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CHARACTERISATION OF THE FISHERIES SECTOR IN THE INDIAN OCEAN: With Particular Reference to Tuna Fisheries in the Bay of Bengal: *Social and Institutional Aspects*

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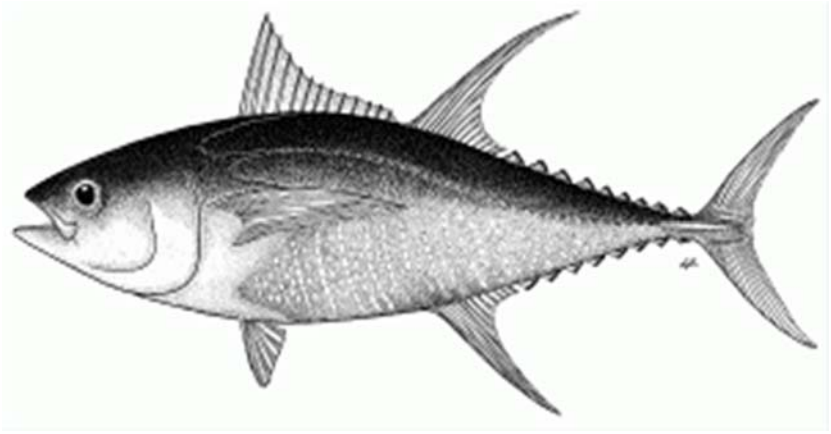
CHARACTERISATION OF THE FISHERIES SECTOR IN THE INDIAN OCEAN:

with Particular Reference to Tuna Fisheries in the Bay of Bengal: (ii) Social and Institutional aspects



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PREFACE

The following report presents a complementary report to the report on environmental and economic aspects of the fisheries sector in the Indian Ocean and more specifically in the Bay of Bengal, with particular reference to the fisheries for tuna and tuna-like species. This report deals with the social and institutional aspects of fisheries in the Indian Ocean and the Bay of Bengal, also with particular reference to fisheries for tuna and tuna-like species.

The overall aim of these two reports is to provide a characterisation of the key features using a standard sector profiling framework.

The information and data on which this report are based have been drawn mainly from published secondary sources.

It is intended that these two preliminary overview reports will contribute to the overall process of research and analysis involved in establishing a sound and up-to-date understanding of the tuna fisheries sector as part of the Oceans Partnership Project –Bay of Bengal (OPP-Bay of Bengal).

The report includes a Summary Table (Page 3) – which highlights the main findings - followed by a series of sections which present the information in greater detail including an Introduction, Objectives and Outputs, Methodology and Schedule, Key Findings and Conclusions.

It is expected that, during the course of the implementation of the OPP-Bay of Bengal, greater detail will be acquired regarding many of the key institutional and social aspects of fisheries in the region covered in this report and that many part of the current document will be updated as this new knowledge is acquired.

ABBREVIATIONS AND ACRONYMS

ABNJ	Areas Beyond National Jurisdiction
BOBP-IGO	Bay of Bengal Programme Inter-Government Organisation
CCRF	Code of Conduct for Responsible Fisheries
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CS	Coastal States
DWFN	Distant Water Fishing Nations
EEZ	Exclusive Economic Zone
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
GDP	Gross Domestic Product
IO	Indian Ocean
IOTC	Indian Ocean Tuna Commission
ISSF	International Seafood Sustainability Foundation
IUU	Illegal, Unregulated and Unreported Fishing
LOA	Length Overall
MCS	Monitoring, Control and Surveillance
MSC	Marine Stewardship Council
OPP	Ocean Partnerships Programme
UNASFSHMFS	United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fishing Stocks
UNCLOS	United Nations Convention on the Law of the Sea
VG-SSF	Voluntary Guidelines on Sustainable Small-Scale Fisheries
WIO	Western Indian Ocean
WPTT	Working Party on Tropical Tuna (IOTC)

CONTENTS

1. INTRODUCTION

Tuna and tuna-like fishes, which include both neritic and highly migratory oceanic species, are the basis for diverse and economically valuable fisheries in the Indian Ocean which involve some 40 nations, including Indian Ocean Coastal States (CS) and Distant Water Fishing Nations (DWFN).

While many inshore tuna fisheries are operated by local fleets of relatively small-scale vessels, largely supplying national and regional markets, other more offshore fisheries, based on tuna stocks which range into the deep sea, and into Areas Beyond National Jurisdiction (ABNJ), are exploited mainly by fleets of large-scale vessels (belonging to both CS and DWFN) with strong linkages to international markets.

However, in common with many fisheries throughout the world, there are concerns over the future productivity and sustainability of tuna fisheries in the Indian Ocean. The current policy frameworks and fisheries management arrangements have recognisable weaknesses at all levels (local, national and regional), including the limited availability and quality of the underpinning data and information for decision-making, the low level of institutional capacity for policy-making and implementation shown by many CS, and the variable extent of cooperation and coherence between nations, both CS and DWFN, which exploit the same fish stocks.

A new World Bank/Global Environment Fund (GEF)-funded initiative called the Oceans Partnership Programme (OPP) has been established to investigate and address the issues facing the future development and management of tuna and other highly-migratory fish stocks, with a series globally-distributed regional projects. The final output of the programme will be a series of business cases to target particular opportunities for future investment and a clear definition of the likely pay-off and impact of these investments with regards to the so-called 'triple bottom line' (economic, social and environmental benefits) for development. The current report is an initial contribution to the work of the OPP-Bay of Bengal project.

2. OBJECTIVES, OUTPUTS AND APPROACH

The primary objective of this report is to produce a preliminary characterisation of the fisheries in the Indian Ocean and the Bay of Bengal, with a particular focus on tuna fisheries.

The work will specifically address social and institutional aspects. Together with the first report on environmental and economic issues this will aim establish an up-to-date multi-disciplinary characterisation of the fisheries sector, forming an essential building block for the subsequent sectoral analysis to be carried out by the project.

The approach to be used to develop the detailed characterisation will be based on a standard sector profiling framework (Box 1). This consists of the four primary areas of environment, economy, social and institutions, and sub-divided in 9 key categories to capture the main features of a fisheries sector. A final section sets out to examine key trends and changes.

For this initial project output, the framework will be populated with information from secondary sources, mainly from the international literature and from international sources. In the future, the project will also undertake an in-depth review and analysis of national information and data, and compare and cross-reference the findings.

It is planned that the current characterisation results will be up-dated, improved and refined over time as the OPP-Bay of Bengal Project is implemented, and as further primary and secondary information and data become available.

Table 1. Fisheries Sector – Profiling Framework		
Environment	**1. Environment and Major fish stocks**	• What are the major aquatic environments and their characteristics? • Identify the major fish stocks, distribution and status
Economy	**2. Production and landings**	• What are the levels of annual and seasonal production by fishery? • What are the overall production trends by key species and fleets?
	3. Fishing fleets and fishing activity	• Identify the fishing vessel and gear characteristics by fleet • Has technology changed over time?
	4. Post-harvest, trade and markets	• How is the catch utilised? What products? • What are the main markets, trends, exports and imports?
	5. Economic valuation	• What is the economic value of the fishery (potential and actual)? • What is the contribution to the economy? (local and national)
Social*	**6. Stakeholders in Fisheries for Tuna and Tuna-like Species**	• What is the level of employment in the sector?
	7. Structure and Activities of Fishing Communities	• What is the structure and the activities of communities?
	8. Stakeholders and stakeholder characteristics in fisheries for tuna & tuna-like species in the India Ocean and Bay of Bengal Region	• Who are the key stakeholders involved in the fisheries for tuna and tuna like species? • How do they differ across the region and different types of fisheries?
Institutions*	**9. Institutions and organisations**	• What are the major institutions and organisations? • What is their role and inter-relationships? • Identify the key fisheries policy and associated legal framework;
Trends	**10. Global Trends, changes and issues**	• What are the key global trends relevant to the fisheries sector? • What are the major factors of change? • Are there specific regional issues affecting the fisheries?

* The sub-divisions of these sections have been modified from that originally envisaged in the first report contributing to this Profiling Framework. This has been done based on the focus of the current work and the information available at the time of its preparation. It is envisaged that more details, particularly on fisheries policy and legal frameworks, and fisheries management arrangements will be added as information on these is acquired during the course of the OPP implementation. Particular attention will be paid to the inclusion of new learning acquired from stakeholder consultations currently underway as part of the project.

