10-31-2022

Assessing the effectiveness of Namibian fisheries management for sustainable development : a case study of hake, monk, and horse mackerel fisheries

Suama Namulilo Mundjego

WORLD MARITIME UNIVERSITY
Malmö, Sweden

Assessing the effectiveness of Namibian fisheries management for sustainable development. A case study of Hake, Monk, and Horse Mackerel fisheries

SUAMA NAMULILO MUNDJEGO
NAMIBIA

A dissertation submitted to the World Maritime University in partial
fulfilment of the requirements for the award of the Degree of

MASTER OF SCIENCE
in
MARITIME AFFARS

OCEAN SUSTAINABILITY GOVERNANCE AND MANAGEMENT

2022

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 personal views and not necessarily endorsed by the University.

(Signature): 

(Date): 20/09/2022

Supervised by: Professor Francis C. Neat

Supervisor's affiliation: Professor of Sustainable Fisheries and Ocean Biodiversity

Head of Specialization Ocean Sustainability, Governance, and Management

World Maritime University

ACKNOWLEDGMENTS

Firstly, I would like to thank the almighty god for granting me the opportunity to do my Study at WMU. I am also delighted that he blessed me with the knowledge, strength, and wisdom that brought me this far in life.

My most immense appreciation goes to the Sasakawa peace foundation under the leadership of Dr. Yohei Sasakawa for funding my study. To Mr. Malcom Block for nominating me and to the Ministry of Fisheries and Marine Resources Executive Director Mrs. Haifene for granting me a special-study leave to pursue my study.

I would be amiss if I did not recognize the following individuals for their invaluable assistance and guidance throughout my study:

Ms. Leena Kadhila, you engineered my interest in ocean governance. You further introduced WMU to me and encouraged me to apply. For this, I m indebted to you.

Prof Francis Neat and Dr. Sun Zhen, please Accept my gratitude for your insightful supervision, excellent guidance, and patience throughout this academic research. Your continuous feedback has intensely contributed to the production of this work.

Ms. Anna Fillemon, thank you for taking care of my son while I was away.

Special thanks to My fiance. You are my world! Thank you for always believing in me and supporting my aspiration and dreams. To My son (Given), thanks for being my cheerer. In your little voice, you would say, "just believe in yourself. You can do it, mommy." to Mom, siblings, families, and friends, thank you for the players and endless support during my study journey.

Finally, my classmate OSGM S2022, thank you for being a family away from home!

ABSTRACT

Dissertation Title: **Assessing the effectiveness of Namibian fisheries management for sustainable development. A case study of Hake, Monk, and Horse Mackerel fisheries**

Degree: **Master of Science**

The success and sustainability of the fishing industry heavily rely on management effectiveness. This dissertation assessed the effectiveness of fisheries management for sustainable development in Namibia, using the Hake, Monk, and Horse Mackerel Fisheries as case studies. The study analyzed the legal framework governing Fisheries in Namibia and evaluated fishery stock status in terms of biomass estimate and fishing effort based on government reports. The study also employed a qualitative method that utilized semi-structured interviews to solicit the view of MFMR, FOA, and fisheries stakeholders on Namibia fisheries Management. The review of Namibia's legal framework for fisheries suggests it is fit for purpose, although it can be strengthened with a timely review. Evaluation of the government reports on the Hake and Monk stocks suggest they are healthy and sustainably fished. However, there are concerns over the Horse Mackerel stock. Several stock status indicators, such as recent declines in Horse Mackerel catches and average size, suggest the stock is overfished (even if biomass remains high). There is a need to reduce pressure on the stock to ensure it does not collapse. Stakeholders and government officials equally agreed that fisheries are well regulated and managed effectively and confirmed that the state of Monk and Hake is good. While that of Horse Mackerel is of concern. The study further revealed a lack of capital resources and corruption as the main challenges inhibiting fisheries management in Namibia.

Keywords: Namibia Fisheries, Sustainable development, Legal Flamework, Hake, Monk, Horse Mackerel

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ASPM	-	Age Structured Production Model
BCC	-	Benguela Current Commission
BCC	-	Benguela Current Convention
CPUE	-	Catch-per-unit-effort
EAF	-	Ecosystem Approach to Fisheries
EEZ	-	Economic Exclusive Zone
FAO	-	Food and Agriculture Organisation
IUU	-	Illegal Unreported Unregulated
MET	-	Ministry of Environment and Tourism
MFMR	-	Ministry of Fisheries and Marine Resources
MSC	-	Marine Stewardship Council
NRG	-	Natural Resource Governance Institute
NRGI	-	Natural Resource Governance Institute
REC	-	Research and Ethics Committee's
SADC	-	Southern African Development Community
SEAFO	-	Southeast Atlantic Fishery Organization
TAC	-	Total Allowable Catch
UN	-	United Nations
UNCLOS	-	United Nations Convention on the Law of the Sea
UNESCO	-	United Nations Educational, Scientific and Cultural Organization
UNFSA	-	United Nations Fish Stock Agreement
WMU	-	World Maritime University

CHAPTER 1: BACKGROUND, LITERATURE REVIEW, AND THE LEGAL ANALYSIS

1.1 Introduction

Natural resources are economic assets for national economic growth and development (Shabbir, Kousar& Kousar, 2020) and vital support for driving development and wealth creation (Bansard and Schröder,2021). Resource-abundant economies with the know-how and technology for resource exploitation for local and foreign markets are expected to accelerate economic growth through sustainable and well-managed resource exploitation (United Nations, 2018). However, unsustainable resource exploitation due to high demand from rapidly growing economies depletes the natural resource base reversing the economic gains. Unsustainable resource exploitation leading to resource depletion is described by Bansard and Schröder (2021) as over-exploitation of natural resources that harms the health of ecosystems and the wellbeing of people leading to environmental crises and growing inequality.

Namibia in Southern Africa is a developing country with varied natural resources ranging from mineral deposits, diverse rangelands, arable land, wildlife, and marine resources (African Legal Information Institute, 2019). Despite being endowed with varied natural resources, the Namibian desert to semi-desert climate is a limiting factor to economic development; hence the available and exploitable resources need careful consideration for sustainable development. This study is on sustainable resource exploitation for sustainable development with a focus on the marine fish resource in Namibia

1.2 Background of the study

Fisheries can play a significant role in developing and eradicating poverty because they provide an essential source of nutrient-rich food, livelihoods, export profits, and job creation (Rice 2014). However, most of the world's fish stocks are under pressure (FAO 2020). Namibia is a developing nation endowed with marine fishery resources along the Benguela coastal belt of the Atlantic Ocean (Ministry of Fisheries and Marine Resources, 2018). Due to the mixing of cold and warm ocean currents along its coast. The Namibian coastal waters are regarded as some of the richest fishing grounds in the world, supported by high plankton growth (Weidlic, 2019). The typical species harvested within the Namibian coastal waters include Hake(Merlucciuscapensis and Merlucciusparadoxus), horse mackerel (Trachuruscapensis), pilchards/sardine (Sardinopsocellatus), anchovy (Engrauliscapensis), Snoek (Thyrsitesatun) and monk (Lophiusvomerinus) (Lange, 2003; Huggins, 2011).

The availability and existence of abundant commercial marine fish species in the maritime Namibia Exclusive Economic Zone attracted many fishing companies, including South African fishing companies and other international fishing companies. Commercial fishing in Namibia began in the 1960s. Due to open access, over 100 foreign vessels from Russia, Spain, Italy, Portugal, Israel, South Africa, Japan, and Cuba participated (Paterson, Kirchner, & Ommer, 2013). South Africa was the control authority over Namibia before independence, and the fishing grounds were an open access fishery with an international free-for-all. This resulted in overfishing, with several fish stocks being over-exploited due to a lack of regulation (Huggins, 2011). The only jurisdictional framework South Africa could control was a narrow territorial sea belt of 12 nautical miles defined by the 1982 UNCLOS, which the United Nations Council ratified for Namibia on Namibia's behalf (United Nations, 2012; Pramod, 2018).

The need for good governance in resource management resulted in the implementation of post-independence measures in 1990 aimed at sustainable utilization of fishery resources (Akawa & Nashima, 2013). Furthermore, the Ministry of Fisheries and the construction of

fisheries management plans coincided with power shifts at independence, resulting in the creation of fisheries legislation in 1992 (Sea Fisheries Act No. 29 of 1992) to protect natural resources (Draper, 2018). Similarly, the Ministry of Environment and Tourism (2014), as cited by Iitembu et al. (2021), states that the National Biodiversity Approaches and Action Plan was created to lay the groundwork for Namibia's long-term biodiversity management and utilization.

1.2.1 Problem statement

The regulation and management of Namibian fisheries established in the early 1990s have been described by many as successful. However, Despite the numerous awards Namibia has won for its effort in fisheries governance. A thorough analysis of the Namibian fisheries management system by Benkenstein (2014) paints a more nuanced picture as it concludes that the Hake stock has slowly grown and is still below Sustainable levels, while Sardine and Orange Roughly stocks were depleted under the watch of MFMR. This questions whether Namibia’s fisheries can be considered sustainable. Therefore, this study's scope is to assess the effectiveness of Namibian fisheries management, focusing on Hake, monk, and horse mackerel fish species exploitation.

1.2.2 Aim of the study

This study aims to assess the effectiveness of Namibian fisheries management systems for sustainable development and to evaluate the evidence for sustainable fishing using three case study fisheries; Hake, Monk, and Horse-Mackerel.

.

Objectives of the study

- To evaluate the existing legislative framework for sustainable marine fishing in Namibia.
- To analyze the effectiveness of the Namibian fisheries management for sustainable marine fishing and development.
- To assess the sustainability of the Hake, Monk, and Horse Mackerel fisheries in Namibia
- To describe and evaluate the views of fishing companies and other marine fishing stakeholders on the Namibian fisheries management policies and legislation for sustainable marine fishing.

1.2.3 Research questions

- Is the existing legislative framework for marine fishing in Namibia sufficient to ensure sustainable exploitation?
- What is the impact of the implementation of the marine fishing legislative framework on fishing in Namibia?
- Is harvesting of Hake, Monk, and Horse Mackerel in Namibia sustainable?
- Is compliance by fishing companies and other marine fishing stakeholders with the Namibian fisheries management policies and legislation sufficient to ensure sustainable marine fishing?

1.3 LITERATURE REVIEW

1.3.1 Introduction

This section reviews the literature related to the assessment of Namibian fisheries management systems for sustainable development. The main focus of the literature is how the legal framework and governance efforts have helped manage sustainable resource exploitation and sustainable development of the fisheries sector in Namibia.

1.3.2 Sustainability, sustainable exploitation of natural resources, and sustainable development

Sustainable development is defined by UNESCO (2021) as developments that satisfy current demands without jeopardizing the ability of future generations to meet their own needs. Furthermore, According to Mulwa (2015), sustainability recognizes that the world's natural resources have conflicting demands upon them and can thus be challenging to manage.

With regard to the objective of this study which is the assessment of the effectiveness of Namibian fisheries management, it is essential to highlight some of the tools, criteria, and indicators of sustainability. In short, sustainability can be assessed qualitatively and quantitatively. According to Stevens (2017), standard sustainability assessment methods include economic (cost/benefit) analysis, environmental (life-cycle, ecological footprint) analysis, socially sustainable livelihoods, human and social capital measurement) analysis. For this study, the emphasis will be on environmental (life-cycle) analysis

1.3.3 The effectiveness of the Namibian fisheries management for sustainable marine fishing and development

The study by Rukoro (2009) concluded that the Namibian fisheries management system has proven to be partly effective because it has reduced IUU fishing within the Namibia EEZ. However, some fish stocks are still declining due to adverse environmental conditions. In a study on "A sustainability analysis of Namibian marine fishery" by Akawa and Nashima (2013), the authors were not hesitant to say that it was difficult to conclude with absolute certainty whether the development of the Namibian marine fishing sub-sector was sustainable or not. The successes and the need for improvements as mentioned by Rukoro (2009) are also echoed by Mulwa (2015) as she explains the outcome of the activities of the Monitoring, Control, and Surveillance (MCS), which is the mechanism for implementation of agreed policies, plans or strategies for oceans and fisheries management. In her study on "Elements of success in Namibian law and policy on sustainable fisheries," Mulwa (2015) concluded that Namibia's current MCS system has been successful and is being well-executed, but with certain areas where improvements to the system can be made. A more recent study by Iitembu et al. (2021) on "The hits and misses of Namibia's attempt to implement the Ecosystem Approach to Fisheries (EAF) Management" also echoed similar sentiments that the Namibian fisheries management processes and legal instruments largely conform to the EAF principles. But, Still there are notable areas needing improvement as Namibia faces complexities and challenges that Namibia needs to overcome.

1.3.4 Namibian fisheries management of Hake, Monk, and Horse mackerel fish species

The historical exploitation of Hake and horse mackerel from the Namibian waters increased considerably in the 1970s, they peaked in the 1980s at almost 600,000 tonnes per year before declining to an average of 300,000 tonnes per year in the early 1990s due to over-fishing (Roux & Shannon, 2004). The introduction and implementation of post-independence marine resource management legislations aimed at the sustainable utilization of fishery resources and rebuilding of marine fish stocks (Akawa & Nashima, 2013). The Ministry of Fisheries and Marine Resources (MFMR), with headquarters in Windhoek and other offices in Luderitz (for aquaculture), Swakopmund (for fisheries management and research), and Walvis Bay (for monitoring, control, and surveillance), is in charge of managing Namibia's fisheries (FAO, 2021).

According to FAO (2021), the management applied to the central fisheries of Hake, horse mackerel, and monk by the Ministry of Fisheries and Marine Resources includes the following:

Hake

A minimum landing size restriction of 35 cm total length, a cod-end mesh size of 110 mm, a fishing season closure in October, and a restriction on fishing in waters within 300 m of 25 00' south latitude

Monkfish
Limitations on the cod-end mesh size of 110 mm and a minimum landing capture size of 75 cm

Horse mackerel

The horse mackerel fleet is subject to a 60 mm cod-end mesh size restriction, a landing capture marketing size limitation of >17 cm for the mid-water fleet, and a size restriction of 12 cm for the purse-seine fleet targeting juveniles for industrial purposes. A mid-water

fleet is also only permitted to land a maximum of 5 percent (by weight) of hake as bay-catch

The above measures are applied to the Hake, Horse Mackerel, and Monk fisheries by the Ministry of Fisheries and Marine Resources. As per the Marine resources White Paper Policy of 2004 for responsible development, regulation, and conservation of marine resources. FAO (2021) further states that Namibia has made several achievements in fisheries management. However, despite noted achievements in fisheries management in Namibia, a study by Paterson and Kainge (2014) on "Rebuilding the Namibian hake fishery" found that distant-water fleets overfished the Hake stock before Namibia's independence. As a result, the stock has failed to rebuild to a sustainable level. Another study by Paterson et al. (2013) on "A short history of the Namibian hake" found strong indicators that the fish stocks are declining, despite the fishery not living up to the high economic expectations. The hake fishery is Namibia's most significant fishery and was transformed from a pre-independence foreign fishery into one that is characterized by locally based, vertically integrated fishing and processing enterprises (Paterson et al., 2013). However, despite attempts to rebuild, the stock has not recovered as the ecological goal of stock rebuilding competes with social and economic objectives, Paterson & Kainge (2014). Furthermore, a study by Akawa and Nashima (2013) on "A Sustainability Analysis of Namibian Marine Fishery" concluded that Namibia had made tremendous progress towards sustainable development of the Hake resource but with reservations about the need for value addition to fish and fish products of the hake fishery.

