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WORLD MARITIME UNIVERSITY
Malmö, Sweden

**IMPACT ASSESSMENT OF ILLEGAL UNREPORTED
UNREGULATED (IUU) FISHING IN CENTRAL AFRICA
AS A STEP TOWARDS SUSTAINABILITY IN AFRICA'S
FISHING INDUSTRY. CASE STUDY: CAMEROON.**

Presented by
MBOTIJI NOELLA NJEUYAP
Cameroon

A dissertation submitted to the World Maritime University in partial fulfillment of the requirements for the award of the degree of:

MASTER OF SCIENCE
In
MARITIME AFFAIRS

OCEAN SUSTAINABILITY GOVERNANCE AND MANAGEMENT (OSGM)
Year of graduation
2019

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Declaration

I, Mbotiji Noella Njeuyap hereby declare that, this dissertation is a record of an original work done by me.

This piece of work is submitted in partial fulfillment of the requirements for the award of Masters of Science degree in Maritime Affairs. The results embodied in this dissertation have not been submitted to any other University for the award of any degree or diploma.

Mbotiji Noella Njeuyap

Signature:

Date:

Supervisor: Professor Ronan Long

Supervisor's affiliation: World Maritime University

Signature:

Date:

Acknowledgement

“I can do ALL things through Christ who gives me strength” Philippians 4:13

I wish to first and foremost express my deep sense of thanks and gratitude to the Lord God Almighty who has made everything possible for me to come this far. For good health, knowledge and wisdom, provision and journey mercies throughout all the field trips, I am grateful to you Lord.

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Abstract

Dissertation Title: **Impact Assessment of IUU Fishing in Central Africa as a step towards sustainability in Africa's Fishing Industry, Case study: Cameroon**

Degree: **Master of Science**

The ever increasing international demand and competition for fish has brought about a rapid depletion of resources, destruction of the ecosystem, fish habitats as well as diminishing returns giving rise to a series of problems which are profound and have disastrous consequences. In the midst of increased entry and competition, ignorance of existing regulations and control mechanisms, prevailing cases of Illegal Unreported Unregulated (IUU) fishing practices arise.

IUU fishing which has been going on in the West and Central African waters since the establishment of Exclusive Economic Zones (EEZs) is increasing at an alarming rate and is a great threat to the Cameroonian economy having some negative environmental, biological and economic implications. This has led to a massive decline of fish stocks in the African fishing industry, Cameroon in particular. This decline and continuous depletion of fish stocks has therefore forced many fishermen to find other means of income and livelihoods. More so, there is the absence of a management plan for the fisheries sector and management measures are limited to control mesh sizes of fishing gears, limiting access to the coastal zone by industrial vessels to protect vulnerable coastal resources.

This piece of research examines the impact of IUU fishing in Central Africa as a step towards sustainability in Africa's fishing industry the case of Cameroon, South west region. This impact is felt at different levels of the economy including environmental/ecological, economic as well as social.

The research also highpoints the lack of capability and capacity of fisheries administrations to sustainably manage the fisheries sector coupled with a weak and ineffective monitoring, control and surveillance system. However, concerted international efforts is required to handle the problems and impacts of IUU fishing given the fact that governments of underdeveloped and developing countries do not have adequate capability and capacity to combat illegal fishing practices in their territorial waters.

KEYWORDS: IUU fishing, SDGs, biodiversity, licensing of vessels, FAOs, UNCLOS, PSMA, RFMOs, UNFSA, MCS

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List of Abbreviations

AIS	Automatic Identification System
BCSAP	Brigade de Contrôle et de Surveillance des Activités de Pêche
BRD	By-catch Reduction Device
CA	FAO Accord on High sea fishing 1993
CACP	Production and Fisheries Control Centers
CEMAC	Economic and Monetary Community for Central African States
CERECOMA	Specialized Research Centre for Marine Ecosystems
CESMAO	Regional Centre for Maritime Security of West Africa
COFI	Fisheries Committee
COREP	Regional Fisheries Committee for the Gulf of Guinea
CRESMAC	Regional Centre for Maritime Security of Central Africa
DREPIA	Regional Delegation for Livestock Fisheries and Animal Husbandry
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EU	European Union
FAD	Fish Aggregating Device
FA	Food and Agricultural Organization
FCFA	Franc Communauté financière d'Afrique
GoG	Gulf of Guinea
GRT	Gross Registered Tonnage

GNP	Gross National Product
HP	Engine Horse Power
HSDN	High Seas Drift Net
ICC	Interregional Coordination Centre
IDAF	Integrated Development of Artisanal Fisheries
IGOs	Intergovernmental Organizations
ILO	International Labor Organization
IMO	International Maritime Organization
IPOAs	International Plans of Action
IRAD	Institute of Agricultural Research and Development
IRCS	International Radio Call Sign
ITU	International Telecommunication Union
IUU	Illegal Unreported Unregulated
Km	Kilometer
MCS	Monitoring, Control and Surveillance
MINEP	Ministry of Nature and Environmental Protection
MINEPIA	Ministry of Fisheries, Livestock and Animal Industries
MPAs	Marine Protected Areas
NAP-IUU	National Action Plan-Illegal Unreported Unregulated
NGOs	Non-Governmental Organizations
RFMOs	Regional Fisheries Management Organizations
SDA	Sub-Directorate of Aquaculture
SDG	Sustainable Development Goal

SDPIA	Sub-Directorate of Industrial and Artisanal Fisheries
SDTPIH	Sub-Directorate of Fish Technology and Fishing Industry
SHROL	Research Station for Fisheries and Oceanography Limbe
SIDS	Small Island Developing States
SRDPIAPA Production	Regional Development Services for Livestock, Fisheries and Aquaculture
TED	Turtle Exclusion Device
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	United Nations Fish Stock Agreement
UN	United Nations
USA	United States of America
VMS	Vessel Monitoring System
WTO	World Trade Organization

CHAPTER 1

“One fish, two fish, IUU and no fish”

1.1 Introduction

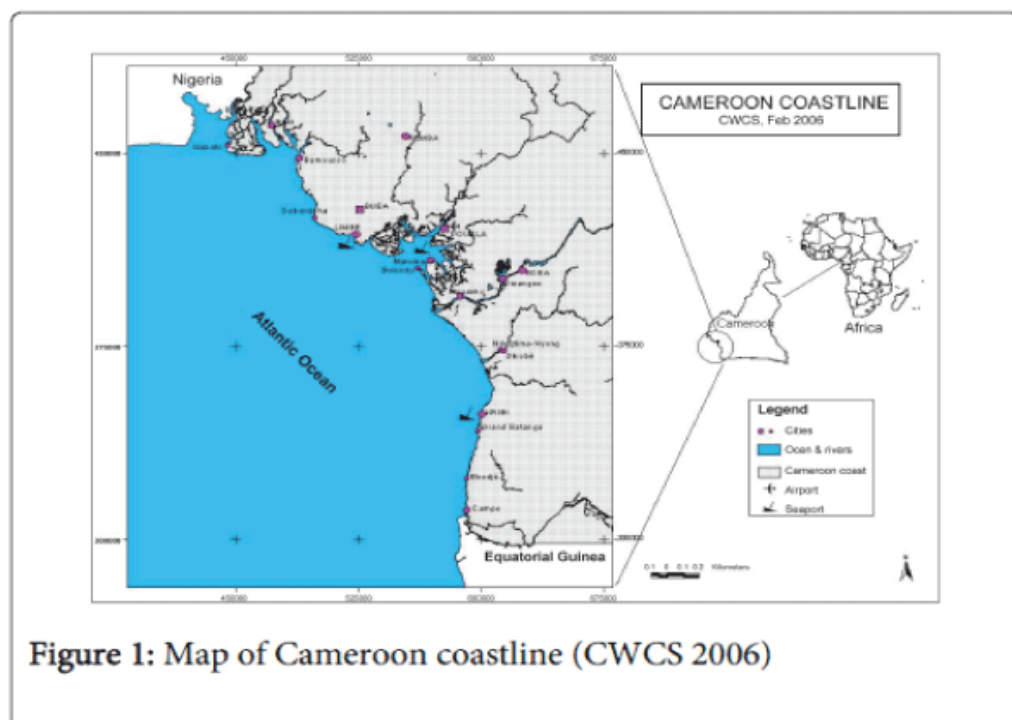
Marine ecosystems along the west and Central African coast are one of the most productive fisheries in the world (Sea Around Us 2009) but since the 1950's, the fishery sectors have been exposed to dramatic stress by foreign fishing fleets. The productive nature of these ecosystems in west and Central Africa emanates from the nutritious water and excellent conditions provided by the upwelling cold ocean currents (Christopherson 2005). Throughout these times, about 400 million people who have been dependent on fishing as a source of food and income in West and Central African countries of the Guinea current have been experiencing rapid dwindling of fish stocks due to overfishing by foreign entities (Avital Dobo 2009). However, since the 1960's, this region through both the distant water fleets and local fishing industries have experienced a collapse in its ecosystem. As part of the strategic action plan of countries who share this large marine ecosystem, Illegal Unregulated Unreported (IUU) fishing has been considered a top most issue hence a loss in its marine resources (GCLME 2008).

In many maritime regions of the world, especially developing countries like Cameroon, illegal fishing has led to a massive depletion of fish stocks. Cameroon has for the last two decades undergone considerable development in the artisanal and industrial fishing sectors even though Africa's rich coastal waters have long been plundered by illegal fishing and foreign fleets. However, the continuous increase in the world's population has led to the high demand for seafood and fisheries stocks which are being harvested beyond their capacity to sustainably reproduce. Therefore, in an era of overfished fish stocks and substantial excess fishing ability which negatively impacts biodiversity, Illegal Unreported Unregulated (IUU) fishing being the topic of research is recognized as a major hazard to the long term sustainability of the world's oceans (International MCS Network 2014). IUU fishing is generally viewed to be the product of overcapacity in the fishing industry, inadequate fisheries management as well as problems associated with ineffective flag State control and the use of flags of convenience (High Sea task force, 2006). IUU fishing destabilizes national and regional efforts to conserve and manage fish stocks and as a result inhibiting progress towards long-term sustainability goal attainment and responsibility.

In 1960, Cameroon attained independence and the fisheries sector was jointly administered by the services of the Ministry of Rural Development with respect to inland fisheries and aquaculture and the Ministry of Livestock with respect to marine fisheries only in 1969. Cameroon's fishery sector has no policy since the late 1960s. However, we find numerous documents geared towards improving the fishery sector (Chiambeng & Ngoande, 2011).

Cameroon also known as Africa in miniature, is a country located in Central Africa region of the Gulf of Guinea and a member of the Economic and Monetary Community of Central Africa (CEMAC) zone. She has a coastline which stretches for about 402km in length, bordering the Bight of Biafra between Equatorial Guinea and Nigeria (6⁰N, 12⁰E). It is bounded on the North by Chad, on the east by Central African Republic, on the south by Congo, Gabon and Equatorial Guinea, and on the west by Nigeria. Cameroon has an Exclusive Economic Zone (EEZ) of about 15,000km². This geographic extension gives Cameroon a wide-ranging geographical and ecological diversity (Folack 2003).

Figure 1: Map of Cameroon



Source: CWCS 2006

1.2 Problem Statement

Fisheries crimes more often than not fall under the canopy of IUU fishing constituting a major threat to fish stocks, oceans, human lives often and livelihoods of fishing communities around the world and their food security. Despite worldwide efforts in finding possible solutions for the management of the marine resources, the state of resources in developing countries, Cameroon in particular, continue to deteriorate and the living conditions of fishers are still poor emanating from the lack of adherence to fisheries regulations as well as the use of destructive fishing methods which persist to a large degree.

Small-scale fisheries are by nature open without limitations on entry leading to a steady increase in the number of fishers and consequently a rise in excessive levels of fishing and fierce competition for the fisheries resources, which are threatened by overexploitation.

Illegal fishing is evident in all Cameroonian waters and according to the Technical Committee of the Regional Fisheries Committee for the Gulf of Guinea (COREP) most of the arrested ships belong to Chinese operators and not less than twelve belonging to foreign nationals which have been boarded in the Cameroonian offshore waters and searched for illegal fishing in 2015 (Business in Cameroon 2018).

Chinese distant water fleets have had an increase in its illegal fishing activities in Cameroon even though some of these Chinese activities may be legal and in accordance with fishing agreements, there is emergent evidence that, many Chinese distant water fleets carryout illegal fishing activities which bring about a vast deterioration of local marine ecosystems. IUU fishing has brought about some alarming increasing environmental, economic and biological implications in inland capture and small scale fisheries (Ousman K. L. Drammeh 2000). With the ever increasing competition for resources, illegal fishing is becoming rampant in Cameroon and these practices in small scale fishing grounds emanate from the use of highly destructive and banned fishing gears, poisonous chemicals and explosives, techniques and methods used by small-scale fishers which are not environmentally friendly for the sustainability of coastal marine resources (FAO 2007).

