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Effectiveness of catch documentation schemes in Ghana's fisheries and their role in deterring IUU fishing

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Effectiveness of Catch Documentation Schemes in Ghana's fisheries and their role in deterring IUU fishing.

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Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): **.....**

(Date): 20/09/2022

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Ecclesiastes 3:1 "there is a time for everything, and a season for every activity under the heavens"

I would first want to thank the creator of life for protecting me through the changing seasons and endowing me with the intellect to navigate all the tricky academic and social challenges that have come my way.

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Abstract

Title of Dissertation: Effectiveness of Catch Documentation Schemes in Ghana's fisheries and their role in deterring IUU fishing.

This is a comparative analysis between Ghana and Namibia with the FAO Voluntarily Guidelines on Catch Document Schemes (VLGCDS) as the reference standard.

Non-probability sampling techniques such as Purposive, snowball sampling and a stakeholder analysis were undertaken to identify respondents for this qualitative study.

Incorporating evidence from semi-structured interviews and desk review, this research finds that while both countries have been successful in implementing an effective CDS for the Tuna sector, the demersal sector in Ghana has room for improvement. The findings show 88% ($US 150 million) of fish export in Ghana is from the Tuna sector (Maale-Adsei, 2015) owing to its perceived economic value on the international market. However, the findings argues and debunks the erroneous impression of the demersal sector not being economically viable. Evidence from Namibia indicates that more than 75% ($US 581 million) of its exports are from the demersal sector (MFMR, 2020). While 50.3% Namibia fish exports are to Europe (Spain), it uses the INFOPECHE platform to find alternative markets in Africa for its demersal species without overly relying on markets in Europe, Asia and North America (MFMR, 2020).

The study concludes that, for the CDS particularly in the demersal sector to work effectively, Ghana needs to fix problems of economic incentives for employees, technical capacity, legal loops and implementation challenges.

However, the research ends with recommendation for Ghana to undertake a structural and policy reforms to refocus attention onto the demersal/trawler sector. This will help address issues of the observers, port inspectors, sustainable financing and all the implementation challenges identified as part of the research.

KEYWORDS: Tuna, fishery, trawler sector, financing, effectiveness, sustainable and observer

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List of Abbreviation

CCAMLR ……. Commission for the Conservation of Antarctic Marine Living Resource

CCSBT……Commission for the Conservation of Southern Bluefin Tuna

CCU……Catch Certification Unit

CDS…… Catch Documentation Scheme

COLTO……Coalition of legal Toothfish Operators

DDT..……..Dichloro Diphenyl Tricholoroethane

EU…….European Union

FC…….Fisheries Commission

FOA……..Fisheries Observer Agency

FSSD……Fisheries Scientific Survey Division

GCDS…….....Ghana Catch Documentation Scheme

GITA……Ghana Industrial Tuna Association

ICCAT…….International Convention for the Conservation of Atlantic Tuna

ILO…….. International Labour Organization

IMO …….. …….International Maritime Organization

INFF…… Integrated National Financing Framework

IUU……. Illegal, Unregulated and Unreported

KDE……... Key Data Element

MCS……. …….. Monitoring Control and Surveillance

MoFaD……Ministry of Fisheries and Aquatic Development

MFMR……Ministry of Fisheries and Marine Resources

MoFEP …… …Ministry of Finance and Economic Planning

MSC……....Marine Stewardship Council

NatMIRC……National Marine Information and Resource Centre

NGOs ……..... Non-Governmental Organizations

NPOA…….National Plan of Action

PHU …….. Post-Harvest Unit

PSMA ……Port States Measures Agreement

RFMOs……...Regional Fisheries Management Organizations

SDGs……..Sustainable Development Goals

UN……..United Nations

VLGCDS …….....Voluntarily Guidelines on Catch Documentation Scheme

VMS……. ……Vessel Monitoring System

WARFP……West Africa Regional Fisheries Programme

INTRODUCTION

1.0 Global and Sustainable fisheries

Fishing is a common sight in coastal areas all over the world (FAO, 2022). It is responsible for the employment over 600 million people and critical for the food security of many others (FAO, 2022).

In 2018, global fish production in capture fisheries was estimated 96.4 million tonnes but experts say the figure could be a lot higher if discards are taken into account (FAO, 2020).

According to the FAO's State of World fisheries and Aquaculture 2022 report, about 34.2 % of global fish stocks are overfished. Overfishing is exacerbated by the growing demand for fish and fish products worldwide (Cullen-Knox et al, 2020). In a bid to meet global demand, fishers have resulted to applying unethical methods to harvesting fish and many coastal states introducing economic subsidies to stimulate production (Bellman et al, 2016). This has seen an increase in unrestricted access to fishing sites thus unwittingly promoting overfishing. The cumulative effect of this is that, certain targeted species are exploited far beyond sustainable levels and in some cases there is legitimate concerns they may never recover (Pires and Moreto, 2017). For example, after more than 30 years of the depletion of the Atlantic Cod stocks in Newfoundland-Canada, stock levels remain low in spite of several conservation measures taken by the provincial government (Rice, 2018). Notwithstanding, there is demonstrated evidence that the application of the right conservation measures does lead to fish stock recovery. A recent study carried out by Hilborn et al (2020), using data accounting for 49% of all fish catch between 1990 and 2016, demonstrated that great fisheries management largely assures a healthy fish population. This position aligns with the *theory of compensatory dynamics* which states that depleted populations should recover when the threat responsible for their decline is removed (Keith and Hutchings, 2012). Aside the depletion of stock through high fishing effort, climate change is also causing changes in the population and spatial distribution of many commercial fish stocks, leading to overfishing (Burden & Fujita, 2019). It has also led to conflicts due to changes in fisheries access

and in the allocation of fishery benefits (Burden& Fujita, 2019).
Despite the negative impact of climate change, there is also evidence to suggest it has contributed immensely to the recovery of Bluefin Tuna stocks as stocks migrates up north into Greenland waters due to more warmer temperatures (Mackenzie et al, 2014).

1.1 Sustainable Fisheries and Sustainable Development Goals (UN SDGs 2030)

The UN SDGs is a multi-lateral agreement signed onto by the international community in 2015 to help in the global transformation towards attaining environmental, economic and social sustainability (Virto, 2018). UN member States showed a great determination to take courageous measures to transition the globe onto a sustainable landscape when adopting the UN SDGs (FAO, 2020).
This SDG has defined targets and objectives to find solutions to some of the immediate, medium and long-term threats to the sustainability of the ocean. As already alluded to in the previous section, in 2020, the global fisheries and aquaculture industry employed about 600 million fishers and many more along the value chain (FAO, 2022). Of this number, 79 % were men with women representing the remaining 21% (FAO,2022).This underscore the value of the sector to help bridge the gender gap and inequality in the workplace as well as help alleviate hunger, poverty and malnutrition(Farmery et al, 2021). In addition, sustainable management of global fisheries will guarantee decent work for fishers and promote the need to take action against climate change as stipulated under Goal# 8 and 13.

1.2 Global Status of IUU Fishing

IUU fishing is a lingering challenge that has created and raised serious concern about the sustainability of the world fisheries (Petrossian, 2015). Its cost to the global economy is estimated between $10-23 billion per annum and West Africa alone is responsible for $ 7.15 billion of the global loss (Garcia et al, 2021). In 2018, the devastating effect of IUU fishing accounted for 11-26 million tonnes (FAO, 2018).

This volume, as noted by the FAO, is equal to 816 kg of marine captured fish per second (FAO, 2020).

Some environmentalist suggests approximately 30% of global marine fish production could be classified as IUU fishing and valued between $5 billion euro and $20 billion by the outset of the century (Borit and Olsen, 2012).

Unfortunately, it has been difficult to find effective solutions to IUU fishing because of its complex nature and ability to circumvent robust conservation measures put in place by national, regional and global organizations to manage fisheries in a sustainable manner. This gave reasons for the Former UN Secretary-General Kofi Annan to describe IUU fishing as '*organized theft disguised as commerce'* (Petrossian, 2019). It has the capability to explore the weaknesses of corrupt officials especially those in developing countries that lack the technology, logistics and manpower for a coordinated and comprehensive MCS program (Morake, 2020). This demonstrates a strong correlation between the prevalence of IUU fishing and poor governance indicators of developing states and so it's no coincidence that the hardest hit areas are the developing countries where legislations are not robust and enforcement are virtually non-existent (Long et al, 2020). West Africa, the Caribbean and the Coral Triangle have been identified as the hotspots for this unscrupulous activity which is increasingly eroding the fisheries resources of the world (Haelein, 2017).

1.3 Chronology of international legal frameworks designed to tackle IUU fishing

Below is a chronology of important events in the evolution of international fisheries regimes.

Table 1 List of international legal instruments related to IUU Fishing and CDS

International Instrument	Year Adoption	Year of enter into force
United Nation Convention on the Law of the Sea	10th December 1982	16th November 1994
Compliance Agreement	November 1993	24th April 2003
United Nations Fish Stocks Agreement (UNFSA)	4th August 1995	11th November 2001
Code of Conduct for Responsible Fishing	31st October 1995	N/A
The International Plan of Action for the Management of Fishing Capacity (IPOA-Capacity).	June 1999	N/A
The International Plan of Action on Illegal, Unregulated and Unreported fishing	2nd March 2001	N/A
FAO Port State Measures Agreement	22nd November 2009	8th June 2016
Cape Town Agreement	2012	*Expected 11 October 2022*
Voluntary Guidelines on Catch Documentation Schemes	July 2017	*N/A*

These laws are particularly encouraged to be incorporated into domestic fisheries laws, so that the international effort is legally coordinated among the international community and the RFMOs. Collaboration among countries, UN organizations (FAO, IMO, and ILO) and civil society have been pivotal to the global response to IUU fishing particularly in areas such as data sharing, scientific information gathering and MCS operations.

1.4 Status of IUU fishing in Ghana

There are no official figures and literature on the extent of impact of IUU fishing on the economy of Ghana but conservative estimates indicates that it runs into millions of dollars. IUU fishing in Ghana in the industrial sector largely occurs through transshipment of fish catch at sea within and outside the Exclusive Economic Zone. Other prohibited methods such as light fishing, use of explosives and chemicals including Dichloro-Diphenyl Trichloroethane (DDT) are also widely used particularly in the artisanal sector. These methods are outlawed in Section 88 and 132 of the Fisheries Act 625 of 2002 and prescribes sanctions for offenders.

1.5 Problem Statement, Aims and research questions

In spite of the aforementioned sanctions in the Fisheries Act, Ghana has been warned twice by the EU for exporting IUU fish and its products onto its market in the last 10 years (Song et al, 2020). In response, Ghana has taken the necessary steps in concert with the EU to reform portions of its fisheries management strategy and incorporate measures such as:

(i) reforms of the fisheries legislative framework,

(ii) adoption of a national plan of action against IUU fishing (NPOA-IUU fishing),

(iii) adoption of a fisheries management plan and

(iv) Strengthening of our MCS.

As part of the restructuring exercise intended to minimize IUU fishing in Ghana's waters, adopted an NPOA-IUU fishing in 2014. Key element of this plan was the introduction of the **Catch Documentation Scheme.** This scheme was modeled after the Voluntary Guidelines on Catch Documentation Scheme and the ICCAT CDS, primarily because of Ghana's association with the FAO and also its membership with ICCAT. The specific goal of the CDS is to act as a "tracking system that monitors the fish from point of catch through to its final destination preventing the entry of IUU fish products into the market" (Siriraksophon et al, 2017). However, since its introduction, no performance review has been carried out to assess the effectiveness of the measure. This research seeks to assess and evaluate the performance of

Ghana`s CDS relative to the FAO Voluntarily Guidelines on Catch Documentation Scheme (VLGCDS) and the CDS implemented by Namibia. To this end, a combination of document review and analysis was combined with interviews with key government representatives and the fisheries stakeholders from both Ghana and Namibia. Thus, these data collection methods will help answer the research questions below:

1) How compatible is Ghana's CDS with FAO voluntary Guidelines on Catch Documentation Scheme and other international legal framework?