3. RESULTS

Table 2. Indian Ocean (plus Bay of Bengal) – Socio-Economic and Institutional Profile - Fisheries for Tuna and Tuna-like Species	
Stakeholders in Fisheries for Tuna and Tuna-like Species	***INDIAN OCEAN*** Figures for numbers of fishers involved specifically in fisheries for tuna and tuna-like species difficult to establish, particularly due to large numbers of artisanal fishers in the region whose multi-species, multi-gear fishing strategies also harvest these fish. Total numbers of fishers for the region is estimated at more than 7 million. ***BAY OF BENGAL*** High levels of involvement in the Maldives where fisheries for tuna and tuna-like species are central to local economy, employment and food security. Significant numbers of fishers involved in Sir Lanka. Historically limited, but growing numbers of fishers targeting tuna and tuna-like species in India and Bangladesh.
Structure and Activities of the Fishing Communities	***INDIAN OCEAN*** **Large-scale purse-seining and long-lining** Dominated by DWFN with some investment by some coastal nations (notably India). **Gillnetting** Large mobile fleets operating particularly in the northern part of the Indian Ocean. Considerable labour mobility between countries in the region to work in fisheries, including in gillnet fleets for tuna and tuna-like species. **Artisanal fisheries** Very significant numbers of people involved in artisanal fisheries in the region, often with high levels of dependence on fisheries. **Pole and line fisheries** Limited to the Maldives, where it is a key fishery in atoll communities, and the Lakshadweep Islands in India. ***BAY OF BENGAL*** Multi-gear, multi-species fisheries common throughout the sub-region, with important fleets of gillnetters/longliners in Sri Lanka. Interest and involvement in fisheries targeting tuna and tuna-like species growing within artisanal fishing communities in India and Bangladesh.
Stakeholders and stakeholder characteristics in fisheries for tuna & tuna-like species in the India Ocean and Bay of Bengal Region	***INDIAN OCEAN*** **Numbers of stakeholders involved in fisheries for tuna and tuna-like species in the Indian Ocean** Estimated numbers involved in all aspects of fisheries for tuna and tuna-like species over 3.3 million, including fishers, fish processors and sellers, and support services. **Capacities & skills of stakeholders** Highly diverse with high levels of expertise in industrial fisheries and areas with long traditions of deep sea fishing, more limited where involvement is recent. ***BAY OF BENGAL*** High levels of skills and capacity among some deep sea fishers in Maldives and Sri Lanka. More limited capacity in India and Bangladesh where involvement is more recent.
Institutions involved in fisheries for tuna and tuna-like species in the Indian Ocean	***INDIAN OCEAN*** **Overview** Institutional arrangements concerned with fisheries for tuna and tuna-like species are complex and operate at many levels. Involve international, national, sub-national and local institutions, as well as non-governmental and non-state actors. High levels of overlap between mandates and areas of competence. Important role of private enterprises operating in the international trade for fish products. **International Institutions** IOTC is key institution with mandate to ensure appropriate use and management of stocks of tuna and tuna-like species in the Indian Ocean. **National Institutions** Increasing emphasis on sustainable management of fisheries throughout the region although fisheries production and welfare measures tend to be given priority. National level policy increasingly reflects concerns regarding market access and certification in order to ensure export earnings, particularly for high value tuna and tuna-like species **Regional / state-level institutions** Interface between institutions and policies at national and sub-national levels are particularly important in India. **Local-level Institutions** Traditional systems of governance still influential in some areas, particularly India. Increasingly important role of associations of producers, boat owners, and fish dealers and processors in representing the interests of the constituencies. **Wider and Cross-cutting Institutional Influences** Range of treaties and agreements to which most countries in the region are signatories. Levels of coherence with national policy and capacity to implement vary considerably. ***BAY OF BENGAL*** Strong focus of most national-level institutions on BOB region on fisheries production and welfare of fishers and fishing communities. Direct involvement in, and capacity to undertake, fisheries management generally limited. Policy coherence and harmonisation between national and sub-national levels is an issue particularly in India where states have considerable autonomy regarding interpretation and implementation of central level policy and legal frameworks. Local level institutions continue to play an important role in conflict-resolution among fishers in India although their potential role in relation to deep sea fishing is less clear.

4. KEY FINDINGS

4.1.Employment in fisheries in the Indian Ocean and Bay of Bengal

Indian Ocean

Precise numbers of fishers involved in tuna fisheries in the Indian Ocean region are difficult to estimate with any degree of precision. While more is known about the numbers and employment on large-scale vessels (over 24m LOA) documented by the IOTC, data regarding the far larger fleets of small-scale fishing vessels in the region is generally less reliable. Estimating numbers of fishers involved specifically in tuna fisheries is made more difficult by the multi-species nature of many small-scale fisheries in the region.

The table below provides approximate figures for those engaged in marine fisheries employment in the countries around the Indian Ocean and the Bay of Bengal, along with figures for their respective EEZ areas in the Indian Ocean and coastlines. For those countries on the Bay of Bengal that also have coastlines on other sea areas, such as Thailand, Malaysia and Indonesia), the figures for numbers of fishers are national and therefore include fishers that may not fish in Indian Ocean waters. Note that these figures are estimates for overall involvement in the fisheries sector rather than fishers specifically involved in fisheries for tuna and tuna-like species, these being discussed later.

Bay of Bengal

The levels of employment in fisheries for tuna and tuna-like species in the 4 Bay of Bengal nations differs very significantly, both in terms of the numbers of people employed and the relative significance in relation to other fisheries and employment in coastal areas in general.

In the Maldives, the archipelagic nature of the nation and its oceanic setting means that the majority of fishers are probably involved in fisheries for tuna and tuna-like species. Tuna constitutes an critical component of the diet of most people on the islands and fisheries for tuna are a fundamental part of the economies of atoll communities, both in terms of earnings and employment. Given the remoteness and limited set of alternatives available to inhabitants on atolls in the Maldives, tuna fisheries are likely to continue to play an important role as a source of employment for the foreseeable future.

Sri Lanka, with a limited continental shelf area, also has a relatively well-developed tradition of fishing in deep waters which has, over the last three decades, included significant long-distance fishing activities, particularly in the central and eastern parts of the Indian Ocean. For many important fishing communities in Sri Lanka, fisheries for tuna and tuna-like species are key.

In India, which is characterised by a large fishing community, historically very limited numbers of fishers have been involved in fisheries specifically targeting tuna and tuna-like species but many small-scale and coastal fishers are known to catch tuna as part of their seasonal fishing strategies. With the growth and diversification of India's economy, coupled with over-exploitation of coastal fisheries resources, more fishers are currently engaging in fishing in deeper waters, often targeting tuna and tuna-like species. The significance of employment in this sub-sector is therefore dynamic, also reflecting wider changes in the structure and activities of fishing communities in the country (see Box 1).

In Bangladesh, fisheries for tuna have also been historically limited due to limited access to deeper waters in the Bay of Bengal. However, there is increasing interest in exploiting marine resources in general, and deeper water fisheries resources in particular, given the intense pressure in inshore waters, and the numbers of coastal fishers targeting tuna and tuna-like species is believed to be growing.

Box 1: Changing Fishing Communities in Tamil Nadu and Puducherry, India

Research conducted as part of the World-Bank supported Fisheries Management for Sustainable Livelihoods Project in Tamil Nadu and Puducherry between 2010 and 2012 highlighted the dynamic nature of fisheries populations along the coasts of these two states. While, historically, the traditional caste groups involved in fisheries have been relatively inward-looking and tied to their traditional occupations, significant changes over the past 2 decades are leading to important changes. Increasing numbers of fishers and changes in technology, coupled with a significant lack of effective management measures for coastal fisheries, have led to steadily increasing pressure on the resources in coastal waters and increasingly marginal returns from fishing for most artisanal and small-scale fisheries. Conflicts between the artisanal and mechanised sectors have been increasing. The Indian Ocean *tsunami* catastrophe in 2004, which had particularly severe impacts on fishing communities along the Coromandel coast of Tamil Nadu and Puducherry, marked a significant watershed. The influx of outside assistance to these communities, and the associated improvements in communications and access to education generated by the relief and rehabilitation process, seems to have led many younger fishers in particular to pay more attention to developments outside of their own communities. Coupled with the opportunities provided by the growth of the Indian economy, this opening up of fishers' perspectives is encouraging more and more youth from the fishing community to seek education and employment in other sectors. Among those that remain in fisheries, there is also an increasing willingness to look for new fisheries options, including fishing for new species in waters further offshore and linkages with new marketing chains for distant markets (facilitated by improved transport infrastructure).
based on **FIMSUL,** 2011b).