The horse mackerel is one of the dominant commercial fish species in Namibia when ranked in terms of production (Akawa & Nashima, 2014). In an earlier study on A Sustainability Analysis of Namibian Marine Fishery" Akawa and Nashima (2013) concluded that the development of the horse mackerel species shows poor signs of sustainability as landings decreased considerably to merely 13 active mid-water trawlers in 2007 compared to 61 in 1990. Furthermore, a study by Akawa and Nashima (2014) on "The role of fisheries management in promoting fishery development in Namibia" concluded that the development of the horse mackerel fishery is not sustainable because it

does not meet the needs of the people and it violates environmental rights despite that it has recovered well and is in abundance. Furthermore, Akawa and Nashima (2013), the development of horse mackerel species can be sustainable if more fishing vessels are allowed into the fishery, considering that horse mackerel is one of the few fish species whose products are available to local and regional markets. The perceived unsustainability of the development of the hake and horse mackerel fisheries leaves some questions on whether the post-independence good governance marine resource management legislation introduced and implemented is effective or not.

1.4 A LEGAL ANALYSIS OF FISHERY LEGAL FRAMEWORK IN NAMIBIA

The legal framework is a system of legal documents containing a set of rules, rights, and obligations that govern the operations and activities of companies, governments, and citizens (Natural Resource Governance Institute, 2015). The legal documents include the International and regional instruments, and the target country's legal instruments, include the Constitution, legislation, policy, regulations, and contracts (NRGI, 2015). Since Namibia does not exist in a vacuum and it shares much of its marine resources with other coastal states along the Atlantic Ocean and the entire globe, it is evident that international and regional legal instruments play a role in developing and exploiting marine fisheries resources in Namibia. Therefore, this analysis of the legal framework related to Namibia's marine fisheries resource development and exploitation for sustainable development is divided into sub-sections, including the international, regional, and national legal instruments.

1.4.1 The international legal framework for marine fisheries management

Several international organizations were established in accordance with Articles 63(2) and 64 of the 1982 United Nations Law of the Sea Convention (UNCLOS) to reduce the effects of overfishing and overexploitation. Agreements like the 1995 United Nations Fish Stocks Agreement (UNFSA), which serves as fisheries legislation, concentrate on the regional implementation of fisheries management (Henriksen, Hnneland, and Sydnes, 2006). Fisheries agreements, such as the 1995 United Nations Framework Convention on the Law of the Sea (UNFSA), offered new international rules covering environmental principles for compliance and enforcement, especially calling on States to cooperate (Henriksen, Hnneland, and Sydnes, 2006). Regional fisheries management regimes functioning under international institutions must cooperate to recognize and address management concerns. Although several international legal instruments govern global marine fisheries management. This study reviewed the major ones, including the 1982 United Nations Convention on the Law of the Sea (UNCLOS), the 1993 FAO Compliance Agreement, and the 1995 United Nations Fish Stock Agreement (UNFSA), as well as the 2009 FAO Port State Agreement.

1.4.2.1 The 1982 United Nations Convention on the Law of the Sea (UNCLOS)

The UNCLOS is an international agreement known as the Law of the Sea Convention, or simply the Law of the Sea, that establishes a legal framework for all marine and maritime activities in order to promote the peaceful use of the seas and oceans, the equitable and effective exploitation of resources, and the preservation of living resources (United Nations, 2012). UNCLOS consists of two sets of rules: those that require each state to adopt a particular behavior that is consistent with or conducive to ensuring responsible fishing and the sustainable utilization of living marine resources, and those that oblige each state to work with other States for the same goal (de Seligny, 2004). Although most of the legislations associated with sustainable marine fishing have been established after independence in Namibia, UNCLOS was ratified earlier in 1983 on Namibia's behalf by the United Nations Council for Namibia, and Namibia was the 5th country in the world to ratify the Law of the Sea (Pramod, 2018; New Era, 2022). The ratification of the UNCLOS became significant at independence in 1990 when the clauses were incorporated in the maritime jurisdiction through Article 100 of the Namibian Constitution and the EEZ Act (Act No. 3 of 1990), which relates to the exploitation, exploration, conservation, or management of the natural resources of the sea (New Era, 2022). Within the EEZ under Articles 61 and 62, Namibia is required to conserve and sustainably use its living resources.

1.4.1.2 The 1993 FAO Compliance Agreement

The 1993 FAO Compliance Agreement was established to encourage high seas fishing vessels to adhere to international conservation and management measures, to increase the role of flag States, and to ensure that states tighten control over their ships to ensure compliance with such standards (FAO, 1993). This ensures the implementation of the measures adopted for the management of the high seas' living marine resources under the UN Convention on the Law of the Sea's provisions and taking into account the flag States' exclusive jurisdiction over vessels flying their flags and operating in these areas (FAO,

1995 & Seligny, 2004). Namibia ratified the FAO Compliance Agreement on 7 August 1998 (Pramod, 2018).

1.4.1.3 2009 FAO Agreement on Port State Measures (PSMA)

PSMA is the first legally binding international agreement to expressly address illegal, unreported, and unregulated (IUU) fishing. Its goal is to stop, discourage, and outlaw IUU fishing by restricting the use of ports and the landing of catches by IUU fishing vessels. Thus, the PSMA lessens the incentive for such vessels to continue operating while simultaneously preventing exporting fishery goods from IUU fishing to domestic and foreign markets (FAO, 2009)

It's the duty of all state parties to this agreement to administer these rules to all fishing vessels seeking admission into their designated port(2009). Although Namibia acceded to this agreement in 2017, this measure is yet to be domesticated. Although IUU is of great concern, this aspect is not legally addressed domestically by the Marine Resources Act and regulation.

1.4.2. The Regional legal framework of fisheries management

SADC recognizes the critical role of fisheries in the social and economic wellbeing and livelihood of the people of the region in ensuring food security and alleviating poverty (SADC, 2001). Since Namibia is part of the Southern African Development Community (SADC) region and shares the Atlantic marine waters along the Benguela zone with South Africa and Angola, it has to adhere to the regional legal framework of fisheries management. Furthermore, neighboring countries in the SADC region may want to harvest marine resources in Namibian waters; hence, agreements with member countries must be made within the SADC region's legal fisheries management framework. Although there are several legal instruments and regional agreements on fisheries management in the

SADC region, this section focuses on the SADC Protocol on Fisheries, the Southeast Atlantic Fishery Organization (SEAFO), and the Benguela Current Commission (BBC)

1.4.2.1 The 2001 SADC Protocol on Fisheries

The SADC Fisheries Protocol encourages the prudent and sustainable exploitation of living aquatic resources and ecosystems of state parties' interest (the Republic of Namibia, 2007). The SADC Member States ratified the Protocol on August 14, 2001, and it became effective on August 8, 2003. Namibia ratified the Protocol on 21 June 2002. Furthermore, to ensure food security and reduce poverty, SADC recognizes fisheries' critical contribution to social and economic well-being and human livelihood (SADAC, 2020).

1.4.2.2 The Southeast Atlantic Fishery Organization (SEAFO)

SEAFO was established in 1997 by Angola, Namibia, South Africa, and the United Kingdom as a regional initiative incorporating the precautionary approach to fishery management, of which Namibia is a member state. Namibia became the signatory on 20 April 2001 and ratified the SEAFO organizational Convention on 26 February 2002. In addition, Namibia hosts the SEAFO Secretariat (the Republic of Namibia, 2007).

1.4.2.3 The Benguela Current Convention

The Benguela Current Commission (BCC) was created in 2007 as a permanent intergovernmental organization under the Benguela Current Convention. The Benguela Current Large Marine Ecosystem is a formal treaty between the governments of Angola, Namibia, and South Africa that outlines the nations' intention to support a coordinated regional approach to its long-term conservation, protection, rehabilitation, enhancement, and sustainable use in order to bring about economic, environmental, and social benefits (BBC 2013). Both parties signed the convention at its establishment in 2013, and Namibia ratified it in 2015

1.4.3 The Namibian legal framework for fisheries management

Namibia is a developing country with a wide range of natural resources, including mineral deposits, diverse rangelands, arable land, wildlife, and marine resources (African Legal Information Institute, 2019). One of the marine resources in Namibia is the commercial marine fish species that exist naturally along the Benguela coastal belt of the Atlantic Ocean (Ministry of Fisheries and Marine Resources, 2018). The need for sustainable development of the marine fishery resource in Namibia was realized soon after independence when resource conservation and management were incorporated into the Namibian Constitution, and this was translated into national statutory instruments. The promotion of sustainable development in Namibia is explained in Article 95(l) of the Namibian Constitution as the "utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future" (the Republic of Namibia, 1990).

The legislation that emerged from the Constitution includes the Namibian Environmental Management Act (Act No. 7 of 2007), which deals with sustainable preservation of the environment and the Marine Resources Act (Act No. 27 of 2000), which addresses all key drivers of overfishing by setting explicit rights/quotas and banning harmful fishing methods (the Republic of Namibia, 2000; the Republic of Namibia, 2007). The concept of sustainable marine fisheries in Namibia is regulated by international, regional, and national legal instruments. The next sections focus on the legal framework of marine fisheries management applicable to ocean sustainability governance and Namibian fisheries management for sustainable development.

Before independence, Namibia was administered by South Africa; hence the legal framework related to the exploitation and management of marine fisheries was South African. However, the South African government did not completely integrate South West Africa (Namibia) into the state but administered it as a de facto province. Without a sustainable legislative framework for exploiting marine fish resources; hence there was uncontrolled over-exportation of marine fish resources (Paterson, Kirchner, & Ommer, 2013).

Namibia's coastal waters had a history of heavy overfishing by South Africa and other international fishing vessels due to uncontrolled access allowing distant water fleets to fish beyond catch limits (Weidlic, 2019).

Immediately after Independence, Namibia established the Territorial Sea and Exclusive Economic Zone of Namibia Act (Act No.3 of 1990), which was meant to determine and define the territorial sea, internal waters, exclusive economic zone, and continental shelf of Namibia (the Republic of Namibia, 1990). Followed by the White Paper Policy of 1991 titled "Towards Responsible Development of the Fisheries Sector." According to FAO (2021), the white paper policy of 1991 was later translated into regulations in the Sea Fisheries Act of 1992.

In 1992, the Sea Fisheries Act (Act No. 29 of 1992) became law for the conservation of marine ecology and the orderly exploitation, preservation, protection, and promotion of marine resources. The Sea Fisheries Act (Act No. 29 of 1992) was later replaced by the Marine Resources Act (Act No. 27 of 2000), which incorporates international best practices for fisheries management and the critical elements of international fisheries management instruments.

1.4.3 The main instruments for the legal framework of Namibian fisheries management include the following:

The Territorial Sea and Exclusive Economic Zone of Namibia Act (Act No.3 of 1990) was established to determine and define the territorial sea and internal waters.

The Marine Resources Act (Act no. 27 of 2000) replaced the Sea Fisheries Act (Act No. 29 of 1992) and incorporated the best international Instrument for fisheries management. The marine resources Act 27 of 2000 Aims to "provide for the conservation of the marine ecosystem and the responsible utilization, conservation, protection and promotion of marine resources on a sustainable basis."

The 2004 Marine Resources White Paper Policy, for responsible development, regulation, and conservation of marine resources.

According to FAO (2002), Namibia subscribes to a number of international fisheries conventions, agreements, and arrangements that include the following:

The Agreement for the Implementation of the Provisions of the UN Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Fish Stocks.

The FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas;

The FAO Code of Conduct for Responsible Fisheries.

The above indicates that the Namibian marine fisheries management changed at independence from uncontrolled management before independence to sustainable management after independence. With regard to international legal instruments, Namibia ensures that all international agreements and legal instruments on fisheries are domesticated, Although they are still to domesticate the Port State Measures Agreements.

CHAPTER 2: RESEARCH METHODOLOGY AND DESIGN

2.2 Research Philosophy

A research design is a framework for collecting and analyzing data to answer research questions and meet or achieve research objectives by providing reasoned justification for the choice of data sources, data collection, and data analysis techniques (Saunders et al., 2019). The research design is guided or informed by the research paradigm or philosophy, which can be interpretivism philosophy (qualitative), positivist philosophy (quantitative), or pragmatist philosophy (mixed methods). The positivist philosophy assumes that some laws or theories regard a study as a natural science based on a belief that the study of human behavior should be conducted in the same way as natural sciences aiming to provide explanations and make predictions based on measurable outcomes (Kivunja & Kuyini, 2017). The interpretive philosophy enables the researcher to gain more insight into the understudied phenomenon by asking the respondents open-ended questions (Saunders et al., 2019). The third philosophy, pragmatism, combines both the positivist and interpretive philosophies to gain a deep understanding through data triangulation. This study adopted a pragmatic philosophy that involves the utilization of the convergent (concurrent) parallel mixed-methods design to collect both qualitative and quantitative data for analysis.

2.3 Research Methods

The study adopts a mixed method to increase validity and reliability by integrating quantitative and qualitative research methodologies (Harris et al., 2009). To understand the effectiveness of Namibia's fisheries management system, Hake, Horse mackerel, and Monkfish were chosen as a case study to assess Namibia's fisheries management. First, I present a quantitative evaluation of secondary data from government reports on the status of marine fish stocks. Secondary data analysis is defined by Koziol & Arthur (2011) as the process of obtaining and examining data that is already available and was collected primarily for another purpose. The study reviewed the annual TAC report of the species under study obtained from the Ministry of Fisheries and Marine Resources to assess trends and variations of the fish stock over time. These reports provide detailed information on stock status presenting data on several indicators such as biomass, recruitment, catch per unit effort, etc., that can be used to evaluate the health of the stock and whether it is being fished sustainably.

The study also adopts a qualitative research approach, utilizing semi-structured interviews to get primary data by gathering information on perceptions of Namibia fisheries management for sustainable development by experts from the Ministry of Fisheries and Marine Resources, Fisheries Observer Agency, and Stakeholders. Asking the respondents open-ended questions enables the researcher to gain more insight into the understudied phenomenon (Saunders et al., 2019).

2.4 Interview questions and design

I designed two sets of open-ended questions (one for MFMR and FOA personnel AND the second for stakeholders). Interview questions were developed based on themes that were considered essential in answering the research question and enabled participants to give an in-depth perception of the Namibia framework for fisheries management. I contacted possible respondents from different organizations in the Namibian maritime sector via my mobile phone and email. Those who responded positively had to schedule the interview appointment at their convenient date and time. I conducted in-person interviews with 12 participants between 09/05/2022 – 19/05/2022.

I began the interview with a brief introduction about myself and explained the purpose of the interview. Then, the participants were presented with an interview guide for them to follow. All interviews were conducted in English and recorded on my mobile phone with the participant's consent, except for two participants (P4 &P9) who indicated their unwillingness to be recorded. To ensure data collection efficiency, I took notes throughout the interview. Interviews took about 15 to 30 minutes.

Below are the question contained in the interview guide:

Section A: Ministry of fisheries and the Observers agency personnel

Biographical data

Your organization:

Current position:

Namibian fisheries management systems for sustainable development

1. In your opinion how effective is Nambia's legal framework for fisheries management?
2. Kindly give an example of how the legal framework has helped with the sustainable management of fisheries.
3. Which of Namibia's fisheries would you describe as "sustainable"?
4. In particular, do you think the harvesting of Hake, Monk, and Horse mackerel is done in a sustainable manner? Please tell me why you consider these fisheries to be sustainable.
5. Is the existing legislative framework for marine fishing in Namibia sufficient to ensure a long-term sustainable future?
6. In your opinion, what are the challenges that the Ministry still needs to address in order to realize sustainable exploitation of marine resources

Section B: Interview guide for Fisher and other fisheries stakeholders

Organization:

Position:

1. Please tell me about the type of fishery you are involved with and if you consider it sustainable?

2. Do you think the exploitation of Hake Monk and horse mackerel in Namibia is done sustainably? Please tell me why.

3. Do you think Namibia's fisheries laws are adequate to ensure a long-term future for your fishing business?

4. Is the Ministry of Fisheries and Marine resources doing enough to promote

sustainable fishing?