2)What are the challenges that hinder an effective CDS?

3) How can a CDS contribute to Ghana's long-term goal of developing its own Catch Certification Scheme (CCS)?

2.0 LITERATURE REVIEW

2.1 Catch Documentation Schemes (CDS)

Catch Documentation Schemes is officially defined by the FAO as "A system that tracks and traces fish from the point of capture through unloading and throughout the supply chain (Andre V., 2018). A CDS documents and validates the source of the harvested fish and ensures that the fish catch is caught in a sustainable way compatible with local, national and international regulations (Ma X., 2020). Generally, the primary aim of CDS is to prevent, deter and eliminate IUU fishing by truncating all entry points to prevent fish from IUU sources from reaching legitimate seafood markets (Hosch G., 2018). This underscores CDS as a trade-based governance mechanism, which could be used by individual States, Regional Communities including the Economic Community of West African States (ECOWAS) and Regional Fisheries Management Organizations (RFMOs) (Hosch G., 2018). In a bid to ensure the traceability of fish and fishery products, the scheme could assume several forms and is often a crucial element of eco-labels and Catch Certifications that must provide data about the origins of fish caught (Ma X., 2018).

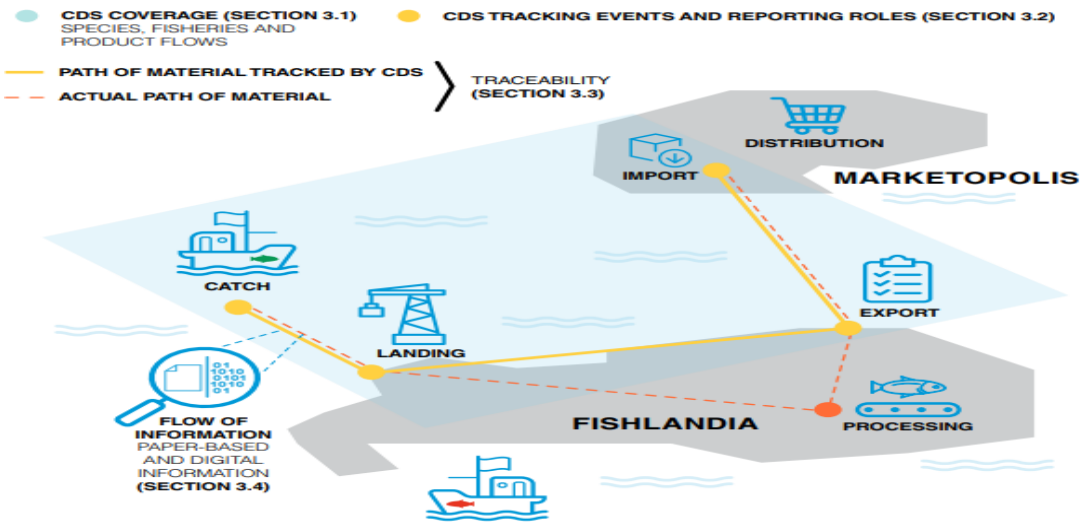


Figure 1BEST PRACTICES AND FAO VOLUNTARY GUIDELINES FOR CDS (VGCDS)

Source:FAO (2022)

2.2 International best practice and key requirements of the FAO VLGCDS

For a CDS to meet the global gold standard set out in the VGCDS, it needs to encompass four key elements: Coverage, Digitization, traceability as well as Documentation and validation.

2.2.1 Coverage

Coverage is arguably the most fundamental component of a Catch Documentation Scheme design. CDSs established across the world are essentially defined by the type, number of species or fishery it encompasses as well as the end market destination (be it international export only, domestic market or both).

2.2.2 Documentation and Validation

According to the VGCDS, a scheme operating under best practices has documentation and validation roles it needs to fulfill for both catch and trade. Documentation and Validation in a CDS often involves recording all activities in the supply chain (both catch and trade documentation) for the purposes of monitoring, stock assessment or eliminating IUU fishing. To achieve the purposes mentioned above, a robust CDS that operates under best practices needs to exhibit the following:

2.2.2.1 Responsibility for Oversight

Under best practice, documentation provided by fishers or exporters are usually audited and authenticated by a government authority independent of the parties directly involved in filling out the forms to ascertain the validity of the data
If the government authority identify irregularities in the documentation, sanctions may be applied and this varies from country to country or RFMO to RFMO.
In addition, verifying the documentation may not be for only accepting or rejecting fish heading into the international or domestic market but will also help establish patterns in IUU fish trade, methods used in conducting IUU fishing and identify general systemic problems in the CDS.

2.2.2.2 Penalties for Improper Documentation

Every CDS either national or RFMO-based indicates that fish export consignment without the required documentation will not be allowed to land or traded.

2.2.2.3 System Learning and Improvement

Every CDS must provide for a period of performance review and evaluation. This enables the scheme to make the necessary adjustments if certain component of the supply chain are not working at the optimum level. At the moment, the only scheme with a performance review program is the CCSBT Catch Documentation Scheme.

2.2.3 Traceability

"Traceability is defined as the ability to trace the history, application or location of an entity by means of recorded identifications" (Olsen and Borit, 2013). It is the process of monitoring the distribution of catch through the supply chain to prevent laundered catch from reaching both a domestic or international seafood market. RFMOs and countries implementing a Scheme under best practices often have these attributes below:

2.2.3.1 Document Security

Unique number is possibly one of the most fundamental security features used to identify fraud, misrepresentations or forgeries. Thus, it has become a very common security feature on catch documentation certificates for most RFMOs and unilateral schemes.

2.2.3.2 Check of Catch Conditions

CDS operating under best practices have Key Data Elements (KDEs). Key data elements ensures that fish catch or activities are consistent with the provisions of domestic and international law. Key Data Elements such as location, gear types and dates of catch are instrumental in knowing all activities related to the catch.
On the trade or export side of the CDS, KDEs helps in knowing the destination of the fish/fish products, origin of catch and transhipment information.

2.2.3.3 Check of Catch Amount and Species

Another very important function of CDS often required under best practice is the provision of accurate fish weight estimates. CDSs whose primary function is document quantities for trade usually collect data only on net weight. However, CDSs whose modus operandi are centered on accuracy of data for statistical purposes, often estimate the entire weight. It may be important to permit a little variation in estimated weight before landing of catch and verified weight after landing of catch.

2.2.3.4 Check of Vessel Authorisation

Under best practice, vessels without valid license and the requisite documentation should not be allowed to operate or offload their catch.

2.2.3.5 Control of Fish Mixing

Finally, under best practices, traceability purposes does not permit the mix up of fish catch from IUU fishing sources with legally documented or certified fish.

2.2.4 Digitization (ELECTRONIC DOCUMENT SYSTEMS (e-CDS)

The use of electronic means to collect and document data has increasingly become a best practice in recent years. It has almost been adopted by all RFMOs and a lot of unilateral schemes are also introducing it in their jurisdictions.

Digitized systems have several benefits over the traditional paper-based method that has characterized marine fisheries data collection for many decades and these include:

a) It helps increase efficiency and productivity of officials.

b) It helps reduce data fraud and forgery.

c) it helps in acquiring high quality data in real time.

d) it reduces the inevitable fallibility of human beings to mistakes, wrong data entry and corruption.

e) it enhances data and intelligence sharing among relevant stakeholders.

2.2.5 EXAMPLES OF RFMOS OR UNILATERAL CDSs UNDER BEST PRACTICES WITH DEMONSTRATED EVIDENCE OF EFFECTIVENESS IN MITIGATING IUU FISHING

2.2.5.1 ICCAT

ICCAT developed and implemented its CDS to deter IUU fishing which was largely due to underreporting of catch by vessel operators with valid licenses. About a decade ago, global stocks of Atlantic Tuna were on the brink of collapse. It was estimated that the underreporting of catch by some ICCAT contracting States exceeded the total allowable catch by as much as threefold.

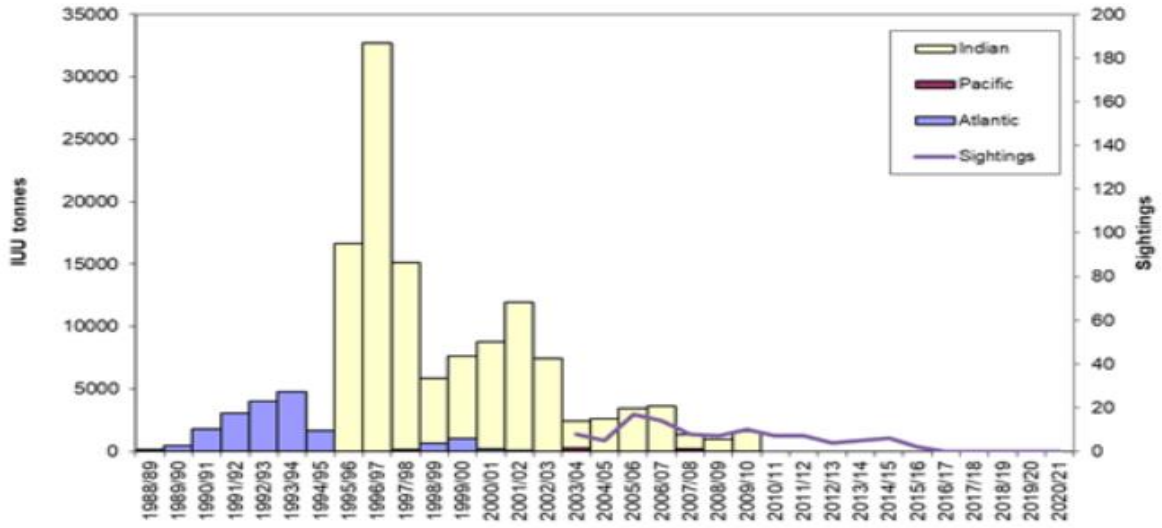
However, since the introduction of the ICCAT CDS, there is data to provide evidence of the effectiveness these CDS to curb the perennial underreporting from fishing vessel operators.

2.2.5.2 CCAMLR

In CCAMLRs catchment area, illegal fishing of Toothfish appeared to be the most concerning problem. IUU fishing related to Toothfish was believed to be approximately twice the official catch data in the 1990s before the Catch Documentation Scheme was adopted.

In 2015, Toothfish catch related to IUU fishing had declined to just 6% of total catch per annum according to the Coalition of Legal Toothfish Operators (COLTO).COLTO largely attributes the drastic decline in IUU fishing cases to introduction of the CDS.

Figure 2 Estimates of IUU catches of toothfish made by CCAMLR



(Source: CCAMLR, 2021)

From the graph it is evident that since the introduction of the CDS 1999, there has been a decline in illegal toothfish catch in the Atlantic, Pacific and Indian oceans. By 2010/2011, the graph points to zero cases of Tooth fish IUU fishing cases in all three oceans under CCAMLRs operations.

Sightings of IUU fishing in the CCAMLR zone has also reduced to zero by 2016/2017.

