



Disentangling politics in the Indian Ocean Tuna Commission

Hussain Sinan^{*}, Megan Bailey, Wilf Swartz

Marine Affairs Program, Dalhousie University, Halifax, NS B3H 4R2, Canada

ARTICLE INFO

Keywords:

Transboundary
Fisheries management
RFMOs
Geopolitics
Tuna

ABSTRACT

Regional Fisheries Management Organizations (RFMOs) require countries with diverse objectives, aspirations, and interests to cooperate to sustainably manage transboundary fish stocks. These organizations are often subjected and are held responsible for overfishing, slow management responses and failure to follow scientific evidence. Disappointing performance is often attributed to a 'black box of politics' or a 'lack of political will' among members. Disentangling the politics and motivations behind RFMO decision-making is crucial in understanding how they function and why they might fail. Here, we analysed eight socio-economic indicators to identify the priorities of 30 members of the Indian Ocean Tuna Commission (IOTC) and conducted 41 interviews with key stakeholders to understand their engagement strategies. This study also focuses on how different actors engage, negotiate, and leverage their political power in the development and adoption of Conservation and Management Measure proposals. Our results demonstrate that socio-economic interests, political and economic influences, and management priorities converge on IOTC members to inform their negotiation positions. Even though individual domestic interests drive the decisions taken by members, we identified 34 unique entities that influence member decisions in the IOTC. Additionally, members with tuna interests influence other members, in particular developing States. Further, the decisions by members are not necessarily based on tuna management but tied to sovereignty, foreign aid, and other development aspects outside the realm of the RFMO decision-making. Our findings also indicate the importance of defining clear ownership of the resource and the critical role of various stakeholders.

"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

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 (UNCLOS) 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).¹ There are currently 30 members in the IOTC,² 22 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 [1]. Despite this mandate, yellowfin tuna have been biologically overfished

^{*} Corresponding author.

E-mail address: hussain.sinan@dal.ca (H. Sinan).

¹ Two tuna RFMOs were established prior to UNCLOS (the Inter-American Tropical Tuna Commission (IATTC) and the International Commission for the Atlantic Tuna (ICCAT)), and the rest were established after UNCLOS (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.

² 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.

<https://doi.org/10.1016/j.marpol.2021.104781>

Received 4 July 2021; Received in revised form 18 August 2021; Accepted 2 September 2021

Available online 15 September 2021

0308-597X/© 2021 The Authors.

Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

since 2014, bigeye tuna and albacore were both overfished in 2019, and skipjack tuna caught in 2018 exceeded their negotiated limit by 30% [2]. Collectively, these stocks account for nearly 60% of the total IOTC catch in the Indian Ocean.³ Furthermore, these four species are the four top commercially traded tuna species globally [3].

Despite clear overcapacity, members continue to invest in their fleets. The coastal States that historically did not operate fishing 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 [4]. The "race to fish" phenomenon, which manifests in open-access fisheries [5], is evident within the IOTC, and Conservation and Management Measures (CMMs) imposed to regulate these fleets are often ineffective [4]. As shared fish stocks, tuna are even more susceptible to the tragedy of the commons [6], 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 general failure to follow scientific advice being raised as particularly problematic [7,8]. Most RFMO decisions are consensus-based, and thus, the agreement on most of the CMMs is of the lowest common denominator [4]. Even though in the IOTC, decisions on CMMs can be taken by a two-thirds majority [1], most decisions are taken by consensus.

In theory, RFMOs possess many characteristics of a polycentric governance structure. Decision centres that are formally independent of each other and competitive enter into cooperative relationships and have modalities to resolve conflicts [10]. Under international law, members in RFMOs are mandated to conserve and sustainably use shared ocean space collectively. They are responsible for developing norms 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' [11]. These conclusions continue to play out in analyses of RFMO governance failures as well [8,12–14]. 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, we analyse how different actors in IOTC strategize their engagement and use or leverage their political power in the development and adoption of CMMs. In particular, we 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 2 outlines the methodology used to address each question, and Section 3 presents the results answering these questions. Section 4 discusses the results, and Section 5 concludes with some of our thoughts on ways forward. In answering these questions, we 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.

³ 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.

2. Methodology

This study is undertaken in three parts. To answer the first question outlined above regarding the influence of socio-economic priorities, we focused on assembling and analysing 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 [15]. A total of 336 socio-economic indicators were initially identified to be used in the analysis from 10 studies [16–23]. Using Schomaker's [24] 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 [25,26]), a recurring problem in including socio-economic indicators in RFMO governance is the lack of data and various data collection methodologies and systems [27]. 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 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 [28]. For each member, quantitative and descriptive data, including the indicators, were sourced from published reports and datasets.

Due to the high number of countries analysed, "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). The

Table 1
Indicators used in the study and socio-economic interests.

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) ^a	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 importance
Average tuna imports to total imports (2014–2017)	Understanding tuna import dependency and decision-making processes
Average tuna catch (2014–2018)	Understanding the importance of tuna catch for a country
Fish consumption per capita	Understanding fisheries dependency for nutrition

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

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. 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 fishermen association representatives; and intergovernmental organization representatives ($n = 2$) who took part in the 2019 IOTC Commission meeting. Interviews were also conducted among market representatives (fisheries improvement projects (FIPs) administrators, retailers, suppliers, and marketing partnerships (collectively referred to as "market representatives" hereafter: $n = 6$)) who submitted letters to the Commission meeting in 2019. 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, we analysed the CMM proposals submitted by members in the IOTC for negotiations from 2014 to 2019 to elicit any relationships with socio-economic priorities. From 2014–2019, 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 analysed to find a relationship with the socio-economic priorities of members.