Table 3: Estimates of marine fisheries employment in the Indian Ocean and Bay of Bengal					
Country	**Coastline - km (FAO Fisheries Profiles)**	**EEZ Area -km^2 (Seaaroundus.org)**	**Marine fisheries employment (estimates based on various sources)**	**% GDP**	**Marine fishing craft**
Bay of Bengal					
India	8,118	1,629,607 (mainland) 659,590 (Andaman & Nicobar Islands)	1,508,310	1.07%	264,350
Sri Lanka	1,770	530,945	221,350	2%	53,988
Bangladesh	710	84,846	310,100	2.7%	43,960
Maldives	644	916,011	20,066	6%	979
Myanmar	1,930	511,389	1,398,000	3.5%	30,795
Thailand	750 (Andaman Sea)	118,714 (Andaman Sea)	109 635 (national total)	1.2%	58 119
Malaysia	1,110 (Malacca Straits)	68,546 (Peninsula West)	79 616 (national total)	1.73% (2004)	36 136
Indonesia	c.8,500 (Indian Ocean)	1,410,200 (Indian Ocean)	2 641 967 (national total)	2.8% (2008)	25,158
Indian Ocean					
Pakistan	1,120	222,255	146,917	0.23%	6335
Iran	2,700	65,850 (Oman Sea)	125,000		10,700
Oman	1,700	529,559	45,200		21,475
Yemen	2,350	509,240 (Arabian Sea)	220,000	1,49%	80,000
Somalia	3,300	831,059	n.a.	n.a.	n.a
Kenya	640	162,794	10,000	0.5%	2,400
Tanzania	1,424	241,129	43,000	5%	
Mozambique	2,470	571,452	90,000	4%	15,187
Madagascar	4,828	1,200,330	196,370	2.9%	
Comoros	340	164,643	32,500		5,000
Seychelles	491	1,331,964	5,600		476
Mauritius	177	1,275,765	11,900	4.9%	2,798
Australia	36 735 (whole country)	6,369,268 (whole country)	11,600		
TOTAL			**7,227,131**		

Note: This table does not include estimates for indirect employment in fisheries in Indian Ocean nations, as figures for this are not widely available. In the small-scale fisheries sector, involvement in the supporting activities such as fish marketing and handling, fish processing, ice supply, and servicing of fishing equipment and craft engage very significant numbers of people, in many cases more than those involved directly in fish harvest

The table above does not include estimates for indirect employment in fisheries in Indian Ocean nations, largely because figures for this are not widely available. Particularly in the small-scale fisheries sector, involvement in the various activities supporting marine capture fisheries such as fish marketing and handling, fish processing, ice supply, and the supply and servicing of fishing equipment fishing craft and marine engines engage very significant numbers of people, in many cases more than those involved directly in fish harvest.

4.2. Structure and activities of fishing communities

4.2.1. Large-scale purse-seining and long-lining

Indian Ocean

Larger-scale fisheries for tuna and tuna-like fisheries are, by their very nature, generally based on landing centres equipped with appropriate facilities to handle larger catches and ensure handling facilities that can maintain quality and ensure access to distant markets. Significantly, industrial scale fisheries for tuna in particular tend to operate out of relatively few urban-based landing centres: Victoria in the Seychelles is the principle landing centre for industrial purse-seine fleets, while Port-Louis (Mauritius), Durban (South Africa) and Diego Marquez (Madagascar) are important centres for the long-liner fleet. The important gillnet fisheries for tuna, which are particularly significant in the Arabian Sea area of the Western Indian Ocean and in fishing areas targeted by Indian and Sri Lankan fisheries, land at a range of landing centres in Iran, India, Pakistan and Sri Lanka (POSEIDON *et al*, 2014).

The communities involved in these larger-scale fisheries for tuna and tuna-like fisheries are cosmopolitan and diverse. Fishing crews are often drawn from a wide range of nations that may or may not be related to the flag state of the vessels concerned. Many of these vessels are based for seasonally in ports in the Indian Ocean but crews may have limited interaction with local communities beyond the landing of fish. However, the large-scale fish landing centres that service these vessels are often major local employers and have major economic impact through the creation of demand for servicing vessels, handling and processing fish catches (including ice and fuel supply, canning facilities, transport) and facilities for moving landed fish to distant markets, mostly in frozen or processed form. Significantly, the majority of catches from purse-seine fisheries in the Western Indian Ocean are processed in facilities within the region (POSEIDON *et al*, 2014).

Bay of Bengal

Large-scale purse seine and longlining operations in the Bay of Bengal sub-region are limited although some foreign vessels, particularly long-liners, from DWFN operate out of ports in the region (particularly from Chinese and Taiwanese vessels operating out of Sri Lanka).

4.2.2. Gillnetting

Indian Ocean

For the more numerous fleets of large scale gillnetters, operating in particular out of Oman, Iran and Pakistan, the structure of the communities involved is often more complex. Many fishing craft based themselves seasonally in harbours distant from their home bases - for example Indian long-liners operating out of Oman, Iranian gillnetters operating from Pakistani ports. Crews are often heterogeneous in terms of their national origins - Bangladeshi fishing labour on Omani fishing craft, Pakistani labour on Iranian fishing craft. Many of these fishers are highly mobile, moving around the Indian Ocean in pursuit of their highly mobile targets. The long distances covered, and the significant periods for which boat crews are absent from their home bases, clearly has impacts on the structure and form of activities of their home communities. Handling and processing of tuna-related catches may be a relatively minor activity (unless related to catches

by other, smaller-scale local operations) although fishing still plays an important economic role with the community.

The landing centres from which these craft operate are more diverse and have to provide a wide range of services to support the operations of these fleets. Marketing channels for tuna and tuna-like also seem to be more diversified depending on their location and the marketing channels they feed into. A proportion of catches, particularly skipjack and neritic tunas, are landed and fed into local and national urban markets for domestic consumption; larger quantities may be frozen for movement to canning facilities which may be local, in neighbouring nations or distant (such as Thailand).

Bay of Bengal

Gillnetting represents a significant proportion of the fishing effort directed at tuna and tuna-like species from the Bay of Bengal countries, with the exception of the Maldives. Many gillnetters in the sub-region also operate as longliners, depending on season and fishing location and multiple-use craft are being promoted by government policy aimed at encouraging deep sea fishing (e.g. Tamil Nadu, India - GoTN, 2015).

4.2.3. **Artisanal fisheries**

Particularly in South Asian nations -India, Pakistan -and in Oman, fisheries for tuna and tuna-like species also involves a large number of small-scale fishers who may target these species seasonally, or as part of more diverse catches from their coastal fishing activities. Operations at this scale include hand-lining, gillnetting and smaller long-line fisheries. In these cases, the communities in which these fisheries are based are generally communities where fisheries represents the key livelihood activity and underpins the economy through income from landings, and employment in fishing, fish handling, processing and marketing. Depending on the country, these communities often have distinct identities linked to the social status of fishers in the local cultural setting.

Marketing arrangements for these fisheries are varied. Smaller tuna, particular coastal and neritic tunas, often feed into local marketing channels for fresh fish, playing a role in domestic food supply. Larger fish are often bought up for onward sale to buyers for companies freezing or processing fish for sale to more distant markets and for international export. Tuna processing facilities are less developed in South Asia compared to other nations in the Indian Ocean region but centres for tuna processing and marketing have developed in some areas (notably in landing centres in Pakistan and in southern India). The precise nature of relationships between exporters, middlemen and fishing operations are not well understood in many of these cases.

Bay of Bengal

Artisanal fishing communities represent a large and diverse constituency in the Bay of Bengal sub-region and, in terms of numbers of people involved, are significant actors in fisheries for tuna and tuna-like species, even where these may not constitute specific target species for their activities. Information on landings from this sub-sector is generally limited.

There are indications, at least from India, that greater numbers of artisanal fishers are beginning to specifically target tuna in particular along some sections of the western shoreline of the Bay of Bengal, particularly using gillnets and lines (BOBP, pers. comm.).

Caste identity plays an important role in defining the characteristics of fishing communities in India, although the impacts of increasing mobility of labour may be attenuating the importance of this.

Ownership of fish operations is also diverse in these situations. Owner-operated fishing enterprises are more common and fishing crews are more likely to be made up of local fishers, although fishing labour from outside the fishing community can also be found. Migrant fishers from distant fishing communities may also

play a role (for example fishers from the east coast of India moving seasonally to the west coast in order to work on fishing craft there).

4.2.4. **Pole and line fisheries**

Indian Ocean

Pole and line fisheries in the Indian Ocean represent something of a case apart as they are limited to a few very specific contexts and particularly important in the Maldives, a few locations in India, and, more recently, in South Africa..

Bay of Bengal

The Maldives represents the only nation in the region where pole and line fisheries for tuna are significant, and here they are the mainstay, not only of fisheries for tuna and tuna-like species, but for the entire fisheries economy of the country. These fisheries are locally based operating on a daily basis out of the 200 inhabited atolls of the island chain, with an important part of the catch landed and consumed locally. A significant portion of the catch is processed locally into 'Maldives fish' for export to Sri Lanka while a similar amount of purchased by a limited number of export companies for freezing and export to canneries, mostly in Thailand. These fisheries are major employers in the small island communities of the Maldives and are central to the local economy in terms of earnings and employment.