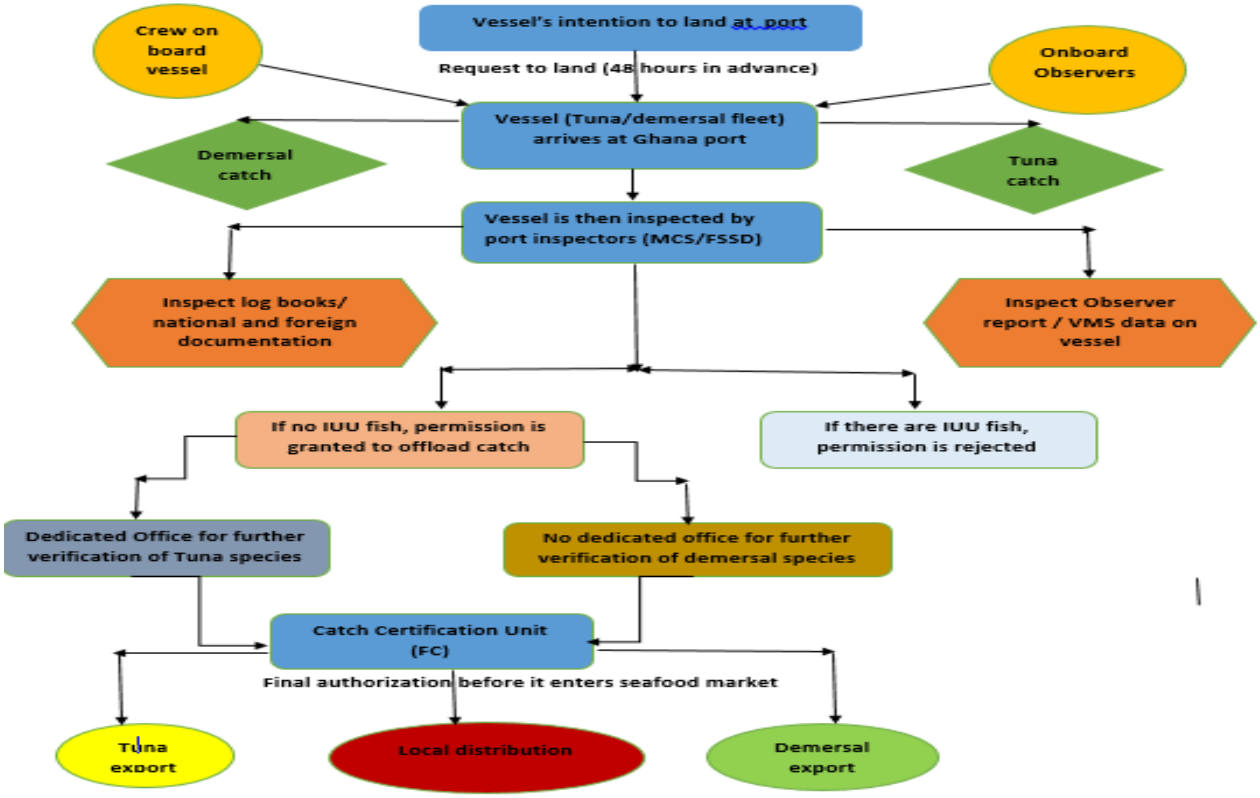
2.2.5.3 EU IUU Regulation

The European Union card system was adopted in 2010 and has resulted in structural changes in the fisheries governance set up in especially third party developing states such as Solomon Island, Belize and Guinea. This EU system has brought the issue of IUU fishing to national consciousness pressuring domestic governments and regional blocs to take decisive actions to safeguard socio-economic and ecological interest of citizens. In addition, the EU system has also provided a blueprint that big fish import States including Japan, China and the U.S could adopt to curb global IUU fishing. Finally, it pressurizes IUU fishing perpetrators to comply with national and

international conservation measures so that their fish/fish products could be allowed onto the EU single market.

2.3 Ghana's Catch Documentation Scheme (GCDS)

Figure 3 flowchart summarizing the Tuna and Demersal CDS



In Ghana, the Tuna and demersal fishery have two similar but different CDSs with ICCAT and national requirements respectively.

The both schemes begins with the placement of fisheries observers onboard the vessel to observe and document activities at sea. These activities usually include documenting transhipment activities, fuel bunkering and catch sampling (length-weight analysis, number and type of fish species).

It is worth mentioning that both the observers and the vessel managers on both trawler and tuna fleets are expected to collect independent catch data to ensure there is no underreporting of catch. Vessel operators usually fill logbooks (See Annex B1).

After fishing expedition, the vessel sends a *request to land information* to MCS

officials stationed at the Tema or Takoradi ports, 48 hours before arriving at the anchorage. Once the request is approved the vessel comes into a dock. The vessel is then inspected by both MCS and Fisheries Scientific Survey Division (FSSD) officials. Inspections often center on licenses, catch documentation and log book information. The catch information is then run against the data from both the onboard observers and the Vessel Monitoring System to ensure accuracy and underreporting.

If it is a foreign vessel, officers run a background check with the flag state to determine if the vessel is duly registered with it or whether the vessel has any history of IUU fishing.

When nothing illegal is found, the vessel proceeds to off load its catch and officials subsequently authorizes it to prepare a landing certificate. It is at this stage that the Tuna CDS greatly differs from the Trawl CDS in procedure. While landing certificates from the Tuna vessel is sent to the MCS Unit and FSSD for further checks for data accuracy and compliance with national and international regulations, the Trawler operators proceed directly to the Catch Certification Unit of the Fisheries Commission to get their consignment ready for export. NB: the Tuna catch goes through one more verification procedure that the Trawler fish is not subjected to.

With respect to the Tuna vessel, if nothing untoward is identified, officials by the MCS and FSSD office then send a *Memo of approval* concerning the consignment to the CCU to confirm that all due diligence have been carried out after auditing all documentation.

At the CCU, the Tuna Vessel is expected to fill the *EU Community Catch Certificate form* (See Annex B3) because virtually all Tuna catch from Ghana goes to the EU market. Catch coming from small scale fisheries/ artisanal sectors fill the *simplified Catch certificate form (Annex B5)* and Tuna stock imported and sold to processing companies such as Cosmo and Pioneer Food Cannery and re-exported after value addition is made to the fill the processing statement/ Annex IV (Annex B4). These forms along with the transhipment report and the landing certificate are added to the

shipment to enable officers at the end market destination to trace and determine the source of the fish.

2.4 Namibia CDS Process

The Namibia just like Ghana implement both the ICCAT and the VLGCDS CDSs for Tuna and Demersal species respectively. For Tuna, it seeks to prioritize the albacore whiles it prioritizes seven demersal species namely; Hake, Horse Mackerel, Monk, Pilchards, Rock Lobster, Orange Roughy and Red Crab (Akawa and Nashima, 2013).

In Namibia, unlike in the case of Ghana, two observers are placed on each vessel either Tuna or Trawl (Ndara, 2015). These observers from the Namibia Fisheries Observer Agency (FOA) are expected to monitor and record activities at sea from recording catch to transhipment activities.

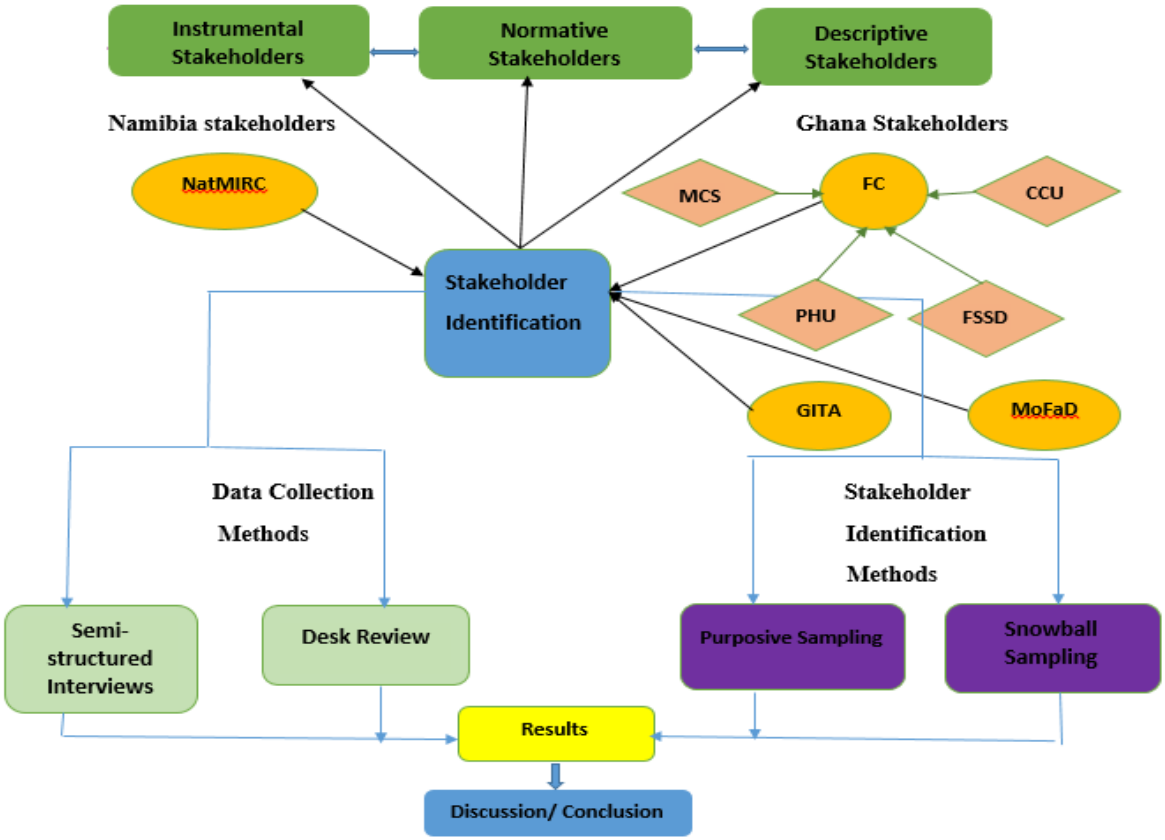
After the fishing trip, the vessel sends a message to officers/ port inspectors from NatMIRC stationed at the Lüderitz and Walvis Bay ports. When the vessel arrives, the captain declares the log book/sheet for inspection. ICCAT has a specific logbook on all Tuna Vessels in Namibia that is filled and declared at the port on arrival. After the initial inspection by competent authority, data is sent to Ministry of Fisheries and Marine Resources of Namibia (NatMIRC) for further verification. While there, this information is run against the VMS and observer data to ensure no underreporting and elimination of catch deemed coming from IUU fishing sources.

If no illegality is found, vessels carrying catch from foreign vessels meant for re-export is made to fill the processing statement while consignments meant for exports are made to fill the catch certificates.

Both of these documents have key data elements necessary for easy traceability such as: a)Unique serial Number b)Vessel Name c) IMO/Lloyd’s number d)Total catch landed weight (kg) e) Fishing License Number f) Species g) product code and h) catch area and dates.

3.0 METHODOLOGY

Figure 4 Flow diagram summarizing the research methodological process



3.1 Stakeholder mapping

A stakeholder mapping was carried out to identify relevant stakeholders for the research based on the following criteria:

1) How relevant are these stakeholders to the effective implementation of the scheme?

2) What is their level of involvement and influence relative to the implementation of the scheme?

3. What is the level of interest of the stakeholders relative to the implementation of the scheme?

4) What is the source of the power of the respondent or stakeholder?

5.What benefits does the stakeholder gain from the scheme?