3. Results

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 (Fig. 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 (Fig. 1[A]). What emerged are five distinctly informative categories of member countries: **Small Island Developing States** (Seychelles, 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

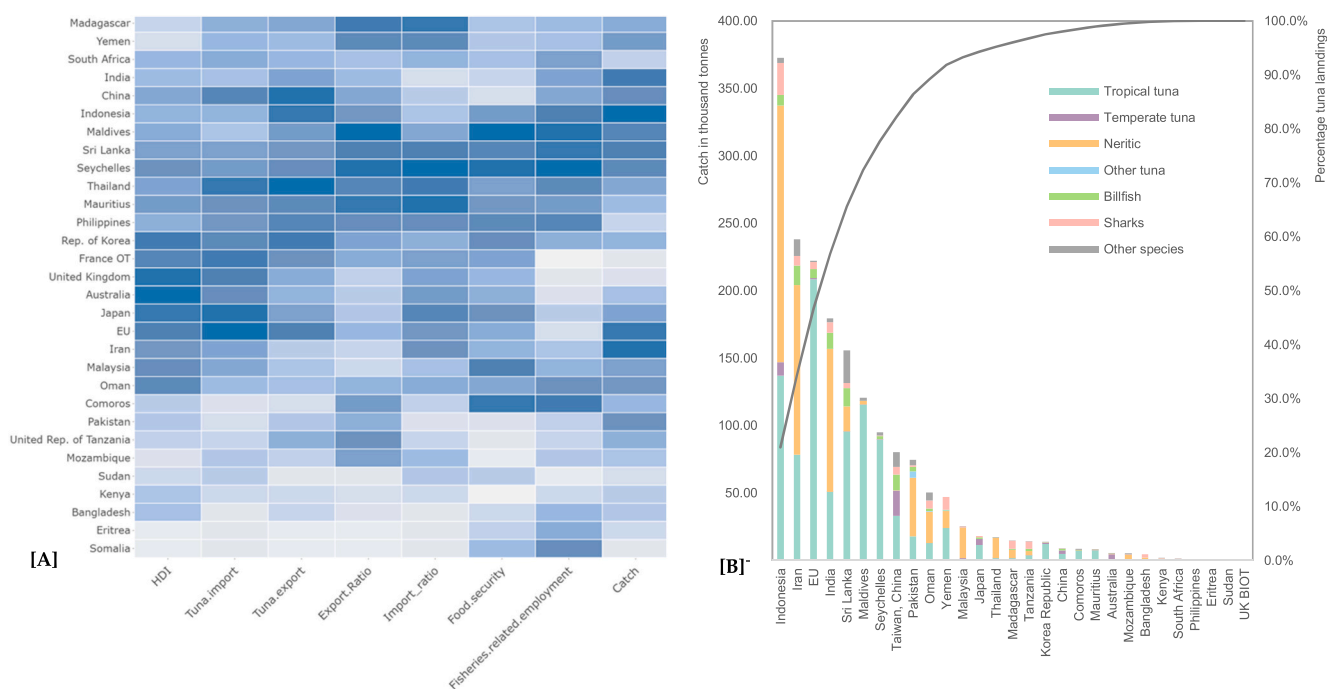


Fig. 1. [A]: IOTC members ranked based on eight socio-economic indicators used in the study. Bin 1 represents the highest ranks for each indicator (darker blue), and Bin 4 represents the lowest ranks (light blue). 1[B]: Average catches of IOTC members from 2014 to 2018 (IOTC, 2019a). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Somalia) that do not have a fishery in the Indian Ocean but have aspirations to develop their fishery. We discuss these categories below.

3.1.1. Small Island Developing States (SIDS)

The three SIDS (accounts for around 12.5% of the total catch in IOTC (Fig. 1[B]) rely significantly on tuna for livelihood, economy and food security. Around 8% of Maldives, 1.4% of Mauritius and 12% of Seychelles employment 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: 163 kg, Mauritius: 11.87 kg, Seychelles: 57.4 kg). 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. In the IOTC Commission, SIDS advocates recognizing their vulnerability and dependency on tuna fisheries. For example, in 2018, in the 23rd Session of the IOTC, a submitted statement by the Maldives [29] 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.”

However, there are significant differences among the three SIDS and 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 [30]. Although Seychelles and Mauritius fish for tuna, most of the catch landed in the two countries are by foreign-owned, locally flagged vessels. Spanish-owned Seychelles flagged vessels caught 86% of the tuna, and in Mauritius, 96% of the tuna are caught by French-owned Mauritius flagged vessels [31]. 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 [32]. 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 [33]. 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.

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 (Fig. 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.

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 (Fig. 1[A]). Thailand and the Philippines 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 722 t of tuna and tuna-like species in the Indian Ocean. Thailand imports Indian Ocean tuna, primarily MSC-certified, pole-and-line caught tuna, to access premium canned tuna markets. Thus, in the Indian Ocean, both these countries would want to maintain catches at sustainable levels to maintain their market share.

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 import surpasses \$3 billion annually. EU also exports around \$559 million worth of tuna products. Japan imports around \$1.9 billion worth of tuna products and exports on average around \$112 million worth of tuna (Fig. 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: Fig. 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 [34]. 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 [35]. 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 [36]. Even though EU catches are significant in the Indian Ocean, fisheries employment contributes 0.10% to the total labour force in the EU (Fig. 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" and are not entitled to any rights observed by its members or cooperating members since IOTC is within the United Nations framework under the FAO [4]. 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 [4]. 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 do not have much fishing activities in these territories [4].

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 fulfil aspirations to develop domestic fleets and improve their development outcomes. These are reflected in their national development plans and fleet development plans [37]. These countries also continue to invest significantly in developing tuna fleets for the domestic fishery with the assistance of international organizations [38]. For example, speaking in the ceremony unveiling the announcement of new tuna and deep-sea regulations, Tanzanian Fisheries Minister, Mr. Mashimba Ndaki [39] 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 Fig. 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 [40]. Indicators are also purely a reflection of the data collection system. Somalia’s fish consumption was at 3.3 kg per capita, far below the global average of 20.5 kg per capita [41]. 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.

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 (Fig. 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 Fig. 2 are of equal magnitude.

