EQUITABLE TUNA GOVERNANCE IN THE INDIAN OCEAN

by

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Dalhousie University is located in Mi'kma'ki,
the ancestral and unceded territory of the Mi'kmaq.
We are all Treaty people.

For Yana, my daughter, the sunshine in our life.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Tuna Regional Fisheries Management Organizations (tRFMOs), such as the Indian Ocean Tuna Commission (IOTC), have been given an arduous mandate under international law to manage and conserve tuna resources within jurisdictions where tuna stocks breed and move. Tuna, which swim across both national waters and areas beyond national jurisdictions are fished by coastal States and distant water fishing nations. Concerns have been raised about the status of tuna stocks and in the case of the IOTC, only 11% of the stocks are fished at sustainable levels. Even though management measures are taken to rectify and recover stocks, questions are often raised about the efficacy of these measures. Furthermore, the measures adopted are often difficult to implement due to several resource constraints, inflicting disproportionate burdens on developing coastal States. At the same time, many developing countries still fail to establish sustainable, economically efficient, and equitable fisheries at the national level. Even though there has been substantial research into equitable governance mechanisms in tuna RFMOs in the last decade, most of these mechanisms remain on paper. So, why and how have RFMOs been unable to adopt and implement equitable tuna governance? To answer this question, in the first chapter, I introduce equity concepts and issues at stake in the IOTC. In the second chapter, I analyze the main socio-economic interests, influences and political interests in the decision-making process. The third chapter identifies institutional, political, and scientific barriers in reaching an agreement in the decade-old allocation negotiations. The fourth chapter identifies how subsidies contribute to inequitable tuna governance. The fifth chapter takes a comprehensive analysis of the international fisheries legal instruments to identify the rights and responsibilities designated to members in RFMOs to facilitate an equitable decision-making process. The concluding chapter synthesizes the findings and provides a personal reflection of the primary reasons behind inequities based on the research. Going forward, there needs to be a drastic shift from current development norms; recognize countries are not equal in time and space; equality will never produce equity; and coastal States need to work collectively for the good of nature and their people.

LIST OF ABBREVIATIONS USED

ABNJ	Areas Beyond National Jurisdiction
BET	Bigeye Tuna
BLUE	Blue Marine Foundation
CBD	Convention on Biological Diversity
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CPC	Cooperating Members and Cooperating Non-Contracting Parties to the Indian Ocean Tuna Commission
CMM	Conservation and Management Measure
CW	Commonwealth
CVI	Commonewealth Vulnerability Index
DWF	Distant Water Fishing
DWFN	Distant Water Fishing Nation
EEZ	Exclusive Economic Zone
EFF	European Fisheries Fund
EMFF	European Maritime Fisheries Fund
ENGO	Environment non-governmental organizations
EU	European Union
EUR	Euro
FAO	Food and Agriculture Organization of the United Nations
FFA	Pacific Fisheries Forum Agency
FIFG	Financial Instrument for Fisheries Guidance
FIP	Fisheries Improvement Projects
G16	Group of like-minded coastal States in IOTC
GDP	Gross Domestic Product
GT	Gross tonnage
GTA	Global Tuna Alliance
HDI	Human Development Index

IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tuna
ICJ	International Court of Justice
INGO	Industry non-governmental organizations
IOF	Indian Ocean Fisheries Commission
IOR	Indian Ocean Region
IOTC	Indian Ocean Tuna Commission
IPNLF	International Pole and Line Foundation
ISA	International Seabed Authority
IUU	Illegal, Unregulated and Unreported fishing
LDC	Least Developing States
LOSC	United Nations Convention on the Law of the Sea
LPNCP	Long-term Participating Non-Contracting Parties
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
NGO	Non-governmental Organization
OT	Overseas Territories
PNA	Parties to the Nauru Agreement
RFMO	Regional Fisheries Management Organization
SDG	Sustainable Development Goal
SMART	Specific, Measurable, Achievable, Relevant, and Time-bound
SFA	Seychelles Fishing Authority
SIDS	Small Island Developing States
SIOFA	Southern Indian Ocean Fisheries Agreement
SKJ	Skipjack Tuna
SSF	Small-scale Fisheries
TCAC	Technical Committee on Allocation Criteria
TUPA	Tuna Protection Alliance
UK	United Kingdom

UN	United Nations
UNFCCC	United Nations Framework Convention for Climate Change
UNFSA	United Nations Fish Stocks Agreement
UNGA	United Nations General Assembly
UNPSMA	United Nations Port States Measures Agreement
USD	United States Dollar
WCPFC	Western Central Pacific Fisheries Commission
WIO	Western Indian Ocean
WTO	World Trade Organization
YFT	Yellowfin Tuna

STATEMENT

The purpose of this positionality statement is to acknowledge and disclose the inspirations and perspectives I bring into my research. As researchers, we strive to avoid bias in our studies, but how we conduct research is always linked to our worldview, epistemological assumptions, personal interactions with nature and people, values, and beliefs. These traits are not a constant in space and will evolve through experience and knowledge acquisition. I hope this disclosure can help readers and future collaborators understand the robustness and the shortcomings of my research.

I am a brown - South Asian descent – tuna blooded Maldivian. I was born in Addu, an atoll famous in the Maldives for tuna fishing. My father was once a sailor on a cargo ship, a boat builder and now a dried tuna seller in the local market in Male', the capital of the Maldives. My mother stayed home to care for my younger brother, sister, and me. My family decided to move to Male' for my education and overcame many hardships. That upbringing – education first, no matter the struggles – made me the person I am today. Tuna and the oceans are the bread and butter of our nation. We eat tuna for breakfast, lunch, and dinner. Just like the other 500,000 inhabitants of the Maldives, my life has always revolved around tuna. After completing my undergraduate degree, I joined the Ministry of Fisheries and Agriculture. I have been a civil servant ever since and worked at the ministry except during times of studying for my postgraduate degree and now PhD.

The Maldives joined the Indian Ocean Tuna Commission (IOTC) officially in 2011, around the same time I was promoted to the Director of Fisheries Management. Since then, I have been a part of the Maldives delegation representing the Maldives in various IOTC meetings. I am also the Chair of the IOTC's Standing Committee on Administration and Finance. I participated in the IOTC meetings as a delegate of the Maldives during the PhD research, and through these experiences I have witnessed the frustrations, disappointments, betrayals, and triumphs in the negotiations. I have personally experienced bullying, intimidation, and threats as well. Our motto, "no matter what others say or believe, if we believe what we are doing is the right thing for the sustainability of the resource and the people dependent on fisheries, eventually everything will finally fall into its rightful place," has kept us going in the lengthy negotiations that go on for weeks with an average of 3 - 5 hours of sleep a night. The inspiration to do this PhD stemmed from the complexity of these negotiations, the injustices faced by the developing coastal states, and finding better solutions in conservation and management of tuna, particularly the allocation negotiations.

Initially, my goal was to find an equitable solution for allocation negotiations. But as my research progressed, I became aware of the barriers for developing coastal States. I was oblivious to those realities when I was inside the system. Without breaking those barriers, an equitable allocation outcome is a far-fetched reality. As I progress through my research, I aim to uncover these barriers and find ways to address them so that the decisions made in the IOTC are equitable, fair, and just for everyone. By doing so, I hope the people who dream to catch fish now and, in the future, to put this fish on the plate for their families, to make a decent living and to utilize their ocean resources sustainably have a fair share of the enormous wealth from the Indian Ocean.

ACKNOWLEDGEMENTS

There are no right words to convey my deepest gratitude and respect to my supervisor, Dr. Megan Bailey. You have provided space and independence in my research and guided me throughout the whole process. Without you, I would not have been able to complete this milestone in my life.

I would also like to acknowledge my committee members, Dr. Ruth Forsdyke and Dr. Ajay Parasram, for accepting me and guiding me through the process in the last four years. Your insights and knowledge in environmental injustices, political and economic systems have strengthened the interdisciplinary approach to my research.

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I would also like to thank from the bottom of my heart, the delegates and representatives of various organizations who spared crucial time from their busy schedules and shared their knowledge and experience in the interviews. The open nature of the interviews contributed significantly to improve the results of my research.

I am indebted to the intellectuals who have worked with me in various chapters, particularly Dr. Daniel Skeritt, Dr.Frédéric Le Manach, Dr. Kamal Azmi, Dr. Quentin Hanich, Dr. Rashid Sumaila, and Dr. Wilf Swartz. I would also like to thank Ciara Willis, Kerrie Robertson, Mathieu Colléter, Dr. Mialy Andriamahefazafy, Dr. Laurenne Schiller, and Dr. Helen Packer, who shared thoughtful suggestions to improve various manuscripts in the thesis.

I would like to specially acknowledge the thoughtful suggestions provided by Dr. Fábio Hissa Vieira Hazin to the thesis. Dr. Fábio chaired the 2016 - UN Fish Stocks Agreement Review Conference, which called upon the need to develop a framework, which I have proposed in the thesis. Unfortunately, Dr. Fábio passed away from COVID-19 in June 2021.

Thank you also to my lab mates, especially the tuna buddies (Dr. Helen Packer and Dr. Laurenne Schiller), for being there for me bouncing ideas, helping me get through the lows and sharing the joyful moments together.

To my friends and colleagues back home, especially Adam Ziyad and Mohamed Muththalib: You have proved time and time again that the size of a country nor the size of an economy matters when the livelihood of fisher communities and sustainability is at risk. Thank you for keeping me inspired and hopeful.

Thank you to all the ministers of Ministry of Fisheries, Marine Resources and Agriculture and staff for facilitating my participation in the various IOTC meetings and G16 meetings as an advisor to the Maldives delegation. I would like to especially acknowledge, minister Dr. Mohamed Shainee for providing the opportunity for my research.

My daughter's honorary grandparents in Canada, John Humble and Lucille Humble: your friendship means a lot to me. Thank you for the joyful moments, especially during the pandemic.

I am extremely grateful to my parents for their love, prayers and sacrifices to make me who I am today. Despite all the hurdles we faced in our childhood, they never gave up on our education and made us better and caring human beings. Thank you, *mamma* and *bappa*. I am forever grateful for my beloved younger sister and brother for always believing in me and shouldering the responsibility as always.

Last but not least, I am deeply indebted to my loving wife, Asi and my daughter Yana. My heartfelt thanks to Asi for being the sounding board and the support to help me achieve my dreams. Without you holding the fort, this milestone in my life would not have been possible. My daughter Yana made this journey more meaningful. Her joy and her passion were the catalysts that pushed me hard every day.

Thank you all.

1 INTRODUCTION

In 2021, after holding one regular session and one special session, the Indian Ocean Tuna Commission (IOTC) finally agreed on an interim yellowfin tuna rebuilding plan (Resolution 21/01); this occurred on the last day of the Commission meeting after extending the virtual meeting for an extra seven hours. The validity of the interim agreement was put to test after five member states lodged their intentions to object to the measure (BLUE & IPNLF, 2021). In the subsequent months, India, Indonesia, Oman, Madagascar, and Somalia have officially lodged their objections to the rebuilding plan(IOTC, 2021d). In its letter of objection to the Commission, Somalia stated:

> *"The large-scale industrial fishing of the developed and distant water nation purse seine fishing fleets that targeted fishing of yellowfin tuna is the biggest responsible factor in the depleted stock of yellowfin tuna we experience today. The proposed allocation of catch structure over seen by IOTC must be based on the needs of the fishery by the coastal states, who have the sovereign rights for the management of tuna fishery stocks in their EEZ, and not on historical catch by industrialized states which have no border and have the luxury to move operations to the current fishing locations that is lucrative for their fisheries campaign..."* (IOTC, 2021a)

The political and ecological situation facing the IOTC negotiations including allocations (how much a country can catch over a year) are such that the burden of conservation as a function of developed and distant water fishing states over consumption are now being borne by developing coastal states, and not the states responsible for creating the situation in the first place. Negotiations on an allocation mechanism have spanned for more than a decade in the IOTC without a resolution (Abolhassani, 2017; Andriamahefazafy et al., 2019). Coastal countries argue that the decisions on conservation and management in the

IOTC are not equitable and favour distant water fishing nations (DWFNs), and DWFNs continue to argue that the decisions need to be fair for everyone (Abolhassani, 2017).

This inability to agree on and implement adequate management measures has had significant detrimental impacts on the health of the Indian Ocean tuna stocks. In 2020, albacore and bigeye tuna in the Indian Ocean were found to be subject to overfishing[1]; yellowfin tuna, blue marlin, striped marlin, longtail tuna, narrow-barred Spanish mackerel were overfished and subject to overfishing[2]; and skipjack tuna were harvested at more than 30% of the agreed limit (IOTC, 2020c). These species account for almost 80% of the total catch of species managed by the Indian Ocean Tuna Commission (IOTC) in 2019 (IOTC, 2020a): a clear sign that the IOTC is failing on its mandates.

1.1 Problem Statement and research questions

Management of tuna is complex due to their transboundary and migratory nature, which requires a high degree of cooperation between governments (Bailey et al., 2010, 2013; Gilman et al., 2013; Lodge et al., 2007; Metzner et al., 2002; Sibert & Hampton, 2003). Essentially, tuna stocks are present and fished in coastal waters and areas beyond national jurisdiction (ABNJ)(Bailey et al., 2013). This migratory nature of tuna species, scientific uncertainties, gear complexities and interactions (Bailey et al., 2013; Havice & Campling, 2010), economic and social importance of the species (FAO, 2018), geopolitics (Yeeting et al., 2016), and the complexity and ambiguity of international legal instruments (Botet, 2001; Tsamenyi, 1986), makes these species one of the most complex species to manage. This makes tuna more susceptible to the 'tragedy of the commons' (McWhinnie, 2009), even though governments interested in fishing for the stock are mandated to cooperate and reach a consensus on the management of the stock to ensure that the fisheries remain at

[1] In the IOTC a stock is determined to be subject to overfishing when the level of fishing effort exceeds the limit reference point. However, the biomass of a fish stock is still above the limit reference point.

[2] In the IOTC a stock is determined to be overfished and subject to overfishing when both the biomass of a fish stock is below the biomass limit reference point, and the level of fishing effort exceeds the limit reference point.

sustainable levels through RFMOs. Despite this enormous mandate, however, it is perhaps not surprising that the status of the stocks continues to dwindle. RFMOs have adopted a long and varied list of management measures to mitigate overfishing and recover stocks. However, questions have been raised often about the efficacy of these measures due to lack of compliance and enforcement (Gjerde et al., 2013), lack of punitive measures (Lodge et al., 2007), and ineffective measures (Polacheck, 2012). The performance of an RFMO depends solely on the cooperation, collaboration and political will of its member states (Lodge et al., 2007). However, achieving it is easier said than done. The fishing industry, the post-harvest industry, national institutes, non-Governmental Organizations (NGOs), and markets play a significant role in framing a country's negotiation position in RFMOs. It is also common in fisheries for countries to use national fishing interests to gain broader geopolitical influence (Parris, 2010; Yeeting et al., 2016). External polities beyond the territory of a member state affect its negotiation position, leading to the poor performance of RFMOs.

Furthermore, governance of RFMOs has been dominated by fishing nations in the 'Global North' until late. The measures that have been adopted are often too difficult to implement due to lack of financial and human resource capacity and often result in a disproportionate burden for developing countries (Hanich et al., 2015). Even though international legal instruments mandate equal but differentiated mechanisms (For example: article 24 of United Nations Fish Stocks Agreement (UNFSA), article 21 of UN Port State measures agreement) especially for vulnerable communities and countries which rely heavily on fisheries resources for food nutrition, such mechanisms have not yet been implemented. These management decisions also have a significant impact on the most vulnerable countries, such as the Small Island Developing Countries and coastal African countries, who are also most prone to these influences from various other entities(Osterblum et al., 2020). At the same time, many developing countries still fail to establish sustainable, economically efficient and equitable fisheries due to weak systems and linkages within institutions, climate change, growing human populations, excessive fishing effort,

corruption, criminality in the fisheries sector and political leaders colluding with foreign fishing interests to serve their individual interests(Cochrane, 2021).

Although, over the last decade, there have been various scholarly studies, projects, and reports on establishing equitable tuna governance mechanisms in tuna RFMOs (Azmi et al., 2016; Bailey et al., 2016; Bush et al., 2014; Campbell & Hanich, 2015; Engler Palma, 2010; Eriksson, 2007; Hanich et al., 2015; A. M. Miller et al., 2014; Yeeting et al., 2016). However, when it comes to putting them in practice, most RFMOs have failed to create an equitable decision-making process. So, why and how have RFMOs been unable to adopt and implement equitable tuna governance mechanisms? To answer this, I focus my research on one of the five tuna RFMOs – the Indian Ocean Tuna Commission – and I ask:

i) What are the main socio-economic interests, influences, and political interests of IOTC members and how are these reflected in IOTC decision-making?
ii) What are the main institutional, political, and scientific barriers in the IOTC?
iii) How may economic incentives by the public (government funded subsidies) contribute to inequitable tuna governance in the IOTC?
iv) How can international legal instruments aid equitable tuna governance mechanisms in the IOTC?

1.2 Equity

A core concept in the work of this thesis is equity, and as such, an introduction to its relation to transboundary fisheries governance is warranted. Principles of equity, fairness and justice have been practiced in customary law[3] for millennia, despite continued ambiguity and complexity around these terms (Shue, 1999). The dominant framing and assumptions underlying the sovereignty of states is that all states are equal in that they are sovereign, geographically bounded entities surrounded by other such states, and indeed the

[3] These could include societal norms, prescribed and proscribed behavior in a societal group.

development of international relations and international diplomacy is modelled on the assumption of state equality (Elden, 2013; Onuf, 1991; P. J. Taylor, 1994).

As scholars have long maintained however, disproportionate power allows powerful states to subvert the ideal of equality in international relations through coercive means, even while international institutions are designed to try to mitigate this and bring about collective benefits for states (Keohane & Nye, 1998; Mearsheimer, 2001). Moreover, scholars focused on the long-term implications of colonialism and its impact on the international system, have argued that the very construction of an international society or system of states' governance based on the idea of equality has been problematic since its inception because the rise of states and state sovereignty into its modern/colonial formation in the 19th century has been predicated on Western exceptionalism, producing one set of rules for European states and another set for states colonized by them (Bhambra, 2015; Branch, 2013; Grovogui, 2002, 2016; Parasram, 2014). It should come as no surprise then, that while for most of our history, sovereign states are viewed as equal and treated as such in international law (Campbell & Hanich, 2015), the ahistorical assumption of equality actually leads to unequitable outcomes. This practice is changing, and there is now a broad acceptance that treating everyone equally will lead to unfair and unjust results (Ringius et al., 2001; Shelton, 2007; Shue, 1999). Thus, decision-making processes must follow the 'right process' – procedural or commutative equity and consider the most vulnerable, marginalized and development-deserving communities in the distribution process of rights and responsibilities – distributional equity or distributive justice[4] (Lapidoth, 1987; McDermott et al., 2013; Shelton, 2007).

[4] Legal Scholars also argue that in international jurisprudence, there is four main dimensions of equity: equity *infra legem* (allows the court to choose between more than one interpretation of the law based on circumstances and balancing the rights and obligations of the parties), equity *praeter legem* (allows the court to fill gaps in the law to remedy insufficiencies), equity *contra legem* (allows the court to decide against the legal rules which are considered "unjust") and *ex aequo et bonto* (allows the court to decide base on what is "fair" and in "good conscience." See for more: Shelton, D. Equity. In International Environmental Law; Bodansky D, Brunnée J, Hey E, Eds.; Oxford University Press: Oxford, 2007; French, D.A. International Environmental Law and the Achievement of Intragenerational Equity. Environ. Law Report. News Anal. 2001, 31; Trakman, L. *Ex aequo et bono*: Demystifying an ancient concept. Chi. J. Int'l L. 2007, 8, 621

As the concept of equity matured, researchers have included two other dimensions of equity such as 'recognition' of differences in stakeholders' rights, cultural identities, values, and knowledge systems (Pascual et al., 2014); contextual equity, which takes into account the uneven playing field created by the pre-existing political, economic and social conditions(McDermott et al., 2013); and structural barriers and institutional roots to inequity (Bennett et al., 2021) as shown in Figure 1.1.

Incorporating equitable approaches and principles is justifiable considering those countries' unfair advantage at the top of the economic ladder, and unfair disadvantages faced by those countries at the bottom (Shue, 1999).

1.3 Equity as a concept in international law

Helsinki Rules in 1966 for the management of watercourses was the first attempt to codify equitable utilization of resources, even though it being a non-binding instrument (French, 2001). Since then, several international environmental legal instruments have adopted equitable principles and applied differential treatment for developing States, particularly small island developing states (SIDS) and least developed countries (LDCs). Some of these international instruments include the Vienna Convention on the Law of Treaties (UN, 1969); Stockholm Declaration (UN, 1972a); United Nations Convention on the Law of the Sea (LOSC) (UN, 1982); Rio Declaration on Environment and Development(UN, 1992b); Convention on Biological Diversity (CBD) (UN, 1992a); United Nations Framework Convention on Climate Change (UNFCCC) (UN, 1992d); UN Convention on the Law of the Non-Navigational Uses of International Watercourses (UN, 1997); and most recently the Paris Agreement (UNFCCC, 2015).

This most recent example, the Paris Agreement, treats developed and developing countries differently when dealing with emission targets. The Agreement binds developed countries to undertake economy-wide emission reduction targets. In contrast, developing countries

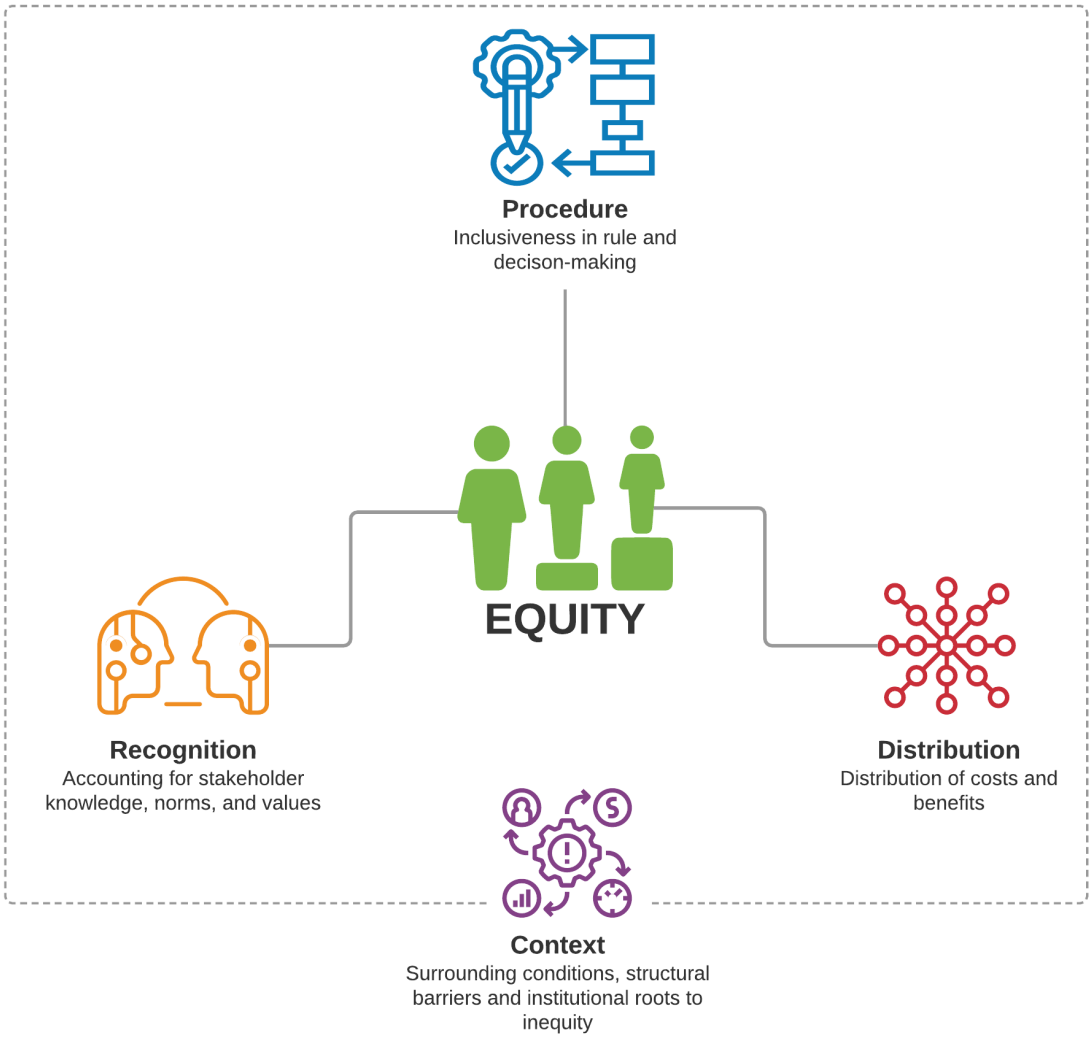

Figure 1.1: Four dimensions of equity: procedural, contextual, distributional, and contextual adopted from McDermott et al., (2013) and Bennett et al., (2021).

are bound to enhance mitigation efforts and are encouraged to move over time towards economy-wide emission targets (UNFCCC, 2015). Furthermore, the Agreement places an obligation for developed countries to mobilize finance for climate adaptation and mitigation efforts (Article 9). The Paris Agreement also binds countries to take a periodical stock of the implementation "in the light of equity and the best available science." The detailed guidance of the Paris agreement known as the "Paris rulebook" also embeds equitable principles (Winkler, 2019), in particular “fairness” and “climate justice”(Will & Manger-Nestler, 2021).

These recent developments notwithstanding, judges in international courts have applied equitable principles in their decisions as far back as the late 1800s (Lapidoth, 1987). Apart from recognizing the power of the International Court of Justice (ICJ)’s statutes to decide cases *ex aequo et bono*, if the parties agree (article 38(2), the court has frequently used equity as a "general principle of law recognized by civilized nations" (article 38(1c) of Statues of the ICJ (Goldie, 1985)). For example: in the fisheries jurisdiction cases between the United Kingdom vs Iceland and Germany vs Iceland, the courts considered equity and preferred the dependency of the coastal communities for livelihood and economic development from the stocks of Iceland over the historical rights of the United Kingdom and Germany[5]. However, in practice in most fisheries resources allocation systems, historical rights remain as the key concept (Bailey et al., 2013; Havice, 2021; Seto et al., 2020).

1.4 Equity in transboundary fisheries

Following the verdicts of the ICJ judicial proceedings and recognizing the imbalance in the global oceans, the United Nations Convention on the Law of the Sea (LOSC) was also seen as a means to facilitate inter- and intragenerational equity by aiming to:

[5] Fisheries Jurisdiction (United Kingdom v. Iceland), Merits, Judgment, I.C.J. Reports 1974, p. 3: Fisheries Jurisdiction (Federal Republic of Germany v. Zeeland), Merits, Judgment, Z.C.J. Reports 1974, p. 175.

> *"… contribute to the realization of a just and equitable international economic order which takes into account the interests and needs of mankind [sic.] as a whole and, in particular, the special interests and needs of developing countries, whether coastal or land-locked."* (UN, 1982, p. 25)

Furthermore, there are several equitable principles (distributional and procedural) used in LOSC, such as : resolving conflicts of interests in Exclusive Economic Zone (EEZ: article 59); regulating access to the fish stock surplus in EEZ from the same subregion or region by land-locked States and geographically disadvantaged States (article 69(1)); delimiting of the EEZ and continental shelves (article 74); distributing payments and contributions made by coastal States to the International Seabed Authority (ISA: article 84(2)); distributing the benefits from the exploitation of the international seabed - common heritage of humankind (article 140, 155, 160, 162(2)), transferring of marine technology for the benefit of all States concerned (article 266(3) and 269(b)) and training of members by ISA (article 274(a)); and guiding the composition of international organs by States through geographic representation (article 76(8), article 160(2), article 162(2), 163(4) (Engler Palma, 2010; Lapidoth, 1987).

However, the implementation agreement under LOSC to regulate straddling and highly migratory fish stocks – the Agreement for the implementation of the provisions of the United Nations Convention on the Law of the Sea of December 10th, 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks (UN Fish Stocks Agreement: UNFSA, 1995), does not have explicit references to equity in its preamble or its substantive provisions (Engler Palma, 2010). Instead, the UNFSA suggests states take into account wide-ranging factors in developing conservation and management measures such as computability with measures already in place in EEZs, high seas by coastal States and States fishing on high seas, and RFMOs; biological unity and other biological characteristics of the stocks; respective dependence of the coastal States and the States fishing on the high seas; and to ensure that such measures do not result in a harmful impact on living marine resource as a whole (article 7(2)). A similar range of

factors is provided in accepting new members or participants for RFMOs (article 11). UNFSA does, however ask members to recognize developing States' special requirements and apply a differential treatment for these States (article 24) and elaborates forms of cooperation with developing States (article 25). Thus, Abolhassani (2020) in her research concluded that at least *prima facie*, both distributional and procedural equity, are guiding principles in the management of highly migratory fish stocks.

1.5 The Indian Ocean Tuna Commission

One of the key functions of UNFSA was mandating the role of RFMOs as the intergovernmental body to manage transboundary and highly migratory species. There are more than 16 RFMOs currently in existence (Ásmundsson, 2016), with five of them dedicated to the conservation and management of tuna and tuna-likes species. One of these, the Indian Ocean Tuna Commission (IOTC), will be the focus of much of the work completed in this thesis.

The IOTC was established in 1993 under Article 14 of the FAO Constitution[6] covering ocean space from Eastern South Africa to Western Australia and Indonesia, and Southern Pakistan (Figure 1.2). IOTC is the only tuna RFMO under the FAO umbrella. All the other tuna RFMOs were established under LOSC and are independent and only responsible for their member States.

[6] Under the provisions of Article XIV of the FAO Constitution, the FAO Council may "approve and submit to Member Nations agreements concerning questions relating to food and agriculture which are of particular interest to Member Nations of geographical areas specified in such agreements and IOTC is the only RFMO to be under the framework of FAO. Under the FAO framework, IOTC is a project administered by FAO.

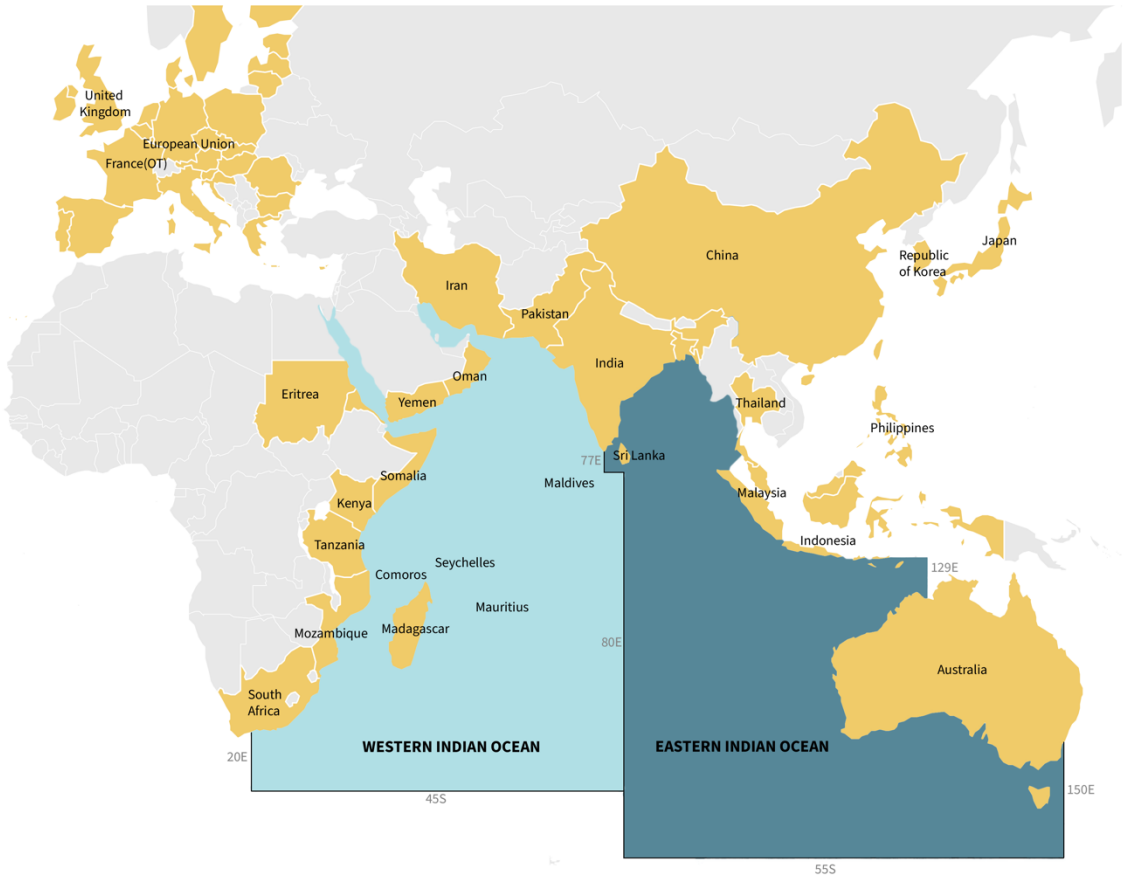

Figure 1.2: IOTC Memership and IOTC area of competence for managing tuna and tuna-like species identified by the shaded area as of October 27, 2020. The area of competence of the Commission is defined by FAO statistical areas 51 (Western Indian Ocean: light blue) and 57 (Eastern Indian Ocean: dark blue) and adjacent seas, north of the Antarctic Convergence (article 3 of the IOTC Agreement). In the 4th Session of the IOTC, it was also agreed to modify the western boundary of the IOTC area of competence from 30^0E to 20^0E, to eliminate the gap between the areas covered by IOTC and International Commission for the Conservation of Atlantic Tuna (IOTC, 1993). Yellow-shaded countries are full members of IOTC. The membership of the United Kingdom, France and the EU in the IOTC is contested by some coastal States, mainly due to the disputed territories in the Indian Ocean. The IOTC's membership is limited to coastal States, or Associate Members situated wholly or partly within the area of competence; (ii) States or Associate Members whose vessels engage in fishing in the Area for stocks covered by the Agreement; or (iii) regional economic integration organizations of which any State referred to in subparagraphs (i), or (ii) above is a member and to which that State has transferred competence over matters within the purview of the Agreement (IOTC, 1993). France gets a separate membership due to its membership in the IOTC based on overseas territories in the Indian Ocean (which are not part of the European Union).

Currently, there are 30 member states in the IOTC, with 23 being coastal states (countries whose waters are found within the convention area as shown in Figure 1.2). Unlike in the other oceans globally, artisanal fisheries[7] take a more significant proportion of tunas in the Indian Ocean (Allen et al., 2010).

In terms of tuna productivity, the Indian Ocean ranks second after the much larger Western and Central Pacific (Raiana et al., 2020). Catch of tuna and tuna-like species in the IOTC area of competence has increased from 50,838 tonnes in 1950 to more than two million tonnes in 2019. The main species targeted by the IOTC membership are tropical tuna, neritic and billfishes. The countries use a variety of type gears to target the stocks. Most artisanal and small-scale fishers use "multi-gear" to capture "multi-species" such as longlines, trawls, trolls, small-scale purse seiners, pole and line and handlines. Industrial fleets use longlines and purse seine, which can stay at sea for months using supply vessels and at-sea transshipments. Presently, skipjack tuna - the only species which has a catch limit agreed by the Commission is fished over its limits. It represents one third of the total catch in the Indian Ocean. Furthermore, 39% of the stocks are overfished and subject to overfishing (yellowfin tuna, blue marlin, stripped marlin, longtail tuna, and narrow-barred Spanish mackerel), 6% are subject to overfishing (albacore and bigeye tuna), 11% of the catch are fished at sustainable levels (swordfish, kawakawa and blue shark), and for the remainder of the stocks, an assessment is yet to be made as shown in Figure 1.3 (IOTC, 2020c). The IOTC, the fishing industry, market, and non-governmental organizations (NGOs) have repeatedly called for more decisive management actions(Holmes, 2020; IOTC, 2021e). The IOTC has taken measures to tackle overfishing, but these measures have been deemed inadequate, and the health of the stock has continued to deteriorate.

[7] There is no accepted definition for artisanal fisheries in the IOTC. However, in the IOTC some resolution exempts vessels below 24m and fishing in the national waters such as Resolution 19/01, interim measure for rebuilding the yellowfin tuna in the Indian Ocean, Resolution 19/04 concerning the IOTC record of vessels authorised to operate in the IOTC area of competence, Resolution 19/01, etc.

