rays and sea turtles) changed your trading practices? Please rank and why do you believe that?

- [ ] Significantly changed
- [ ] Somewhat changed
- [ ] Not changed

15. How do you see the role of state rules in your trading activities? Please rank and why do you believe so?

- [ ] Very important
- [ ] Important

- [ ] Somewhat important - [ ] Not important

16. What state rules have had impact on your trading activities and what are the consequences of the impact?

17. What are the primary challenges you face in complying with these rules and customary practices?

18. How has religious (Christianity, Islam and Traditional) beliefs influenced your trading activities regarding marine megafauna? Please rank and provide examples of Christianity, Islam and Traditional values that has affected your trading activities if any?

- [ ] Strong influence
- [ ] Little influence
- [ ] No influence

19. Do you notice any differences in conservation practices between Christians, Muslims and Traditionalists in your community? If yes, what are some of these differences?

20. How diverse is your community in terms of backgrounds (e.g., ethnicity, culture)?

- [ ] Very diverse
- [ ] Somewhat diverse
- [ ] Not diverse

21. How does this diversity affect the way people in your community follow customary practices?

Interaction between customary and statutory institution

From literature, the following customary practices (rules, norms or taboos) are to be observed at sea.

1. The taboo on catching “whales” and neonates of large marine species (children of sea gods) particularly sharks, sea turtles and dolphins

Do fishers observe this taboo? Why or why not?

Do fish traders buy and sell from these marine megafauna species from fishers? Why or why not?

How are violators punished and what sanctions are imposed on fish traders who violate this taboo?

2. No fishing on Tuesdays

Do fishers observe this taboo? Why or why not?

Do fish traders go and buy fish from landed fishers on shore on Tuesdays? Why or why not?

How are violators punished and what sanctions are imposed on fish traders who violate this taboo?

3. From the Fisheries laws, a closed season declared by any international body of which Ghana is a member shall be regarded as a closed season declared under this Act. A person who engages in fishing during a closed season declared in accordance with this section commits an offence and is liable on summary conviction to a fine of not less than $500,000 and not more than $2 million in respect of a local industrial or semi-industrial fishing vessel or a foreign fishing vessel.

Do fish traders engage in trading activities during the closed season?

- [ ] Yes - [ ] No

If so, what are the reasons why you trade or do not trade during this time?

What alternative jobs you do engage in during the closed season?

Are there sanctions for those who trade during the closed season? If yes, what sanctions are imposed on them?

4. From the Fisheries laws, the Minister acting in accordance with the advice of the Fisheries Commission by regulations prescribe the types and sizes of or devices that may be used for fishing including prohibited nets and the relevant fishing activities.

What species do you mostly buy from fishers, and why are these species preferred?

5. From the Fisheries laws, a person shall not be permitted to use or attempt to use any explosive, poison or other noxious substance for the purpose of killing, stunning, disabling or catching fish, or in any way rendering fish more easily caught.

6. From the Fishers laws, a person shall not within the fishery waters of this country use any fishing method that aggregates fish by light attraction and the use bamboo including use of portable generator, switchboard, bulbs beyond 500 watts or bulbs whose cumulative light intensity attracts fish and long cable to facilitate light production or any other contrivance for the purpose, of aggregating fish by light

Do fishers use dynamite or other explosives, poison or noxious substances in fishing? If yes, why do you think they do this?

Do you buy and sell fish caught with dynamite or noxious substances? Why or why not?

Do you know if fishers use light attraction methods (using light attraction and bamboo) for fishing? Why do they use them?

Do you buy and sell fishes from them? Why or why not? Please rank their catch if they use this method:

- [ ] Very high
- [ ] High
- [ ] Normal
- [ ] Low
- [ ] Very low

Are there sanctions or penalties for those who trade fishes with fishers who use these illegal fishing methods? If yes, what sanctions are imposed on them?

7. From the Fisheries laws, a foreign fishing vessel shall not fish or attempt to fish within the fishery waters of the Republic except under a licence issued under this Act, or as may be otherwise authorised under an agreement between the Government and the government of the country in which the fishing vessel is registered or otherwise belongs.