Using the method in fig.6 below, the stakeholders were mapped on a scale of 1-10 for both vertical and horizontal axes on the matrix. Stakeholders with high numbers (above 5) for both influence and interest were categorized as *instrumental stakeholders*. Those with average mark of 5 for both influence and interest were referred to as *normative* and those below 5 are seen as *descriptive*.

Instrumental Stakeholders are individuals or groups considered indispensable or "without whose support the organisation would cease to exist" (Bowie, 1988: 112). Usually, stakeholders identified within this category are few and considered very critical because of their influence and stature within the organization they represent. It is often members of the top echelon of the organization. Example is the Director of Marine Division of the Fisheries Commission and the Deputy Director at the Ministry of Fisheries and Aquaculture Development. The secretary of the Ghana Industrial Tuna Association and Director of the Catch Certification Unit also falls within this category.

Normative stakeholders on the other hand are defined as "any naturally occurring entity that is affected by organizational performance. Most entry to middle level officers within an organization fall within this category. They are not the final authority but plays a crucial role in the smooth running of the organization. With Normative stakeholders they are broad and there are mostly many of them to choose from. ". Example of such stakeholders are the fisheries officials at the various departments within the Fisheries Commission.

The last category are referred to as the descriptive stakeholders. These stakeholders are not often part of the government machinery but are private actors with personal interest in how fisheries resources are managed. Example, though the Secretary of the Tuna association is categorized as instrumental, though his organization is generally deemed descriptive.

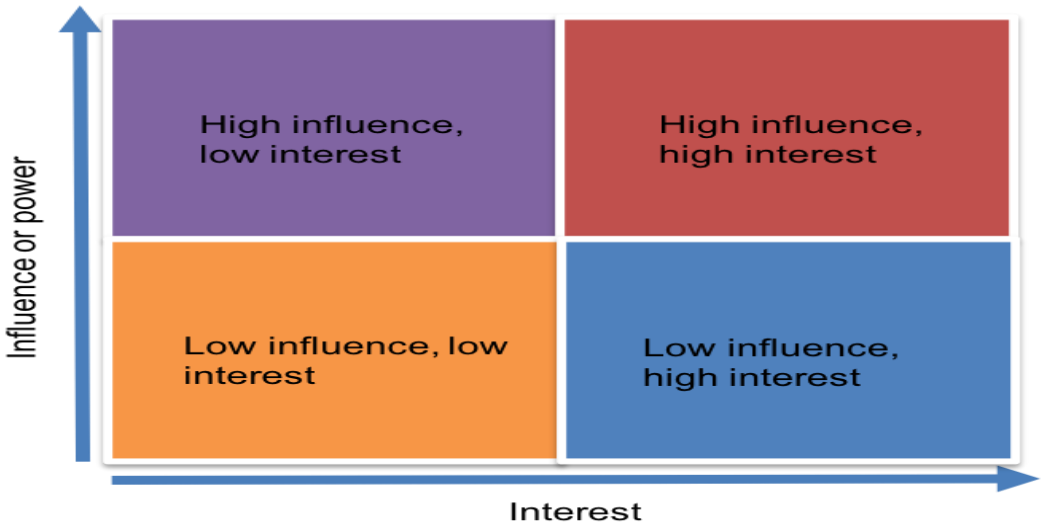


Figure 5 Method used for Ghana CDS stakeholder mapping

Table 2 Stakeholder analysis table

Stakeholder group	***Nature of interest***	***Potential research impact***	***Relative importance of interest***	***Importance of group***	***Influence of group***
MoFaD	Elimination of IUU fishing	High	High	High	High
FC(Marine Division)	Effectiveness of the CDS	Medium	Medium	High	Medium
CCU	Prevention of IUU fish from being exported	Medium	Medium	Low	Low
PHU	All post-catch activities	Low	Low	Low	Low
MCS	Compliance with regulation	Medium	Low	Medium	Medium
FSSD	Statistics and fish stock assessment	Medium	Low	Medium	Medium

GITA	Economic interest through export of Tuna	High	High	High	Medium

3.2 Sampling Methods

3.2.1 Purposive Sampling

Purposive sampling is one of the sampling methods used to identify which individuals and from which organizations should be interviewed. “Purposive sampling also known as judgmental, selective or subjective sampling, reflects a group of sampling techniques that rely on the judgement of the researcher when it comes to selecting the units (e.g. people, case/organisations, events, pieces of data) that are to be studied”(Sharma, 2017). So respondents were chosen based on my own assessment of their value, involvement and interest in the formulation, adoption and implementation of the scheme.

3.2.2 Snowball Sampling

This is also a non-probability sampling method where interviews of already identified informants trigger the need for the recruitment of new informants to provide perspectives previously unthought-of. Example, the initial sample size did not include GITA but a snowball effect meant I had to interview this organization to give a broader perspective on the situation to be able to arrive at an unbiased conclusion.

3.3 Methods of Data Collection

3.3.1 Desk review

Data collection was also collected through desk review of key peer reviewed articles and grey literature primarily the FAO Voluntary Guidelines on Catch Documentation Scheme, RFMOs CDS and Namibia’s CDS.

3.3.2 Semi-structured Interviews

In all 19 key informants were interviewed using an open ended semi-structured interview. 15 of these respondents were functionaries within the Ghana fisheries governmental structure and the remaining 4 from the (NatMIRC). All interviews were recorded with the permission of respondents, transcribed and coded to ensure anonymity of the respondents.11 of the 15 interviews in Ghana was through Zoom meeting with 4 through phone calls whiles all 4 of interviews in Namibia was through face-to-face.

3.3.2.1 Inter-rater reliability

It is worth mentioning that the data collected from Namibia was done on my behalf by Ms Suama Mundjego. Ms Mundjego is an officer of NatMIRC with 10 years' experience in matters related to fisheries management and aquaculture.

To ensure myself and Ms Mundjego were coordinated in our approaches, we undertook an inter-rater reliability test to ensure we had the same capacity to conduct the interviews. The test was based on the following criteria:

Table 3 Criteria for assessing the inter-rater for the Namibia data collection

Criteria	*Grade*
Knowledge of the VLGCDS and international best practices	Excellent
Familiarity of the Namibia CDS	Excellent
Capacity to identify when to ask follow-up questions when the need be.	Very Good
General knowledge of the Namibia industrial fisheries sector	Excellent
Academic and Professional Competence	Very Good
Ability to identify the key informants	Excellent

3.4 Ethical Considerations

Research instruments such as interview questions were cleared for ethical appropriateness by the WMU Ethical Review Committee, through appropriate assurances of anonymity/confidentiality and the ensuring of no harm to respondents

4.0 RESULTS

As already alluded to in the methodology, semi-structured interviews were used to gather data from key respondents in both Ghana and Namibia. However, the recurring themes or patterns are catalogued in Table 5 below. These themes were instrumental in answering the overarching research questions.

Table 4 List of themes from the interviews

NUMBER	***THEMES***
1	***Alignment of CDS with international best practice***
2	***Data Collection and technical capacity***
3	***Conflict and overlap of function***
4	***Incentives and motivation to implement***
5	***Lack of Economic incentives***
6	***Logistical and Practical Challenges***
7	***Long-term vision for sustainability***

In answering question 1, *how compatible is Ghana's CDS with FAO voluntary Guidelines on Catch Documentation Scheme and other international legal framework*?**,** two main approaches were used. First (Section A), an Evaluation framework was developed to compare Ghana and Namibia with the VLGCDS as reference standard and second (Section B), the appropriate themes were applied to answer the question. These selected themes summarized responses from the interviewees with some important quotes as evidence.

4.1 Evaluation Framework

Table 5 Ghana Trawler CDS in comparison with VLGCDS

VLGCDS RECOMMENDATIONS	STATUS	MARK
National laws must be consistent with the VLGCDS	Ghana's Amended Act 880 of 2014 is compatible with provisions of the VLGCDS	√

Multilateral Scheme: FAO recommends a Regional or Multilateral Scheme over unilateral measures.	Unilateral Scheme. Ghana's scheme is independent of other CDS in the region	O
CDS objective must be clearly defined: whether the purpose is for a Catch Documentation Scheme or Statistical Documentation Program	Not clearly defined	O
CDS must specify species or stocks concerned	Does not specify the type of demersal species it is covering	O
CDS must include requirements for unique, secure document numbers, transshipment report, vessel identification information, distribution documents, import and export documents	Ghana's CDS has all the required documents including Log sheet/book, landing certificate, export form, re-export form and the simplified catch certificate form as seen in Appendix (B1-B4).These documents also have all the required KDEs such product code, unique serial numbers etc	√
Relevant standards for information exchange and data confidentiality	Ghana has no personal standards for information exchange but rely on the Fisheries Committee for Western Gulf of Guinea (FCWC)	O
Verification of Documents must be done by governmental officials other than the parties directly responsible for filling out and validating the forms	No dedicated office and government officials to verify and audit catch information beyond what has been done by port inspectors and fisheries observers	O
Application of MCS Tools	Ghana has a VMS set-up and carry out periodic naval patrols	√
Appropriate training and taking into account special requirement for developing countries	No training of officials and other user groups	O

Table 6 Namibia Trawler CDS in comparison with VLGCDS

VLGCDS RECOMMENDATIONS	STATUS	MARK
National laws must be consistent with the VLGCDS	Namibia's Marine Fisheries Act of 2000 is compatible with provisions of the VLGCDS	√
Multilateral Scheme: FAO recommends a Regional or Multilateral Scheme over unilateral measures.	Unilateral Scheme. Ghana's scheme is independent of other CDS in the region	O
CDS objective must be clearly defined: whether the purpose is for a Catch Documentation Scheme or Statistical Documentation Program	Namibia has a clearly defined objective which is implementing a Catch Documentation scheme rather than a Statistical Documentation Program	√
CDS must specify species or stocks concerned	Namibia's CDS specifies which species it is targeting. It targets seven (7) demersal species: Hake, Horse Mackerel, Monk, Pilchards, Rock Lobster, Orange Roughy, Red Crab.	√
CDS must include requirements for unique, secure document numbers, transshipment report, vessel identification information, distribution documents, import and export documents	Namibia's scheme has all these documents just like Ghana	√
Relevant standards for information exchange and data confidentiality	Namibia has standards for information exchange and data confidentiality	√
Verification of Documents must be done by governmental officials other than the parties directly responsible for filling out and validating the forms	Dedicated office within the Marine of Fisheries and Marine Resources and officers for verification of demersal catch	√

Application of MCS Tools	Namibia has a VMS set-up, carry out periodic naval patrols and has an air wing unit for air patrol.	√
Appropriate training and taking into account special requirement for developing countries	No training of officials and other user groups	O

Table 7 Comparison of Ghana Tuna CDS with VLGCDS

VLGCDS RECOMMENDATIONS	STATUS	MARK
National laws must be consistent with the VLGCDS	Ghana's Amended Act 880 of 2014 is compatible with provisions of the VLGCDS	√
Multilateral Scheme: FAO recommends a Regional or Multilateral Scheme over unilateral measures.	Ghana implement the ICCAT scheme which is a multilateral scheme	√
CDS objective must be clearly defined: whether the purpose is for a Catch Documentation Scheme or Statistical Documentation Program	It is clearly defined	√
CDS must specify species or stocks concerned	The CDS specify that is concerned with Big eye, Yellowfin and Skipjack Tuna stocks	√
CDS must include requirements for unique, secure document numbers, transshipment report, vessel identification information, distribution documents, import and export documents	Ghana's scheme has all these documents	√
Relevant standards for information exchange and data confidentiality	It relies on the ICCAT platform for data exchange and data confidentiality	O
Verification of Documents must be done by governmental officials other than the	Dedicated office and government officials for further verification and auditing of catch	√

parties directly responsible for filling out and validating the forms	information beyond what has been done at the ports	
Application of MCS Tools	Ghana has a VMS set-up and carry out periodic naval patrols	√
Appropriate training and taking into account special requirement for developing countries	Periodic training of members of the Ghana Industrial Tuna Association.	√