In this section, we discuss 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

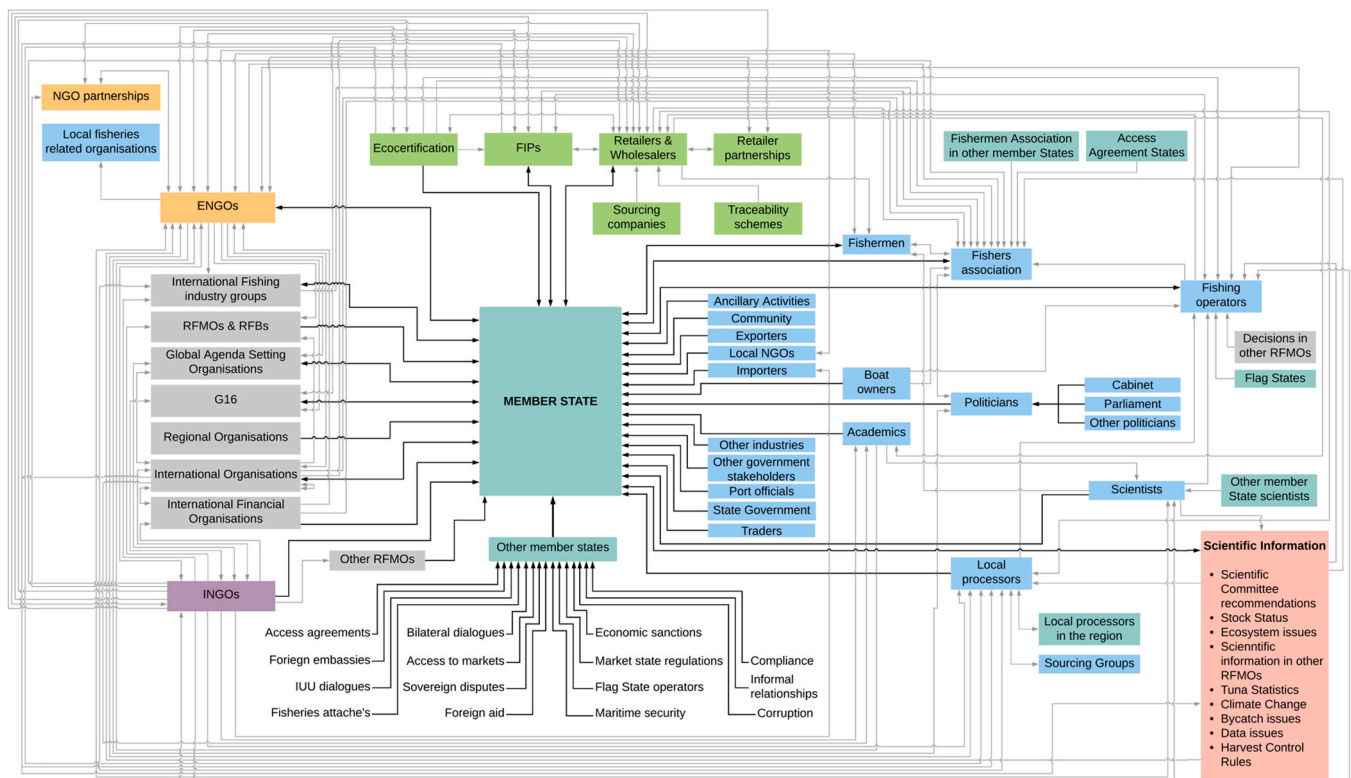


Fig. 2. Map of influences of members in the development and adoption of CMMs in IOTC based on responses from the interviews. The influences are colour-coded: Domestic stakeholder influences on members (blue), other members (pale green), ENGOs (orange), INGOs (purple), Market (green), Regional, international 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. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

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 (Fig. 3[A]). Interestingly, other than domestic stakeholders, other members influence the most in the decision-making process (76% of interviewed delegates). 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); develop a proposal and get in touch with other members in the region (delegate 13) or bilaterally (delegate 17), focussed discussions within key members (delegate 6); discuss 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 (Fig. 3[A]). Few informants raised economic sanctions, corruption, market state regulations, and maritime security as influencing their decision-making process. In what follows, we analyse the main actors in IOTC and their role in member behaviour in adopting CMMs.

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 (Fig. 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 four 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 was to be 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

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 (Fig. 4[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

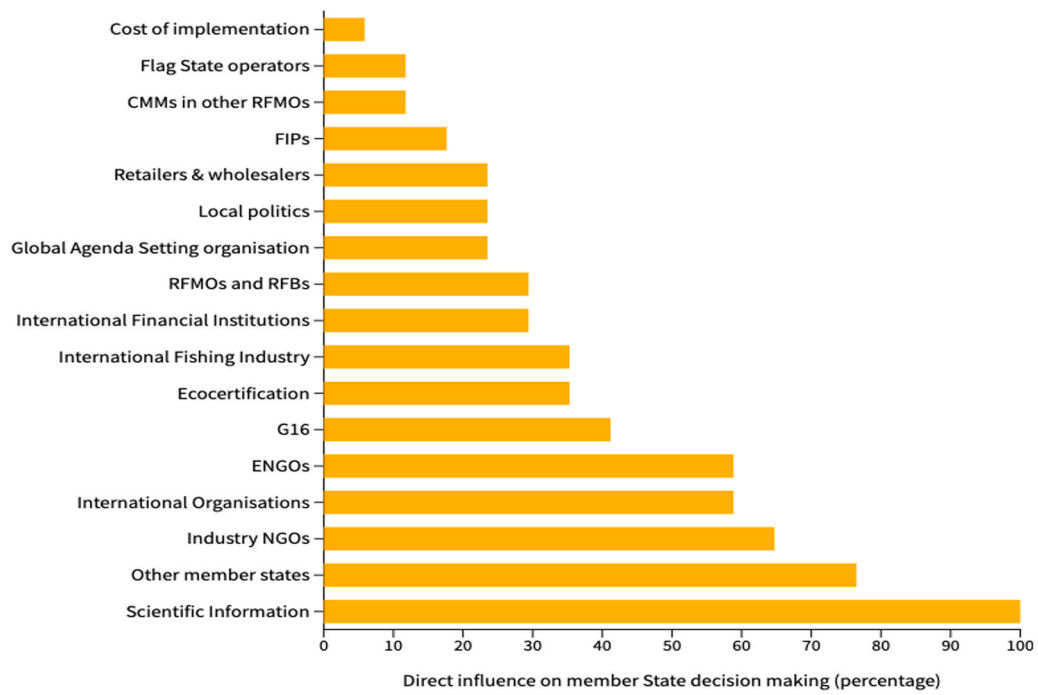
However, some respondents also noted that they verify the results through internal assessments due to biases in the scientific process (delegate 2, delegate 4, delegate 8, delegate 13).