More so, the lack of physical, material and human resources of local fisheries administrations such as the Ministry of Nature and Environmental Protection (MINEP) to monitor, control and manage fishing activities and the use of fishing nets whose mesh sizes are far smaller than the legislated

mesh sizes in small scale fishing grounds are reasons for illegal fishing practices in the South West region of Cameroon (World Ocean Review 2013). Environmental degradation, climate change and overfishing will continue to impact the world fisheries resource in the coming years although efforts can be made to mitigate the impacts. IUU fishing greatly disadvantages and discriminates against fishermen who act responsibly, honestly and in accordance with fishing authorizations terms. Also, Cameroon's aquaculture's reliance on fisheries for feeds will become increasingly challenging and less sustainable (Tacon et al 2012).

1.3 Research objectives

The study has as main objective to evaluate the impacts of Illegal Unreported Unregulated (IUU) fishing in Central Africa as a step towards improving the sustainability of Africa's fishing industry with a particular focus on Cameroon.

1.3.1 Specific Objectives

The specific objectives are as follows:

1. Outlining the leading causes of unreported fish catch in Cameroon
2. Determining the role of the government and other stakeholders in decision making concerning the future sustainability of the fishing sector; and
3. To find out what measures can be undertaken to mitigate the impact of IUU fishing in Central Africa using Cameroon as case study.

1.4 Significance of the study

The significance of this research is for the strengthening of regulatory frameworks and measures through which monitoring and reporting of IUU fishing practices can be improved upon in the future in order to reduce the rate at which livelihoods of artisanal fishing people are at risk. More so, prospects of the study are for opportunities for the economic sustainability and development of the fishing sectors in Cameroon.

1.5 Research Questions

The following questions were formulated from the above problem:

1. What are the leading causes of Illegal Unreported Unregulated (IUU) fishing in Cameroon?

2. What is the role of government, ministries, departments, agencies and other stakeholders in combatting illegal fishing practices in Cameroon?
3. What measures can be undertaken to mitigate the impact of IUU fishing in Central Africa using Cameroon as case study?

1.6 Hypothesis

The following hypothesis have been derived for this research:

Illegal Unreported Unregulated (IUU) fishing in Cameroon is as a result of lack of enforcement of fisheries laws by the Ministry of Fisheries, Livestock and Animal Industry (MINEPIA) in Cameroon

1.7 Ethical issues

The research would be fair, well-balanced in contents, reliable, valid and well referenced. The researcher during the research process kept all information given by respondents confidential and anonymous with regards to protecting the subject's identity.

Also, the researcher provided non faulty information free from bias.

1.8 Definition of key terms

Biodiversity:

Biodiversity also known as biological diversity refers to a whole range of genetic variations from the occurrence of different types of ecosystems, species and organisms adapting to different environments and climatic conditions alongside their interactions and processes of which they are a part (Environmental Management 2017).

Exclusive Economic Zone:

This is an area which is beyond and adjacent to the territorial sea up to 200 nautical miles wide subject to the specific legal regime under which the rights and jurisdiction of the coastal states and the rights and freedoms of other states are governed by the relevant provisions of the Convention. In this zone, coastal states have the right to explore and exploit as well as the responsibility to conserve and manage its living and non-living resources (UNCLOS 1982).

Fishery:

It refers to the act of using similar gears by fishers during the same time period of the year within the same region by a group of vessels targeting an assemblage of species (ICES Advice 2012).

Fishing community:

It includes fishing families, fishing vessel owners, recreational fishers, crew, fish processors and others in the community who depend on fishing or are constantly engaged in the harvesting and processing of fishery resources to meet their socio-economic needs.

Fishing effort:

It refers to the measure of the concentration of fishing operations used on fishing grounds which are dependent on the availability of the type of gear and information (Victor Restrepo, 2000).

Fishing gears:

They fall basically under two general categories, the active gears and passive gears. These are apparatuses which are used for the capture of marine/aquatic resources and can be used in several different ways for different target species (Voices of the Bay 2011).

Fish stock:

It refers to all fish individuals that are actually capable of interbreeding for which they belong to given species living in a particular geographic area at a particular time (National Academy of Sciences 1998).

IUU fishing:

There are three categories of IUU fishing as defined by the Food and Agricultural Organization of the United Nations (FAO) which are:

Illegal fishing:

It refers to fishing activities carried out by foreign vessels in waters under the jurisdiction of another state without permission which is however against its fisheries rules and regulations.

Unreported fishing:

It refers to the misquoting of fishing activities by some vessels to the relevant national authority

Unregulated fishing:

This refers to the absence of applicable management measures in regulating the catch of fishing activities. This term applies not only to highly migratory species but also to fishing activities in international waters which are in violation of Regional Fisheries Management Organizations (RFMO's) established regulations (WOR 2, 2013).

License:

Also known as a permit, it is a document which gives fishermen and producers the right to operate in fishing grounds according to the terms set out by regulatory establishments.

Log book:

This is an official record of a vessel's fishing activities which are systematically registered on board the fishing vessel and whose completion maybe a compulsory requirement for a fishing license. The information contained in the log book are the corresponding fishing effort, information on fish catch and the composition of species as well as the location.

Regional Fisheries Management Organizations (RFMOs):

These are intergovernmental fisheries organizations which play a critical role in the global system of fisheries governance and have the authority to establish fisheries conservation and management measures on the high seas (Rosemary Rayfuse 2016).

Sustainable development:

It can be defined as an improvement in meeting the present needs without conceding the ability of forthcoming generations to meet their own needs (M.M. Shah 2008).

Trawlers

These are fishing vessels which use trawls as fishing gears and are provided with abundant power engines to tow the net at an appropriate trawling speed. Trawlers vary in size from open boats with inboard motors to large freezers and factory trawlers depending on the region of operation and the type of trawl used.

UNCLOS:

The United Nations Convention on the Law of the Sea also known as the Law of the Sea Convention was adopted in 1982 and it is a legal framework which lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules which governs all uses of the oceans and their resources.

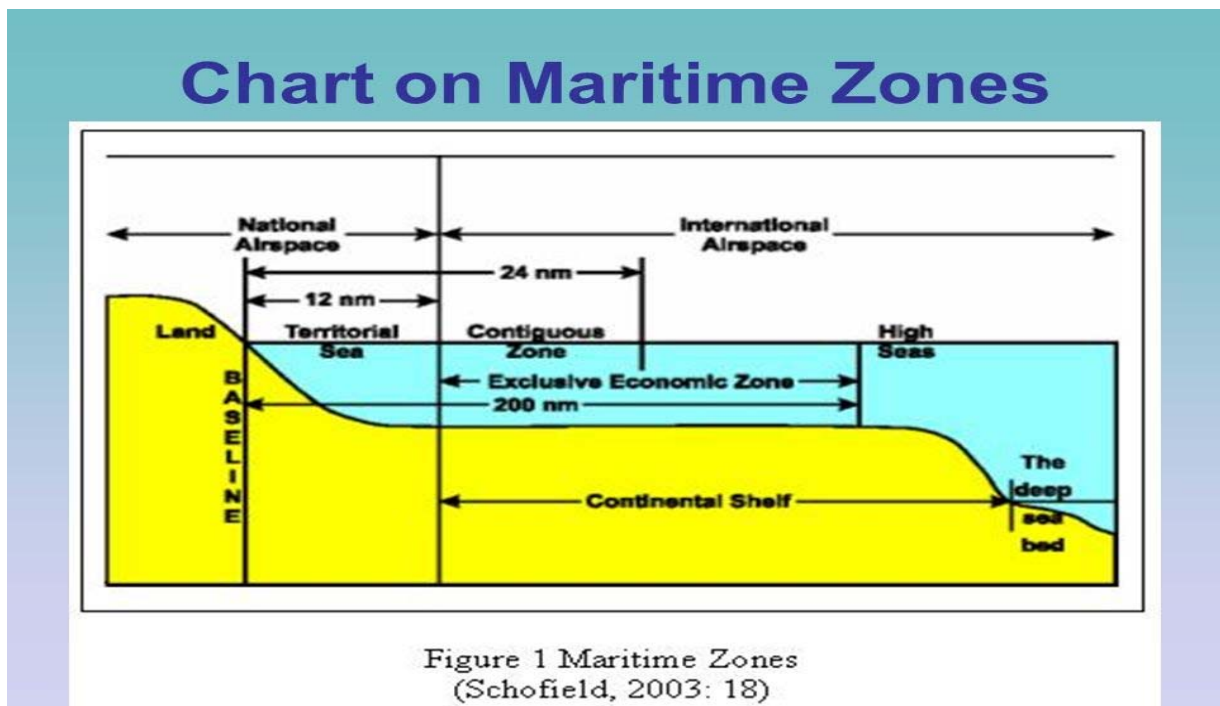
CHAPTER 2

Literature review

2.1 Maritime jurisdictional zones of Cameroon

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) is a law of the sea mechanism that provides a regulatory analysis for maritime security as an appealing starting point and it is also very relevant for the management of the oceans and provides the widest foundation for uniform governance. Cameroon being a coastal state has the right to regulate and exploit areas of the ocean under its jurisdiction as one of the foundations of UNCLOS. UNCLOS permits coastal states to establish several different maritime zones for which they need to balance these rights with the freedom of navigation and to provide access to resources outside a state's control (Maritime Executive 2014). Cameroon ratified the United Nations Law of the Sea Convention on the 19/11/1985 (NOAA, 2009).

Figure 2: Graphical representation of maritime zones



Source: Schofield 2003

In this regard, the management of marine living resources of all coastal nations as well as Cameroon's fisheries legislation and highlighted aspects in the legislation which require attention in meeting international standards are analyzed by the different Articles and provisions of UNCLOS together with other international instruments as follows:

2.1.1 Territorial sea

As excerpted from UNCLOS 1982, the sovereignty of coastal states Cameroon being one, have territorial sea which extends beyond its land territory and internal waters to an adjacent belt of the sea for which they claim 12 nautical miles. Cameroon has the right to establish the breadth of its territorial sea up to a limit not exceeding 12 nautical miles where the normal baseline for measuring its territorial sea is the mean low-water line along the coast as marked on large scale charts officially recognized by Cameroon.

2.1.2 Contiguous zone

According to Article 33 of UNCLOS, a contiguous zone is a zone which is contiguous to a coastal state's territorial sea, over which it may exercise necessary control in the following:

- Prevention of infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea
- Punish infringement of the above laws and regulations committed within its territory or territorial sea

Where the coasts of two states are adjacent to each other, neither state is entitled to extend its contiguous zone beyond the median line and every point which is equidistant from the nearest points of the baseline from which the contiguous zone of both states are measured.

However, the contiguous zone may not extend beyond 24 nautical miles and Cameroon claims a contiguous zone of 24 nautical miles from the baseline from which the breadth of its territorial sea is measured.

2.1.3 Exclusive Economic Zone (EEZ)

Part V of UNCLOS defines an EEZ as a zone which is beyond and adjacent to the territorial sea in which coastal states have the following rights:

- Sovereign rights for the purpose of exploring and exploiting

- Conserving and managing the natural resources, whether living or non-living of the waters superjacent to the seabed and of the seabed and its subsoil and with regard to other activities for the economic exploitation and exploration of the zone, such as production of energy from the water, currents and winds
- Jurisdiction with regard to the establishment and use of artificial islands, installations and structures
- Marine scientific research
- The protection and preservation of the marine environment

In exercising its rights and performing its duties under the Convention in the exclusive economic zone, the coastal States shall have due regard to the rights and duties of other States and shall act in a manner compatible with the provisions of the Convention.

The rights set out in this article with respect to the seabed and subsoil shall be exercised in accordance with Part VI.

Nonetheless, the outer limit of the exclusive economic zone shall not exceed 200 nautical miles from the baseline from which the breadth of the territorial sea is measured.

2.1.4 Continental shelf

Article 76 of UNCLOS defines the continental shelf of a coastal State as comprising the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin or to a distance of 200 nautical miles from the baseline from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance. The continental shelf of a coastal State shall not extend beyond the limits provided for in paragraphs 4 to 6 of this article.

The continental margin comprises the submerged prolongation of the landmass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise.

Wherever the continental margin extends beyond 200 nautical miles from the baseline, coastal states may extend their claim to a distance not exceeding 350 nautical miles from the baseline or 100 nautical miles from the 2,500-meter isobaths which is a line connecting points of 2,500 meters in depth. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.

2.1.5 Exclusive fishing zone

This is a term which is not used in UNCLOS but some States such as the United Kingdom have chosen not to claim an EEZ but rather to claim jurisdiction over the living resources off their coast. In such circumstances, the term exclusive fishing zone is used and the breadth of this zone is normally the same as that of an EEZ or 200 nautical miles.