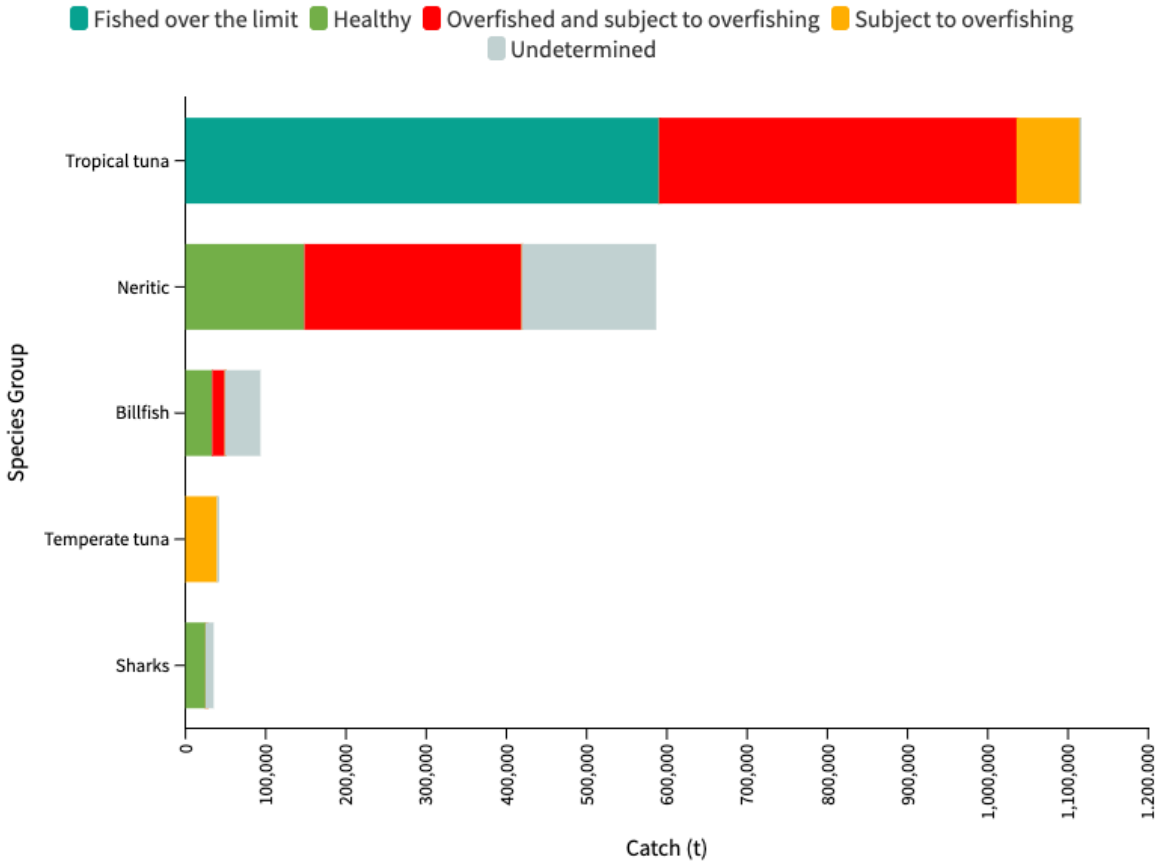

Figure 1.3: Catches of Indian Ocean tuna based on the status of the stocks of different species subgroups, i.e. tropical tuna (bigeye tuna, skipjack tuna, and yellowfin tuna), neritic (bullet tuna, frigate tuna, kawakawa, longtail tuna, Indo-Pacific king mackerel, and narrow-barred Spanish mackerel), billfishes (swordfish, black marlin, blue marlin, stripped marlin and Indo-Pacific sailfish), temperate tuna (albacore), sharks (blue shark, oceanic whitetip shark, scalloped hammerhead, shortfin mako, silky shark, thresher shark, and pelagic thresher shark).

1.6 Thesis outline

The thesis is divided into six chapters, with four main research chapters each answering the sub-questions as a stand-alone paper. The first chapter offers an introduction to the problem rationale, main concepts, outline, and limitations of thesis. Following that, each research chapter will introduce the subject matter, discuss the methodological approach, and then analyze and discuss the results with a conclusion from the research.

The second chapter of the thesis is based on how different actors in the IOTC strategize their engagement and use or leverage their political power in the development and adoption of Conservation and Management Measures (CMMs). In particular, I analyze: i) how socio-economic priorities influence and motivate the involvement of member delegates at RFMO meetings; ii) how these priorities and motivations of member States influence external engagements with different actors, and iii) how these priorities and motivations of member States and external influences relate in the adoption of CMMs.

Chapter three analyzes the decade-old allocation negotiations in the IOTC and identifies the institutional, political, and scientific barriers preventing an agreement to allocate future fishing opportunities in the IOTC. The chapter demonstrates how IOTC might end up in a pseudo-allocation process if these barriers are not addressed, leading to inequities.

Chapter four explores the role of subsidies in transboundary fisheries management and how they contribute to inter-generational inequities in the IOTC. Using subsidies estimates developed by *Sea Around Us*, catch and vessel data of the IOTC, publicly available datasets, and anecdotal evidence published in various studies, the chapter illustrates how subsidies distort future fishing opportunities in IOTC allocation negotiations leading to an intergenerational loss.

Chapter five takes a comprehensive look at the international fisheries legal instruments to identify rights and responsibilities designated to member countries in RFMOs to facilitate

an equitable decision-making process. Following the analysis, the research found no institutionalized mechanism to implement an equitable decision-making process to date. Thus, the chapter proposes a remedy for this oversight in international transboundary fisheries using measures proposed in IOTC to illustrate its utility.

Chapter six, the concluding chapter, is an essay based on personal reflection based on the findings from the research (the four chapters) and inequity in transboundary fisheries management. It speaks to the need to decolonize transboundary fisheries governance if we are ever to achieve equitable outcomes from these shared resources.

1.7 Thesis limitations

This thesis is predominantly based on the Indian Ocean Tuna Commission. This thesis might differ from other tuna RFMOs, as socio-economic priorities, geopolitics, and fisheries management objectives are different from those in the IOTC. Hence, it is advised to be cautious in generalizing the findings of this thesis in the application and generalization of inequities in other RFMOs, in particular tuna RFMOs.

In addition, the research is confined to the respondents' experiences, validated in most cases with academic papers, books and reports. Since, research into the geopolitics of the Indian Ocean and socio-economic importance of the ocean economy (other than ocean security) is limited, some of the respondents' responses cannot be validated. Hence the data that are reported based on expert interviews need to be interpreted as opinions and perceptions of respondents, not necessarily as facts.

An additional limitation faced in this thesis relates to data availability. The data on socio-economic indicators in the Indian Ocean is inconsistent. It is not abnormal in small-scale and artisanal fisheries. Hence, data for some indicators were obtained from different sources (Chapter 2 and 5). Those sources might use different methodologies to formulate

the indicator. When data are unavailable from a single source, they were obtained as much as possible from similar organizations or reports to avoid discrepancies.

1.8 Statement of co-authorship

The overall conceptualization of this thesis was developed by myself. For the individual research chapters, I designed the research, conducted all data collection and analysis, and wrote the majority of the manuscripts. My co-authors provided valuable initial ideas, feedback (comments, suggestions, and edits) on various versions of the chapters, and aided in the process of submission to various journals. Published chapters and the chapter in review from the thesis are as follows:

Chapter 2:

Sinan, H., Bailey, M., & Swartz, W. (2021). Disentangling politics in the Indian Ocean Tuna Commission. *Marine Policy, 133, 104781.* https://doi.org/10.1016/J.MARPOL.2021.104781

Chapter 3:

Sinan, H., & Bailey, M. (2020). Understanding Barriers in Indian Ocean Tuna Commission Allocation Negotiations on Fishing Opportunities. *Sustainability 2020, Vol. 12, Page 6665*, *12*(16), 6665. https://doi.org/10.3390/su12166665

Chapter 4:

Sinan, H., Willis, C., Swartz, W., Sumaila, R.U., Forsdyke, R., Skerritt, D., Le Manach, F., Colléter, M., & Bailey, M. Subsidies and allocation: a legacy of distortion and intragenerational loss. *Conservation Letters, In Review*

Chapter 5:

Sinan, H., Bailey, M., Hanich, Q., & Azmi, K. (2021). Common but differentiated rights and responsibilities in tuna fisheries management. *Fish and Fisheries, 00, 1–11.* https://doi.org/10.1111/faf.12610

2 DISENTANGLING POLITICS IN THE INDIAN OCEAN TUNA COMMISSION

"I love the IOTC, right? Could I just put that right out there? … It is such an amazing body, so much diversity of culture and thinking and capacity. And the people were always amazing, you know. It is just that makes it complex and difficult as well, because there are so many [respondent pauses], such as lack of capacity. It is such a huge part of food security and how do we recognise that and take into account in our fisheries management?" – INGO 002

2.1 Introduction

The Indian Ocean Tuna Commission (IOTC) is one of five tuna Regional Fisheries Management Organizations (RFMOs) established after the adoption of the United Nations Convention on the Law of the Sea (LOSC) to manage and conserve tuna and tuna-like species in the Indian Ocean under the auspices of the Food and Agriculture Organization of the United Nations (FAO)[8]. There are currently 30 members in the IOTC.[9], 23 of which are coastal States (i.e., countries whose waters are found within the convention area) and eight are distant water fishing nations (DWFN). Countries fish for tuna and tuna-like species with diverse objectives, aspirations and interests; yet are collectively mandated to negotiate to conserve and optimally utilize the stocks. Despite this mandate, yellowfin tuna has been biologically overfished since 2014, bigeye tuna and albacore were both overfished in 2019, and skipjack tuna caught in 2018 exceeded their negotiated limit by 30% (IOTC, 2019g). Collectively, these stocks account for nearly 60%

[8] Two tuna RFMOs were established prior to LOSC (the Inter-American Tropical Tuna Commission (IATTC) and the International Commission for the Atlantic Tuna (ICCAT)), and the rest were established after LOSC (Commission for the Conservation of Southern Bluefin Tuna (CCSBT), Indian Ocean Tuna Commission and the Western Central Pacific Fisheries Commission (WCPFC)). The IOTC is the only tuna RFMO under the framework of the FAO.

[9] The European Union is a member of the IOTC. Under the EU membership, France, Italy, Portugal, Spain, La Reunion, and Mayotte's vessels operate in the Indian Ocean.

of the total IOTC catch in the Indian Ocean[10]. Furthermore, these four species are the four top commercially traded tuna species (Raiana et al., 2020).

Despite clear overcapacity, members continue to invest in their fleets. The coastal States that historically did not fish at an industrial scale are rapidly building new fleets under their individual "fleet development plans" whilst countries with fleets in the region are upgrading their fishing capacity to compete with the fleets from these emerging fishing nations (Sinan & Bailey, 2020). The “race to fish” phenomenon, which manifests in open-access fisheries (Grafton et al., 2006), is evident within the IOTC, and Conservation and Management Measures (CMMs) which are imposed to regulate these fleets but are often ineffective (Sinan & Bailey, 2020). As shared fish stocks, tuna are even more susceptible to the tragedy of the commons (McWhinnie, 2009), meaning finding collective solutions for managing these fisheries by members is a critical but constant struggle.

Tuna RFMOs are subject to much scrutiny, especially in the last decade, with continued overfishing, slow and limited management responses and a general failure to follow scientific advice being raised as particularly problematic (De Santo, 2018; Polacheck, 2012). Most RFMO decisions are consensus-based, and thus, the agreement on most of the CMMs is of the lowest common denominator (Sinan & Bailey, 2020). Even though in the IOTC, decisions on CMMs can be taken by a two-thirds majority (IOTC, 1993), most decisions are taken by consensus.

In theory, RFMOs possess many characteristics of a polycentric governance structure within which decision centers that are formally independent of each other and competitive enter into cooperative relationships and have modalities to resolve conflicts (V. Ostrom et al., 1961). Under international law, members in RFMOs are mandated to conserve and sustainably use shared ocean space collectively. They are responsible for developing norms

[10] Apart from these species, there are 12 more species under the mandate of the IOTC, including neritic tuna, swordfish, and marlins and southern bluefin tuna (SBT) as per Annex B of the IOTC Agreement. However, SBT is managed by CCSBT.

and rules for fisheries governance in Exclusive Economic Zones (EEZs) and the high seas. In previous analyses of polycentric governance structures, scholars argued that the lack of understanding and nuance of political dynamics has led to superficial post-hoc explanatory conclusions such as 'a black box of politics' or the 'lack of political will' (Morrison et al., 2019). These conclusions continue to play out in analyses of RFMO governance failures as well (Fischer, 2020; Pentz et al., 2018; Polacheck, 2012; Wang, 2014). Distilling or unpacking these power dynamics inherent in RFMOs is crucial to establish an effective governance structure and improve inclusivity, equity, fairness, and justice in RFMOs.

CMMs in RFMOs set the rules for sustainable use and management of stocks and are binding to all members. Thus, I analyze how different actors in IOTC strategize their engagement and use or leverage their political power in the development and adoption of CMMs. In particular, I ask: i) how do key socio-economic priorities influence and motivate member delegates' involvement at RFMO meetings? ii) how do these motivations and priorities shape and influence external engagements with different actors? and iii) how do these priorities and motivations of members and external influences relate to the adoption of CMMs? Section two outlines the methodology used to address each question, and Section three presents the results answering these questions. Section four discusses the results, and Section five concludes with some of my thoughts on ways forward. In answering these questions, I aim to unpack the political dynamics, particularly the influences on members and how members influence others in protecting the socio-economic priorities in adopting CMMs in RFMOs.

2.2 Methodology

This study is undertaken in three parts. To answer the first question outlined above regarding the influence of socio-economic priorities, I focused on assembling and analyzing socio-economic and governance indicators. Governments have used indicators in environmental management since the late 1980s to simplify large pools of information and improve communication between scientists and policymakers (Hammond et al., 1995). A

total of 336 socio-economic indicators were initially identified (see Appendix A: Table ST.1) to be used in the analysis from 10 studies (Accadia & Spagnolo, 2006; Avelino et al., 2018; Boyd & Charles, 2006; FAO, 2017a, 2017b; Kruse, 2012; Ünal & Franquesa, 2010; Wabnitz et al., 2018). Using Schomaker's (1997) SMART indicator selection framework: specific, measurable, achievable, relevant and time-bound, a total of eight fisheries-specific indicators were selected to use in this study.

While indicators are growing in relevance to RFMO decision-making (as evidenced by IOTC and Pacific Islands Fisheries Forum Agency (FFA) internal studies on socio-economic indicators (FFA, 2020; Macfadyen & Defaux, 2019)), a recurring problem in including socio-economic indicators in RFMO governance is the lack of data and various data collection methodologies and systems (Willis & Bailey, 2020). While the number of indicators selected in this study is also limited due to data constraints, the indicators do function to elicit broader socio-economic priorities. The indicators selected were mainly from trade, dependency, and governance dimensions as these connect to members' socio-economic priorities, as shown in Table 2.1. Four trade-related indicators were included primarily to understand the dependency of tuna trade in a country based on economic diversity. Macro-level indicators that focus on details such as fleets, crew, processors, and society were ignored as this information is not available across the board for the 30 members of IOTC. Even though most West Indian Ocean countries have access agreements to fish in their national waters, these are not publicly available. Hence, it is difficult to ascertain the dependency of these agreements. Furthermore, the indicators for the EU are aggregated at the 27-member country level. Even though a handful of countries in the EU fish in the Indian Ocean (Spain, France, Italy, and Portugal), the EU's decisions about fisheries management in IOTC are finalized by the EU parliament and EU Commission (EU, 2019). For each member, quantitative and descriptive data, including the indicators, were sourced from published reports and datasets.

Table 2.1: Indicators used to identify socio-economic interests and its relevance to the study.

Indicator	Relevance
Human Development Index	Understanding development, power, governance, and linkages with decision-making processes
Ratio of fisheries-related employment to total employment (2014 – 2017)	Understanding linkage with dependency and decision-making processes
Average tuna export (2014 – 2017)[11]	Understanding the magnitude of tuna exports even though a country is not dependent on tuna exports.
Ratio of average tuna exports to total exports (2014 – 2017)	Understanding tuna export dependency and decision-making processes
Average tuna import (2014 – 2017)	Understanding the magnitude of tuna imports even though a country is not dependent on tuna imports
Average tuna imports to total imports (2014 – 2017)	Understanding tuna import dependency and decision-making processes
Average tuna catches (2014 – 2018)	Understanding the relative importance of tuna catch for a country
Fish consumption per capita	Understanding fisheries dependency for nutrition

[11] Some countries fish and source tuna from other oceans; thus, trade indicators such as exports and imports will include those figures.

Due to the high number of countries analyzed, “like” countries were ranked based on their performance and distributed into four bins across all indicators. Bin 1 included the highest-ranking countries (with maximum values for each indicator), and Bin 4 included the lowest-ranking countries (with minimum values for each indicator: see Appendix - Table ST.2). The results from these indicators are also supplemented by various literature to identify the socio-economic priorities of members.

To answer the second question around power and influence, semi-structured interviews were conducted to identify various mechanisms employed by different actors to engage and influence stakeholders in the decision-making process of adopting CMMs in the IOTC. The methodology, interview process and questions were approved by the Dalhousie University Research Ethics Board (See Appendix B). Even though members are the decision-makers in a RFMO, there is a growing participation of non-State actors in the governance processes. To unpack the 'black box of politics', it is vital to understand the dynamics, in particular the influence and interaction between members and non-State actors. For the study, an interview request was sent to all accredited head of delegates of members; scientists from members; representatives of various actors who attended the IOTC Commission meeting in 2019 and organizations that sent letters to the IOTC Commission meeting in 2019 describing their demands and positions on CMMs. From January to June 2020, a total of 41 semi-structured interviews were conducted with member delegates *(n=17)*; Member scientists *(n=4)*; industry NGOs (INGOs) and environmental NGOs (ENGOs) collectively referred to as NGO representatives *(n=7)*; domestic stakeholders (*n=5*) including fish harvesting and processing industry representatives and fisher association representatives; and intergovernmental organization representatives *(n=2)* who took part in the 2019 IOTC Commission meeting. Interviews were also conducted among market representatives that submitted letters to the Commission meeting in 2019. These include fisheries improvement projects (FIPs) administrators, retailers, suppliers, and marketing partnerships (collectively referred to as “market representatives” hereafter: *n=6*). The interviews were initially planned to be conducted during the IOTC Commission meetings scheduled for June 2020. However, due to the

COVID-19 pandemic, the meeting was postponed and held in virtual format. As a result, most of the interviews were conducted virtually. Some of the interviews were conducted in person during a G16 like-minded coastal States preparatory meeting held in Muscat, Oman, in January 2020. Members were asked about domestic stakeholder consultation processes and non-State actor interactions and how they influence decision-making processes, and non-State actors were asked to identify how they interact and influence member decision-making processes, including their engagement with other non-State actors. Each respondent was given an alpha-numeric code based on their organization. The interviews were then coded in NVivo 12 based on common themes and different actors in IOTC meetings to identify how respondents influenced and were influenced by different actors involved in IOTC decision-making processes for CMMs.

For our third study component, CMM proposals submitted by members in the IOTC for negotiations from 2014 to 2019 were analyzed to elicit any relationships with socio-economic priorities. From 2014 to 2019, the IOTC commission considered 104 CMM proposals submitted by member countries. These years correspond to a similar timeline for the socio-economic data used to answer the first question. The CMMs were analyzed to find a relationship with the socio-economic priorities of members.

2.3 Results

2.3.1 Socio-economic interests of members in IOTC

Eight indicators were used in this study to infer the socio-economic interests of IOTC members (Figure 2.1 [A]). It is important to note that just because a country has a certain priority does not mean it is dependent on it, but rather such an analysis can identify what interests are likely to be brought to bear in negotiations. The countries are grouped based on which ones more frequently scored in high bins (darker blue) versus low bins (lighter blue) for the different indicators (Figure 2.1[A]). What emerged are five distinctly informative categories of member countries: Small Island Developing States (Seychelles,

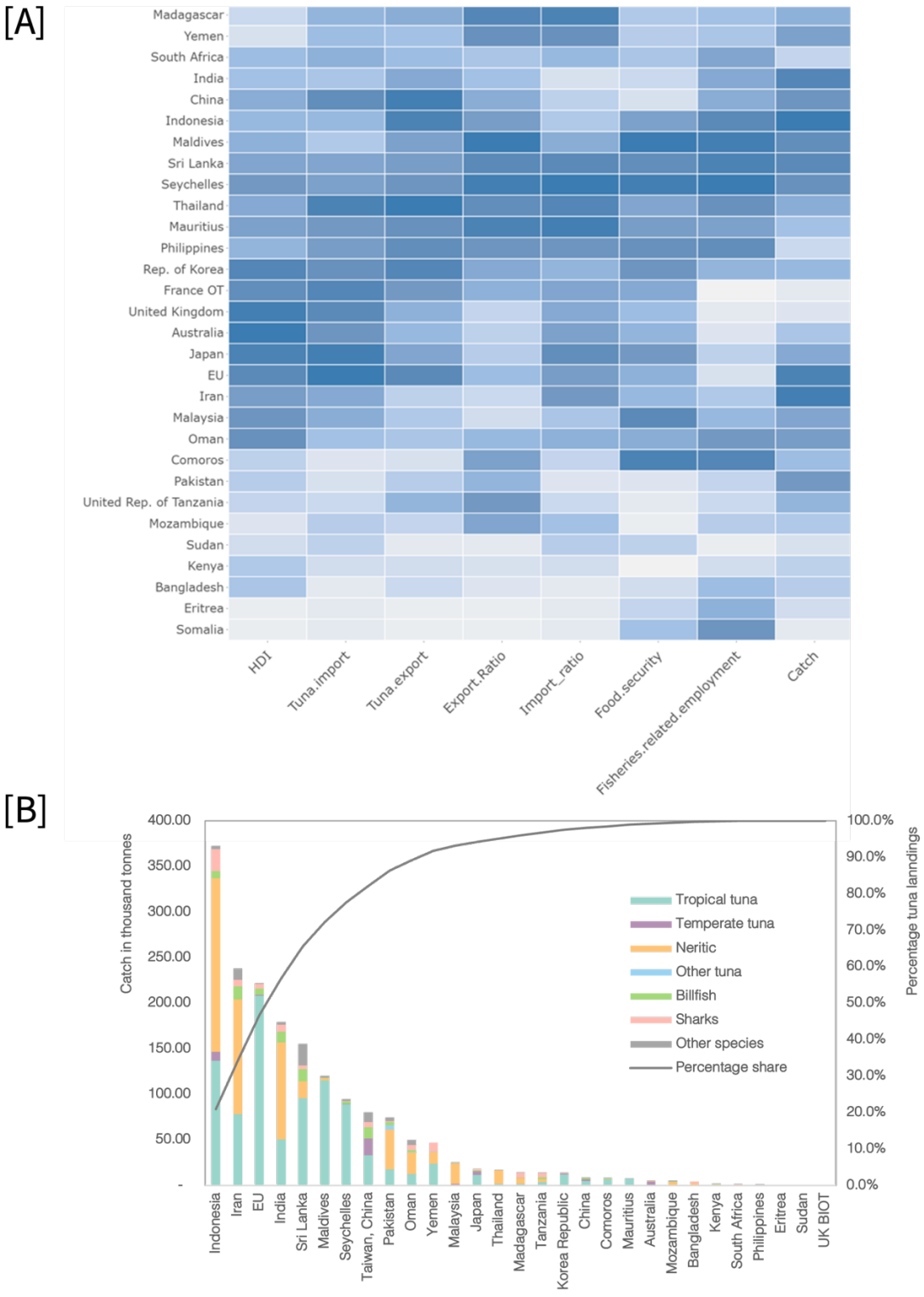

Figure 2.1[A]: IOTC members ranked based on eight socio-economic indicators used in the study. Bin 1 represents the highest ranks for each indicator (darker blue), and Bin 4 represents the lowest ranks (light blue). **[B]:** Average catches of IOTC members.

Mauritius and Maldives) that score highly across most ranked indicators; large coastal fishing States (Indonesia, India and Iran) with a high volume of catch in the region but are largely made up of low-valued neritic tuna species; export States (Thailand and Philippines) with a low domestic catch but with a significant amount of trade in tuna products; market States consisting of developed and DWFN (France, United Kingdom, Japan, Korea and the EU) countries and China that import significant tuna products; and aspiring coastal States (Bangladesh, Comoros, Eritrea, Sudan and Somalia) that do not have a fishery in the Indian Ocean but have aspirations to develop their fishery. These categories are discussed below.

2.3.1.1 Small Island Developing States (SIDS)

The three SIDS accounts for around 12.5% of the total catch in IOTC (Figure 2.1[B]) and rely significantly on tuna for livelihood, economy and food security. Around 8% of employment in Maldives, 1.4% of Mauritius and 12% of Seychelles depend on fisheries jobs. They are also significant exporters of tuna products (Maldives: $116 million, Mauritius: $300 million, Seychelles: $280 million in export value). The proportion of tuna exports from total exports is significantly high in these countries (Maldives: 74%, Mauritius: 4%, Seychelles: 53%). These countries are also among the top in terms of fish consumption per capita in the Indian Ocean (Maldives: 163kg, Mauritius: 11.87kg, Seychelles: 57.4kg). It is fair to assume that a significant portion of fish consumption in Seychelles and Maldives is tuna since it is their main target species. Consistent with this data, in the IOTC Commission meetings, SIDS advocates recognizing their vulnerability and dependency of these countries upon tuna fisheries. For example, in 2018, in the 23rd Session of the IOTC, a submitted statement by the Maldives stated:

> *"As a large ocean State, we are heavily dependent on the marine resources for our economic growth, food security, employment etc. Without yellowfin and skipjack tuna stocks in a healthy state, Maldives is probably the nation that would suffer the most."* (IOTC, 2019h)

However, there are significant differences among the three SIDS and these may lead to divergences in their actions at IOTC. Seychelles and Mauritius license foreign fleets to fish in their waters, while the Maldives bans foreign fishing vessels within their waters (Fisheries Act of the Maldives, 2019). Although Seychelles and Mauritius fish for tuna, most of the catch landed in the two countries is caught by foreign-owned, locally-flagged vessels. In 2019, Spanish-owned Seychelles-flagged vessels caught 86% of the tuna, and in Mauritius, 96% of the tuna was caught by French-owned Mauritius-flagged vessels (IOTC, 2020a). Seychelles lands most of the fish caught by the purse seine fleet in the Indian Ocean to transship or process in the facility co-owned between a subsidiary of one of the world's largest seafood companies Thai Union and the Seychelles government (SFA, 2016). Mauritius also imports tuna landed in Seychelles port for the processing facility owned by UK-based food and beverage company Princes. Since Mauritius does not catch much tuna, Mauritius imports most of the tuna required for the processing facility (on average, Mauritius imported around $192 million worth of tuna) and exported about $300 million worth of tuna products between 2014 and 2017.

On the other hand, Maldives has three small processing facilities supplied entirely from their fishing fleet (Edwards et al., 2020). Even though fisheries employment is a crucial contributor to the labour force of these countries, there are significant differences in the type of employment. Around three quarters (72%) of Mauritian and Seychellois fisheries employment are in the secondary and tertiary sectors (processing and ancillary sectors), while in the Maldives, three quarters (74%) of job concentration is in the fisheries harvesting sector.

2.3.1.2 Large coastal fishing States

From 2014 – 2018, India, Indonesia and Iran – three of the top four members – accounted for around 44% of the total catch in the IOTC (Figure 2.1 [B]). Indonesian vessels have caught most of the tuna and tuna-like species in the Indian Ocean (~21%). However, nearly half of the catch is from coastal species, such as neritic tuna caught by small-scale fishing vessels for local consumption (India: 59%, Indonesia: 51%, Iran: 53%). The total employment in fisheries jobs is relatively high due to its population size (India: 1%,

Indonesia: 5%, Iran: 1%). Even though India's ratio of marine fisheries employment is 1%, India employs around 4.95 million marine fisheries-related jobs.

However, there are again significant differences among these countries. India and Iran primarily consume their tuna and tuna products with negligible exports (India: $73 million, Iran: $82million). On the other hand, Indonesia is a significant exporter of tuna products, with about $612 million per year worth of tuna. However, tuna exports account for only 0.383% of total exports from Indonesia.

Unlike Indonesia, Iran and India's main target gear is gillnet. Around 95% of tuna landings in Iran are from both offshore and coastal gillnet vessels. This pattern is very similar to some coastal States such as India, Pakistan, Oman and Malaysia. Iran also exports a minor fraction of its tuna catches, mainly to Thailand and China, respectively.

2.3.1.3 Export States

Thailand and the Philippines do not catch much tuna in the Indian Ocean but are among the top tuna traders (Figure 2.1[A]). Together both these countries caught less than 1% of the total tuna landings in the Indian Ocean. From 2014 – 2017, Thailand exported $3.7 billion and imported $2.2 billion worth of tuna products per year. However, compared with tuna fisheries exports and imports with the total exports and imports respectively, Thailand ranked relatively low (For example, Thailand's tuna exports were 1.695% of its total exports). It is very similar to the Philippines, which has a DWFN fleet fishing in other RFMO jurisdictions. Even though the Philippines exported $367 million and imported $169 million worth of tuna products, Philippines fleets caught 722t of tuna and tuna-like species in the Indian Ocean. In order to access premium canned tuna markets, Thailand imports Indian Ocean tuna, primarily MSC-certified, pole-and-line caught tuna. Thus, in the Indian Ocean, both these countries would want to maintain catches at sustainable levels to maintain their market share.

2.3.1.4 Market and Distant Water Fishing Nations

Developed nations, DWFN (France, EU, Japan, Korea and the United Kingdom) and China are significant tuna importers. Among them, the EU stands out as their imports surpassed $3 billion annually. The EU also exported around $559 million worth of tuna products. Japan imported around $1.9 billion worth of tuna products and exported on average around $112 million worth of tuna (Figure 2.1[A]). On the other hand, China imported on average $625 million worth of tuna and exported around $2.3 billion worth of tuna products. However, these are 0.0008% and 0.00016% of its total exports and total imports respectively.

Apart from trade, most of these developed countries are also major distant water fishing nations. The EU is the third-largest tuna harvesting State in the Indian Ocean, catching around 12% of the total catches (94% are highly valued tropical tuna species: Figure 2.1[B]). The catches are caught by Spanish, French and Italian and artisanal vessels from La Reunion and Mayotte (France Overseas Territories). EU also has access agreements to fish in the EEZs of Seychelles and Mauritius (European Commission, 2016). In addition to distant water fishing fleets operating under the EU flags, EU-based companies own purse seine fleets in the Seychelles and Mauritius with catches reported as these coastal States (IOTC, 2020b). This flagging strategy allows EU companies to avoid a cap imposed by the EU on the total size of the DWFN fleet and avoid several other EU regulations(Campling, 2012). Even though EU catches are significant in the Indian Ocean, fisheries employment contributes 0.10% to the total labour force in the EU (Figure 2.1 [A]).

The Asian distant water fishing fleet (China, Taiwan-a province of China as accepted by IOTC, Republic of Korea and Japan) contributed to around 6.8% of the total landings in the IOTC. Taiwan participates in the IOTC as an "invited expert" not entitled to any rights observed by its members or cooperating members since IOTC is within the United Nations framework under the FAO (Sinan & Bailey, 2020). These countries mainly target

tropical and temperate tuna using industrial longline and purse seine vessels. They also have access agreements with Western Indian Ocean countries, but these agreements are not made public as they are made by private companies (Sinan & Bailey, 2020). Apart from access agreements, Western Indian Ocean countries also have chartering agreements with the Asian DWFN fishing fleet. These DWFN countries are also significant traders of tuna. France and United Kingdom have overseas territories in the Indian Ocean; however, they are not involved in much fishing activity in these territories (Sinan & Bailey, 2020).

2.3.1.5 Aspiring coastal States

The lowest-income States in the IOTC are the least dependent on tuna resources but participate in the Indian Ocean Tuna Commission to fulfill aspirations to develop domestic fleets and improve their development outcomes. These are reflected in their national development plans and fleet development plans (IOTC, 2018b). These countries also continue to invest significantly in developing tuna fleets for the domestic fishery with the assistance of international organizations (World Bank, 2018). For example, speaking in the ceremony unveiling the announcement of new tuna and deep-sea regulations, Tanzanian Fisheries Minister, Mr. Mashimba Ndaki (Allafrica, 2021) stated:

> *"Start issuing fishing licenses; all we need is money. You have an uphill task; we want to get maximum benefits from our maritime resources."*

However, these countries face significant challenges in the development of their tuna capacity. For example, Somalia's HDI (0.434) is in the lowest bins, shown in Figure 2.1[B]. Even though 2% of Somalia's employment is fisheries-related, the IOTC database does not have any record for landings of tuna, nor any of the trade indicators. There is no established data collection mechanism in Somalia, which might be the reason for the lack of data on these indicators (Breuil & Grima, 2014b). Indicators are also purely a reflection of the data collection system. Somalia's fish consumption was at 3.3kg per capita, far below the global average of 20.5kg per capita (FAO, 2020c). Even though the indicators show

that these countries are less dependent on tuna, it also underscores the importance of coastal States with huge ocean space for food security and as a means of development, especially for coastal communities.

2.3.2 Socio-economic influences on members in IOTC

As stated above, Members have diverse socio-economic interests in the IOTC, and these require them to navigate through various internal and external influences in the development and adoption of CMMs. As part of this study through the interviews conducted, 34 unique entities aggregated under six categories (members; domestic stakeholders; market; intergovernmental organizations; ENGOs; and INGOs) were identified to influence the decision-making process (Figure 2.2). These influences include actors and policies, policy processes, and other political and economic themes. The analysis reveals that these influences on members, influences that in many ways contribute to the black box of RFMO politics, are: i) direct (domestic and international stakeholders); ii) indirect (via multiple tracks by domestic and international stakeholders); and that not all lines of influence on members and other actors in Figure 2.2 are of equal magnitude.

In this section, I will be discussing the categories identified above and explain how they influence the decision-making and behaviours of members. Interviewees indicated various approaches and practices used to influence the decision-making process around CMMs. For example, lobbying for adopting a CMM proposal occurs prior to and during the Commission meeting, implying that influences on the decision-making processes are not isolated to the meetings themselves (delegate 4, delegate 10). Scientific information provided by the IOTC Scientific Committee influences all members' decision-making (Figure 2.3[A]). Interestingly, other than domestic stakeholders, other Members influence the most in the decision-making process (76% of interviewed delegates).

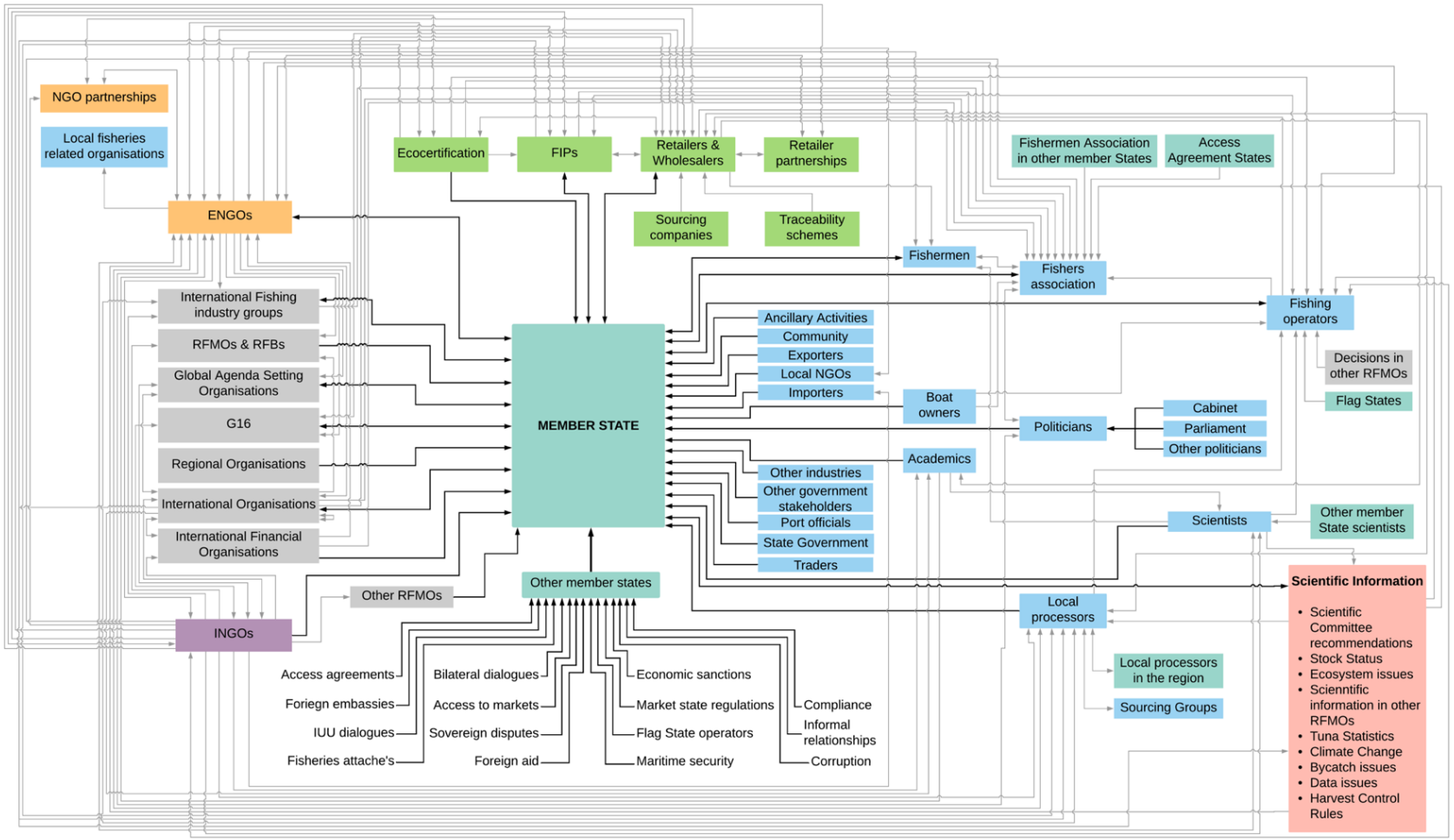

Figure 2.2: Map of influences of members in the development and adoption of CMMs in IOTC based on responses from the interviews. The influences are colour-coded: Domestic stakeholder influences on members (blue), other members (pale green), ENGOs (orange), INGOs (purple), Market (green), Regional, international organizations and groups (grey) and scientific information (peach). The arrows represent the direction of influence (black) from stakeholders to members and indirect influences (grey) from one stakeholder to another. The map illustrates the complexity of influences in the decision-making processes.