Limited pole and line fisheries also play an role in the Lakshadweep islands off the south-west coast of India. On one island in particular, Minicoy, they are operated in a way very similar to the Maldives and represent the most significant fishing operations on the island. Some extension of pole and line fishing is also underway in other islands of the Lakshadweep archipelago.

4.3. Stakeholders and stakeholder characteristics in fisheries for tuna & tuna-like species in the Indian Ocean and Bay of Bengal

4.3.1. **Numbers of stakeholders involved in fisheries for tuna and tuna-like species in the Indian Ocean**

As indicated above, the stakeholders involved in fisheries for tuna and tuna-like species in the Indian Ocean are highly diverse and varied across different scales of operations and types of fishing activity. The sets of stakeholders involved in industrial scale purse seine fisheries by distant-water fishing nations (DWFN) in the Indian Ocean are very different compared to those involved in small-scale seasonal tuna fisheries in the coastal waters of Indian Ocean coastal states. The table below reviews these stakeholders and aims to give some estimates of the numbers of different stakeholders involved. It is arranged according to the types and scales of fisheries concerned, with indications of the countries involved in each. Robust data concerning any of these categories of stakeholders is largely lacking and therefore should be regarded as purely indicative.

Table 4: Estimates of Numbers of Key Stakeholders involved in Fisheries for Tuna and Tuna-like Species in the Indian Ocean and Bay of Bengal

Type of fisheries	Indian Ocean nations	Key stakeholder groups	Nos. (est.)	Key characteristics
Large-scale purse seine and long-liner fisheries	Seychelles, Mauritius, Madagascar,	Fishing crews	42,000	Highly cosmopolitan
		Fishing operation owners	60	International fishing corporations
		Processing plant labour	6,000	Highly cosmopolitan, often non-local
		Processing plant owners/exporters	20	International fish trade

Large gillnetters	Iran, Pakistan, Oman	Fishing crews	60,000	Regionally cosmopolitan, often non-local or hired from operating port (as opposed to home port)
		Fishing operation owners	6,000	National fishing entrepreneurs
		Processing plant labour	20,000	Probably cosmopolitan, both national and international
		Processing plant owners	200	National fish dealers / exporters
Pole & line	Maldives, Sri Lanka	Fishing crews	50,000	Mostly local fishers
		Fishing operation owners	3,000	National fishing entrepreneurs
		Fish processors	20,000	Mostly locally based
		Fish exporters	50	National
		Fishing support services	1,500	Locally based
		Fish traders	1,000	Locally and nationally based
Artisanal fishing operations (handline, gillnet, longline)	Indonesia, Iran, India, Pakistan, Yemen, Sri Lanka, Maldives, Malaysia, Oman	Fishing crews	1,200,000	Highly diverse, mostly national and/or locally based
		Fishing operation owners	400,000	Local owner/operators, some local fishing entrepreneurs
		Fish processors	800,000	Local fish processors, some national
		Fishing support services	200,000	Locally based
		Fish traders	600,000	Local and nationally based
TOTAL KEY STAKEHOLDERS in FISHERIES for TUNA & TUNA-LIKE SPECIES in the INDIAN OCEAN (estimated)			**3,389,830**	

It should be noted that figures for artisanal fisheries stakeholders here are based on estimated numbers of artisanal fishing operations which often include operations that do not target tuna and tuna-like fishes and are likely to therefore be over-estimated. However, given the difficulty in separating out artisanal fishers specifically targeting, even on a seasonal basis, tuna and tuna-like species, overall figures for the artisanal sector have been included here. The figures above should therefore be regarded as estimated numbers for potential stakeholders in the sub-sector and taken only as an approximate guide to indicate the scale of the social and economic issues involved in these fisheries.

4.3.2. **Capacities & skills of stakeholders**

As is to be expected given the heterogeneous nature of the stakeholders involved in fisheries for tuna and tuna-like species in the Indian Ocean, levels of skills and capacities are also very varied. Industrial fleets of purse-seiners and long-liners are characterised by highly skilled operators and crews operating in an extremely high-pressure environment (bearing in mind the levels of investment involved). Similarly, the captains of most large-scale gillnetters, and owner-operators in the artisanal sub-sector, are also generally highly skilled and knowledgeable, particularly where fishing for tuna and tuna-like species involved long-distance movement in the high seas and offshore areas, and ability to adapt to different cultural and socio-economic relations where fishing is carried out from distant fish landing centres, often in countries other than fishing crews' home base. The levels of technology involved, increasingly even in artisanal scale operations, is often relatively high involving the use of communications equipment, storage technology such as ice-making machines, navigational devices and fish finding equipment.

The skills levels involved among fishing crews at the artisanal level is less well-known.

Many of the fisheries targeting tuna and tuna-like species in the Indian Ocean are relatively recent - large-scale exploitation developed dramatically from the 1960s onward and, in many areas, smaller-scale and artisanal fishers only began to move offshore to fish for large pelagic species from the 1980s onwards. In part the different levels of involvement in these fisheries reflect the status of coastal fisheries in different countries around the Indian Ocean.

Likewise, changes in patterns of fish utilisation and marketing have played an important role. With the spread of motorisation and mechanisation in fisheries throughout the region from the 1960s onwards, there has generally been a steady move away from village-based landings, and fishing operations based purely in home fishing communities, towards more mobile operations focussing on fewer, better equipped fishing harbours where the infrastructure and facilities to support these operations are available. Access to ice, petrol and proper handling facilities is increasingly a key part of any fishing operation and fishing operations are progressively becoming more focussed on those fishing centres that can provide these services. Better communications networks, both in terms of telephones that enable access to up-to-date information on prices and demand, and transport networks that enable quicker movement of fish from landings to distant markets, are also key. The result is that international demand for fish, including for tuna and tuna-like species, now effects almost all fisheries operations, including small-scale artisanal fisheries in all but the most remote locations. This penetration of influence from distant markets is an important driving force in stimulating interest in fisheries for tuna and tuna-like species that are in demand worldwide.

Bay of Bengal

Specifically in the Bay of Bengal countries, nations with relatively limited inshore fisheries and continental shelf areas (such as Sri Lanka and the Maldives) have a longer tradition of involvement in fisheries for tuna and tuna-like species, while nations with significant coastal resources, such as India and Bangladesh, have only begin to focus on fisheries in deeper waters in response to growing market demand for tuna and pressure on coastal fisheries due to over-exploitation by growing artisanal and mechanised fishing fleets. The availability of appropriate technology for offshore fishing operations has also played a role in changing patterns of exploitation of resources in deeper waters.

There is evidence in the sub-region of increasing involvement of labour from outside of the fishing community in work on fishing vessels in some areas. The extent to which this is true on vessels targeting tuna fisheries in particular is less clear. In some areas, notably in India and Bangladesh, fishing in deeper waters within or outside the EEZ is a relatively new development and it is to be expected that skill levels are relatively lower, although some specific groups are known to have long traditions of deep-sea fishing and significant capacity to undertake long-range fishing operations using relatively sophisticated fisheries technology (e.g. deep sea fishers in some specific areas of southern Tamil Nadu).

4.4. Institutions involved in fisheries for tuna and tuna-like species in the Indian Ocean and Bay of Bengal

4.4.1. **Overview**

As to be expected, in a heterogeneous set of fisheries such as those targeting tuna and tuna-like species in the Indian Ocean, the institutions involved make up a patchwork of inter-locking, and often over-lapping, jurisdictions, mandates, capacities and effectiveness. In common with other oceans, institutions concerned with tuna fisheries operate at a variety of scales, ranging from regional fisheries bodies mandated by the international community (such as the Indian Ocean Tuna Commission - IOTC), through national bodies with jurisdiction over EEZs, national, and in some important cases, sub-national administrative bodies with

responsibility for territorial waters, and local or traditional bodies with recognised or *de facto* powers relative to fisheries in local areas.

International treaties, such as CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), provide an important backdrop to these institutional arrangements specifically relating to fisheries in the region, with most of the countries concerned being signatories to all or some of these international instruments.