2.2 Fish stocks

Fish stocks have always been vulnerable to too much fishing but however, wide-scale overexploitation started since the development of distant water fishing fleets of the Soviet Union in the 1950s, which was followed by the improvement of similar fleets by European states, Japan and the United States of America (USA) in the 1970s. Until the creation of Exclusive Economic Zones (EEZs) in the 1970s, the cherishing of this heretofore customary law concept in UNCLOS 1982 and the reinforcement of the obligation to cooperate for the purposes of conservation in the United Nations Fish Stock Agreement (UNFSA) of 1995 where fishing was merely unencumbered.

However, leniency and corruption seem to have allowed unprecedented Chinese fishermen plundering Cameroon's coastal waters, and this however is leading to a massive decline of Cameroon's sea fish stocks despite a ban on malicious fishing by the Minister of Livestock, Fisheries and Animal Industries (MINEPIA) as the Chinese are still shipping Cameroon's fish stock in hundreds of tons. This practice has however left the artisanal fishermen who fish in the coastal areas profoundly worried about the disappearing fish populations and dwindling incomes as a result of overfishing carried out by the Chinese in the Cameroon waters (Green vision 2014).

2.3 Fishery Industry in Cameroon

Cameroon's fishery industry has undergone considerable development in the past decades. The industrial fishery sector has however undergone a relatively rapid development as opposed to the artisanal fishery sector which is still operating at a subsistence level. It is, however, worth noting that there has been a reasonable advancement which has been made with regards to the collection of statistical fishery data even though more is still to be done in the aspect of gathering more information with regards landings by the artisanal fishing boats and also the by-catch of shrimpers and finfish trawlers. There is however, a need to update data in the aspects of inventory of all canoe types, fishing gears, number of fishermen and the landing sites along Cameroon's entire coast. More so, it is very important that a revision on the inventory of type of boats, horsepower, all

industrial fishing vessels, indicators with regards the nationality of vessels, Gross Registered Tonnage (GRT) as well all fishing gears characteristics and fishing grounds should be done.

Cameroon's marine fisheries industries are divided into two major sectors namely:

- The artisanal fishery sector and
- The industrial fishery sector

2.3.1 The artisanal fishery sector

This sector mostly operates within 3 nautical miles from the shoreline for which industrial vessels are excluded. Artisanal fishing fleets which are used are canoes which tend to concentrate within the estuaries, creeks and coastal inshore sector of surface warm waters above the thermocline. This sector is further sub-divided into small scale artisanal, semi-industrial and artisanal shrimp fisheries. This sector is dominated by about 85% of immigrant fishermen who come mainly from Ghana, Nigeria and Benin (Djama 1992). The immigration of these fishermen is however a major limitation in the development and coherent management of this sector. The artisanal fishery sector has however undergone significant development over the years. For a production of about 55000tons, 6011 canoes were being operated by a sample of about 18,615 fishermen in the seventies (Njock, 1985). As a result of fishermen seeking for refuge in the Cameroon territory from the Bakassi war that intensified in the 1990s leading to an increase in the number of fishermen and today there are about 24,000 for a production of over and above 62,876 tons (MINEPIA frame survey, 2009). In this sector, the species exploited by artisanal fleets include:

- *Ethmalosa fimbriata* (bonga or bepa);
- *Sardinella maderensis* (short sardine, strong kanda, ndololo);
- *Caranx/Chloroscombrus* (jacks/Atlantic bumper or mutungu, motondo);
- *Arius* (sea catfish or kwakoro);
- *Pseudotolithus senegalensis* (cassava croaker or musobo);
- *Pseudotolithus elongates* (bobo croaker or nyendi);
- *Galoides/Pentanemus/Polydactylus* (threadfin);
- *Cynoglossus* spp. (Guinean and Nigerian tonguesoles);
- *Palaemon* (estuarine white shrimp or njanga);
- Juvenile *Ethmalosa/Sardinella* (bonga/sardine or nyamtolo); and
- *Panulirus regius* (royal spiny lobster) (Njifonjou, 1998).

It is worth noting that, about 20-30% of landings in the artisanal sector is mainly directed from the coastal pelagic species and demersal resources (Njock J.C 1985a). The sub-division of this sector is as follows:

2.3.1a Small scale artisanal fishery sector

This is a fishing sector in which fishing activities are carried out exclusively within 3 nautical miles and also within estuaries. The vessels used in fishing are of relatively small sizes and are mostly sail driven. Small scale artisanal fishing is carried out in almost all fishing camps (Njifonjou & Mounchipou, 2003).

2.3.1b Semi-industrial fishing

This is a type of artisanal fishing which is mostly carried out by foreigners coming particularly from Ghana which extends a little into the sea. These Ghanaians use large size canoes as fishing vessels which are driven by 40 Horse Power (HP) engines. The fishers are migratory having as main fishing camps Limbe, Idenau, Yoyo and Bekumu (Chiambeng, 2011).

2.3.1c Artisanal shrimp fishery sector

The artisanal shrimp fishing is carried out in estuaries, creek zones and most especially in the artisanal fishing camps of Mokala, Bamusso in the Ndian Division as well as Mabeta and Mboko in the Fako Division. The species exploited in this sector is primarily *Nematopalaemon hastus* wherein only one type of net called the “ngoto” is used for fishing. According to recent developments in the Bakassi region, there is the exploitation of small-scale alien shrimp called *Penaeus monodon* (Chiambeng 2009, 2011). However, the artisanal fishing camps require instantaneous responsiveness by the government so as to improve livelihood standards because they are in a very socio-economic state.

The artisanal fishery sector uses the following type of gears:

- 1) The monofilament bonga gillnet or bonga chain which is locally called strong kanda net and is mainly used to catch bonga and *Sardinella*;
- 2) Hooks and line primarily used to catch barracuda and marine catfish;
- 3) The drift net which is locally known as waka-waka and is used to catch pelagic fish such as Bonga and *Sardinella*;

- 4) The artisanal purse seine locally called watsha which has recently been introduced in Cameroon by the Ghanaians to catch targeted species such as bonga and Sardinella;
- 5) The beach seine which is also called drawing net or drawing chain which is commonly used in coastal inshore sandy areas for both pelagic and demersal fish catches;
- 6) The cast net which is locally called mbunja and is used in the artisanal pelagic fishery sector;
- 7) The small mesh-sized conical shrimp net which is commonly called ngoto and is very effective in the harvesting of white shrimp in the estuaries, creeks and shallow shore waters; and
- 8) The multifilament bottom set gillnets which are also known as musobo net predominantly used to catch demersal fish such as soles, catfish and threadfins.

2.3.2 The industrial fishery sector

Industrial fishing started more than fifty years ago in Cameroon and a historical catch and effort data on industrial fleet can be referred to in Sessengo & Njock (1987). Since 1951, industrial fishing fleets have been exploiting the demersal fish and shrimp fish. There has been a rapid expansion by the industrial fleets from the sixties and eighties as the industrial fishery that is the trawlers and shrimpers are now purportedly exploiting the deeper waters beyond the 25meter depth contour which is beyond the thermocline being an area predominantly dominated by the demersal fish such as the red fish even though some white fish also outspread. It should be noted that, the Gross Registered Tonnage (GRT) as well as the length of vessels differ considerably and the mesh size of the cod end of the finfish trawl is about 36-41 millimeters stretched whereas that of the shrimp trawl is about 32-40 millimeters. The industrial fleet catch peaked at about 20,400 tons in 1976 and since then, catches have experienced a gradual decline to about 6000tons in 2010 (MINEPIA reports). The artisanal fishermen who use the 20meter depth which is possibly outside and off the estuaries in the coastal sector are ideally supposed to be at least 3.2kilometers as is the case in the traditional fishing grounds where finfish trawlers are used (Njock 1990).

In this sector, the following important crabs, molluscs, crustacean as well as other fish species are exploited:

- *Parapaeneus atlantica* (Guinea shrimp);
- *Parapaeneus longirostris* (rose shrimp);

- *Nematopalaemon hastatus* (Estuarine prawn); and
- *Penaeus notialis* (Pink shrimp)

Cameroon's current fisheries legislation stipulates that the industrial fishing vessels shall not surpass 250 average GRT. For the last three decades, the industrial fishing sector has been using otter trawlers whose characteristics have significantly changed (Chiambeng & Ngoande, 2011). At the extremities of two outriggers, fish trawlers use a single net while the shrimp trawlers use two or four nets at the same time where one or two on each side of the vessel are being towed. However, it is worth noting that, for fish and shrimp production most vessels have not been designed and equipped to meet international standards (Njifonjou, 2002).

2.4 Socio-Economic Aspect

As stated by the FAO, the state of the world marine fisheries continues to worsen at an increasing rate and this conveys a strong message which is the increased percentage of overexploited fish stocks coupled with the declining global marine catch over the last few years leading to negative social and economic consequences (FAO, 2012). Similarly, depending on the value systems used, the accelerating rate which is reflected on the impacts of globalization of fish markets can be viewed as positive or negative (Taylor et al., 2007). Likewise, adverse effects by international trade on the environment, livelihoods, small-scale fisheries culture and special needs in relation to food security are a matter of concern despite the fact that fish trade greatly contributes to food security through the generation of revenues.

However, since 1994, the Integrated Development of Artisanal Fisheries (IDAF) in West Africa came up with a number of working groups which had as aim to address certain socio-economic aspects in relation to capital needs and availability, studies on costs and earnings, fiscal policies, use of boat-owners' income as well as the role of women in the fisheries industries. The end result of the IDAF programme showed artisanal fishermen generally do not earn very much from the use of their boats which can be able to cover their fixed and variable costs. More so, boat-owners lack financial management skills and techniques to cater for the slender seasons as well as the replacement of some of their capital equipment.

A more rational utilization of production equipment, the construction of necessary infrastructural facilities and the better management of fishing industries and resources will do a great to all fishermen rather than just subsidies. Technological developments such as Fish Aggregating

Devices (FAD), improved fuel and diesel outboard engines can be well utilized in the development and management of artisanal fisheries.

Additionally, emphasis was laid on the need for intermediary organizations to act between banking institutions, fishermen and individual operators. For this to be achieved, a strong relationship based on confidence must be built among the fishing community members and there is a need for a good knowledge of fishing and economic operators as well with regards credit repayment. It was remarked that, the artisanal fishing units if well managed can be very profitable economically.

However, there is a need for the consideration of fishermen as true partners as the assurance of an equal access to the means of production in the financial markets by fisheries administrations.

2.4.1 Livelihood

Besides the various impacts that is ecological, economic and social caused by IUU fishing, there are certain implications caused in relation to livelihood. These implications vary from single households to the state and even at regional levels. As a result of these implications, the revenues of incomes are bound to decrease and hence, a reduction in the incomes of people who are involved in the secondary processing industrial units (Diaz-Bonilla et al., 2000). The reduction of fish-catch greatly affects the livelihood of the fishermen and all those who depend on the fishery industry for their daily survival thereby likely to leave them underneath the poverty line. Also, the impact of fish stock decline brings about an inequality in gender since many workers in the secondary fish processing units are women (Bennet, 2004). However, since most West and Central African countries rely on fish trade and tax as an important source of revenue, where catches are not reported and thus it affects and decreases these revenues.

In addition, despite the negative impacts on the local populations and communities which are felt by the loss of livelihood and the collapse of fisheries industries, there is the existence of destabilization of the governing systems of self-governing countries. States which experience significant stress factors such as food insecurity and loss of livelihood are very vulnerable to social insecurity (Adger, 2000), which can sooner or later be translated into political instability which will also have a negative effect on livelihood.

2.4.2 Cameroon fishing fleet

The artisanal fishing sector uses motorized and non-motorized canoes while the industrial sector uses trawlers and shrimpers which range between 25 and 500 GRT. The following are the principal types of vessels used in the artisanal fishing sector:

- i. The small dugout canoes which are small in nature and carry 2 men are about 4-6 meters long and use hooks and lines to mainly catch catfish and threadfins;
- ii. The medium-sized and planked canoes which are about 7-8 meters long and use set gillnets to catch threadfins and other demersal fish. Also, the medium-sized and planked canoes which are about 8-10 meters long use bonga monofilament gillnets to catch bonga;
- iii. The large-sized planked canoes which are about 10-12 meters long use special conical nets locally called ngoto to catch mainly white shrimps (*Palaemon hastatus*). These nets are common around the estuaries of the northern coastal regions of Cameroon; and
- iv. The larger dugout planked canoes which are about 12-20 meters long are used by Ghanaian fishermen fishing with artisanal purse seines to catch *Sardinella* and bonga. The canoes fishing with purse seines usually carry more than 14 men.