5. Are you aware of any noncompliance with Namibia's fisheries laws? Please describe.

6. Do you have any suggestions for the Ministry of fisheries and marine resources to help improve Fisheries Management in order to realize sustainable fishing

2.5 Data analysis

The data from interviews were analyzed qualitatively using thematic data analysis, whereby the interview's transcription and coding produced several themes examined in this study.

2.7 Ethical issues

Firstly, I applied for permission to conduct the research at the Ministry of Fisheries. Data collection at the Ministry of Fisheries and Marine Resources only commenced after the Executive Director granted permission. Furthermore, the research study collects primary data through interviews with human subjects. Therefore, before starting the research with respondents, The World Maritime University Research and Ethics Committee's ethical clearance and approval were sought. Participant engagement only started after approval was granted. All participants signed a consent form, which is included in Appendix 2. Participants were further assured in this document that I would only utilize the data for the dissertation and safely dispose of all the data at the end of the study. Additionally, participants were informed that participation is voluntary; this implies that participants have a choice to withdraw from the study for any reason and at any time. Participants were also assured of their anonymity and that their responses will be treated with strict confidentiality.

2.8 Sampling method

The study was carried out based on the availability and willingness of respondents. To attain even participation, requests were sent to the Ministry of fisheries personnel, all fisheries stakeholders, and civil society organizations involved in the maritime sector. Furthermore, to avoid sampling error, I also recruited some participants via the snowball sampling technic. Snowball sampling is defined by Flick (2018) as The sampling strategy that relies on available participants to recommend additional experts based on their applicability to the research issue.

CHAPTER 3: RESULTS OF THE MINISTRY OF FISHERIES DOCUMENT ANALYSIS

Introduction

This chapter presents the study's findings derived from the Ministry of Fisheries and Marine Resources document analysis, the evaluation of the Monk, Hake, and Horse Mackerel fish stock status based on the government's statistics report (2021 TAC)

3.1 THE HAKE STOCK STATUS

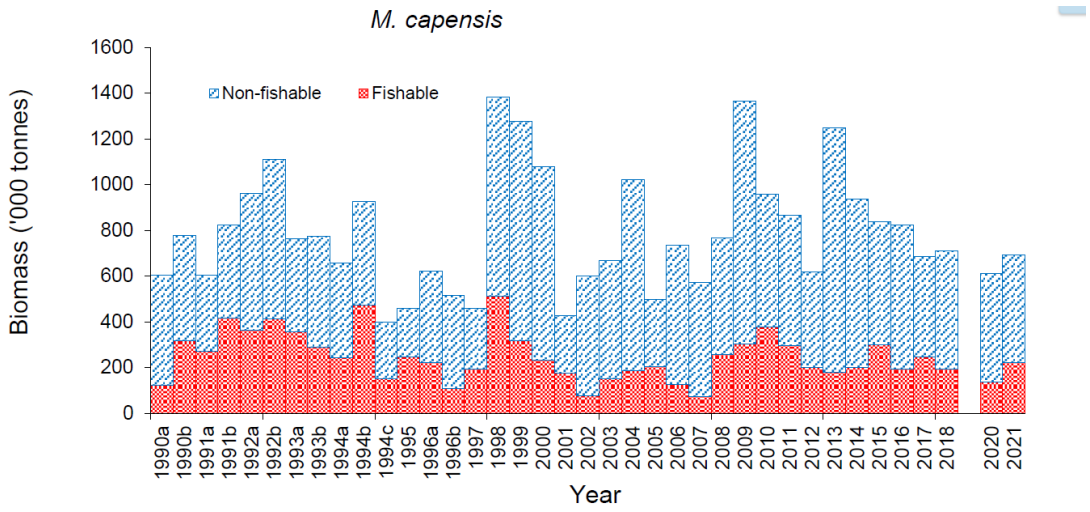
The Hake Stock Status is evaluated based on the 2021 Stock Status report

Two types of Hake: *Merluccius capensis* (shallow-water Cape hake) and *Merluccius paradoxus* (deep-water Hake), are found in Namibian EEZ. Both are targeted by bottom trawl (frozen and wet fleets) and longline fisheries.

3.1.1 Biomass estimates

Annual surveys have been conducted since 1990, except for 2019, when no survey occurred due to research vessel mechanical problems. The fishable biomass (fish that are 36cm and above) of *M. capensis* has been around the average biomass over the year, fluctuating from around 100,000 T in low stock years (e.g., 2002 and 2007) to over 300,000 T in good years (e.g., 2010). The non-fishable biomass (fish less than 36 cm) has been consistently higher over the years (figure 3.1).

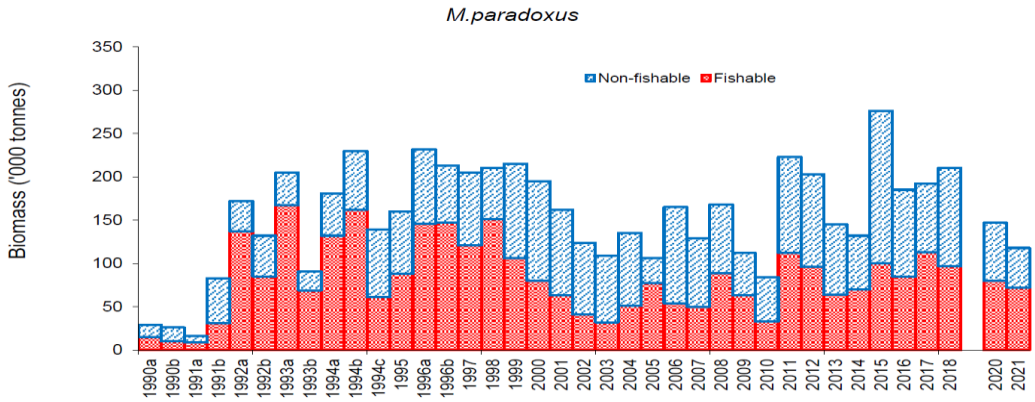
figure 3. 1 Estimated fishable and non-fishable biomass of M. capensis



Source: Hake 2021 Total Allowable Catch (TAC) Report (Ministry of Fisheries and Marine Resources (MFMR))

The *M. paradoxus* biomass, both fishable and non-fishable, was very low in 1990. due to a plan to rebuild the stock by the government at independence, a steep increase in Biomass was observed from 1992 before a decrease around 1999 to 2003. And it has been increasing since then, with a minor decline in non-fishable biomass observed in 2021, as indicated in figure 3.2

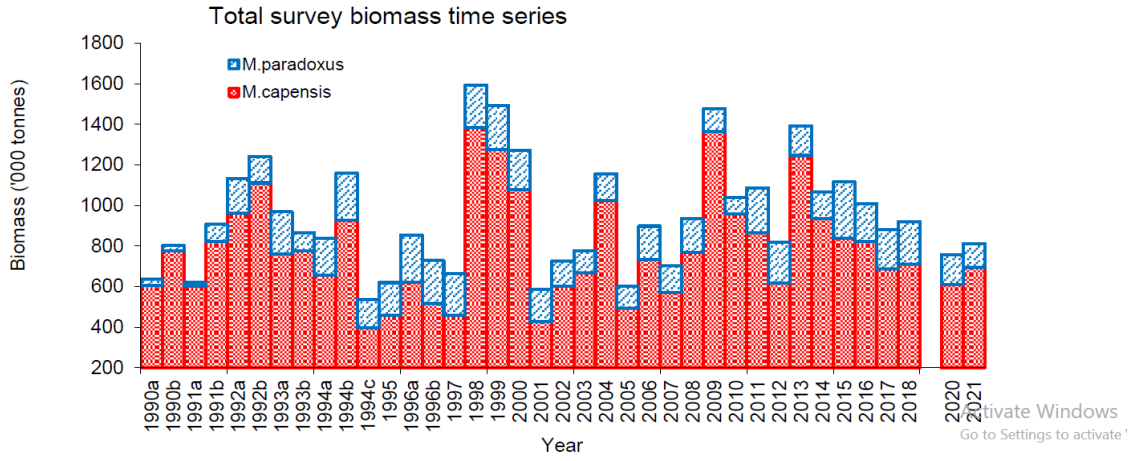
figure 3. 2: Estimated fishable and non-fishable biomass of M. paradoxus



Source: Hake 2021 TAC Report (MFMR)

Overall, the combined survey biomass estimates of Hake (*M capensis and M pradoxus*) in the Namibian waters since 1990 have been dominated by M. capensis. And the total biomass has been above the average biomass (about 700 000 tonnes) over the years, except the last quota of 1994 (1994c), 1995,2001, and 2005 where a drastic decline was observed and the biomass was recorded as below the average. as indicated in figure 3.3

figure 3. 3: Total Survey biomass estimates of Hake,

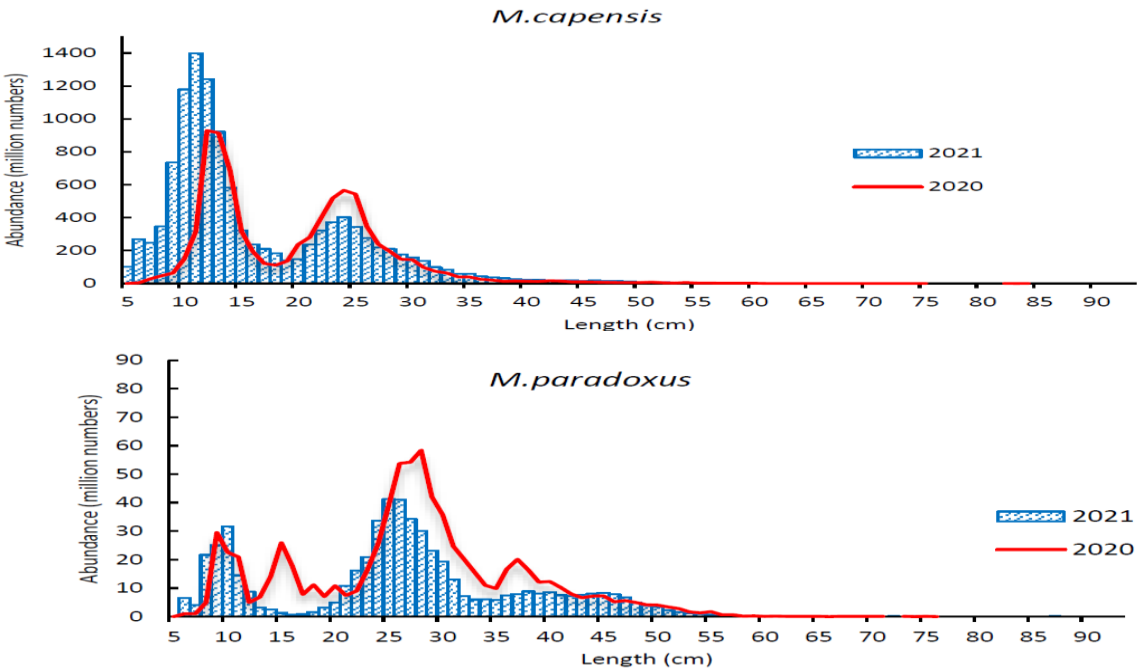


Source: Hake 2021 TAC Report (MFMR)

3.1.2 Size composition

The overall size composition of the survey for 2020 and 2021. *M. capensis* shows an increase in the biomass of fish between 10-13 cm and fish greater than 28 cm (figure 3.4). The abundance estimates show no increase in the fish greater than 28 cm, indicating that the increase in biomass for those lengths may result from increases in weight due to growth and not recruitment. While The *M. paradoxus* saw a decrease, especially in the size classes between 25 to 40 cm range, and very few fish bigger than 60cm were found

Figure 3. 4**:** Comparison of the abundance (in numbers) per 1-cm length class of M. capensis and M paradoxus during the 2020 and 2021 surveys.

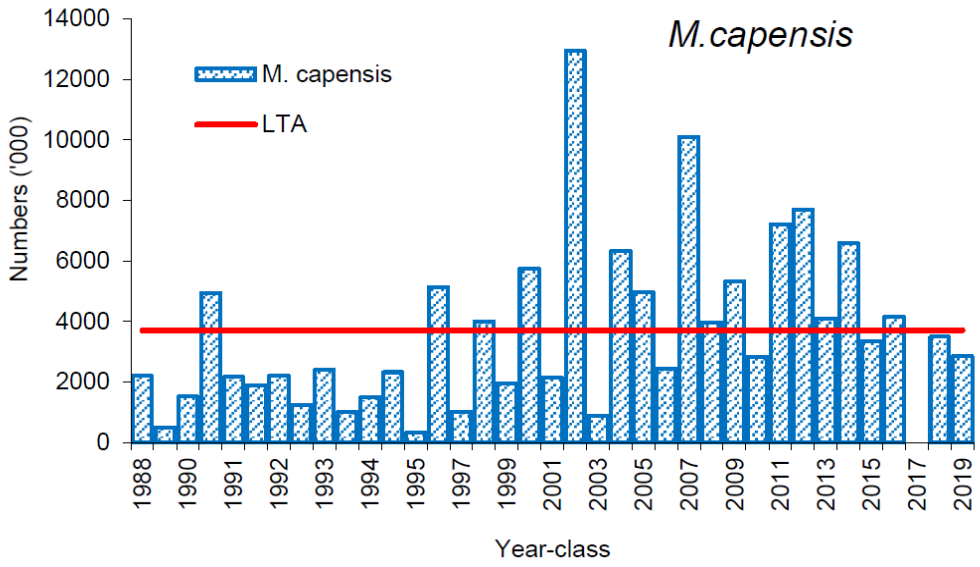


Source: Hake 2021 TAC Report (MFMR)

3.1.3 The recruitment of M. capensis

Recruits of the fisheries stock are estimated from the numerical abundance of fish with a modal length of about 22 cm (between 17 and 27 cm), assumed to be about 1.5-2 years old when caught during the surveys. From 1988 to 2001, M. capensis recruitment to fisheries was primarily below the long-term average; however, in 2002, there was a significant uptick before a precipitous drop-off in 2003, and since then, it has generally been at and around the long-term average (figure 3.5).