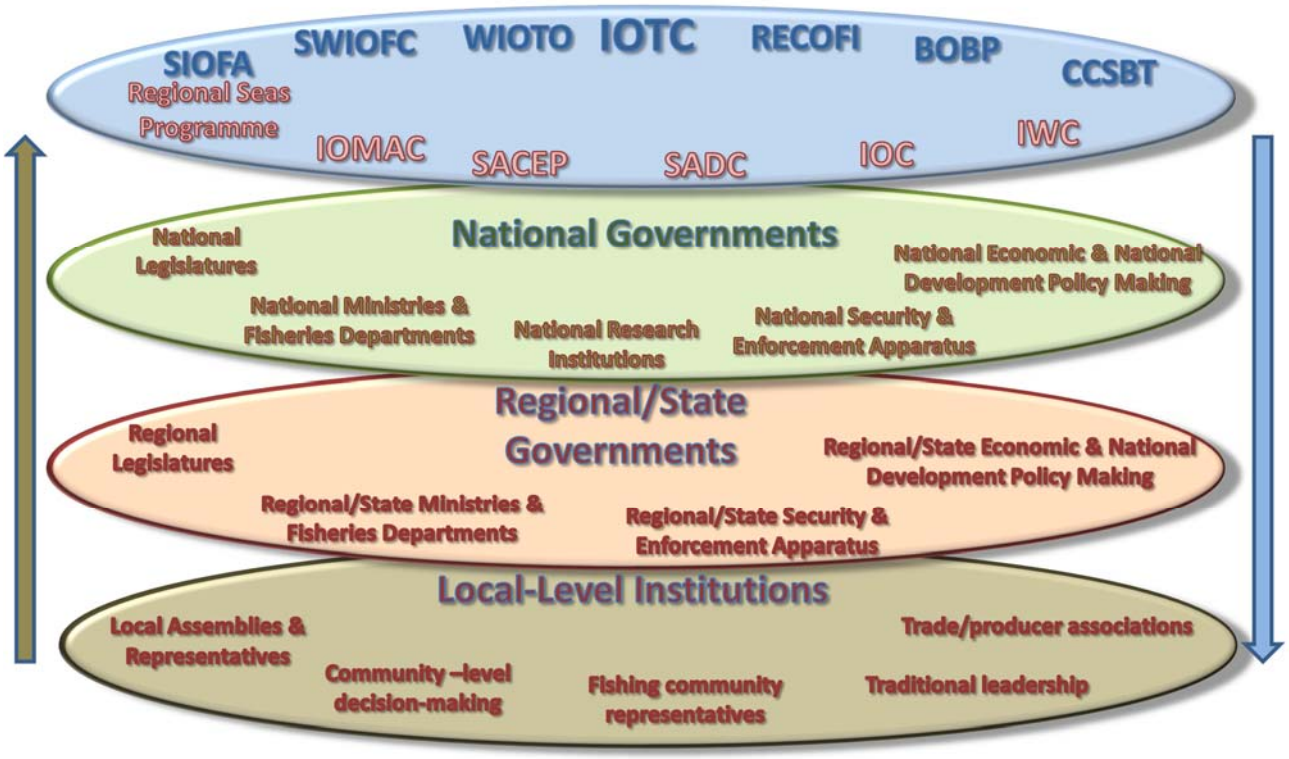
A further overlay to this patchwork of institutional arrangements is provided by an increasingly important network of non-governmental organisations which are directly concerned with fisheries, marine conservation, environmental protection and the social and economic welfare of people in Indian Ocean states. These operate at the international level, involving major groups such as Greenpeace, IUCN or Conservation International, and at national, regional and local levels. A very significant development among these types of organisations has been the growth of organisations (such as the Marine Stewardship Council - MSC) certifying fisheries production with a view to harnessing consumer demand in developed countries for ecologically and socially sustainable products and establishing monitoring and control mechanisms to enable certification regimes to be maintained.

Other key non-state actors include the growing array of associations and trade-based organisations, representing fishers, fishing craft owners and entrepreneurs, fish workers, processors and dealers, as well as higher-level trade associations representing the interests of larger corporations and companies involved in the fishing industry and the fish trade internationally.

Fish represents one of the most traded food commodities worldwide and tuna and tuna-like species represent one of the most valuable items in this trade. The international trade in fish involves a complex network of private enterprises and businesses ranging from transnational corporations operating at an international level, dealing with fish being sourced from all the world's oceans, to small-scale fish buyers and processors focussed on specific products from local fisheries which may be fed into both local, national, regional and international marketing networks. It is important to remember that, while international organisations and state institutions may provide important institutional and policy frameworks for fisheries in the region, the driving forces that determine most fishers choices about fishing operations and fish sales are market-related and articulated through the actions of private, non-state actors. Fisheries for tuna and tuna-like species are no exception in this regard, and the role of market actors is key. Given the importance of international trade in fish products, the form of linkages between retail outlets and producers at all levels is also important. While at the local-level, these linkages may be relatively short and closely integrated (for example, fisher's wives market and process fish landed by their husbands working on fishing operations), the international market chain for fisheries commodities can also stretch from local fish landings in the Indian Ocean to supermarket shelves in the EU, North America and the Middle and Far East. With the growing role of large-scale retail in more developed nations, and their exceptional buying power, strategic decisions on pricing, fish supply and access arrangements targeting distant markets can have knock-on effects right down to the level of producers and harvesters.

While it is impossible to represent all the institutional actors involved in fisheries for tuna and tuna-like species concisely, the diagram below seeks to illustrate some of these levels and potential complexity of interactions between these levels.

Figure 1: Institutions and Interactions in Fisheries for Tuna & Tuna-like Species in the Indian Ocean



The interactions between these multiplicity of institutions operating at different levels can be extremely complex. Often mandates and roles overlap both within levels and between levels, or, perhaps more significantly, those mandates and roles are not clearly defined or do not take into account the different levels involved. Beyond their specific mandates, **capacity** to implement institutional mandates is also extremely variable, between and within levels, between different parts of the Indian Ocean region and between different countries.

4.4.2. International Institutions

The table below focuses on the key international institutions, both those with specific responsibilities relating to fisheries and those with wider responsibilities that can influence fisheries in the Indian Ocean. This table focuses on those institutions who currently play an active role in influencing fisheries-related decisions and management in the Indian Ocean (several of the institutions identified in the diagramme above may be mandated to play some role in this regard but are either inactive or marginal to key decision-making regarding fisheries in general, and fisheries for tuna and tuna-like species in particular.

Table 5: Key Institutions, Membership & Mandates relating to fisheries for tuna & tuna-like species in the Indian Ocean

Institution	Membership	Mandate	Type of body
IOTC - Indian Ocean Tuna Commission	*Full* Australia, Belize, China, Comoros, Eritrea, European Union, France, Guinea, Indonesia, India, Islamic Republic of Iran, Japan, Kenya, Republic of Korea, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Sultanate of Oman, Pakistan,	*" To promote cooperation among the Contracting Parties (Members) and Cooperating Non-Contracting Parties of the IOTC with a view to ensuring, through appropriate management, the conservation and optimum utilisation of stocks covered by the organisation's establishing Agreement and encouraging sustainable development*	Established 1993 under Article XIV of FAO Constitution. Statutory body under the Food and Agriculture Organisation (FAO).

	Philippines, Seychelles, Sierra Leone, Somalia, Sri Lanka, South Africa, Sudan, Tanzania, Thailand, United Kingdom, Yemen. *Cooperating non-contracting partners* Bangladesh, Djibouti, Liberia, Senegal	*of fisheries based on such stocks."*	
SWIOFC - South-West Indian Ocean Fisheries Commission	Comoros, France, Kenya, Madagascar, Maldives, Mauritius, Mozambique, Seychelles, Somalia, South Africa, Tanzania, Yemen.	*"To promote the sustainable utilization of the living marine resources of the Southwest Indian Ocean region, by the proper management and development of the living marine resources, and to address common problems of fisheries management and development faced by the Members of SWIOFC, without prejudice to the sovereign rights of coastal States."*	Established 2004 under Article IV 1 of the FAO Constitution (*"to advise on the formulation and implementation of policy and to coordinate the implementation of policy.")*
RECOFI - Regional Commission for Fisheries	Bahrain, Iraq, Iran (Islamic Rep. of), Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates.	*"To promote the development, conservation, rational management and best utilization of living marine resources, as well as the sustainable development of aquaculture within its area of Agreement."*	Established 2001 under Article XIV of FAO Constitution.
CCSBT - Commission for the Conservation of Southern Bluefin Tuna	*Members of Extended Commission* Australia, European Union, the Fishing Entity of Taiwan, Indonesia, Japan, Republic of Korea, New Zealand, South Africa. *Cooperating Members* Philippines	*"To ensure, through appropriate management, the conservation and optimum utilisation of southern bluefin tuna."*	Created under the Convention for the Conservation of Southern Bluefin Tuna (1993) (non-UN body).
BOBP-IGO - Bay of Bengal Programme Inter-governmental Organisation	India, Sri Lanka, Bangladesh, Maldives	*"To enhance cooperation among member countries, other countries and organisations in the region and provide technical and management advisory services for sustainable coastal fisheries development and management in the Bay of Bengal region."*	Established 2003 under agreement between member countries.
IOC - Indian Ocean Commission	Comoros, France/Réunion, Madagascar, Mauritius, Seychelles	• *Political & diplomatic cooperation,* • *Economic & commercial cooperation* • *Sustainable development in a globalisation context, cooperation in the field of agriculture, maritime fishing, & the conservation of resources and ecosystems* • *Strengthening of the regional cultural identity, cooperation in cultural, scientific, technical, educational & judicial fields.*	Established 1984 under the Victoria Agreement between member countries.