It is not only members who are engaged in the scientific processes. One member scientist highlighted NGO involvement to direct scientific findings to fulfil 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).

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 (Figs. 2 and 4[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

[A]



[B]

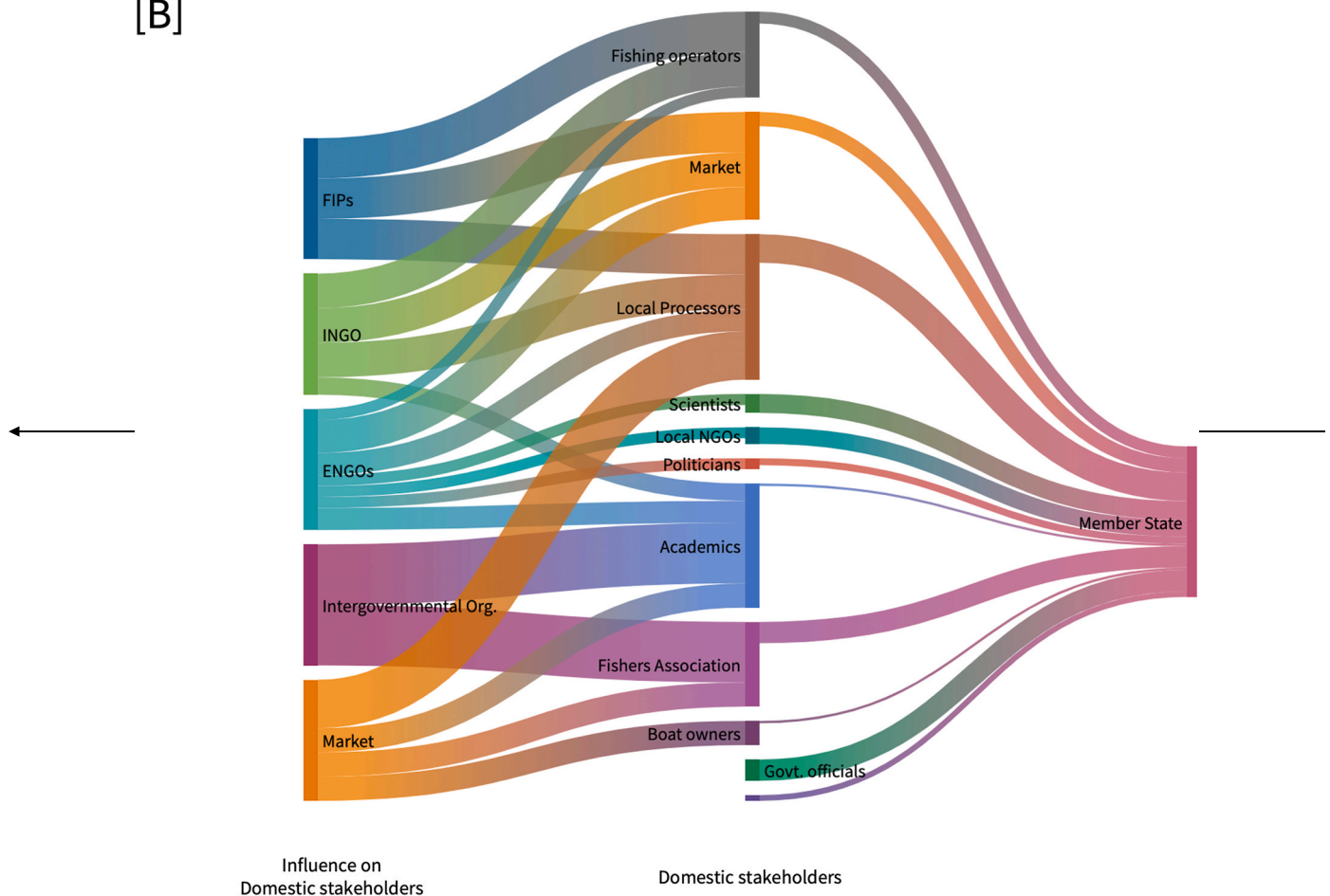


Fig. 3. [A] Types of direct influences on members in CMM decision-making process except domestic stakeholders based on responses from interviews and the level of influence identified as a percentage of interviewees (x-axis) who identified these (y-axis) factors had influenced their decisions [B] Indirect 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.

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, we explain these influences 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

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) (Fig. 2) and directly influence member decisions. However, instead of participating in IOTC meetings, retailers often send their positions on CMMs through NGO letters [29]. 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 Echebatar Purse Seine skipjack tuna fishery are the only MSC certified fisheries [42]. 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 [43]. 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 fulfilment 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).

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 [44], which are also managed by the IOTC and most members of RECOFI are not members of IOTC [45].

“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 [4] 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 [46], 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 (Fig. 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 [4]. 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

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 (Fig. 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 (Fig. 2). Here, we

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 programmes (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,⁴ 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 polarized 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).

- *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 [47]. 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

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 (Fig. 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 Fig. 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.

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 fulfil the conditions laid out by the Marine Stewardship Council (MSC) to maintain their certification [33]. 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.

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

⁴ Technical Committee on Allocation Criteria formed in 2010 to develop a systematic allocation framework for the IOTC.