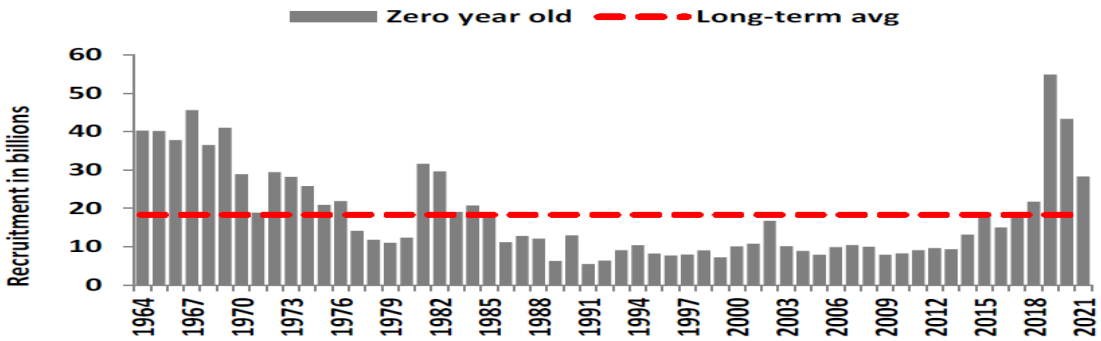
figure 3. 5:Model Estimates of the M. capensis recruitment to the fisheries



Source: Hake 2021 TAC Report (MFMR)

Although stock recruitment has been below the total average, it is worth noting that a steady increase has been observed since 1991, gradually reaching the long-term average in 2015. and remained above the long-term average. A minor decline was observed in 2021, figure 3.6. Overall, there has been an improvement in stock-recruitment

figure 3. 6: Model estimated recruitment to the stock from 1964-2021

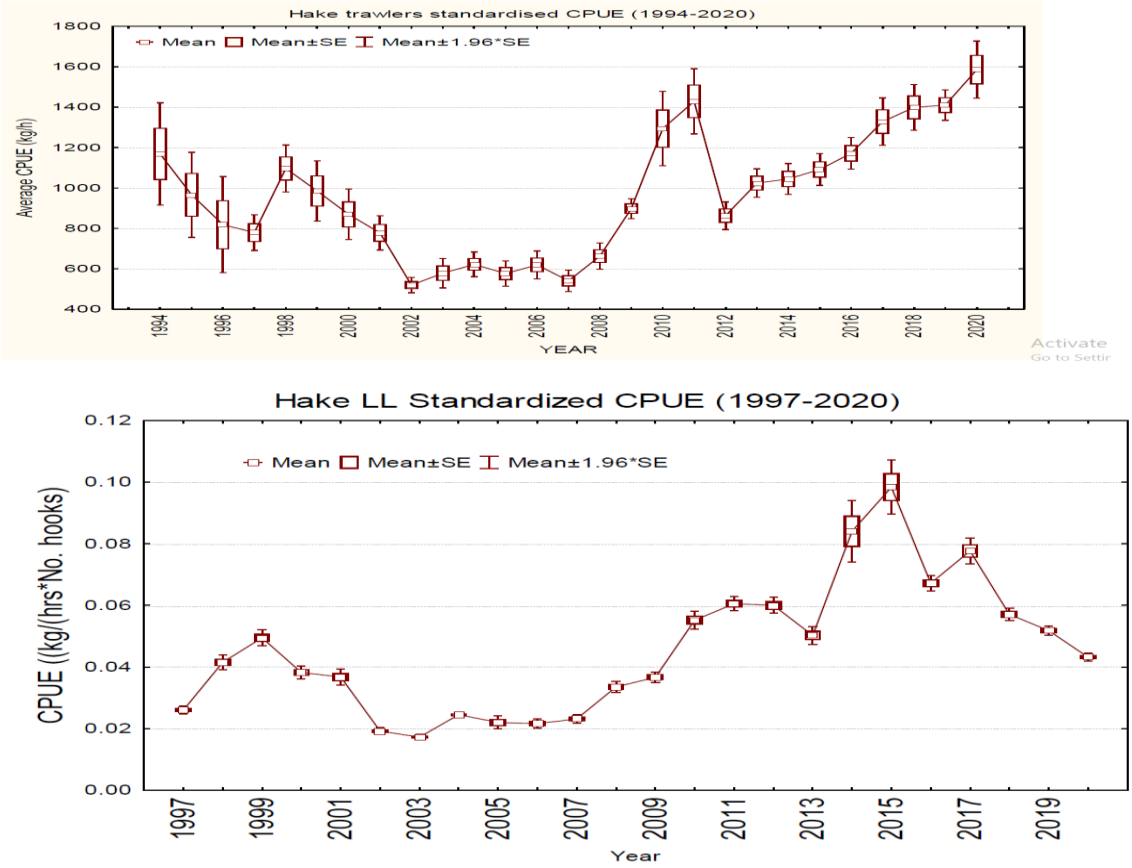


Source: Hake 2021 TAC Report (MFMR)

3.1.4 The catch per unit effort

The overall size structure of the commercial captures from 1994 to 2019, according to the trawl fleet standard-mean (figure 3.7), reveals that the catch rate declined until 2002 before sharply increasing in 2009. 2012 had a gradual fall, which was followed by a steady increase up until the present. In contrast, the CPUE in the Hake long-liner (LL) fishery had shown a steady increase over the years before a drastic downward trend from 2015 was observed.

Figure 3. 7:The annual CPUE Mean (kg/hr) for the trawl and longline fleet since.

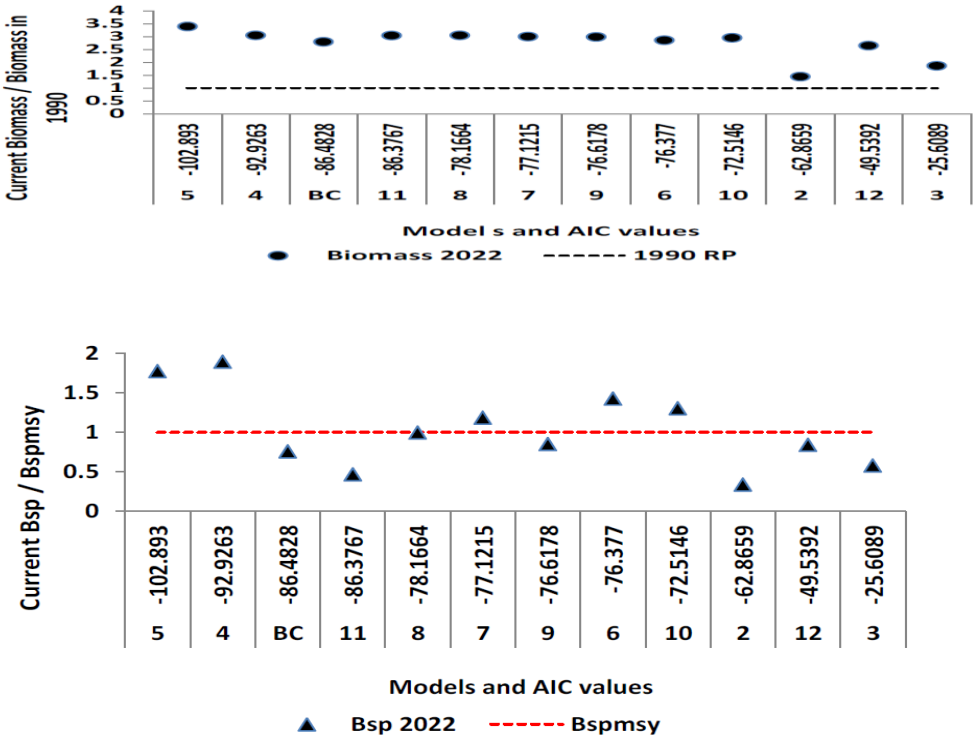


Source: Hake 2021 TAC Report (MFMR)

3.1.5 The current status of the stock

According to the 2021 report, Twelve (12) model specifications were run to determine the state of the stock, as indicated in figure 3.8. The state of the resource relative to the 1990 level and the Spawning stock biomass that would produce a maximum sustainable yield (Bspmsy) are indicated. The 1990 reference point was selected as the year where the hake stocks were at their lowest point, while the Bspmsy is the target biological reference point per the FAO guidelines of responsible fishing. All model specifications estimated the total biomass to be above the 1990 stock level, whereas only five models estimated the spawning stock biomass to be above Bspmsy. While six indicated, the stock is still below the Bspmsy

Figure 3. 8*:* Total biomass relative to the biomass in 1990 (a) and spawning stock biomass relative to Bspmsy.

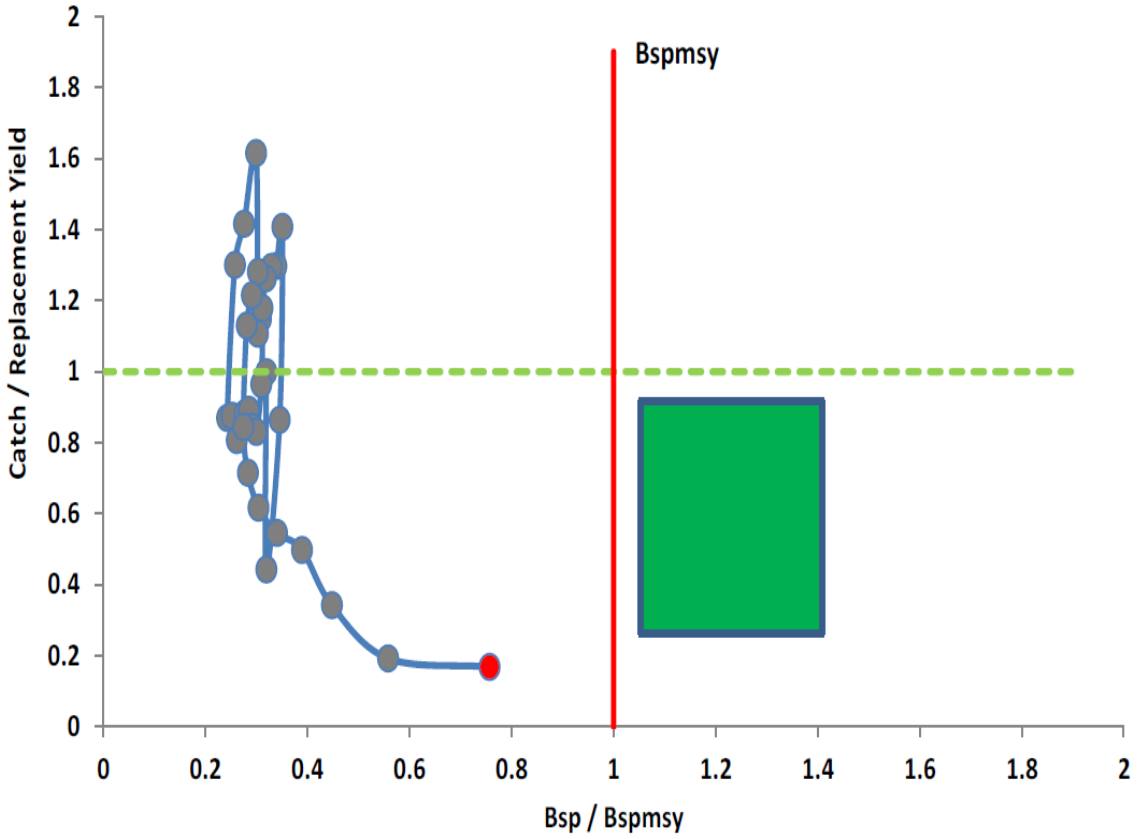


Source: Hake 2021 TAC Report (MFMR)

3.1.6 Hake Stock Management

The management of stock is assessed using a Management Monitor Graph (figure 3.9) shows the management of hake stock. This graph illustrates both management (along the y-axis) and the status of resources (along the x-axis). As of 2021 (indicated by the red dot on the graph), the stock is still on the left of the vertical line, which indicates that the stock is below the Bspmsy (not sustainable); however, it is slowly moving towards the Bspmsy level as indicated by the green rectangle in the graph

Figure 3. 9 The Management Monitor Graph



Source: Hake 2021 TAC Report (MFMR)

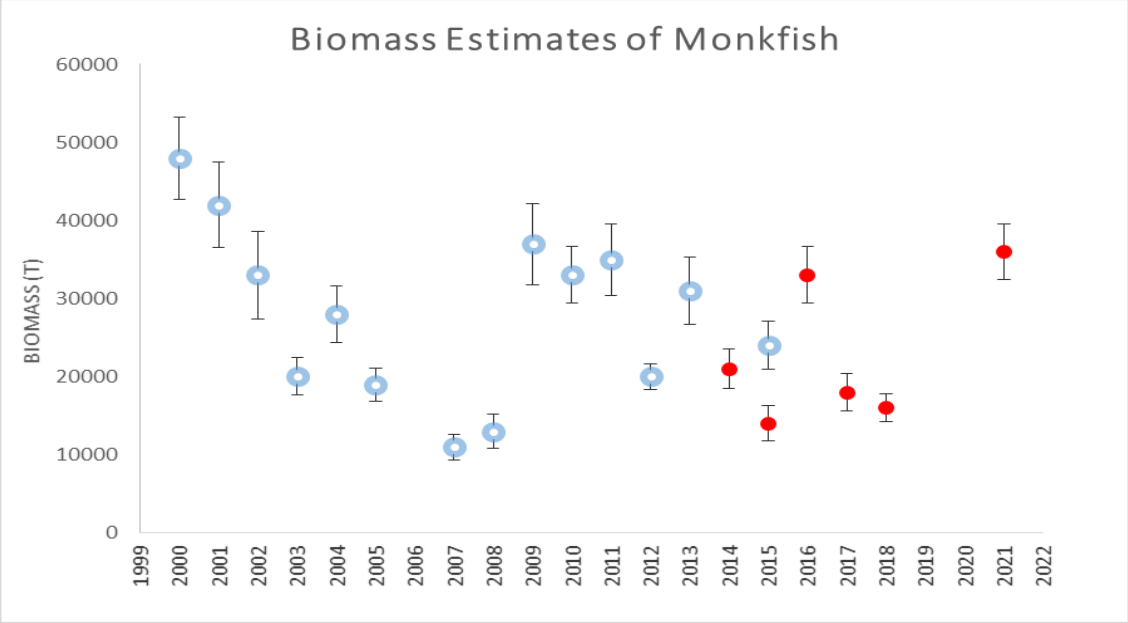
3.2 THE MONK STOCK STATUS

The Monk stock Status is evaluated based on the 2022 Total Allowable Catch report, which reflects the stock's status as follows.

3.2.1 biomass surveys

The Cape monkfish biomass survey started in 2000, and since then, the fishery has been regulated through a Total Allowable Catch (TAC). The surveys are performed annually. The total biomass estimate figure 3.10 shows a downward trend till 2007, whereby it increased sharply and remained about average, with a minor decline observed in 2017 and 2018

Figure 3. 10 Survey biomass estimates with standard deviations from 2000-2021 in tonnes.