2.5 Fish landing areas in the South West region of Cameroon

The characteristics of fish landing areas are reflected in the Cameroon coastline landscape and can be divided into four zones following the sandy and rocky area from Campo to river Nyong, sandy and muddy area from river Nyong to river Mungo, rocky and sandy area from Tiko port to Idenau and finally sandy and muddy area from Sanje to the Bakassi peninsula (Ayissi, 2014). As adapted from Njock 1987 and updated in the regional and delegation of the Ministry of Fisheries, Livestock and Animal Husbandry Limbe, Cameroon showing the distribution of fish landing sites, canoes and catches (Cameroon report, 2017) as represented in the table that follow suit:

Table 1: Fish landing sites, canoes and catches in the South West region of Cameroon

Coastal Division	Fish landing site	Total number of canoes	Total estimated fish catch	Ranking
Ndian Division	Bamousso			

	Idabato West I			
	Idabato II			
	Ide-Dong Nanjo			
	Kombo Abosukulu			
	Komno Ausa			
	Kombo Adibai	3256	17254	29400
	Makora Tanda			
	Jabana			
	Bekumu			
	Njangassa			
Fako Division	Eyenge I			
	Eyenge II			
	Eyenge III			
	Bibundi			
	Sandje Native			
	Debunsha			
	Isobe			
	Bakingili			
	Ghanean			
	Batoke Native			
	Ngeme			
	Wovia			
	Limbe Dockyard	832	3172	9600
	Limbe fish market			
Botaland				
Bonaberi				
Man O'War Bay				
Mboko				
Ijomabeta				

	Ijomboko			
	Mabeta			
	Mbomo I & II			

(Source: Njock, 1987)

2.6 Illicit maritime activities in the Gulf of Guinea

Illicit maritime activities occur on a daily basis in several maritime regions of the world and it is for this reason that, States in their multiple venues including United Nations Organizations, International Maritime Organization (IMO) and other international and regional bodies have developed many legal authorities to proscribe criminal activities in their waters with a focus of enforcing capabilities and capacity ashore. In the Gulf of Guinea which is made up of different States including Cameroon, Nigeria, Benin and Ghana, the most renounced illicit maritime activity are human trafficking, migrant smuggling, armed robbery at sea, illicit drugs, environmental pollution, piracy and illegal fishing but more emphasis will be laid on illegal fishing as it is the topic of research.

UNCLOS which is a framework on which many international agreements to address living marine resources are grounded. Specificities on Part V of the 1982 UNCLOS especially Articles 61-68, 77, and 116-120 recognizes a coastal State's sovereign rights for the purpose of exploring and exploiting as well as the duty to conserve and manage natural living resources in its EEZ. The Convention provides for freedom in the high seas subject to a number of conditions such as treaty obligations in Article 116 (a) and the interests of coastal States in dealing with cross-boundary stocks in Article 63 (2), Article 64 on highly migratory species, Article 65 on marine mammals, Article 66 for anadromous species and Article 67 for catadromous species. UNCLOS in its Article 118 obliges the duty of states to collaborate and negotiate on living resources management both directly and through regional fishery bodies. Article 119 of UNCLOS equally provides for conservation measures for living resources to maintain and restore populations of harvested stocks which are to be based on the best scientific evidence available as well as taking into account the interdependencies of stocks. Article 120 require states to conserve and manage marine mammals in the high seas.

However, Article 73 (3) of the Law of the Sea Convention stipulates that, coastal states' can give penalties for the violations of fisheries laws and regulations in their EEZ but may however not include imprisonment in the absence of agreements or any other corporal punishment.

CHAPTER 3

Research methodology and data analysis

3.1 Research methodology

Research methodology defines the various techniques used in identifying, selecting, processing and analyzing information about a particular topic. The methodological approach which could be quantitative, qualitative or a mix states how data is being collected and analyzed which allows readers to evaluate the reliability and validity of the research (Shona McCombes 2019).

The researcher used both qualitative and quantitative methods in the study. This allowed the researcher to employ the various variables applicable to the study.

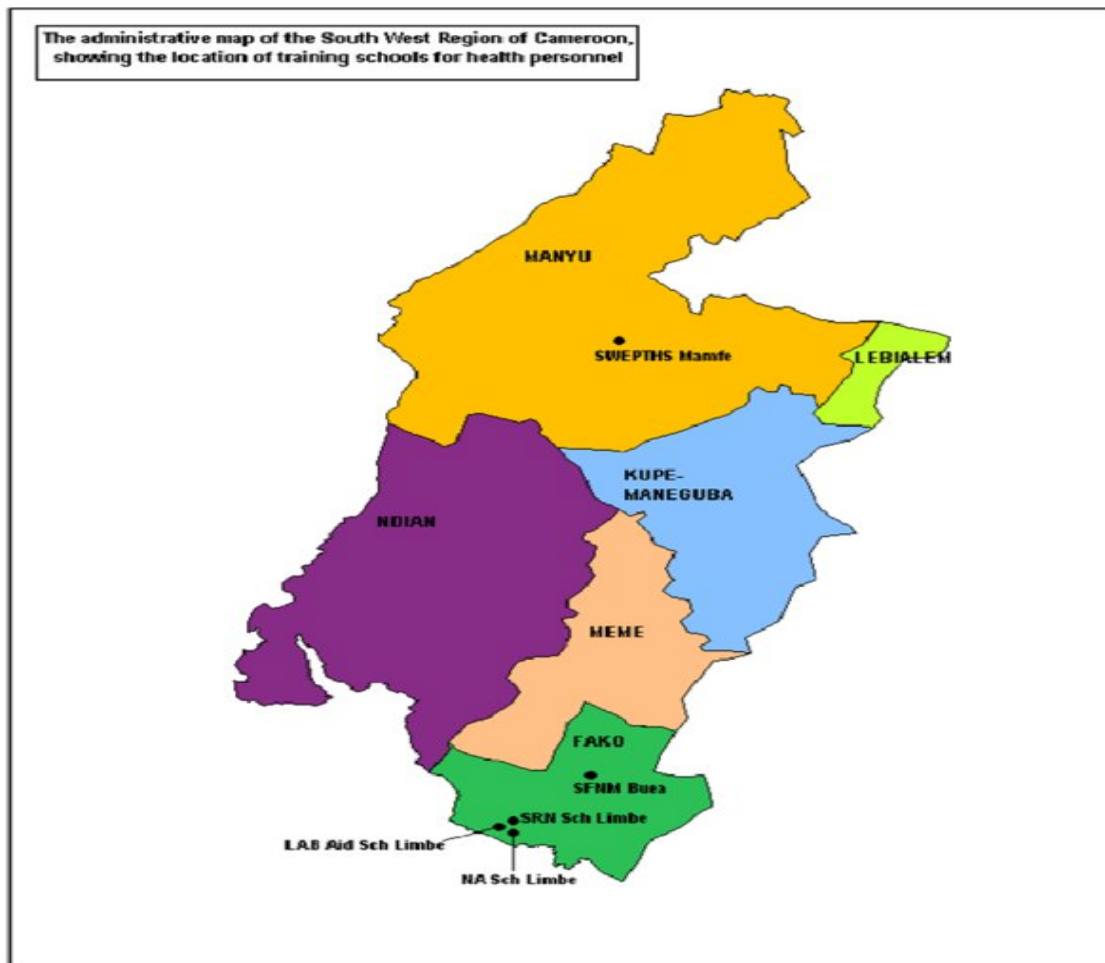
3.2 Research instruments

Quantitative and qualitative research instruments were employed in this research. In the quantitative analysis, the researcher administered 50 questionnaires to 50 respondents who are actively involved in the fishing industry as industry players and administrative staff but 30 responses were obtained. The questionnaires were divided into 2 main parts: the first part is based on the identification and biodata and the consent forms and the second part was based on specific questions which relates to illegal fishing.

3.3 Study area

The study area for this research is the South West region of Cameroon where most fishing grounds are located. According to the ministry of territorial administration and decentralization, it has a surface area of about 25, 410Km² located in the Gulf of Guinea between latitude and longitude 5° north and 9° east. Its coastal area expands through two administrative divisions: Ndian and Fako divisions. These divisions are further sub-divided into six sub-divisions: Bekora, Idenau, Ekondo Titi, Tiko, Limbe and Isangele which are headed and governed by divisional and sub-divisional officers. The study area is predominantly dominated by fishermen both artisanal and industrial who are in one way or the other affected by the illegal fishing practices because fishing is their source of livelihood.

Figure 3: Map of South west region of Cameroon showing the location of fishing grounds



Source: Earnest Njih Tabah

3.4 Data Collection Methods

The process of data collection for this piece of research will be done through primary and secondary data sources for which emphasis will be laid on primary data. For primary data collection, a set of questionnaires were administered to a sampled population of selected fishermen and some stakeholders in the coastal areas of the South west region of Cameroon. The questionnaires were administered to respondents of the two fishing grounds in the South west region of Cameroon that is Fako and Ndian divisions. Secondary data were obtained from the internet, some books, annual reports, articles, journal publications and other official documents from the Ministry of Livestock,

Fisheries and Animal Industries (MINEPIA), and the Ministry of Nature and Environmental Protection (MINEP) in Cameroon.

3.5 Data Analysis

This part of the study deals with the presentation, analysis and interpretation of the data obtained from the administered questionnaires to respondents. The data collected for the research is analyzed using the simple descriptive statistical means such as frequency distribution tables based on the various responses obtained from the sampled population chosen.

Table 2: Gender of respondents

Item	Frequency	Percentage (%)
Male	26	86.7
Female	4	13.3
Total	30	100

Source: Field data, 2019

From the table above, out of a total of 30 respondents, 26 representing (86.7%) were male while 4 representing (13.3%) were female. This shows that, the fishing industry is predominantly a male dominated environment.

Table 3: Age of respondents

Item	Frequency	Percentage (%)
18-30	4	13
31-40	12	40
41-50	9	30
51-60	3	10
60 and above	2	7
Total	30	100

Source: Field data, 2019

From the above table, a bulk of respondents who fall between the ages 31-50 representing 70% while a minority of respondents who fall between the ages of 51 and above representing 17% are almost

inactive in the fishing sector. This signifies that, 70% of the population are more engaged in the fishing industry.

Table 4: Educational background of respondents

Item	Frequency	Percentage (%)
Primary	5	17
High school	7	23
Technical education	13	43
University	2	7
No education	3	10
Total	30	100

Source: Field data, 2019

From the table above, a majority of the respondents had undergone technical education representing 43% of the population while a minority of the respondents had undergone university representing 7% of the population. This shows that, the people actively involved in the fishing industry have more technical knowledge in their background while a minority of the population have attained a higher level of education.

Table 5: Occupation of respondents

Item	Frequency	Percentage
Public/civil servant	2	7
Artisanal fishermen	18	60
Fish mongers	7	23
Students	2	7
Unemployed	1	3
Total	30	100

Source: Field data, 2019

From table 5 above, 18 respondents representing 60% have an occupation of artisanal fishing while 1 respondent representing 3% indicated being unemployed. This implies that, those who are more engaged and committed in the fishing industry of Cameroon are artisanal fishermen.

Table 6: Respondents knowledge of IUU fishing

	Frequency	Percentage (%)
Yes	20	67
No	10	33
Total	30	100

Source: Field data, 2019

A majority of the respondents representing 67% of the population answered yes to the question while a minority representing 33% answered no. This shows that, a greater majority of the population are aware of the existence of IUU fishing activities in Cameroon.

Table 7: Respondents opinions on the impacts of illegal fishing practices

Item	Frequency	Percentage (%)
Environmental impacts	10	33
Economic impacts	15	50
Social impacts	5	17
Others	-	-
Total	30	100

Source: Field data, 2019

From table 7 above, a greater proportion of respondents representing 50% were of the fact that, the impacts of illegal fishing are more economic than social as responded by 17% of respondents. This indicates that, the impacts of illegal fishing practices are felt more at the economic level of Cameroon as incomes and livelihood of the local population are being negatively impacted.

Table 8: Involvement of other nationals in illegal fishing

Item	Frequency	Percentage (%)
Chinese	15	50
Nigerians	9	30
Ghanaians	5	17

Equatorial Guineans	1	3
Others	-	-
Total	30	100

Source: Field data, 2019

Table 8 indicates that a greater number of respondents representing 50% were of the outlook that, Chinese nationals are more involved in illegal fishing practices as compared to the other nationals like Equatorial Guineans representing 3% are less involved in illegal fishing practices. This shows that, the Chinese national constitute a greater part of those carrying out illegal fishing practices in Cameroon's waters.

Table 9: Respondents opinions on methods used in illegal fishing

Item	Frequency	Percentage (%)
Dichlorodiphenyltrichloroethane (DDT)	14	47
Petrolling	4	13
Illegal nets	12	40
Others	-	-
Total	30	100

Source: Field data, 2019

Table 9 above shows that more respondents representing 40% had a view that, the methods used in illegal fishing are illegal nets while a minority of respondents representing 13% were of the opinion that, illegal fishing methods used is petrolling. This indicates that, those who are more engaged in illegal fishing practices do not used the legislated net size.