Are you aware of any foreign fishing vessels engaging in illegal fishing activities? What activities do they engage in?

Do fish traders buy and sell fish from these foreign vessels? Why or why not?

Are violators among foreign vessels held responsible for their actions, and what sanctions are imposed on them?

Do the activities of foreign fishing vessels affect the catch of local fishers? How?

Appendix 3

Kwame Nkrumah University of Science and Technology,

Kumasi

College of Agriculture and Natural Resources

Department of Silviculture and Forest Management

Interview Guide on Institutional Framework for Marine Megafauna Conservation in Ghana

Name of target respondents: Chief fishers

Introduction

I am Josephine Entsie, a postgraduate student of the Kwame Nkrumah University of Science and Technology, Kumasi offering MPhil Natural Resource and Environmental Governance. I am undertaking a study on Institutional Framework for Marine Megafauna Conservation in Ghana. The aim is to investigate the customary and statutory framework that govern marine megafauna conservation in Ghana. The objectives are:

1. To determine the customary and statutory institutions that guide human interactions with marine megafauna in Ghana.
2. To assess the interaction between the customary and statutory institutions protecting marine megafauna in Ghana.
3. To examine the effectiveness of management approaches that regulate human activities affecting marine megafauna in Ghana.

Every information provided will be used for research purpose only. The identity of respondents will not be disclosed. Respondents have the right not to respond to questions they are uncomfortable with and can withdraw at any time in the interview. The interview would last for about 30 – 45 minutes.

Please indicate your willingness to participate in the study. Yes [ ] No [ ]

Community…… Date ……...

Personal and demographic information of respondents

1. Name (Optional): .....

2. Age: .....

3. Gender:

- [ ] Male - [ ] Female

4. Role/Position:

- [ ] Chief fisher - [ ] Other:.....

5. Years of experience in marine fishing:

- [ ] 0-5 years - [ ] 6-10 years

- [ ] 11-15 years - [ ] 16+ years

6. Ethnicity: .....

7. Residence status:

- [ ] Indigene - [ ] Migrant

Knowledge of customary and statutory institutions

1.What customary practices do you use to regulate marine megafauna (whales, dolphins, sharks, rays and sea turtles) fishing in your community?

2. What norms or taboos do you follow regarding marine megafauna (whales, sharks, rays, dolphins and sea turtles) fishing in your community?

3. Who are the key individuals or groups responsible for upholding these customary practices?

4. What roles do they play to uphold these customary practices?

5. How are these norms or taboos enforced within the fishing community?

6. How do you monitor adherence to these practices?

7. How well are the enforcement of norms working in protecting marine megafauna (whales, sharks, rays, dolphins and sea turtles). Please tick:

- [ ] Not working at all
- [ ] Slightly working
- [ ] Working well
- [ ] Working very well

8. What challenges do you face in enforcing these norms or taboos?

9. What penalties or sanctions are imposed on individuals who violate the norms or taboos on marine megafauna (whales, dolphins, sharks, rays and sea turtles) fishing?

10. Can you provide examples of recent violations and the consequences faced by those involved?

11. Do fishers respect and obey the rules related to marine megafauna (whales, dolphins, sharks, rays and sea turtles) conservation? Why or why not?

12. How important are customary practices in your fishing activities?

- [ ] Very important
- [ ] Important
- [ ] Somewhat important
- [ ] Not important

13. Can you explain why you think this way?

14. Have government regulations changed or affected customary practices? What are the changes or impacts?

15. How do religious (Christianity and Islam) teachings influence approaches to marine megafauna (sharks, whales, dolphins, rays and sea turtles) conservation and protection?

- [ ] Strong influence
- [ ] Little influence
- [ ] No influence

16. Can you provide examples of Christian or Islam values that affects fishing practices?

17. Do you notice any differences in conservation practices between Christians and Muslims in your community? If yes, what are some of these differences?

18. How diverse is your community in terms of backgrounds (e.g., ethnicity, culture)?

- [ ] Very diverse
- [ ] Somewhat diverse
- [ ] Not diverse

19. How does this diversity affect the way people in your community follow customary practices?

Interaction between customary and statutory institutions

1.What kind of collaboration exist between you (as chief fishers) and the Fisheries Commission?