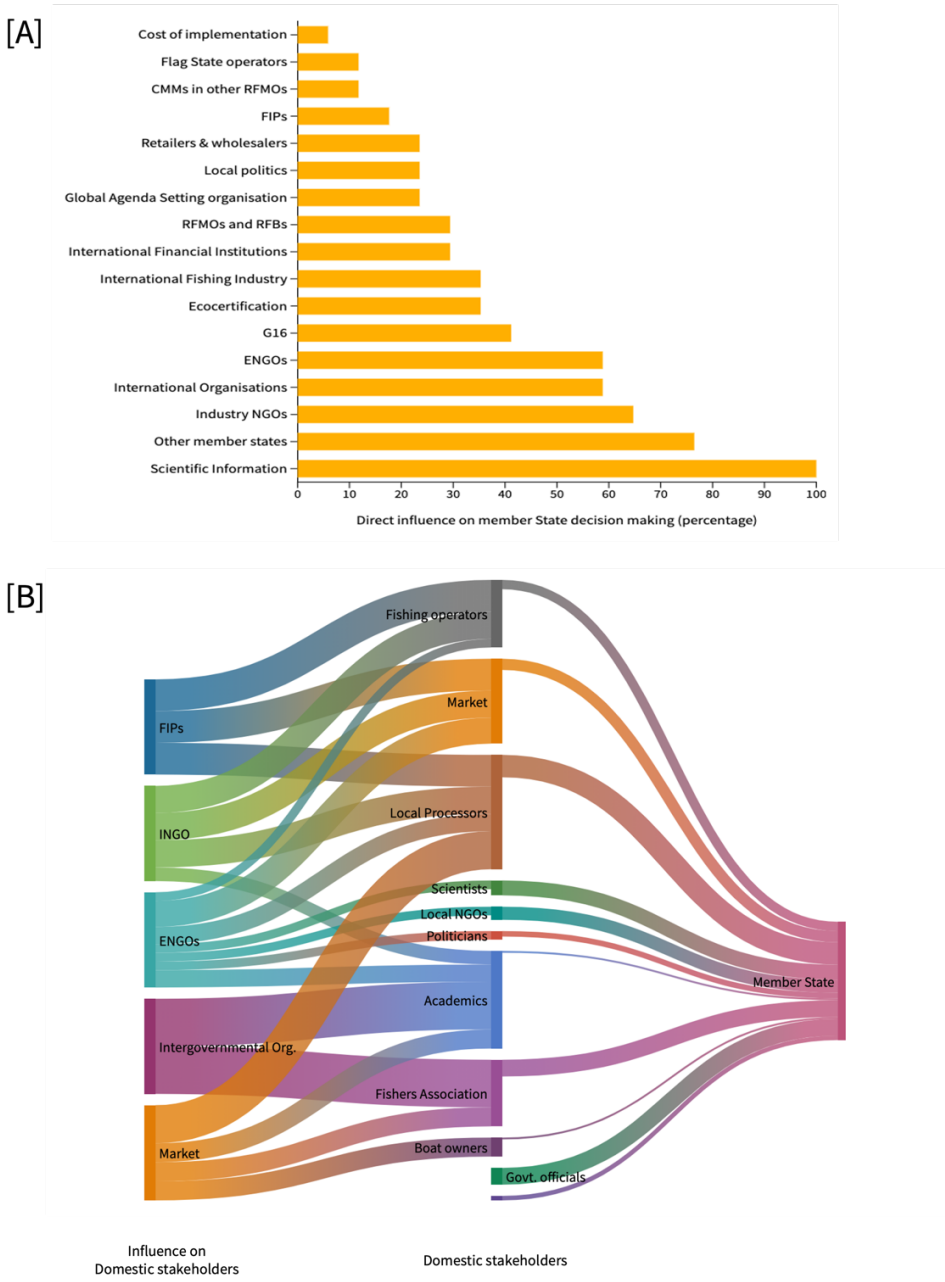

Figure 2.3[A]: Types of direct influences on members in CMM decision-making process except domestic stakeholders based on responses from interviews and the level of influence identified as a percentage of interviewees (x-axis) who identified these (y-axis) factors had influenced their decisions. **[B]:** Indirect and direct influences on members via domestic stakeholders as identified by interviewees: the first section identifies influences on domestic stakeholders by various external actors and the second section identifies the influences on members by domestic stakeholders. The width of each stream indicates the level of influence on stakeholders as indicated as a percentage of the respondents.

These influences can happen in all stages of CMMs, ranging from development to adoption. These include: working together with other members in the development of the proposal (delegate 1); developing a proposal and getting in touch with other members in the region (delegate 13) or bilaterally (delegate 17), focussed discussions within key members (delegate 6); discussions with other like-minded members prior to the formulation of a national position (delegate 2, delegate 7, delegate 9) and a general discussion with like-minded States prior to the Commission meeting (delegate 1). NGOs and international organizations have the most influence compared to other entities (Figure 2.3[A]). Few informants raised economic sanctions, corruption, market state regulations, and maritime security as influencing their decision-making process. In what follows, the main actors in IOTC and their role in ember behaviour in adopting CMMs are analyzed in detail.

2.3.2.1 Domestic stakeholders

Consultations directly with domestic stakeholders about proposed CMMs prior to IOTC Commission meetings are a norm for most countries in the study (Figure 2.3[B]). Only one respondent (delegate 17) indicated an absence of a consultation process ahead of an IOTC commission meeting. However, this country is amongst the lowest in tuna catches, suggesting tuna fisheries may not be a priority or, as an aspiring State, there may not be significant stakeholders to consult. Some members prefer to limit the consultations depending on the CMMs (delegate 1, delegate 3). In contrast, most prefer to conduct a systematic consultative process, and in one instance, a member has developed a national IOTC Commission with domestic stakeholders (delegate 5).

> *"What we have in the (Country Name) is, we have a framework of the process before the decision gets through the Commission. In fact, before every IOTC Commission meeting, we will hold locally what we call a stakeholders meeting." – delegate 4*

Even though consultative processes exist, on average, the interviewed member delegates consulted with only five different domestic entities. Domestic processors (76%), fishermen associations (53%), scientists (47%), domestic NGOs (41%) and fishing operators (29%) were entities most frequently consulted. One respondent consults only with a domestic branch of an international ENGO before a Commission meeting on CMMs (delegate 16). Despite consulting with only one entity, the respondent did indicate that information about the decisions of the meeting is communicated to other domestic stakeholders following the Commission meeting. Interestingly, one respondent said that governments find it easier to consult with a formalized stakeholder such as fishing operators and processing companies rather than directly with fishers and others working in the field (delegate 18).

> *"What we have done is like all the stakeholders within the fisheries value chain, we have formed them into associations. …so that those are the forums that we use for them to give their views. And some of them [provide] very invaluable data, which may not have reached us through research, but they have worked. And also the communities have their indigenous knowledge in terms of which where they [tuna] normally feed, where the seamounts are and where the breeding areas are and who are the key players within that place." – delegate 13*

Ultimately, delegates explained that the States' negotiation boundaries are determined at the highest government levels, such as the parliament and ministers. Some members present the domestic stakeholders' consultative processes and the delegation views to the cabinet or parliament in the development of the mandate to negotiate (delegate 4, delegate 12, delegate 14), while in other instances decisions are made by individual politicians (delegate 3). Decisions made at the parliament or ministerial levels may pose a barrier to developing CMMs (delegate 3, delegate 9), as they are made without much involvement or knowledge in the IOTC processes and constrain delegates' ability to negotiate (delegate 3, delegate 4, delegate 5, delegate 9, delegate 13). The rapid change in governments, policies and priorities also limit effective engagement in IOTC (delegate 9, delegate 14).

"We basically present a document, a paper to the cabinet of ministers informing them of the ministry's position, taking into account the consultation that we have done with the stakeholders and including their views so that we can get a government's position going into the meeting for the decision to be taken by the country." – delegate 4

2.3.2.2 Scientists

In the IOTC scientific processes, three groups of scientists have been involved: member scientists, NGO scientists, and independent experts for stock assessments in IOTC scientific meetings. However, the scientific meetings are also attended by fishery managers, fishing operators, scientists, NGOs, and industry. Scientists from NGOs and independent scientific experts have chaired these meetings. Despite only half of the member respondents consulting with scientists prior to decision-making processes, all member respondents noted that they take scientific advice from relevant scientific bodies (reports and data) into their decision-making (Figure 2.3 [B]). The lack of engagement with scientists is due to a lack of scientific capacity within the country (delegate 1).

"For us the challenge is the expertise in stock assessment and [it] is very difficult. And we have very limited in resource persons to play a role in this area." – delegate 1

However, some respondents also noted that they verify the results through internal assessments due to biases in the scientific process (delegate 2, delegate 4, delegate 8, delegate 13).

It is not only members who are engaged in the scientific processes. One member scientist highlighted NGO involvement to direct scientific findings to fulfill their agenda (scientist 2). Interestingly, scientific cooperation across various members occurs. Ahead of a Commission meeting, it was reported that some scientists get in touch informally with member scientists from other members on CMMs, including clarification of science for

CMMs and measures taken in CMMs to clear up misunderstandings during the discussion (scientist 1, scientist 3).

2.3.2.3 Non-governmental Organizations (ENGOs and INGOs)

According to respondents, ENGOs and INGOs, collectively referred hereafter as NGOs, are heavily involved in and influence members (Figure 2.2 and Figure 2.3 [A]) directly and indirectly. These two types of NGOs are grouped because their influencing strategies with members were very similar in the interviews, despite the differences in goals. However, members with fisheries economic interests related to particular INGOs tend to influence and engage more with those countries (delegate 4, delegate 6, delegate 12). Members with domestic offices and representatives of ENGOs have regular engagement and consultation (delegate 7, delegate 13, delegate 16). Even though there is significant overlap between ENGOs and INGOs, the mode of engagement varies with members significantly. Almost 60% of the member respondents consult with NGOs, and NGOs themselves responded that they consult with 21 different groups of actors involved in the IOTC. NGOs influence members directly via i) domestic consultations, ii) position statements and letters, iii) intermediaries between members, and iv) the development of CMMs with members. These NGOs also influence members indirectly via i) various project partners in members ii) domestic processors and retailers and, iii) market including retailers and wholesalers. However, influence, participation, and engagement with NGOs vary significantly, particularly with States who rely on tuna trade. Here, these influences are explained in detail.

Apart from domestic consultations, members receive letters from NGOs with the support of fishing operators, retailers and NGO partnerships (ENGO1) representing their positions in IOTC meetings. These letters cover a broad range of areas for discussion and are not member-specific. Members use these letters as a barometer for RFMO issues and market reactions and use them as a guide for discussion in IOTC meetings (delegate 4,

delegate 7, delegate 10, delegate 12). The domestic fishing industry and processors also use these letters in their consultative processes with governments (delegate 15).

Some members also work with the NGOs to develop proposals (delegate 6), and NGOs also develop their own CMMs and seek a member delegate who could champion it (ENGO 2). These NGOs then work with the members to garner further support for the CMM through technical experts, NGO networks, and industry in various consultative platforms (ENGO 1, ENGO 2, INGO1). NGOs' lobbying efforts also go through various government levels, including ministers and parliament members (NGO 5). Further, members seek NGO support and co-sponsorship to have robust engagements (ENGO 1, INGO1). Members also seek NGO support where they have a strong presence and act as intermediaries to member delegates in the negotiation of a CMM (ENGO 1, ENGO 2).

> *"Somebody, I can't remember which country it was, asked me to go and talk to another country because those two countries weren't talking to each other. He said, can you go and talk to them because they won't talk to me. And I said, okay, I'll go and see what the problem is. So, we can sometimes act as a bridge between countries that aren't comfortable having direct negotiation. - ENGO 2.*

The NGOs are also actively involved with fishers, fishery operators and processors in providing independent information and data relevant to their agenda (delegate 1, ENGO 4, INGO 1) either directly or through members (from the projects they work with the members) or through prominent technical experts on the scientific processes to make the process more robust (ENGO 1, ENGO 2, ENGO 3). These data are also used to achieve third-party certification, such as the Marine Stewardship Council certifications and progress towards FIPs (INGO 1).

> *"Where we worked on in 2018 that the commission meeting, the Manta and Mobula species measures that were tabled by the Maldives government were deferred just because of the reason there was not enough evidence of Manta and Mobula species having*

interaction with surface fisheries. So, we as [ENGO 1], started to bring together the scientists and experts into the Indian Ocean to develop reports and present at the Working Party in Ecosystems meeting of the IOTC. We were successful in that we provided that evidence, and then we made sure the recommendations were there to move towards a scientific committee. But then again, we also worked closely with the members in developing the proposal" - ENGO 1

The lobbying efforts of NGOs also target downstream value chain actors in the market to influence members. So far, retailers have not been heavily involved in the IOTC process, but this influence appears to be gaining momentum. For example, retailers and the NGOs were heavily involved in the lobbying efforts in adopting the harvest control rules for skipjack tuna in 2017 (ENGO 1, INGO 1).

However, these influences by NGOs on members vary significantly. For states with significant tuna trade, NGOs' outreach and influence are significant, often through domestic processors and fishing operators (delegate 1, delegate 4, delegate 6, delegate 7, delegate 10, delegate 11, delegate 12). However, not all demands and lobbying efforts are met by members (delegate 4). They do consider the funding sources of NGOs and the external influences and interests of NGOs prior to decision-making (delegate 4). On the other hand, members also suggested that despite the engagement of NGOs, the influence on members is minimal (delegate 9).

"Being a State that exports the fish to the international market, what we have to ensure is that we do not basically tarnish our reputation. There is also the reputational risk that could be at stake in being dependent on those markets. So, we have to consider their opinions, not saying that we have to take into account everything that they see or wish. But their views are also part of the decisions because, you know, when you have influence from different areas, you have to weight and balance the merits, the pros and cons, because sometimes not necessarily all the lobbying are fair or how can I put that or take into consideration the status of the economy and the people." – delegate 4

2.3.2.4 Market actors

The level and type of engagement and influence by market actors on members vary significantly. Retailers, wholesalers and brand names in the tuna industry where they have a significant business are involved in the domestic consultation process (delegate 10, delegate 12) (Figure 2.2) and directly influence member decisions. However, instead of participating in IOTC meetings, retailers often send their positions on CMMs through NGO letters (IOTC, 2019h). It was indicated that these letters submitted by the market are taken seriously by the States that export tuna species into the international market (delegate 4).

On the other hand, retailers consult NGO tuna forums and FIPs (Market representative 1, Market representative 3, Market representative 4, Market representative 5) and members (Market representative 3) in developing their positions. However, most retailers and wholesalers who push for improved stock management usually stop at their sourcing partners, suppliers and processing industry in the member countries (Market representative 3, Market representative 4, Market representative 5). They, therefore, tend not to work directly with producers (i.e., operators, as above) nor with delegates of members. Some retailers have used their sourcing power to demand members to take action for adopting CMMs. This lobbying is limited to countries and individual retailers who trade much seafood and significantly export tuna products (INGO 1, INGO 2).

> *"I know that [Company Name], based out of Germany, wrote a letter to the [Country Name] Government. [Company Name] said to [Country Name], 'you are an influential member of the IOTC. We would like you to know our priorities are the following. We do a lot of business with your country. These are our priorities, and we want you to work on this.'" – INGO 2*

However, the market has taken a more united front recently with the formation of retailer partnerships such as Global Tuna Alliance (GTA) and Tuna Protection Alliance (TUPA)

in influencing decisions, especially on sustainability and traceability (Market representative 1, Market representative 2, Market representative 3, Market representative 3).

Eco-certification of fishery products by third parties offers consumers the opportunity to select and differentiate sustainable products from seafood shelves offered by the retailers, processors, sourcing groups, fishing operators and fishers associations. In the Indian Ocean, some fisheries are certified by Marine Stewardship Council (MSC) and Fair-Trade USA, among other eco-labels. The bar for certification can be high, and thus FIPs provide a mechanism or pathway for the fishery to reach the criteria to achieve eco-certifications. In the Indian Ocean, the Maldives pole and line skipjack tuna fishery and Echebastar Purse Seine skipjack tuna fishery are the only MSC certified fisheries (MSC, 2020). There are 10 FIPs in the Indian Ocean for species in the jurisdiction of the IOTC that aspire to be MSC certified at the end of their project (Fish Choice, 2020). Even though these eco-certified fisheries have a strong interest in seeing stock status improvements, they only indirectly influence members in adopting CMMs. The conditions that these eco-certifications have established (INGO 1, industry representative 1, industry representative 3) indirectly influence members. On the other hand, FIPs are involved in stakeholder consultation processes within members (delegate 1, delegate 4, delegate 12).

As some of the FIPs in the Indian Ocean partner with processors, fishing operators, NGOs and members, there are discussions regularly about the fulfillment of the FIP, including through the adoption and implementation of CMMs at the IOTC (FIP 1). For example, together with NGOs and FIPs, the industry is working to reduce skipjack tuna catches in the Indian Ocean, which is currently deemed too high (30% higher than the harvest control limits) because of fear of losing its certification (industry representative 3). Even though MSC does not directly influence members for stringent conservation measures, members, industry and its partners, mindful of the demand for MSC certified products as an increasing condition to access EU and US markets, work to garner support for stringent measures in the IOTC (delegate 6, Industry representative 3). However, some members of the IOTC also have frequent engagements with MSC because of certifications of tuna in

other oceans and other species, and these are not related to particular CMMs (delegate 7, delegate 9).

2.3.2.5 Intergovernmental organizations

Donor Agencies and International Organizations such as inter-governmental bodies and multilateral organizations are interwoven in the decision making and the implementation of CMMs in IOTC (delegate 2, delegate 6, delegate 11, delegate 13, delegate 16). They play a vital role in facilitating the implementation of the measures through various projects. For example, the Southwest Indian Ocean Fisheries Commission (SWIOFC) has a tuna working group that conducts pre and post IOTC meetings to garner support among SWIOFC member countries to have a common position on CMMs. These are vital to iron out differences among coastal States in SWIOFC, which also have diverse objectives (delegate 4, delegate 8, delegate 13).

However, these organizations sometimes lead to an overlap of mandate and create barriers to decision-making. The Regional Commission for Fisheries (RECOFI), which manages species in the Caspian and the Arabian Sea (part of the IOTC area), manages neritic tuna species as part of their mandate (RECOFI, 2011), which are also managed by the IOTC and most members of RECOFI are not members of IOTC (FAO, 2020b)

> *"Neritic tuna is essential for [my country]. Most of the catches are neritic. So that is why we have the regional commission RECOFI. In this region, some country is not a member of the IOTC. If approve a resolution on neritic tuna, only two or three countries obligated to implement this resolution. But the other country is not a member of the IOTC. That's why the fishermen complained to us why you force for us to do that, but other countries not to do it" delegate 5.*

The members of IOTC especially developed States, also use high-level forums such as the UN General Assembly (UNGA) and the Committee on Fisheries (COFI) in FAO to

influence decision-making processes in RFMOs. The developed nations in the IOTC drive the main issues facing the sustainability of fisheries through the UNGA, such as stock health, the ecosystem approach, combatting illegal, unregulated and unreported fishing (IUU) and development aspirations (delegate 7, delegate 12). The members have also used these platforms in IOTC to drive IOTC specific issues. For example, in 2016, during the 32nd COFI, some members called on FAO to find an urgent solution for the IOTC executive secretariat (Sinan & Bailey, 2020) due to IOTC's unique relationship with FAO.

> *"We see things like General Assembly resolutions as being a really useful tool for articulating priorities and articulating best practice. [Country name] was really involved in getting language about bottom fishing impact assessments into general assembly resolutions is a really good example of that" – delegate 7*

The G16, a like-minded coastal countries group that emerged informally from the IOTC allocation negotiations in 2010 (Andriamahefazafy et al., 2019), has grown into a united block that functions to improve its capacity to understand the CMMs put forward in the Commission meeting. Even though there are significant differences among the interests of G16 States, the group's work is focused on building the support and capacity of coastal States and strengthening regional solidarity. Delegates use the G16 platform to develop proposals, create a shared understanding of the proposals, and discuss ideas on developing coastal States' positions (delegate 1, delegate 4, delegate 7, delegate 9, delegate 11, delegate 14, delegate 16, delegate 17).

In 2010, only one-third of the CMM proposals were from G16 members. However, since the formation of the group, this has doubled, such that in 2019, 63% of proposals were from G16 members (Figure 4). The increase in the involvement of G16 has also led to better engagement of coastal States in the discussion of the proposals in recent years (Sinan & Bailey, 2020). Finally, the G16 also partners with NGOs and regional groups such as SWIOFC to garner support for proposals (ENGO 2, INGO 1). The Australian government has been the main financial contributor to hosting the G16 meetings apart

from the Maldives Government, which has recently funded some of the meetings. The International Pole and Line Foundation, World Wide Fund for Nature (WWF), and the South West Indian Ocean Fisheries Project have also contributed to hosting some of the meetings.

> *"We have seen the G16 when the member countries are speaking with one voice. They agree on something. You see how distant water fishing nations tremble. In the true sense of that, they tremble with all of their money, with all of their power, with all of their influence" – delegate 9*

2.3.2.6 Other members

Tuna is more than a staple food, and the geopolitics surrounding one of the most traded species in the world cannot be ignored, especially between members in IOTC (Figure 2.2). Members influence other members through various mechanisms, such as access agreements, foreign embassies, IUU dialogues, fisheries attaché's, bilateral dialogues, market controls, sovereignty disputes, foreign aid, economic sanctions, market State regulations, flag State operators, maritime security, compliance, corruption and through informal relationships (Figure 2.2). Here, I highlight some of the critical influences noted by respondents:

Use of diplomatic presence

Member countries with a foreign diplomatic presence in other member countries have used it to lobby for CMMs proposed in IOTC. These have been pursued through foreign ambassadors or high commissioners, fisheries attaché's, bilateral dialogues including trade dialogue, and matters relating to IUU to influence the decision-making process (delegate 6, delegate 2).

"Over the years what we have seen is members that would be heavily impacted by the allocation formula, they have influenced some of the supporting members at the bilateral level through their high commissioners, ambassadors and also with threats of economic sanctions, withdrawal of foreign aid, yellow card and all of that" – delegate 6

Foreign aid and fisheries

Apart from access to markets in the global North, developing countries in the Indian Ocean also face diplomatic threats of withdrawing funds for foreign aid for fisheries and other development programs from developed countries (delegate 2, delegate 6, delegate 9). For example, the negotiation around quota allocation, limiting fishing vessels' capacity, and the tensions between G16 and DWFN have amplified foreign diplomatic arguments or leverage points by some DWFN to lobby coastal states in the allocation negotiations (delegate 2, delegate 6, delegate 9).

"They seem to want to use their foreign policy as a measure or as a tool of leverage in terms of how they want to drive the decision making. We have seen in the TCAC[12]*, for instance, a member saying it and without shame and embarrassment that we are putting more money into this. I'm not quoting it verbatim, but you can kind of conclusively say that that's exactly what she was meaning that we put money into. So, if we put money, we should have them, get what we want in a way."– delegate 9.*

Furthermore, a member delegate respondent noted that the polarised nature of the divide between DWFN and G16 had affected the adoption of CMMs as G16 members take political considerations rather than the substance of CMMs into the discussion (delegate 12).

[12] Technical Committee on Allocation Criteria formed in 2010 to develop a systematic allocation framework for the IOTC.

Access to markets

Market states where tuna products are imported from use their market leverage and "access to markets" to influence decision-making processes in IOTC (delegate 6, delegate 9, delegate 14). Respondents noted the use of the EU Illegal, Unreported and Unregulated (IUU) carding system and tariff restrictions as threats (delegate 6, delegate 9).

> *"We have seen this manifesting as well in the form of a way even politicians or ministers get instructed to instruct their delegations in a particular meeting to take a certain stance. We saw that happening in 2016 in La Reunion. So, this is the hard arm, very hard arm. But still very subtle. It's kind of invisible, but it is there. Then you get to a level where now it becomes a trade threats of some sort. Couple of times we've seen these big countries using the issue of markets, for instance, or market access for their products, again as a measure or as a threat. Obviously, these are tools. They have this arsenal. They are in at disposal. So, they use them as in when they deem fit. Whereby we find threats that 'no, if you don't do this, then the tuna that's coming from your companies or from your waters, we're not going to get it.'" - delegate 9*

Corruption

In Transparency International's – an NGO that works to end the injustice of corruptions – 2019 Corruption Perceptions Index, 2/3rd of the Indian Ocean States ranked below the global average of 43 (Transparency International, 2020). One of the respondents suggested the alarming practices of corruption in both the ICCAT and IOTC. Member representatives are coerced to adopt CMMs in favour of the industry.

> *"ICCAT is a bit different from how they do it. They are more daring and very clear about it at ICCAT. At IOTC, they do it covertly, you know, kind of a thing whereby delegates are taken out, or they take out for shopping and things like that. It's done in a kind of a covert way at IOTC, I think. But I've seen it blatant at ICCAT where people are given money to support that particular thing. And you would always see it is the industry that*

is driving this. And you would always see that the head of the delegation is going to get rounded to somewhere." – delegate 9

2.3.3 CMM proposals and socio-economic priorities

Another way to understand the socio-economic interests and influences on members is to look at the content of CMMs proposed during IOTC meetings. The indicators reveal the socio-economic priorities of members, and the CMM proposals indicate how these socio-economic priorities are protected in the decision-making process. From 2014 - 2019, the IOTC considered a total of 104 CMM proposals (Figure 4). The EU (36%), Maldives (16%), Mauritius (11%) and Seychelles (10%) submitted the most proposals for consideration by the Commission during the mentioned time frame, together accounting for almost three-fourth of all proposals. It is important to note that while proposal numbers can indicate interest, the absence of proposals by a State does not necessarily indicate lack of interest, as more developed States have the capacity to engage in the IOTC process more, including the development and refinement of proposals.

As observed in Figure 2.4, most of the proposals submitted by members are to protect or regulate the interests of the members' fishing fleet. For example, countries prominent for the use of fish aggregating devices in purse seine fishery (EU and Mauritius) have submitted the most proposals to regulate that fishery component. Seychelles and Mauritius were the only members to submit proposals to minimize discards from the purse seine fishery. These countries have foreign operated locally flagged fishing purse seiners and land most of the purse seine catches in their ports. The proposals prohibit purse seiners from discarding species fit for human consumption, facilitating improved food security outcomes in these countries.

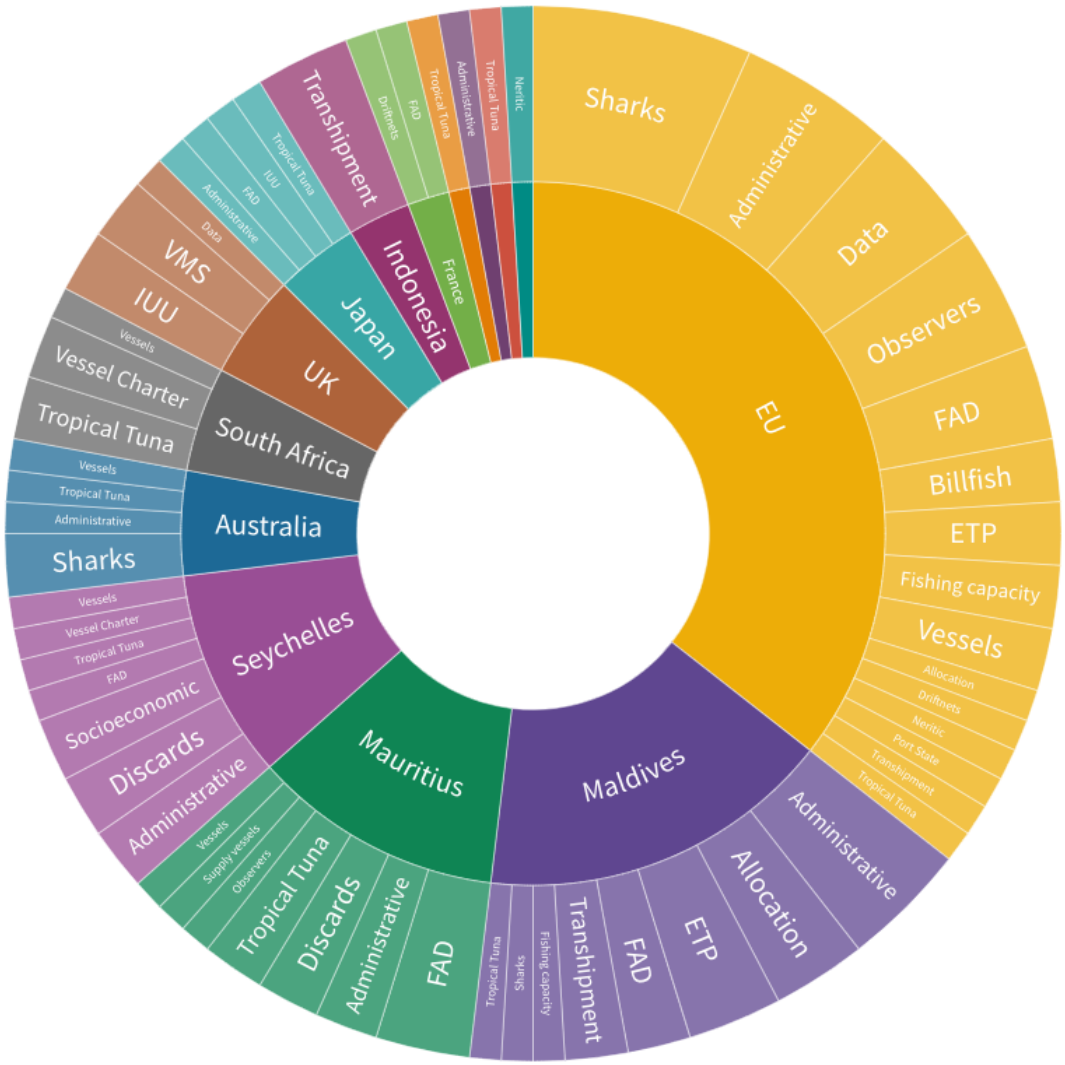

Figure 2.4: Proposals submitted by members from 2014 – 2019 and thematic areas of proposals to illustrate the connection between socio-economic priorities and decision-making processes. The size of the wedge is proportional to the number of proposals submitted in each category.

Further, the EU, which has a significant DWF fleet in the Indian Ocean (both flagged in EU and third countries), has submitted the most proposals in the Indian Ocean managing their DWF fleet and interests. The administrative measures proposed by the Maldives, particularly on harvest control limits, were to fulfill the conditions laid out by the Marine Stewardship Council (MSC) to maintain their certification (Edwards et al., 2020). Indonesian CMMs primarily focused on allowing Indonesian wooden carrier vessels to transship tuna, which do not have an International Maritime Organization identification number, a prerequisite in the measure.

2.4 Discussion

As evident from the results, political interests are a strong influence on IOTC actors. These diverse interests and myriad influences mean political manoeuvring is ubiquitous in the CMM decision-making processes to optimize members' socio-economic interests and other influential entities involved in the IOTC member. For the IOTC to adopt equitable decision-making processes, understanding these economic, geopolitical and conservation priorities are essential. Here, four key findings from this research are discussed: pathways for supporting aspiring coastal states, the implications of diffuse webs of influence on RFMO governance, fragmentation and its relationship with power imbalances and the lack of leadership, willingness, and priority for cooperation for low-valued species.

2.4.1 Aspiring coastal States

The study has indicated that by examining socio-economic indicators, IOTC members can be classified into five categories. Despite commonalities that bring these countries together within categories, there are still substantial differences between like-States. One category that I identified here that has received little attention in the scholarly literature studying RFMOs is aspiring coastal States. These States tend to be less developed, and thus when interests are determined based on indicators of use, this will automatically bias concern or power to the States that could use the resource. These States also tend to be involved in armed conflicts, are least developed (Figure 2.1 [A]), and are often dependent on fisheries

as a source of nutrition (Hendrix & Glaser, 2011). Even though these coastal States have socio-economic interests, they have little influence and engagement with other States, resulting in their disenfranchisement in the RFMO decision-making processes. For example: In the 24th IOTC Commission in 2020, Eritrea, Sudan, Somalia and Madagascar were not even present in the meeting (IOTC, 2020d). It is an irony that the countries that potentially have the most marginal utility from tuna catch, trade, and consumption, are those that are continually overlooked.

The RFMO decision-making process on the surface presumes that every member has a seat at the table. Nevertheless, RFMO outcomes continue to perpetuate historical power imbalances, and with every passing year of repeated similar negotiations, aspiring coastal States get left further and further behind. For example, the continued pressure for historical catches to form the basis of ongoing catch allocations reaffirms this dynamic (Seto et al., 2020; Sinan & Bailey, 2020). However, for equitable, fair and just decision-making around CMMs, there needs to be a better mechanism than the current global environmental regime where "powerful actors receiving more favourable outcomes than less powerful ones" (Morrison et al., 2019). Sub-groups such as the G16 and other regional organizations could minimize these power dynamics, such as the role of Parties to the Nauru Agreement (PNA) and Pacific Islands Forum Fisheries Agency (FFA) in WCPFC (McCluney et al., 2019). Even though the G16 operates informally, the group has similarities in the operations of FFA in WCPFC. The regional cooperation of PNA has also facilitated better ownership of the resource, primarily through the Vessel Day Scheme, benefiting over $500 million a year (Walton et al., 2020). Notably, in the WCPFC, all the tropical tuna species are at sustainable levels (WCPFC, 2020), where FFA member countries are the majority (17 out of 32 member countries). FFA countries, in particular, the PNA countries, have a strong influence in determining the performance of WCPFC (A. M. Miller et al., 2014). The results from the study indicate a lack of capacity among the developing coastal States to fully engage in the scientific process and their role as ‘science- and policy-takers’ instead of ‘science- and policymakers.' These organizations could play a vital role in improving

capacity, especially science and modern fisheries management practices around transboundary fisheries resulting in improved resource ownership.

2.4.2 Diffuse governance

Even though there are consultative practices to engage and gain broader acceptance in members' decisions, politicians ultimately alter these even in the scientific process (Polacheck, 2012). Although members are the primary decision-makers in IOTC, the results of this study suggest they are subject to several influences, meaning RFMO governance unfolds via a diffuse net of actors and institutions. The analysis shows that some influences are direct, and some influences are exerted indirectly through various layers of stakeholders both within and outside the IOTC decision-making process. The results also validate that these sources of influence have a varying degree of impact, and members look beyond stakeholder engagement, such as their sources of funding, partners and interests. The results corroborate the critical role of NGOs as agitators, architects, entrepreneurs, activists, diplomats, governors, shapers, brokers and doers (Bush et al., 2017; Jordan & Van Tuijl, 2000) in RFMO governance. In the IOTC, NGOs are involved in every layer of decision-making, from data collection to the implementation of CMMs (Figure 2.3[A] and Figure 2.3[B]), and they engage with almost every entity involved in the decision-making process, both directly and indirectly ranging from fishers to parliamentarians and ministers in members. NGOs' presence and engagement in the IOTC give them a strong mandate to push for stringent CMMs favouring their agenda. However, it also helps developing coastal States who do not have much capacity to engage in IOTC. On the contrary, NGOs' commitment, engagement and agenda are also short-lived (Petersson et al., 2019; Schiller et al., 2021). Like any other actors involved in RFMOs, NGOs also clash and compete with each other to maintain territory and dominance (Jordan & Van Tuijl, 2000).

Retailer partnerships such as GTA and TUPA operate differently from other NGOs. The IOTC scientific committee failed to advise on management reference points for yellowfin

tuna to the Commission due to uncertainties and lack of data. Instead of participating in the RFMO process, GTA published independent stock advice on yellowfin tuna (GTA, 2020). Some retailers in the GTA partnership also decided to stop sourcing yellowfin tuna from the Indian Ocean in their brands (Holmes, 2020). The market (retailers and wholesalers) have enormous power to control the inflow of tuna products and, thus, could play an essential role in promoting sustainability. The market is also fearful of bad publicity among consumers created by NGOs. However, market influences are limited to individual members who rely on the trade of tuna products. In IOTC, only one-third of members (10 of 30) have a significant tuna trade. Thus, market pressure will only affect those States.

Additionally, market actors in these partnerships and outside these partnerships do not act in one voice. Thus, countries that rely on exports could move to other retailers and wholesalers, defeating the purpose. One possible avenue is to pressure the members through a whole range of seafood. However, tuna is a minor component of the seafood in retail chains, and retailers might opt for an easier route of de-listing the product from the shelves (Market representative 2).

Respondents in this study emphasized the continual and likely continued role of value chains and eco-certification in influencing RFMO processes. There is a growing demand for products to be certified to get access or retain access to the markets in developed countries (Borland & Bailey, 2019). Interestingly, the results of this study suggest that eco-certification plays a crucial role in RFMO governance by pushing for improved management measures, even though these are indirect engagements. Following the Maldives pole and line skipjack tuna fishery certification, the MSC laid out eight conditions, including adopting precautionary approach measures, limit and target reference points, and Harvest Control Rules in the IOTC (Edwards et al., 2020; Scott & Stokes, 2015) before the end of the fifth year. In response, the Maldives, together with INGOs, NGOs, industry and other members, got those measures adopted (Edwards et al., 2020) and used the threat of a vote to adopt the measure in IOTC (Schiller & Bailey, 2021).

Despite these influences by NGOs, retailers, and wholesalers and the eco-certification process in member decision-making, continuous engagement and participation of these actors in the RFMO meetings are vital. Fishing industry representatives participate in national delegations with continuity, indicating more significant opportunities to influence, and they are far numerous than civil society in RFMO meetings (Petersson et al., 2019). As a market, NGOs and intergovernmental organizations push for sustainability using their influence on members; ultimately, the system will improve, even though these organizations have diverse objectives.