Table 10: Respondents opinions on the ministries responsible for monitoring illegal fishing practices

Item	Frequency	Percentage (%)
Ministry of fishery	15	50

Ministry of transport	10	33
Ministry of environment	5	17
Total	30	100

Source: Field data, 2019

From the table above, a greater proportion of respondents representing 50% were of the opinion that, the ministry of fishery is responsible for monitoring illegal fishing practices in Cameroon while a minority of respondents representing 17% were of the opinion that the ministry of environment is responsible for monitoring illegal fishing activities. This indicates that, the ministry of fishery should be more active in the monitoring of illegal fishing activities.

3.6 Limitations of the study

There is no perfect piece of research work void of limitations and setbacks. The researcher had drawbacks in the following areas:

The researcher couldn't have access to the study area (South west region) for the collection of data as a result of the civil war currently going on in the Anglophone regions of Cameroon where the fishing grounds are located. As a result, the questionnaires were sent via email to the respondents and the respondents took a long time before responding to the questionnaires.

Also, the researcher had a limitation in retrieval of the administered questionnaires as the target responses were not attained.

More so, the researcher had difficulties in translation as most of the information available were in French and needed to be translated to English. This was however, time consuming for the researcher.

CHAPTER 4

Legal and Regulatory Frameworks

4.1 International Regulations of IUU fishing

There exist many regional, national and international regulations which aid the fight against illegal maritime activities in West and Central African countries. These regulatory bodies are put in place for minimizing illegal maritime activities including IUU fishing and piracy at sea. In order to counteract all illicit maritime activities in the Gulf of Guinea, the following major international and regional frameworks are necessary. Some of these regulatory bodies include:

As stated in chapter 2 above, UNCLOS is considered as the backbone for the conservation and management of all marine living resources. On the 19 November 1982, Cameroon ratified the United Nations Convention on the Law of the Sea (NOAA, 2009). Apart from UNCLOS, there exist other national and international institutions for the management and conservation of living marine and aquatic resources of coastal nations. These institutions work hand in glove with the Cameroon fisheries legislation and highlights various aspects in the legislation that necessitate attention for it to meet international and national standards.

4.1.1 International Plan of Action on IUU fishing

A non-binding International Plan of Action on IUU fishing (IPOA-IUU) was developed in 2001 within the framework of the FAO code of conduct for responsible fisheries adopted in 1995 and other international instruments (FAO 2007). The code of conduct for responsible fisheries covers only fisheries management in the EEZ, high seas as well as issues related to postharvest practices, aquaculture and trade. With due respect of the ecosystem and biodiversity, the code is expected to set out guidelines and international standards of behavior for responsible fishing practices in view of ensuring the effective conservation, sustainable management and development of marine and aquatic living resources. Existing international conventions and accords such as UNCLOS 1982, FAO accord which deals with the conservation and management of living resources (CA, 1993) by fishing vessels in the high seas, United Nations (UN) accord related to straddling fish stocks (UNFSA, 1995) also contributed to the development of IPOA-IUU which was confirmed in 2001 by the Fisheries Committee (COFI) of the FAO. In an attempt to address problems related to fishing, IPOA-IUU provides a numerous measure which covers all sectors of the fishing industry

from flagging of vessels to fishing authorizations to landings and market-based control of fish trade. Generally, some legislative measures are required for the institutional control of IUU which include; control of access to fisheries, regulation of port access, design of inspection organizations, catch certificate schemes as well as a system of penalties. For this to be achieved, various facets of the Cameroon fisheries legislation such as sanctions, vessels licensing, Monitoring Control and Surveillance (MCS), incentives and co-operation with other coastal States need to be taken into consideration so as to meet international standards in relation to the conservation and management of marine and aquatic living resources with respect to IUU fishing.

4.1.2 United Nations Fish Stock Agreement

As set out within the framework of UNCLOS of 10 December 1982, the United Nations Fish Stocks Agreement (UNFSA) which relates to the conservation and management of straddling fish stocks and highly migratory fish stocks, there are principles established for the conservation and management of these fish stocks for which such management must have to be grounded on the precautionary approach as well as the best available scientific information. UNFSA which aims to ensure the long term conservation and sustainable use of straddling and highly migratory fish stocks was adopted on August 4, 1995 by the United Nations Conference on straddling fish stocks and highly migratory fish stocks and was opened for signature up to December 1996 but entered into force on December 11, 2001 and was signed by 59 States and entities. The Agreement spells out the duties of flag States including those which are related to registration and records of vessels, authorizations, MCS and enforcement. It also discourses cooperation in international, regional and sub-regional enforcement together with boarding and inspection procedures as well as port State measures. The Agreement also expounds on the fundamental principle established in the Convention that, States should cooperate to ensure conservation and objective promotion of the optimum utilization of fisheries resources both within and beyond the EEZ. UNFSA attempts to achieve this set objective through the provision of a framework for cooperation in the conservation and management of these resources. Through effective management and conservation of high seas resources which is achieved by establishing detailed minimum international standards for the conservation and management of straddling fish stocks and highly migratory fish stocks, it ensures that measures are taken for the conservation and management of those stocks in areas under national jurisdiction and in the adjacent high seas are compatible and comprehensible. Also, UNFSA ensures that there are effective mechanisms for compliance and enforcement of those

measures on the high seas and recognizing the specific requirements of developing States in relation to the conservation and management as well as the development and participation in fisheries for the two types of stocks which goes a long way in promoting good order in the oceans (UNFSA 1995). It is however worth noting that, Cameroon has not yet ratified the UNFSA Agreement.

4.2 United Nations 2030 Sustainable Development Goals

The UN 2030 agenda since its initiation in 2015, provided a plan for shared prosperity in a sustainable world where everyone can be productive, energetic and live peacefully on a healthy planet (SDG report 2019).

It is worth noting that, the 2030 agenda for sustainable development lays emphasis on the importance of partnership building and solidification of stakeholder participation as a key to growth and attainment by promoting and effectively implementing activities in support of SDGs targets. Since IUU fishing is a significant area to tackle, FAO is working hand in glove with numerous organizations such as the International Maritime Organization (IMO), World Wildlife Fund (WWF), International Labor Organization (ILO), International Monitoring Control and Surveillance (IMCS) Network as well as other Non-Governmental Organizations (NGOs) and Inter Governmental Organizations (IGOs). FAO equally works in direct partnership with RFMOs and member countries both at the national and regional levels (FAO 2016).

The FAO code of conduct under the framework of UNCLOS which is often under the auspices of the fisheries department of the Food and Agricultural Organization (FAO) of the United Nations is another regulatory framework.

- **The FAO code of conduct**

The FAO code of conduct is considered to be the foundation of sustainable fisheries and aquaculture development for responsible fisheries. While the FAO code of conduct is voluntary, it derives from existing provisions of international law which includes UNCLOS. The code of conduct addresses the following six fundamental themes:

1. Fisheries conservation and management
2. Fishing operations;
3. Aquaculture development;

4. Coastal area management;
5. Post-harvest practices and trade; and
6. Fisheries research

The Code identifies the responsibility of flag States for both the management of resources as well as for the activities of fishing vessels flying its flag as stipulated in the Fish Stocks Agreement. It has as overall objective to promote international cooperation through the enhancement of management measures that improve the optimum and sustainable use of fisheries resources. Stakeholder participation and cooperation which is a relatively new approach has been incorporated in the Code (FAO Code of Conduct, 1995).

More so, the Code supports International Plans of Action (IPOAs) which apply to all States and international fisheries organizations as well as fishermen. Just like the FAO Code, the IPOAs are voluntary instruments which address the following issues:

- 1) Preventing, deterring and eliminating IUU fishing;
- 2) Reducing incidental catch of seabirds in long line fisheries;
- 3) The conservation and management of sharks;
- 4) The management of fishing capacity;
- 5) Overfishing and rebuilding of fish stocks; and
- 6) Reducing waste in fisheries

In addition, all nations are being encouraged by the global United Nations Moratorium on High Seas Drift Net (HSDN) fishing to take both individual and collective measures to prevent large-scale pelagic driftnet fishing operations on the high seas of the world's oceans. This is so because most nets that are set adrift from fishing vessels in the open oceans cause massive harm to the marine environment as they are never recovered. The by-catch from drift nets which include not only commercial fish but also dolphins, seabirds, sharks, seals, sea lions, large whales and sea turtles can be captured even though some nets used in capturing certain species can be quite efficient and effective. Also, what environmentalists call "ghost nets", it is as a result of lost nets which are drift and go a long way to kill animals for long time periods.

▪ **West Africa Code of Conduct**

The governments of countries within and nearby the Gulf of Guinea which represent the Economic Community of West African States (ECOWAS), the Economic Community of Central African

States (ECCAS) and the Gulf of Guinea Commission (GGC) met in June 2013 and signed the Yaounde code of conduct regarding the suppression of piracy, armed robbery against ships and unlawful maritime activities in West and Central Africa. It has as main aim to promote a stable maritime environment that contribute to regional prosperity and regional maritime cooperation. It calls on the European Union (EU) to support the execution of the Gulf of Guinea strategy and plan of action together with other national and regional efforts in the context of this code of conduct. Signatories created regional centres for information sharing and coordination in accord with the code of conduct. These regional centres include: the Interregional Coordination Centre (ICC) located in Yaounde Cameroon, the Regional Centre for Maritime Security of West Africa (CESMAO) located in Abidjan, Ivory Coast and the Regional Centre for Maritime Security of Central Africa (CRESMAC) in Pointe Noire, Congo (EU Maritime Security factsheet 2018).

- **The Gulf of Guinea Code of Conduct**

On June 24/25 2013 an Agreement which lays emphasis on regional solutions to regional problems was held in Yaounde Cameroon by twenty-five heads of state as well as senior representatives of member states from the Economic Community of Central African States (ECCAS) and the Economic Community of West African States (ECOWAS) all in a bid to decide upon a cooperative maritime strategy. The Gulf of Guinea Code of Conduct which is modelled after the Djibouti Code of Conduct was initially proposed by ECOWAS. The Code of Conduct for West and Central Africa otherwise known as the Gulf of Guinea Code of Conduct (GoG) was signed in Yaounde acknowledging the economic and geo-political importance of the maritime domain as it is critical to the continued development and future of Africa. However, the Gulf of Guinea Code of Conduct covers a whole range of regional threats within the maritime domain such as armed robbery at sea, illegal fishing, illicit drugs, environmental pollution, piracy and arms and human trafficking. As observed by the president of Tchad at the close of the Yaounde summit, it was remarked that it was the first time where leaders from the 26 West and Central African Member States met to take into consideration solutions on regional economic communities' problems. As an ambitious undertaking beginning with a non-binding agreement between 26 West and Central African States then urges signatories to proceed thereon to a binding agreement within three years (Captain Philip, 2013).

4.3 Sustainable Development Goal (SDG) 14

As adopted by the United Nations in 2015, SDG 14 sets objectives to put an end to IUU fishing and eradicate subsidies contributing to it by 2020 and members of WTO continue to discuss disciplines to abolish such subsidies (OECD 2019).

According to Nilsson, the framework of Sustainable Development Goals plays the following three distinct roles for science, technology and innovation:

1. Characterizing the challenges;
2. Providing solutions; and
3. Strengthening public institutions and society

The Sustainable Development Goal (SDG) 14 which is “Life below water” is one of the 17 SDGs which focuses on areas such as marine pollution, ocean and climate as well as the conservation and sustainable use of marine and ocean resources. SDG 14 has the following 7 targets:

1. To prevent and significantly reduce marine pollution of all kinds in particular from land-based activities including marine debris and nutrient pollution by 2025.
2. To sustainably manage and protect marine coastal ecosystems to avoid significant adverse impacts including the strengthening of their resilience and taking actions for their restoration in order to achieve healthy and productive oceans by 2020.
3. Minimization and addressing the impacts of ocean acidification including through enhanced scientific cooperation at all levels.
4. To effectively regulate the harvesting and put an end to overfishing, Illegal, Unreported and Unregulated fishing and destructive fishing practices and implementing science-based management plans in order to restore fish stocks in the shortest time feasible at least to levels that can produce maximum sustainable yield as determined by their biological characteristics by 2020.
5. To conserve at least 10% of coastal and marine areas consistent with national and international law and based on the best available scientific information by 2020.
6. To prohibit certain forms of fisheries subsidies by 2020 which contribute to overcapacity and overfishing, eliminate subsidies that contribute to Illegal, Unreported and Unregulated fishing and

refrain from introducing new techniques such as subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries in order to become an integral part of the World Trade Organization (WTO) fisheries subsidies negotiation.

7. Increasing the economic benefits to Small Island Developing States (SIDS) and least developed countries from the sustainable use of marine resources including sustainable management of fisheries, aquaculture and tourism (Nilsson 2016).