This table clarifies the potential for overlapping institutional mandates regarding fisheries for tuna and tuna-like species in the Indian Ocean. In practice, the most important single institution with a specific mandate for the management of tuna fisheries in the region is the Indian Ocean Tuna Commission (IOTC) which, since

its establishment in 1993 has played a key role in undertaking research on the fisheries and acting as a platform for the negotiation and establishment of production ceilings for tuna and tuna-like fisheries throughout the region. While hampered by limited resources and the constraints due to its status as a UN body (Taiwan, historically an important fishing nation in the Indian Ocean, is not a member as it is not a member of the UN), the IOTC continues to represent the key institution at the international level concerned with the management of tuna and tuna-like species in the Indian Ocean.

Significantly, all the international bodies identified above have an advisory role. They are in a position to make recommendations to their members

4.4.3. **National Institutions**

Most coastal nations in the Indian Ocean have departments of fisheries, or dedicated ministries of fisheries and/or aquatic resources which have responsibility for developing fisheries regulations and management measures to be passed by their respective legislatures, determining policies relating to the development of fisheries, and implementing monitoring, surveillance and control measures. The capacity of these administrative bodies to implement policy and enforce legislation regarding fisheries is extremely variable, with many administrations hampered by shortage of resources, personnel and enforcement capacity. This often contributes to a degree of disconnect between policy and formal policy instruments and the realities of fishing activities at sea and in the communities where they operate.

Historically fisheries policy in most of the countries around the Indian Ocean has been dominated, until relatively recently, by the drive to increase fisheries production in order to maximise food security and export earnings. The principle instrument for achieving these increases has been the modernisation of fishing fleets through motorisation and mechanisation and a wide range of subsidy schemes to support fishers in both their investment in new technology and in operational costs. In many countries, the welfare of fishing communities has also been traditionally regarded as a key area of fisheries policy, with fishing communities generally regarded as something of a 'special case' in terms of their vulnerability to poverty and natural disasters. This has generated a wide range of welfare schemes throughout the region specifically targeting fishing communities.

From around 2000, concern regarding the overexploitation of coastal fisheries resources has led to a greater emphasis on fisheries management in an effort to mitigate the degradation of coastal fisheries resources. The principle instruments deployed for this have been input regulation (controls on fishing nets and fishing practices, licensing), spatial controls (zoning for fisheries) and the promotion of fishing in deeper waters offshore in an effort to alleviate pressure on coastal resources.

In fisheries for tuna and tuna-like species, catches on the high seas are monitored by the IOTC and 'management advice' issued based on the results of this monitoring and IOTC's estimates of fish stocks. While these measures are generally thought to be reasonably effective with regards to the large-scale industrial fleets operating in the Indian Ocean (particularly the DWFN fleets), for the national fleets they depend on national reporting which is, in some instances, constrained by limitations in national systems for data collection on catches and fleets, and on-going concerns regarding IUU fishing in the Indian Ocean.

Throughout the Indian Ocean, national policies are paying increasing attention is being paid to the promotion of more sustainable fishing methods for tuna and tuna-like species, in response to pressure from international non-governmental organisations and market demand for fish products certified as originating from ecologically and socially sound fishing practices. The influence of certification schemes, such as MSC certification, and regulations governing access to major fish markets such as the US and the EU, has grown significantly over the past decade and the critical need for exporting countries to ensure certification for high-value products, such as tuna in particular, has become a major driver of fisheries policy in this sub-sector (see Box 2).

Box 2: Influence of Certification Measures on Fisheries Policy in the Indian Ocean

Recent years have seen several important episodes relating to fisheries for tuna in the Indian Ocean that illustrate the increasingly important role of certification schemes on fisheries policy throughout the region.

In Sri Lanka, exports of high-value tuna and swordfish to EU countries have represented an increasingly important source of foreign exchange earnings. In 2013, the value of such exports reached over €74 million. In 2010, the EU introduced new regulations making certification of imports of fish products conditional on the adoption and implementation of specific measures to address Illegal, Unreported and Unregulated (IUU) fishing. In October, 2014, certification for fish imports from Sri Lanka to the EU was withdrawn in the wake of reports that insufficient efforts were being made by the authorities in the country to combat IUU fishing by Sri Lankan craft. The impact of this ban on the fish trade from Sri Lanka was significant and led to the rapid introduction by the Sri Lankan Ministry of Fisheries and Aquatic Resources of a series of measures aimed at tightening controls on high seas fishing activities, improving monitoring of fishing activities, increasing penalties for IUU fishing, introducing new regulations on high seas operations, shark fishing and fishing gear marketing, and raising awareness and capacity among fishers to combat IUU fishing activity. Following these efforts, the EU ban on Sri Lankan fish imports was lifted in April, 2016. (OPP, 2016b)

Based on IOTC estimates of the fish stock and their monitoring of catches, yellowfin tuna stocks in the Indian Ocean were generally regarded as being in 'healthy' condition until 2015, although concerns had been expressed regarding levels of fishing effort and the lack of defined harvest controls. In late 2015, IOTC's estimates underwent a significant revision, indicating that stocks were being overfished and yellowfin tuna from the Indian Ocean was given a 'red card'. This has encouraged both non-governmental organisations and tuna trade organisations to pressure the IOTC to introduce stricter harvest controls on yellowfin tuna in the Indian Ocean (ISSF, 2015).

Changes in the IOTC's assessment of the status of stocks for yellowfin tuna in the Indian Ocean overall have had direct impacts on the certification status of individual fisheries. Pole and line fisheries for both yellowfin and skipjack tuna in the Maldives had received MSC certification in 2012. However, as a direct result of the IOTC assessment of yellowfin stocks in late 2015, certification of the yellowfin component of these fisheries was withdrawn in early 2016. (OPP, 2016a; MSC, 2016a; MSC, 2016b).

Bay of Bengal

In the Maldives, national level policy making has always paid careful attention to fisheries sustainability and, while capacity in key government institutions is limited, efforts to align national policy with international standards and with the changing demands of international markets for fish products have been pursued. The Maldives has recently played a central role in promoting the establishment of harvest control rules for skipjack tuna in the Indian Ocean by the IOTC.

Recent reviews of fisheries policy in Sri Lanka (MFARD 2012; OPP, 2016b) indicate that production remains the key focus of fisheries policy, although the need for sustainable development and improved management is recognised.

National level policy in India has, in the past, had a consistent emphasis on maintaining or increasing fisheries production in order to ensure food security for its population, and livelihood security for fishing communities, widely regarded as being an under-privileged and vulnerable group. However, draft versions of the new National Fisheries Policy (GoI 2016) suggest that the new policy document is likely to give more emphasis to sustainable management of fisheries and makes specific reference to the fact that marine fisheries resources are not inexhaustible. The potential for increased use of tuna and tuna-like species in ABNJ areas is also specifically highlighted.

In Bangladesh, where fisheries policy has historically tended to focus on the huge inland fisheries of the country, marine fisheries have generally received less attention. However, recent concerns regarding the capacity of inland fisheries to satisfy the demand for fish from a growing population has encouraged greater attention to be paid to marine fisheries. Recent Bangladesh documents on Bangladesh fisheries policy emphasise that efforts to encourage offshore fisheries, including those targeting tuna and tuna-like species, are to be given priority in the future.

4.4.4. **Regional / state-level institutions**

Indian Ocean

The implementation of national-level policies is also frequently hampered where, particularly in larger countries, a level of decision-making responsibility has been devolved to lower administrative levels. While the respective roles of national compared to sub-national or state administrations is generally well-defined in law, in practice there are often inconsistencies and areas of poor definition where regional or state-level measures are not well-aligned with national policy and legislation. The scope for such inconsistencies is particular marked in relation to fisheries in offshore and deep-water areas.

Generally speaking, responsibility for activities in the national EEZ (up to 200 km. offshore) is the responsibility of national government with regional or state governments having different degrees of responsibility and control over activities in territorial waters adjacent to their land areas. Where fishers from particular regions or states venture beyond territorial waters, or move between the waters of different regions or states, the application of local legislation and the implementation of fisheries policies can often become blurred.

Bay of Bengal

Issues regarding coherence between policies in fisheries at the level of central government and state-level policies are particularly important in India, where individual states exercise significant autonomy in establishing policies for both the management and the development of fisheries within their jurisdictions. Fisheries regulations, while established by state governments, are required to comply with the Marine Fishing Regulation Act of 1983, but each state is able to interpret these as appropriate to their specific circumstances.