2.4.3 Fragmentation and power

As stated in the introduction, RFMOs do exhibit characteristics of polycentricity. Nevertheless, they also exhibit tendencies of fragmentation; issue in both of these are power and capacity (Berardo & Lubell, 2019; Fanning & Mahon, 2020; Morrison et al., 2017). Fragmentation is considered when there are distinct clusters within the organization in the decision-making process(Kim, 2020) rather than the collective approach. This study reaffirms that there are multiple nodes of governance power in RFMO processes, specifically in the IOTC, which can lead to getting things done (for example, through industry and market aggregations) and capacity building (for example, the G16). The socio-economic interests, influences and priorities identified in the study also reinforces power imbalances that disrupt RFMO decision-making.

Further, it also reaffirms the dependency, for example, on foreign aid and influences by former colonial countries and developed DWFN fishing States on developing States. In three Indian Ocean countries, Mauritius, Seychelles and Madagascar, aid contributions have influenced how these coastal States interact with DWFNs and with each other (Andriamahefazafy et al., 2019). These aid contributions also have prevented Mauritius and Madagascar from strongly supporting the like-minded coastal States group G16 (Andriamahefazafy & Kull, 2019). Furthermore, some of the States' perceived import tariffs and regulations to counter IUU fishing have been misused to garner influence to

adopt CMMs favouring market States. These are further exacerbated by the allegations of corruption in the IOTC decision-making process, which can be linked to most members' weak rule of law. Though it is concerning, corruption and corrupt fisheries practices are challenging to address (Sumaila et al., 2017), especially in a multilateral forum such as IOTC. As mentioned, RFMOs are consensus-based, and a single member can block a CMM or dilute the decision to favour the relevant beneficiary.

The analysis also reveals that the decisions around CMMs by members might be perceived as irrational from a fisheries management or conservation perspective. However, the decisions by members are tied to neocolonial practices, sovereignty, foreign aid, and other development aspects outside the realm of the RFMO. Thus, understanding the geopolitics and political economy surrounding one of the most traded species is crucial. Several sovereignty disputes in the Indian Ocean are an additional barrier affecting the organization's performance (Sinan & Bailey, 2020). The sovereignty disputes are linked to the ocean space's economic wealth, neocolonial practices, cstrategic warfare presence, and maritime security (Dutton, 2011; Issur, 2020). Furthermore, with the increase in global demand for tuna, the global market regimes and the ecology of resources have led coastal States to depend on developed countries with fleets operating within coastal waters and in areas beyond national jurisdiction for revenues from licensing, processing, and the use of the port, and ultimately caused coastal states to push for more leverage to claim resource sovereignty.

2.4.4 Low-value, low-priority

Since there is limited economic interest for neritic tuna species, there is limited influence and engagement within the RFMO decision-making process, as evident from the lack of CMM proposals (Figure 2.4); since these species are not export-oriented and are low valued species, the market and NGOs do not influence members in the decision-making process. For example, despite the fact that 35% of the catches in the IOTC (589,813 tonnes) in 2017 are neritic species (80% of the catch is estimated due to poor reporting)

and only one species out of five remains at a healthy state, the IOTC has failed to take any measures to recover the stocks or improve the data collection for neritic tuna. The failure is linked to several factors; lack of market visibility: lack of premium prices in the market: lack of a stakeholder (NGOs, market, multilateral organizations) push for less charismatic species: and members who want to retain the status quo due to the fishery's coastal nature and the significance of its employment contribution. On the contrary, high valued and internationally traded yellowfin tuna (overfished since 2014) has received significant attention from the market and the NGOs. Letters were submitted by NGOs, retailers and the market to lobby for strong measures for yellowfin tuna. Some retailers push for effective measures by boycotting yellowfin tuna from the Indian Ocean. With this significant lobbying effort, members with tropical tuna interests have submitted measures for a yellowfin tuna recovery plan every year since 2015. Though the measures adopted by IOTC to recover yellowfin tuna are insufficient, there is a comparatively much better drive to adopt measures with increased engagement of various stakeholders with members.

2.5 Conclusion

Distilling the power dynamics within the IOTC, it is evident from this study that the failure of RFMOs is not at all due to a "lack of political will" or a "black box of politics," but it is a function of the very design of RFMOs. As international governance bodies made up of diverse and competing interests, they were designed to fail in delivering easy pathways to consensus-based decision-making. The study also reveals the inequity and neocolonial practices in engagements in conservation and management of stocks. NGOs, market and international organizations lobby and engage for highly traded tuna, while low-valued species essential for food security in developing States are given low priority. Further, the lack of adequate uptake of CMMs is driven by diverse socio-economic interests and protecting those interests for short-term gains is a rational strategy. Members with economic interests, in particular former colonial and developed DWFN countries exploit developing and least-developed States through financial aid and corrupt practices, but sometimes in subtle ways that are difficult to detect. Markets (mostly from developed and

DWFN) where tuna products ultimately end up misuse regulations to garner support to protect their economic interests.

Our findings also validate the critical role of various stakeholders such as NGOs, market entities, subgroups and multilateral organizations in the decision-making process. Despite the differences in these stakeholders' agendas and engagement, they improve the IOTC as an institution by providing crucial expertise and technical knowledge. I emphasize that these stakeholders' engagements need to be consistent and continuous for improving the sustainability of the resource. Moreover, there needs to be broader engagement by all stakeholders involved in the decision-making for all the species under the IOTC mandate rather than the high valued species. Even though the politics around tuna in the Indian Ocean is imperfect, focussed, and continuous effort could improve the effectiveness of RFMOs.

3 UNDERSTANDING BARRIERS IN INDIAN OCEAN TUNA COMMISSION ALLOCATION NEGOTIATIONS

3.1 Introduction

The Indian Ocean Tuna Commission (IOTC) is one of the five tuna Regional Fisheries Management Organizations (RFMOs) established under the framework of the United Nations Convention on the Law of the Sea (LOSC) and its implementing agreement—The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA). These legal instruments have various provisions to guide RFMOs in sustaining institutional credibility, stability, and legitimacy in their decision-making processes. While RFMOs have the right to rule on the management of the stocks, external perceptions of legitimacy and credibility matter to ensure the stability of the institution (Buchanan & Keohane, 2006). The mechanisms to achieve stability are based on the reliability, sufficiency, and confidence of its member state decision-making processes (Mautner-Markhof, 2019). Multilateral institutions will only thrive if they are viewed as legitimate by the general public, which is in part linked to the need for credible decisions only attainable when RFMO delegates have sufficient knowledge to interpret and validate scientific and technical information (Aradau & Huysmans, 2019). Furthermore, fair and equitable decision-making among other elements such as enforcement, compliance, adaptivity, membership, and transparency are certain elements for any RFMO to perform effectively.

One of the most fundamental decisions to be made for natural resource governance is how resources are allocated among individuals (E. Ostrom, 1990). The success of an allocation process has the potential to permeate almost all other decisions taken by RFMO members and thus has the potential to either secure or to undermine the credibility and legitimacy

linked with the realization of the conservation and management mandate (Lodge et al., 2007). However, regulating highly migratory species such as tuna, one of the most tradable fish in the world, is a contentious issue, mainly due to economic, institutional, and political factors, including competition in trade (Hanich & Ota, 2013); the transboundary nature of tuna stocks and their presence, both in coastal waters and in areas beyond national jurisdiction (Bailey et al., 2013); species distribution; gear complexities (Bailey et al., 2013; Havice & Campling, 2010); scientific uncertainties; and geopolitics (Yeeting et al., 2016). Additionally, due to their economic and employment significance and importance to food security (FAO, 2016c), members protect their own economic and political interests within a scientific framework during negotiations in RFMOs (Hanich & Ota, 2013; Telesca, 2014). These differences are compounded with the complexity and ambiguity of international legal instruments with regards to sovereignty over tuna resources. Together, these complexities create a fundamental barrier in the negotiations for a systematic allocation model by all the RFMOs (Seto et al., 2020), and the Indian Ocean Tuna Commission (IOTC) is no exception.

The IOTC was established in 1993 as an Article 14 body of the Food and Agriculture Organization of the United Nations (FAO) Constitution[13] covering ocean space from eastern South Africa to eastern Australia and Indonesia. FAO was instrumental in the development of IOTC, and article 14 was the most favorable mechanism to retain IOTC within the FAO framework at that time. Currently, there are 30 member states in the IOTC, 23 of which are coastal states (i.e., countries whose waters are found within the convention area). Unlike in the other oceans in the world where industrial operations dominate, artisanal fisheries take a greater proportion of the tuna catch in the Indian Ocean (Allen et al., 2010), and there is huge variation among the benefits that the coastal states accrue from tuna resources.

[13] Under the provisions of Article XIV of the FAO Constitution, the FAO Council may "approve and submit to Member Nations agreements concerning questions relating to food and agriculture which are of particular interest to Member Nations of geographical areas specified in such agreements and IOTC is the only RFMO to be under the framework of FAO. Under FAO framework, IOTC is a project administered by FAO.

From 2014 to 2018, around 94% of the catch of the three tropical tuna species (skipjack tuna, yellowfin tuna, and bigeye tuna) in the Indian Ocean was caught by 11 members of the 30 with IOTC membership. In the spirit of promoting "optimum utilization", under Article 62 of LOSC, some coastal states have permitted other states to fish for the resources within their Exclusive Economic Zone (EEZ) through fishing access agreements, mainly due to a lack of domestic fishing capacity. For example, the European Union (EU) has tuna access agreements with Seychelles and Mauritius in the Indian Ocean (European Commission, 2016). The European Commission also allows the tuna processed in these countries to be imported into Europe tax-free. In addition, Japan, China, and South Korea also have access agreements, but these agreements are not publicly available (Mwikya, 2006). Furthermore, the canneries in the Indian Ocean also process and add value to the catch. Thailand, Indonesia, Iran, Oman, Seychelles, Mauritius, Maldives, and Madagascar all have canneries that process skipjack and yellowfin tuna.

Besides canning, the major fishing nations in the Indian Ocean also export their fish to the sashimi market in Japan and to fresh and frozen tuna markets in the EU and the USA. At the same time, some of the countries in the Indian Ocean rely heavily on tuna species for local consumption. For example, Maldivians consume on average 163 kg of pelagic fish per year (FAO, 2013), about eight times the global average. Countries that catch the majority of tuna in the Indian Ocean are also large consumers of pelagic fish and are above the global average of 6.9 kg per capita per year (FAO, 2013). Finally, the entire EEZ and coastal waters of the British Indian Ocean Territory is declared a Marine Protected Area (Robinson et al., 2017), suggesting that conservation and not consumption is also a priority for some members.

Like other tuna RFMOs (Seto et al., 2020), the IOTC has been working on developing an allocation framework. These discussions on allocating fishing opportunities (i.e., typically a proportion of the total allowable catch in a given year) to IOTC member countries started in response to the organizations' first performance review (Noye &

Mfodwo, 2012). The process was later formalized through Resolution 10/01 after the scientific committee recommended taking decisive steps to reduce the overexploitation of yellowfin tuna and bigeye tuna in 2010 (Resolution 10/01). Since then, the negotiations have progressed both in the Technical Committee on Allocation Criteria (TCAC) and in the commission. The TCAC was established to solely discuss the technicalities of the allocation process, but a considerable time of the commission plenary has also been devoted to discussing the matter in length over the last decade. However, the negotiations have been slow to progress, with a substantiable divide between member states (Abolhassani, 2017). While these negotiations continue, tuna stocks continue to be heavily fished. Since 2014, yellowfin tuna is considered biologically overfished, with overfishing occurring; in 2019, bigeye tuna and albacore were both considered overfished; and skipjack tuna was fished by more than 30% of the harvest control limit in 2018 (IOTC, 2019g). As fishing pressure remains high and stocks are not being given a chance to rebuild, the calls to reach an allocation agreement as soon as possible have gained traction (IOTC, 2017c, 2018a, 2019h). So, how can the tension between the institution's own calls for an agreement with a lack of practical progress towards cooperation be explained?

Lodge et al. (2007) highlighted that the main difficulties RFMOs encounter in allocation mechanisms are (i) the inability to agree on a total allowable catch because of the concomitant limits it would impose on their national fleets, (ii) an inability to accommodate new members with an interest in fishing within allocation regimes, and (iii) non-compliance with national allocations owning to perceived inequalities. While all of these challenges are true for tuna RFMOs, here I explore the history of the allocation process at the IOTC and identify the additional barriers that have impeded consensus in the context of a fishery that is worth more than 4.76 billion US dollars (Macfadyen & Defaux, 2019). My contribution is two-fold: provide a brief overview of the IOTC allocation process to date, and subsequently expand on the current limitations affecting progress. Understanding these barriers is critical for creating an effective allocation process not only in theory but in practice, and one that will help to contribute to the legitimacy, credibility, and thus stability of the RFMO.

To develop this paper, I attended IOTC meetings (2017 – 2019) and TCAC meetings (2018 and 2019) as a country delegate (2017–2019). During the 2018 IOTC meeting, I kept notes of the interventions made by member states in the IOTC's TCAC and commission meetings in 2018 and 2019 in order to identify and categorize the barriers to decision-making. These were than correlated with the findings from the IOTC's performance review and the reports of the IOTC commission and subsidiary bodies. The barriers that were identified were then grouped based on their commonalities.

3.2 Allocation Negotiations in the IOTC

When formal allocation negotiations began in 2010, there were five distinct proposals by Indonesia, Seychelles, European Union, Iran, and the Republic of Korea. Japan and Sri Lanka also submitted proposals in the earlier meetings (IOTC, 2020g). Focused discussions on establishing guiding principles and criteria that would govern a quota allocation system occurred in the first three TCAC meetings. At the outset of the allocation negotiations, the proposals and subsequent negotiations were focused on establishing a systematic (formulae-based) allocation system. A group of like-minded coastal states grouped under the tag of G16[14] proposed a list of criteria, as did the EU and France Overseas Territories (France OT) (Table 3.1). After five meetings of TCAC in over 10 years, two proposals still remain on the negotiation table—one from the Maldives with support from 10 other members, and a proposal from the European Union (IOTC, 2019a). The Maldivian delegation tabled their proposal in 2017, 2018, and in 2019 in the commission to expedite the process. However, there has still been little progress made, and tensions in reaching an agreement remain.

[14] named after Article XVI of the IOTC agreement, acknowledging the sovereign rights of coastal states over the living resources in their EEZs

Table 3.1: Guiding principles proposed by the G16 group of like-minded coastal states and European Union and France Overseas Territories (OT) in the third allocation meeting (IOTC, 2016d).

General Principles	G16 Coastal States	European Union and France OT
Sustainability	Sustainable fishery.	Ensure the sustainable utilization of the resources.
		Consider degree of sustainability of fishing methods with respect to ecosystem approach.
Rights under international law	Exclusive rights of the Indian Ocean coastal states in their EEZs.	Recognize the rights of both Indian Ocean coastal states and distant water fishing nations.
	Recognize and take account of the rights of all CPCs on the high seas.	
Food security	Food and livelihood security.	Consider food security issues, which shall include not only the catch of tuna and tuna-like species, but also their processing and trade.
		Consider socio-economic factors, such as the dependency of Indian Ocean coastal state economies, for the livelihood of their local communities on tuna and tuna-like fisheries and investments made in the tuna sector.
Equity	Equitable utilization and conservation of the resources.	Allocate fair and equitable fishing opportunities to all participants.
Differentiation for coastal states	Special consideration for small, vulnerable economies and developing coastal states of the Indian Ocean.	Take into account the aspirations of Indian Ocean coastal states, including to develop their fishing opportunities.
Trade		Consider the weight of imports of tuna products on economies and the global consumption of tuna products of contracting parties.
Compliance		Reflect the compliance record/status of each member.
		Enforce effective rules against Illegal, Unreported and Unregulated (IUU fishing.
Transferability		Authorize the transferability (lease) of allocations.
Governance	Tuna management process shall be consistent with international laws.	

For many states, the different principles articulated in the two proposals remain abstract in terms of their practical implication for catches and the attending benefits that the catch brings. In 2019, as discussed and agreed upon at the 2018 meeting, a consultant was hired to develop allocation simulations to provide catch estimates under the two different allocation proposals. However, the negotiations still remain tense and inconclusive, even though countries now have a tangible potential catch allocation to work with. The tensions and the divisions in allocation negotiations have spilled over into other discussions in the commission and vice versa, and it therefore remains important to identify and suggest ways around the key institutional, political, and scientific barriers limiting cooperation.

3.3 Institutional Barriers

3.3.1 Relationship between FAO and IOTC

The IOTC evolved through the FAO system. Recognizing the lack of inadequate fisheries bodies in the Indian Ocean, under FAO Council Resolution 2/48, the FAO established the Indian Ocean Fisheries Commission (IOFC) in 1969 (FAO, 1967). At the first session of the IOFC, it established a committee for the management of Indian Ocean Tuna to consider management measures for tuna stocks. However, the discussions to establish a separate body, such as the two other tuna RFMOs in existence at that time—International Commission for the Conservation of Atlantic Tunas (ICCAT) and Inter-American Tropical Tuna Commission (IATTC)—began right from the first meeting of the IOFC. There were discussions at that time as well to establish a separate body outside the framework of the FAO, but apparently it was decided that, due to the complex political considerations, it would need to be a long-term goal. Moreover, the member states felt that they needed the financial and technical support of the FAO in the initial development of the organization (Kambona & Marashi, 1996). The draft agreement was formulated by the FAO, reflecting the negotiations and giving a greater autonomy to IOTC compared to other Article 14 bodies.

The IOTC is the only tuna RFMO that is an FAO body, and the strained relationship between the two institutions has posed explicit challenges in fulfilling the mandate of the organization, including allocation negotiations. IOTC member states have to rely on the FAO rules of procedure to hire staff, administration, and finance, instead of the rules and procedures adopted by the member states of the IOTC. In 2006, the commission decided to explore ways to change the relationship between the IOTC and the FAO (IOTC, 2006) due to frustrations with the inability to address the integration of fishing entities, the perceived interference of the FAO in the transparency of IOTC governance without much added value, the lack of flexibility and autonomy operating in the FAO system, and the increased cost of operating under the FAO system (Hurry, 2016). However, after the terms of a "divorce" were agreed to in a working session, the director general of FAO blocked the documents being circulated among member states, preventing it from being discussed in the IOTC commission (W. R. Edeson, 2007). The FAO's intervention in the matter has been argued to be unconstitutional by many member states (W. R. Edeson, 2007).

The resignation of the IOTC executive secretary in 2015 (Undercurrent news, 2015) and the election of a new executive secretary reignited these disputes. The FAO proposed to follow its standard procedures for the appointment of the new executive secretary instead of the rules of procedure of the IOTC, agreed to and adopted by the FAO and the IOTC. Many members opposed the decision[15] (IOTC, 2016a), and without any progress on the issue for the next two years, the FAO and IOTC members agreed to appoint an executive secretary according to an exceptional procedure under the instruction of the FAO council based on the FAOs rules and procedures. The commission also agreed to work with the FAO to revise the IOTC rules of procedure, considering FAO's concerns through a

[15] In a written statement, many members stated "in seeking to address these issues the FAO has disregarded the agreed, legitimate rules established by this Commission and you have asked this Commission to join you in disregarding our own rules of procedure. We do not take departure from our agreed Rules of Procedure lightly. It sends the wrong signal to member States and the rest of the world about IOTC's commitment to the rules and measures it has passed".

working group (IOTC, 2017c). However, FAO has rejected the revised amendments by the working group, and the matter continues to impede the work of the commission.

Without a resolution to the difficult relationship between the FAO and the IOTC, the tuna RFMO is almost crippled to fulfil its objectives. The organization cannot accept funds from external sources, cannot invite fishing entities to participate, and on top of this has to pay the FAO for its services. The commission hired a consultant to draft a modernized IOTC agreement, as advised in the second performance review (IOTC, 2016b). These amendments include modern fishery management practices, including a better reflection of the UNFSA and compliance agreement (IOTC, 2019c). However, the commission could not even agree to discuss the amendments due to the disagreements over the relationship of the IOTC and the FAO (IOTC, 2019h). Despite these inconveniences and interferences, some countries opt to remain, mainly due to the perceived security of being in the FAO framework and the FAO's ability to assist if things go wrong. Furthermore, member states also have to take into account FAO's assistance in fishery development and management projects, and in the decision-making process. An allocation framework in an RFMO is supposed to provide the stability of the fishery to its members (Lodge et al., 2007), yet it remains hard to envision how stable internal mechanisms will be possible with the overall organizational instability.

3.3.2 Time-Gap between Data Reporting and Decision-Making Processes

With the continual decline in fish stock abundance and increased fishing pressure present throughout the Indian Ocean, it is evident that another institutional barrier in the decision-making processes within the IOTC is the time-gap between data reporting, stock assessments, and scientific analysis and the decision-making processes. Under the current rules adopted by the commission, decisions can only be made based on the data of fishing activities that occurred two years previous to the decision-making year. Furthermore, the adopted measures come into force after 120 days. If a member state has objected to the

measure within those 120 days, an additional 60 days is given before the measure comes into force (IOTC, 1993).

The issues arising from this "time-gap" were evident in the yellowfin tuna reduction measures adopted by the commission to mitigate the overfishing of the stock. In 2016, the IOTC members decided to take measures to reduce yellowfin tuna catches based on the scientific committee's advice (based on 2014 data, as shown in Figure 3.1). One of the measures under Resolution 16/01 adopted in 2016 was for the purse seine flag states, with an over 5000 MT catch of yellowfin tuna to reduce their catches by 15% compared to the 2014 levels (IOTC, 2015). However, almost a year later in 2017, Seychelles submitted a letter stating that its fishing industry would collapse if the measure was to be implemented and requested to change their base year from 2014 to 2015 (IOTC, 2017b). This was due to the fact that in 2014 the Seychelles purse seine fleet had fished 25,065 MT of yellowfin tuna, and in 2015 without a measure in place it had already fished 40,907 MT of yellowfin tuna. If Seychelles were to reduce its yellowfin tuna catch according to the measure, they would have to reduce it to 21,387 MT (15% reduction in the of 25,065 MT of yellowfin tuna caught in 2014), which is around 47% compared to the 2015 levels. The commission in 2017 agreed to take onboard Seychelles' concerns and revised the measure (IOTC Resolution 17/01). A similar trend was observed in the 2019 commission meeting. Additionally, Mauritius had developed its purse seine fishery beyond the allowable threshold as per the measure (increased its catches to 7,681 MT in 2017); the commission allowed Mauritius to reduce their purse seine catches from the 2018 levels, even though they did not submit their data for the 2018 levels at that time (IOTC, 2019h).

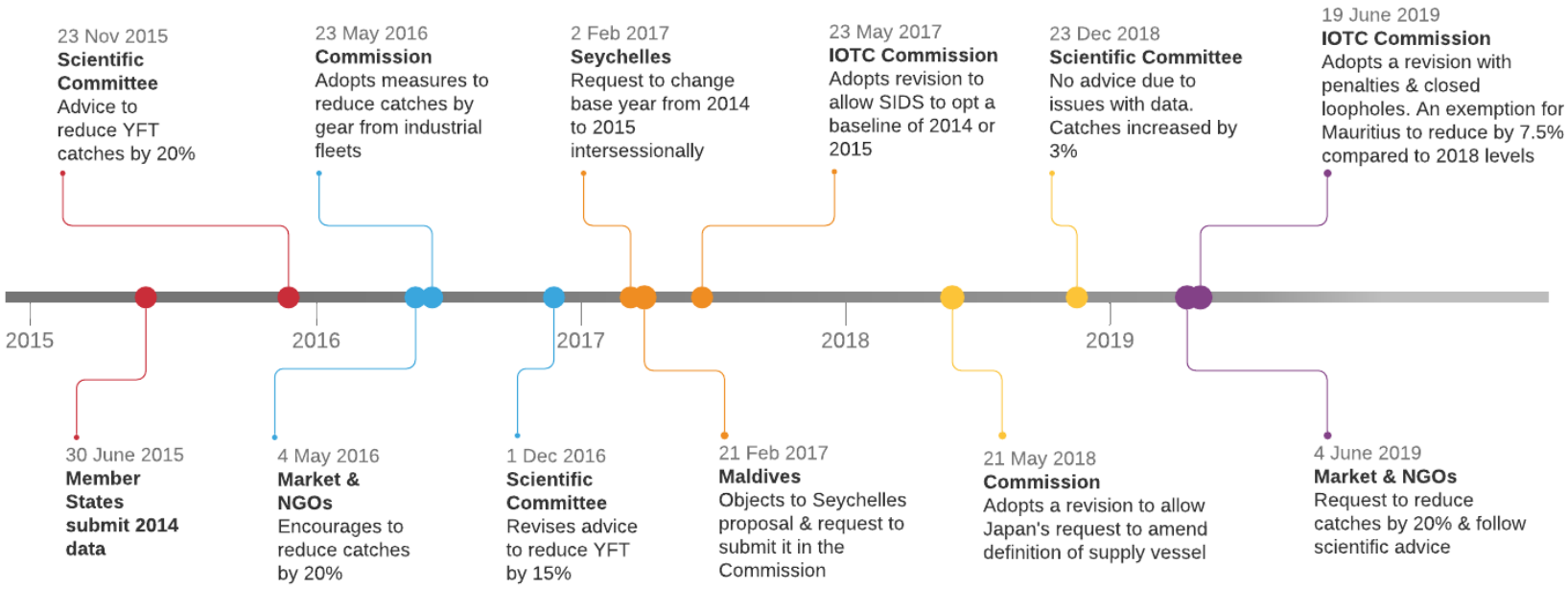

Figure 3.1: Indian Ocean Tuna Commission's yellowfin tuna reduction measures from 2015 to 2019.

IOTC is the only tuna RFMO with such a huge time gap between the data submission and decision-making. On average, the other tuna RFMOs usually make decisions within 4–7 months after data are submitted, as shown in Table 3.2. Member states in all the RFMOs except IOTC make decisions based on the previous year's data. Even though the data are submitted to IATTC, a month after the science committee, the commission staff utilize the real-time reporting from the purse seine fleet in the stock assessment. In IATTC, 85% of the landings come from these purse seine fleet (IATTC, 2020). On the other hand, where they have almost perfect allocation or rights-based management systems, decisions on the total allowable catch are made in lengthy intervals due to the lack of financial and capacity constraints. These decisions also face lengthy court battles, delaying their implementation (Hersoug, 2018). However, the IOTC has the financial and capital resources to make decisions in a timely manner.

Table 3.2: Time frame of reporting of previous year's catch and effort data in different tuna RFMOs, scientific processes, and decision-making.

RFMO	Data Submission Deadline	Scientific Committee	Commission
IOTC	June	November	Following year May/June
ICCAT	July	September	November
WCPFC	April	August	November/December
CCSBT	April	August	October
IATTC	June	May	August

Thus, the credibility of an allocation mechanism is questionable, because even once established it would not be effective without reducing the time-gap between data submission, scientific analysis, and decision-making. The allocation would be based on a total allowable catch determined from two-year-old data, creating unnecessary uncertainties for parties to question the credibility and technical acceptability of the allocation mechanism.

3.4 Scientific Barriers

3.4.1 Lowest Common Denominator

Like other tuna RFMOs, IOTC scientific processes are hindered by a lack of accurate data, given a large proportion of the catch is landed by artisanal fishing vessels. Moreover, some of the industrial fleet also faces issues with reporting complete data for stock assessments in compliance with IOTC resolutions. For example, in 2019, 72% of the nominal catches were fully or partially complete. The data reported are also of poor quality, which makes them difficult to use in stock assessments. For example, 30% of the data for tropical tuna are poorly reported, while 40–70% of the neritic tuna data are of poor quality (IOTC, 2019i).

Furthermore, the conservation and management measures as prescribed in the UNFSA are often slow and diluted in order to satisfy the lowest common denominator, as the decisions are mostly consensus-based. This is usually reinforced by claims of insufficient data or uncertain science, which is typical in tuna mis-management (Telesca, 2015). For example, one of the proposals adopted by the commission in 2018 on billfishes (Resolution 18/05) mandated all members of IOTC to collectively ensure that the billfish of the Indian Ocean (i.e., striped, black, and blue marlin and Indo Pacific sailfish) in any given year do not exceed either the Maximum Sustainable Yield (MSY) level or, in its absence, the lower limit of the MSY range of central values, as estimated by the scientific committee. The commission debated the feasibility of establishing a mechanism to collectively ensure that catches do not exceed the MSY, in the absence of an allocation for each country. The proposal was adopted by changing the text so that members "endeavor collectively" that all the catches of billfishes do not exceed the MSY.

As shown in Table 3.3, the catches in 2016 of these species are substantially higher than the MSY levels, and nearly double in the case of black marlin. The IOTC has established a compliance management mechanism to monitor and review its member states' performance against the adopted conservation and management measures. Members are

required to report on their progress of implementation and any compliance issues faced during the implementation of the conservation management measures. Without a mandated clear direction for its members, the adopted measure by the commission of simply having members endeavor to conserve and manage the bill fish stocks in the Indian Ocean is toothless. The perception of the general public of IOTC's failure in adopting conservation and management measures in line with the scientific committee's findings and to fulfill its mandate pose a question about the legitimacy of the organization.

Table 3.3: 2016 catches and the Maximum Sustainable Yield (MSY) in metric tonnes for each species, as advised by the scientific committee to the commission (IOTC, 2017b).

Species	2016 Catch (MT)	MSY (t)
Black Marlin	17,829	9,932
Blue Marlin	16,353	11,930
Striped Marlin	5,299	3,260
Indo-Pacific Sailfish	27,975	25,000

3.5 Political Barriers

3.5.1 Taiwan vs. China

Since the introduction of the concept of "fishing entities" in UNFSA, many regional fisheries bodies have found solutions of one kind or another to include Taiwan, a province of China (as recognized by the United Nations), as a commission member and subsequently in the decision-making process (W. R. Edeson, 2007). All the solutions to this issue for fishery bodies to date have occurred outside the framework of the FAO or UN system. However, as an FAO body, the IOTC lies within the boundaries of the UN system. The IOTC is the only tuna RFMO that has so far failed to find a solution to incorporate Taiwan (W. R. Edeson, 2007). Presently, Taiwan participates in the IOTC as an "invited expert", which does not entitle any rights observed by its members or cooperating members. Taiwan

is responsible for 16% of bigeye tuna, and its catches account for over four times that of other Chinese vessels in the Indian Ocean, so without their legitimate participation the commission is unable to function effectively. The possible recognition of Taiwan as a fishing entity in the IOTC would threaten the legitimacy of the "one China policy" in the UN, thus China—a member state of the IOTC—would obstruct any move to recognize Taiwan more formally. This has the effect then of creating political barriers borne from institutional barriers, as described above with the FAO.

This situation has affected the allocation process as well, as both the proposals in the table have tried to find a resolution to the matter, but without much progress. For example, an information paper on allocation submitted by the EU in 2018 tried to include Taiwan in an allocation mechanism, proposing to define Taiwan as "long-term participating non-Contracting Parties (LPNCP). However, China rejected the definition during the 5th Technical Committee on Allocation Criteria in 2019. As long as the IOTC lies within the framework of the FAO as discussed, Taiwan will not be granted a seat at the table without China's formal endorsement, which is unlikely due to the geopolitical situation.

3.5.2 Disputed Territories

Apart from the China–Taiwan issue, several other disputes over sovereignty of various territories in the Indian Ocean Table 3.4 also hinder the performance and cooperation potential of IOTC members. Based on sovereignty over these islands in the Indian Ocean, UK and France claim a vast EEZ and sizable extended continental shelf[16]. These territories provide an EEZ of 0.6 million km^2 to the United Kingdom and 2.7 million km^2 to France, amounting to around 5.5% of the total IOTC area of competence, as shown in Table 3.4.

[16] United Nations Convention on the Law of the Sea of 1982 provides the framework to demarcate 12 nautical miles for territorial sea and further 200 nautical miles for the Exclusive Economic Zone (EEZ), giving full sovereignty for the living and non-living resources in the ocean space, seafloor, and underneath the seafloor to the island state, except for rocks. Furthermore, it also allows states to claim an exclusive jurisdiction over the extended continental shelf

The EEZ of France in the Indian Ocean is almost nine times greater than its metropole (Bouchard & Crumplin, 2011).

These territorial claims have been one of the persistent issues in the IOTC. The matter has escalated following the advisory opinion of the International Court of Justice on the "legal consequences of the separation of the Chagos Archipelago from Mauritius in 1965", and the UN General Assembly's (UNGA) adoption of a resolution (Res: 73/295) affirming that Chagos Archipelago is an integral part of the territory of Mauritius, demanding that the United Kingdom unconditionally withdraw its colonial administration within six months (United Nations, 2019). In 2019, Mauritius asserted that the United Kingdom's participation in the IOTC be terminated as a coastal state and demanded IOTC to follow the UNGA's resolution, as IOTC lies within the UN framework (IOTC, 2019h). The United Kingdom rejected Mauritius' claims and urged members to focus on fishery management measures rather than bilateral sovereignty disputes.

These sovereignty claims lead to lengthy interventions and a general lack of full legitimacy in the commission's positions and decisions. Mauritius and Comoros have argued that France and the UK should not be granted any allocation in respect to the disputed territories. France and the UK maintain their position that this is a domestic and bilateral issue and should not be discussed in the IOTC. Given that the IOTC members are often represented from fishery departments, the introduction of these complex geopolitical matters hinders the already complicated fisheries governance issues. However, without any headway in these "domestic and bilateral EEZ disputes", it would be difficult to achieve any systematic allocation process.

Table 3.4: British and French territories in the Indian Ocean. Reconstructed based on data from (Bouchard & Crumplin, 2011; Claus et al., 2014; Foreign and Commonwealth Office, 2012; INED, 2016).

Territory	Claimed by	Contested by	Population	Land Area	Claimed EEZ (km^2)	Claimed Shelf (km^2)
BIOT	UK	Mauritius	No permanent	60	638,555	21,654
Crozet	France	Not contested	No permanent	352	574,539	7449
Kerguelen	France	Not contested	No permanent	7,215	567,687	63,888
Mayotte	France	Comoros	850,966	374	62,982	2179
Reunion	France	Not contested	235,132	2,512	315,071	595
Saint-Paul and Amsterdam	France	Not contested	No permanent	62	509,014	164
Scattered Islands	France	Mauritius, Comoros and Madagascar	No permanent	44	622,706	3,131

3.5.3 Civil War and Conflicts

Any legitimate allocation regime needs to be inclusive and equitable for it to remain stable. The allocation regimes in tuna RFMOs heavily depend on the level of historical fishing to determine the potential for future fishing opportunities. However, this criterion has been heavily contested by coastal countries who have not historically had a fishery but who have aspirations to develop one. Strikingly, another group of coastal states that has emerged from the negotiations in the Indian Ocean are countries that have had a fishery in the past, but, due to civil wars and internal conflicts, the fishery has been diminished or has been prevented from further development. For example, the ongoing Somali civil war and the recently subsided 23-year armed conflict in Sri Lanka substantially diminished their fishing opportunities in the past. Foreign fleets used this opportunity to fish illegally (i.e., without authorization from the Somali government or a formal access agreement) in the 0.78 million km2 productive Somali waters (Devlin et al., 2020), increasing the historical catch of those flag states. Furthermore, the Sri Lankan government banned domestic fishing vessels from the north (which constituted around 20% to 25% of the national catch) to venture into the sea and even restricted fishing in most of their EEZ during the armed conflict period to mitigate insurgents and the transfer of weapons (Siluvaithasan & Stokke, 2006).

The negative economic impacts of conflict have been labelled as “development in reverse”, recognizing the enormous difficulty that states may have in getting back to their previous conditions (Collier et al., 2003; Hendrix & Glaser, 2011). Populations, including fishers, get displaced and labor gets redeployed, resulting in economic counter insurgents, third party encroachments, and diminished fishing opportunities (Hendrix & Glaser, 2011). Somalia and Sri Lanka have raised these issues in TCAC meetings, drawing the attention of the Commission that the historical catch criteria will create a bias against these countries. Furthermore, Yemen, who is involved in a bitter civil war, has not taken part in these negotiations. The ongoing conflict in Yemen has resulted in huge losses in their fisheries sector (Mundy, 2016), including the loss of jobs of around 93% of the total workers in the

fisheries and industrial sector in the areas bound by the Red Sea. (Elayah et al., 2019). A key element in promoting cooperation on allocations is to ensure that no one is worse off in acting cooperatively than in acting individually (Lodge et al., 2007), and for all parties to recognize that the process is fair, equitable, and just. However, there are disagreements on how these states with diminished fishing opportunities due to civil wars would be accommodated in an allocation process in the IOTC.

3.5.4 Subsidies

As indicated above, historical catch remains one of the contentious principles in the allocation mechanism. Countries with historically large fishing fleets were heavily subsidized, and they continue to subsidize today to remain competitive in the sector. Subsidies generally make fishing more profitable than it otherwise would be, thereby contributing to increasing effort and over-capacity, which can lead to the overfishing of the stock (Bailey et al., 2018; Sumaila et al., 2010). Using the game-theoretic concept of a double principle-agent problem, Bailey et. al(2016) argued that fishing subsidies can undermine the conservation and management measures adopted by RFMOs. Moreover, fishing fleets that are subsidized will have ultimately lower costs and could offer lower prices to remain in the market and for market competitiveness. Furthermore, countries with subsidized fishing fleets will have an established catch history. For example, in 2018 China, the European Union, the Republic of Korea, Japan, and Thailand contributed around 51% (18.26 billion USD) of the global estimated subsidy, spending 12.6 billion USD in 2018 for capacity-enhancing subsidies (Sumaila et al., 2019). Thus, subsidies pose a barrier for coastal developing states to create a historical fishing narrative to even access future fishing opportunities, particularly if historical catch is attributed to the flag state. Subsidies are further investigated in Chapter 4.