4.3.1 Sustainable Development Goal (SDG) 2

The 2030 agenda identifies peace as a vital condition for sustainable development and the eradication of hunger. SDG 2 associates the eradication of hunger and malnutrition to a transformation in agriculture and food systems as well as the empowerment of women and the rural population who act as acute agents of change. SDG 2 highlights the complex inter-linkages between food security, nutrition, rural transformation and sustainable agriculture. It is however worth noting that, more than 70% of the world's extreme poor population living in rural areas rely on a main source of living which is agriculture (HLPF thematic review of SDG 2, 2017). This part of the population is more often than not very vulnerable to climate change and are the first victims of natural resources degradation and are mostly severely impacted by crisis. The 2030 agenda which has as vision to achieve "zero hunger" also requires social protection and food systems that are environmentally sustainable, economically efficient and socially inclusive. According to the State of Food Insecurity in the world (SOFI) 2015 current data and study shows that if present trends continue, it will be difficult to achieve SDG 2 targets in most areas of the world. Also, a greater portion of the world's populace especially in sub-Saharan Africa, Africa and South Asia will linger malnourished by 2030 and 2050.

However, in an attempt to ensure that everybody has satisfactory nutritious food today as well as the future generation, it is required that, there be a widespread campaign of sustainable agriculture as well as the conservation of biodiversity in order to enhance the livelihoods of smallholder farmers, fishers, pastoralists and foresters inclusive and augmented investments in agriculture, fishery sectors, markets and related organizations (HLPF thematic review of SDG 2, 2017).

4.3.2 Regional Fisheries Management Organizations (RFMOs)

Regional Fisheries Management Organizations (RFMOs) which are in existence today differ greatly in their mandates, legal authorities, involvement and geographical coverage. RFMOs play a vital role through preventing, deterring and eliminating all illegal practices as far as IUU fishing is concerned. A greater part of the world's most valuable fish stocks as well as a large portion of the stocks which are subject to significant IUU fishing fall under the purview of RFMOs. While some RFMOs are only coming into existence now, others have been in operation for decades in which case the newer RFMOs cover sectors and fish stocks which have not yet been covered so as to deal more effectively with problems of IUU fishing. As a result of the dwindling amount in fish stocks, RFMOs have adopted a great number of stringent guidelines to manage the fisheries for which they are responsible. While some fishing vessels comply with stricter rules, others decide to ignore the rules or to register in non RFMOs member States hence not being directly bound by the rules. However, for RFMOs to effectively succeed in addressing strategies for dealing with IUU fishing, both members and non-members of RFMOs should be effectively addressed. Moreover, RFMOs must find ways to incorporate measures to control IUU fishing together with their other basic missions such as general data collection and dissemination, conservation of marine resources, scientific research, management of fishing capacity and also the control of catches and effort (Judith Swan 2000). In addition, the following critical steps can be taken by RFMOs to prevent, deter and eliminate IUU fishing:

- Collection and dissemination of IUU fishing related information
- Identification and measures of coordination against vessels engaged in IUU fishing
- Identification of States whose vessels are engaged in IUU fishing and urging identified States to rectify such behavior
- Call on members to take actions against vessels that carry out fishing in the relevant regions without nationality
- The adoption of rules that ensure that vessels engaged in chartering arrangements do not lead to IUU fishing
- The adoption of port inspection schemes, restrictions on transshipment at sea as well as creating a presumption which does not permit harvested fish by non-member vessels in the relevant region to be landed in ports of members

- The adoption of catch certification and trade documentation schemes
- The adoption of other market-related measures to combat IUU fishing

4.4 National Regulations and infrastructures of the fisheries sector

Cameroon's fisheries exploitation and management is administered by an institutional framework and fisheries legislature as seen below:

- **Ministry of Fisheries Livestock and Animal Husbandry (MINEPIA)**

This is an institution which is responsible for the management of the fisheries sector in Cameroon. MINEPIA works in glove with other institutions notably the Ministry of Scientific Research and Innovation (MINRESI), the Ministry of Economy, Planning and Regional Development (MINEPAT), the Ministry of Transport (MINTRANS), the Ministry of Environment and Nature Protection (MINEP) and the Ministry of Defence (MINDEF).

According to a Presidential decree n° 2420/152 of 8 December, 2004 the Ministry of Livestock, Fisheries and Animal Husbandry was restructured. MINEPIA performs the following functions:

- It is responsible for the expansion, execution and follow-up of government policies with respect to fishing, fisheries management and sustainable development of the sector.
- It provides fishing authorizations, follow-up activities of licensed vessels, ensures the respect of all fisheries legislation and promotes fisheries production.

For a proper carry out of the above functions, MINEPIA has a Directorate of Fisheries and Aquaculture (DPA) at the Central level. The Directorate of Fisheries and Aquaculture is partitioned into 4 sub departments and 9 services which cover the main management sections of the sector. The 4 sub departments of the Directorate of Fisheries and Aquaculture include:

- The Sub-Directorate of Aquaculture (SDA)
- The Sub-Directorate of Industrial and Artisanal Fisheries (SDPIA)
- The Sub-Directorate of Fish Technology and Fishing Industry (SDTPIH) and
- The Monitoring and Control of fishing activities (BCSAP)

The Directorate of Fisheries and Aquaculture is directed by a Director who is answerable to the Minister and executes its functions through decentralized services of MINEPIA in the different regions and divisions.

There exist a Regional Delegation for Livestock Fisheries and Animal Husbandry (DREPIA) which is headed by a Regional Delegate at the regional level. DREPIA is aided by the Regional Development Services for Livestock, Fisheries and Aquaculture Production (SRDPIAPA) under the direct supervision of a Chief of service assisted by 2 controllers.

At the divisional level, Divisional Delegates are assisted by a Divisional service for the Development of Livestock, Fisheries, Animal Industry and Aquaculture production (SDPIAPA) which acts as an intermediary between the subdivisions and the regions. All the subdivisions in principle have fingerling Production and Fisheries Control Centers (CACP) controlled by a Chief of Center.

The following institutions work in collaboration with MINEPIA to ensure that national rules and regulations are strictly followed so as to combat IUU fishing in the Cameroon fishing grounds:

- **The Ministry of Defence (MINDEF)**

This is a Ministry which takes the lead in relation to the supervision of maritime waters and the protection of the coastal population, investments in the coastal zones and marine resources. MINDEF assists MINEPIA in monitoring and controlling all fishing activities including the implementation of the legislation by fishermen. MINDEF equally intervenes through the Navy, the Rapid Intervention Battalion (RIB), the national gendarmerie and other sub regional maritime forces.

- **The Ministry of Scientific Research and Innovation (MINRESI)**

This Ministry was restructured in 2005 defining Cameroon's policy in relation to scientific research. It comprises the Institute of Agricultural Research for Development (IRAD) which has a Fisheries Research Station (SHROL) in Limbe, an Inland Fisheries Research Station in Fouban and recently a Specialized Research Centre for Marine Ecosystems (CERECOMA) in Kribi. These research stations and centres are in charge of carrying out research activities on stock assessment, marine ecology, fisheries biology, fish postharvest technology, marine pollution and aquaculture mainly.

- **The Ministry of Transport (MINTRANS)**

The Ministry of Transport is in charge with the coordination of activities in relation to terrestrial, air and maritime transport. MINTRANS controls the movement of fishing vessels and other

vessels within the Cameroon territorial waters together with ports through the merchant marine. It is also concerned with licensing of vessels and security conditions onboard all industrial fishing vessels through the Direction of Maritime Affairs which is a prerequisite for the issuance of licenses by MINEPIA. These activities contribute to assuring security for industrial fishing in the Cameroon waters.

- **The Ministry of Environment and Nature Protection (MINEP)**

This Ministry is in charge of formulating and executing national environmental policies, elaborating strategies for the sustainable management of natural resources including fisheries and pollution control of the marine and terrestrial ecosystems. MINEP is also responsible for the evaluation of Ecosystem Impact Assessments (EIAs) studies for all activities carried out in the diverse ecosystems including marine, riverine, terrestrial and air.

- **The Ministry of Economy, Planning and Regional Development (MINEPAT)**

The Ministry of Economy, Planning and Regional Development has the responsibility of carrying out regional planning, embellishment of economic policies which are geared towards sustainable development, management of public investments and cooperation. In this light, it guarantees studies and management of the oceans through the financing of projects in the fisheries sector.

4.5 Fisheries Law

Law N° 81/013 of 27th November 1981 publicized the first fisheries and aquaculture legislation as part of a multisector legislation on forestry, wildlife and fisheries in Cameroon. This law was revised to produce the forestry, wildlife and fisheries law N° 94/01 of 20th January 1994 on the regime for forestry, wildlife and fisheries which is in force up to date with its different texts of application (Douffisa, 2007). This legislature and its applicable texts defines the various conditions of access to industrial and artisanal fishing and acts as a guide to anyone who intends to invest in the fisheries sector in Cameroon.

In addition, law N° 96/12 of 1996 with regards the management of the environment provides a universal framework for the management of the environment. This law provides guiding doctrines for the protection of the coastal marine environment, the management of resources as well as sustainable development.

4.5.1 Licensing of vessels

In Cameroon, the licensing of vessels is governed by the laws which are in clash with IPOA-IUU obligations. This is because IPOA-IUU in its articles 4(2) and 5(2) of decree No. 95/413/PM of June 1995, the presentation of an International Radio Call Sign (IRCS) and the history of IUU fishing vessels are not pre-requisites for the obtainance of fishing agreement as it is not in line with the provisions in article 24 of the IPOA-IUU and the International Telecommunications Union (ITU) of Geneva. This has resulted in a situation where a majority of fishing vessels registered in Cameroon have double matriculation. Again, Article 119 of the 1994 fishery legislation makes provision for high seas fishing licenses even though there are no laid down conditions for this type of fishing together with access to other coastal waters which is in disagreement with CA 1993 and UNFSA 1995. Also, as stated in article 92(2) of UNCLOS: “A ship which sails under the flag of two or more States, using them according to convenience may not claim any of the nationalities in question with respect to any State and may be assimilated to a ship without nationality.”

The control of coastal States vessels in order to minimize illicit activities is spelt out in articles 34 to 41 of IPOA-IUU. Coastal States are therefore encouraged to avoid according flagging to vessels having IUU fishing established history as well as discouraging the change of flagging for vessels of convenience.

According to FAO analysis for licensing in the years 2004, 2006 and 2007, the following was noted:

- I. Some operators fraudently declared tonnages lower than the real tonnage of the vessels they were operating
- II. In 2006, no vessels were licensed even though many continued to operate normally without licenses
- III. In late May 2007, licenses were issued to fishing operators after having operated for about five months without licenses.

Furthermore, MCS systems which are in existence do not have the minimum tools as well as the necessary finances to function. There is practically the non-existence of a system of data collection for efficient monitoring and control.

4.5.2 Sanctions

In order to discourage the continuous practice of IUU fishing activities as well as other illicit maritime activities, IPOA-IUU in its article 21 encourages coastal States to put in place very severe sanctions. The 1994 fisheries regulation which is currently in force presents six types of sanctions which are:

- a. 5000 to 50 000FCFA and 10 days imprisonment for violation of articles 121 on non-renewal of licenses and 122 on non-presentation of fishing license to controllers
- b. 1-3 000 000 and 1year imprisonment for violation of article 127a which relates to the use of trawl gear within 3 nautical miles limit, use of inappropriate mesh sizes by industrial vessels and the capture and detention of protected species
- c. 50-200 000 for the violation of articles 116 for the non-possession of fishing agreement, 117 on fishing license, 125 on non-declaration of catches, 127 on the discharge of toxic substances into the environment, 129 on the use of vessels > 250GRT
- d. 3-10 000 000 and 1-3 years imprisonment for fraudulent fishing documents
- e. 3-10 000 000 for holders of categories A, B and C permits
- f. 50 000 000 000 to 100 000 000 for any offence committed by a foreign fishing vessel (Douffissa, 2007).

However, the newly proposed fisheries legislation has seven types of sanctions though not approved yet. Going by both the old and new fisheries documents, the last category of sanction though the sanctions are very severe, generic and too heavy applies to all vessels with foreign flags. According to the proposed law in its article 130, the sanction ranges between 400 000 000 and 900 000 000 FCFA (FAO, 2005). It is however worth noting that, this approach is discriminatory as it provides sanctions based on nationality without considering the nature, gravity and estimated value of the crime which is against Article 21 of IPOA-IUU.

4.5.3 Port State control measures

In order to specifically target IUU fishing, the Agreement on Port State Measures (PSMA) is the first international binding agreement and it is one of the most effective means of dealing with IUU fishing. It sets out the minimum control a state should use when foreign fishing vessels enter the ports of a State and it serves for the verification that all fish landed are legally caught. The agreement also covers the role of flag States and RFMOs in the implementation of port State

measures (FAO Agreement, 2009). It has as principal objective to prevent, deter and eliminate IUU fishing by thwarting vessels which are involved in IUU fishing from the use of ports to landing their catches. By so doing, the agreement lessens the incentive of such vessels which prevents them from continuing their operation. Also, it blocks fishery products which are derived from IUU fishing from getting into national and international markets. However, the long-term conservation and sustainable use of living marine resources and marine ecosystems is greatly determined by the effective implementation of the agreement.