Policy agendas in fisheries at the state level are, perhaps inevitably, more responsive to wider policy agendas and local political, economic and social priorities. The need to respond to popular demand for welfare measures to support fishing communities, which represent a significant number of potential voters in most of the maritime states of India, has historically led to an emphasis in state-level fisheries policies on policies that provide various forms of support to fishers and fishing communities (see Box 3). By contrast, fisheries policy has generally paid less attention to fisheries management measures with the exception of the enforcement of existing regulations or introduction of limited new regulations, zoning arrangements for different fishing activities, and the establishment of closed seasons for fisheries. Levels of enforcement, and the resources devoted to MCS are generally low.

Box 3: Fisheries Policy in Tamil Nadu, India

The stated objectives of recent fisheries policies in Tamil Nadu include the conservation of fisheries resources through enforcement of regulations, and the management of resources by encouraging diversification of fisheries and exploitation of offshore resources (GoTN, 2015). These are largely in line with past policy statements for the state which, for example, have highlighted the need "*..to encourage fishers to exploit the underutilised fishery resources and to reduce fishing pressure in the inshore areas*" (GoTN, 2010). However, an analysis of budgetary allocations in fisheries for the years 2009-10, undertaken in 2011, provided an indication of the extent to which these policy statements have been translated into substantive action. In this analysis, 79% of budgetary allocations for the sector were devoted to 'socio-economic measures', in other words a range of welfare schemes ranging from subsidies or tax exemption for fuel and purchase of engines, to housing for fishers, grants for education, relief payments for lean season or closed seasons, and savings and insurance schemes for fishers. Specific allocations for fisheries management measures were not identified but the overwhelming emphasis on investment in welfare schemes is clear. Fisheries research, and information and statistics, to generate information that might provide a basis for better fisheries management receives a mere 0.8% and 0.2% of budget allocations respectively. The analysis highlights how the concentration on welfare may actually be creating 'perverse incentives' encouraging fishers to remain in the sector, and thus maintaining or increasing fishing pressure, rather than diversifying out of fisheries. The policy instruments deployed for fisher welfare may thus be undermining the long-term sustainability of fisheries resources (FIMSUL, 2011a).

Recent 'fisheries management' measures have taken the form of subsidies to support diversification of fishing effort, such as current Tamil Nadu government programmes to provide 50% subsidies for the purchase of 'tuna longliner cum gillnetter vessels' and the development and deployment of 'mother vessels' to support fishing in deeper waters offshore. The extent to which these measures will be effective in relieving pressure on inshore resources has yet to be evaluated but, in the absence of detailed information on the stocks these fisheries are supposed to be exploiting, and the lack of effective MCS arrangements and capacity to control their activities, they may run the risk of further exacerbating the levels of fishing effort in an already over-crowded fishery.

Particularly in the Bay of Bengal region, the historical development of the mandates of fisheries related institutions (ministries at the national level, ministries and departments of fisheries at national and sub-national levels) has important implications in terms of future efforts to improve the management of fisheries resources, and in particular for management of new developments in fisheries for tuna and tuna-like species in national EEZs and ABNJ waters. While most of these institutions have formal mandates that include the development of policy on fisheries management, and the implementation of that policy, in practice their primary role has been focused on the delivery of various forms of welfare schemes or schemes to support fisheries development. Actions relating to fisheries management have tended to be focused on the establishment of input/effort regulations and attempts to shift fishing effort from one fishing area to another. The structure and capacity of these institutions therefore tends to mirror this focus. In the context of future needs to engage more extensively in effective fisheries management, and address critical needs for the research and information required in order to support such efforts and incorporate output controls with appropriate forms of MCS, the need for significant reform of these institutions becomes clear.

4.4.5. **Local-level Institutions**

As well as regional or state-level administrations, many decisions about the lives and livelihoods of actors involved in fisheries in the Indian Ocean, including those involved in fisheries for tuna and tuna-like species, are profoundly influenced by local administrations (districts, municipalities, villages, or traditional community bodies). Rules and regulations established at this level can have an important influence on the state of fish landings, the facilities available for fishers, interactions between locally-based versus outside fishers, and the performance of the numerous activities involved in the fisheries value-chain from landing to onward sale to consumers. Accommodating the variety of local-level decision-making processes, and the institutions involved in making those decisions and implementing them, represents a major challenge for higher level policy makers in the sector.

Associations of producers and traders in the sector, ranging from boat owner associations, to fishing crew associations or trade unions, to representative groups for processors, vendors, buyers and transporters, may

all influence the way in which fisheries for tuna and tuna-like species have developed and likely to develop in the future.

Bay of Bengal

Particularly in India, many decisions regarding local measures to govern fishing activity have traditionally been taken by caste-based decision-making mechanisms. In the past, these exerted considerable influence on the activities of artisanal fishers although their focus tended to be above all on the resolution of conflicts between fishers and between fishing communities along the coast. The limitations of these mechanisms in dealing with increasingly complex fisheries, with significant interactions between artisanal, village-based operations and larger-scale mechanised fisheries from larger harbours, are clear. However, given the limited capacity of formal institutions to enforce regulations on fisheries, these mechanisms, or other *ad hoc* informal arrangements have often played a key role in addressing conflicts in fisheries, particularly in South India (FIMSUL 2011c). The role of these traditional structures seems to be being replaced, to some extent, by associations representing the interests of different fishing groups, such as mechanised boat owners, artisanal fishers or fish sellers and processors. However, they still represent an important point of reference for many fishers in some areas of India (see Box)

Box 4: Traditional and Community-based Institutions and Fisheries in Tamil Nadu, India

The last four decades have seen an erosion of the strength of the supra-local organisations due to cleavages created by mechanisations and the impact of mainstream politics and constitutional systems of governance. However, the village organisations are still strong and remain the first point of reference for every member of a fishing village. This has important consequences for fisheries management, as genuine resource management requires cooperation across long coastal stretches as the fish resources are mostly non-localised. For instance, many of the gear control systems formulated by individual villages break down as their neighbours do not subscribe to the same rules. However, there are still instances of common regulations accepted over reasonable stretches of coastline.

Examples of their roles in the recent past include local adjustments of official zoning arrangements for mechanised fishing in Kanyakumari, definition of fishing locations in traps fishing and rotas for use of shore seines in Kanyakumari, bans or regulation of ring-seining and pair trawling in many locations along the Tamil Nadu coast, restrictions on numbers of trawlers in Chennai, and restrictions on landings outside fishing operations' home base in Tuticorin and Kanyakumari (FIMSUL, 2011c).

4.4.6. **Wider and Cross-cutting Institutional Influences**

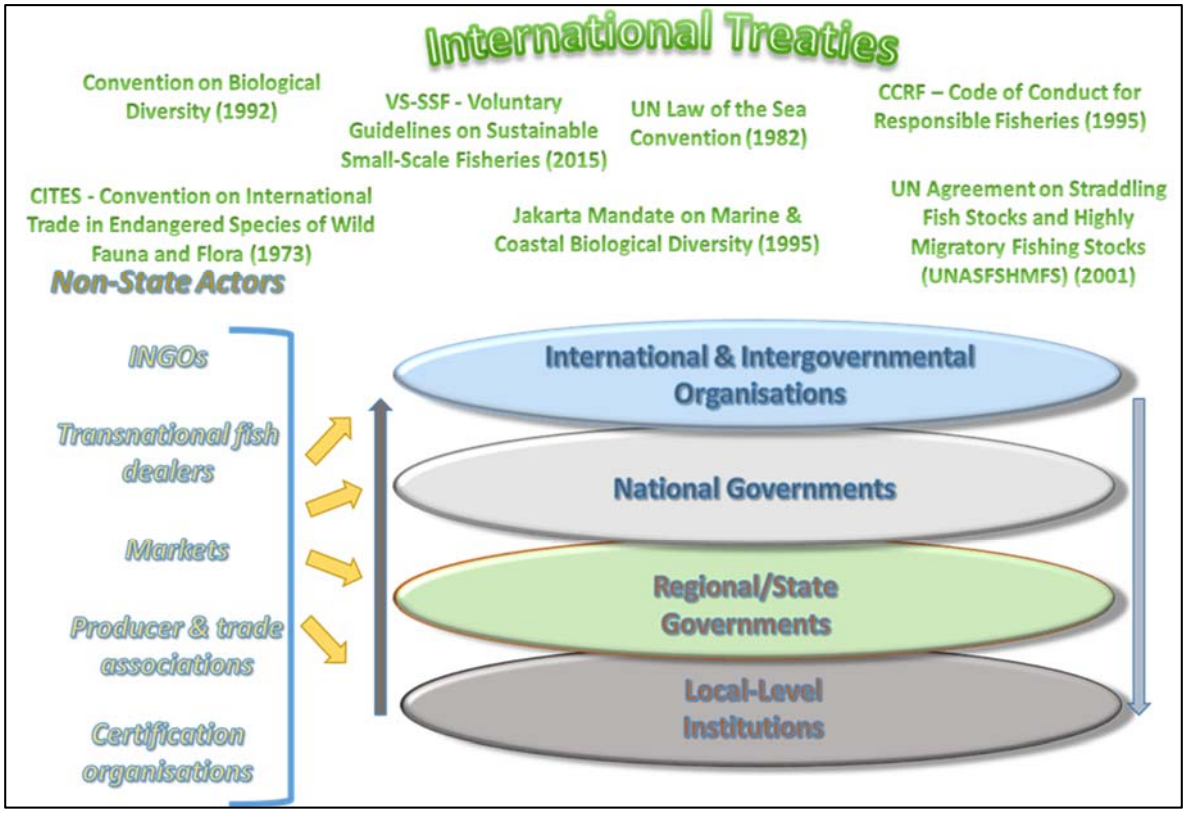
Figure 2 illustrates a further range of institutions that play an increasingly important role in fisheries in general, and fisheries for tuna and tuna-like species in particular.