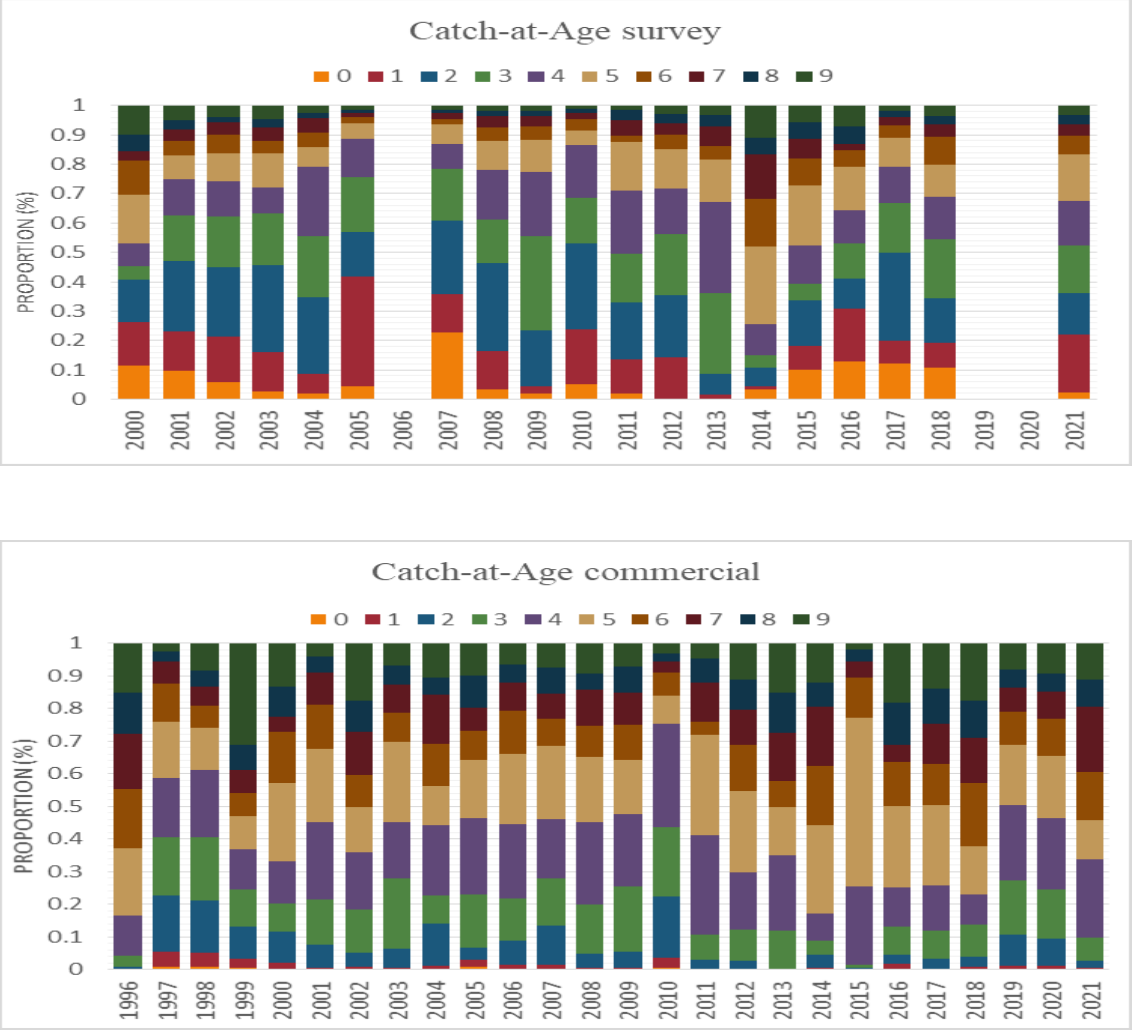


Source: Monk 2021 TAC (MFMR)

3.2.2 Catch at Age

Figure 3.11 shows the trend in catches at age as per the survey carried out by MFMR (2000-2021) as well as in the commercial catches (1996-2021), although the small fish 0-1 year age group are caught in survey trawling. It is worth noting that a similar trend is not observed in commercial catches. This is a good trend allowing the small fish to grow as these are the fish expected to recruit to the adult stock. Over the years, all catches are dominated by the middle age group (3-4 years)

Figure 3. 11 Catch-At-Age proportion of monk survey catches (2000-2005; 2007-2018; 2021)



Source: Monk 2021 TAC (MFMR)

3.2.3 Commercial Catch Per Unit of Effort (CPUE)

As per the result produced by A Generalized Linear Model (GLM) standardized catch Per Unit of Effort (CPUE) used in this fishery Figure 3.12, The trend shows three distinct phases, with increasing CPUEs from 1991 with a peak in 1997 and consequent declines to low levels in 2009. After that, the CPUE started to increase again. The CPUE has, however, declined in 2021 as compared to 2020.

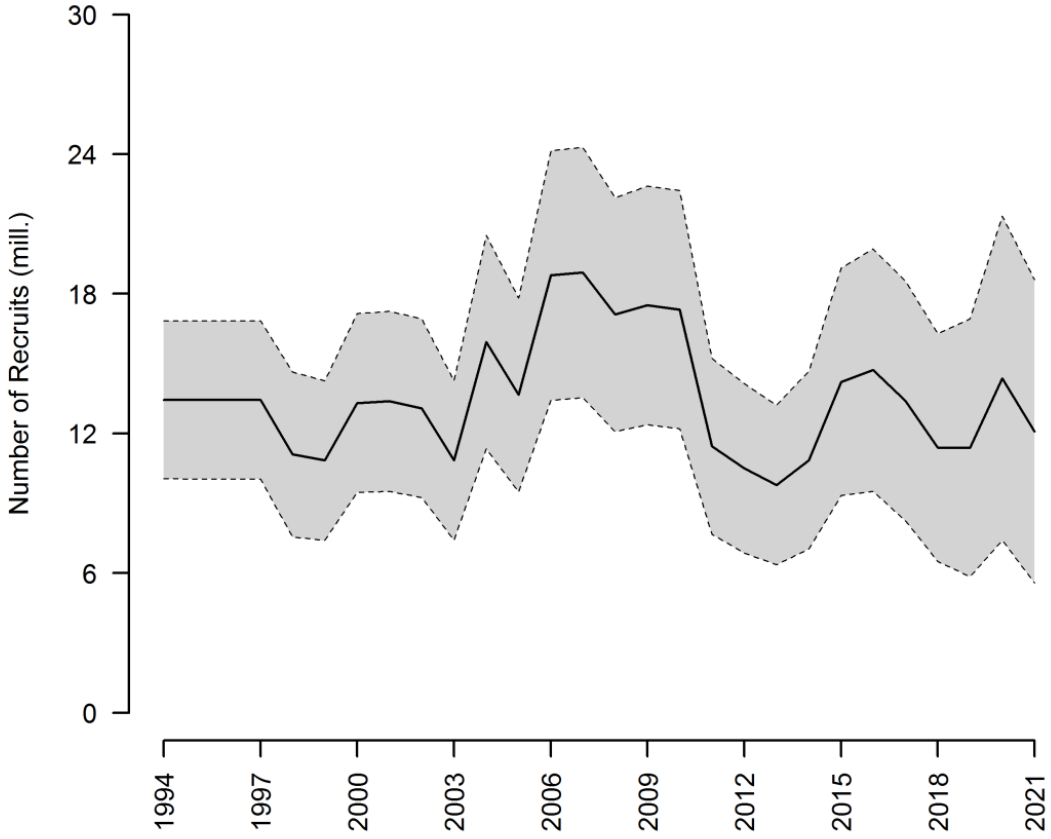
Figure 3. 12 CPUE in kg/h for the Namibian monkfish fishery obtained from fitting the GLM model from 1991 to 2021, excluding 1997.

Source: Monk 2021 TAC (MFMR)

3.2.4 Stock recruit estimate

The estimated level of recruitment derived from the observed catch-at-age data from 1994 to 2021 is shown in figure 3.13. The estimated recruitments show an increase from 2000 to 2007; hence the growth in the stock observed in the successive years (figure 3.14). However, the impacts of poor recruitment thereafter may have affected the stock negatively. Therefore, the recruitment for 2019, 2020, and 2021 varies but remains above average.

figure 3. 13 Estimated recruitment of Namibian Cape monkfish

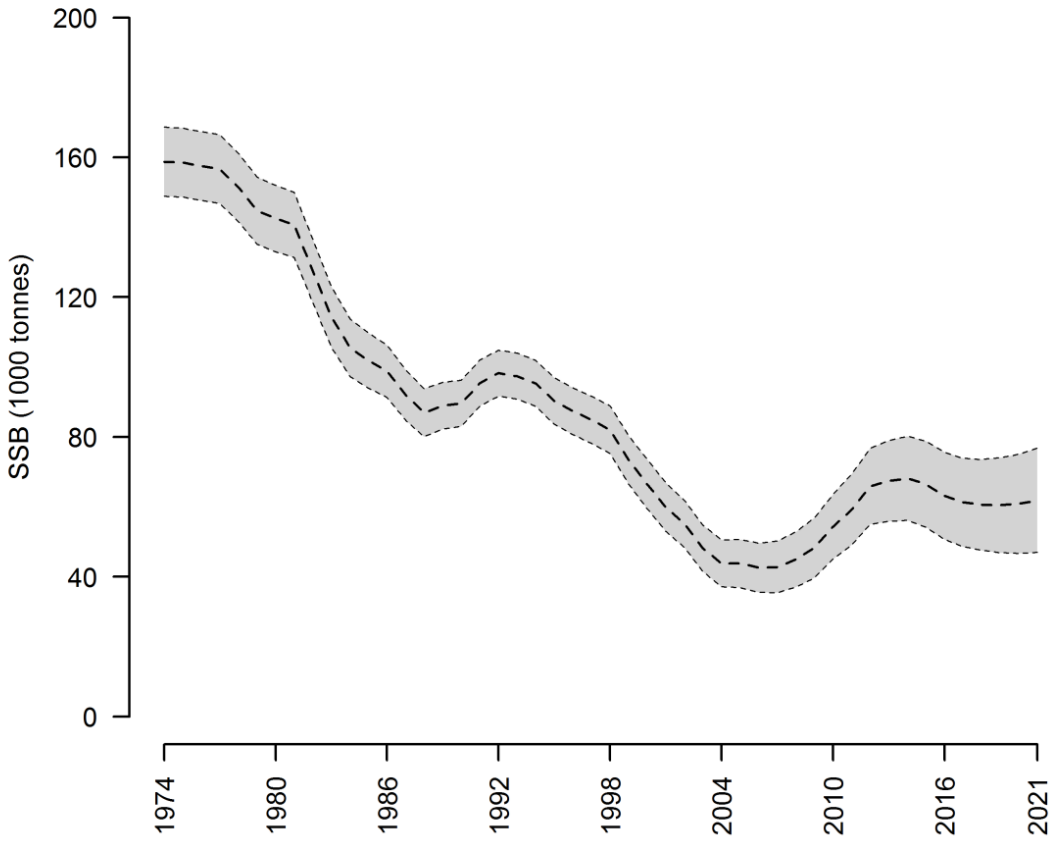


Source: Monk 2021 TAC (MFMR)

3.2.5 Total biomass estimate

The estimated total biomass of Cape monkfish stock is shown in Figure 3.14. The estimated historic biomass rate showed a downward trend till around 2007, when a steady increase was observed till about 2013, and it has remained constant to date.

figure 3. 14 Estimated total biomass of Namibian Cape monkfish

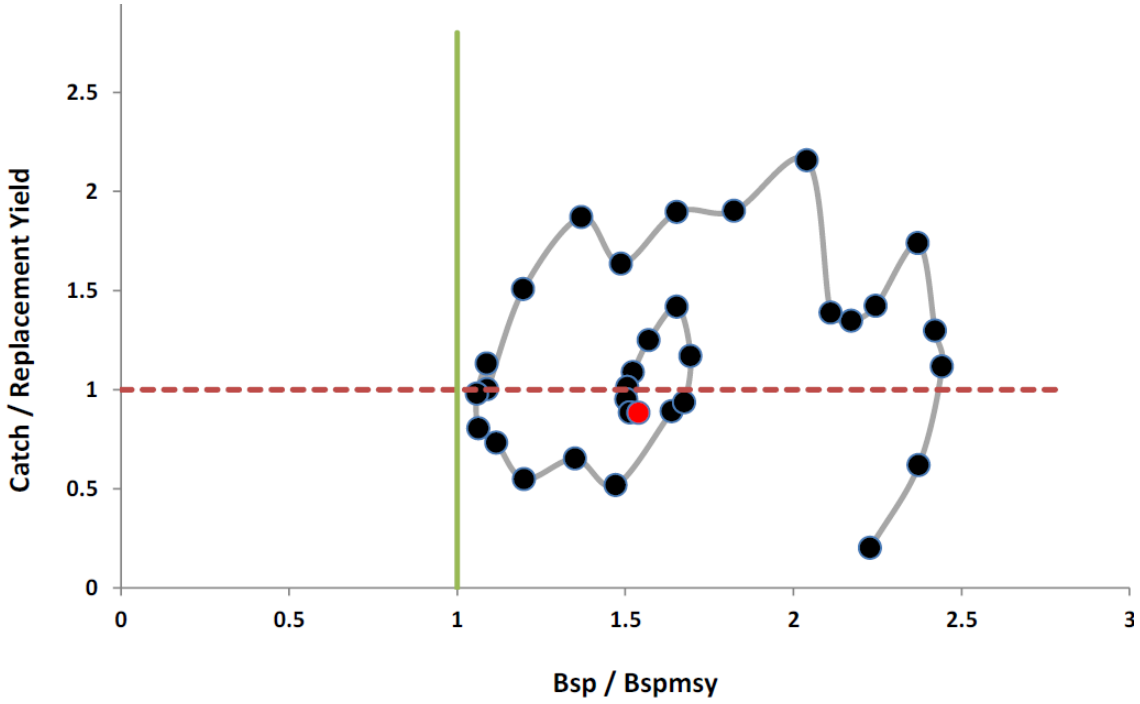


Source: Monk 2021 TAC (MFMR)

3.2.6 Stock Management

Figure 3.15 demonstrates that overfishing occurred in some years because the catch was above replacement yield (RY). According to figure 3.15, the current catches are marginally below the replacement yield, and the Bsp is currently above the Bspmsy level. If this trend continues, the stock is sustainable and anticipated to increase in the future if catches remain below the replacement yield

figure 3. 15 the Monk Management Monitor Graph



Source: Monk 2021 TAC (MFMR)

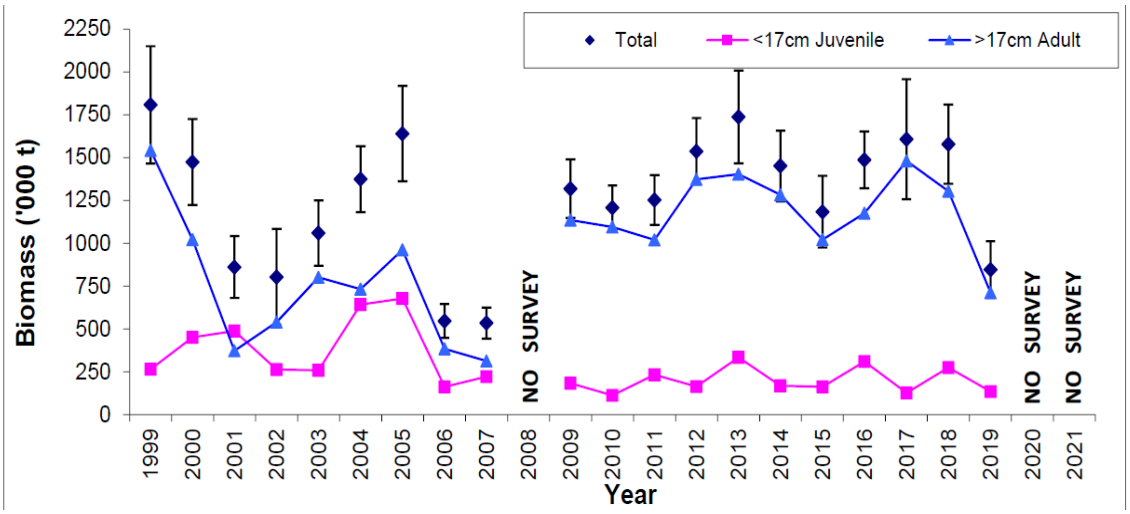
3.3 HORSE MACKEREL STOCK STATUS.