Port State Measures (PSM) are requirements put in place and undertaken by port States which sets conditions for the use of ports within the port State by foreign fishing vessels for which they are subjected to comply with. Port State measures should be applied in a just, transparent and non-discriminatory manner. Also, before the entry of vessels in ports, a port State should implement some control measures. When vessels enter the ports of coastal States, it is required by international law that, enforcement officers be authorized to board and inspect fishing vessels documents. In addition, as stated in paragraph 55 of the IPOA-IUU, foreign vessels seeking access are required by a port State to provide:

- Reasonable prior notice of their entry into port
- A copy of their authorization to fish
- Details of their fishing trip and quantities of fish on board

4.6 Role of Cameroon coast guards and Navy

In order to suppress illicit maritime activities taking place in African waters, IMO created a Memorandum of Understanding (MoU) in West and Central Africa consisting of 22 coastal member states on the establishment of a sub-regional integrated coast guard network which was adopted in Senegal in July 2008. This network was created with the objective of promoting regional maritime cooperation, a stable maritime environment and peace, good order and prosperity in West and Central Africa. In accordance to this network, Cameroon's navy regularly search the high seas off the Atlantic coast of Central Africa for illegal fishing boats.

According to Lieutenant Colonel Emmanuel's report in the South West region of Cameroon, most unauthorized fishing operations in his area are Chinese and the navy have seized six Chinese vessels and crews from China (Moki 2016).

Also, Cameroon coast guards do constant patrol of its waters and borders to respond to the dramatic increase in the number of foreign vessels. Sea patrols and aerial surveillance are conducted occasionally to detect Chinese vessels which have been noted for changing their vessel names to avoid detection and prosecution by local MCS authorities.

CHAPTER 5

Impact assessment of IUU fishing in Cameroon

The impacts of IUU fishing in relation to resource sustainability cannot be overemphasized owing to the fact that, illegal fishing activities are not well addressed and are however an issue and of great concern to national administrations, RFMOs and at the international level (SOFIA, 2002). Even though IUU fishing has tremendously contributed to a great depletion of fish stocks in most maritime regions of the world most especially in the coastal waters of developing countries such as Cameroon, if better international cooperation to control all fishing vessels is being launched with the objective of eliminating IUU fishing activities in the nearest future, it will help deter such illegal fishing practices (WOR 2, 2013). It has been noticed that, a majority of landings that Chinese trawlers can harvest cannot be seen as negligible in relation to the impacts caused on the marine ecosystems as seen below:

5.1 Environmental/ecological impact

Generally, fishing is potentially known to destroy fragile and vulnerable marine ecosystems such as turtles, coral reefs and seabirds wherein the destruction done on these ecosystems tend to reduce future catch opportunities consequently leading to loss of potential economic rent. The negative impacts of Illegal Unregulated Unreported (IUU) fishing cannot be overemphasized as the decrease of fish stocks and the damaging effects on the marine environment are very glaring (MEA 2005a).

Also, the unregulated fishing initiatives which is deemed excessive in nature leads to an overall increase in catch levels and as a result over-exploitation and depletion of fish stocks. The inappropriate utilization of fishing gears and equipment in sensitive fishing areas such as spawning grounds and fish breeding grounds greatly contribute in damaging the marine environment including marine ecology.

However, there are reports from countries like Somalia which reveal an enormous dumping of toxic and poisonous wastes with consequences being the damage of the ecosystems as well as human life most especially when it is washed up on the shore (Ewan Dunn 2005). In Cameroon, pollution is a major source of resource degradation which emanates from chemical pollution,

sewage pollution, radioactive pollution, solid waste pollution and pollution from marine origin (E & D, 2009).

Activities that mostly take place in the sea such as the transportation of hydrocarbons, petroleum exploitation and exploration causing pollution are of marine origin. The discharge of toxic and poisonous substances like oil emanating from activities such as drilling containing heavy metals, which could be amalgamated into the food chain and eventually affecting marine resources and human beings. Prominent regions for such activities are Souelaba, Kribi and Bakassi. Moreover, all other activities which are carried out aboard fishing and transport vessels at sea contribute in one way or the other to environmental degradation of fish resources through pollution with main sources of pollutants such as hydrocarbons (fuel and lubricants), organic compounds, waste water, cleaning and repairs solvents, varied paints from heavy metals, soap and detergents containing phosphates and surfactants (Folack 2007).

Figure 4: Image showing the impact of aquatic life through marine littering



Source: <https://waterjournalistsafrika.files.wordpress.com/2014/07/litter-at-down-beach-limbe.jpg>

Figure 5: Image showing the exploitation and exploration of hydrocarbon in Kribi



Source: https://www.google.com/url?sa=i&source=images&cd=&ved=2ahUKEwi7_42Ehb3kAhVBa1AKHeF_CWcQjB16BAgBEAM&url=https%3A%2F%2Finvestincameroon.net%2Ffr%2Fmines-metallurgy-iron-and-steel%2F&psig=AOvVaw2Agj6mTfQROYkApetfiD6X&ust=1567887817198401

- **Climate change**

The impacts of climate change on marine resources cannot be overemphasized as it affects a diverse amount of fisheries resources. As reported by the IPCC (2001), Africa is highly vulnerable to sea level rise and climate change. Sea level rise results in loss of flora, cities, biodiversity and fauna in coastal and flooded lands most especially in brackish waters (Ibe & Ojo 1994). More so, the current degradation of coastal mangrove ecosystem greatly increases the effects of climate change, which however affect fisheries resources indirectly as a result of the fact that mangroves have a direct link in relation to fish production (WWF, 2005; SNH 2009). In addition, in the South West region where most fishing grounds are located as well as in the Littoral region, fishing camps are greatly affected by sea level rise and wave action which result in increased flooding where there are loss of lives and materials. This impact is very pronounced in the Littoral region where major government installations; schools and homes are being destroyed leaving most of the land area permanently occupied by water (Chiambeng & Holvoet, 2008). Also, this action is very prominent in areas such as Adiata, Barracks and Bamusso of the South West region where many fishermen living in the camps attempt to fight against flooding by building “Make Shift houses” on stilts by using mangrove wood and constructing local bridges that serve as pathways to ease

their movement from one end of the camp to the other (Chiambeng, 2011). From the framework of Dr Fridtjof Nansen done on surveys along the coastline of Cameroon, increase in seawater temperature has been documented in it (Krakstad et al. 2004, 2005, 2006). As a result of the disappearance of certain species, which are very important to the ecosystem, primary and secondary production can be highly impacted (Yaqub, 2000). There is however, a need for consideration in this aspect with regards the sustainable management of resources through intensified research.

5.2 Economic impacts

Various factors such as Gross National Product (GNP), non-payment of license fees, taxes and levies by fishing operators which when not strictly followed up can result in drastic economic effects of the Cameroon's economy. Also, unreported catches in the fishery sectors and illegal transshipments, which take place within Cameroon's EEZ represents a significant loss of opportunities to generate national revenue. In addition, there are other indirect and induced economic impacts resulting from the loss of income and employment in other industries and fishing operation itself in the supply chain upstream and downstream. The demand for fishing gears, boats and equipment as well as other inputs are depressors by IUU fishing from the upstream side. From the downstream side, areas such as fish processing and packaging as well as marketing and transport could however be negatively impacted. Impacts on the demand for consumption goods by fishing families are brought about by associated reduction in fishing incomes. More so, Cameroon's annual export earnings could be greatly reduced by IUU fishing through the non-payment of access dues and local landings which reduce actual and potential export earnings (OECD, 2004).

5.3 Social impacts

Generally, developing countries such as Cameroon, Somalia, Sierra Leone and Liberia, which are vulnerable to IUU fishing, tend to be those with poorer governance institutions and law enforcement. The result of gender issues effects is because of IUU fishing activities, which undermines the rule of law and other social values.

The reduction in biodiversity, productivity and ecosystem resilience are factors which usually contribute to unsustainable impacts by IUU fishing on both target species and the ecosystem which

in turn leads to reduction in food security for artisanal fishermen. For developing countries such as Cameroon, food security is of particular importance in its communities as it greatly depends on fish as its source of animal protein.

Also, decreased employment rates in marine fishing communities is an indicator of social impacts of IUU fishing which has led to negative impacts on stocks and the activities of artisanal and local coastal fishing activities as well as lesser opportunities for new generations of fishermen to participate in fishing.

Another social impact could result from gross and net household incomes. Conflicts with local fishing fleets as well as over exploitation of marine resources may lead to a drastic reduction in household incomes hence exacerbating poverty and hunger which are possible negative impacts on income distribution.

Moreover, gender issues are a great social impact indicator in relation to the employment of women in fishing and fish marketing caused by IUU fishing may negatively impact onshore fishing by women as well as the marketing opportunities for women who in many societies and communities have a very important role to play in basic fish processing and marketing (W.E. Shrank et al., 2003).

5.4 Gaps in IUU fishing in Cameroon

Developing States are among those that undergo the most adverse effects of IUU fishing. Cameroon in particular is lacking in MCS systems since they are less operational in its coastal waters which makes it difficult for effective monitoring and control (MINEPIA report). Below are some of the gaps that are identified by some respondents as far as IUU fishing regulation is concerned:

In the context of Cameroon, the first gap emanates from the fact that, data in the fishery sector is incomplete which results from illegal landings abroad. More so, existing and available data are not well coordinated, centralized and shared between various administrations (FAO, 2007).

Also, cooperation with competent international organizations at the sub regional, regional and global levels which aims at avoiding the over-exploitation and exchange of scientific data for the better management of living resources as provided in Article 61(2) and 61(5) of UNCLOS is not

considered within the context of the present fisheries regime. Specific fisheries research programs and reporting of associated scientific data as spelled out in Article 62 of UNCLOS are yet to be considered.

In general, the fisheries legislation in Cameroon suffers two setbacks which are:

1. Poor implementation; and
2. The non-respect of international instruments

1. Poor implementation

Several reasons account for the relatively low and inadequate implementation of the fisheries legislation by various actors of the competent institutions and respect of its provisions which are:

- The absence of a central crime register, complicating Monitoring, Control and Surveillance (MCS) activities on the field
- Poorly structured and functional MCS
- Insufficient dissemination and vulgarization of provisions to the target population (MINEPIA staff) as well as other administrations and actors of the fisheries sector
- The absence of trained fisheries inspectors who are well equipped and committed to the task
- Poor coordination between the different institutions remarkably MINEPIA, MINTRANS and MINDEF
- Poor sanctioning wherein very few violations have been sanctioned to guarantee respect of the legislation
- The fines to discourage defaulters are too low
- A majority of actors in the fisheries sector declare being ignorant of the provisions and are not even ready to respect the fishery statutes which can be very dangerous to management. Moreover, most of these actors recognize the fact that some gears and illegal practices are banned (MINEPIA Frame Survey, 2009).

2. The non-respect of international instruments

More often than not, the fisheries laws are not in conformity with international principles in relation to the management of marine and aquatic resources, the fight against IUU fishing, high sea fishing and the management of shared stocks. Contrarily, it presents some faintness at the level

of MCS and there is therefore a need for immediate revision of these laws (Giles 2008). These drawbacks are well known and have been highlighted in diverse studies in the fisheries sector (Djama, 1992 & Chiambeng, 2011). However, in an attempt to integrate these drawbacks, the fisheries administration initiated a process for the revision of fisheries law in 2005. This move received a great backing from FAO and a draft proposal was produced for a new fishery legislation which needs to be concluded before promulgation. Furthermore, with the joint efforts of FAO, Cameroon produced an Action Plan which is intended to combat IUU fishing (FAO, 2007). This plan has to be taken into consideration alongside the issues discussed for the revision of the fisheries law in order to produce a final revision of the proposed legislation.

5.5 Best practices in combatting IUU fishing

IUU fishing poses one of the biggest threats to the marine ecosystems as a result of its potential aptitude to undermine national and regional efforts to manage fisheries in a sustainable manner as well as actions for the conservation of marine biodiversity (FAO 2016). For the purpose of sustainability and conservation of the marine ecosystems the following course of actions should be taken by the management of the multi-stock fisheries in Cameroon in order to deter and fight against IUU fishing in its fishing grounds:

- There is a need to protect and regulate fishing on spawning and nursery grounds whenever applicable through the introduction of closed areas and closed seasons based on well-documented scientific data on the biology of all exploited fish species.
- Controlling the average size of fish species caught by limiting the mesh size of innumerable fishing gears.
- In the Cameroon's national EEZ certain limits should be set on the GRT and Horse Power (HP) engines of licensed vessels which carryout fishing. The establishment of a limited entry system needs cautious prior consideration and aid should be sought from FAO. Also, there is a need to control fishing efforts by limiting the number of trawlers, shrimpers, purse-seiners and liners.
- The total catch effort allowed should be determined for foreign distant industrial vessels and there should be an enforcement on this measure by fixing catch quotas as well as having observers on board all vessels, inspectors and marine coast guards who patrol the Cameroon's waters and control any infringements.