2. Can you give examples of any joint activities or programs?

3. Do you feel that the Fisheries Commission appreciates your role as chief fishers? Why or why not?

4. In what ways does the Fisheries Commission provide support to chief fishers? (e.g., training, financial assistance, resources)

5. Are you invited to meetings with the Fisheries Commission and how often do you attend these meetings?

6. Are there any existing fisheries laws that you believe contradict your customary practices? If yes, can you explain which laws and how they conflict?

7. Do you have opportunities to give feedback to the Fisheries Commission about fishing regulations? If yes, how is your feedback received?

8. What challenges do you face when working with the Fisheries Commission? (e.g., lack of communication, differing priorities)

From the Fisheries laws, a person shall not use a canoe for fishing in the fishery waters unless a licence has been issued for the canoe for the purpose of fishing.

9. Are people in your community obeying the law that requires canoes to be licensed for fishing? If people are not obeying the registration law, what are the reasons?

10. Do chief fishers play any role in the registration of canoes in your community? If yes, what kind of role do they play?

From the Fisheries laws, a closed season declared by any international body of which Ghana is a member shall be regarded as a closed season declared under this Act. A person who engages in fishing during a closed season declared in accordance with this section commits an offence and is liable on summary conviction to a fine of not less than $500,000 and not more than $2 million in respect of a local industrial or semi-industrial fishing vessel or a foreign fishing vessel.

11.Do people engage in fishing activities during the closed season?

- [ ] Yes - [ ] No

12. If people are fishing during the closed season, what are the reasons for not obeying this regulation?

13. Are violators fined, by how much are they fined and to whom do they pay the fines to?

14.What alternative jobs do you involve in during the closed season?

From the Fisheries laws, the Minister acting in accordance with the advice of the Fisheries Commission by regulations prescribe the types and sizes of or devices that may be used for fishing including prohibited nets and the relevant fishing activities.

15.What types of nets are recommended for fishers to use for fishing:

- [ ] Ring net gears - [ ] Beach seine gears

- [ ] Purse seine gears - [ ] Gillnet gears

16.What is the preferred mesh size:

- [ ] Large sizes -$18_{1/2}$, $15_{1/2}$, $15_{1/4}$, $12_{1/2}$, and $12_{1/4}$ inches

- [ ] Small sizes - $12_{1/4}$, $9_{1/2}$, and $9_{1/4}$, $9_{1/5}$, $9_{2/5}$ inches

- [ ] Other sizes .....

17. What species are not to be caught during fishing? What are the reasons why those species not caught?

From the Fisheries laws, a person shall not be permitted to use or attempt to use any explosive, poison or other noxious substance for the purpose of killing, stunning, disabling or catching fish, or in any way rendering fish more easily caught

18. Are dynamite and other explosives used fishing activities? Why?

19.Is poison or other noxious substance used for killing and catching fish? Why?

20. What sanctions are imposed on violators?

From the Fishers laws, no person shall fish for marine mammals (sharks, whales, dolphins, rays and sea turtles) in the fishing waters. Any marine mammal caught incidentally shall be released immediately and returned to the waters which it was taken with the least possible injury.

21. Are marine mammals (sharks, rays, dolphins, whales and sea turtles) returned back into the waters when caught incidentally, why or why not?

22.What sanctions are imposed on violators?

From the Fishers laws, a person shall not within the fishery waters of this country use any fishing method that aggregates fish by light attraction and the use bamboo including use of portable generator, switchboard, bulbs beyond 500 watts or bulbs whose cumulative light intensity attracts fish and long cable to facilitate light production or any other contrivance for the purpose, of aggregating fish by light

23. Do fishers use light attraction and bamboo as a fishing method to catch fish, why?

24.Rank their catch if they use this method:

- [ ] Very high - [ ] High

- [ ] Normal - [ ] Low

- [ ] Very low

25. Is this rule punishable? What sanctions and punishments are imposed on violators of this rule?

Appendix 4

Kwame Nkrumah University of Science and Technology,

Kumasi

College Of Agriculture and Natural Resources

Faculty Of Renewable Natural Resources

Department Of Silviculture and Forest Management

Interview Guide on Institutional Framework for Marine Megafauna Conservation in Ghana