Section B

a) Alignment of CDS with international best practice

All but three participants strongly indicated that they think the Ghana CDS is in alignment with the ICCAT and Trawl sector CDSs. They indicated that since Ghana was part of the FAO and ICCAT, it was likely to follow their processes and procedures. For example, the Deputy Director in charge of Statistics at MoFaD *said "Yes, our laws are consistent with the ICCAT recommendation 97-10 and largely the VLGCDS. This was done I think in 2013 or 2014 in response to our first issues with the EU on IUU fishing".* Two of the respondents explicitly said they do not believe the scheme aligns with international best practice. ***W5*** said "*with the many problems I am seeing with this scheme, it is hard for me to believe it aligns with international regulations"*. Lastly, only one participant said he had no idea if CDS aligns or not. ***W7*** "honestly*, I do not know much about the international laws. Those things are handle at the Ministry or FC Head office*"

In comparison with the situation in Namibia, all four respondents (4/4) also said that both their Tuna and trawl fishery is compatible with the provisions of the VLGCDS, ICCAT and CCAMLR CDSs. For instance, informant ***P 3*** indicated that *"Namibia's CDS follows both the processes of CCAMLR and ICCAT. I am inclined to believe that these RFMOs follows international best practices".*

b) Data Collection and technical capacity

All informants indicated that the CDS in Ghana is paper based. ***W2*** " *Yes, yes, our scheme is mainly based on paper. Observers record with paper, MCS and FSSD officers record with paper and all the paper works at the head office is also paper"*

All but two of the respondents (13/15) indicated that they did not understand the value of digital CDS but they would be willing to transition to this in the future. For example, ***W 1*** *said**:** "Example, let's say if you input your data collection into an electronic system it is automatically updated into a server, you understand. It is time efficient and it's more reliable and more flexible when it comes to data collection. It makes data easy to retrieve."* However, the other two did not know much about electronic or a digitized CDS to make substantive comments on the matter.***W8*** said "*I have been working at FSSD for the past two years. All we have been trained to use is the paper form. I do not know much about the electronic CDS but will be willing to learn if it will improve our work here".*

In comparison from speaking to informants in Namibia the CDS is already digitalized. For example, ***P 3****: "The digitization process is very effective and it makes data collection much easier".*

Another important issue raised by respondents in Ghana is lack of training. Most respondents 11/14 said they needed training on fish identification, port state measures, estimating catch-in-hold and international laws on CDS. **W7** stated that " *I have been doing this work since 2015, I have not had any training since then. To be sincere with you, I do not have a science background so identification of the various fish in the catch and recording the right thing is a big problem for me."* The remaining three respondents who happened to be senior government officials thought they did not need immediate training to exercise their duties successfully. ***W10*** said, *I have been part of the Government delegation to ICCAT meetings since 2013, I do not think I need any special training to do my work".*

In Namibia, all but 1 (3/4) respondents raised issues with in-service training. For example, Respondent ***P 1*** *said* ***"****The system started long time ago and no proper training is given to the staff members to effectively carry out the program implementation".* The remaining respondent ***P4*** who had the same views as ***W10*** from Ghana said "*I regularly travel to Madrid for ICCAT meetings and have in-depth knowledge of the CDS process*".

c) <u>Incentives and motivation to implement</u>

There was general consensus among informants that the Tuna fishery has less challenges with IUU fishing compared with the demersal trawler sector because of its high position on government priority list. All 14/14 informants say that government places more value on protecting the integrity, transparency and legitimacy of Tuna stocks because of its economic value on the international market and its ability to generate revenue through exports, foreign direct investment and taxes. For example, secretary of GITA *said that "Tuna is a premium fish and generates lots of revenue for government through licensing and export fees. Government is very much aware of its value on the international market and are keen to adhere to ICCAT regulations to avoid sanctions."*

Informants further revealed that Tuna catch has a dedicated office and personnel to manage the CDS, however, no such equivalent is available for the demersal fleet. For example, respondent ***W 12*** said "my *office only focuses on Tuna species like Yellowfin, Big eye and Skipjack. We do not work on fish caught from the trawler vessels."*

Furthermore, the informants also revealed that fishers and vessel operators are not motivated to cheat the system as they recognize the economic value of exporting their catch to the international market rather than risking being sanctioned for engaging in IUU fishing. Thus, are willing to comply with all provisions of the VLGCDS and ICCAT scheme. For example the Secretary of GITA said *"The latest EU sanctions on IUU fishing has nothing to do with us. It was caused by the Trawler vessels. We attend ICCAT meetings and adhere to its regulations. No member of us has been identified as engaging in IUU fishing".*

In comparison with Namibia, all informants said government recognizes the importance of the Tuna sector and implement the ICCAT CDS to the smallest detail. *For example, **P3** said "For proper documentation and traceability purposes, the tuna sector is governed by an international body, a well-structured body. They aid in the traceability but also marketing purposes. Because of proper documentation of ICCAT log book, for instance it is easier for the EU to determine the exact location*

of the fish, where the fish was caught".

However, in relation to demersal trawler fleet, informants say Namibian Government prioritizes it as well as Tuna fishery and it is well managed. All informant said the Hake, Monkfish and Horse Mackerel fisheries contributes hugely to the economy and therefore government ensures that there is transparency in the chain of custody of the landed fish.

Question 2, *what are the challenges that hinder an effective CDS?*

Two themes (***a*** and ***b seen below***) provides answers to this research question. These selected themes also summarized responses from the interviewees with a quotes as evidence.

a) <u>Lack of Economic Incentives</u>

All but two of the informants from Ghana indicated that salaries are poor and there are no incentives to motivate them. They expressed the need for increase in wages and wages paid on time to prevent corruption. For instance, respondent ***W 8*** *said "Let me make a vivid example, the last time I went to sea was in January or March, I think March and for about 6 months I never got my allowance. It was only last month or early this month that I got my January allowance and so I still have arrears of two trips that they still have to pay me. If you tell your people you went to work, they still expect you to come back with something because you went to work".* However the remaining three said they had no comment on the matter. They clearly were not comfortable stating their views for fear of future victimization by FC in the event details of the interviews were leaked. My assurances of confidentiality and anonymity will still not get them to answer the question. ***W5*** said *"officer please I have no answer to give you as he smiled. I do not know you well to answer this question*." These three responders interestingly took the same position when it came to the issue of social security and insurance packages. However, the rest of the respondents revealed that observers were not permanent employees of the Fisheries Commission and do not have an insurance package in the event of injury or death at sea. ***W7*** who is an observer *said "Sir, our job with the government is a contract. Sir,*

will you believe there is no insurance for us? I sometimes I get scared because two of our colleagues went to sea and never came back and we do not know what happened to them. I think if I die now I have died in vain".

In comparison with Namibia, respondents also complained of poor salaries. All informants indicated that their salaries needed to be increased to meet the growing inflation and rise in the cost of living. However, in spite of the general consensus on poor remuneration, the interview further revealed that salaries of fisheries observers were still higher than that of port inspectors. For example, respondent ***P 2*** said *"Our salaries are not good at all. Though salaries of observers are better than ours, they keep asking for salary increment. Two weeks ago, I heard they had planned a protest and submit a petition for salary increment". P2 further added that "though I do not work with the Namibia Fisheries Observer Agency, I am aware every observer is entitled to a danger allowance and which is incorporated into their monthly allowance.*

b)Logistical and practical challenges

Ten out of the fifteen (10/15) interviewees revealed serious logistical and financial challenges hampering the effort of the officials to exercise their duties effectively. They complained about challenges with the VMS, irregular boat patrols, breakdown of computers and lack of vehicles for easy mobility. These logistical challenges they say lead to less productivity, less efficiency and less accuracy of data collected. For example, informant ***W 11*** *said "You may not have an official vehicle to do your work or the computer system in the office may fail at a particular time and so may need to wait after the repair works to do your work". The Director of the Marine Division (FC)* further added that *"since the end of the West Africa Regional Fisheries Programme in 2018, Fisheries Commission have not had funds on a consistent basis to provide fuel for regular boat patrols, internet data to run the VMS and monies to pay fisheries observers".*

However, the five (5) remaining respondents said though they agreed that the CDS is confronted with logistical challenges, but they think the unwillingness and lack of interest to implement particularly the Trawler CDS is the main driver of the

ineffectiveness. **W6** said *"Boss, I will not mince words, we have many logistical problems just like all developing countries but the over reliance on the Tuna sector is allowing IUU fishing in the Trawler sector to rise".*

However, respondents in Namibia said there are logistical challenges but it has not stopped an effective implementation of its CDS. ¾ of the respondents say logistical constraints are not mitigating against effort of implementing an effective CDS as they have regular sea and air patrols, a digitized data entry system and an effective VMS that ensures that all vessels that offload their catch at the Walvis Bay and Lüderitz ports are free from any irregularities. ***P 2*** said "We *sometimes hear that operational funds have not come but Namibia's MCS network is quite effective. We have an effective sea and air patrols and a VMS that monitors all fishing activities all year round".*

3) How can a CDS contribute to Ghana's long-term goal of developing its own Catch Certification Scheme (CCS)?

In answering this question, the theme: **Long-term vision for sustainability** was needed to answer the research question. Just as was done in the previous questions, this single theme summarized responses from the interviewees with a quote as evidence.

a)Long-term vision for sustainability

In relation to this question, the interview revealed that 8/14 respondent do not think Ghana's marine fisheries is well enough managed to pass any certification scrutiny from the Marine Stewardship Council or any recognized global certification organization. For example, the Director of the Catch Certification Unit of FC said *"Ghana is a long way from getting any of its fish stock certified because of its current issues with IUU fishing. However, the Fisheries Commission in partnership with USAID, Environmental Justice Foundation and the Ministry of Fisheries and Aquaculture Development are educating fishers, vessel operators etc on the negative impact of IUU fishing. The commission is also serious about enforcing sanctions in the Fisheries Act to deter both fishers and officials from flouting processes of the CDS. This is the only way Ghana marine fisheries can meet the standards of these*

certification firms". However, 4/14 had a more optimistic views, they believe a fix of the challenges with the CDS will reduce IUU fishing in the demersal fleets and put Ghana fisheries on the path of sustainability. ***W10*** said "*We are currently not in a good place but am hoping that the current measures in the Ghana marine fisheries plan 2019-2024 can solve many of the issues with the CDS and sustainable fishing*". Lastly, the remaining two were non-committal. They were neither optimistic nor pessimistic. **W7** said *"Sir, I won't say we can't get our fish stocks certified, but because of failed policies in the past, I want to wait and see"*

In comparison with the situation in Namibia, all four informants said their CDS has been effective in eliminating IUU fishing in Namibian waters. ***P4*** *said "Namibia does not have a perfect system but our MCS has help us a lot. We used to experience a lot of IUU fishing cases but it has gone down"*

Lastly, conflict and duplication of functions among key stakeholders was one critical issue raised in the cause of the interviews. There appeared to be a certain level of disconnect between key stakeholders in the CDS implementation process. The director of the post-harvest unit (PHU) of FC said *"typically, the vetting and authorization of fish exports should be done by my office.. But this is being done by the CCU. Clearly, I think they are doing our job. There is no office called Catch Certification Unit under the fisheries commission scheme of service"*

5.0 DISCUSSION

The findings casts light on multiple recurring themes that are thought to be responsible for the ineffectiveness of the Demersal CDS in Ghana.