3.6 Discussion

For a multilateral organization such as the IOTC to govern effectively, the organization needs to be legitimate, credible, and stable. To succeed, the organization need not only fulfill its mandate under the convention or the agreement or other international laws, but must also fulfill the expectations and perceptions of the players involved in the decision-making processes of RFMOs. As shown in Figure 2, critical elements for the performance of an RFMO are a fair and equitable decision-making process, compliance, monitoring, control and surveillance, capacity to adapt (for example, to climate change, among other dynamic processes), memberships, the ability to include the aspirations of developing coastal states, transparency, allocation, and harvest strategies for species under the mandate of the commission (Clark et al., 2015; Cullis-Suzuki & Pauly, 2010; Haas et al., 2020; Leroy & Morin, 2018; Lodge et al., 2007). However, in the case of IOTC, I have identified institutional, political, and scientific barriers that have impeded allocation negotiations (Figure 3.2). The issues identified in the paper raise questions about the future of the organization, including its credibility, stability, and legitimacy.

Cooperation on allocation is contingent on ensuring that no one is worse off in acting cooperatively than in acting individually (Lodge et al., 2007) and avoiding conflict and uncertainty while maintaining fairness throughout the process (E. Ostrom, 1990). However, this has proven difficult, as states have diverse fishery management objectives and are at different levels of fleet development and subsidization, especially in the IOTC. The relationship between the FAO and IOTC needs to be resolved to bring stability to the organization. The FAO played a crucial role in establishing the IOTC and facilitating the evolution of the organization. However, the IOTC has matured over the years, and there is no clear need for the FAO's direct involvement, as evident from their engagement in the IOTC internal processes over the last few years.

The other four tuna RFMOs are independent but maintain a healthy relationship with FAO (Hurry, 2016). In fact, the FAO is often represented in the commission meetings of

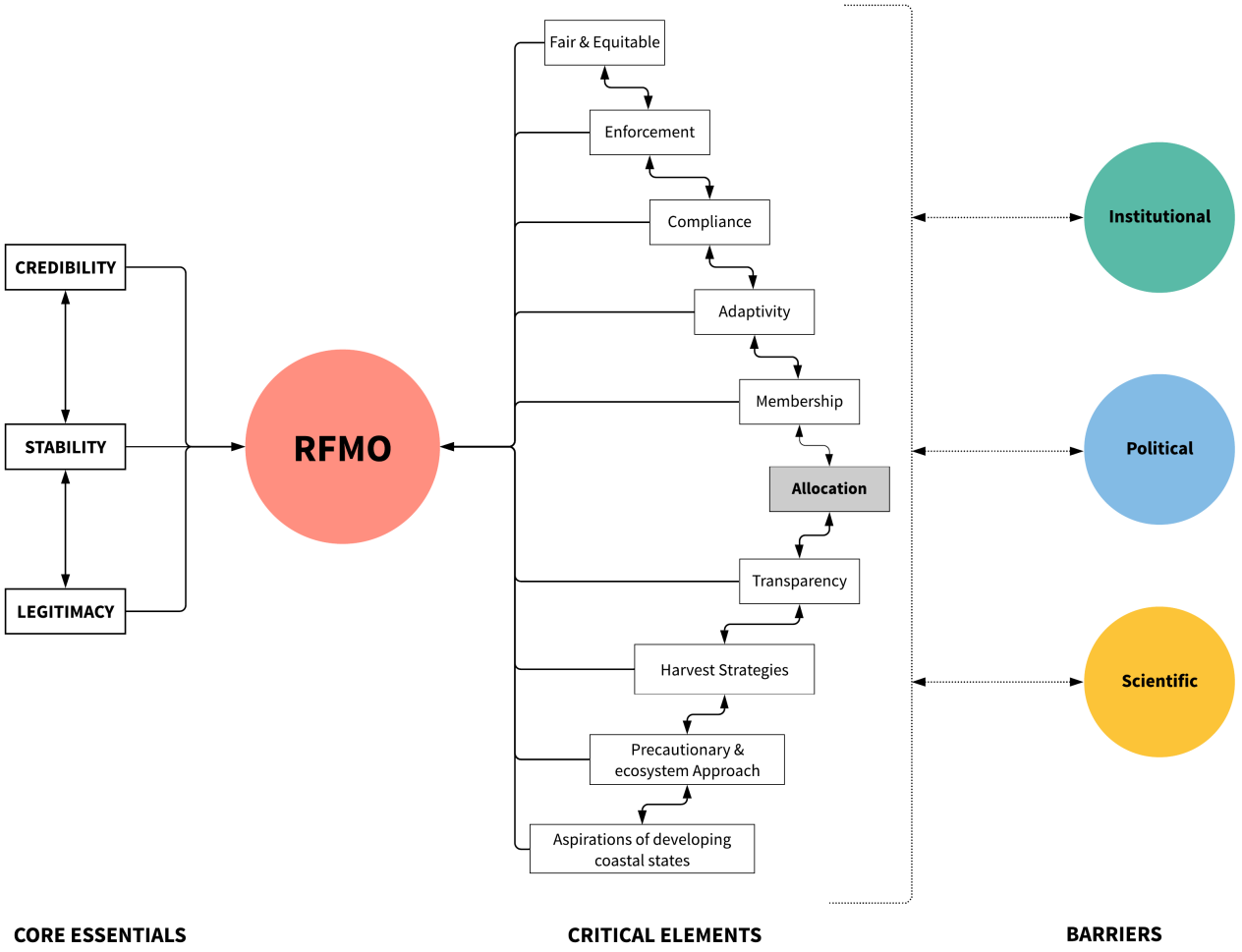

Figure 3.2: Core essentials and critical elements for an effective performance of Regional Fisheries Management Organizations and the barriers that prevent such effectiveness in the IOTC.

all the RFMOs as an observer, and contributes to capacity development programs through various projects run by these organizations. Cognizant of this difference, the FAO could take a leadership role in providing the required autonomy to the member states. The FAO could facilitate the process of transferring the organization to an independent body similar to all the other tuna RFMOs. If the IOTC is independent, the member states have the opportunity to operate similar to all the other tuna RFMOs, responsible only for the member states, including reporting, compliance, and financial and human resource management. Moreover, this could pave the way for a negotiation of a new agreement with modern fishery management concepts and addressing the membership of Taiwan. One of the newest RFMOs—the Southern Indian Ocean Fisheries Agreement (SIOFA), established in 2012—addressed the issue by including a provision in the main text of the treaty to allow the participation of fishing entities in subsidiary bodies and decision making (Scanlon, 2017). Furthermore, this could also resolve the issues surrounding sovereignty and disputed territories, as discussed above. As the FAO lies within the UN system, the disputes over sovereignty continue to rear their ugly heads at the IOTC. On the contrary, countries which have lobbied in the UN system over the disputed territories might block the removal of the IOTC from the FAO system.

Subsequently, if the IOTC remains a "project" of FAO, there needs to be a more cohesive working relationship between the two organizations that addresses the concerns of both the parties in a timely manner. Given the sensitivities in international diplomacy around the issue of Taiwan (Scanlon, 2017), it would be a challenge to resolve the matter within the FAO system. This might also mean that one of the important fishing members in IOTC will not be involved in the negotiations nor its inclusion in the allocation table. Furthermore, the strained relationship with FAO has also blocked the progress in modernizing the agreement, as highlighted in the second performance review. Modernizing the agreement could open up the discussion on reducing the time gap between data submission, stock assessment, and decision-making. As illustrated, the time from data submission to decision-making in the IOTC is the longest in all the tuna RFMOs and is already impacting the decision-making process. Tuna, being a highly

migratory stock fished across many member countries with diverse fishing capacities, requires stock management decisions to be made in a timely manner. However, member states opt for the lowest common denominator or delay the adoption of management measures, questioning the reliability of data. Data deficiency is not unique to the IOTC, but it is more challenging, mainly due to the high proportion of artisanal fisheries catches. From 2014–2018, artisanal fishing vessels caught around 48% of the total tropical tuna catch (skipjack tuna, yellowfin tuna, and bigeye tuna) (IOTC, 2020a). In 2018, in the WCPFC, which manages the largest tropical tuna catches in the world, artisanal gears caught around of 14% of the tropical tuna catch (Williams & Read, 2019). Due to the characteristics of artisanal fisheries, it can be more difficult to monitor these catches compared to those of industrial vessels. The conventional stock assessments are usually based on costly and data-intensive methodologies, which are often inadequate to be implemented in small-scale or artisanal fisheries (C. Pita et al., 2019). Furthermore, the industrial fishing vessels are also not immune from data issues. In 2019, the scientific committee revised the data reported by Spain for stock assessments, citing that the data submitted was implausible (IOTC, 2019g). The IOTC needs to strengthen data reporting and invest in monitoring programs to assist coastal countries in developing capacity to collect data from artisanal fisheries. In fact, the IOTC has a meeting participation fund to facilitate developing coastal countries to participate in scientific and commission meetings. However, a broader capacity building fund could be established to develop the capacity of artisanal fishery data collection, such as the one developed in ICCAT.

The divide between coastal states and DWFNs and the adoption of conservation and management measures to satisfy the lowest common position, compounded with issues in implementation compliance and the enforcement of conservation and management measures, continue to plague the IOTC. If the IOTC intends to move forward with developing and operationalizing the allocation process, the negotiations have to move from the 5-day sitting of 32 member countries to bilateral and multilateral negotiations. As historical catch constitutes a huge proportion of the allocation proposals on the negotiation table, countries who have the financial capacity (often former colonial, developed countries

and DWFN), continue to increase their fishing capacity and catch landings will continue to benefit from the current systems. Countries who have these capacities often use delaying tactics until there is a necessity (increase costs, reduced stock levels) to adopt a measure (Libecap, 2007).

3.7 Conclusion

There are essential and critical elements for the effective performance of RFMOs, but as demonstrated for the case of the IOTC, barriers that impede the decision-making process limit the extent to which these elements can be realized. In this paper, the specific case of allocation has been highlighted. Though there are commonalities in tuna RFMOs, they should not be viewed through a single lens. Allocation negotiations in the IOTC have a long history, but progress remains slow. With the global pandemic of COVID-19, the IOTC TCAC has been reduced to a virtual sitting of a 2-hour, 2-day session This would limit constructive discussion on the allocation framework, could make overcoming any of the barriers identified almost impossible, and could threaten the momentum of the cooperation recently observed in the developing coastal state block. The IOTC is the only RFMO that has attempted to implement a systematic allocation framework (Seto et al., 2020). However, if there are no agreements on the institutional, political, and scientific barriers identified, the commission might end up with a pseudo-allocation process, just like all the other tuna-RFMOs, which are often unstable and would lead to a general lack of compliance due to the inequities perceived by member states in the long term. Former colonial, developed and DWFN who have established catch history will use their relatively developed economies to lobby to skew the outcome in their favour similar to other RFMOs. This will lead to an inequitable allocation outcome for developing coastal States who has sovereign rights, and dependent for livelihood and economic well-being from the resource.

4 ALLOCATION OF TUNA FISHING OPPORTUNITIES IN THE INDIAN OCEAN AND SUBSIDIES: A LEGACY OF DISTORTED HISTORY AND INTERGENERATIONAL LOSS

4.1 Introduction

In international law, there exists the recognition that equal treatment can lead to inequitable outcomes (Shelton, 2007). Differentiating treatments for the most vulnerable, marginalized, and underdeveloped communities, thus, has been the norm, particularly for transboundary resources (Article 24 of UN Fish Stocks Agreement). However, while international agreements may enshrine the principles of equitable access to shared ocean resources, in practice, these resources are most often accumulated by just a few (Havice & Campling, 2021; Osterblum et al., 2020). Some critics have argued that this is due to the existing political and economic systems, historical legacies and existing norms (Osterblum et al., 2020). Others have argued that it is due to power asymmetries (Havice, 2021) and the allocation of future fishing opportunities favouring the historically developed fishing States (Hanich & Ota, 2013; Seto et al., 2020). The reality may be that it is a combination of the two.

It is this last point, how the allocation of fishing opportunities shapes equitable access, that I wish to examine in this contribution, specifically the relationship between past subsidization and future allocations. Subsidies, here, refer to a financial contribution by a government that confers benefits to a specific entity or industry. In fisheries, subsidies generally take forms of support in reducing capital or operating costs of fishing with a goal of either developing additional or maintaining existing capacity. Globally, it is estimated that upward of USD 22 billion is spent on these types of capacity-enhancing subsidies (Sumaila et al., 2019). Apart from the negative environmental impacts associated with overfishing that excess capital infusions encourage, subsidies pose barriers to attaining more

equitable fisheries (Osterblum et al., 2020). For example, Schuhbauer et al. (2020) estimated that around 80% of subsidies globally are directed toward large, industrial fleets as opposed to smaller, independent operators, even though small-scale fisheries (SSF) employ 90% of the labour in the marine sector (Kelleher et al., 2012). This disparity in subsidies provides a competitive advantage to large, industrial fleets, leaving the SSF sector fewer options to attain and maintain economic viability (Schuhbauer et al., 2017). Moreover, the differing capabilities of fishing nations to support their domestic fleets via subsidies skews the competitiveness of these fleets in the global seafood market, a significant obstacle for small developing coastal States that aspire for a share of this market. In the case of transboundary tuna fisheries where the resources are exploited by multiple countries, subsidized fleets by operating at a capacity beyond what the economics of the fishery would otherwise dictate can not only outcompete non-subsidized ones in the shared marketplace but also at sea. This, in turn, can reduce the yield for non-subsidized fleets (Ruseski, 1998) as productivity of the exploited tuna stocks are diminished (i.e. overfished).

While much of the discussion around the role of subsidies on fisheries governance—including the ongoing negotiations to improve World Trade Organization (WTO) disciplines—currently focuses on their environmental outcomes, this contribution will examine another aspect: misrepresentation of catch history of the fishery and perpetuation of the legacy of unfair resource competition between the wealthy distant water nations that were able to support the expansion of their fleets and coastal states without such means nor opportunities (Sumaila & Vasconcellos, 2000). Specifically, I will examine how the ongoing negotiation for the allocation of future fishing rights at the Indian Ocean Tuna Commission (IOTC), one of the five tuna Regional Fisheries Management Organizations (RFMOs), predominantly based on the relative size of each member's catch in the past (i.e. "catch history") may lead to inequitable outcomes without explicit considerations for the role that subsidies played in the development of these fisheries.

4.2 Management of tuna fisheries in the Indian Ocean

As highly migratory species that are exploited across multiple jurisdictions by fleets from coastal and distant water States, management of tuna and tuna-like species requires multi-national coordination. The UN Convention on the Law of the Sea (LOSC) and its implementing agreement, the UN Fish Stocks Agreement (UNFSA), thus, mandate States to jointly manage their fleets through RFMOs. These legally binding international instruments also provide additional requirements for the management of highly migratory species, including the adoption of precautionary measures and compatibility of measures between national waters and areas beyond national jurisdiction. Furthermore, the UNFSA dictates that all management measures adopted by RFMOs must take into account the dependency and vulnerability of developing coastal member States, the food security and livelihood needs of small-scale fishers and fish-workers involved and that the measures may not place a disproportionate burden of implementation on these developing States (Sinan, Bailey, Hanich, et al., 2021).

In the Indian Ocean, the IOTC is tasked with such responsibilities. Currently, the IOTC has a membership of 30 States: 23 Indian Ocean coastal States and seven distant water States[17]. Given the diverse socio-economic conditions and national interests of these member States, the IOTC, which requires in the majority of the cases that its management measures to be made based on a consensus, has often fallen short in achieving its objectives, i.e., "ensuring…the conservation and optimum utilization (Art V.1)" of tuna stocks whilst ensuring "the equitable participation of Members…in the fisheries and the special interests and needs of…developing countries. (Art V.2(b))" (IOTC, 1993). Figure 4.1[A] and [B] demonstrate the clear disparities in catch and fishing capacity between the Member States in the Indian Ocean. In 2018, half of the IOTC Member States accounted for 95% of the total catch, 20% of which by distant water States.

[17] Under the EU membership, France, Italy, Portugal, Spain, La Reunion, and Mayotte operate in the Indian Ocean

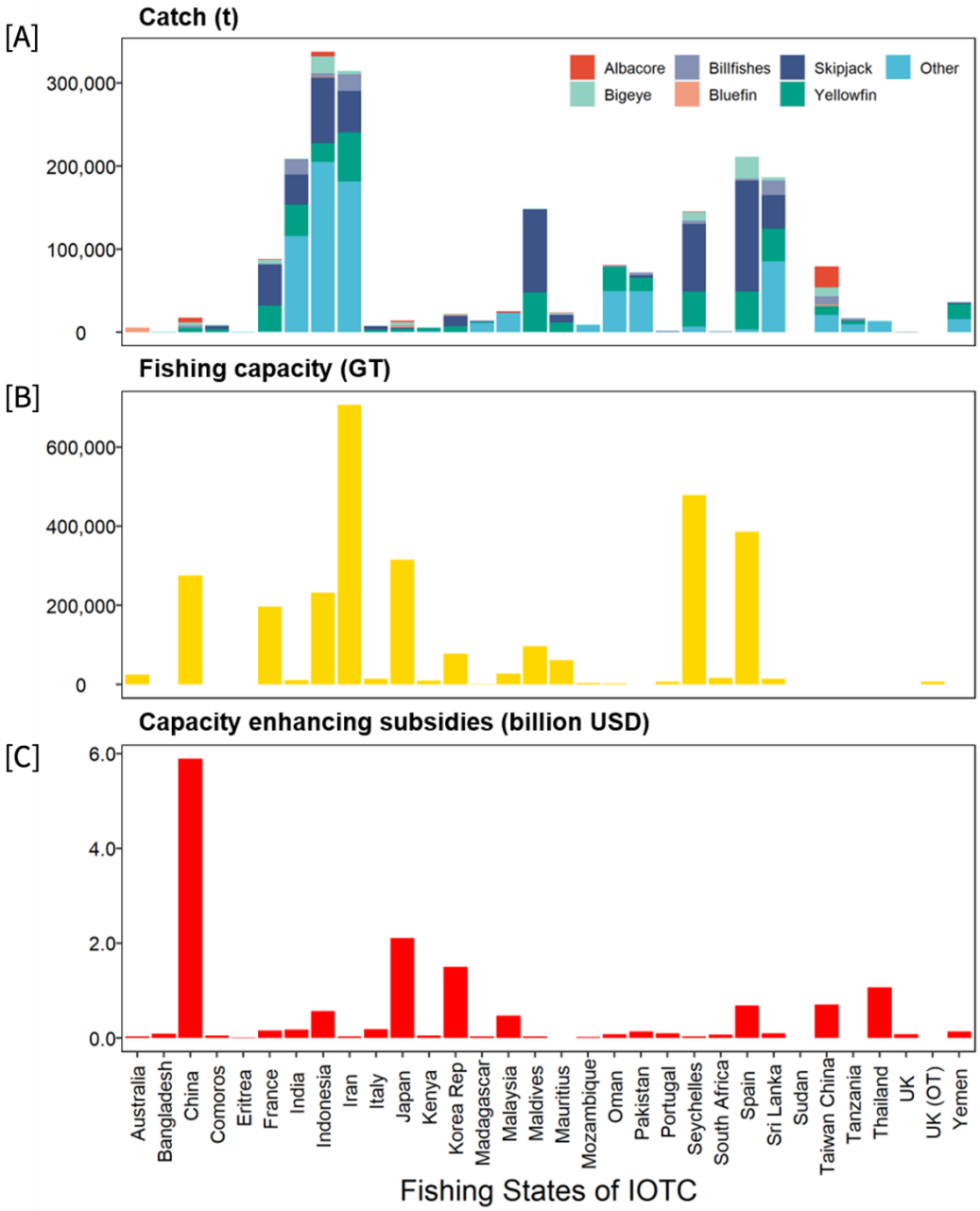

Figure 4.1[A]: 2018 Indian Ocean tuna catch, **[B]** fishing capacity reported by the IOTC member States (IOTC, 2019d, 2020a) and **[C]** estimated total capacity-enhancing subsidies (Sumaila et al., 2019): Total fishing capacity is reported, in gross tonnage (GT) of vessels above 24m and vessels below 24m operating in the high seas. The total catch for 2018 was 2.1 million metric tonnes and the total fishing capacity was 423,716 GT. Capacity-enhancing subsidies are defined as public payments for boat construction, renewal, and modernization; fishing access agreements; development programs; port development, infrastructure for market and storage, fuel subsidies and non-fuel tax exemptions. Note that the subsidy estimates represent subsidies provided to all domestic fleets and not explicitly for tuna fleets operating in the Indian Ocean. It is estimated that these countries spent around US$15 billion on 2018 for capacity-enhancing subsidies.

Similarly, nine member States accounted for 95% of the total fishing capacity in the Indian Ocean, while coastal developing States with negligible fishing capacity, such as Mozambique and Somalia, are often marginalized in the negotiations for management measures at the IOTC, despite their strong aspirations to engage in and develop their domestic fleets (Sinan, Bailey, & Swartz, 2021). Subsidies, if they remain unconstrained, are likely to further exacerbate these disparities as some of the IOTC member States are also large subsidizing nations (Figure 4.1[C]).

4.3 IOTC allocation negotiations and catch history

Due to the increasing concerns over the status of the Indian Ocean tuna stocks - seven stocks are currently assessed as overfished, representing 45% of the total catch, while skipjack tuna accounting for a third of the total catch is fished beyond its limit (IOTC, 2020c), the IOTC launched a new round of negotiations in 2010. Its aim was to create a mechanism for annually allocating fishing opportunities, i.e. shares of the total allowable catch for the year, among its member States (Sinan & Bailey, 2020). As evident in a series of proposals submitted by the member States (Table 4.1), little progress has been made in achieving a consensus in the past decade, with the negotiations still centered on defining parameters and criteria to be used for computing national allocations. However, the negotiations have matured in the last few years with proponents of the proposals putting weights (percentages) for each principle or criteria (Table 4.1). To date, proposed criteria can be broadly categorized into six approaches: catch history; development status; an equal allocation for all member States; food, livelihood and economic dependency on the tuna fisheries; considerations for members with no capacity or history of the tuna fisheries but, nonetheless, with aspirations to do so, and other "correctional factors" based on past scientific and financial contributions, and dependency on tuna imports for all members(IOTC, 2020g).

Table 4.1: Proposals submitted to the IOTC on the allocation of fishing opportunities since 2010(IOTC, 2020g). Proposals that did not explicitly address the allocations between member States were not included. The nature of proposed mechanisms was identified by six categories of approaches: historical catch, coastal states, all member states, correction factors, dependency and new entrants (see text for explanation of these categories). Numbers (in percentage) represent the contribution (i.e., weighting) of these approaches to the final allocation. Grey shade implies that the proposal explicitly identified these approaches without detailing their contribution. Black shade indicates that the approach was not included in the proposal.

Proponent	Year	Baseline historical years	Historical Catch	Coastal States	Correctional factors	Dependency	New Entrants	All member States
Indonesia	2011	1999 - 2009						
Seychelles	2011	1981 - 2010						
Iran	2011	2000 - 2009	100%					
Korea	2011	1960 - 2009						
EU	2011	NA						
Japan	2012	NA	97%				3%	
Seychelles	2012	1981 - 2010						
EU	2012	2001 - 2011					3-5%	
Iran	2012	2001 - 2011						
Indonesia	2016	2010 - 2015					2.5-10%	
Iran	2016	2005 - 2015						
EU	2016	2005 - 2015					3-5%	
Seychelles	2016	1981 - 2010						
EU	2018	2000 - 2016	85%	8%	6%		1%	
Maldives	2018	NA						
EU	2019	2000 - 2016	85%	8%	6%		1%	
Maldives	2019	2012- 2016 2002 – 2016 5 best years from 1950 - 2016	60-80%	4.5-45%		4.5-20.5%		2.5%-7.5%
EU	2020	2000 - 2016	80%	12%	7%		1%	
Maldives*	2020	2012- 2016 2002 – 2016 5 best years from 1950 - 2016	65%	8%	15%	7%		5%
Chair	2021	2012- 2016 2002 – 2016 5 best years from 1950 - 2016						

Also indicated in Table 4.1, key coalitions have emerged since 2018, coalescing around two sets of proposals—those submitted by the Maldives and the European Union. The Maldives' proposals, with the support of 11 coastal member States, center on the rights of coastal member States and the significance of their national waters to the tuna fishery, including those without a history of industrial/commercial tuna fishery. Thus, they propose to curtail the impact of catch history on the future allocation by giving higher weights to other considerations, including a proposal that allocations for coastal member States will not be reduced by more than 5% from the baseline historical year. Meanwhile, the EU, representing the demands of most of the distant water fishing nations, has proposed that the catch history be the most crucial factor in determining the future allocations (Table 4.1). As the negotiations progressed, EU reduced the weightings of catch history (from 85% to 80%) and increased the weightings for coastal States (from 8% to 12%) (Table 4.1). Furthermore, EU also have reduced the number of criteria for correctional factors focusing on trade and development factors.

The central difference between the EU and the Maldives proposals is how tuna catches are attributed and how significant of a role such catch histories should play in defining future catch allocations (Abolhassani, 2017; Andriamahefazafy et al., 2019; Sinan & Bailey, 2020). While both groups recognize the benefits of catch history in future allocations-for the distant water member States, the use of catch history protects their past investments in the development of the Indian Ocean tuna fisheries, and for the coastal States, catch history is the recognition of the social, cultural and economic importance and dependency of these countries to tuna fisheries--the significant difference is in how two groups calculate, and weigh catch history. Moreover, in the Maldives proposals, catches taken within national waters of Member States are to be attributed to the coastal State regardless of the nationality of the vessels, while in the EU proposals, catches are to be attributed to the flag States of the vessels regardless of the location of the catch, arguing that these catches were already compensated for and fished by their vessels (Sinan & Bailey, 2020).

Another area of disagreement is the catch history timeframe. The Maldives and its supporting States have proposed three timeframes—five-year average (2012 – 2016), 15-year average (2002 – 2016), and best five years averaged from within the period between 1950 and 2016—while the EU has proposed an average from 2000 to 2016(Figure 4.2). Countries with an established history of fishing in the Indian Ocean prefer an extended timeframe, whereas countries that lack such history but aspire to do so or have recently developed their fleets desire a shorter timeframe. For example, under the EU proposal, Japan's yellowfin tuna catch history baseline for longer period (2000 -2016) would be 11,095 t whereas, under the recent five-year average proposal (2012 – 2016), it would be 3,751 t. India, on the other hand, would increase their baseline by 50% if the 5-year average is used as opposed to the 15-year average (Figure 4.2).

Since catch history has a significant weight in the allocation formula, the large portion of the fishing opportunities is allocated to States that have had a fishery. For example, in the case of yellowfin tuna, the EU is allocated nearly one-fourth of the total allowable catch under their proposal (Figure 4.3). In the coastal States proposal, tuna caught in national waters irrespective of the flag State which it caught, is attributed to the coastal State. Thus, despite 65% of the total allowable catch is allocated for catch history in the coastal States proposal, the allocation for the EU decreases significantly (Figure 4.3), as nearly half of the yellowfin tuna caught by the EU fleet during 2000 – 2016 was in the EEZs of coastal States (IOTC, 2020a). As a result, aspiring coastal States and Small Island Developing States in the Indian Ocean benefit significantly (Figure 4.3: See Appendix A Table ST.3 for details).

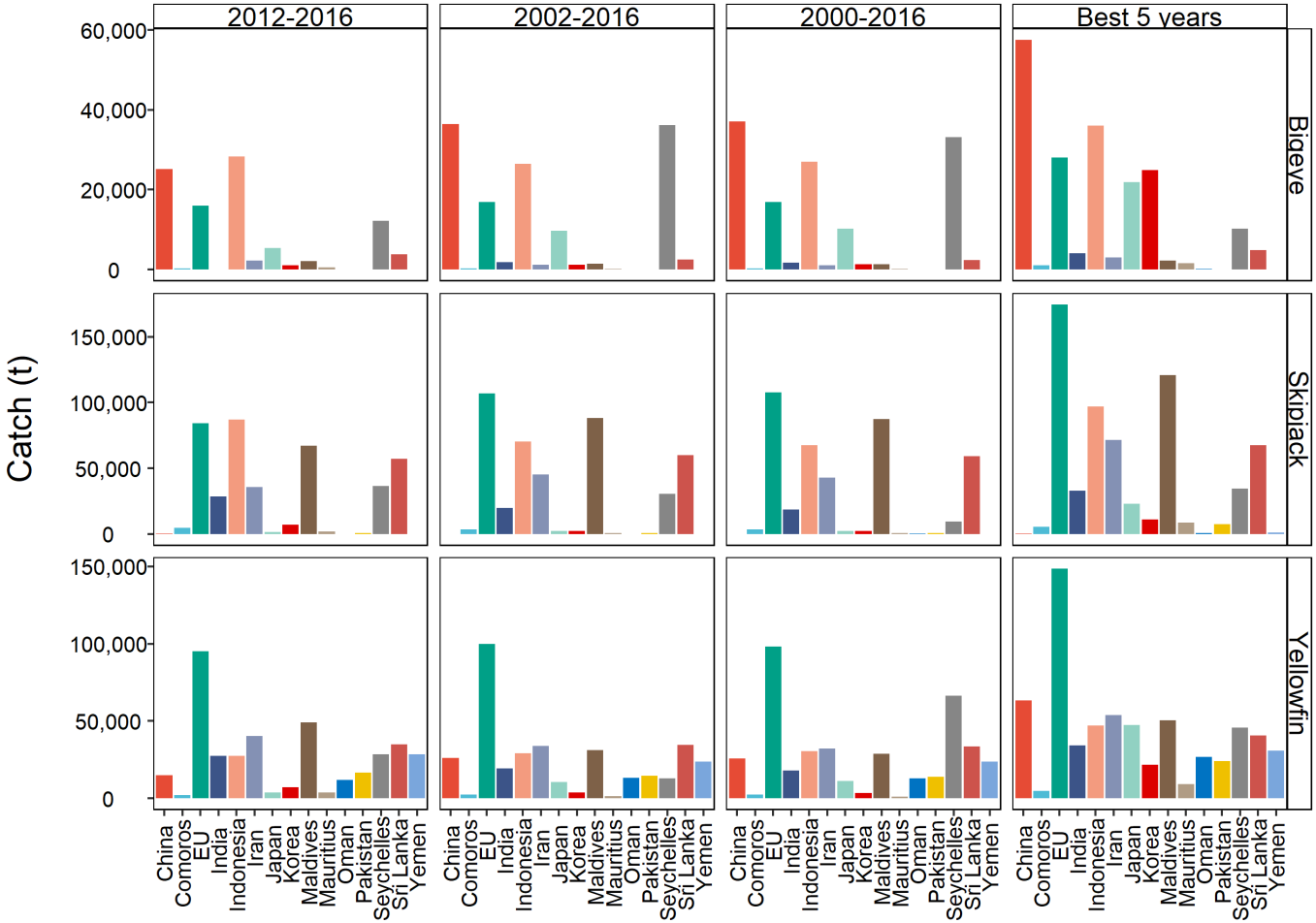

Figure 4.2: Top 10 countries catching tropical tuna (bigeye tuna, skipjack tuna and yellowfin tuna) in the Indian Ocean and the baseline catch histories in tonnes that are factored into the calculation of the allocation formulae for the two proposals proposed in 2020. Maldives proposal have proposed three baselines (2012 – 2016, 2002 – 2016, and average of the best five years from 1950 – 2016). The EU has proposed the baseline from 2000 – 2016.

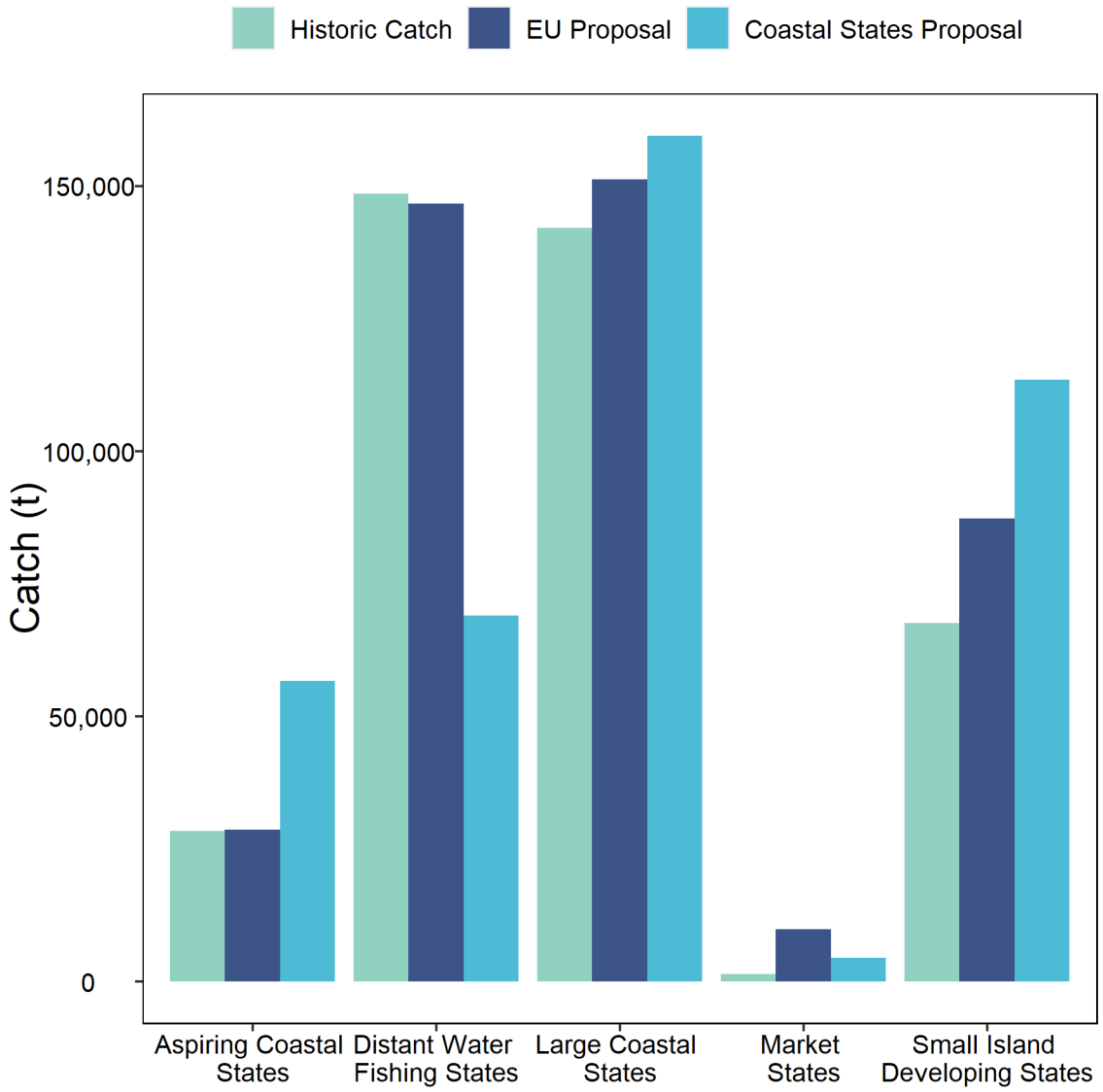

Figure 4.3: Average yellowfin tuna catch between 2000 - 2016 catch and the simulated allocation of yellowfin tuna catch under the EU and the coastal States proposal for the categories of countries used by Sinan, Bailey and Swartz (2021) in the IOTC. (Simulated using data from IOTC, 2020)

4.4 Catch history built on subsidies

Irrespective of which proposals gain consensus, it is highly likely that the allocation of future fishing opportunities will be closely linked to catch history. Yet, catch history is distorted by the fact that some countries, particularly the distant water States, had the means to publicly finance the development of their fleet in the past, while others were unable to do so.

For example, out of the entire EU fleet that operated in the Indian Ocean (63 vessels with a total capacity of 85,320GT), at least half of the vessels that operated in 2019 (at least 69% of the gross capacity of the fleet) were subsidized for its construction and / or modernization (Table 4.2). Between 2005 and 2019, the EU fleet in the Indian Ocean caught nearly one-fourth (23%) of the highest valued species managed by the IOTC, i.e., tropical tuna (skipjack tuna, yellowfin tuna and bigeye tuna). During this period, the EU fleet caught on average over 240,000t of tropical tuna, 96% of which were caught by purse seine vessels. In 2019, for the European purse seine fleet operating in the Indian Ocean, at least 82% of Spanish and 57% of the French gross capacity of the purse seiners were constructed or modernized through subsidies provided from 1998 to 2007. Three vessels were constructed using the European Fisheries Fund in 2007 (EFF) and the rest of the vessels were constructed using funds from Financial Instrument for Fisheries Guidance (FIFG: from 1994 to 2006). Skerritt et al. (2020) in their analysis of the EU subsidies showed that from 2000 to 2006, under the FIFG program, the EU spent around EUR 883 million on fishing vessel construction. The EFF allocated an additional EUR 172 million from 2007 to 2013 and EUR 86 million under the European Maritime Fisheries Fund (EMFF) from 2014 to 2020 and was committed for vessel modernization and replacement (Skerritt et al., 2020).