Name of target respondents: Fisheries Commission

Introduction

I am Josephine Entsie, a postgraduate student of the Kwame Nkrumah University of Science and Technology, Kumasi offering MPhil Natural Resource and Environmental Governance. I am undertaking a study on Institutional Framework for Marine Megafauna Conservation in Ghana. The aim is to investigate the customary and statutory framework that govern marine megafauna conservation in Ghana. The objectives are:

1. To determine the customary and statutory institutions that guide human interactions with marine megafauna in Ghana.
2. To assess the interaction between the customary and statutory institutions protecting marine megafauna in Ghana.
3. To examine the effectiveness of management approaches that regulate human activities affecting marine megafauna in Ghana.

Every information provided will be used for research purpose only. The identity of respondents will not be disclosed. Respondents have the right not to respond to questions they are uncomfortable with and can withdraw at any time in the interview. The interview would last for about 30 – 45 minutes.

Please indicate your willingness to participate in the study. Yes [ ] No [ ]

Community…… Date ……...

Personal and demographic information of respondents

1. Name (Optional): .....

2. Age: .....

3. Gender:

- [ ] Male - [ ] Female

4. Role/Position: .....

5. Years of experience in marine conservation:

- [ ] 0-5 years - [ ] 6-10 years

- [ ] 11-15 years - [ ] 16+ years

6. Ethnicity: .....

7. Residence status:

- [ ] Indigene - [ ] Migrant

Knowledge of customary and statutory institutions

1.What formal rules exist for the conservation and protection of marine megafauna (whales, dolphins, rays, sharks and sea turtles) in Ghana?

2.Who are the key government bodies or officials responsible for enforcing marine conservation regulations?

3.Do officials engage with local fishing communities to ensure understanding and compliance of state regulations? How?

4.In your opinion, do local fishers obey the established state regulations for marine megafauna (whales, dolphins, sharks, rays and sea turtles) conservation? What evidence supports your view?

5.To what extent do local fishing communities comply with the enforced regulations related to marine megafauna (whales, sharks, dolphins, rays and sea turtles)? Please tick:

- [ ] Very low compliance - [ ] Low compliance

- [ ] High compliance - [ ] Very high compliance

6. How is compliance with marine conservation laws monitored at the community level?

7.Who monitors at the community level?

8. What challenges do you encounter in ensuring compliance?

9. Are there specific laws that empower local authorities to enforce state regulations?

10. What enforcement mechanisms/strategies are in place to ensure compliance with state regulations?

11. What penalties or sanctions exist for violations of marine megafauna (whales, dolphins, rays, sharks and sea turtles) conservation laws?

12. How are violators punished?

13. Can you provide examples of enforcement actions taken against violators?

14.How do you view the importance of customary practices in relation to state regulations?

- [ ] Very important - [ ] Important

- [ ] Somewhat important - [ ] Not important

15.Why is this perspective important for conservation efforts?

16. Are there any programs aimed at educating local fishers and traders about these state regulations? What are some of the programs?

17.How does religious (Christianity and Islam) values impact state regulations relate to marine megafauna (whales, sharks, dolphins, rays and sea turtles) conservation?

- [ ] Strong impact

- [ ] Little impact

- [ ] No impact

18.Can you provide examples of state regulations influenced by religious (Christian and Islam) teachings?

19.How do the beliefs of Christians and Muslims in your community affect the enforcement of conservation laws?

- [ ] Very positive effect - [ ] Positive effect

- [ ] No effect - [ ] Negative effect

20.What challenges arise from these varying religious influences?

Interaction between customary and statutory institutions

1.What kind of collaboration exist between you (as Fisheries Commission) and the chief fishers?