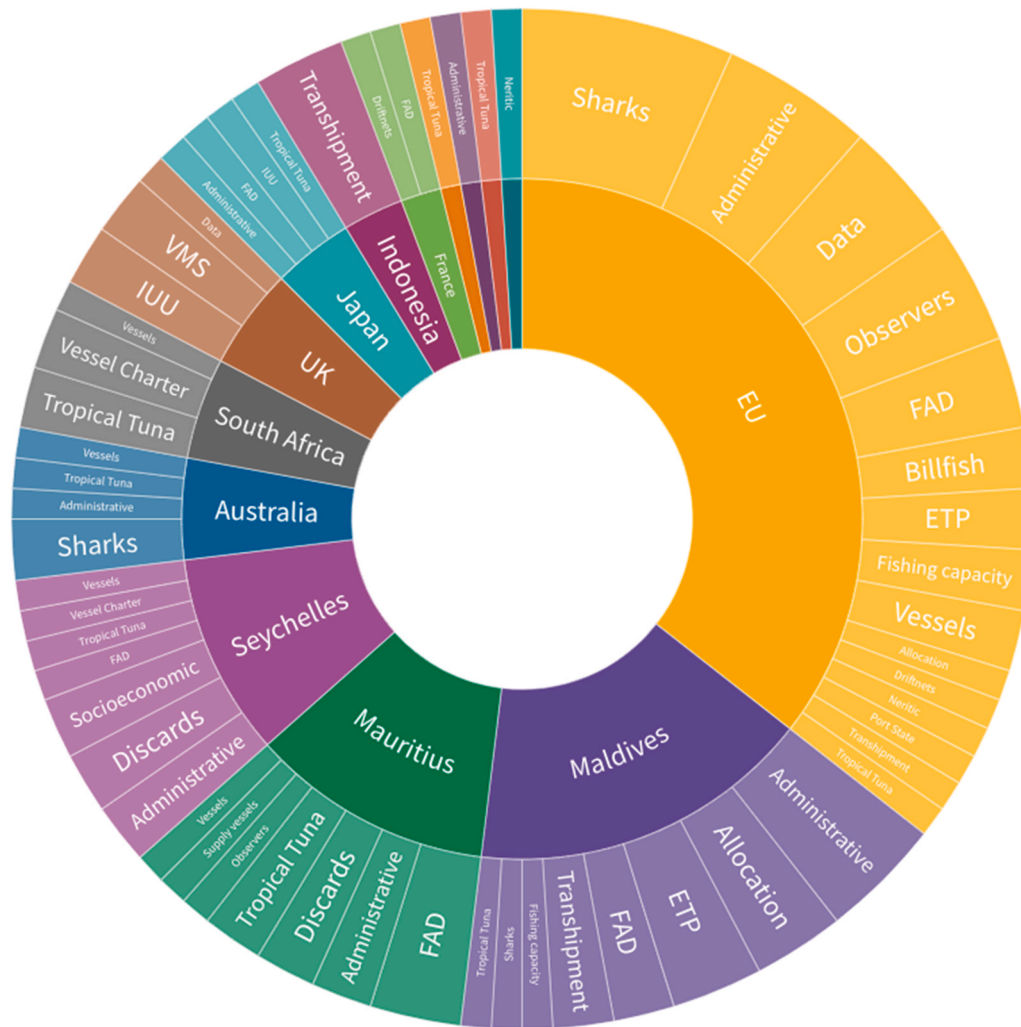


Fig. 4. Proposals submitted by members from 2014 to 2019 and thematic areas of proposals to illustrate the connection between socio-economic priorities and decision-making processes. The size of the wedge is proportional to the number of proposals submitted in each category.

processes to optimize members' socio-economic interests and other influential entities involved in the IOTC member. Here we discuss four key findings from this work: 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.

4.1. Aspiring coastal States

Our 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 we 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 (Fig. 1[A]), and are often dependent on fisheries as a source of nutrition [48]. 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 [49]. 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 [4,50]. 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" [11]. 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 [51]. 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 [52]. Notably, in the WCPFC, all the tropical tuna species are at sustainable levels [53], 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 [54]. 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.

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 [8]. 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 [55,56] in RFMO governance. In the IOTC, NGOs are involved in every layer of decision-making, from data collection to the implementation of CMMs (Fig. 3[A] and [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 [57,58]. Like any other actors involved in RFMOs, NGOs also clash and compete with each other to maintain territory and dominance [56].

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 [59]. Some retailers in the GTA partnership also decided to stop sourcing yellowfin tuna from the Indian Ocean in their brands [60]. The market (retailers and wholesalers) has 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 [61]. 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 [33,62] before the end of the fifth year. In response, the Maldives, together with INGOs, NGOs, industry and other members, got those measures adopted [33] and used the threat of a vote to adopt the measure in IOTC [63].

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 [57]. 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.

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 [64–66]. Fragmentation is considered when there are distinct clusters within the organization in the decision-making process [67] 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 developed 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 [46]. These aid contributions also have prevented Mauritius and Madagascar from strongly supporting the like-minded coastal States group G16 [68]. 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 [69], 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 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 [4]. The sovereignty disputes are linked to the ocean space’s economic wealth, strategic warfare presence, and maritime security [70,71]. 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.

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 (Fig. 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.

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 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 exploit developing and least-developed States through financial aid and corrupt practices, but sometimes in subtle ways that are difficult to detect. Markets 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. We 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.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Hussain Sinan: Conceptualization, Formal analysis, Writing, Visualization. **Megan Bailey:** Conceptualization, Formal analysis, Writing – review & editing. **Wilf Swartz:** Writing – review & editing.

Conflict of interest

HS participated in IOTC meetings as a country delegate (advisor) and chaired the Committee on Administration and Finance in IOTC during the research period. HS worked and represented the Government of the Maldives in IOTC meetings prior to his research.

Acknowledgements

The authors are indebted to all the respondents who spent their time and shared invaluable knowledge for the study. The authors are also thankful to Ciara Willis, Helen Pecker, Laurene Schiller, Mialy Andriamahefazafy and Ruth Forsdyke for their thoughtful suggestions to improve the manuscript. Further, the authors are also grateful for the valuable suggestions provided by two anonymous reviewers. HS acknowledges funding support from the International Pole and Line Foundation. WS acknowledges funding support from the Nippon Foundation Ocean Nexus Center at EarthLab, University of Washington.