Table 4.2: Average catch (t), capacity of vessels (gross tonnage), and evidence linked capacity enhancing subsidies (vessel construction and modernization) spent through the European Union funds and member States contributions between 1998 - 2006

Country	Vessel type	Avg Catch (t)	Gross Tonnage (GT)	Subsidized GT	EU subsidy (EUR)	Country specific subsidy (EUR)	Total Subsidy (EU)
Spain	Purse seine	157,782.68	49,504	40,784	26,172,451.96	9,646,303.42	35,818,755.38
Spain	Longline	6,912.27	3,058	2,135	4,433,979.73	684,104.84	5,118,084.57
Spain	Supply vessels	-	2,535	-	-	-	-
France	Purse seine	69,187.63	27,196	15,618	32,251,588.28	1,976,559.19	34,228,147.47
France	Longline	1,557.36	890	162	523,666.08	284,292.50	807,958.58
Italy	Purse seine	5,470.74	2,137	-	-	-	-
Total		240,910.68	85,320	58,699	63,381,686.05	12,591,259.95	75,972,946.00

For the identified 31 subsidized vessels in this study the EU spent at least EUR 63.38 million for its construction and modernization. Out of these 31 subsidized vessels, for at least eight vessels, the EU has spent for its construction and subsequent modernizations. The records also reveal that another EUR 12.59 million was also spent by the national governments (i.e., France and Spain), totaling EUR 75.97 million as construction and modernization subsidies. Vessel-specific subsidies of the EU were obtained from the published datasets for the EMFF by the European Commission for all member States, fishsubsidy.org dataset for FIFG and EFF programs and cross-referenced fishsubsidy.org data with other published reports (details are in Appendix 1: Table ST.4).

While no records of subsidization specific to the Indian Ocean tuna fleets were available, similar histories of fleet subsidization can be seen in other distant water States. The Chinese government has prioritized the development of its distant water fleet and aquaculture since 1983 implementing capital credit and other fiscal measures, as well as through fuel subsidies (Mallory, 2016). These policies significantly increased the distant water fishing capacity in China, doubling its fleet from around 1,200 vessels in 2012 to 2,500 vessels in 2017 (Yu & Han, 2021). China continues to provide vessel construction subsidies, including US$ 660 million in 2017 (OECD, 2021b). While I cannot ascertain what proportion of these subsidies were allocated toward its Indian Ocean fleet, nor whether these programs directly contributed to the development of the Chinese fleet in the Indian Ocean, the Chinese longline fleet capacity did undergo a major expansion from 2012 to 2017, with its GT doubling from 17,981 GT to 36,214 GT. The Chinese tuna catch in the Indian Ocean also almost tripled from 5,143 t to 13,794 t during this period.

Similarly, the Republic of Korea provided US$1.75 billion in fisheries subsidies in 2009, of which 45% were fuel subsidies (C. Lee & Choi, 2017). From 2010 to 2012, its distant water fleet received on average around US$818 million as subsidies (Park, 2013). Vessel modernization and other fixed cost subsidies for the Korean fleet have continued, and in 2017, Korea spent around $948 million on these subsidies (OECD, 2021b). In 2019, Korea operated 13 fishing vessels (11,082GT), out of which 6 vessels (5,309 GT: 48% of the total

Korean capacity) belong to Dongwon Industries Co., Ltd and 4 vessels belong to Dongwon Fisheries Co., Ltd (4,320 GT: 39% of the total Korean capacity) in the Indian Ocean. Between 2010 to 2012, the two companies received public payments of around $238 million for vessel and equipment modernization, foreign market and investment development abroad (Park, 2013).

Japan currently does not have any subsidy programs specific to its distant water tuna fleets; however, the expansion of the distant water fleets had been a major component of its fisheries development policies in the second half of the 20th Century(Swartz et al., 2010), and these vessels continue to qualify for various government-sponsored fisheries loan programs (JFC, 2020). Developing countries have also increased the level of capacity enhancing subsidies in the last few years (Sumaila et al., 2019), however vessel level subsidies data was unavailable from these countries. For example, Indonesian industrial (greater than 60GT) fleet is publicly supported via fuel subsidies(Yusuf et al., 2015), but it is difficult to ascertain other capacity enhancing subsidies or how much was spent for Indonesian vessels operating in the Indian Ocean due to lack of transparency around subsidies data.

4.5 Discussion

Environmental impacts of fisheries subsidies have extensively been discussed (Cisneros-Montemayor et al., 2020; Kumar et al., 2020; Sala et al., 2018; Sumaila et al., 2010, 2019). The capacity to subsidize a fishery at an industrial scale tends to be limited to wealthy developed States, providing an advantage when compared to the production capacity of non-subsidized fleets of developing States in the cases of transboundary fisheries. For some distant water States, the depletion of the domestic fish stocks have served as an impetus for fleet expansion, providing subsidies to construct distant water fishing vessels, tax incentives for fuel, and used public payments to access to waters of developing countries (He, 2015; Mallory, 2016; McCauley et al., 2018). Often vested interests within DWFN do not share

an interest in conserving ecosystems or the capacity and aspirations of local communities for access to the resource (Cisneros-Montemayor et al., 2020).

Subsidies are commonly provided to support and protect domestic infant industries (Schrank & Wijkström, 2003). In the case of fisheries, however, subsidizing States have had a legacy of expanded fisheries for decades and subsidies serve to maintain and increase their fisheries dominance in the market. Such is the Indian Ocean where distant water fleets benefited from government subsidization programs for over four decades and could now skew the allocation of future fishing opportunities in their favour. In doing so, the IOTC risks marginalizing half of its Member States—which currently account collectively for 4% of the total catch in the Indian Ocean—which have had no economic means to develop their domestic fleets despite their aspirations to do so in the near future. Furthermore, as the historical catch is the principal criterion for allocating future fishing opportunities (Bailey et al., 2013; Havice, 2021; Serdy, 2016; Seto et al., 2020) developing coastal States are also forced to share the burden of responsibility for overexploitation of resources, though they did not participate in the current overexploitation of the Indian Ocean tuna stocks (Campbell & Hanich, 2015). Thus, the allocation based on catch history without explicit recognition of the distortive effects that subsidization efforts in the past would represent the continuation of this advantage that distant water fleets have had and undermine the development aspirations of the coastal States.

In the Indian Ocean for more than half of the total catch, and for low-valued species found near-shore - all the catch, is taken by small-scale and artisanal fisheries (Sinan, Bailey, & Swartz, 2021). High operational costs, limited opportunities for economies of scale, and competition from large-scale fishing vessels pose a significant barrier for developing countries and, in particular, small-scale fisheries to access resources and the market. On top of these barriers, small-scale fishermen from developing coastal States have to compete for the same target stock with privately unprofitable industrial fishing vessels supported by public funds, leading to intra-generational inequity. Sala et al. (2018) estimate that without subsidies, as much as 54 percent of the current high-seas fishing are non-profitable.

Further, using cost data from the EU's annual economic review, Sala et al. (2018) showed that the Spanish purse seine fleet in the Eastern Central Pacific, the western Indian Ocean, and the Eastern Central Atlantic (West Africa) would not be profitable at current rates without subsidies. Most of the fish caught by these fleets fishing on the high seas play a negligible role in global food security (Schiller et al., 2018). Thus, if future fishing opportunities are based on privately unprofitable, publicly supported fisheries, it poses a significant barrier in achieving Sustainable Development Goal (SDG) Goal 14. b for access for small-scale artisanal fisheries to marine resources and markets, as well as the overarching SDGs objective - *'leave no one behind.'*

Equitable allocation of future catch opportunities is an essential starting point for effectively managing multinational fisheries. And is of critical importance given the current conservation status of the Indian Ocean tuna stocks. If we want an equitable fishery, we need to take into account the allocation of future fishing opportunities, and that catch history has been distorted by subsidies. In doing so, allocation to countries that have historically subsidized will decrease, offering a potential avenue to a more equitable allocation result. For that to happen, there needs to be better transparency around past and future subsidies data. However, accounting for subsidies from an allocation is not the only pathway for a more equitable outcome. While multiple futures may exist, here I present four distinct ones which may emerge in contemporary transboundary governance: i) the legacy of subsidization continues to dispossess developing coastal states of future fishing aspirations and opportunities; ii) account for the role of subsidies in propping up historical catches and removing that effect iii) attribute catches caught in coastal States waters to coastal States; and iv) remove the historical catch as a large contributor in the allocation criteria or formula. Only one of these four perpetuates the status quo and should be removed from future discussions moving forward. Accounting for subsidies in an allocation will prove to be a challenge due to opacity in fisheries subsidies. Since the IOTC agreement allows members to review economic and social aspects of tuna fisheries (article V(2d)), the Commission could facilitate improving subsidies data relevant to tuna fisheries, in particular for capacity-enhancing subsidies. In the absence of reliable subsidies data,

attributing catch caught in coastal States waters to coastal States in an allocation system proves to be a simple fix as evident from the analysis. This is also in line with the principles in the LOSC (articles 61 and 62). The last option is to remove catch history from an allocation mechanism. The only drawback is that there are countries that have had practiced fisheries for centuries and have developed a fishery without significant level of subsidies resulting in a disproportionate burden for those countries.

4.6 Conclusion

As Lodge et al., (2007) noted, one of the greatest threats to the conservation and management of the stocks in RFMOs is the failure to allocate equitably future fishing opportunities. 'Catch history' is seen as one of the barriers to reaching equitable allocation decisions as its often skewed to former colonial, developed and DWF countries that have provided public funds to increase fishing capacity. Even if negotiations in the WTO eliminate harmful subsidies today, the legacies of inequity that result from past subsidization will remain for generations to come if 'subsidized catch history' remains the basis for deciding future fishing opportunities. This will lead to inequitable economic and social outcomes, in particular, for small-scale fisheries.

5 COMMON BUT DIFFERENTIATED RESPONSIBILITIES IN TUNA FISHERIES MANAGEMENT

5.1 Introduction

In addition to establishing a legal order for the seas and oceans, the UN Law of the Sea Convention (LOSC) aimed to facilitate the creation of a just and equitable international economic order (UN, 1982). The UN Fish Stocks Agreement (UNFSA) – an implementing agreement under LOSC, which sets the global framework for the management of highly migratory and straddling fish stocks – places a duty upon State Parties to cooperate for the common goal of long-term conservation and sustainable use of resources through Regional Fisheries Management Organizations (RFMOs). In doing so, UNFSA requires member states to differentiate developing states from developed states by taking into account their special requirements in the establishment of conservation and management measures (CMMs) (Azmi et al., 2016; Davis & Hanich, 2020; Hanich et al., 2015). In effect, the LOSC and UNFSA establish common but differentiated responsibilities.

Without a mechanism to quantify these differentiated responsibilities, it is left to countries to negotiate and interpret international legal instruments, which they do to their own advantage. The Western Central Pacific Fisheries Commission (WCPFC), through CMM 2013-06, mandates the Commission to identify the impacts of CMMs on one specific sub-group of developing states, namely small island developing states (SIDS) and territories (Hanich et al., 2015). Despite this, there is to date no uniform mechanism established under WCPFC to evaluate these impacts. Ad-hoc negotiations have exempted SIDS fishing fleets from certain measures (for example in WCPFC, CMM 2018-01 exempts SIDS from high seas purse seine effort limits). However, exemptions are adopted without formalized or consistent processes (Hanich & Tsamenyi, 2014), meaning

the outcomes of these negotiations continue to be skewed towards relatively powerful countries (Seto et al., 2020), or require broad exemptions so as to avoid disproportionate impacts on developing States (Hanich & Ota, 2013), perhaps watering down conservation and management in the process.

Noting a lack of progress on formalizing mechanisms, the review conference of the UNFSA in 2016 recommended the urgent development of a common understanding of States' differentiated responsibilities, including quantitative and qualitative elements (UN, 2016). To support this need, I analyse the concept of "common but differentiated responsibility" as it applies to UNFSA and develop a framework to implement the concept in RFMOs, with a specific focus on tuna RFMOs. To illustrate its utility, the framework is applied to one of five tuna RFMOs grappling with these issues – the Indian Ocean Tuna Commission (IOTC). I argue that the framework could be adopted across RFMOs to avoid the use of different interpretations and to provide an equitable decision-making process.

5.2 Common but differentiated responsibilities in LOSC and UNFSA

5.2.1 Common responsibilities

To achieve the objectives of a "just and equitable international economic order" (UN, 1982, p. 25), the LOSC took a spatial approach to attribute rights and duties for State Parties (Engler Palma, 2010). The LOSC grants coastal States sovereign rights to explore, exploit, conserve and manage the natural resources within the Exclusive Economic Zone (EEZ: Article 56(1)). Coastal States are also mandated to determine total allowable catch within the EEZ, taking into account best scientific evidence (Article 61). On the other hand, reflecting the traditional European principle of the freedom of the seas (a concept envisioned by Hugo Grotius , *Mare Liberum*) (FAO, 1992), LOSC asserts that all States, whether coastal or land-locked, may exercise freedom of fishing in the high seas (Article 87(1)). However, LOSC also prescribes limits on these rights, requiring States fishing on the high seas to: give due regard to the interests of others fishing on the high seas (Article

87(2)), treaty obligations, the rights and duties as well as the interests of coastal States, and various provisions relating to the conservation and management of high seas marine living resources and the control of nationals (Article 116 – 120 (Warner & Rayfuse, 2008)).

Recognizing the implications, especially in the high seas, where no single State has exclusive control, the LOSC attributed jurisdiction over vessels to the State whose flag the vessel flies (Article 91)(Takei, 2013). Further, flag States in another State's waters also have to ensure that their nationals fishing within the EEZ of the coastal State comply with the laws and regulations of the coastal State. As all harvested fish must be landed and since ports are subject to the coastal State' sovereignty (LOSC Articles 2(1), and 11) , port State measures can be very effective (W. Edeson, 2000). Coastal State sovereignty arguably confers on them port State rights to deny entry, place conditions on, carry out inspections and institute proceedings for vessels suspected of breaches. The recognition of the rights of port States has been fundamental in the development of the Port State Measures Agreement (Doulman & Swan, 2012; FAO, 2016a).

Yet despite extended jurisdiction, and mandated inter-State cooperation in regard to straddling and highly migratory fish stocks that occur within EEZs, and the high seas, implementation of LOSC had been insufficient to address the objectives of the Convention, especially to prevent the depletion of fish stocks (Lodge & Nandan, 2005). To address some of the shortcomings and further elaborate the duties and responsibilities in LOSC, the UNFSA was adopted. One additional element UNFSA ushered in was the 'duty to cooperate' – by requiring States to either become members of RFMOs, or at least cooperate and apply the applicable Conservation and Management Measures (CMMs) (Azmi et al., 2016; Molenaar, 2003). UNFSA further limits access to the resources within the region to the above mentioned two groups of States (members or cooperating non-members, Article 8(4)). In addition, UNFSA requires that CMMs adopted for the high seas and areas under national jurisdiction are compatible (Article 7(2)) and to ensure that CMMs do not result in a harmful impacts on living marine resources, In addition, UNFSA asks all States (a common responsibility) to take into account new entrants (Munro, 2000;

Pintassilgo & Duarte, 2000) and the precautionary approach (Article 6: (Freestone, 2001)) in the development of CMMs. The non-exhaustive list of criteria for the allocation of fishing opportunities for new entrants and existing members (Molenaar, 2003) in Article 11 of UNFSA provides guidance to assist for such a possibility in CMMs.

5.2.2 Differentiated Responsibilities

Even though UNFSA places a common responsibility for all members and non-cooperating members in adopting and implementing CMMs, Article 24(1) of UNFSA asks member states to give full recognition to the special requirements and development aspirations of developing States in relation to CMMs, thus differentiating the common responsibility. Furthermore, Article 24(2) of UNFSA elaborates that in giving effect to the duty to cooperate to establish CMMs, States are to take into account the special requirements of developing States and provide priority to three broader principles that should be taken into account in the establishment of CMMs. However, UNFSA does not provide any detailed criteria or guidance on how these principles would be assessed or utilized in adopting CMMs. Using existing literature, I have tried to elucidate the definition and interpretation used in Article 24(2) of UNFSA. The three broader principles include:

*(a) **the vulnerability** of developing States which are **dependent** on the exploitation of living marine resources, including for meeting the **nutritional requirements** of their populations or parts thereof;*

First, vulnerability generally refers to the potential for loss (Barnett et al., 2008) or exposure to external economic forces and environmental hazards (Atkins et al., 2000). The UN (1998) raised two critical considerations for vulnerability, i) vulnerability indices are meant to reflect relative economic and ecological susceptibility to exogenous shocks and ii) vulnerability indices should refer to a structural vulnerability that depends on factors that

are not under the control of national authorities when the shock occurs (Atkins et al., 2000).

Second, when dependency is factored in, it should be limited to not only States to which particular species or stocks have a relative importance, but also the dependence of specific groups of population for livelihoods and economic development from the stocks concerned as determined by the International Court of Justice in fisheries jurisdiction cases between the United Kingdom and Iceland (*Fisheries Jurisdiction (United Kingdom v. Iceland), Merits Judgment*, 1974) and Germany and Iceland (*Fisheries Jurisdiction (Federal Republic of Germany v. Zeeland), Merits judgment*, 1974) (Elferink, 1999).

Third, Article 24(2a) mandates consideration of nutritional importance in assessing dependency. In the negotiations on the final text of UNFSA, negotiation around "dependence" was focussed largely on nutritional requirements rather than other elements of dependency, such as gendered employment, access to foreign currency, etc (UN, 1993).

(b) the need to ***avoid adverse impacts*** *on, and ensure access to fisheries by,* ***subsistence, small-scale and artisanal fishers and women fish workers, as well as indigenous people*** *in developing States,* ***particularly small island developing States****; and*

In giving effect to the duty to cooperate, UNFSA Article 5(i), requires Parties to take into account the interests of different vulnerable groups in developing States, in particular in SIDS. Furthermore, recognizing that CMMs adopted by RFMOs will have an impact on these and other marginalized fishing groups, article 24(2b) requires States to ensure that these impacts are not adverse. However, these impacts might be difficult to quantify, given the challenges in vulnerable groups such as small-scale fisheries, i.e., inadequate data collection, multi-gear, multi-species, remote landing sites, many seasonal workers and lack of organized market infrastructure (Doria et al., 2020; Salas et al., 2007).

(c) the need to ensure that such measures do not transfer, directly or indirectly, ***a disproportionate burden of conservation action*** *onto developing States.*

The UNFSA does not define "disproportionate burden" or provide guidance on how it will be assessed or identified. Azmi et al. (2016) proposed using the principle of proportionality as used in international law to verify that a disproportionate burden on developing States exists and to make adjustments to a proposed CMM if one does. The WCPFC's CMM2013-06 uses a similar mechanism by mandating the Commission to identify the impacts of the CMM on developing States (Hanich et al., 2015) and if a disproportionate burden exists to mitigate the burden by either i) phased or delayed implementation, ii) exemption of specific obligations, iii) proportional or rotational implementation, iv) establishment of a compensatory funding mechanism. But how does a State assess if a disproportionate burden exists, and if it does, in what magnitude and to what effect? To address this, I turn to the use of indicators.

5.3 Methodological approach: Indicators and differentiated responsibilities in UNFSA

Adapting the two step approach used by Azmi et al. (2016) and the concepts explained above in LOSC and UNFSA, I developed a three-step approach (Figure 5.1) to analyze CMMs and to elicit differentiated responsibilities. In the first step, the RFMO must identify the management objective and the target of CMMs based on the rights of States in LOSC, the principles laid out in UNFSA, Article 7(2), Article 11 and taking into account the precautionary approach (Article 6), that is, the common responsibilities of all member States. Once the management objective is identified, then the indicators related to the differentiated responsibilities laid out in Article 24 of UNFSA need to be selected. These indicators will vary depending on different RFMOs and the management objective of the CMM. Furthermore, there could be other dimensions that could be included in the selection of the indicators, which could include social, cultural, institutional, and ethical dimensions (Angel et al., 2019).

Socio-economic indicators have been largely overlooked in RFMO governance (FAO, 2016b; Fletcher, 2020). However, there has been growing interest in the last few years among IOTC and WCPFC member States to use socio-economic indicators in the decision-making process (as evidenced by IOTC and the Pacific Islands Forum Fisheries Agency (FFA) internal studies on socio-economic indicators: (FFA, 2020; Macfadyen & Defaux, 2019)). A recurring problem in including socio-economic indicators in RFMO governance is the lack of data and various data collection methodologies and systems (Macfadyen & Defaux, 2019). Therefore, any indicator framework must be flexible enough to be geared to the context and data availability. Thus, the indicators used in the framework could be modified based on the availability of data.

Schomaker's (1997) SMART indicator framework: specific, measurable, achievable, relevant and time-bound, is used in this study to select indicators to identify common but differentiated responsibilities. Initially, a pool of 336 socio-economic indicators from 10 studies were identified to be used in the analysis (Accadia & Spagnolo, 2006; Avelino et al., 2018; Boyd & Charles, 2006; FAO, 2017a, 2017b; Kruse, 2012; Ünal & Franquesa, 2010; Wabnitz et al., 2018) (Figure 5.1). To measure vulnerability, the Commonwealth Vulnerability Index (Atkins et al., 2000) was used to identify the vulnerability criteria in the framework. To identify dependency as stated in article 24 (a), several indicators were used due to limitations in data. Economic Complexity Index was used to identify the diversity and ubiquity of products produced in the country (Hausmann et al., 2014). The other indicators used to measure dependency are fisheries contribution to GDP (in percentage) and fish consumption per capita (kg/person/year) as a measure of dependency across countries. The role of fish as nutrition is important in assessing dependency. Here, we've selected prevalence of severe food insecurity in total population (FAO, 2020a) to examine the linkage with total catches of that country and the dependency of those catches.

There are several limitations in obtaining indicators for small-scale fisheries. In most cases in the IOTC, to mitigate the impact on coastal fisheries, there are exemptions for vessels

below 24m and I have taken a similar approach in this study (IOTC, 2019b). I assumed all vessels below 24m are of artisanal or small-scale fisheries. To assess the state of small-scale fisheries, percentage of catch, percentage of fishers in total employment and percentage of estimated fisheries employment of vessels below 24m was analysed.

An indicator to examine whether a coastal State is a Small Island Developing State or not is used as a reflection of the special recognition in Article 24(2b) of UNFSA. I have also used data from different sources and data points in time due to lack of availability of data.

To assess whether there is a disproportionate burden, we've used indicators to reflect the impacts or costs to the fishery. These include yellowfin tuna catch, its value, port calls, processing capacity, imports and exports, fish consumption and foreign access revenue per year.

To identify whether there is a disproportionate burden, and any adverse impact on small-scale fishers, in particular in SIDS, the selected indicators are used. If there is any impact or disproportionate burden – direct or indirect – CMMs need to be adjusted accordingly (Figure 5.1). Since UNFSA Article 24(2a) does not mandate a comparison with a baseline, all CMMs need to consider the vulnerability of developing States and need to be adjusted accordingly. Administrative adjustments such as report submissions will ultimately have economic consequences, but these could be mitigated by imposing a lag or a delay or providing financial and institutional assistance.

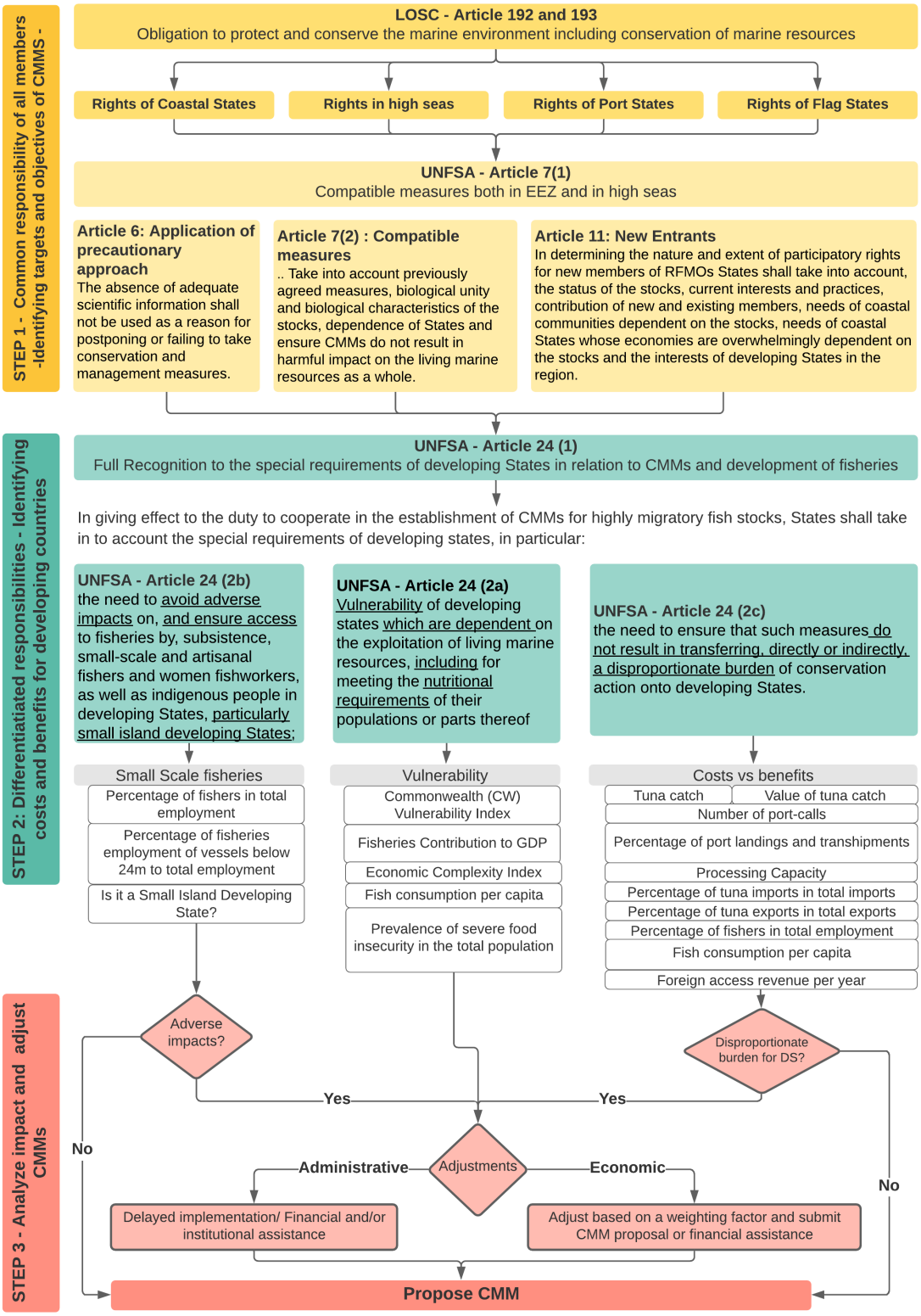

Figure 5.1: Framework identifying common but differentiated responsibilities in UNFSA and indicators that could be used in IOTC to implement the framework.

5.4 Application: 2019 IOTC measures

The framework was applied to resolutions from the most recent IOTC meeting where these measures were adopted in 2019 to identify any economic or administrative impacts. Of the seven measures adopted in 2019, Resolution 19/01, "On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna sock in the IOTC Area of Competence,"(IOTC, 2019b) only imposed an economic impact for developing coastal states (see Appendix A, Table ST.5), and thus this Resolution forms the basis for application in the paper. In the 2019 Commission meeting, three proposals (European Union (IOTC, 2019e), South Africa and Maldives (IOTC, 2019f), and Republic of Korea (IOTC, 2019e)) were submitted to the Commission for their consideration to rebuild the yellowfin tuna stock.

Subsequent negotiation in the Commission led to the adoption of Resolution 19/01. To assess the framework's ability to identify the presence of a disproportionate burden, two countries were chosen from the pool of developing coastal states: a least developed state (Mozambique) and a SIDS (Seychelles), and the European Union was chosen as the developed State. To test the framework's robustness and efficacy, it needed a broad set of conditions. Hence, the three initial proposals submitted to the 2019 IOTC Commission meeting on the same topic and the adopted measure (Resolution 19/01) were tested (Table 1 and Appendix A, Table ST.6). Under these proposals and the Resolution, countries were subject to reductions based on gear types for each member State (IOTC, 2019b). Detailed catch reductions based on gear reduction for the three member States used in the study are presented in Appendix A, Table ST.7.

Table 5.1: Indicators used in the study for Mozambique, Seychelles, and the EU (NA- Not applicable, NAV – Not available). Data sources for each indicator are provided in Appendix I: Table ST.6)

Category	Indicator	Mozambique	Seychelles	EU
Vulnerability	Commonwealth Vulnerability Index	3.51	16.22	NA
	Fisheries contribution to GDP (%)	8.00	15.00	NA
	Economic Complexity Index	(1.25)	NAV	NA
	Fish consumption per capita (kg/per person/year)	11.4	57.4	NA
	Prevalence of severe food insecurity in the total population (% of population)	40.7	3.2	NA
Small-scale fisheries	Percentage of catch by vessels below 24m	70.00	1.65	0.61
	Percentage of fishers in total employment	0.50	3.24	NA
	Percentage of estimated fisheries employment of vessels below 24m to total employment	0.48	0.8	NA
	Is a Small Island Developing State	No	Yes	NA
Cost vs benefits	Maximum yellowfin tuna catches (tonnes)	294.29	44,089.28	92,714.29
	Value of yellowfin tuna catch (million USD)	0.78	116.53	245.04
	Number of port-calls	48	521	43
	Percentage of port landings and transshipments in the Indian Ocean	0.002	48.997	0.126
	Processing Capacity (tonnes)	0	100,000.00	NAV
	Percentage of tuna imports in total imports	0.05	12.46	0.15
	Percentage of tuna exports in total exports	0.11	67.01	0.03
	Percentage of fishers in total employment	0.39	3.24	0.05
	Fish consumption per capita (kg/per person/year)	11.4	57.4	5.10
	Foreign access revenue per year (million USD)	0.45	13.5	NAV

Since the vulnerability indicators need to be considered irrespective of the proposal, the other indicator categories were analysed to identify the disproportionate burden and adverse impacts on small-scale fishers for Mozambique and Seychelles compared with the EU (Table 2). A detailed working of the table is included in Appendix A, Table ST.7.

Mozambique, a least developed country with minor catches (294t), will suffer a further reduction in their catches and, as a result, will lose revenue from the first point of sales of around $0.17 million USD in EU proposal and $0.13 million USD in Korean proposal. Mozambique must also reduce the catches of handline yellowfin tuna caught by small-scale fishermen from 80t to 34t and 31t in EU and Korea proposals respectively. Even though the total catch of Mozambican fishers is minor, reducing their catches by one half will likely impact small-scale fishermen. The EU proposal also mandates a reduction in Mozambique's longline catches, predominantly a foreign vessel fleet licensed to fish in Mozambique waters. Based on Mozambique ports' landing levels(IOTC, 2020e), it is estimated that the reduction of landings under the EU proposal will reduce port activities by around two visits. In the Korean proposal, there was no limit for longline vessels fishing less than 5,000t and hence, there is no change in the number of port calls. The South Africa/Maldives proposal would have no impact on any of the indicators for Mozambique.

For Seychelles, the impacts are significant. Seychelles fishes around 95,000t of tuna and tuna-like species (flag State), lands almost 50% of the tuna that's transhipped or landed in IOTC in their port (port State) and also exports around US $351 million worth of processed tuna products (processing State)(UN, 2020a). Even though there is a significant catch by Seychelles, 86% of the catch was from Spanish-owned Seychelles-flagged vessels (IOTC, 2020a, 2020b). A maximum of 727t of yellowfin tuna was caught by vessels below 24m between 2014 and 2017 (IOTC, 2021c).

Table 5.2: Assumed changes in indicators for the three test member States (Mozambique, Seychelles, EU) with respect to Resolution 19/01, including the three proposals (European Union(IOTC, 2019e), South Africa and Maldives(IOTC, 2019f), and Republic of Korea(IOTC, 2019e)and the adopted Resolution for EU, Mozambique and Seychelles. Impacts are assessed based on the base data in Table 5.1 and subsequent changes from catch reductions and are shaded. (*Values are based only for a reduction in catches based on gears as for some gears there is no catch limits specified in the resolution), ** based on EU access agreement with Seychelles(EU, 2020)).[18]

State	Type	Indicator	EU Proposal	South Africa and Maldives Proposal	Korean Proposal	Adopted
Mozambique	Small-scale fisheries	Change in catch by vessels below 24m	-45.69 for other gears	No change	-48.76 for other gears	No change
		Impact on fishers in total employment	Significant	No impact	Significant	No impact
		Impact on fisheries employment of vessels below 24m to total employment	Significant	No impact	Significant	No impact
		Is a Small Island Developing State?	No	No	No	No
	Cost vs benefits	Change in yellowfin tuna catches (tonnes)	-65.79	No change	-48.76 for other gears and no limits for other type of gears	No change
		Change in value of yellowfin tuna catch (million USD)	-0.17	No change	-0.13*	No change
		Change in number of port-calls	-2	No change	No change	No change
		Change in % of fishers' employment	Significant	No change	Significant	No change
		Change in fish consumption	Significant	No change	Significant	No change
Seychelles	Small-scale fisheries	Change in catch by vessels below 24m	-41.03 for other gears	No change	-42.48 for other gears	No change
		Impact on fishers in total employment	Impact	No impact	Impact	No impact
		Impact on fisheries employment of vessels below 24m to total employment	Impact	No impact	Impact	No impact
		Is a Small Island Developing State?	Yes	Yes	Yes	Yes

[18] If there is no change for any indicator across the three proposals and the adopted measure, it has been removed from the table as they do not affect the outcome of the result

State	Type	Indicator	EU Proposal	South Africa and Maldives Proposal	Korean Proposal	Adopted
		Change in yellowfin tuna catches (tonnes)	-8,994.45	-8,482.15 for purse seine and no limits for other type of gears	-21,792.55 for purse seine and no limits for other type of gears	-8,482.15 for purse seine and no limits for other type of gears
	Cost vs benefits	Change in value of yellowfin tuna catch (million USD)	-23.64	-22.42*	-57.60*	-22.42*
		Change in number of port-calls	-69	-79	-128	-59
		Change in % of fishers' employment	Minor	No change	Minor	No change
		Change in fish consumption	Minor	No change	Minor	No change
		Change in access agreements value (million USD)	0.38**	0.38**	0.38**	0.38**
European Union	Small-scale fisheries	Change in catch by vessels below 24m	-142.28 for other gears	No change	64.15 for other gears	No change
		Impact on fishers in total employment	Minor	No change	Minor	No change
		Impact on fisheries employment of vessels below 24m to total employment	Minor	No change	Minor	No change
		Is a Small Island Developing State?	No	No	No	No
	Cost vs benefits	Change in yellowfin tuna catches (tonnes)	-14,009.21	-13,710.79 for purse seine and no limits for other type of gears	-16,770.92 for purse seine and no limits for other type of gears	-13,710.79 for purse seine and no limits for other type of gears
		Change in value of yellowfin tuna catch (million USD)	-37.03	-36.24*	-44.33*	-36.24*
		Change in number of port-calls	-8	-8	10	-8
		Change in % of fishers' employment	Minor	No change	Minor	No change

Seychelles small-scale handline fishers would have to reduce their yellowfin tuna catches from 56.89t to 15.86t, and 42.48t in the EU and Korean proposals, respectively. In the Seychelles, the proportion of small-scale fishermen in the overall fishery is low, and hence the impact by the reduction is low compared to Mozambique, but while the fisheries employment is low, the indirect employment is likely high due to processing and port activities. On the other hand, Seychelles' will experience a significant impact (Table 5.2), potentially losing US $22 million to US $58 million from the first point of sales from the reduction of catches, primarily from purse seine fisheries. Seychelles will also lose around $0.38 million from access agreements which allows foreign flag fleets to fish in Seychelles waters. This estimate is based on the EU access agreement as other foreign flag access agreements are not publicly available as they are negotiated by fleets rather than the government (Sinan & Bailey, 2020). In 2018, total Government revenue excluding grants in Seychelles was $536 million (OECD, 2021a). Thus, the reduction in catch volumes and sales revenue in the proposals is around 4% to 10% of the total government revenue.

Furthermore, as Seychelles is a port-state where the bulk of purse seine catches in the Indian Ocean are landed, any reduction in purse seine catches will significantly impact Seychelles' economy. Under the proposals, the number of calls to Seychelles port reduces by 59 to 128 based on the level of landings and port calls. This reduction will significantly impact ancillary activities related to port calls, such as bunkering facilities, gear repair, port-related work and its labour force. For example: in 2018, Seychelles Petroleum Company earned US $397 million, and around 60% of its revenues were from refuelling fishing vessels, and around 25% of the fisheries' employment is related to port activities (Lecomte et al., 2017). It is estimated that Seychelles government will lose around 5 to 10% revenue from petroleum sales tax, which constitute around 8% total government revenue. In 2019, around 283,000t of tuna was received in Seychelles port (including Seychelles and EU flagged vessels) and around 155,000 was landed in Seychelles and the rest was transhipped (IOTC, 2020e). Even though the number of port-calls will reduce with the decrease in catch limits, vessels might stay in port for longer durations if the catch quotas run out before the end of the year with the reduced catches. These will increase revenue from port

fees and other services provided to these vessels. Furthermore, Seychelles also has a processing cannery, which processes around 100,000t of tuna a year. Even though there is a reduction of 23,000t in purse seine fisheries under the proposals and the adopted Resolution, it is assumed it will not have a significant impact on the processing sector and the trade of tuna and tuna-like species from Seychelles. This is mainly due to high landings in Seychelles port and the nature of trade of tuna in Seychelles.

To test whether a disproportionate burden exists for developing States, I compared the potential outcomes for Mozambique and Seychelles with those of the EU. The European Union, which catches around 23% of yellowfin tuna caught in the Indian Ocean will lose around $37 to $44 million in first point sales due to the reductions. However, this amounts to a loss of around 0.019% to 0.022% of the total revenue earned by the EU ($199.4 billion USD) (EU, 2021). As Mozambique does not land much tuna, the impact on Mozambique, in terms of loss of sales revenue is low (around 0.006% of the total government revenue of $2.2 billion USD)(UNICEF, 2019). As illustrated, the impact is significant for Seychelles. The revenue loss from the first point of sales equates to around 4% to 10% of government revenue. Adding to it, is the impact from a reduction in port activities, and ancillary activities and fees from access agreements Table 5.2. Even though the catch reductions in absolute terms are lower for Seychelles compared to the EU, the burden placed on Seychelles is significant.