First, one of the major issues identified to hinder the effectiveness of the CDS is **data collection and technical capacity**. Capacity building as a concept started in the 1980s and increasingly became a global human resource development tool throughout the last decade of the 20th century (Lavergne and Saxby,2001). "Capacity building is widely defined as a measurable improvement in an organization's or individual's ability to fulfil its mission through a blend of sound management, strong governance and dedication to assessing and achieving results" (Monson-Rosen, 2021). It is used as an instrument to develop the technical capacity of employees to perform at a high level. The value of capacity building is recognized by the FAO and have developed several capacity building programmes tailored towards educating employees and stakeholders of several of its member states. A typical example is the capacity training and assistance programme in relation to the implementation of the CDS for developing countries. However, evidence from the interviews indicated that majority of respondents have not been beneficiaries of this or any other training programme built to improve their performance relative to the CDS.

Interestingly, informants from Namibia echoed the position of their Ghanaian counterparts by reiterating the need for further education on the processes and implementation of the CDS to improve performance.

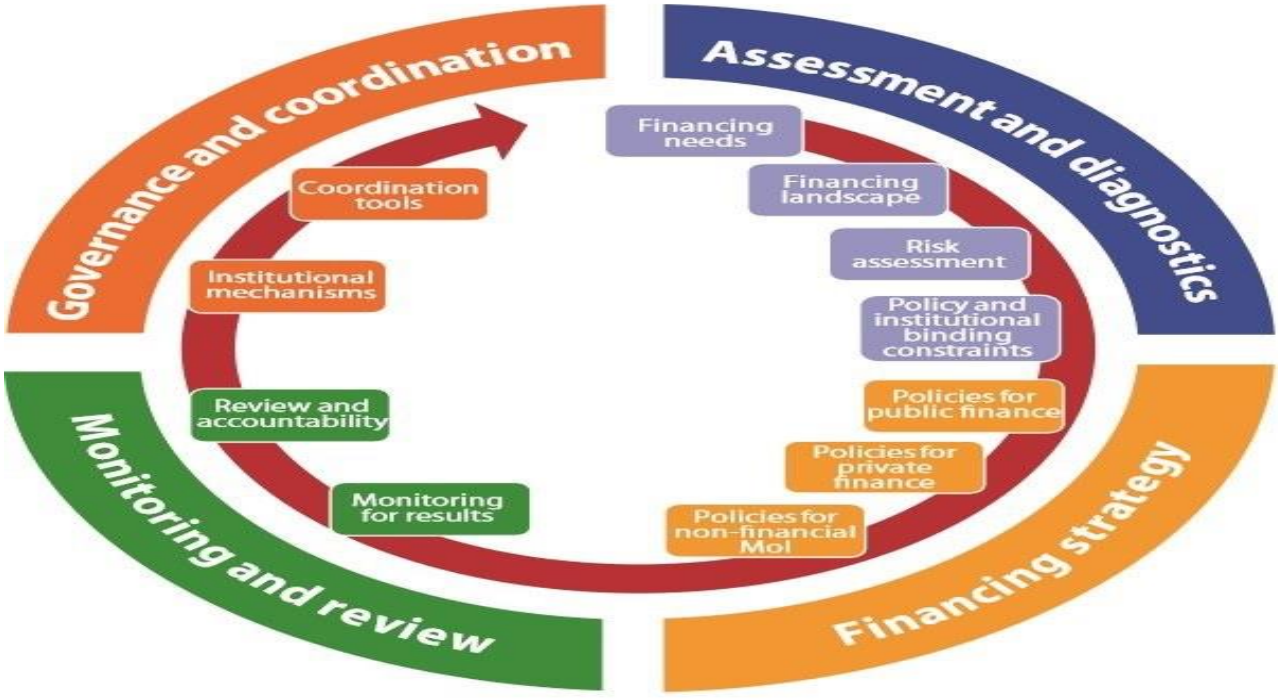
Another issue identified as part of the findings was **practical and logistical challenges** caused by budgetary/economic constraints. This raises the eternal debate about sustainable financing to tackling challenges in the fisheries sector including implementation of a CDS. Issues raised during interviews ranged from logistical and practical problems such as broken computers, paltry salaries to no vehicles for easy mobility in Ghana.

Historically, the fisheries sector in Ghana has been a marginalized area with focus often directed towards the oil and service sectors. To put this into perspective, the

annual budget for the fisheries sector in 2022 was $US46 million (GHC374m) which is less than 3% of the total funds allocated for the fiscal year (MoFEP,2022). This often forces the fisheries administration to further prioritize which issues to address. Thus, pushing the demersal fishery down the priority list and lift the Tuna sector to the very top owing to the fact that it generates 88% of total fish export each year (Maale-Adsei et al, 2015).

With sustainable financing being a hindrance to sustainable development in many countries, the United Nations in 2019 developed an *Integrated national financing frameworks* (INFFs) to introduce a set of guidelines to assist national governments fund their developmental priorities as well as the SDGs. Example, while Ghana's policy on CDS outlines which areas *need* to be funded, the INFF demonstrates *how* the policy will be funded and implemented. The procedure is presented through the diagram below.

Figure 6 United Nations Integrated National Financing Frameworks



Source: United Nations Inter-Agency Task Force on Financing for development.

Third, is the **lack of incentives and motivation to implement** the demersal fishery CDS**.** The global Tuna fishery whose estimated value is $US12.2 billion is crucial to the economy a lot of coastal states (McCluney et al, 2019). It is no coincidence that majority of RFMOs focus on the management of Tuna and Tuna-like species. This narrative is further supported by the respondents interviewed in Ghana. Respondents cites the creation of a dedicated office at FSSD for Tuna catch alone for further documentation and verification. This office audit information provided by the VMS, observers, port inspectors and landing certificates to ensure there is no illegal Tuna fish enters the supply chain.

Ghana like most developing world economies has little resources to tackle its many challenges and so its priority list is centred on activities that generates more revenue. And so prioritize the Tuna fishery owing to the fact that it contributes 88% of total fish exports (Maale-Adsei, 2015).

Aside the commitment and focus of Government on the Tuna fishery, fishers and vessel operators are generally compliant and not motivated to cheat the system. They recognize the value of Tuna on the international market and so comply with the dictates of the CDS to ensure their consignments are not tainted as coming from illegal sources.

However, the situation in Namibia, is different. Demersal fish contribute a far greater proportion of fisheries contribution to GDP than the Tuna sector. About 75 %($US 731 million) of annual revenue generated from fish exports in 2018 came from the trawler sector (MFMR, 2020). According to the Namibia Statistical Agency report 2017, while 50.3% of fish catch are exported to Spain (50.3%), it has also identified viable markets in South Africa, Zamibia, Mozambique and the DR Congo using the INFOPECHE platform (MFMR, 2020). Thus, it does not overly reliable on markets in Europe, Asia or North America to export their fish.

Economic Incentives: The research findings also cites economic incentives for employees are one of the topical issues raised in the interviews.

According to Nagin et al. (2002) employees are “rational cheaters”. Employees will cheat the system if there are no economic and social motivations. In short, ethical

and high degree of professionalism will matter little to employees if they are not motivated. Lack of economic incentives will likely de-motivate employees making them susceptible to corruption and negative behaviours such as lateness and absenteeism. Companies anticipating this attitude have countered it with incentives and monitoring (Nagin et al, 2002). Interestingly, the research findings appear to buttress the position espoused by Nagin et al. (2002). The research findings indicated that fisheries observers in Ghana are paid paltry salaries with no social security benefits. Observers are also not permanent officials of the government and have no insurance package in the event of injury or death. At sea, they feed at the benevolence of the crew, thereby sometimes compromising their independence and objectivity.

The West Africa Regional Fisheries Programme (WARFP)(2012-2018) funded under the $53.8 million World Bank loan facility (MoFaD, 2022) attempted to address the issue of observer salaries and motivation. While it was able to provide regular income for observers for a while, sustainability ultimately became a challenge. Contrary to Ghana's situation, observers in Namibia are government officials working for the Namibia Fisheries Observer Agency and receive a monthly salary and paid social security. Evidence from the findings indicated that observers receive a "danger allowance' as part of their salary to incentivize them owing to the danger of being at sea for a prolong periods of time. This makes them independent and are able to carry out their functions without compromise, fear or favour.

Furthermore, one very important theme identified is the **long-term vision for sustainability**. Goodland (1995) defines "environmental sustainability as the maintenance of natural capital" and as a concept apart from, but connected to, both social sustainability and economic sustainability". Environmental sustainability is a contentious debate with scientists advocating for measures to protect the environment because of imminent catastrophe. On the other hand, d*enialists* do not see the urgent need to protect the environment because of their lack of belief in scientific evidence. Others may not be denialists or scientists but beneficiaries of capitalization of natural resources such as fisheries, thus close their eyes to the reality

of resource over-exploitation. For example, capitalization of fisheries resources in developing countries and weak legal framework allows for easy and unsustainable harvest of fisheries resources. This situation is well articulated in Hardin's (1968) article the "Tragedy of the Commons" (Hardin, 2019). While scholars such as Elinor Ostrom opposes this position and argues that users could cooperate to prevent the over-exploitation of common pool resources (Ostrom, 2008), Hardin's theory unfortunately explains the situation in Ghana fisheries best. Poor stakeholder consultation and weak governance framework has increased fishing effort promoting exploitation beyond the total allowable catch (Quartey, 2020).

In light of this, Ghana's long-term vision of sustainability and certification of its marine fisheries by an independent assessor such as the Marine Stewardship Council currently looks like an illusion.

Alignment of Ghana's CDS with international best practice is also another issue that featured prominently in the interviews**.** While Ghana has been successful in incorporating international requirements such as fisheries observer programmes, installation of VMS, ICCAT recommendation 97-10 and the VLGCDS into domestic legislation and National Plans, it has been unable to digitize the scheme. This is contrary to the recommendations of the VLGCDS which considers an electronic CDS as a fundamental requirement to ensuring an effective scheme (Hoesch, 2018). The findings documents the shortcomings of the paper-based system and describes it as inefficient, bureaucratic and presents a high possibility of data fraud.

In the implementation of governance tools such as the CDS, transparency has been linked to improved accountability, enforceability, compliance and sustainability (Ardron et al, 2018). However, the current Ghana CDS is seen by respondents as unreliable to effectively combat IUU fishing.

While a positive step in incorporating the observer programme in domestic law, implementation has been an entirely different prospect. Evidence from respondents indicate that some demersal trawler vessels go fishing without any observers. Conversely, the findings in **Table 6** shows that the Namibia scheme is efficient and aligns with virtually all recommendations under the VLGCDS and ICCAT schemes.

Finally, **Conflict and overlap of functions** also appears to contribute to the ineffectiveness of the CDS. “Institutional overlap implies that separately established governmental institutions do not operate in isolation from each other, but influence each other’s normative development and governance effectiveness” (Dunoff, 2012). This has the potential to result in conflicts and undermine institutional efforts to solve challenges such as IUU fishing. This happens to be the situation between two key actors in the Ghana CDS institutional architecture namely; the CCU and the Post-harvest Unit (PHU) of the FC as revealed by respondents. While no evidence suggest the CCU do not have the competence to validate and certify consignment for exports, the office is not recognized by the 2014 Fisheries Commission Scheme of Service (FCSS) (See Annex C1). The mandate of fish trade, certification and verification is under the PHU as indicated in FCSS.