References

- [1] IOTC, Agreement for the Establishment of the Indian Ocean Tuna Commission, Indian Ocean Tuna Commission, Victoria, Seychelles, 1993 (Accessed 10 November 2018), (<http://www.iotc.org/about-iotc/basic-texts>).
- [2] IOTC, Report of the 22nd Session of the IOTC Scientific Committee, Indian Ocean Tuna Commission, Victoria, Seychelles, 2019 (Accessed 10 February 2020), (<https://iotc.org/documents/SC/22/RE>).
- [3] M. Raiana, G. James, W. Esther, G. Grantly, Netting Billions 2020: a global tuna valuation, Pew Charitable Trust, 2020.
- [4] H. Sinan, M. Bailey, Understanding barriers in Indian Ocean Tuna Commission Allocation Negotiations on Fishing Opportunities, Sustainability 12 (2020) 6665, <https://doi.org/10.3390/su12166665>.
- [5] R.Q. Grafton, T. Ragnar Arnason, R. Bjørndal, D. Campbell, H.F. Campbell, C. W. Clark, R. Connor, D.P. Dupont, R. Hannesson, R. Hilborn, J.E. Kirkley, D.E. L. Tom Kompas, G.R. Munro, S. Pascoe, S. Dale Squires, Q. Weninger, Incentive-based approaches to sustainable fisheries, Can. J. Fish. Aquat. Sci. 63 (2006) 699–710, <https://doi.org/10.1139/f05-247>.
- [6] S.F. McWhinnie, The tragedy of the commons in international fisheries: an empirical examination, J. Environ. Econ. Manag. 57 (2009) 321–333, <https://doi.org/10.1016/j.jeem.2008.07.008>.
- [7] E.M. De Santo, Implementation challenges of area-based management tools (ABMTs) for biodiversity beyond national jurisdiction (BBNJ), Mar. Policy 97 (2018) 34–43, <https://doi.org/10.1016/j.marpol.2018.08.034>.
- [8] T. Polacheck, Politics and independent scientific advice in RFMO processes: a case study of crossing boundaries, Mar. Policy 36 (2012) 132–141, <https://doi.org/10.1016/j.marpol.2011.04.006>.
- [10] V. Ostrom, C.M. Tiebout, R. Warren, The Organization of Government in Metropolitan Areas: a theoretical inquiry, Am. Polit. Sci. Rev. 55 (1961) 831–842, <https://doi.org/10.2307/1952530>.
- [11] T.H. Morrison, W.N. Adger, K. Brown, M.C. Lemos, D. Huitema, J. Phelps, L. Evans, P. Cohen, A.M. Song, R. Turner, T. Quinn, T.P. Hughes, The black box of power in polycentric environmental governance, Glob. Environ. Change 57 (2019), 101934, <https://doi.org/10.1016/j.gloenvcha.2019.101934>.
- [12] J. Fischer, How transparent are RFMOs? Achievements and challenges, Mar. Policy (2020), 104106, <https://doi.org/10.1016/j.marpol.2020.104106>.
- [13] B. Pentz, N. Klenk, S. Ogle, J.A.D. Fisher, Can regional fisheries management organizations (RFMOs) manage resources effectively during climate change? Mar. Policy 92 (2018) 13–20, <https://doi.org/10.1016/j.marpol.2018.01.011>.
- [14] K.-H. Wang, In combating and deterring IUU fishing: do RFMOs work?, in: *The Limits of Maritime Jurisdiction Brill Nijhoff*, 2014, pp. 431–447.
- [15] A. Hammond, A. Adriaanse, E. Rodenburg, D. Bryant, R. Woodward, Environmental indicators: a systematic approach to measuring and reporting on environmental policy performance in the context of sustainable development, 1995. (http://pdf.wri.org/environmentalindicators_bw.pdf) (Accessed 27 November 2018).
- [16] P. Accadia, M. Spagnolo, Socio-economic indicators for the Adriatic Sea demersal fisheries 2006. (<http://oregonstate.edu/dept/IIFET/html/353.pdf>) (Accessed 21 March 2019).
- [17] J. Avelino, R. Crichton, V. Valenzuela, M. Odara, M. Padilla, N. Kiet, D. Anh, P. Van, H. Bao, N. Thao, M. Linh, P. Hoai, N. Thao, M. Onuki, M. Esteban, J. E. Avelino, R.N. Crichton, V.P. Valenzuela, M.G.N. Odara, M.A.T. Padilla, N. Kiet, D.H. Anh, P.C. Van, H.D. Bao, N.H.P. Thao, M.T.Y. Linh, P.T.P. Hoai, N.D. Thao, M. Onuki, M. Esteban, Survey tool for rapid assessment of socio-economic vulnerability of fishing communities in Vietnam to climate change, Geosciences 8 (2018) 452, <https://doi.org/10.3390/geosciences8120452>.
- [18] H. Boyd, A. Charles, Creating community-based indicators to monitor sustainability of local fisheries, Ocean Coast. Manag. 49 (2006) 237–258, <https://doi.org/10.1016/j.ocecoaman.2006.03.006>.
- [19] FAO, Handbook for Fisheries Socio-economic Sample Survey, Rome, Italy, 2017. <http://www.fao.org/3/a-i6970e.pdf>. (Accessed 28 February 2019).