The 'vulnerability' indicators can also play a significant part in the CMM development. Mozambique is ranked 39 in Commonwealth (CW) vulnerability rankings (CW vulnerable index = 3.5: Atkins et al., 2000), and fisheries contribution to GDP is higher than most developing coastal states in the Indian Ocean. Even though Mozambique has a large exclusive economic zone (104,300km2: Chacate & Mutombene, 2015), fish consumption is low among Mozambiquans (FAO, 2019) and there is significant food insecurity (Table 1: FAO, 2020). Furthermore, artisanal and small-scale fishing vessels' employment is minor compared to the total employment. Seychelles is ranked 21 in CW

vulnerability rankings (CW vulnerable index = 16.2) and around 15% of the GDP comes from fisheries.

5.5 Discussion

Differential treatment of States exists to provide equitable access, utilization, and trade for developing States to develop their economies and manage resources sustainably, including fisheries and especially highly migratory and straddling fish stocks (French, 2000; J. Lee, 2015). All States are required to recognise the differences in their development status, needs, capacities and resources and, in cooperating to ensure the sustainable conservation and management of shared fish stocks, strive to level the playing field. However, 20 years since UNFSA entered into force, differential treatment has not been defined or implemented. In this paper, I developed a structured framework to remedy this oversight and used it to demonstrate that in the IOTC a level playing field has not been achieved in CMMs.

The framework requires the assessment of proposed CMMs against indicators identified as relevant to the particular context. States would then base negotiations on the proposed CMM on these assessments. Applied here, the framework has shown differential impacts on the three candidate States that should be addressed. For example, while Mozambique's very small catches could be exempted from limits or even given an increased limit with little impact on the overall yellowfin catches in the IOTC. This would also maintain the livelihoods of small-scale fishermen and food security. The impact on small-scale fishers in Seychelles could be mitigated by establishing a national quota and allowing States to assign it to different gear types. The impacts on its port could be mitigated by differentiating Seychelles and other developing States. However, the loss in revenue from access agreements will be difficult to resolve as most of the distant water fishing fleets are from developed States. Financial compensation could be an option in these circumstances, but given the financial troubles within IOTC membership, this is unlikely As of December

2020, IOTC had an outstanding contribution of $3.6 millions accrued over the years. The annual budget of IOTC is around $4.4 million per year (IOTC, 2021b).

In summary, both Mozambique and Seychelles will bear a disproportionate burden and will face significant social and economic impacts compared to the developed EU, if they implement the yellowfin tuna Resolution. Even though the reduction in yellowfin catches is higher for the EU compared with Mozambique and Seychelles, the burden of reduction is more severely felt by the developing States. By recognizing this disproportionate burden, and the impact on small-scale fisheries and the vulnerability of developing states, the process will facilitate better transparency in decision-making and enable developing coastal countries to participate and contribute to the negotiations.

Importantly, the framework proposed here could be applied and/or modified to be adapted to each RFMO. Identifying the management objectives in step 1 and step 2 would not consume additional resources or negotiations in RFMOs. Negotiations to mitigate the economic and administrative impacts would be difficult, but transparency could tilt the power imbalance in RFMOs (Davis & Hanich, 2020; Fischer, 2020). Mitigation mechanisms could include a delayed implementation, exemption of most vulnerable States and small-scale fishers, differential treatment and providing administrative or financial relief as reflected in Articles 25 and 26 of UNFSA.

Differentiating countries based on potential impacts of management measures is a data-intense process. In 2012, the FAO, World Bank and Worldfish launched a program called “Hidden Harvest", meant to elucidate the magnitude of global fishing with an emphasis on data-poor fisheries, particularly the small-scale sector (Kelleher et al., 2012). Fundamentally, what is counted in fisheries, gets counted in policy, and thus from the perspective of global, regional, and domestic marine governance, data-poor fisheries, and the fishers, households and economies that depend on them, are often left out of the scope of decision-makers who do not, and cannot, understand their importance (for example: the case of Galician shellfish fisheries (P. Pita et al., 2019)). When dealing with issues like

differentiated responsibilities, demonstrating disproportionate or adverse impacts requires data, and for tuna fisheries, the small-scale sector, and catch destined for local markets, continues to be under-represented.

An additional consideration is that ownership of data is democratized. By this, I mean that those who collect, and control data often have the ability to wield those data to serve their interests. In the IOTC, data equity could mean that socio-economic data is collected at a national scale and is available to non-technical users. This allows users to elicit different interests and improve transparency and facilitate equitable decision making (Willis & Bailey, 2020).

It is also important to correctly and comprehensively attribute catches to coastal States when catches occur inside their waters as well as the responsible flag State. Failure to include aggregated catch location data in regional and global reporting systems may undermine coastal States' sovereign rights over catches within their EEZs.

The framework could be further enhanced with new socio-economic data and indicators that could better define the criteria listed in Article 24(2) of UNFSA. Socio-economic data collection in the IOTC (Macfadyen & Defaux, 2019) and in the FFA (FFA, 2020) could be focused to achieve the objectives of UNFSA for developing States. In this paper, the number of small-scale fishers is based on national level figures. If data could be disaggregated by species, the results from the framework would be further improved to reflect the impacts on the fishery.

Historical fishing powers have dominated the ocean for decades. While the LOSC and UNFSA paved the way for an equitable and efficient utilization of ocean resources, efforts in RFMOs to level the playing field have been met with resistance, mainly due to lack of a mechanisms to operationalize UNFSA. The framework presented here allows the common responsibilities to conserve and manage the ocean resources to be elicited and identifies ways to mitigate the impacts on developing States. This could help to reduce the

continuous political negotiation in RFMOs by developing States to mitigate the impacts and systematize them according to the legal obligations to UNFSA.

5.6 Conclusion

To facilitate an equitable and efficient utilization of ocean resources, create a new economic order as laid out in LOSC, and manage highly migratory and straddling fish stocks, States need to cooperate in good faith. To do so, States need to understand better the impact and/or costs and benefits arising from CMMs, especially for developing States, as laid out in UNFSA. Currently, the CMMs favour countries with relative power and better human and institutional capacity. The framework I have proposed will enable a better understanding of the relative impacts of measures in line with the values enshrined in LOSC and UNFSA. This better understanding can then be used to negotiate transparently for CMMs that better support equitable outcomes from RFMO management. The framework could further be adapted based on the needs of RFMOs, and species concerned and will improve transparency and facilitate an equitable decision-making process.

6 CONCLUSION: EQUITY V. COLONIALISM

"Access to ocean resources and sectors is rarely equitably distributed. Many of their benefits are accumulated by a few, while most harms from development are borne by the most vulnerable" - (Osterblum et al., 2020).

6.1 Introduction

Just days ahead of an Indian Ocean Tuna Commission (IOTC) Special Session to discuss options to move yellowfin tuna management forward, the UK-based *Guardian* published an article headlined, *"EU accused of 'neocolonial' plundering of tuna in Indian Ocean"* in March 2021. The article further elaborates on how the EU proposed insufficient measures to tackle overfishing of yellowfin tuna, despite being the largest harvesting entity. The divisions over yellowfin tuna management within IOTC are clear. On the one hand, a coalition of coastal countries, including those whose economic development is linked to colonization, are calling for equitable ocean governance and on the other hand, the EU is continuing to defend the interest of fishing fleets that disproportionately drain the region of its resources and fish unsustainably.

This thesis set out to investigate why and how RFMOs such as the IOTC have been unable to adopt and implement equitable tuna governance mechanisms. In particular I asked: i) what are the main socio-economic interests, influences, and political interests of IOTC members and how are these reflected in IOTC decision-making?; ii) what are the main institutional, political, and scientific barriers in IOTC?; iii) how may economic incentives by the public (government funded subsidies) contribute to inequitable tuna governance in

IOTC?; and iv) how can international legal instruments aid equitable tuna governance mechanisms in IOTC (See Appendix C: Figure ST.1).

From the research in this thesis, it is evident that that there is a common barrier for equitable tuna governance in the Indian Ocean – (*Neo)colonialism and imperialism*. Extra-territorial countries (DWFN), predominantly the colonial and imperial countries (EU, United Kingdom, France and Japan) as well as other powerful Asian countries, notably, the Republic of Korea, and China have benefited on the back of the developing countries. There are bodies of interdisciplinary scholarship that describe what we might generally call the "neo-colonial" or "development-era" economic and political relations of former colonizers and former colonies (Arturo, 1995; Frank, 1966; Rodney Walter, 1972; R. Rojas, 2007). However, the work of the late Immanuel Wallerstein (1974) remains relevant, as the world economy continues to be structured by national cores and peripheries[19], even if the rigid structure of these Cold-War-era categories need to be reframed to accurately capture the nuances of 21st century power relations. In regional terms, the Indian Ocean Region (IOR) remains a zone that is disproportionately exploited by former colonizers for the last commodity (tuna) frontier (Campling, 2012). Although developed countries represent deep interests in the fishery and boast the most expertise in fisheries management, their efforts have clearly never delivered sustainability nor equity.

The IOR has been a geopolitically and economically central region for thousands of years, connecting cultures and economies across the vast Asian continent and beyond. In the last 500 years, waves of European naval states made their way into the region, the IOR became an essential part of the distribution of power and resources that formed the modern international system. The Indian Ocean has been, and remains, strategically important for

[19] In Immanuel Wallerstein's (1974) world systems theory, core are dominant capitalist countries that exploit peripheral countries for labour and raw materials. Peripheral countries are dependent on core countries for capital and have underdeveloped industries. Semi-peripheral countries share the characteristics of both core and peripheral countries.

the global North to flex their economic, cultural, and social objectives (Fatima & Jamshed, 2015; Rahman et al., 2021).

For production of tuna and tuna-like species, the Indian Ocean is the second most-productive ocean apart from the Western Pacific (Raiana et al., 2020). However, it is more than just tuna that's important in the Indian Ocean. In terms of global trade, the Indian Ocean remains a major channel linking manufacturers in East Asia to markets in Europe, Africa, and the Persian Gulf. Freight through the Asia-Europe shipping route, via the Indian Ocean, surpassed the transpacific route in 2013 as the world's largest containerized trading lane (UNCTAD, 2017). In addition, more than two-thirds of the world's oil shipments, one-third of its bulk cargo, travel the ocean's busy sea lanes annually (MOD, 2009). The IOR is also among the top proven energy reserves including crude oil, gas (BP, 2021), and uranium concentrate (Hall & Coleman, 2012). Further, the IOR also possess the world's main commerce chokepoints: Bab el Mandeb, the straits of Hormuz and Malacca (Kaplan, 2009).

It is no accident that colonial political economic relations developed over centuries have contributed to reducing the IOR to a virtual playground for core and now semi-core countries, at the direct expense of the peripheral states in the region and whose cultures and economy rely most heavily on the sustainability of the IOR. One of the world's top traded marine species, tuna (its value in the Indian Ocean surpasses $4 billion annually (Raiana et al., 2020)) is not immune from the geopolitics and resource extraction dynamics by the developed countries. At the moment, the main beneficiaries of this enormous wealth from the Indian Ocean are not the people of the Indian Ocean, but the global North (as evident from the results in Chapter 2 and Chapter 4). From the lessons learnt in the past, we need to first address the unlevel playing field created by the existing conditions and the structural and institutional barriers to deliver a complete equitable tuna governance in the Indian Ocean.

6.2 Neocolonialism and capitalist extraction

From the research in this thesis, there are four distinct lines of evidence that demonstrate how extra-territorial countries (DWFN), predominantly the colonial and imperial countries (EU, United Kingdom, France and Japan) as well as other powerful Asian countries, notably, the Republic of Korea, and China have benefited from the tuna governance system. They have done so by: i) focussing the decision-making process on wealth accumulation, not the sustainability of stocks; ii) distorting future fishing opportunities to maintain wealth accumulation; iii) misleading the institutions, the political system and science; and iv) creating barriers to implement legal obligations mandated by international law. These are discussed in detail below:

6.2.1 Wealth Accumulation

Until the adoption of the Law of the Sea Convention (LOSC) in 1982, former colonialists and imperialists conquered the oceans and enjoyed its wealth freely (Mancke, 1999). However, with the creation of EEZs under LOSC and the dissipation of marine resources in those countries' waters, the strategy of wealth accumulation changed to develop 'sustainable fisheries agreements' and 'sustainable fisheries partnerships' to access developing country waters using public funds (as evident from results in Chapter 2, 3 and 4). These extra-territorial countries elaborate the importance of sustainability and benefits arising from it for the entire human race in public discourse, but when it comes to practice, the focus is on wealth accumulation instead (Andriamahefazafy et al., 2019). The extra-territorial countries claim that this fishing access agreements provide government revenue to develop coastal countries and enable them to use the resources at maximum sustainable levels (Iheduru, 1995; Le Manach et al., 2013). However, for coastal countries on the ground, the results are: unfair competition, reduced size of fish, reduced revenues for local fishers and lack of seafood self-sufficiency (Andriamahefazafy et al., 2019; Iheduru, 1995). Further, there is no importance given to manage species vital for the food security of coastal

countries as they are low-valued species as evident from the high number of over-fished stocks and low number of management measures (Chapter 2).

The findings of this research reveal that tuna management decisions (including who can catch how much in the future, i.e., allocation) in the IOTC are not necessarily based on tuna management but are tied to broader geopolitical and diplomatic relations including foreign aid, claims to extra-territorial sovereignty and commitments to other development projects (delegate 9, Chapter 2), at the expense of resource benefits for the coastal communities. The wealthy extra-territorial countries use their political instruments such as foreign embassies, attachés, and bilateral engagements to bolster and maintain their power and influence IOTC decision-making (Figure 2.2 of Chapter 2). Further, the regulations adopted by the extra-territorial nations (often the market where most tuna is traded) are misused to influence decisions by developing countries (as evident from the results of the interviews in Chapter 2). Interestingly, these countries also use higher levels of authority such as the United Nations to bolster their agenda (Chapter 2) of wealth accumulation.

These power relations and the explanations that buttress them are remarkably similar to the kinds of claims made by European powers during the heyday of colonialism and the trans-Atlantic slave trade. As Walter (1972) describes, the European powers couched their arguments in economic and universal terms.

> *"It was morally evil, but it was economically good for Africa."*

Confronting the uncomfortable continuity of economic determinism and manufactured liberal 'equality' within regional organizations is a minimum requirement of decolonizing international relations. Furthermore, it also requires building equitable relations instead of 'equal' relations between inherently unequal partners. Unsurprisingly, the legacies of this wealth accumulation and human rights violations by the European powers remain a huge impediment in the development of the African countries (Mekoa, 2019).

6.2.2 Distorting future fishing opportunities

The analysis in this thesis has also revealed that the extra-territorial countries have continued to use neo-colonial and capitalistic tools to distort future fishing opportunities. Firstly, catch history (how much a country has caught in the past) remains the principal criterion for deciding how much a country will be able to fish in the future in the IOTC. Yet, the extra-territorial countries have enabled themselves distorted catch history using public funds, where private funds are deemed unprofitable (Chapter 4). For example, research in this thesis reveals that 82% of the Spanish and 57% of the French gross capacity of purse seiners were constructed or modernized through subsidies provided by the EU's public funds (Chapter 4). The purse seine vessels caught 96% of the 240,000t of tuna caught by the EU fleet in the Indian Ocean (Chapter 4). China, Republic of Korea, and Japan follow a similar pattern in the Indian Ocean where multimillion dollar companies receive public funds to maintain fishing presence (as seen from the anecdotal evidence in Chapter 4). Catch histories by these countries are built upon privately unprofitable, but publicly supported fisheries mainly by the wealthy extra-territorial countries.

Second, extra-territorial countries have claimed that catches in coastal countries' waters are part of their catch history because they paid for access to and harvested these catches (as evident from the synthesis of IOTC allocation negotiations in Chapter 3 and Chapter 4). However, this claim is at odds with international law where coastal States, whether a developed or a developing country, have sovereign rights to living marine resources such as tuna in their waters and complete management control over these resources. In the latter years of the IOTC allocation negotiations, the EU has agreed to a marginal role for the attribution principle, arguing that 10% of the resource taken in coastal countries waters be attributed to the coastal country and the rest to the flag State (predominantly DWFN) (Chapter 3). However, other extra-territorial countries have not agreed to this EU position.

Finally, the extra-territorial countries have also demanded payback for their past contributions (for science and the functioning of the IOTC) through future fishing opportunities (interview of delegate 9 in Chapter 2 and results in Chapter 4). Apart from catch histories, the EU's proposal on fishing opportunities submitted in 2019 includes a correctional factor to which rewards countries for contributions made both in kind and through financial support for scientific research and dissemination of results; capacity building in developing coastal states; imports of tuna products, and the public and/or private sector investments made in the tuna sector (Chapter 4). In this way, less developed participants in the IOTC, who have not had the financial capacity to contribute in large amounts to the functioning of the IOTC, will continue to be held back from economic development through the fishery if their future fishing opportunities are forever tied to their previous and ongoing lack of financial capacity.

Together, these tools will ultimately skew a bigger slice of the total allowable catch to the extra-territorial countries at the expense of countries who have not had a chance to build a fishery, countries that are dependent on fisheries for food security, livelihoods, and their economy; and countries that have limited economic activities. Half of the IOTC member countries catch only 4% of the tuna and tuna-like species caught in the IOR (As evident from the results in Figure 4.1 in Chapter 4). These countries, who are often involved in armed conflict and dependent on tuna resources for food security, are sidelined and the voices of their communities are unheard through various mechanisms employed by the extra-territorial countries (Chapter 2).

6.2.3 Misleading the systems

Historically, the European empires legitimized their rule by insisting that the natives did not have the competency to exercise sovereignty yet (Adler-Nissen & Gad, 2017) and that they were contributing to humankind by developing concepts of modernity (Arturo, 1995; Parasram, 2018; C. Rojas, 2016). The formal political decolonisation theories made sovereignty - the entry ticket to international society (Adler-Nissen & Gad, 2017).

Sovereignty gives the exclusive right to exercise, within a territory, the functions of a nation-state and answer to no higher authority (Esperson et al., 2002; Parasram, 2014).

However, the case in the Indian Ocean is different, where all pre-agreed norms and systems are distorted to maintain power and influence by the same countries that developed these concepts. In this respect, the islands accreted by France in the Indian Ocean (part of the European empire), Mayotte stands out (results from Chapter 3). Geographically, Mayotte belongs to a four-island group, the Republic of Comoros. The Comoros was admitted to the United Nations in 1975 "as a sovereign state composed of four islands including Mayotte (UN, 1988) and subsequently urged France to return Mayotte back to Comoros (UN, 1992c, 1994). There were attempts to reunite the four island states, and in fear, France accelerated the integration process and in 2014 was accessed as a French Overseas *départements* and regions. Ironically, Mayotte is neither France metropole, nor does it possess French ancestral roots (Lambek, 1993). Nowhere in the *outre-mer* is French spoken less than in Mayotte, which practices Islamic Sharia Law, and which is economically unproductive as the metropole (K. Miller, 2013). The people of Mayotte consented to colonization primarily in the hope of economic prosperity.

The case is similar with the people of La Réunion. The people of Réunion island have decided to remain as a department of France since 1946 (Houbert, 2008). The island tends to use its hegemonic status within the region to influence other islands formerly controlled by France, to reconsider acquiring department status (Rankhumise, 2008). At the same time, France continues to use the island as its gateway to advance French diplomatic and economic influence in the IOR (Rankhumise, 2008). Given that there are not enough economic enterprises to support the population (Houbert, 2008), the French government provides considerable social security and unemployment benefits (Vergès, 2016). This provides the Réunionnais the purchasing power similar to the citizens of metropole (Vergès, 2016). Thus, economic interests reinforce historical and cultural considerations in the willingness of others in the Indian Ocean to accept the political status of their French 'sister island' (Vergès, 2016).

On the contrary, Chagossians have been knocking on the door of every international avenue, to argue that they are ready to claim their sovereignty of the Chagos Archipelago back from the United Kingdom. The LOSC arbitration panel has concluded that Mauritius has legitimacy in their claims for the territory (Sand, 2015); the International Court of Justice (ICJ) declared in its advisory opinion that United Kingdom did not complete decolonization and is under obligation to bring to an end the administration of Chagos Archipelago (ICJ, 2019); the United Nations General Assembly (UNGA) has reaffirmed that the Chagos Archipelago forms an integral part of the territory of Mauritius (UN, 2019b). Despite the appeals by Chagossians in various international bodies, the United Kingdom has shown little empathy and maintains their stand: they might be willing to consider ceding sovereignty to Mauritius in the event that the ocean space was no longer needed for Anglo-American defence purposes (UN, 2019a). Sovereignty for the Chagosssians is parked until mother earth is peaceful.

The analysis in this thesis further reveals that the Food and Agriculture Organization of the United Nations have benefited immensely from funds paid by developing countries to support the operation of the IOTC (Chapter 3). Even though these members have sought to separate from FAO, the organization has done everything in its power to maintain this institutional link. By doing so, one of the most important fishing countries (Taiwan) cannot be recognised as a member of the IOTC due to the "one China" policy in the United Nations. This lack of recognition calls into question the legitimacy of the IOTC. Despite this policy, UNGA Resolution 2758 (UN, 1972b) to admit China into the United Nations did not explicitly include Taiwanese representation as part of China (Chang & Lim, 1996) Furthermore, other than a civil war from 1945 to 1949, Taiwan has never been part of a Chinese empire, nor has any racial connections to mainland China (Jacobs, 2013).

The situations facing the Chagos Archipelago, Mayotte, La Réunion, and Taiwan illustrate very different contexts, but are grounded in neocolonial geopolitical relations. The ability of France and the UK to claim a territorial presence in the region gives them unfair privilege

and power in making decisions in the Indian Ocean. Furthermore, the results of the analysis in the thesis demonstrates that colonial manipulation of the decolonization system poses significant legitimacy concerns of Indian Ocean tuna management (Chapter 3). Mauritius and Comoros demand that due to the illegitimate sovereignty of the Islands in the Indian Ocean, France and the United Kingdom should not be allocated any future fishing opportunities (Chapter 3). Taiwan demands that they should be awarded allocation despite not being a member, due to its long-term presence in the Indian Ocean (Chapter 3).

The science which forms the foundation of management measures in the IOTC are also distorted to favour the extra-territorial countries (as evident from the results in Chapter 2). In some instances, the political hierarchy in these countries withdraw and prevent scientific findings from being reported in RFMOs (Polacheck, 2012), data submitted by the developed and DWFN are implausible (as evident from the Spanish data submission demostrated in Chapter 2), skewing the outcome of scientific processes. Furthermore, these developed countries often verify the findings of the scientific committee through internal assessments while developing countries that do not have the capacity (almost half of the interviewed countries) and are solely dependent on the scientific findings of the RFMO (Chapter 2). Additionally, science continues to be disproportionately levied at species of interest to the extra-territorial countries, with those species that are important to coastal States remaining data-poor (Chapter 2). As a result, the system is distorted, and coastal countries second-guess the outcome of the IOTC scientific process.

6.2.4 Barriers to implementing legal obligations

An additional conclusion in this thesis revolves around the judgements of the international courts and the international law proscribing equity in transboundary fisheries, especially taking into account the interests of disadvantaged and dependent nations (Chapter 5). In particular, I focussed the research in the thesis on UNFSA, which sets out an obligation for differential treatment for disadvantaged communities, including, but not limited

developing States, artisanal and small-scale fishers and women fish workers, indigenous communities, and SIDS. However, 25 years after the adoption of the Agreement, there is no mechanism to implement this differential treatment for disadvantaged nations for an equitable playing field. This is common evasion tactic used by developed countries- to evade international legal obligations (Búzás, 2016). Even though there is an obligation placed on the developed countries, if there are no prescribed mechanism for implementation, those States are not literally incompliant.

Due to a lack of technical and institutional capacity, the peripheries are not able to develop and implement such a framework despite their repeated calls in various Organs of the United Nations (Chapter 5). Without a framework, all States are treated equally resulting in a significant disproportionate burden on peripheries who are just beginning to extract resources or who are significantly dependent on the resources. The pairing of liberal international commitment to equality and the neo-colonial geopolitical interests of extra-territorial players works to ensure that equity is not possible in the IOTC. Results in Chapter 5 demonstrate that even though the reduction of yellowfin catches by the EU is higher compared to Seychelles and Mozambique, the burden of reduction is more severe for the developing States in the IOTC. If mechanisms prescribed in international agreements are implemented to the letter, developed countries will have to reduce their fishing capacity or change their fishing strategy and fish in the high seas (with increased costs) or pay higher fees to the developing coastal States for access to their waters. So, there is no appetite from the developed countries, in particular DWFNs, to change the situation for the developing countries.

The lack of capacity in developing countries is also taken advantage of by the developed countries. In the negotiations for conservation and management measures, the developing countries are led to believe and accept when a core country purposefully misinterprets or misquotes international agreements to favour the developed countries, in particular the extra-territorial countries. For example, in the Indian Ocean Tuna allocation negotiations,

in the written responses to the coastal states led by the Maldives (IOTC, 2017a), the EU states :

> *"there is no basis in the IOTC agreement or in UNCLOS/UNFSA for introducing the notion of SIDS into a discussion of allocation principles within the IOTC[3]. With regard to so-called "vulnerable economies", the notion is not found in the IOTC agreement which talks about developing countries and remains too imprecise to be introduced into the IOTC through a Resolution."*

The footnote 3 states:

> *"Contrary to what the fourth recital indicates, there is no reference to Small Island Developing States (SIDS) in Article 24 of UNFSA. This is also relevant in relation with paragraph 7 d) which seems to duplicate the concept with the reference to both SIDS and vulnerable economies."*

These statements are in direct conflict with the law as written. The foundation of article 24 of UNFSA is to recognise the special requirements of the marginalised, vulnerable and resource dependent developing States, *in particular SIDS* (article 24(2b)). However, the EU portrays to the Commission, that these paragraphs are non-existent and should not justify differential treatment. Furthermore, the EU also stated in the document:

> *"Moreover, the proposal completely ignores the rights of those i) who have long standing investments in the region, ii) who discovered new fishing grounds and developed fisheries in the Indian Ocean, iii) who developed local processing and fishing industries in developing Indian Ocean coastal States, iv) who took financial and social risks and developed local employment…"*

However, these are in fact not rights enshrined in international law, but merely assertion of power resulting from historic fishing patterns. Similar, repeated statement like these generate doubt among the negotiators (usually fisheries managers) concerning what constitutes an internationally recognized right and a fishing pattern. In the end, there are different schools of thought as to whether the economic activity of EU countries, including historic fishing patterns in the region, justify compensation through future fishing opportunities. In international negotiations withholding information, misrepresentations, propaganda, delusions and deception enable negotiators to build power and tilt outcomes in their favour (Olekalns et al., 2013). These deceptive and misrepresentational tactics are the norm for internationally trained negotiators, but not among the fisheries managers and other government officials from coastal states who do not have adequate capacity to recognise these negotiation strategies.

6.3 Decolonizing the ocean

In general terms, when decolonization of political geographies is discussed, its often linked to land – not to the ocean. However, one aspect is often forgotten from the debate and analysis is that the outcome of decolonization through imperial principles such as the *uti possedetis* principle, the *usque ad coelum maxim* principle[20] and various other territoriality principles (Ranganathan, 2020). These principles allow that sovereignty of a State automatically entitles an ocean boundary of a maximum of 200nm (based on various principles in LOSC) if connected to an ocean (UN, 1982). The area beyond these borders is left to the traditional European concept of freedom of the seas.

However, in this thesis I have shown that within those sovereign boundaries remnants of colonialism are still flourishing. With imperialism and extractive capitalism, sovereignty

[20] *Uti possedetis* provides new sovereign States to maintain their boundaries at the time of independence. See Shaw (1997) for more details. *Usque ad coelum maxim* provides the owner of the land the air above the surface of the soil. See Abramovitch (1961) for more details.

has become just a tool through which to advance neocolonial interests in the ocean as well as on land, without much entitlement for the peripherals. The DWFNs, or extra-territorial states, have continued to extract resources from coastal developing countries, often times with the acceptance, willingness and participation of the coastal developing countries. The thesis also has shown that in order to compete in the capitalist markets, often times the developing countries duplicate the extractive methodologies utilised by the developed countries even though they end up in an economic loss (Chapter 4).

The extra-territorial countries (in most cases former colonialists and imperialists and recently the Asian countries, Republic of Korea and China) have misused the developing coastal countries to develop their economies and continue to do so in different forms as illustrated above. Just a week before Professor Fábio Hazin (Chair of the UNFSA Review Conference and head of delegation of Brazil to International Commission for the Conservation of Atlantic Tunas), passed away during the COVID-19 pandemic, in an online conversation discussing the framework for common but differentiated responsibilities, he said:

> *"The developed will never change their behaviour for our betterment. It is us who must change the course we are in for ourselves".*

So how do we bring about that change? Without addressing the context, that is the structural and institutional barriers, the social, economic and political context, there is no equitable tuna governance in the Indian Ocean. Through the findings of this thesis I offer some solutions.

6.3.1 Self-sufficiency and less dependency

The dependency of developing countries on developed countries, such as through foreign aid (including grants and low-interest loans) for development, is an additional shortcoming of the current regime that this thesis has revealed (Chapter 2). The developing countries

are forced to make decisions that compromise long term economic gains for short-term economic objectives often times compromising sustainability of the resource. Countries are forced to sell access agreements at values at much lower levels than the real value of the extracted resource without investing in developing a local fleet to harvest the resource to provide economic benefit in the Indian Ocean, compromising food insecurity(Teh et al., 2017). Furthermore, the common belief that the revenue generated from these access agreements will in return benefit national food security issues, maybe be misguided due to the trade-off with coastal communities who experience lack of access and reduction of wealth resulting due to decreases in stock size(S. F. W. Taylor et al., 2019). Without better ownership of the resources for the coastal countries, these dynamics will never change. For least developed countries that rely on international aid, the negotiations to access their waters need to be decoupled from development negotiations.

6.3.2 Improved institutional governance

As the IOTC is part of the FAO governance framework, FAO shoulders a huge responsibility to improve governance of the organization (Chapter 3). However, FAO has remained on the sidelines without offering significant assistance to the IOTC and the challenges it faces. FAO considers the IOTC a "project" and its institutional link remains a huge obstacle for the organization (the modernization of the agreement and inclusion of Taiwan: Chapter 3). The peripheries believe that by maintaining the IOTC's institutional link with FAO, they will be provided some sort of security for their interests, while in reality there is little that FAO can do in a multilateral organization. Some developing countries fear that withdrawal of the institutional link might result in retaliatory actions from FAO including withholding of aid (Chapter 3). However, the gains from a modernization of the IOTC Agreement, including a better reflection of the rights and responsibilities guaranteed or at least strived for in other international agreements, could address all these concerns. None of the other tuna RFMOs are under the FAO and recently the WCPFC and the ICCAT has modernized their agreement including better reflection of the rights and responsibilities of developing coastal States. This has facilitated the

negotiations to mitigate the impacts of coastal States in the adoption of conservation and management measures (Chapter 5).

6.3.3 Collective bargaining

The developing coastal countries need to reclaim their rights in the Indian Ocean, and to do so, they need to tilt power into their favour by working together as a collective. As seen in this thesis, the developed countries and DWFNs have used their power to affect, and even direct, the practices of developing countries, and have misused the systems to ensure decisions remain in their favour. The power of developed countries and DWFNs accrued from the colonial era continues to be a barrier for establishing equitable principles. While acknowledging and understating that coastal States in the Indian Ocean have significant differences in their dependency, fishing objectives and aspirations for development (Chapter 2), should coastal States choose to operate as a collective, they would have potential to improve the ways in which they benefit from the resource and the system itself. The thesis has shown that the catch history is distorted by extra-territorial countries who have had the financial power to subsidize and fish in coastal waters (Chapter 4). This unfair advantage gives these extra territorial countries to obtain a bulk of the future fishing opportunities. However, the thesis has shown that the coastal States will benefit significantly if the catch in their waters is attributed to the coastal States (Chapter 4). This is per international law and if unified, despite their differences coastal States will benefit significantly (Figure 4.3 of Chapter 4). The WCPFC, the Parties to the Nauru Agreement (PNA) and the Pacific Islands Forum Fisheries Agency (FFA) are faring better due to a better ownership of the resource and due to the collective bargaining effort. There are significant differences among these countries, but when it comes to sustainability and the overall ownership of the resources, there is a collective approach.

The significant difference in the Indian Ocean is that the DWFNs have embedded in the tuna-value chain in the coastal countries. So, the real question is whether the leaders of the Indian Ocean stand up against the DWFNs for collective bargaining. For example: the

South West Indian Ocean Fisheries Commission (SWIOFC) has developed minimum terms and conditions for access agreements four years ago (Stop Illegal Fishing, 2017) but due to differences in opinions, lack of appetite in the Western Indian Ocean African States, and influence of DWFNs, in particular France and the EU, the implementation of this Agreement is on hold. A mediator such as Australia – the only developed coastal State in the Indian Ocean could be a bridge. Australia does not have a large fishing presence in the region (Chapter 2), but has been a key financial contributor for Group of 16 like-minded coastal States. Australia could bring impartiality and the knowledge and experiences from other RFMOs such as WCPFC and CCSBT to bring coastal States together.

6.3.4 NGOs and the market

While much of the thesis focuses on the role of the state in Indian Ocean tuna governance, non-state actors like NGOs and markets need to be mindful that the policies that they utilise to influence decisions can promote and reinforce systems and approaches based on colonial mindsets, structural racism, and capitalist extraction, all of which separate humans from nature (Bennett et al., 2021; Musavengane & Leonard, 2019; Sand, 2012). Coastal countries need to be weary and cautious of allowing NGOs to operate without demonstrating commitment to equity. As evident from the results in this thesis, NGOs and more recently markets have continued to play a crucial role in the decision-making process, even though they are focussed on high-value species (Chapter 2). NGOs and the retailers, wholesalers, and food processors need to take into account a human centrist perspective in their sourcing, funding and lobbying policies. NGOs and the market need to realise that millions of fishermen in the peripheral coastal communities who are dependent in the resource are disproportionately affected by the decisions that they lobby. Their lobbying efforts should prioritise small-scale fishermen, disadvantaged communities and communities that are dependent on the resource, rather than large-scale fishing industries that can fill up the supermarket shelves. As a further consideration NGOs and market actors would be well-advised to avoid oversimplification in their approaches within

the Indian Ocean. The complexity of the Indian Ocean requires nuanced approaches that are not generalizable.

6.3.5 Improved institutional and technical capacity

One of the most significant underlying issues among developing countries in the IOTC is the lack of institutional and technical capacity in scientific and management processes (Chapter 2, 3 and 5). To begin with, developed countries have scientific capacity to verify the results from the IOTC scientific advice through internal assessments due to biases. For developing countries, however, the advice is taken at face value due to lack of financial and technical ability to participate and contribute to the process. This knowledge gap is further widened by the inclusion of new methodologies into scientific assessments and management actions (for example: management strategy evaluations). As developing countries focus on meeting aspirations of development, adequate focus needs to be spent on improving institutional capacity in science and management. Utilizing collaborative efforts and coalitions, like the G-16, could help to share and disseminate best practices from the region such that coastal states could work to replicate such practices, recognizing of course that there might be significant differences (social, cultural, economic, and oceanographic).

6.4 Conclusion

In the IOR, there are more than 9.1 million fishers whose livelihood is dependent on the sustainability of the resource (Chapter 2). But these fishers find themselves operating in a region characterized by diverse fishing capacities, socio-political contexts, and colonial histories. There are SIDS, such as the Maldives and Seychelles, who do not have any other economic activity other than tuna and tourism. There are countries such as Madagascar, Mozambique, and Somalia with a coastline in the IOR yet with minuscule tuna fisheries but aspire to develop a fishery. There are countries such as the Mauritius and Seychelles

that have processing facilities with significant employment that relies on the sustainability of the resource. There are countries that do not produce any other protein, except fish for food consumption such as the Comoros and the Maldives. Finding governance solutions for all of these realities is complex, but fundamentally these solutions can only be found through a genuine decolonization process in the Indian Ocean.

This thesis has proved in various forms that without addressing the contextual barriers to equity, there is no hope for coastal communities to continue benefiting from the resources, and by extension, this means there is no hope for equity within the IOTC. Without equity, the status quo will prevail; the rich will get richer, the poor will get poorer. As Walter (1972) noted the core will continue to exploit the peripheries. Despite decades of ostensibly being in a post-colonial world, the neo-colonial tentacles continue to exert distortive power through legal, economic, and political means that result in a bad deal for coastal states and a disproportionately excellent one for the former colonizers. For that to change, there needs to be drastic shift from current development norms, that recognises countries are not equal in time and space, and equality will never produce equity. As professor Hazin said, we are the people to change our fate. Nobody else will.

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APPENDIX A: SUPPLEMENTARY TABLES

Table ST.1: Socio-economic indicators identified through various studies.