- Furthermore, conflicts which often arise between artisanal and industrial fishermen need to be reduced by delimiting fishing grounds based on the depth of zones or a specified distance from the shoreline.
- However, it will be a great deal if regulations with neighboring countries are harmonized whenever necessary. Also, the fisheries legislation should be reviewed and mutually harmonized with those of coastal States so as to meet international requirements.

CHAPTER 6

Summary, recommendation and conclusion

6.1 Summary of findings

As stated in chapter 5 above, the impacts of IUU fishing on the Cameroonian economy is evident and some of the leading causes for these impacts include:

Inadequate tools for management in Cameroon's fisheries sector with regards the control of mesh sizes as well as stating what the minimum size for certain types of species are in a way to prohibit some fishing gears and also limit access to the coastal zones by industrial vessels in the fishing grounds in order to protect and conserve vulnerable coastal and marine resources most especially juvenile fish. Likewise, there is the lack of capacity for limiting authorized access in Cameroon for both the industrial and artisanal fishing sectors (Djama, 1992).

Also, the artisanal and industrial fishermen responded that, there is lack of control of fishing activities in both the industrial and artisanal fishing sectors which leads to fishing in the nursery zones as well as the excessive catch of juveniles. As a result of the degradation of fish stocks, there was a prohibition in the marine environment in relation to the practice of pair trawling by Chinese trawlers in the Cameroon waters since the year 2000.

More so, there is insufficient environmental friendly technology such as BRD and TED as industrial vessels excluding some Time Charter boats are not well equipped. The presence of these environmentally friendly devices will guarantee the sustainability of marine resources (Njifonjou, 2002).

There is equally no mechanism put in place to control fishing efforts and also the regulation of entry and exit of pirate boats in the Cameroon waters. In addition, there is bias in the national catch statistics for fish production which emanate from the fact that catches are landed abroad.

In addition, there is no implementation of closed seasons and also Marine Protected Areas (MPAs) are limited.

However, there is weak control over fishing licensing and no regulation for false declarations. For instance, some artisanal and industrial fishermen responded that, with regards tonnage, there are many fishing vessels which declare false tonnages and equally operate without licenses onboard either throughout the year or for most of the year.

6.2 Recommendations

IUU fishing is one of the biggest threats happening on a global scale and has become very difficult to quantify nowadays. Illegal fishing is and continues to be a very intricate issue requiring multifaceted responses and as a result of this, Cameroon being a coastal developing country which relies heavily on fish resources is amongst the many developing countries which suffer from IUU fishing. As such, the following recommendations will aid reduce the rate at which illegal fishing occurs in west and Central African waters:

Sanctions:

As identified in chapter 4 above, there exist some sanctions in the form of fines to govern and manage the fishery sector of Cameroon but most of these sanctions are not fully enforced. It is therefore recommended that, the government puts in place very severe sanctions in the form of penalties to deter IUU fishing in her waters so as to better conserve and manage her marine living resources.

The absence of severe sanctions against offenders such as Chinese vessels who fail to act according to fisheries laws through the licensing of vessels have become very remarkable. According to Article 30 of the People's Republic of China fisheries law (NPC 2004) "it is banned to go fishing in the prohibited fishing areas or within the prohibited periods... It is banned to go fishing with nets smaller than the smallest size of mesh". Hence, it is evident that the Chinese authorities are very much aware of the alarming problems created by IUU fishing in West and Central African waters but refrain to take responsible actions and apply these laws on their own distant water fleets. It is recommended that, West and Central African countries especially Cameroon should react where there is failure to comply to this article by confiscation of the fishing vessel and prosecution as well as the withdrawal of the offender's license.

Information sharing and co-operation:

Building collaboration and personal relationships amongst countries can help foster proactive co-operation, allow for broadening participation and rapid information sharing as well as the generation of immediate responses. Proper and effective communication by various West and Central African countries will lessen misunderstandings and miscommunications which can block or hinder investigations or sanctions. It is essential to verify and crosscheck the information shared

by other countries for the prevention, identification, investigation and sanctioning of illegal fishing activities and crimes taking place in the fisheries sector.

In addition, proactive interagency cooperation in information flow in the fisheries administration between various countries will allow for better, accurate and systematic information sharing. However, an enforcement in communication capabilities through the use of mechanisms such as Automatic Identification System (AIS) and Vessel Monitoring System (VMS) of west and Central African countries will strengthen information sharing and reporting.

Monitoring Controlling and Surveillance (MCS):

Given the high rate at which illegal fishing practices occur in the Cameroonian waters through the use of inappropriate and banned fishing gears wherein small mesh size fishing gears are widely used as well as explosives and chemicals, which are environmentally unfriendly for the sustainability of coastal marine resources (FAO, 2007), in order to resolve this issue, it is recommended that, MCS be strengthened, incorporated and implemented in the National Action Plan-Illegal Unreported Unregulated (NAP-IUU) of the new proposed fisheries legislation to mitigate IUU fishing in Cameroon in particular and Africa at large.

In addition, the lack of capital resources to invest in MCS authorities by most African countries, augments illegal fishing activities. As a result of this gap, it is recommended that, the Chinese authorities who are part and devoted to the United Nations law of the sea should act by taking responsibility and actions against Chinese vessels which carry out illegal fishing activities in west and Central African waters. By so doing, there will be a tendency and possibility for the achievement of sustainable fisheries.

Technology transfer and sustainable management:

A more rational utilization of production equipment, the construction of necessary infrastructural facilities and the better management of fishing industries and resources will do a great to all fishermen rather than just subsidies. Technological developments such as Fish Aggregating Devices (FAD), improved fuel and diesel outboard engines are recommended for the development and management of artisanal fisheries.

There is a need to update data in the aspects of inventory of all canoe types, fishing gears, number of fishermen and the landing sites along Cameroon's entire coast. It is very important that a revision on the inventory of type of boats, horsepower, all industrial fishing vessels, indicators with regards the nationality of vessels, Gross Registered Tonnage (GRT) as well all fishing gears characteristics and fishing grounds should be done.

More so, boat-owners need financial management skills and techniques to cater for the slender seasons as well as the replacement of some of their capital equipment.

Capacity building:

It is recommended that, coastal state countries together with fisheries authorities organize training sessions such as participation in large-scale maritime exercises, inspection simulations and boarding at sea. Also, training programs for personnel in other sectors such as the transport sectors and others agencies should be done by the fisheries authorities in order to raise awareness on fisheries issues as well as teaching them how to detect and counteract illegal practices. These training programs will give a better understanding of fisheries issues and challenges.

Ratification of the United Nations Fish Stock Agreement (UNFSA):

The UNFSA which was opened for signature until December 1996 was signed by 59 States and entities and taking a glance at the list of parties who have ratified the Fish Stocks Agreement, Cameroon is not a member of this Agreement. It is recommended that, Cameroon and other African countries should find a way of ratifying the UNFSA so as to promote good order in the oceans as well as the effective management and conservation of marine resources under their national jurisdiction.

Increment in Marine Protected Areas (MPAs):

Cameroon as well as other west and Central African countries should increase the number of Marine Protected Areas (MPAs) by creating Exclusive Economic Zones (EEZs) solely for their local fishermen which will improve and allow for the regeneration of environmentally vulnerable spaces for fish stocks. For this to be achieved, it is very necessary to consider surveilling and policing as an integral part in creating progress on the rejuvenation of the marine ecology in the country. An increment in MPA coverage by 30% will fulfill target 14.5 of the 2030 Agenda

whereby, at least 10% of coastal and marine areas, consistent with national and internal law and based on the best available scientific information should be conserved by 2020.

Building trust

More emphasis should be laid on the need for intermediary organizations to act between banking institutions, fishermen and individual operators. For this to be achieved, a strong relationship based on confidence must be built among the fishing community members and there is a need for a good knowledge of fishing and economic operators as well with regards credit repayment. It was remarked that, the artisanal fishing units if well managed can be very profitable economically.

Also, there is a need for the consideration of fishermen as true partners as the assurance of an equal access to the means of production in the financial markets by fisheries administrations.

6.3 Conclusion

To conclude, IUU fishing which has become a more critical situation, continues to give rise to the excessive exploitation of fish stocks hence posing huge impacts on the marine ecosystems, fish resources and livelihoods of the local population. According to the world's statistics, over 75% of the world's fish stocks are already fully exploited and depleted resulting from the intensification of human exploitation of the world's ocean resources which however restricts their ecological capacity to sustainably reproduce. In Africa at large, the sustainability of fish stocks is threatened as one in four fish is caught illegally hence damaging the marine ecosystem and depriving the governments of income and the local communities of their livelihoods.

However, in Cameroon particularly in the Southwest region, fishing is a main source of income and protein but this sector has experienced a drastic decline of a greater portion of its fish stocks which are caught by Chinese fishermen beyond their capacity to sustainably reproduce leaving its waters almost empty which in one way or the other results to conflicts between these fishermen and the local communities. These illegal fishing activities, if not well managed, will continue to pose a great threat to marine resources consequently leading to the collapse of the marine ecosystems not only to the present generating but the upcoming ones as well. In addition, many illegal fishermen do not comply with fishery laws and have a high volume of under reported catches which results in a decline in fish stocks and incomes of fishermen as well as local communities who depend on fishing as a source of livelihood.

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Appendices



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a specialized agency of the United Nations

Consent Form for Research Questionnaire

I volunteer to participate in a research conducted by Ms. Mbotiji Noella Njeuyap from the World Maritime University. I understand that, this questionnaire is designed to gather information about an Impact Assessment of Illegal Unreported Unregulated (IUU) in Central Africa as a step towards sustainability in Africa's fishing industry case study: Cameroon.

1. I,voluntarily agree to participate in this research study.
2. I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
3. I understand that I will not be paid for my participation.
4. If, however at any time I feel uncomfortable in any form during this research, I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
5. I understand that, all information I will be provided with for this piece of research work will be treated with confidentiality.
6. All data gathered in this study is confidential and anonymous with respect to my personal identity unless I indicate otherwise. I grant permission for the use of this information for dissertation. I also grant permission to use one of the following (*please select one*):
 My full name My first name only A pseudonym
7. I understand and hereby give permission that the data collected will be used in connection with writing a dissertation. I have the right to review, comment on, and/or withdraw information prior to the paper's submission and presentation.

8. I understand that this research study has to be reviewed and approved by the Research Ethics Committee (REC) of the World Maritime University and that I may contact my research supervisor with any questions I may have.

9. I have read and understood the explanation provided to me. I have had all questions answered to my satisfaction, and I voluntarily agree to participate in this research study.

10. I have been given a copy of this consent form.

The access to the transcript will be limited to researchers and academics involved in the research. All research data collected will be archived on a safe drive. All the data will be deleted subsequently upon completion of the research.

Signature of Participant

Date

I believe the participant is giving informed consent to participate in the study.

Mbotiji Noella Njeuyap

Researcher

29th May 2019

Date

RESEARCH QUESTIONNAIRES

Questionnaires to fishermen and other stakeholders for a research study to be submitted to World Maritime University (WMU) as a Dissertation in Partial Fulfillment of the requirement of a Master's Degree in Ocean Sustainability Governance and Management (OSGM)

- 1) Gender 1. Male 2. Female
- 2) Age of respondent 1. 18-30 2. 31-40 3. 41-50 3. 51-60 4. 61 and above
- 3) Educational background 1. Primary 2. High school 3. Technical education University 4. No education
- 4) Occupation of respondent 1. Public servant 2. Artisanal fisherman 3. Fisher mongers 4. Unemployed 5. Student
- 5) Have you heard of IUU fishing 1. Yes 2. No
- 6) What are some of the impacts of IUU fishing on the Cameroonian population?
1. Environmental impacts 2. Economic impacts 3. Social impacts
- 7) Which country/nationals are most prominent when it comes to illegal fishing practices and violations 1. Chinese 2. Nigerians 3. Ghanaians 4. Equatorial Guineans 5. Others if any
- 8) What are the methods used by other nationals in illegal fishing practices and violations?
1. DDT 2. Petrolling 3. Illegal nets 4. Others
- 9) Which ministry in your opinion is responsible for monitoring illegal fishing practices in the fishing industry 1. Ministry of fishery 2. Ministry of transport 3. Ministry of environment
- 10) Why is IUU fishing rampant in most African fishing grounds nowadays?

- 11) How are fishermen and the population coping with IUU fishing?

12) What local policies and regulations are in place to manage fishing practices in Cameroon?