- [20] FAO, Improving our knowledge on small-scale fisheries: data needs and methodologies, in: *Fish. Aquac. Proc. No. 55*, Food and Agriculture Organization Rome, Italy, 2017, p. 104. (<http://www.fao.org/3/a-i8134e.pdf>) (Accessed 21 March 2019).
- [21] S. Kruse, Socio-economic indicators for fisheries: a case study of the Yukon River salmon fishery, 2012. (https://www.researchgate.net/profile/Sarah_Kruse4/publication/267724249_Socioeconomic_Indicators_for_Fisheries_A_Case_Study_of_the_Yukon_River_Salmon_Fishery/links/54dcd3f70cf28a3d93f87682.pdf) (Accessed 21 March 2019).
- [22] V. Ünal, R. Franquesa, A comparative study on socio-economic indicators and viability in small-scale fisheries of six districts along the Turkish coast, *J. Appl. Ichthyol.* 26 (2010) 26–34, <https://doi.org/10.1111/j.1439-0426.2009.01346.x>.
- [23] C.C.C. Wabnitz, V.W.Y. Lam, G. Reygondeau, L.C.L. Teh, D. Al-Abdulrazzak, M. Khalifallah, D. Pauly, M.L.D. Palomares, D. Zeller, W.W.L. Cheung, Climate change impacts on marine biodiversity, fisheries and society in the Arabian Gulf, *PLoS One* 13 (2018), 0194537, <https://doi.org/10.1371/journal.pone.0194537>.
- [24] M. Schomaker, Development of environmental indicators in UNEP, in: FAO (Ed.), *Land Quality Indicators and Their Use in Sustainable Agriculture and Rural Development: Proceedings of the Workshop*, Food and Agriculture Organization of the United Nations, Rome, 1997. <http://www.fao.org/docrep/W4745E/w4745e00.htm#Contents> (Accessed 30 November 2018).
- [25] FFA, Request for Proposals to develop a socio-economic development indicator framework for the Pacific Tuna Industry Forum Fisheries Agency, 2020.
- [26] G. Macfadyen, V. Defaux, Scoping study of socio-economic data and indicators of IOTC fisheries, Indian Ocean Tuna Commission, Victoria, Seychelles, 2019. (<http://iotc.org/documents/scoping-study-socio-economic-data-and-indicators-iotc-fisheries>) (Accessed 10 February 2020).
- [27] C. Willis, M. Bailey, Tuna trade-offs: balancing profit and social benefits in one of the world's largest fisheries, *Fish. Fish.* 21 (2020) 740–759, <https://doi.org/10.1111/faf.12458>.
- [28] EU, EU Council Decision on the position to be taken on behalf of the European Union in the Indian Ocean Tuna Commission (IOTC), and repealing the Decision of 19 May 2014 on the position to be adopted, on behalf of the Union, in the IOTC, *Official Journal of the European Union*, 2019. (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019D0860>) (Accessed 4 August 2021).
- [29] IOTC, Report of the 23rd Session of the Indian Ocean Tuna Commission, Indian Ocean Tuna Commission, Victoria, Seychelles, 2019. (<https://iotc.org/meetings/23rd-session-indian-ocean-tuna-commission>) (Accessed 17 September 2019).
- [30] MoFMRA, Fisheries Act of the Maldives, Ministry of Fisheries, Marine Resources and Agriculture, Male', Maldives, 2019.
- [31] IOTC, IOTC Datasets 2020. (<https://iotc.org/data/datasets>) (Accessed 20 December 2020).
- [32] SFA, Fisheries Statistical Report, Semester 1, 2016, 2016.
- [33] Z. Edwards, H. Sinan, S.M. Adam, A. Miller, State-led fisheries development: Enabling access to resources and markets in the Maldives pole-and-line skipjack tuna fishery, in: J. Zelasney, A. Ford, L. Westlund, A. Ward, O.R. Penarubia (Eds.), *Securing Sustainable Small-scale Fisheries: Showcasing Applied Practices in Value Chains, Post-harvest Operations and Trade*, Food and Agriculture Organization of the United Nations, Rome, Italy, 2020, <https://doi.org/10.4060/ca8402en>.
- [34] European Commission, Bilateral agreements with countries outside the EU, Fish. – Eur. Comm., 2016. (https://ec.europa.eu/fisheries/cfp/international/agreements_en) (Accessed 14 May 2020).
- [35] IOTC, IOTC vessel records, Victoria, Seychelles, 2020. (<https://iotc.org/vessels>) (Accessed 25 September 2020).
- [36] L. Campling, The Tuna 'Commodity Frontier': business strategies and environment in the industrial tuna fisheries of the Western Indian Ocean, *J. Agrar. Chang.* 12 (2012) 252–278, <https://doi.org/10.1111/j.1471-0366.2011.00354.x>.
- [37] IOTC, Status of the implementation of Fleet Development Plans, Victoria, Seychelles, 2018. (<https://iotc.org/documents/status-implementation-fleet-development-plans>) (Accessed 3 September 2020).
- [38] World Bank, Bangladesh: World Bank Helps Improve Coastal and Marine Fisheries, 2018. (<https://www.worldbank.org/en/news/press-release/2018/10/25/bangladesh-world-bank-helps-improve-coastal-and-marine-fisheries>) (Accessed 3 June 2021).
- [39] AllAfrica, Tanzania: regulations set to boost deep sea fishing, 2021. (<https://allafrica.com/stories/202104120439.html>) (Accessed 4 June 2021).
- [40] C. Breuil, D. Grima, Country Review 2014: Somalia, Smart Fish Programme of the Indian Ocean Commission, Ebene, Mauritius, 2014. (<http://www.fao.org/publications>).
- [41] FAO, The State of the World Fisheries and Aquaculture, Food and Agriculture Organization of the United Nations, Rome, Italy, 2020. (<https://doi.org/10.4060/ca9229en>).
- [42] MSC, Search Fisheries – MSC Fisheries, Marine Stewardship Council, 2020. (<https://fisheries.msc.org/en/fisheries/@@search?q=Indian+Ocean+tuna&search=>) (Accessed 13 September 2020).
- [43] Fish Choice, FIP Directory, Fishery Progress, 2020. (<https://fisheryprogress.org/directory>) (Accessed 13 September 2020).
- [44] RECOFI, Recommendation RECOFI/6/2011/1 on minimum data reporting in the RECOFI area, 2011.
- [45] FAO, Regional Fishery Bodies Summary Descriptions – Regional Commission for Fisheries (RECOFI), Food and Agriculture Organization of the United Nations, 2020. (<http://www.fao.org/fishery/rfb/recofi/en#Org-OrgsInvolved>) (Accessed 2 September 2020).