Horse Mackerel is assessed based on the 2021 total allowable catch report

3.3.1 Biomass estimate

The estimated biomass from the acoustic surveys is used as a measure of the abundance of the horse mackerel stock. Prior to 2005, biomass fluctuated between 0.8 and 1.8 million tonnes, but after that point, it decreased to the lowest estimate of roughly 0.5 million tonnes in 2006 and 2007 (figure 3.16). After that, this index got better and maintained levels similar to those that were reported before 2005 until a significant decline was noted in 2019.

figure 3. 16 Biomass estimates of adult (≥ 17 cm), juvenile (< 17 cm) and the total horse mackerel biomass

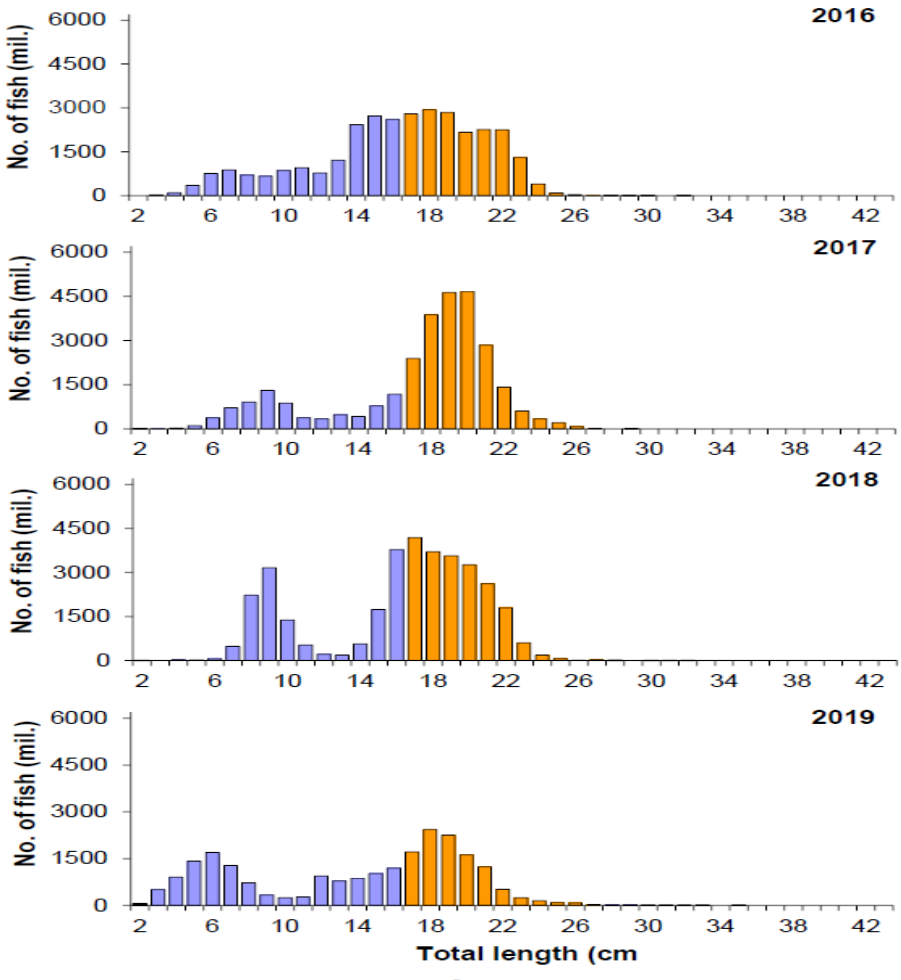


Source: Horse Mackerel 2021 TAC report (MFMR)

3.3.2 Size and age structure

Horse mackerel is divided into two size categories, one of which is made up of juvenile (0-1-year-old and <17cm) and adult fish (2-3 years and >17cm). Figure 3.17 shows a decline in stock abundance in juvenile and adult fish, with big fish gradually disappearing from the stock as per the 2019 survey.

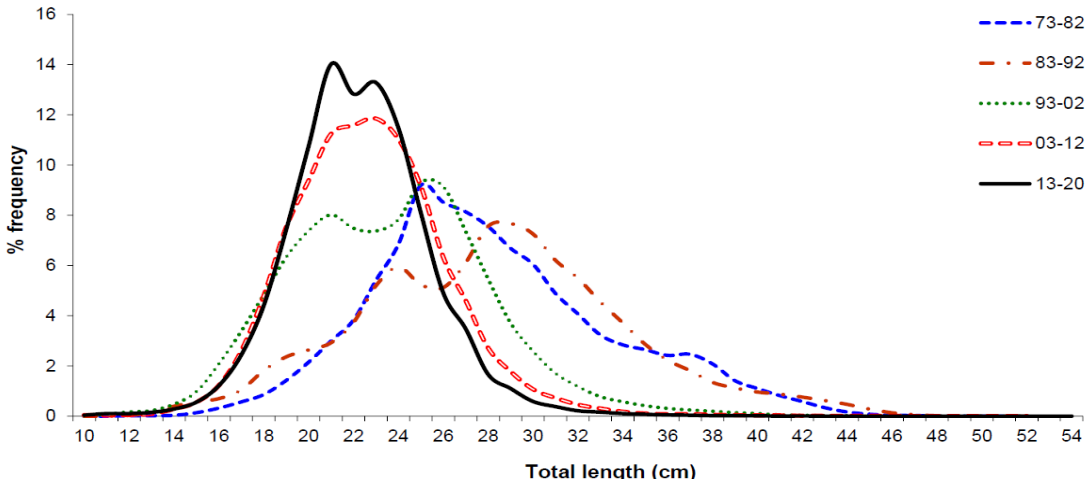
figure 3. 17 length frequency distribution



Source: Horse Mackerel 2021 TAC report (MFMR)

From 1973 to 1982, the midwater catches' length frequency distribution ranged from 14 to 52 cm, with a modal length of 26 cm (Figure 3.18). Fish between 20 and 40 cm TL made up the majority of the catches at that point. The length frequency distribution displayed a slight leftward shift from 1983 to 1992, with lengths spanning from 11 to 49 cm and showing dual modal values of 24 and 29 cm. The majority of the captures were still made up of fish between 20 and 40 cm. As of today, the typical lengths are 21 and 26 cm. Obviously, at that point, fish 30 cm in length and larger had all disappeared; the last decade saw a continuation of declining fish sizes and an increase in the proportion of small fish in the midwater catches. Fish less than 20 cm in length started to make up a significant portion of the catches from this fishery. With modal lengths between 18 and 24 cm

figure 3. 18 **Length frequency distribution of horse mackerel in midwater catches made** during the last four decades

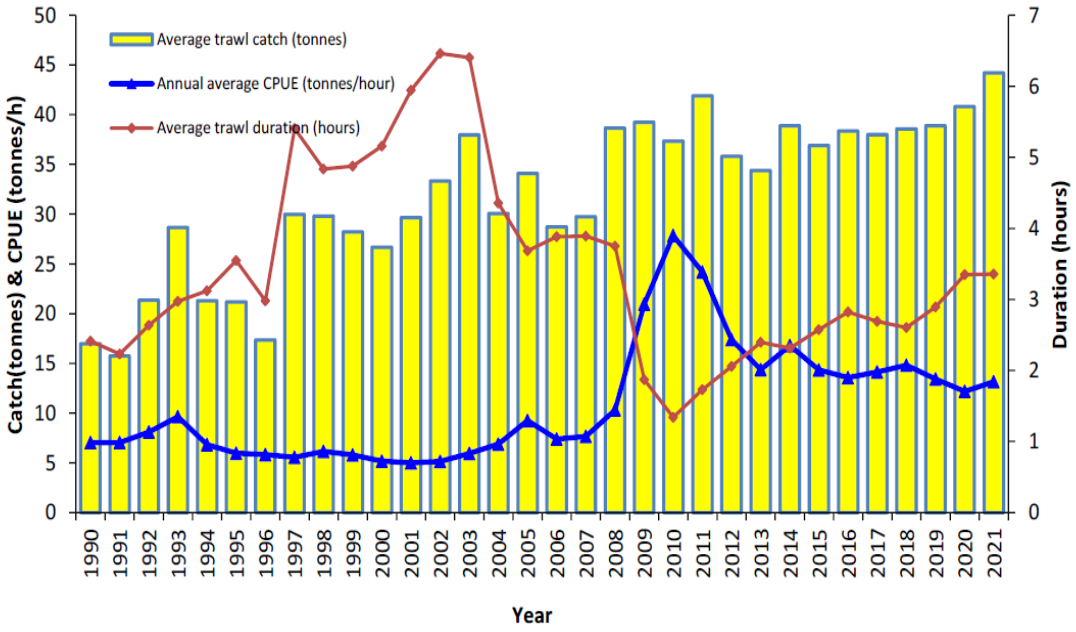


Source: Horse Mackerel 2021 TAC report (MFMR)

3.3.3 Effort and Catch-per-unit-effort (CPUE)

The average trawling hours trend shows three separate periods: a period of erratic but upward trend between 1990 and 2004, a period of abrupt declines from 2004 to 2010, and finally, a period of moderate but consistent increase from 2010 to the present (figure 3.19). The two years with the longest annual average trawl duration were 2002 and 2003, when it was around 6 hours, and 2010 when it was only about 1 hour. Before 2007, the trend in trawl durations was mirrored by the average trawl catch, meaning that greater fishing effort would result in higher average trawl catches. However, since 2008, the volume of catch per trawl has significantly increased, contrary to the decrease in trawl duration.

figure 3. 19 Annual average trawl catch, CPUE, and trawl duration of the midwater fishery during the period 1990 to July 2020

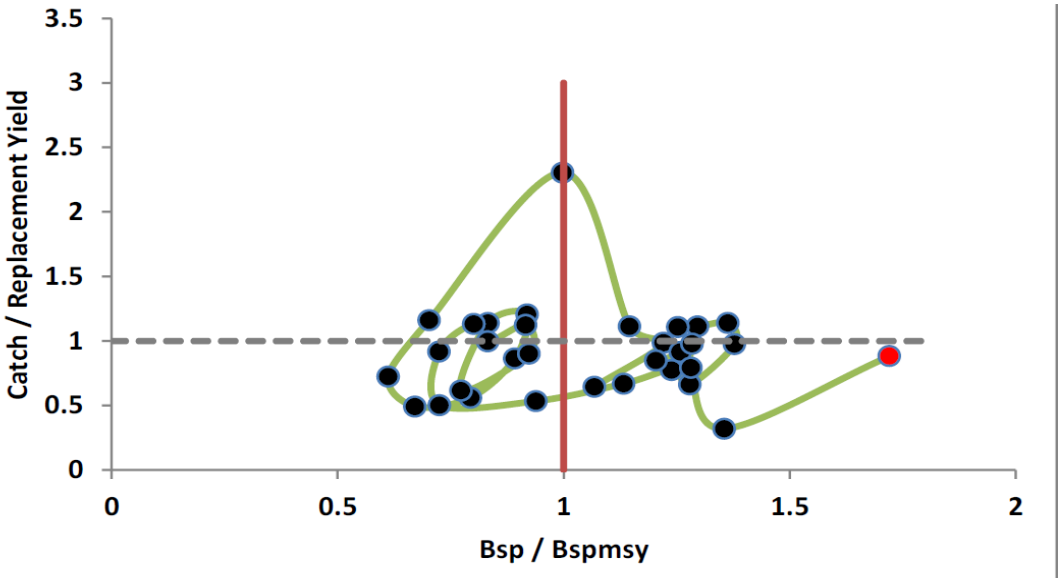


Source: Horse Mackerel 2021 TAC report (MFMR)

3.3.4 Stock Management

As seen in figure 3.20, the management monitor graph indicated that the Bsp was almost around the Bspmsy level in 1990. However, overfishing occurred in one of the years. It can also be observed that in some of the years, catches stayed close to the RY, but eventually, catches dropped below the RY, which caused the Bsp to grow to the Bspmsy and the catches remained around the replacement yield. Therefore the resource is currently above the Bspmsy level and sustainable, as indicated by the red dot in figure 3.20

Figure 3. 20 the management and status of the stock from 1990 to 2021.



Source: Horse Mackerel 2021 TAC report (MFMR)

CHAPTER 4: RESULTS OF INTERVIEW

4.1 Interview results

The result is divided into two sections: first, the results from the Ministry of fishery and Fishery Observers Agency's personnel as per section A of the interview guide attached as appendix 1, and stakeholders as per section B of the interview guide.

4.2. THE INTERVIEW RESULTS OF MFMR AND FOA PERSONNEL

4.2.1 Participants

Six individuals were interviewed and coded as P1, P2, P3, P4 ….. as per table 4.1 below. Of which four are from the Ministry of Fishery, while two are from the Observers Agency. Due to their experience and position in their organization, these participants' contributions to the study were highly pertinent, and their explanations exhibited high confidence.

Table 4.1 summary of the participant's demographic information.

Participants	*Gender*	*Organization*	*Date*	*Interview type*
P1	M	FOA	12/05/22	Semi-structured interview
P 2	F	FOA	12/05/22	Semi-structured interview
P 3	M	MFMR	13/05/22	Semi-structured interview
P 4	M	MFMR	16/05/22	Semi-structured interview
P 5	M	MFMR	16/05/22	Semi-structured interview
P 6	M	MFMR	20/05/22	Semi-structured interview

Namibia fisheries legal framework

The legal flame work is crucial as it's the basis for fisheries management. Table 4.2 below is a summary of all questions on regal frameworks

Table 4. 1 a summary of questions on legal frameworks

Interview guide	Questions
Section A	1, 2 ,5

Question one & two asked about the effectiveness of Namibia's legal framework for fisheries management and how it has helped with the sustainable management of fisheries. All 6 participants (P1, P2, P3, P4, P5 & P6) indicated that Namibia's fisheries legal framework., such as the Marine Resource Act, the regulation, and the Marine resource policy, are very effective and have greatly helped with the rebuilding of many Namibia fish stock that was nearing depletion at independence (1990). Additionally, it has greatly helped minimize IUU, say P2 and P4. Furthermore, P1, P2, and P3 alluded that the Namibian fisheries legislative framework is on par with other leading fishing nations of the world and has won several international accolades for excellent fishing framework in relation to marine resources.

In response to question 5, which asked if the Namibian Fisheries legal framework is sufficient to ensure long-term sustainable development, all participants were quick to say the legal framework is sufficient. P4 &P6 added that Namibia has the best legal framework for marine fishing; however, its implementation and enforcement component challenge its success. While P1, P2, P 3 alluded that the legal framework is sufficient to ensure long-term sustainable harvest of marine resources however it could further be strengthened by timely review to make it current as a lot has changed in the fishing sector and to incorporate recent international legal instruments that Namibia is a party to, also taking into account the dynamic of the blue economy and other new elements in our fishing industry. "we cannot have a law that is stagnant in this world, the law needs to change with time the current act is from 2000" says P3

4.2.3 Sustainability of Hake, Monk, and Horse Mackerel

In response to question three, which asked about which fishery is most sustainable, and question four asked about the respondent's perception of the sustainability of Hake, Monk, and Horse Mackerel Fisheries, the participant responded as follows:

Hake

Hake is considered the most sustainable fishery. Five participants (P1, P2, P3, P4, P5), of the participants, revealed that the most sustainably managed fishery is Hake, citing that Hake is the only fishery in Namibia that has a management plan in place and an annual closure during October that allows the fish to spawn uninterrupted. Additionally, P1, P2, and P3 Stated that the hake fishery is well managed because "this fishery recently (2020) received Marine Stewardship Council (MSC) certification. MSC certification is a lengthy process, and many conditions were assessed, including the entire ecosystem and the hake fishery meets all international standards that MSC assessed*" (P2)*. In contrast, P6 states That the most sustainable fisheries in Namibia are Monk and horse mackerel, as their biomass is above the maximum sustainable yield biomass.

Monk

All participants consider it sustainable; many cited that this fishery is new and has few rights holders. Furthermore, they have observed that the annual TAC has been constant over the years. P6 alluded that its biomass is above the maximum sustainable yield biomass. At the same time, P2 stated that the current management measure in places such as “annual stock assessment, monk association, and monk working group that thoroughly study all data and advise on annual TAC has dramatically helped with good management of this fishery over the year. Therefore, I can say it is sustainable."

Horse Mackerel

Five participants (P1, P2, P3, P4, P5) raised concerns about the sustainability of this fishery. Citing that there are a lot of right holders in this fishery and the carrying capacity of the fleet is big. For example, P1 states that "there are a lot of right holders and I believe the kind of fishing vessels in this sector are huge, and they could eventually deplete that resources I am very concerned. "

P 2 & P3 stated that there is a concern of fish length decline as per the observers and fishers report. Citing that may be caused by too much pressure in this fishery created by the wet-landed horse mackerel fleet for land-based production that was recently added after the collapse of the Sardine fishery. Additionally, P3 stated, "complaints have recently risen in this fishery, such as the stock has drastically declined, and fishers are finding it hard to fill up their vessels. Previously a trip used to take about two weeks, but recently it can take up to a month. And the landed catch is too small in size, mostly 16cm down".