5.1 Limitation of findings and suggestions for future research

Due to the nature of the research questions, a qualitative semi-structured interview was ideal to obtain answers.

These findings should be viewed with caution because of the limited number of informants and sample size based on human judgment rather than randomization/probability. Thus, future researchers could replicate this study with a broader pool of stakeholders using a more probability-oriented sampling technique to eliminate bias. For example, views of fishers, crew members, NGOs and academics could be sought to provide a broader perspective and a deeper understanding of the challenges with the CDS. Another area of focus of a future research could be examining the psychology behind the actions of vessels operators relative to the CDS and finally, investigating the contribution of the artisanal fisheries sector to the challenges of the CDS.

6.0 CONCLUSION

The aim of this qualitative research was to answer three overarching research questions: *1) How compatible is Ghana's CDS with FAO voluntary Guidelines on Catch Documentation Scheme and other CDSs, 2) what are the challenges that hinder an effective CDS and lastly long-term vision for sustainability.*

Through semi-structured interviews I have collected responses from identified informants related to the operations of the Ghana and Namibia CDSs. These interviewees have provided interesting and unexpected answers and it is upon these that the conclusions below have be drawn:

First, it appears that the Tuna fishery CDS works well, is adequately resourced and aligns with best practice. Ghana's trawl fishery however tells a different story. The CDS appears to have all the relevant paper documentation prescribed in the VLGCDS (See Appendix A1) to collect data and ensure traceability but the scheme is still ineffective. Thus, the ineffectiveness of the CDS in the trawl fishery in Ghana is largely as a result of implementation and logistical challenges.

Secondly, the Ghana scheme needs structural, logistical and policy reforms to refocus attention onto the demersal/trawler sector. It is evident from the findings that the balance of power and leverage is with the Tuna fishery. Therefore, government needs to broaden its priority scope to encompass the trawler sector to enable it harness all its untapped potential benefits as seen in the case of Namibia.

Third, there appears to be overlapping jurisdiction and duplication of functions which has the potential to mitigate against institutional cohesiveness to solve challenges with the CDS. Thus, objectives and mandates of each organization needs to be clearly defined to forestall conflicts and eliminate any grey misunderstandings that might arise because of poor coordination.

Furthermore, the fisheries administration in Ghana should consider to provide greater economic incentives to its officials to guard against corruption and low motivation. Economic incentives are motivational tools used worldwide to get increased productivity and excellence out of employees. If government does not prioritize this, challenges with the CDS will persist.

Finally, the scheme lacks focus and objectives not clearly defined. For example, it is not clear which demersal species the scheme intends to cover. It is also not clear whether it is a Statistical Documentation Programme or an MCS tool.

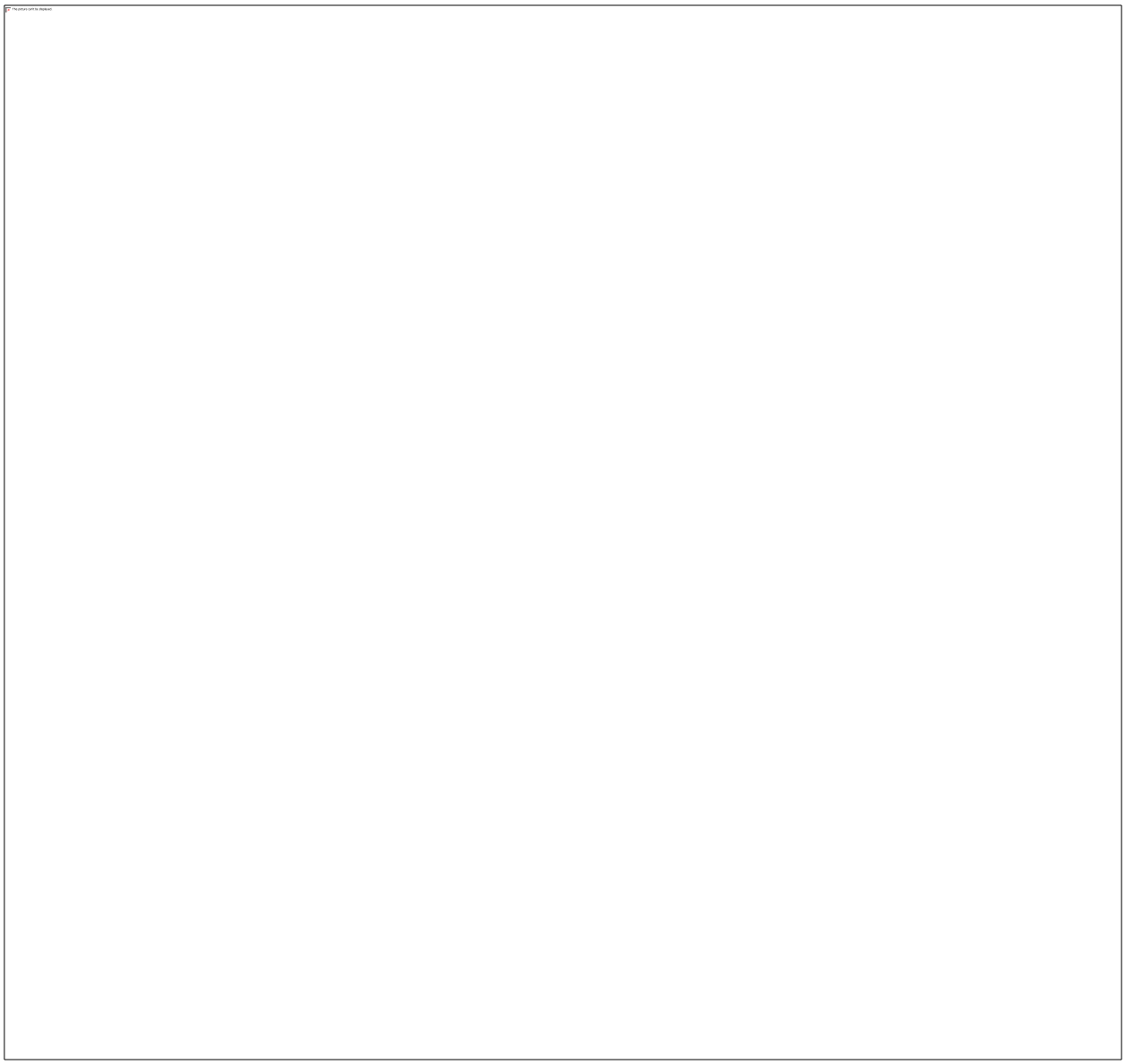
Overall, it is evident that there is much room for improvement in Ghana's CDS for the demersal fleet. While other aforementioned challenges bears some of the blame, it is evident that a greater portion rest with the implementation process. The current scheme lags behind the Namibia demersal fish industry in terms of structure, focus and implementation. The recent certification of the hake fishery by the Marine Stewardship Council (MSC) further underlines Namibia's credentials as a country whose fisheries is being managed sustainably.

7.0 RECOMMENDATIONS

Thus, the research recommends a few international best practices to help Ghana implement an effective CDS:

First, owing to the problem with implementation, Ghana can adopt the conceptual Model for Evidence-Informed Policy Formulation and Implementation to improve implementation challenges with the CDS as seen in Bullock et al 2021(Fig.7).

Figure 7 Conceptual Model for Evidence-Informed Policy formulation and Implementation



The model highlights 3 groups of stakeholder-related variables which are essential to the effectiveness of any design and implementation of a policy; (1) stakeholder characteristics, (2) stakeholder relationships, and (3) the context in which the stakeholders are embedded. First, characteristics of the stakeholders including their knowledge of the subject matter, influence, interest and legitimacy as well as their leadership in the implementation process are cited as vital to the implementation of any policy or programme. Second, the relationship among stakeholders is also very important. It is imperative for stakeholders to have shared values, beliefs and coordinate their activities if the implementation is to be a success. Finally, is the context in which stakeholders are embedded in the formulation and implementation process. A successful implementation will require long-term stability of stakeholders and sustained political interest and commitment.

If this concept is integrated in the implementation strategy relative to the CDS, it will resolve most of the implementation challenges identified in the research findings.

Second, *Ghana should undertake a periodic performance review and audit*: The VLGCDS and international best practice requires States to carry-out a periodic performance audit to determine the effectiveness of its scheme. This performance audit is expected to review activities such as the inclusivity, impermeability and efficacy of the CDS process. Other activities include review the scope of work of the CDS which includes the objectives and species coverage. If Ghana subjects its CDS to a performance audit, it may diagnose deeper underlying problems far beyond what this research studies has uncovered.

Establishment of Fisheries Observer Agency (FOA): Ghana needs to establish a statutory organization under a legal instrument to manage the affairs of on board observers just as in Namibia. If this done, observers will have an employment contract with a clearly defined condition of service. This will make observers accountable to the State and carry out their functions with a high degree of professionalism.

This could provide observers with the opportunity to establish a Union that could advance their interests e.g salaries and working conditions at the board level.

Furthermore, under an agency, employees will be recruited based on a minimum set of academic and professional experiences. This will ensure that observers have the requisite competence to carry out their job description at a very high level.
In addition, FOA sends two observers per vessel (Ndara, 2015). This is an initiative that can be replicated in Ghana to improve transparency, accountability and efficiency of on board observers.
Paradigm Shift with respect to Trawler sector: Evidence from Namibia indicates that the Trawler sector is as economically viable as the Tuna sector if it gets the needed attention and investment. Through Ghana's association with the Intergovernmental Organisation for Marketing Information and Co-operation for Fishery Products in Africa (INFOPECHE), it can find new lucrative markets in Africa for its trawler fish stocks and generate comparable money as Namibia. But first it needs to establish a dedicated office as it has done for Tuna stocks for further verification of trawler stocks to ensure that they are not coming from IUU fishing sources.
Finally, *review of the Ghana transhipment provision in the Fisheries Act*. While Ghana has a provision in its fisheries Act that prohibits transhipment at sea (Section 88 and 132), it does not seem to be effective as anticipated. Thus, it is important for Ghana to review this provision and integrate the new FAO Voluntarily Guidelines for Transhipment that was adopted by the 35th session of the Committee on Fisheries (COFI) in September 2022 (FAO, 2022). The objective of this non-binding instrument is to help States or RFMOs develop or revise existing legislations on transhipment, with the purpose of incorporating it within the wider fisheries management set-up (FAO, 2022).
Overall, the empirical findings have satisfactorily answered the research questions. The findings have provided new insight into the Ghana CDS and could serve a reference for policy makers and future researchers on the subject matter.