2. Can you provide examples of any joint activities or programs implemented with chief fishers?

3. Do you believe the Fisheries Commission appreciates the role of chief fishers? Why or why not?

4. In what ways does the Fisheries Commission provide support to chief fishers? (e.g., training, financial assistance, resources)

5. Are chief fishers regularly invited to meetings with the Fisheries Commission? How often do these meetings occur?

6. Are there any existing customary practices that you believe contradict your fisheries laws? If yes, can you explain which practices and how they conflict?

7. Do chief fishers have opportunities to provide feedback on fishing regulations? How is their feedback received?

8. What challenges does the Fisheries Commission face in collaborating with chief fishers? (e.g., lack of communication, differing priorities)

From literature, the following traditional rules, norms or taboos are to be observed while at sea.

No dynamiting and light fishing

9.Do fishers observe this norm? Why or why not?

10.How are violators punished and who is responsible for meting out the punishment to violators?

11. What sanctions are imposed on them?

The taboo on catching “whales” and neonates of large marine species (children of sea gods) particularly sharks, billfishes and dolphins

12. Do fishers observe this taboo? Why or why not?

13. Do they return the “whales” and “children of the sea gods” to sea as it is to be done according to their customary practices? Why or why not?

14. How are violators punished and what sanctions are imposed on them?

No fishing on Sundays and Tuesdays

15. Do fishers observe this taboo? Why or why not?

16. What are the consequences of not observing this taboo?

17. What sanctions are imposed on them?

18. Do fishers adhere to the sanctions? Why or why not?

Appendix 5

Kwame Nkrumah University of Science and Technology,

Kumasi

College Of Agriculture and Natural Resources

Faculty Of Renewable Natural Resources

Department Of Silviculture and Forest Management

Interview Guide on Institutional Framework for Marine Megafauna Conservation in Ghana

Name of target respondents: Non- Governmental Organizations (NGOs)

Introduction

I am Josephine Entsie, a postgraduate student of the Kwame Nkrumah University of Science and Technology, Kumasi offering MPhil Natural Resource and Environmental Governance. I am undertaking a study on Institutional Framework for Marine Megafauna Conservation in Ghana. The aim is to investigate the customary and statutory framework that govern marine megafauna conservation in Ghana. The objectives are:

1. To determine the customary and statutory institutions that guide human interactions with marine megafauna in Ghana.
2. To assess the interaction between the customary and statutory institutions protecting marine megafauna in Ghana.
3. To examine the effectiveness of management approaches that regulate human activities affecting marine megafauna in Ghana.

Every information provided will be used for research purpose only. The identity of respondents will not be disclosed. Respondents have the right not to respond to questions they are uncomfortable with and can withdraw at any time in the interview. The interview would last for about 30 – 45 minutes.

Please indicate your willingness to participate in the study. Yes [ ] No [ ]

Community…… Date ……...

Personal and demographic information of respondents

1. Name (Optional): .....

2. Age: .....

3. Gender:

- [ ] Male - [ ] Female

4. Organization: .....

5. Years of experience in marine conservation:

- [ ] 0-5 years - [ ] 6-10 years

- [ ] 11-15 years - [ ] 16+ years

6. Ethnicity: .....

7. Residence status:

- [ ] Indigene - [ ] Migrant

Knowledge of customary and statutory institutions

1. What customary practices are used to regulate marine megafauna (whales, dolphins, sharks, rays and sea turtles) conservation in communities?

2. What conservation practices do you promote within the communities you work with?

3.Who do you identify as the key custodians of marine conservation practices in the communities you work with?

4. How do you support these custodians in their roles?

5. Do the coastal communities you work with respect and obey the conservation norms?

- [ ] Yes - [ ] No

6.Please rank their adherence to these norms:

- [ ] Always - [ ] Sometimes

- [ ] Rarely - [ ] Never

7.What reasons contribute to their respect or lack thereof?

8.What strategies do you employ to encourage compliance with conservation norms or taboos among community members?

9.How significant are customary practices in the communities' conservation efforts?

- [ ] Very significant - [ ] Significant

- [ ] Somewhat significant - [ ] Not significant

9.Can you elaborate on why you think this is the case?

10. How do you facilitate dialogue or communication between local custodians and government authorities?

11. What role do sanctions or penalties play in enforcing conservation practices?

12. Have you observed any sanctions or penalties that encouraged compliance within communities? Please give examples:

13.How effective are the enforced rules are in protecting marine megafauna (whales, sharks, dolphins, rays and sea turtles)?