VESSELS	**Vessel attributes**	Expenses on food for the crew	**Revenue**	**Discards**
	Length of the vessel	Expenses on ice	Revenue earned other than fishing	Discards
	The tonnage of the vessel	Expenses for other consumables	The quantity of fish landed by species	Food waste
	Engine Horsepower	Other operational expenses	The quantity of fish landed per day	Others
	Age of vessel (year of construction)	Maintenance costs	Average Price of fish	The current market value of the fishing vessel
	Variable Costs	Bookkeeping costs	Revenue from landings	The cost to produce one unit
	Fuel costs	Vessel Insurance costs	Net profit	Asset value cf. historical high
	Type of Fuel	Legal expenses	The ratio of asset value to gross earnings	Borrowing rate cf. risk-free rate
	Price of fuel per litre	Gear replacement cost	Annual total revenue volatility	Source of capital
	Fuel consumption	**Fixed costs**	Annual Landings volatility	The functionality of harvest capital
	Lubricant costs	Fishing license costs	Intra-annual landings volatility	
	Lubricant consumption	The current market value of fishing licenses	Annual price volatility	Harvester organization influence on fisheries management & access
	Expenses on bait	Other fixed costs	Spatial price volatility	Harvester organization influence on business & marketing
				The proportion of harvesters in industry organizations
OWNER	**Owner char.**	The nationality of the owner	**Revenue**	**Costs**
	Ownership by gender	**Subsidies**	Owners engagement with fishing	The total amount of loan for fishing
	Age of owner	Direct monetary subsidies for fishing	Remuneration of owner	% of assets by loan for fishing
CREW	**Crew char.**	**Revenue**	**Social standing**	Education levels for crew
	Number of the active crew	Remuneration of crew	Captains earnings cf. regional average earnings	**Costs**
	Age of crew	Remuneration of captain	Captains wages cf. non-fishery wages	Social security, social costs and pensions per fisher
	Gender of crew	Average daily remuneration of one fisher	Captains social standings	Crew member insurance per fisher
	Professional years of work for the crew	Owner-operator revenue	Crew earnings cf. regional average earnings	Labour cost to produce one unit of catch
	% of indigenous persons or ethnic minorities in the fisheries workforce	Fair price for the crew	Crew wages cf. non-fishery wages	Migrant labour cost
	The economic activity of offspring (to measure intragenerational greying of the fishery)	Landings per crew	Access to health care for captains	**Participation**

	Foreign and local employment as captains	**Safety**	Access to health care for the crew	Participation in environmental and fisheries management issues
	Foreign and local employment as a crew	Safety for crew	Education levels for harvest captains	
EFFORT	**Effort**	Days at sea	**Effort char.**	**Gear char.**
	Number of fishing trips	Average hours at sea	Catch per unit Effort	Type of gears used in a fishing trip
	The average duration of the fishing trip		Length of the fishing season	Number of hours of fishing in each gear in the same fishing trip
PROCESSORS	**Processors Char**	Age of facilities	Other commercial costs including marketing	Final market wealth
	Number of processors	Sanitation	Revenue	Domestic trade
	Number of processing facilities	Regional support businesses	Gross revenue	**Support services**
	Size of processing facilities	Contestability and legal challenges	Return on investment	Days in stakeholder meetings
	Processing yield	Discards	Wholesale price cf. similar products	Industry financial support for management
	Shrink	Food waste	**Subsidies**	International shipping service
	Capacity utilization rate	Right to organize	Direct monetary subsidies for processors	Road Quality
	Product improvement	Forced labour	**Others**	Technology Adoption
	Capacity to export to premium markets	**Costs**	The current market value of processing facilities	Extension Service
	Final market use	Transportation costs	Market incentives	Reliability of Utilities/Electricity
	Borrowing rate cd. Risk-free rate	Processing costs (packaging, ice and other)	Added Value	Access to Ice & Refrigeration
	Source of capital	The operational cost of processing facilities	International trade	
OWNERS	**Process owner char**	Gender or processing owners	**Social standings**	Processing owners' social standings
	Non-resident ownership of processing facilities	**Revenue**	Processing owners earnings cf. regional average earnings	Access to health care for processing owners
	Age of processing owners	Processing owners' revenue	Processing owners' wages cf. non-fishery wages	Education access for processing owners
PROCESSING WORKERS	**Workers char.**	% of indigenous persons or ethnic minorities in the fisheries workforce	Person hours required to produce one unit	Processing workers' wages cf. non-fishery wages
	Non-resident employment as processing workers	Hours worked per week	**Social standing**	Processing workers earnings cf. regional average earnings
	Worker experience	**Revenue**	Education access for processing workers	**Safety**
	Gender distribution of workers	Fair wage	Access to health care for processing workers	Number of Deaths/accidents
	Age distribution of workers	Employment benefits	Processing workers social standings	
ANCILLARY ACTIV	**Ancillary char.**	**Ancillary owner char.**	Education access for processing owners	Revenue earned for ancillary workers
	Types of different ancillary activities	Non-resident ownership of ancillary activities	**Workers in ancillary activities**	Number of working hours for ancillary workers

	Number of ancillary activities	Age of ancillary activities owners	Number of ancillary workers	**Safety**
	Costs of ancillary activities	Gender or ancillary activities owners	Number of foreign/domestic labour	Worker safety
	Revenue earned from ancillary activities	Ancillary activities owner's revenue	Age of ancillary workers	**Workers Social standing**
	Use of technology in ancillary activities	**Owner Social standing**	Gender of ancillary workers	Education access for ancillary workers
	Subsidies	Ancillary owners' social standings	Work experience of ancillary workers	Access to health care for ancillary workers
	Direct monetary subsidies	Access to health care for processing owners	Paid and unpaid ancillary workers	Ancillary workers social standings
TRADERS	**Traders Char.**	**Revenue**	Direct monetary subsidies for exporters	International trade
	Number of wholesalers	Direct sales to customers (restaurant, resorts, hotels, etc.)	Direct monetary subsidies for fishmongers	Final market wealth
	Number of Exporters	Gross revenue	Market incentives	Wholesale price cf. similar products
	Number of fishmongers	Return on investment	**Trade workers**	Capacity of firms to export to premium markets
	Current market value of whole sale facilities	**Costs**	Number of trade workers	Ex-vessel to wholesale marketing margins
	Current market value of fishmongers	Transportation costs	Age of trade workers	Borrowing rate cd. Risk-free rate
	Discards	Fish market commission	Gender of trade workers	Source of capital
	Food waste	Other commercial costs	Employment benefits	Age of facilities
	Percentage of catch exported	Operational costs of wholesalers	Revenue earned for trade workers	Road Quality
	Number of intermediaries before reaching the final consumer	Operational costs of exporters	Fair wage	Technology Adoption
	Trade workers safety	Operational costs of fishmongers	Number of working hours for trade workers	Extension Service
	Number of Deaths/accidents	Subsidies	**Others**	Reliability of Utilities/Electricity
		Direct monetary subsidies for wholesalers	International trade	Access to Ice & Refrigeration
OTHERS	**Diversity of other sectors**	Economic Complexity Index	Gross Domestic Product (GDP) per capita	
	Index of Economic Freedom	**Economic returns**		
SOCIETY	**Fisheries household char**	Proximity of fishing communities or landing points to urban centres	Worker adjacency	Population
	Number of household members engaged in fishing	Fisheries household covered by social security	**society char.**	median income
	Number of household members involved in ancillary activities	Fishers owning a house	Household sizes	% of the indigenous population

	Number of household members involved in processing	**Use**	Age and gender	Leadership of community
	Number of household members involved in fishmongers	Consumption	Nationalities	Social Cohesion within the community
	Number of household members involved in wholesale	Non-consumptive use	Indebtedness	Business management influence
	Literacy level of household members involved in the fisheries sector	Food waste	Forced labour	Resource management influence
	Proportion of total household income from the fishing activity	**Rule of law**	Discrimination/gender	Employment of disadvantaged segments of the population
	Number of household fisheries as a sole income	Compliance with regulation	Marital status	Labour exploitation rate
GOVERNANCE	**Governance indicators**	Durability of access rights	Age distribution of workers	Level of non-tariff barriers
	Data	Flexibility of access rights	Minimum Age of workers	Governance Quality
	Data availability	Exclusivity of access rights	Proximity	Governance Responsiveness
	Data analysis	Proportion of harvest managed with rights-based management	Traditional use	Expenditure
	Availability of ex-vessel price and quantity information	Transferability of harvest rights	Concentration	Government expenditure
	Social Justice and Accountability	Security of harvest rights	**Structure**	Government expenditure on fisheries management
	MPAs and Sanctuaries	Durability of harvest rights	Self-governance structure (cooperatives/associations)	Subsidies
	Spatial Management	Flexibility of harvest rights	**Systems**	Management expenditure to the value of harvest
	Fishing Mortality Limits	Exclusivity of harvest rights	Landing Price System	Enforcement Capability
	Proportion of harvest managed under limited access	Latent Quota	Number of buyers	Management Jurisdiction
	Transferability of access rights	Excess capacity	Degree of Vertical Integration	
	Security of access rights	Right to organise	Level of Tariffs	
DEPENDENCY	**Nutrition**	**Employment**	Proportion of children	**Revenue**
	Dependence on Fishery as a nutrition	Percentage of fishers of total employment	Number of people below national poverty lines (% of the population)	landed value as a proportion of %GDP
	Fish protein as a total of protein	**Diversity**	Number of people living in coastal areas of elevation < 5m (% of the population)	Value of fisheries exports as a proportion % of exports
	Percentage of vitamin A, zinc and iron derived from fish	Additional income source	Proportion of land area of elevation <5m	
	Micronutrient replacement cost	**Livelihood**	Proportion of population living in coastal areas (100km from shoreline)	
A D	**Health**	**Economy**	Perceptions of the quality of public services, the quality of the civil service and its	**Participation**

			independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (-2.5–2.5)	
	Life expectancy at birth	Total GDP	Perceptions of the ability of the government to formulate and implement sound policies that permit private sector development (-2.5–2.5)	Extent to which a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and free media (-2.5–2.5)
	Access to health services provided by government institutions	**Education**	**Social Security**	Perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. (-2.5–2.5)
	Prevalence of HIV/AIDS and other STDs in population	Number of people who can read and write (% of population)	Access to social security (retirement) provided by the Government institutions	The amount of knowledge embedded within an economy, as measured by the diversity and ubiquity of products in a country
	Prevalence of addiction and dependent on alcohol/illegal stimulants	Number of tertiary aged people enrolled in tertiary education (% of population)	**Social Justice and Accountability**	**Land tenure**
	Access to water and sanitation	**Political Economy**	Perceptions of the extent to which agents have confidence in and abide by the rules of society, the quality of contract enforcement, property rights, the police, and the courts (-2.5–2.5)	Security of land tenure to home/property in coastal population
		Perceptions of the likelihood of political instability and/or politically-motivated violence (-2.5–2.5)	**Disasters**	
			Damages, losses and impacts from natural or manmade disasters	

Table ST.2: IOTC members ranked based on eight socio-economic indicators used in the study. Bin 1 represents the highest ranks for each indicator, and Bin 4 represents the lowest ranks.

Country	HDI	Fish. employment	Tuna import	Tuna export	Tuna export ratio	Tuna import ratio	Catch	Food security
Australia	1	4	1	3	3	2	3	2
Bangladesh	3	3	4	4	4	4	3	4
China	2	2	1	1	2	3	1	4
Comoros	3	1	4	4	2	3	3	1
Eritrea	4	2	4	4	4	4	4	3
EU	1	4	1	1	3	2	1	2
France	1	4	1	2	2	2	4	2
India	3	2	3	2	3	4	1	4
Indonesia	3	1	3	1	2	3	1	2
Iran	2	3	2	3	4	2	1	3
Japan	1	3	1	2	3	1	2	2
Kenya	3	4	4	4	4	4	3	4
Madagascar	4	3	2	2	1	1	2	3
Malaysia	1	3	2	3	4	3	2	1
Maldives	2	1	3	2	1	2	1	1
Mauritius	2	2	2	1	1	1	3	2
Mozambique	4	3	3	3	2	3	3	4
Oman	1	2	3	3	3	2	2	2
Pakistan	3	3	4	3	2	4	2	4
Philippines	2	1	2	1	1	1	4	1
Rep. of Korea	1	2	1	1	2	2	3	1
Seychelles	2	1	2	1	1	1	1	1
Sierra Leone	4	2	3	4	3	3	4	1
Somalia	4	1	4	4	4	4	4	3
South Africa	3	2	2	3	3	3	3	3
Sri Lanka	2	1	2	2	1	1	1	1
Sudan	4	4	3	4	4	3	4	3
Thailand	2	1	1	1	1	1	2	2
United Kingdom	1	4	1	2	3	2	4	3
United Rep. of Tanzania	3	4	4	2	2	4	2	4
Yemen	4	3	3	3	1	1	2	3

Table ST.3: Catch levels of countries of yellowfin tuna (t) between 2000 – 2016 and the allocation of yellowfin tuna under the EU and the coastal States allocation proposal for each member State in the IOTC and the category those countries fall into as used in Chapter 2.

Country	Catch history (2000 – 2016, t)	EU proposal (t)	Coastal States Proposal (t)	Category
Australia	129.33	4,471.40	3,765.28	Large Coastal States
Bangladesh	-	-	2,571.84	Aspiring Coastal States
China	25,948.93	24,577.50	10,221.99	Distant Water Fishing States
Comoros	2,796.09	8,923.46	8,834.19	Small Island Developing States
Eritrea		-	2,020.09	Aspiring Coastal States
European Union	102,665.25	89,373.12	40,834.84	Distant Water Fishing States
France	4,644.13	8,420.31	6,122.07	Distant Water Fishing States
India	18,991.94	21,979.30	30,574.60	Large Coastal States
Indonesia	31,899.16	32,262.77	30,193.36	Large Coastal States
Iran	35,367.54	34,360.30	28,987.75	Large Coastal States
Japan	11,251.32	12,949.91	3,744.27	Distant Water Fishing States
Kenya	109.42	4,932.83	3,491.34	Aspiring Coastal States
R. Korea	4,012.60	7,120.18	2,263.26	Distant Water Fishing States
Madagascar	744.02	14,466.67	5,926.06	Aspiring Coastal States
Malaysia	578.83	5,711.74	2,335.37	Large Coastal States
Maldives	31,880.86	32,712.75	35,686.02	Small Island Developing States
Mauritius	1,877.01	11,051.01	9,176.54	Small Island Developing States
Mozambique	26.52	9,304.37	5,473.94	Aspiring Coastal States
Oman	13,986.51	-	17,416.84	Large Coastal States
Pakistan	5,200.98	9,740.56	6,874.10	Large Coastal States
Philippines	729.73	4,400.80	1,774.90	Market States
Seychelles	31,112.00	34,641.93	59,746.22	Small Island Developing States
Somalia	-	-	6,955.98	Aspiring Coastal States
South Africa	196.51	6,675.37	2,791.91	Large Coastal States
Sri Lanka	35,796.64	36,033.52	36,594.89	Large Coastal States
Sudan		-	1,024.58	Aspiring Coastal States
Tanzania	2,330.04	-	8,826.53	Aspiring Coastal States
Thailand	683.63	5,504.55	2,763.64	Market States
United Kingdom	10.55	4,229.00	5,780.35	Distant Water Fishing States
Yemen	25,212.65	-	20,401.90	Aspiring Coastal States

Table ST.4: Subsidies provided by the European Union to their vessels sourced from publicly available datasets and reports (PS = purse seine vessel, LL = longline vessel).

IOTC No	Name of Ship	Flag	Type of Ship	LOA	GT	Type of subsidy	EU subsidies	National Subsidies	Total	Source
IOTC000907	Alakrana	Spain	PS	104.3	3716	Construction	2,670,600.00	1,602,360.00	4,272,960.00	(IPS, 2010)
IOTC000159	Albacan	Spain	PS	85.85	2347	Modernization	1,210,440.00	172,920.00	1,383,360.00	(Fishsubsidy.org, 2020)
IOTC000161	Albacora Cuatro	Spain	PS	83.45	2082	Modernization	478,945.87	131,600.16	610,546.03	(Fishsubsidy.org, 2020)
IOTC000164	Albacora Uno	Spain	PS	105	3584	Construction	3,090,651.20	682,489.45	3,773,140.65	(Greenpeace, 2014)
IOTC000811	Albatun Dos	Spain	PS	116	4406	Construction	4,318,440.00	616,920.00	4,935,360.00	(Greenpeace, 2013)
IOTC000878	Albatun Tres	Spain	PS	115	4406	Construction	4,318,440.00	616,920.00	4,935,360.00	(Greenpeace, 2014)
IOTC000200	Alexia	Spain	LL	28	193	Construction	580,561.24	116,112.25	696,673.49	(Fishsubsidy.org, 2020)
IOTC000373	Avel Vad	France	PS	67.3	1598	Construction and modernization	1,081,498.28	795,744.19	1,877,242.47	(Fishsubsidy.org, 2020)
IOTC003576	Babouk	France	LL	19	67	Modernization	257,202.22	171,468.09	428,670.31	(Fishsubsidy.org, 2020)
IOTC003608	Belma	Spain	LL	28.73	276	Modernization	632,458.49	63,245.84	695,704.33	(Fishsubsidy.org, 2020)
IOTC009828	Bernica	France	PS	89.4	2666	Construction	10,000,000.00		10,000,000.00	(Yuan Ding et al., 2014)
IOTC000370	Cap Sainte Marie	France	PS	67.3	1596	Modernization	30,397.50	45,596.25	75,993.75	(Fishsubsidy.org, 2020)
IOTC000221	Coyo Tercero	Spain	LL	32	335	Construction	823,248.61	92,856.38	916,104.99	(Fishsubsidy.org, 2020)
IOTC000172	Doniene	Spain	PS	109.3	3674	Construction	2,979,128.27	662,028.50	3,641,156.77	(Thurston & Mulvad, 2013)
IOTC000175	Elai Alai	Spain	PS	80	2217	Modernization	56,127.75	37,063.33	93,191.08	(Fishsubsidy.org, 2020)
IOTC008743	Franche Terre	France	PS	89.4	2664	Construction	10,000,000.00		10,000,000.00	(Yuan Ding et al., 2014)
IOTC003575	Glenan	France	PS	84.1	2319	Construction	1,110,600.00	1,110,600.00	2,221,200.00	(Fish for the future, 2013)
IOTC003613	Herdusa Primero	Spain	LL	25.95	211	Modernization	196,472.53	25,468.60	221,941.13	(Fishsubsidy.org, 2020)

IOTC No	Name of Ship	Flag	Type of Ship	LOA	GT	Type of subsidy	EU subsidies	National Subsidies	Total	Source
IOTC008820	Hermanos Labaen	Spain	LL	29.3	238	Construction	564,285.88	112,857.17	677,143.05	(Fishsubsidy.org, 2020)
IOTC000879	Izurdia	Spain	PS	108	4089	Construction	2,894,400.00	1,736,640.00	4,631,040.00	(Thurston & Mulvad, 2013)
IOTC003579	Le Grand Morne	France	LL	15.8	35	Construction	134,234.71	89,489.85	223,724.56	(Fishsubsidy.org, 2020)
IOTC001097	Le Marius 2	France	LL	13.05	20	Construction	108,936.00	19,224.00	128,160.00	(Fishsubsidy.org, 2020)
IOTC009131	Manapany	France	PS	89.4	2666	Construction	10,000,000.00		10,000,000.00	(Yuan Ding et al., 2014)
IOTC006950	Marguel	Spain	LL	32.1	257	Construction	543,848.40	60,427.60	604,276.00	(Fishsubsidy.org, 2020)
IOTC000275	Nuevo Golondrina	Spain	LL	39	427	Construction	895,508.03	179,101.60	1,074,609.63	(Fishsubsidy.org, 2020)
IOTC003811	O'covelo	Spain	LL	27.85	198	Modernization	197,596.55	34,035.40	231,631.95	(Fishsubsidy.org, 2020)
IOTC000187	Playa De Aritzatxu	Spain	PS	86.7	2458	Construction	1,149,543.93	1,431,565.37	2,581,109.30	(Fishsubsidy.org, 2020)
IOTC000368	Talenduic	France	PS	79.8	2109	Modernization	29,092.50	24,618.75	53,711.25	(Fishsubsidy.org, 2020)
IOTC000812	Txori Argi	Spain	PS	106.5	4134	Construction	2,921,400.00	1,752,840.00	4,674,240.00	(Greenpeace, 2014)
IOTC016254	Txori Zuri	Spain	PS	89.66	3671	Modernization	84,334.94	202,956.61	287,291.55	(Fishsubsidy.org, 2020)
IOTC003584	Vetyver 6	France	LL	16.07	40	Modernization	23,293.15	4,110.56	27,403.71	(Fishsubsidy.org, 2020)

Table ST.5: Resolutions adopted in the 2019 IOTC Commission measures, and their impacts on developing coastal states (IOTC, 2019)

#	Resolutions	Type of measure	Management Objective	Types of impacts	Who will be impacted	Differentiation for developing coastal	Differentiation
19/01	On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence	Amendment	Reduce catches from 427, 000 to 340,000 t	Administrative, Economic	All	Yes	<24m exempted from the measure and thresholds for development
19/02	Procedures on a Fish Aggregating Devices (FADs) Management Plan	Amendment	Non-entangling BioFADs, FAD marking, decrease FADs, Data reporting and analysis, FAD tracking and recovery	Administrative	Purse seine countries	No	Administrative burden: Reporting of daily FAD with a lag of 60 days is cumbersome. But FAD sets have increased, and catches have increased in PS vessels. Thus, no economic impact, but administrative impact
19/03	On the Conservation of Mobulid Rays Caught in Association with Fisheries in the IOTC Area of Competence	New	Conserve mobulid rays, limit retention and targeting mobulid rays except subsistence fishery	Administrative	All	Yes	Mozambique and Oman had a subsistence fishery for local consumption Bycatch has to be declared or discarded. Subsistence fishery and mobulid rays caught for local consumption exempted. Data reporting obligations
19/04	Concerning the IOTC Record of Vessels Authorised to Operate in the IOTC Area of Competence	Amendment	Mandate vessels eligible for IMO numbers to register at IMO and include photographs of the vessel	Administrative	All	Yes	Resolution only applies to vessels above 24m and if below 24, fishing on high seas. Moreover, there is a later date (2-year lag) for application for vessels fishing inside EEZ.
19/05	On a Ban on Discards of Bigeye Tuna, Skipjack Tuna, Yellowfin Tuna, and Non- Targeted Species Caught by Purse Seine Vessels in the IOTC Area of Competence	Amendment	Mandating Purse seine vessels to retain non-targeted species	Administrative	Purse seine countries and port states	No	Allow discards that are banned for local consumption or trade in the country from PS vessels
19/06	On Establishing a Programme for Transhipment by Large-Scale Fishing Vessels	Amendment	Addresses issues by Maldives and Indonesia on transhipment of their collector and wooden boats respectively	Administrative, Economic	Indonesia and Maldives	Yes	Mitigates impacts to Indonesian and Maldives transhipment operation otherwise will be included in the broader data reporting and regional observer programme
19/07	On Vessel Chartering in the IOTC Area of Competence	Amendment	Chartering agreements to fulfill development aspirations of coastal states and should not undermine IOTC CMMs.	Administrative	All	No	Vessel chartering mechanisms not to undermine IOTC CMM

Table ST.6: Indicators used in the framework for common but differentiated responsibilities in IOTC

Category	Indicator	Mozambique	Seychelles	EU	Notes
Vulnerability	Commonwealth Vulnerability Index	(Atkins et al., 2000)	(Atkins et al., 2000)	NA	
	Fisheries contribution to GDP (%)	(UNEP, 2019)	(Breuil & Grima, 2014a)	NA	
	Economic Complexity Index (ECI)	(Hausmann et al., 2014)	NAV	NA	ECI for Seychelles is not available due to limitation in data
	Fish consumption per capita (kg/per person/year)	(FAO, 2019)	Breuil & Grima, 2014)	NA	
	Prevalence of severe food insecurity in the total population (% of population)	(FAO, 2020a)	(FAO, 2020a)	NA	
Small-scale fisheries	Percentage of catch by vessels below 24m	(IOTC, 2021c)	(IOTC, 2021c)	NA	
	Percentage of fishers in total employment	(FAO, 2019; The World Bank, 2021)	(Breuil & Grima, 2014a; Nageon De Lestang, 2005; The World Bank, 2021)	NA	Ratio of fisheries specific employment to total labour force
	Percentage of estimated fisheries employment of vessels below 24m to total employment	(IOTC, 2020f)	(IOTC, 2020f; Lecomte et al., 2017; Nageon De Lestang, 2005)	NA	
	Is a Small Island Developing State	(UN, 2020b)	(UN, 2020b)	NA	
Cost vs benefits	Maximum yellowfin tuna catches (tonnes)	(IOTC, 2021c)	(IOTC, 2021c)	(IOTC, 2021c)	
	Value of yellowfin tuna catch (million USD)	(IOTC, 2021c; Macfadyen & Defaux, 2019)	(IOTC, 2021c; Macfadyen & Defaux, 2019)	(IOTC, 2021c; Macfadyen & Defaux, 2019)	
	Number of port-calls	(IOTC, 2020e)	(IOTC, 2020e)	(IOTC, 2020e)	
	Percentage of port landings and transhipments in the Indian Ocean	(IOTC, 2020e)	(IOTC, 2020e)	(IOTC, 2020e)	
	Processing Capacity (tonnes)	Personal communication	(Lecomte et al., 2017)	NAV	
	Percentage of tuna imports in total imports	(UN, 2020a)	UN, 2020a)	UN, 2020a)	Tuna products were obtained using tuna HS Codes
	Percentage of tuna exports in total exports	(UN, 2020a)	UN, 2020a)	UN, 2020a)	Tuna products were obtained using tuna HS Codes
	Percentage of fishers in total employment	(FAO, 2019; The World Bank, 2021)	(Breuil & Grima, 2014a; Nageon De Lestang, 2005; The World Bank, 2021)	(European Commission, 2020)	
	Fish consumption per capita (kg/per person/year)	(FAO, 2019)	(Breuil & Grima, 2014)	(FAO, 2020a)	
	Foreign access revenue per year (million USD)	(MSIWF, 2020)	(EU, 2020)	NAV	

Table ST.7: Reduction in yellowfin tuna catches (t) for Mozambique, Seychelles and European Union under various proposals and the adopted Resolution 19/01 (IOTC, 2021). Other gears include coastal gears such as handline, pole and line fisheries and trolling.

Country	Gear	Maximum catch (2014 – 2017)	<24m catch	EU Proposal	South Africa and Maldives Proposal	Korean Proposal	Adopted Resolution
Mozambique	Purse seine	126.02	-	138.62	No limit	No limit	No limit
	Gillnet	-	-	10	No limit	0	No limit
	Longline	88.77	-	46.07	No limit	No limit	No limit
	Other gears	79.5	79.5	33.81	No limit	30.74	No limit
	Total	294.29	79.5	228.5	0	30.74	0
Seychelles	Purse seine	41,693.58	-	33,211.43	33,211.43	30,651.65	33,211.43
	Gillnet	-	-	10	No limit	0	No limit
	Longline	4,312.69	670.0	3,881.42	No limit	No limit	No limit
	Other gears	56.89	56.89	15.86	No limit	14.41	No limit
	Total	46,063.16	726.89	37,118.71	33,211.43	30,666.06	33,211.43
European Union	Purse seine	91,405.29	-	77,694.50	77,694.50	74,698.52	77,694.50
	Gillnet	-	-	10	No limit	0	No limit
	Longline	893.68	-	727.54	No limit	No limit	No limit
	Other gears	564.22	564.22	421.94	No limit	500.07	No limit
	Total	92,863.19	564.22	78,853.98	77,694.5	75,198.59	77,694.5

APPENDIX B: INTERVIEW PROCESS AND QUESTIONS

DALHOUSIE UNIVERSITY

INTERVIEW PROCESS & SEMI-STRUCTURED QUESTIONS: MEMBER AND NON-MEMBER NATIONAL DELEGATES

Project title: Investigating different entities and their relationship in decision making processes in the Indian Ocean Tuna Commission

Lead researcher: Hussain Sinan, Dalhousie University (Halifax, Canada)
Contact: hussain.sinan@dal.ca

Supervisor: Megan Bailey, Dalhousie University (Halifax, Canada)
Contact: megan.bailey@dal.ca

Welcome (5 min)

I will re-introduce myself and thank the participant for agreeing to participate in the study, I will give additional background on who I am and what I am trying to do; what will be done with the information; why the participants have been asked to participate.

I will also present the consent form and ensure the participant has time to read and sign it, as well as ask me any questions before we begin.

I will explain that the purpose of these interviews is to supplement additional research I've done on the tuna value chain study but that I see immense value in having their first-hand knowledge and perspectives. I will explain that the interviews will be semi-structured, so there will be room for open dialog and discussion around topics.

I will turn on the audio recorder if participant agrees.

Question period (50 mins)

BACKGROUND

How long have you been a member of this delegation?

How involved are you with developing and or implementing fisheries policies in the Indian Ocean?

What are the biggest challenges with regard to developing conservation and management measures in IOTC?

CONSERVATION AND MANAGEMENT MEASURES AND DECISION-MAKING PROCESSES

Do local stakeholders get involved in preparing or making decisions about conservation and management measures tabled in the IOTC meeting? If so, what type of stakeholders (such as fishermen, industry or others) and how do they get involved? If no, why they don't get involved?

Do you believe scientific information provided by the scientific committee influence your decision-making processes about conservation and management measures tabled in the IOTC meeting? If so, what are the most important five elements that you consider most important? (why?)

Do you get in touch with other member states or do they get in touch with you in preparing or improving or making decisions on conservation and management measures? Do you believe they influence the decision-making process? (Why)

Do international industry organizations, private sectors get in touch in the buildup of a commission meeting? If yes, can you list the most five frequent categories of organizations that get in touch. Do you believe they influence the decision-making process? (Why?)

Do the tuna supply and market involve in the buildup of a commission meeting? If yes, can you list the most five frequent categories of organizations that get in touch? Do you believe they influence the decision-making process? (Why?)

Do global organizations UN bodies, financial institutions or international legal instruments the preparation or decisions regarding the conservation and management measure? How?

Do you believe there are other influences other than discussed today that influence the decision-making processes? If so who and how?

How do you think going forward, the different entities involved in the IOTC, are they being helpful in achieving the mandate of the Commission in conserving and managing tuna and tuna like species?

Any final comments?

DALHOUSIE UNIVERSITY

INTERVIEW PROCESS & SEMI-STRUCTURED: SCIENTISTS

Project title: Investigating different entities and their relationship in decision making processes in the Indian Ocean Tuna Commission

Lead researcher: Hussain Sinan, Dalhousie University (Halifax, Canada)
Contact: hussain.sinan@dal.ca

Supervisor: Megan Bailey, Dalhousie University (Halifax, Canada)
Contact: megan.bailey@dal.ca

Welcome (5 min)

I will re-introduce myself and thank the participant for agreeing to participate in the study, I will give additional background on who I am and what I am trying to do; what will be done with the information; why the participants have been asked to participate.

I will also present the consent form and ensure the participant has time to read and sign it, as well as ask me any questions before we begin.

I will explain that the purpose of these interviews is to supplement additional research I've done on the tuna value chain study but that I see immense value in having their first-hand knowledge and perspectives. I will explain that the interviews will be semi-structured, so there will be room for open dialog and discussion around topics.

I will turn on the audio recorder if participant agrees.

Question period (50 mins)

BACKGROUND

How long have you been a member of this delegation?

How involved are you with developing and or implementing fisheries policies in the Indian Ocean?

What are the biggest challenges with regard to developing conservation and management measures in IOTC?

CONSERVATION AND MANAGEMENT MEASURES AND DECISION-MAKING PROCESSES

Do you believe that scientific information is taken onboard in preparing or making decisions conservation and management measures tabled in the IOTC meeting? If so, what are the five most frequent categories of scientific information and how are they used? If no, why they are not used?

Do you get in touch with other member states scientists or do they get in touch with in preparing or improving or making decisions on conservation and management measures?

Do they contribute in the preparation or decisions regarding the conservation and management measures? How?

Do you get involved with other stakeholders in the preparation of conservation and management measures other than member delegates? If so, what are the five most frequent categories of stakeholders and how do they involve?

Do you believe there are other influences other than discussed today that influence the decision-making processes? If so who and how?

How do you think going forward, the different entities involved in the IOTC, are they being helpful in achieving the mandate of the Commission?

Any final comments?

DALHOUSIE UNIVERSITY

INTERVIEW PROCESS & SEMI-STRUCTURED QUESTIONS: OTHER DELEGATES

Project title: Investigating different entities and their relationship in decision making processes in the Indian Ocean Tuna Commission

Lead researcher: Hussain Sinan, Dalhousie University (Halifax, Canada)
Contact: hussain.sinan@dal.ca

Supervisor: Megan Bailey, Dalhousie University (Halifax, Canada)
Contact: megan.bailey@dal.ca

Welcome (5 min)

I will re-introduce myself and thank the participant for agreeing to participate in the study, I will give additional background on who I am and what I am trying to do; what will be done with the information; why the participants have been asked to participate.

I will also present the consent form and ensure the participant has time to read and sign it, as well as ask me any questions before we begin.

I will explain that the purpose of these interviews is to supplement additional research I've done on the tuna value chain study but that I see immense value in having their first-hand knowledge and perspectives. I will explain that the interviews will be semi-structured, so there will be room for open dialog and discussion around topics.

I will turn on the audio recorder if participant agrees.

Question period (50 mins)

BACKGROUND

How long have you been a member of this delegation?

How involved are you with developing and or implementing fisheries policies in the Indian Ocean?

What are the biggest challenges with regard to developing conservation and management measures in IOTC?

CONSERVATION AND MANAGEMENT MEASURES AND DECISION-MAKING PROCESSES

Do stakeholders similar to you get involved in preparing or making decisions conservation and management measures tabled in the IOTC meeting? If so, what are the five most frequent categories of stakeholders and how do they get involved? If no, why they don't get involved?

Do you get in touch with member states or do they get in touch with other member states in preparing or improving or making decisions on conservation and management measures?

Do you contribute in the preparation or decisions regarding the conservation and management measures? How?

Do you get involved with other stakeholders in the preparation of conservation and management measures other than member delegates? If so, what are the five most frequent categories of stakeholders and how do they involve?

How do you think going forward, the different entities involved in the IOTC, are they being helpful in achieving the mandate of the Commission?

Any final comments?

APPENDIX C: SUPPLEMENTARY FIGURE

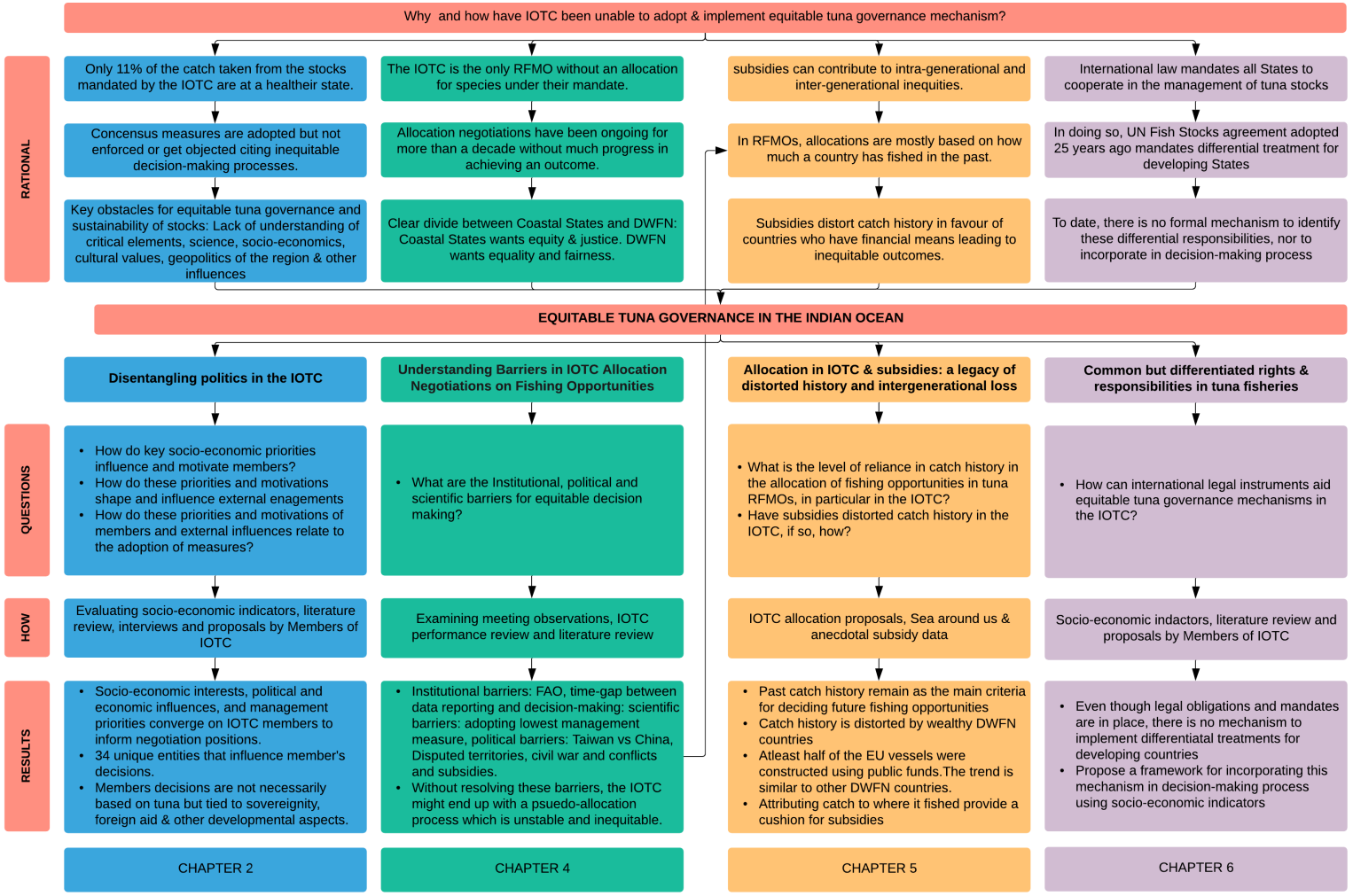

Figure ST.1: PhD thesis outline, with rational, questions asked, methodology used, and a summary of results for each chapter.