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Appendices

APPENDIX A1

Informants	Gender	Organization	Position	Date	Type of stakeholder
W 1	W	FC (MCS)	Fisheries Manager	25/07/2022	Normative
W 2	W	FC (Central Region)	Senior Fisheries Manager	22/08/2022	Normative
W 3	M	Ministry of Fisheries	Deputy Director	27/07/2022	Instrumental
W 4	M	FC (MCS)	Deputy Director	27/07/2022	Instrumental
W 5	M	FC (MCS)	Fisheries Observer	03/08/2022	Normative
W 6	W	FC (Greater Accra)	Senior Fisheries Manager	19/08/2022	Normative
W 7	M	FC (MCS)	Fisheries Observer	04/08/2022	Normative
W 8	M	FC (MCS)	Fisheries Observer	17/08/2022	Normative
W 9	M	FC (Western North)	Regional Director	23/07/2022	Instrumental
W 10	W	FC (Head Office)	Director, Marine Division	07/08/2022	Instrumental
W 11	M	FC (FSSD)	Fisheries Manager	14/08/2022	Instrumental
W 12	M	FC (FSSD)	Assistant Fisheries Manager	12/08/2022	Normative
W 13	M	FC (FSSD)	Assistant Fisheries Manager	09/08/2022	Normative
W 14	M	Ghana Tuna Industrial Tuna Association (GITA)	Secretary	15/08/2022	Instrumental/Descriptive
W 15	W	FC(PHU)	Director	29/08/2022	Instrumental

APPENDIX B1

CATCH DECLARATION/LOGBOOK/LOGSHEET (CD1)				
1. Unique Serial Number		2. Reference Number		
3. Validation Authority: (Agency Name)				
(a) Address	(b) E-mail Address		(c)Tel.	(d) Fax
4. Fishing Vessel Name:	5. Flag-Home Port	6. Registration Number	7. Call Sign:	8. IMO/Lloyd's Number: (If issued
9. Fishing License No. Valid to:	10. Vessel Contract No. Inmarsat No., Fax No., Telephone No., E-mail address (if issued):			
11. Type of Processing On Board:				
12.Description of Product				
(a) Species	(b) Product Code	(c) Catch Area(s) & Dates	(d) Estimated Live Weight (kg)	(e) Verified Weight Landed (kg) where appropriate
13. Name of Master of Fishing Vessel – Signature – Seal:				
14. Declaration of Transshipment At Sea				
(a) Name of Master of Fishing Vessel/ Captain/Representative:		(b) Signature and Date	(c) Transshipment Date/Area/Position	(d). Estimated Weight (kg)
(e) Name of Master of Receiving Vessel/Carrier	(f) Signature	(g) Vessel Name	(h) Registration Number	(i) IMO/Lloyd's Number (If issued)
15. Flag State Authority Validation:				
(a) Name/Title		(b) Signature	(c)Date	(d) Seal (stamp)

APPENDIX B2

GHANA FISHERIES COMMISSION VESSELS LANDING CERTIFICATE

1. Document number		**Validating authority**	
2. Name	**Address**		**Tel.** **Fax**
Fishing Vessel Name	**Flag – Home Port and Registration Number**	**Call Sign**	**IMO/ Lloyd's Number** (if issued)
Fishing licence No. – valid to	**Inmarsat No. Telefax No. Telephone No. E-Mail Address (if issued)**		
3. Description of Product	**Type of processing authorized on board:**	**4. References of applicable conservation and management measures**	

Species	Product code	Catch area(s) and dates	Estimated live weight (kg)	Estimated weight to be landed (kg)	Verified weight landed (kg)

4. Name of master of fishing vessel - signature – seal:				
5. Declaration of transshipment at sea Name of fishing vessel		**Signature and date**	**Transshipment date/ area position**	**Estimated weight (kg)**
Master of receiving vessel	**Signature**	**Vessel name**	**Call sign**	**IMO/Lloyds number (if issued)**

6. Transshipment authorization within port area							
Name	**Authority**	**Signature**	**Address**	**Tel.**	**Port of landing**	**Date of landing**	**Seal (stamp)**

7. Name and address of Operator/Company	**Signature**	**Date**	**Seal**
8. Flag state authority validation			
Name/ title	**Signature**	**Date**	**Seal (stamp)**

APPENDIX B3 EXPORT FORM

EUR0PEAN COMMUNITY CATCH CERTIFICATE							
1. Document number			**Validating authority**				
2. Name		**Address**			**Tel.** **Fax**		
Fishing Vessel Name		**Flag – Home Port and Registration Number**		**Call Sign**	**IMO/ Lloyd's Number** (if issued)		
Fishing licence No. – valid to		**Inmarsat No. Telefax No. Telephone No. E-Mail Address (if issued)**					
3. Description of Product		**Type of processing authorized on board:**		**4. References of applicable conservation and management measures**			
Species	**Product code**	**Catch area(s) and dates**	**Estimated live weight (kg)**	**Estimated weight to be landed (kg)**	**Verified weight landed (kg)** where appropriate		
5. Name of master of fishing vessel - signature – seal:							
6. Declaration of transshipment at sea Name of fishing vessel			**Signature and date**	**Transshipment date/ area position**	**Estimated weight (kg)**		
Master of receiving vessel		**Signature**	**Vessel name**	**Call sign**	**IMO/Lloyds number (if issued)**		
7. Transshipment authorization within port area							
Name	**Authority**	**Signature**	**Address**	**Tel.**	**Port of landing**	**Date of landing**	**Seal (stamp)**
8. Name and address of exporter		**Signature**		**Date**		**Seal**	
9. Flag state authority validation							
Name/ title		**Signature**		**Date**		**Seal (stamp)**	
10. Transport details *(See Appendix I)*							
11. Importer declaration							
Name and address of importer		**Signature**	**Date**		**Seal**	**Product CN code**	
Documents under articlee14(1), (2) of regulation (EC) No…/2008		**References**					
12. Import control: authority		**Place**	**Importation authorize (*)**		**Importation suspended (*)**	**Verification requested – date**	
Customs declaration (if		**Number**		**Date**		**Place**	

APPENDIX B 4

ANNEX IV

Statement under Article 14(2) of Council Regulation (EC) No.1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing.

I confirm that the processed fishery products: _____

have been obtained from catches imported under the following catch certificate(s):

Catch certificate number	Vessel name(s) and flag(s)	Validation date(s)	Catch description	Total landed weight (kg)	Catch processed (kg)	Processed fishery product (kg)

Name and adress of the processing plant:

Name and adress of the exporter (if different from the processing plant):

Approval number of the processing plant:

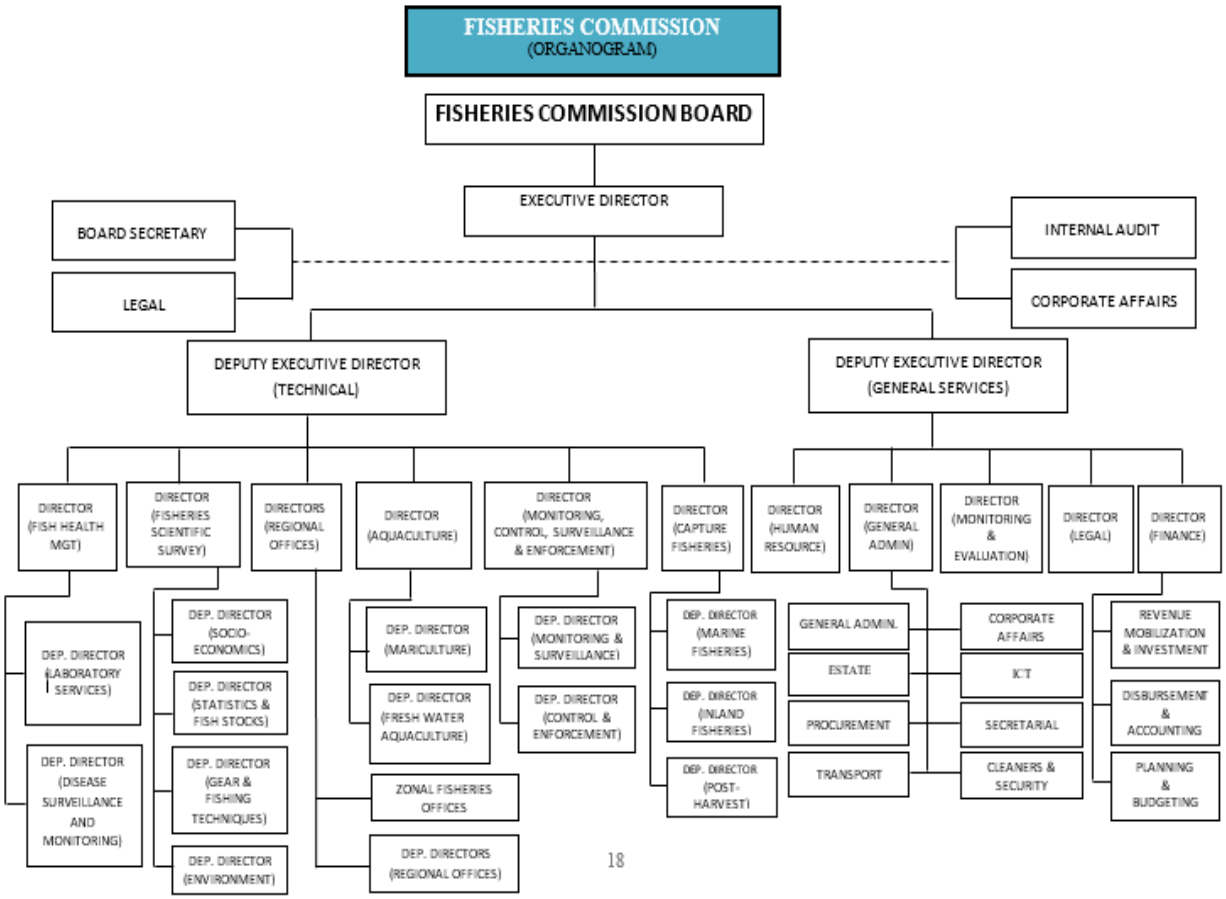
Health certificate number and date:

Responsible person of the processing plant:	Signature:	Date:	Place:

Endorsement by the competent authority:

Official:	Signature and seal:	Date:	Place:
Icelandic Directorate of Fisheries			Hafnarfjordur, Iceland

APPENDIX C


FISHERIES COMMISSION
(ORGANOGRAM)
FISHERIES COMMISSION BOARD
EXECUTIVE DIRECTOR
BOARD SECRETARY
LEGAL
INTERNAL AUDIT
CORPORATE AFFAIRS
DEPUTY EXECUTIVE DIRECTOR (TECHNICAL)
DEPUTY EXECUTIVE DIRECTOR (GENERAL SERVICES)
DIRECTOR (FISH HEALTH MGT)
DIRECTOR (FISHERIES SCIENTIFIC SURVEY)
DIRECTORS (REGIONAL OFFICES)
DIRECTOR (AQUACULTURE)
DIRECTOR (MONITORING, CONTROL, SURVEILLANCE & ENFORCEMENT)
DIRECTOR (CAPTURE FISHERIES)
DIRECTOR (HUMAN RESOURCE)
DIRECTOR (GENERAL ADMIN)
DIRECTOR (MONITORING & EVALUATION)
DIRECTOR (LEGAL)
DIRECTOR (FINANCE)
DEP. DIRECTOR (LABORATORY SERVICES)
DEP. DIRECTOR (DISEASE SURVEILLANCE AND MONITORING)
DEP. DIRECTOR (SOCIO-ECONOMICS)
DEP. DIRECTOR (STATISTICS & FISH STOCKS)
DEP. DIRECTOR (GEAR & FISHING TECHNIQUES)
DEP. DIRECTOR (ENVIRONMENT)
DEP. DIRECTOR (MARICULTURE)
DEP. DIRECTOR (FRESH WATER AQUACULTURE)
ZONAL FISHERIES OFFICES
DEP. DIRECTORS (REGIONAL OFFICES)
DEP. DIRECTOR (MONITORING & SURVEILLANCE)
DEP. DIRECTOR (CONTROL & ENFORCEMENT)
DEP. DIRECTOR (MARINE FISHERIES)
DEP. DIRECTOR (INLAND FISHERIES)
DEP. DIRECTOR (POST-HARVEST)
GENERAL ADMIN.
ESTATE
PROCUREMENT
TRANSPORT
CORPORATE AFFAIRS
ICT
SECRETARIAL
CLEANERS & SECURITY
REVENUE MOBILIZATION & INVESTMENT
DISBURSEMENT & ACCOUNTING
PLANNING & BUDGETING
18