Contrary, P6 is confident about the sustainability of this fishery, stating that "the biomass is above the maximum sustainable yield." However, he acknowledges that The population size structure has declined. The L50, which is the maturity size, has also declined, agreeing that the stock is under pressure. And there is a need to moderate pressure on the stock. However, he believes the pressure emanates from IUU fishing in the northern part of the country. And not from too many actors in these fisheries

The challenges that hinder sustainable exploitation of marine resources

Participants highlighted the implementation, funding, and Review of the Marine Resource Act as the significant challenges that the MFMR needs to address in order to realize sustainable harvesting of marine resources

Most participants acknowledge the good laws governing the fishing industry; however, they were quick to point out that the success of this law is hindered by lack of implementation citing funding as the major contribution. E.g., P6 & P4 & P5 stated that all rules and policies need to be implemented to the ladder; however, sometimes, an annual survey is not done due to financial challenges. Similarly, P1and P2 stressed the importance of research and the MCS directorate. Citing that this directorate has been underfunded makes it hard for research, the MCS section, and Observer Agency to execute their mandates fully. Additionally, P3, P2 & P1 cited that the marine resources Act is a bit outdated and needs to be revised and updated with changing times and regularly domesticated international regal instruments aimed at better management of fisheries resources. Finally, P2 and P1 added that the penalty no longer serves as a deterrent as they are too low; hence the review of the act will have this loophole closed. E.g., ″taking out a patrol vessel to patrol the EEZ and issue a fine of N$300-00, which is less than 20 US$, is laughable. Therefore, with good laws in place and very low punitive measures, it will not serve as a deterrent, Therefor law needs to be revised to be current and serve as deterrents”(P1).

4.2 INTERVIEW RESULTS FOR STAKEHOLDERS

A total of six participants from the different fishing organizations in Walvis bay and one from The Namibia nature foundation (NGO) were interviewed in person between 12-19 May 2022. They are coded as p7. P8, P9… as shown in the table below

Table 4. 2 Stakeholders' participant demographic information

Participants	Gender	Organization	Date	Interview (section)	Interview type
P 7	M	Tunacor fisheries limited	13/05/22	B	Semi-structured interview
P 8	M	Hangana seafood	13/05/22	B	Semi-structured interview
P 9	M	Seawork fish processor	18/05/22	B	Semi-structured interview
P 10	M	Benguela fishing	19/05/22	B	Semi-structured interview
P 11	M	Hangana sea food	19/05/22	B	Semi-structured interview
P 12	M	Namibia nature foundation	19/05/22	B	Semi-structured interview

4.2.1 Namibia fisheries legal framework

Responding to question three, which asked if Namibia's fisheries laws are adequate to ensure a long-term future for your fishing business? Most participants answered yes, and only P12 answered no, citing that the law is outdated. Further, in response to question 4, which asked if the MFMR is doing enough to promote sustainable fishing, all participants answered yes. Citing reasons such as annual stakeholders' engagement by the Minster of fisheries, placing of observers on board to oversee the harvesting operation, landing inspection by the inspector, and coastal patrol inspection.

4.2.2 Types of fishery

In response to question 1, which asked, which type of fishery are you involved in and do you consider it sustainable, All six interviewed stakeholders revealed they are engaged in the Hake fishery, with P7 involved in all three fisheries and P9 also engaged in the Monk fishery. They all stated that they consider their fishery sustainable due to the government's control mechanism to control and manage the stock. Citing the fishing rights, the annual setting of TAC, and the seasonal closure in the hake fishery as one of the government's significant control.

4.2.3 sustainability of hake Monk and Horse Mackerel

In response to question 4, which asked if the harvesting of Hake, Monk, and Horse Mackerel in Namibia is done sustainably, the respondents answered as follows:

Hake

All participant thinks the harvesting of Hake is sustainable due to fisheries management measures that are applied to this fishery which involve research, surveys, data collation by scientists, and the October closure that allow the fish to spawn uninterrupted. P12 also added that the certification of these fisheries by the MSC is another reason he believes that the hake stock is managed sustainably.

Monk

Most participants (P7,. P9, P10, and P12) consider it sustainable; many cited that this fishery is new and has few rights holders. Furthermore, they have observed that the annual TAC has been constant over the year.

Horse mackerel

Only participant P7 believes that this fishery is sustainable. In contrast, others are concerned about the sustainability of Horse mackerel, citing reasons such as the constant

decline in body size and an increase in catch duration. e.g., “previously, a trip took about fourteen days per trip; however, now, it can even take up to thirty days for the skipper to fill up the holds” (P11). Another concern raised by P9 is that the recent introduction of quota auction in this fishery poses a danger to the resources as this development has attracted a lot of foreign interest, and more foreign vessels have joined the fishery, further increasing the pressure on the resources. P11 and P8 stated that recent catches have been extremely poor, and several requests have been made to the MFMR to consider relaxing regulations prohibiting trawling within the 200m depth.

4.2.4 Compliance with fisheries laws

Answering question 4 which asked, Are you aware of any noncompliance with Namibia's fisheries laws? Please describe**.** Most participants indicated that they are not aware of any, with P11 stating he is aware of a few incidents of fish dumping while p12 indicated that some vessels in the hake fisheries do not comply with seabird bycatch regulation. Additionally, P7, P10, and P11 stated that the participatory and co-management approach used by the ministry to manage fisheries were by stakeholders who are also part of different fisheries associations and fisheries working groups that study the stock assessment outcomes and other indicators and advice on TAC. has greatly helped the industry to understand and value the resources hence they influence their employees to comply with the set rules and regulation and to report a violation to MFMR. P10 also added that a lot of IUU vessels apprehended by MFMR were reported by Namibian skippers.

Suggestions to Improve Fisheries Management

Responding to question 6, which asked for suggestions For MFMR to help improve Fisheries Management in order to realize sustainable fishing. The participant suggested the following measures:

- Strengthen the monitoring control and surveillance unit to ensure compliance and enforcement.

- Agent intervention measures in the horse mackerel fishery to reduce pressure on the stock and allow the stock to rebuild.
- Establish a more transparent right/ quota allocation process to reduce corruption
- Suspension of quota auction and fully emblaze Namibinzation of the fishing industry
- Increase knowledge and competency of fisheries inspectors through refresh course
- Review the marine resource act to make it current

CHAPTER 5: DISCUSSION AND CONCLUSION

The aim of the study is to assess the effectiveness of fisheries management for sustainable development in Namibia. Three approaches were taken; firstly, a review of the legal framework; second, an evaluation of government stock status reports; and third, a series of interviews with government departments (MFMR, FOA) and fisheries stakeholders

designed to establish their perceptions of the sustainability of the Hake, monk, and horse mackerel fisheries, the challenges that hinder fisheries management, and issues of compliance.

5.1.1 The legal framework for Namibia's fisheries

The legal framework is the main pillar of sustainable fisheries management. The international legal framework for management is the collection of international instruments, rules, principles, and standards that compel States to regulate fishing efforts and provide them with the institutional and legal resources required to accomplish this goal (Francois, 2020). The legal review indicates that Namibia has ratified and domesticated major international and regional legal instruments to improve fisheries management, such as UNCLOS, the 1993 FAO compliance agreement, and the 1995 FAO code of conduct for responsible fisheries management that regulates marine fisheries and sustainable development. All of this has been incorporated into the Namibian national legal instruments, including the national Constitution and national statutory instruments for sustainable resource exploitation and development (the Marine resource act 27 of 2000). Furthermore, the review revealed that although Namibia has ratified the 2009 FAO Agreement on Port State Measures, it has not domesticated this crucial international Instrument aimed at eradicating IUU by recording and sharing IUU vessel information with other states. Additionally, Namibia is a member of the BCC commission and has ratified the BBC convention to support and coordinate a regional approach to its long-term conservation, protection, rehabilitation, and enhancement of marine resources. However, no plans or regulations are in place to manage transboundary species in the region (Itembu et al., 2021)

Although Namibia has not domesticated all international or regional regal Instruments relevant to fisheries Management, the overall perception of those who participated in the interview indicates that Namibia's regal framework for fisheries management is sufficient. Citing that it is on par with other leading fishing nations. Though, it can further be strengthened by timely review to incorporate international and regional instruments to

which Namibia is a party to. Also, to be current with the changing time and reinforce the penalty that no longer serves as a deterrent.

The stakeholders' perceptions of the Namibia fisheries' legal frameworks are positive. Most think it is good but would benefit from a regular review. This is in agreement with the finding of Iitembu et al. (2021), which concluded that The Namibian fisheries management processes and legal instruments largely conform to the Ecosystem Approach to Fisheries.

5.1.2 Sustainability of Hake, Monk, and Horse mackerel fisheries in Namibia

Hake

The scientific evidence confirms that the hake stock was nearing depletion at independence, with an estimated biomass of about 610 000 tonnes at independence. The government has committed to rebuilding the stock, and annual scientific surveys are carried out to assess the stock (Kinge et al., 2016). The time series of the stock biomass only saw a decline in late 1990, and it has increased steadily and remained above the average biomass for the past 15 years. The recruitment of the stock time series indicates a steady increase over the years and is currently above the long-term average. Similarly, the catch per unit effort has also been constant over the year, indicating that there fishing pressure is low enough to allow rebuilding of the stock.

Studies of the biological, behavioral, and ecological aspects are crucial to understanding fish populations' dynamics and ensuring they are exploited sustainably (Kathena et al., 2016). A Statistical-catch-at-age Analysis (SCAA) model, treating the two hake species (Merluccius capensis and M. paradoxus) as a single stock, has been used since 1990 to assess the status of the hake resources. Input data consists of all available catch information such as total catch, catch at age matrices from biomass surveys and commercial fishing, combined survey biomass estimates, weight-at-age, selectivity-at-age, and maturity-at-age.

The latest (2021) Statistical-catch-at-age Analysis (SCAA) model has estimated the total biomass to be above the 1990 level reference point, but the stock still needs to be rebuilt to the spawning stock biomass at the maximum sustainable yield level (Bspmsy). Furthermore, data from the 2020 biomass survey shows recruitment has slightly decreased

but is still above the long-term average. The recent harvest level (about 154 000 tonnes annually) is sustainable since the catches are lower than the replacement yield, which should allow for the recovery of the stock to the desired level.

Similarly, during the interviews, most participants indicated the Hake stock is sustainably harvested due to control measures, such as the management plan, the October closure, and a constant TAC over the years. The Marine Stewardship Council (MSC) certified this fishery in 2020, demonstrating the progress in its recovery and how implementing a sound fisheries management plan can result in a sustainable fishery despite considerable historical overfishing (Jones, 2021).

Monk

This fishery is managed through annual TAC. Scientific surveys to assess the stock status have been conducted annually since 1996, except for 2019 and 2020, when no survey took place due to vessel-related issues. The time series data shows that the total biomass estimate fluctuated over the years, with no systematic decline observed. Currently, the total biomass estimate, as per the 2021 survey, is 36000 tonnes. The recruitment time series showed an increase over the year as small fish are not caught by commercial fishery, thus arrowing a good recruit to the stock. According to the 2021 model estimate, the spawning stock biomass (Bsp) is above the spawning stock biomass at maximum sustainable yield (Bspmsy). The current harvest level indicates that catches are below the replacement yield, and thus the stock is sustainable.

The government personnel and stakeholders interviewed equally perceived this fishery as sustainable, stating that the current management measure in places such as annual stock assessment, monk association, and monk working group that thoroughly study all data and advise on annual TAC has dramatically helped with sustainable management of this fishery over the year. This has been reflected by constant annual TAC over the years.

Horse mackerel

The stock is managed through TAC. Stock is assessed using an Age-Structured Production Model (ASPM), which incorporates the age distribution and biomass indices from the acoustic surveys since 1999, as well as both historical and recent commercial landings, catch-at-age (CAA), and catch per unit effort (CPUE). From the analysis, The biomass estimate used as an indicator for stock abundance time series shows it was constant since 2009 at an average of about 1,5 million tonnes annual, before a gradual decline to about 7000000 tonners in 2019; regrettably, no survey took place in 2020 and 2021 due to research vessel issues.

According to the last assessment (2021) base case model estimated an increase in the total biomass. A decline in recruitment remains below the long-term average. The CPUE remains higher, but the harvest level is still below the replacement yield and hence sustainable. However, the size of fish landed by the midwater fishery has been declining. The mean length of midwater catches now stands at a low 24 cm, which is fish that is maturing or just matured and has been such during the last five years as compared to the early 1990s when mean lengths of over 29 cm were observed.

Despite the model estimate indicating a good stock status that is sustainable, the overall overview of interviewed participants (both MFMR personnel and stakeholders) is not certain about the sustainability of this fishery, and describes the stock as under pressure and nearing depletion. as the fishing sector is reporting poor fishing at the fishing ground and requiring greater effort to maintain catches. Whereby it takes up to 30 days to feel up the hold, contrary to when it used to take about 1-2 weeks in the past. A decline in the size of landed fish by commercial fleet mainly dominated by juvenile fish (16cm and less.) the MFMR 2020 annual report also confirms this, were by a total allowable catch (TAC) of 330 000 tonnes was allocated for the 2020 fishing season, of which both the midwater and wet-landed fleets only landed about 126 080 tonnes. Furthermore, the government objective quota of 51317.91 mt auctioned on 18 June 2021 was not caught due to poor catches experienced the last season (Fishing Industry News and Aquaculture Southern Africa 2022).

The fish landed ranged in length from 10cm to 34 cm with a modal length of 20 cm. The landed catches are dominated by juvenile fish**.** The capture of significant numbers of juvenile fish is a global issue that threatens fish stocks' health and severely jeopardizes fisheries' sustainability (Sullivan 2005 &Tudela et al. 2006). In the long term, this leads to fisheries collapse, biodiversity change, and recruitment failure (FAO 2000).

5.1.3 participant perception of challenges that hinder fisheries management

During the interview, both government and stakeholders have a similar view on the challenges that hinder effective fisheries management. One of the emphasized challenges is capital resources. It was mentioned that the research section responsible for stock assessment, FOA, monitoring control, and surveillance section that is responsible for compliance and enforcement is underfunded. This makes it difficult for this critical department to fully execute its mandate, compromising the effectiveness of fisheries management. It is also confirmed as no scientific survey was conducted in the Monk fishery in 2019 and 2020, in the Hake fishery in 2019, and in the Horse Mackerel, no survey was conducted in 2020 and 2021, all due to funding problems.

Furthermore, a review of MFMR control and surveillance by Ganapathiraju in 2018 revealed that the 2017 sea patrol where reduced by 65% compared to 2016 due to government budget cut

Another challenge from participants' perceptive is corruption in the fishing right and quota allocations it was stated that sometimes laws are bypassed, scientific evidence are ignored, and political and individual interests are at the core of the fishing rights and quota awarding process. This is in agreement with the finding of Iitembu et al. (2021), which concludes that Namibia has no transparent policy for rights and quota awarding. Furthermore, the study by Chiripanhura & Teweldemedhin (2016) found a lack of competent workers, insufficient vessels, seismic effects of oil exploration, and dangers posed by proposed phosphate mining at sea as other issues that challenge fisheries management. This is similar to the finding of Itembu et al. 2021, which found problems with fisheries management, such as illegal, unreported, and unregulated fishing, inadequate government oversight, underfunded research, and fishing pressure in some fisheries.

5.1.4 Stakeholders' compliance with fisheries Laws

The participatory approach to fisheries management is regarded as one of the best tools for fisheries management (Alpizar, 2006). Although MFMR spearheads the management of marine resources, Namibia adopted a participatory approach and co-management in managing different fisheries. A fishing association and working group were established in each fishery (consisting of state and stakeholders representatives); this has dramatically helped with fishery compliance by stakeholders. During the interview, both participants acknowledge that the participatory approach and annual stakeholder engagement by MFMR have greatly helped with compliance. Only a few incidents of fish dumping and non-compliance with Sea bird-by-catch regulations were mentioned by some participants. Additionally, due to this approach, stakeholder has dramatically helped with combating IUU as skippers mostly report IUU vessel to MFMR whenever they spot them in the Namibia EEZ. This is in agreement with the study by Sjostedt & Sundstrom(2015) that found that due to Namibia's institutional structures for managing fisheries, relatively little IUU fishing and poaching occur, making Namibia a success story for the Benguela region.