- [ ] Very ineffective - [ ] Ineffective

- [ ] Neutral - [ ] Effective

- [ ] Very effective

14. Please give reasons for your answer

15.To what extent do coastal communities comply with the enforced rules related to marine megafauna (whales, dolphins, sharks, rays and sea turtles)?

- [ ] Very low compliance - [ ] Low compliance

- [ ] Moderate compliance - [ ] High compliance

- [ ] Very high compliance

16. Please give reasons for your answer

17. How supportive are fishing communities of the enforced rules regarding marine megafauna (whales, dolphins, sharks, rays and sea turtles) conservation?

- [ ] Not supportive at all
- [ ] Moderately supportive
- [ ] Supportive
- [ ] Very supportive

18.How much are the enforced rules are in helping marine life?

- [ ] Not helping at all
- [ ] A little helping
- [ ] Helping
- [ ] Very helping

19. Please give reasons for your answer

20. How does religious (Christian or Islam) beliefs shape community attitudes toward marine conservation?

- [ ] Strong influence
- [ ] Little influence
- [ ] No influence

21. Can you share examples of successful initiatives that incorporated Christianity or Islam values and has it encouraged conservation, how?

22. How do the diverse religious backgrounds of community members affect your conservation projects?

- [ ] Very positive effect
- [ ] No effect
- [ ] Negative effect

23. What approaches do you take to address these differences?

Interaction between customary and statutory institutions

1. What kind of collaboration exists between your organization and the Fisheries Commission?

2. What kind of collaboration exists between your organization and fishers?

3. Can you provide examples of any joint activities or programs that your organization has undertaken with the Fisheries Commission?

4. Can you provide examples of any joint activities or programs that your organization has undertaken with the fishers?

5. How do you perceive the role of chief fishers in fisheries management? Do you believe they are adequately supported by the Fisheries Commission?

6. In what ways does the Fisheries Commission support organizations like yours in promoting sustainable fisheries? (e.g., training, financial assistance, resources)

7. Does your organization participate in meetings with the Fisheries Commission? If so, how often do these meetings occur?

8. Does your organization participate in meetings with the fishers? If so, how often do these meetings occur?

9. What challenges does your organization face when collaborating with the Fisheries Commission? (e.g., lack of communication, differing priorities)

10. What challenges does your organization face when collaborating with the fishers? (e.g., lack of communication, differing priorities)

Canoe Registration

11. In your observation, are community members complying with the law requiring canoes to be licensed for fishing? If not, what are the reasons for non-compliance?

12. Do you see chief fishers playing a role in the registration of canoes within the community? If yes, what kind of role do they play?

Closed Season Regulations

13. Have you observed whether fishers engage in fishing activities during closed seasons?

14. What are the reasons given for this behaviour?

Fines and Penalties

15. Are you familiar with the penalties and fines imposed on those who fish during the closed season? If so, what are the penalties and fines and who collects them?

Alternative Employment

16. What alternative jobs do fishers pursue during the closed season?

Fishing Methods and Equipment

17. What types of nets do you see being commonly used by fishers and what types of nets do you recommend for fishers to use, based on best practices??

Target Species

18. What species are most commonly targeted by fishers, and why do you think these species are favoured?

19. Which species are not to be caught during fishing, and what are the reasons for these protections?

Use of Prohibited Methods

20. Have you encountered any cases where dynamite or other explosives are used in fishing? What is your organization's stance on this practice?

21. What reasons do fishers give for using these prohibited methods?

Handling Marine Mammals

22. Are marine mammals (sharks, rays, dolphins, whales, and sea turtles) returned to the waters when caught incidentally? What is your perspective on this practice?

23. What sanctions should be imposed on those who violate laws related to marine mammals (sharks, rays, dolphins, whales, and sea turtles)?

Light Attraction Methods

24. Do you observe fishers using light attraction methods to catch fish? What are the implications of this practice?

25. How do these methods affect the fish catch, and what are the community's views on these practices