These operate at a range of levels.

International treaties, agreements and codes of conduct

At the highest level, there are a series of key international agreements to which most countries in the Indian Ocean, including DWFN, are signatories, which provide a framework within which both international organisations and national and sub-national governments are supposed to operate. While the degree to which these agreements are effectively reflected in national policies is variable, and the extent to which resources are available within different countries to ensure compliance with these international treaties also varies, these treaties, conventions and agreements provide important indications, with a varying degree of obligation to comply with those indications, regarding the use of fisheries resources and maintenance of ecosystem health for coastal and high seas fisheries.

Figure 2 : Wider Institutional Context influencing Fisheries for Tuna & Tuna-like Species in the Indian Ocean



Key agreements and treaties are identified in Figure 2. Adherence to these agreements and treaties generally plays an important role in shaping national level policy throughout the region, although the degree to which real harmonisation between international obligations and national policy priorities is achieved is, inevitably, variable.

The extent to which individual countries have the capacity and resources to actually implement these obligations is also variable. The extent to which acceptance of the FAO's Code of Conduct for Responsible Fisheries has generated a significant shift in fisheries policy and fisheries practices is a case in point.

Non-State Actors

The role of non-state actors also cuts across the specific levels of institutional arrangements identified here. While the actions of some non-governmental actors, such as International Non-Governmental Organisations and pressure groups (e.g. Greenpeace, IUCN) tend to focus on the international and national levels, their impacts are also felt throughout the institutional levels concerned with fisheries for tuna and tuna-like species. In particular, pressure on international organisations and governments to subscribe to internationally accepted levels of environmental and ecological safeguards, as well as standards of social and economic equity has lead to significant shifts in treaty agreements at the international level, as well as national legislation which can alter the terms under which fishing enterprises can operate. They can also lead to significant changes, or pressures to change, on well-established relations between owners and crew, and between buyers and producers.

Expanding linkages between transnational companies and corporations dealing with seafood and fish products and fisheries value chains right down to the producer level in countries in the region means that market demand worldwide for fish products can have a relatively direct impact on decision-making

regarding fisheries at the producer level. The strong demand worldwide for tuna means that this is particular true for fishing operations targeting tuna and tuna-like species (see Box).

Box 5: The Influence of International Fish Markets on Fishers Choices

For fishers targeting high-value species from deep sea fishing, such as tuna or swordfish, access to international markets is essential. While some countries in the Indian Ocean and the Bay of Bengal have important domestic demand for tuna and tuna-like species, fishers generally know that they will achieve the best returns for their catches where they can sell them into marketing channels that lead to processing and export to high-value markets in the EU, Middle East, Japan and North America. However, achieving this access requires the maintenance of standards of quality and handling that can often be challenging and which may require significant investment on the part of producers and fish processors and traders. Decisions on standards, whether developed by international bodies such as the EU or non-state actors such as MSC, taking place in contexts far distant from producers and responding to the concerns of consumers or lobby groups of which they may be unaware, can have a significant influence on what options are available to fishers in remote areas of the Indian Ocean.

In 2003, changes in EU legislation regarding acceptable levels of cadmium in fish products led to a ban on imports of swordfish from the Seychelles, where this species constituted the principle catch of the small and medium-scale longliner fleet. Given that the EU was the principle market for this product, Seychellois fishers were forced to look for alternative catches and alternative market outlets for their produce.

5. Conclusions, Trends and Issues

Numbers and diversity of stakeholders

The numbers and diversity of stakeholders involved in fisheries in the Indian Ocean represents a significant challenge for any future efforts to develop sustainable forms of exploitation of tuna and tuna-like species. In particular, the presence of a very sizeable population of small-scale and artisanal fishers, particularly in the Bay of Bengal countries, who increasingly have access to technology which will allow them to consider movement into fisheries in more offshore areas targeting tuna and tuna-like species, is particularly likely to create increasing pressure on resources of these species in the foreseeable future. Taking account of the diverse needs and priorities of this growing range of stakeholders is liable to represent a key challenge for all the institutions involved in fisheries in the region.

Social change and dynamics in fishing communities

The fishing communities in the region are working in a highly dynamic economic and social context. Major advances in many of the coastal states around the Indian Ocean in access to education and information, as well as in poverty reduction, mean that the expectations and capacities of fishers are rapidly changing. Access to a wider range of economic opportunities can be expected, in some cases, to relieve pressure of fisheries in areas where it has been exploited to the point of diminishing returns from fishing activity, but this access is very uneven and cannot be taken for granted. Some degree of 'professionalisation' in fisheries can be seen in some locations as new generations of fishers seek alternative forms of livelihood in cities, through migration or through requalification. But whether this will have a significant impact on fishing pressure and what this is likely to mean for the numbers of fishers seeking to engage in more distant fisheries in deeper waters remains to be seen. Clearly not all coastal fishers, even in intensely overexploited areas, are likely to choose to fish in more distant waters given the changes in working and living patterns that this often

requires. In order to adjust the future scope and form of efforts to promote fisheries for tuna and tuna-like species in the region, it is important to understand, and take full account of this dynamic social and economic context, and its different manifestations in different parts of the Bay of Bengal in particular.

Institutional complexity

The complexity of the social and economic context of fisheries for tuna and tuna-like species in the region is mirrored, not surprisingly, by institutional complexity. Such complexity is a feature common in many fisheries worldwide where interactions between international, national and sub-national spheres of action and responsibility are all interact and the demand generated by the increasingly globalised trade in fish products are constant and pervasive. The Indian Ocean, and the Bay of Bengal in particular, are especially characterised by the widely differing levels of capacity of some of the institutions involved and the different patterns of interaction between national, sub-national and local mechanisms for policy and decision-making in particular. Accommodating this complexity in processes of working towards agreed solutions on future directions in fisheries for tuna and tuna-like species is likely to be particularly challenging.

Institutional 'fit'

Formal institutional structures relating to fisheries have, historically, been primarily focussed on raising fisheries production to provide high-quality protein for burgeoning populations in the coastal states of the region, and on welfare measures. While establishment of appropriate regulations to mitigate as far as possible the negative impacts of fisheries has also fallen within the mandate of these institutions, the emphasis has been above all on the definition of rules, regulations and instruments, with little attention paid to the means for effective implementation. Above all, the structure of these institutions tends to reflect the emphasis on measures to support and promote fisheries and assist fishing communities (subsidies, welfare schemes, exemptions and special programmes for fishers and fishing communities). Particular in the Bay of Bengal countries, formal institutions tasked with supporting and managing fisheries are therefore bureaucratic in orientation and have limited capacity in management, consensus building, scenario analysis, monitoring control and surveillance, or research to generate the information needed to support effective management processes. This lack of institutional 'fit', where the role of these institutions in the future needs to be re-oriented towards more of a regulatory and management function, is a further challenge that needs to be addressed as a precursor to establishing effective management regimes.

Policy coherence

Policies in fisheries, and for fisheries for tuna and tuna-like species, tend to pay limited attention to the relative coherence between different sets of policy objectives. Traditionally, and to some extent still today, the Bay of Bengal countries have tended to give priority to policy objectives related to ensuring production, reflecting past concerns for food security for their sizeable populations. Any eventual shift towards an increasing focus on effective and sustainable management of fisheries resources will require greater attention to how these policy objectives can be harmonised with the needs for high-quality food production, and livelihood security for fishers. Current policies often suffer from internal contradictions in this regard, with aspirations for 'sustainable management' often at odds with targets for fish production that may have been identified with little information available on actual availability of fish. Increasing awareness among policy makers at all levels of the need to harmonise policies and seek appropriate middle ground to satisfy apparently contradictory policy goals is therefore also important for the future.

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