5.2 Conclusion

The main aim of this study was to evaluate the effectiveness of fisheries management for sustainable development using Namibia's Hake, Monk, and Horse mackerel fishery as case studies. This goal was achieved by carefully analyzing the legal framework governing fisheries as the basis of sustainable fishing and reviewing the stock status reports from the MFMR. To cross-validate the reviews' findings, interviews were conducted to get insight into the state's and stakeholders' perceptions of Namibia's fisheries management.

This study provides an improved understanding of fisheries management in Namibia. Based on the evidence collected from the document and interviews analysis, Namibia has a well-established legal and institutional framework that governs fishing activities that fairly conforms to International guidelines for sustainable fisheries as set by UN Fish Stocks Agreement (FSA). As a result, it has greatly assisted in rebuilding the Namibian fish stocks that were nearing depletion at independence.

Furthermore, the assessment of the stock status as per the reviewed report and interview analysis indicated a healthy and sustainable stock status in the Hake and Monk fishery. Although the hake biomass is estimated to be below the maximum sustainable yield level, the fishery can be considered to be sustainable as long as catches remain below the Replacement Yield level, it will gradually rebuild and reach the desired maximum sustainable yield. The Horse mackerel stock assessment indicated a healthy stock with the biomass estimated above the sustainable biomass; however, declining catches and decreasing average size of fish, together with concerns raised by industry stakeholders, suggested a worrisome situation hinting the stock is nearing depletion. Even though this analysis is not entirely conclusive, the precautionary approach would advise that fishing effort is reduced in the Horse mackerel stock to ensure it does not collapse. Further research in the Horse mackerel fishery is needed to validate this study's findings.

The study further revealed that the implementation and enforcement component hinders the success of fisheries management due to a lack of funding, corruption in the right and quota awarding process, and a lack of training and education of staff members. Finally, the

study concludes that the fisheries stakeholders, to an extent, comply with fisheries policy and regulation with only a few violation incidents.

5.3 Recommendations

To further enhance Namibia's fisheries management, MFMR should take into account the following:

- To ensure compliance and enforcement, there is a need for increased budget allocation to strengthen research, Fisheries Observers Agency, monitoring control, and surveillance directorate.
- Consider management intervention measures in the horse mackerel fishery to reduce pressure on the stock
- Establish a more transparent right/ quota allocation process to minimize the opportunity for corruption
- Reconsider the government's objective quota auction and fully nationalize the fishing industry
- Increase staff capacity and skills through training and awareness creation
- Review the marine resource act to make it current, domesticate all international treaties to which Namibia is a party, and further strengthen punitive measures to serve as a deterrent.

REFERENCES

African Legal Information Institute. (2019). Namibia: Environmental Law Context Report. *Judicial Environmental Law Training, August 2019.*https://africanlii.org/book/namibia-environmental-law-context-report

Akawa, T. & Nashima, E. P. (2013). A Sustainability Analysis of Namibian Marine Fishery. *Journal of Human Resource and Sustainability Studies, 1*(1), 1-7.

Akawa, T. & Nashima, E. P. (2014). The role of fisheries management in promoting fishery development: An analysis of the Namibian Horse Mackerels (Trachurus capensis). *Journal of Agriculture and Biodiversity Research, 3*(1), 9-13.

Alpizar, M. A. Q. (2006). Participation and fisheries management in costa rica: From theory to practice. *MarinePolicy,30*(6),641650. http://doi.org/10.1016/j.marpol.2005.09.001

Bansard, J. &Schröder, M. (2021). The Sustainable use of natural resources: The Governance challenge. International Institute for Sustainable Development (IISD). *Earth negotiations bulletin brief Number 16.*

Benkensin, A. (2014). Rents, Rights and Restructuring: Namibia's Lessons for the Governance of Africa's. *Fisheries Governance of Africa's Resources Programme* https://www.files.ethz.ch/isn/188674/saia_sop_207_benkenstein_20150217.pdf

Chiripanhura, Blessing & Teweldemedhin, M. (2016). AGRODEP Working Paper 0021 An Analysis of the Fishing Industry in Namibia: The Structure, Performance, Challenges, and Prospects for Growth and Diversification. 10.13140/RG.2.2.36280.57609.

Elliott, V. (2018). Thinking about the Coding Process in Qualitative Data Analysis. The Qualitative Report, 23(11). https://doi.org/10.46743/2160-3715/2018.3560

FAO. 2020. The State of World Fisheries and Aquaculture 2020. Sustainability in action. Rome. https://doi.org/10.4060/ca9229en

Fishing Industry News and Aquaculture Southern Africa (2022). *Namibia, Horse Mackerel Bidders Can Fish Quota; There's A New Factory Too*https://www.fishingindustrynewssa.com/2022/03/08/namibia-horse-mackerel/

Flick, U. (2018). Triangulation in data collection. The SAGE handbook of qualitative data collection, 527-544.

Food Aid Organisation (FAO). (2002). *Information on fisheries management in the Republic of Namibia*. https://www.fao.org/fi/oldsite/FCP/en/NAM/body.htm

Food Aid Organisation (FAO). (2021). *Fishery and Aquaculture Country profiled . Country Profile Fact Sheets. Fisheries and Aquaculture Division*. Rome: FAO. Retrieved on 20 June 2022 from https://www.fao.org/fishery/en/facp/nam.

Jake R, Evolution of international commitments for fisheries sustainability, *ICES Journal of Marine Science*, Volume 71, Issue 2, January/February 2014, Pages 157–165, https://doi.org/10.1093/icesjms/fst078

Jones (2021) Namibia Hake Fishery becomes the second in Africa to earn the MSC certification https://www.msc.org/media-centre/news-opinion/2020/11/17/a-sustainable-and-bright-future-for-namibian-hake

Harris, J. E., Gleason, P. M., Sheean, P. M., Boushey, C., Beto, J. A., & Bruemmer, B. (2009). An introduction to qualitative research for food and nutrition professionals. Journal of the American Dietetic Association, 109(1), 80-90. https://https://doi.org/10.1016/j.jada.2008.10.018

Huggins, L. E. (2011). Fencing Fisheries in Namibia and Beyond: Lessons from the Developing World. *PERC Policy Series No. 49, 2011*.https://www.perc.org/wp-ps49_fisheries_namibia.pdf

Iitembu, J. A., Erasmus, V. N., Uanivi, U. Nakwaya, D., Horaeb, R. R., Nangolo, E., Nashima, F. P., Iita, T. K., & Mwandemele, O. (2021). The hits and misses of Namibia's attempt to implement the Ecosystem Approach to Fisheries (EAF) Management. *Ecosystem Health and Sustainability*, *7*(1),

Kivunja, C &Kuyini, A.B. (2017). Understanding and Applying Research Paradigms in Educational Contexts. International Journal of Higher Education, 6(5), 26-41.https://files.eric.ed.gov/fulltext/EJ1154775.pdf

Lange, G. (2003). The value of Namibia's commercial fisheries. *DEA Research Discussion Paper Number 55 February 2003.*

https://millenniumindicators.un.org/unsd/envAccounting/ceea/archive/Fish/Namibia_Value_Commercial_Fisheries.PDF

Ministry of Fisheries and Marine Resources. (2018). *Current Status Report: National Overview for Marine Spatial Planning & Knowledge Baseline for Namibia's 1st Marine Spatial Plan*. Windhoek: Ministry of Fisheries and Marine Resources (MFMR).

Mulwa, M. L. (2015). Elements of success in Namibian law and policy on sustainable fisheries: A law and policy evaluation of Namibia's property rights approach to sustainable fisheries in light of obligations set down in the UNCLOS and related international agreements. *Research Paper, United Nations-Nippon Foundation Fellowship Program 2015-2016.*

Natural Resource Governance Institute (NRGI). (2015). *Legal Framework: Navigating the Web of Laws and Contracts Governing Extractive Industries* https://www.resourcegovernance.org/sites/default/files/nrgi_Legal-Framework.pdf

New Era. (2022). *Towards a modern law for maritime transport*. Retrieved on 6 June 2022 from https://neweralive.na/posts/opinion-towards-a-modern-law-for-maritime-transport#

Paterson, B., Kirchner, C. & Ommer, R. E. (2013). A short history of the Namibian hake fishery—a social-ecological analysis. *Ecology and Society, 18*(4), 66 – 75.

Pramod, G. (2018) Namibia – Country Report. In: Policing the Open Seas: Global Assessment of Fisheries Monitoring Control and Surveillance in 84 countries, *IUU Risk Intelligence - Policy Report No. 1, Canada,* 1 - 8.

Punch, K. F. (1998). Introduction to Social Research – Quantitative & Qualitative Approaches (1st ed.). https://doi.org/10.5840/intstudphil19781064

The Republic of Namibia. (1990). *The Constitution of Namibia.* Windhoek: Office of the Prime Minister.

The Republic of Namibia. (2000). *Marine Resources Act (Act No. 27 of 2000).* Windhoek: Office of the Prime Minister.

The Republic of Namibia. (2007a). *Environmental Management Act (Act No. 7 of 2007).* Windhoek: Office of the Prime Minister.

The Republic of Namibia. (2007b). *National plan of action to prevent, deter and eliminate Illegal, Unreported and Unregulated (IUU) fishing*. Windhoek: Ministry of Fisheries and Marine Resources.

Rukoro, R. M. (2009). *Promotion and Management of Marine Fisheries in Namibia.* In Gerd, W. (Ed). (2009). Towards Sustainable Fisheries Law. A Comparative Analysis. IUCN, Gland, Switzerland.

Saunders, M. N. K., Lewis, P., & Thornhill, A. (2019). *Research methods for business students.* (8th ed.). Pearson Education Limited: London.

Sjöstedt, M., & Sundström, A. (2015). Coping with illegal fishing: An institutional account of success and failure in namibia and south africa. *Biological Conservation, 189*, 78-85. https://https://doi.org/10.1016/j.biocon.2014.09.014

Shabbir, A., Kousar, S., & Kousar, F. (2020). The role of natural resources in economic growth: new evidence from Pakistan. *Journal of Economics, Finance and Administrative Science, 25*(50), 221-238.

Southern African Development Community (SADC). (2001). *SADC Protocol on Fisheries.* Gaborone: SADC Secretariat.

Steer, A. (2013). Resource Depletion, Climate Change, and Economic Growth. *Working Paper 5 June 2013.* Global Citizen Foundation.

UNESCO. (2021). *Sustainable Development.* Paris, France: UNESCO.

United Nations. (2018). *Technology and Innovation Report: Harnessing Frontier Technologies for Sustainable Development.* New York: United Nations Conference on Trade and Development (UNCTAD).

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. Nursing and Health Sciences, 15(3), 398–405. https://doi.org/10.1111/nhs.12048

Weidlic, B. (2019). *Cold Benguela current provides abundant fish resources*. Retrieved on 21 January 2022 from https://namibian.org/news/nature-and-environment/benguela-current.

APPENDICES

Appendix 1 Consent Form

Dear Participant

Thank you for agreeing to participate in this research interview, which is carried out in connection with a dissertation written by the interviewer, in partial fulfillment of the requirements for the degree of Master of Science in Maritime Affairs at the World Maritime

University in Malmo, Sweden. The Topic of the Dissertation is "Assessing the effectiveness of Namibian fisheries management for sustainable development. A case study of Hake, Monk, and Horse mackerel fish species."

The information you provide in this interview will be used for research purposes. The results will form part of a dissertation, which will be published online and made available to the public. Your personal information will not be published. You may withdraw from the research at any time, and your data will be immediately deleted. Anonymized research data will be stored in my laptop and hard disc secured with a strong password. All the data will be deleted once the degree is awarded on 31 October 2022.

Your participation in the interview is highly appreciated.

Student's name: Suama Namulilo Mundjego

Specialization: Ocean Sustainability, Governance, and Management

Email address: w1904834@wmu.se

As outlined above, I consent that my data is being used for this study. I understand that all personal data relating to participants is held and processed in the strictest confidence and will be deleted at the end of the researcher's enrolment.

Name: Suama Namulilo Mundhego

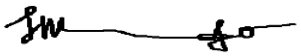
Signature: 

Date: 28/04/2022

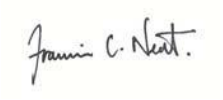
Appendix 2 WMU Research Ethics Committee Protocol

Name of principal researcher:	Suama N Mundjego
Name(s) of any co-researcher(s):	N/A
If applicable, for which degree is eac registered?	MSc in Maritime Affairs (OSGM)
Name of supervisor, if any:	Prof, Francis Neat
Title of project:	Assessing the effectiveness of Namibian fisheries management for sustainable development. A case study of Hake, Monk, and Horse mackerel fish species
Is the research funded externally?	No
If so, by which agency?	
Where will the research be carried out?	Namibia
How will the participants be recruited?	Random selection
How many participants will take part?	20
Will they be paid?	No
If so, please supply details:	
How will the research data be collected (by interview, by questionnaires, etc.)?	Document analysis and interview
How will the research data be stored?	In a private laptop secured with a strong password
How and when will the research data be disposed of?	At the end of the study when the degree is awarded (31/10/2022)
Is a risk assessment necessary? If so, please attach	No

Signature(s) of Researcher(s): Date: 28/04/2022



Signature of Supervisor: Date: 02/05/2022



Appendix 3 Interview guide

Introduction

This interview guide has been designed in order to gather information on perceptions of Namibia fisheries management by the Ministry of fisheries personnel, observer agency personnel, and stakeholders

The aim is to explore:

1. The Ministry of fisheries personnel, observers, and stakeholders' perspectives on Namibia's fisheries management system

The interview is purely for academic purposes being part of the requirement for the award of a Master of Science degree in Maritime Affairs at the World Maritime University.

- Participation in this study is voluntary.
- This will be a recorded interview unless the participant is unwilling to have it recorded; they may state so at the beginning of the interview
- A participant shall be required to provide consent for the use of data by signing a consent form
- A participant has the freedom to exit the study at any time or withdraw the consent
- All information from the participants will be held with strict confidentiality hence no divulging to third parties

Section A: Ministry of fisheries and the Observers agency personnel

Biographical data

Your organization:

Current position:

Namibian fisheries management systems for sustainable development

1) In your opinion, how effective is Nambia's legal framework for fisheries management?
2) Kindly give an example of how the legal framework has helped with the sustainable management of fisheries.
3) Which of Namibia's fisheries would you describe as "sustainable"?
4) In particular, do you think harvesting Hake, Monk, and Horse mackerel is done sustainably? Please tell me why you consider these fisheries to be sustainable.
5) Is the existing legislative framework for marine fishing in Namibia sufficient to ensure a long-term sustainable future?
6) In your opinion, what are the challenges that the Ministry still needs to address in order to realize sustainable exploitation of marine resources

Section B: Interview guide fisheries stakeholders

Organization:
Position:

1. Please tell me about the type of fishery you are involved with and if you consider it to be sustainable?
2. Do you think the exploitation of Hake Monk and horse mackerel in Namibia is done sustainably? Please tell me why.
3. Do you think Namibia's fisheries laws are adequate to ensure a long-term future for your fishing business?
4. Is the Ministry of Fisheries and Marine resources doing enough to promote sustainable fishing?
5. Are you aware of any noncompliance with Namibia's fisheries laws? Please describe.
6. Do you have any suggestions for the Ministry of fisheries and marine resources to help improve Fisheries Management in order to realize sustainable fishing