- [46] M. Andriamahefazafy, M. Bailey, H. Sinan, C.A. Kull, The paradox of sustainable tuna fisheries in the Western Indian Ocean: between visions of blue economy and realities of accumulation, *Sustain. Sci.* (2019), <https://doi.org/10.1007/s11625-019-00751-3>.
- [47] Transparency International, Corruption Perceptions Index 2019, Berlin, Germany, 2020. (www.transparency.org/cpi) (Accessed 14 September 2020).
- [48] C.S. Hendrix, S.M. Glaser, Civil conflict and world fisheries, 1952–2004, *J. Peace Res.* 48 (2011) 481–495, <https://doi.org/10.1177/0022343311399129>.
- [49] IOTC, Report of the 24th Session of the Indian Ocean Tuna Commission, Held by video-conference, 2020.
- [50] K. Seto, G.R. Galland, A. McDonald, A. Abolhassani, K. Azmi, H. Sinan, T. Timmiss, M. Bailey, Q. Hanich, Resource allocation in transboundary tuna fisheries: a global analysis, *Ambio* (2020) 1–18, <https://doi.org/10.1007/s13280-020-01371-3>.
- [51] J.K. McCluney, C.M. Anderson, J.L. Anderson, The fishery performance indicators for global tuna fisheries, *Nat. Commun.* 10 (2019) 1–9, <https://doi.org/10.1038/s41467-019-09466-6>.
- [52] G.W. Walton, M. Keen, Q. Hanich, Can greater transparency improve the sustainability of Pacific fisheries? *Mar. Policy* (2020), 104251 <https://doi.org/10.1016/j.marpol.2020.104251>.
- [53] WCPFC, Sixteenth Regular Session of the Scientific Committee: Summary Report, 2020.
- [54] A.M.M. Miller, S.R. Bush, P.A.M. Van Zwieten, Sub-regionalisation of fisheries governance: the case of the Western and Central Pacific Ocean tuna fisheries, *Marit. Stud.* 13 (2014) 1–20, <https://doi.org/10.1186/s40152-014-0017-2>.
- [55] S.R. Bush, M. Bailey, P. van Zwieten, M. Kochen, B. Wiryawan, A. Doddema, S. C. Mangunsong, Private provision of public information in tuna fisheries, *Mar. Policy* 77 (2017) 130–135, <https://doi.org/10.1016/j.marpol.2016.12.019>.
- [56] L. Jordan, P. Van Tuijl, Political responsibility in transnational NGO advocacy, *World Dev.* 28 (2000) 2051–2065, [https://doi.org/10.1016/S0305-750X\(00\)00078-4](https://doi.org/10.1016/S0305-750X(00)00078-4).
- [57] M.T. Pettersson, L.M. Dellmuth, A. Merrie, H. Österblom, Patterns and trends in non-state actor participation in regional fisheries management organizations, *Mar. Policy* 104 (2019) 146–156, <https://doi.org/10.1016/j.marpol.2019.02.025>.
- [58] L. Schiller, G. Auld, H. Sinan, M. Bailey, Decadal changes in international advocacy toward the conservation of highly migratory fishes, *Conserv. Lett.* (2021), e12827, <https://doi.org/10.1111/CONL.12827>.
- [59] GTA, Developing management advice to rebuild the Indian Ocean yellowfin tuna (*Thunnus albacares*) stock in two generations, London, UK, 2020.
- [60] H. Holmes, Tesco set to drop Indian Ocean tuna due to failures to manage overfishing | News | The Grocer, Groc., 2020. (<https://www.thegrocer.co.uk/so-urcing/tesco-set-to-drop-indian-ocean-tuna-due-to-failures-to-manage-overfishing/648032.article>) (Accessed 13 September 2020).
- [61] M.E. Borland, M. Bailey, A tale of two standards: A case study of the Fair Trade USA certified Maluku headline yellowfin tuna (*Thunnus albacares*) fishery, *Mar. Policy* 100 (2019) 353–360, <https://doi.org/10.1016/j.marpol.2018.12.004>.
- [62] I. Scott, K. Stokes, Surveillance Report The Pole & Line Skipjack Fishery in the Maldives Certificate No.: MML-F-137, Male', Maldives, 2015. (<https://fisheries.msc.org/en/fisheries/maldives-pole-line-skipjack-tuna/@assessments>) (Accessed 3 September 2020).
- [63] L. Schiller, M. Bailey, Rapidly increasing eco-certification coverage transforming management of world's tuna fisheries, *Fish. Fish.* 22 (2021) 592–604, <https://doi.org/10.1111/faf.12539>.
- [64] T.H. Morrison, W.N. Adger, K. Brown, M.C. Lemos, D. Huitema, T.P. Hughes, Mitigation and adaptation in polycentric systems: sources of power in the pursuit of collective goals, *WIREs Clim. Change* 8 (2017) 479, <https://doi.org/10.1002/wcc.479>.
- [65] R. Berardo, M. Lubell, The ecology of games as a theory of polycentricity: recent advances and future challenges, *Policy Stud. J.* (2019) 6–26, <https://doi.org/10.1111/psj.12313> (Blackwell Publishing Inc.).
- [66] L. Fanning, R. Mahon, Governance of the Global Ocean Commons: hopelessly fragmented or fixable? *Coast. Manag.* 48 (2020) 527–533, <https://doi.org/10.1080/08920753.2020.1803563>.
- [67] R.E. Kim, Is global governance fragmented, polycentric, or complex? The state of the art of the network approach, *Int. Stud. Rev.* 22 (2020) 903–931, <https://doi.org/10.1093/ISR/VIZ052>.
- [68] M. Andriamahefazafy, C.A. Kull, Materializing the blue economy: tuna fisheries and the theory of access in the Western Indian Ocean, *J. Polit. Ecol.* 26 (2019) 403–424, <https://doi.org/10.2458/v26i1.23040>.
- [69] U.R. Sumaila, J. Jacquet, A. Witter, When bad gets worse: Corruption and fisheries, in: *Corruption, Natural Resources and Development: From Resource Curse to Political Ecology*, Edward Elgar Publishing Ltd, 2017, pp. 93–105, <https://doi.org/10.4337/9781785361203.00015>.
- [70] P. Dutton, Three disputes and three objectives – China and the South China Sea, *Nav. War. Coll. Rev.* 64 (2011). (<https://digital-commons.usnwc.edu/nwc-review/vol64/iss4/6>) (Accessed 14 September 2020).
- [71] K. Issur, Mapping ocean-state Mauritius and its unlaidd ghosts: hydro-politics and literature in the Indian Ocean, *Cult. Dyn.* 32 (2020) 117–131, <https://doi.org/10.1177/0921374019900703>.