SIOFA | APSOI
Southern Indian Ocean Fisheries Agreement
Accord relatif aux Pêches dans le Sud de l'Océan Indien

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IOTC data of relevance to SIOFA, reporting and usage challenges

Submitted by SIOFA Data Officer

1. Introduction

Indian Ocean Tuna Commission (IOTC) and the Southern Indian Ocean Fisheries Agreements (SIOFA) have a large part of high-seas area in common. But the two organisations have a different mandate, where IOTC's focus is on tuna-like and highly migratory species, SIOFA's focus is on fishes, molluscs, crustaceans and other sedentary species

One of SIOFA responsibility is to collect all fisheries data relevant to its species, and in accordance with the relevant conservation and management measure (CMM) adopted by the Meeting of the Parties.

Some fisheries are common to both organisations, in those fisheries several fishing vessels would catch both SIOFA and IOTC species. A typical example is the pelagic longline fisheries. This fishery is targeting IOTC resources (tuna-like species) and SIOFA resources (oilfish). Oilfish is a small part of the overall longline fisheries compared to tunas but they nevertheless represent a drain on the resource.

SIOFA's CCPs must report these catches and all the relevant data of the activities. It is also known that a few IOTC CPCs report oilfish as bycatch to IOTC but not systematically to SIOFA. This situation is a significant challenge, as SIOFA needs to have to most complete figures of the catch and the fisheries activities for the species it is responsible for its management, and request as much data as possible from IOTC in order to provide the Scientific Committee with the best figures, which will inform and advise the Meeting of the Parties. Moreover, the MoP tasked its Scientific Committee to discuss potential data sharing and data reporting mechanisms that would address this issue (ref MoP11 report, para 137).

This paper presents the current situation from a data collection and reporting perspective and explore options that would contribute to the improvement of SIOFA species data.

No potential compliance matters will be addressed here. This document will use the pelagic longline fisheries data that operated in the high sea as a typical example. The situation of this fishery may be expanded to any fisheries that can catch SIOFA species.

2. Background

2.1. data collection frameworks

Both organisations have a clear data collection framework, driven by either resolutions or conservation and management measures. Table 1 summarizes this:

topic	SIOFA	IOTC
Documents		
CMM/Resolution	CMM 02(2023) for the collection, reporting verification and exchange of data	Resolution 15/02 Mandatory statistical reporting requirements
Catch and effort data	Collected and submitted on a haul-by-haul basis	Submitted on a month/grid basis

2.2. data reporting requirements

The data reporting requirements are provided in the above documents and is also supported by the implementation of data reporting templates. The templates provide the necessary details and format for the data that is required to collect and submit. The table below summarizes the requirement for the longline fisheries.

Topic	SIOFA	IOTC
Fishery information	Individual vessel identifiers, main gears and target species	Fisheries code (which includes category, main gear and target species)
Operations information		
Spatial resolution	set start and end position	Grid: 1° square for surface fisheries and 5° square for longline fisheries.
Time resolution	set start and end time	month
Operation Effort	Number of hooks	Number of hooks
Gear details	line length, number of hooks between floats, bait used	-

Topic	SIOFA	IOTC
Species	FAO codes	FAO codes (and aggregate)
Operation Catch	Green weight	Green weight
Observers' data		
Observer coverage	*Not specified for non-bottom fishing activities*	5% of operations/sets
Spatial resolution	set start and end position	1° square
Time resolution	set start and end time	month
Target species	Species FAO code(s)	-
Catch	Green weight (Kg)/species	Estimated weight/species
Effort	Number of hooks	Number of hooks
Gear details	line length, number of hooks between floats, bait used	-
Data submission		
Catch and effort data	Annually, 30 May	Annually, 30 June
Observers' data	Annually, 30 May	Within 150 days

2.3. Importance of IOTC bycatch data for SIOFA

The amplitude of catch data recorded in IOTC and relevant to SIOFA has been assessed and presented at the last two Scientific Committee of SIOFA in 2023 and in 2024. The table below summarizes it for year 2022.

Table 1: Comparison of IOTC adjusted catch for main group of species in high-seas (where grids overlap with SIOFA area) and SIOFA catch for year 2022 (tonnes). Only tonnes values have been retained, number values are not included

	IOTC catch in the SIOFA area reported by its CPCs in 2022	% of IOTC catches	SIOFA catch reported by its CCPs in 2022	% unreported to SIOFA
Tunas	243441	93.73%	3071	98.75%
Billfish	5305	2.04%	607	89.73%
Sharks	1929	0.74%	500	79.42%
Oilfish (OIL+LEC)	334	0.13%	4649	6.70%
Others (not OIL+LEC)	8709	3.35%	9693	47.33%
Totals			18520	

Sources: IOTC data, SIOFA catch and effort database

These figures have been computed from the catches reported in tonnage that have been made in the squares that are overlapping with SIOFA. The tonnage has been adjusted according to the proportion of the square that is overlapping in SIOFA. The catches reported in number of fish have not been considered. So, these figures are underestimated, for example the adjusted catch in number of oilfish was 22,946 individuals in 2022 and the corresponding tonnage has not been accounted.

IOTC species catches (tunas and billfish) reported to SIOFA are very small, which make sense since most of the 80,000+ IOTC vessels are not registered in SIOFA and only target tuna-like species.

Likewise, the catches of non-IOTC species (oilfish, sharks and others) constitute a very small part of total catch made by IOTC. However, these catches are significant in regards of the total catch of these species reported in SIOFA.

3. Discussion and issues

The catch figures illustrate that a big part of IOTC bycatches, which is constituted of species under the management responsibility of SIOFA, is not reported to SIOFA. In addition, the reporting of bycatch to the IOTC Secretariat is not mandatory for its CPCs, so it is likely that the current catch levels recorded are under the actual figures. However, the figures may have some bias, where double counting can occur for fishing vessels that are registered in the two organizations.

SIOFA could use IOTC catch information to complement its databases, but several issues would need to be addressed first. These issues are presented in the following paragraphs, the illustrating examples are taken from the high-sea longline fisheries.

3.1. Spatial resolution

The spatial accuracy requirements between the two organisations are different. SIOFA currently request for all its fisheries to report data on a haul-by-haul basis (with start and end point of all longline operations), as IOTC request its member to provide data on area basis (1° or 5° squares). Figure 1 below illustrates the situation.
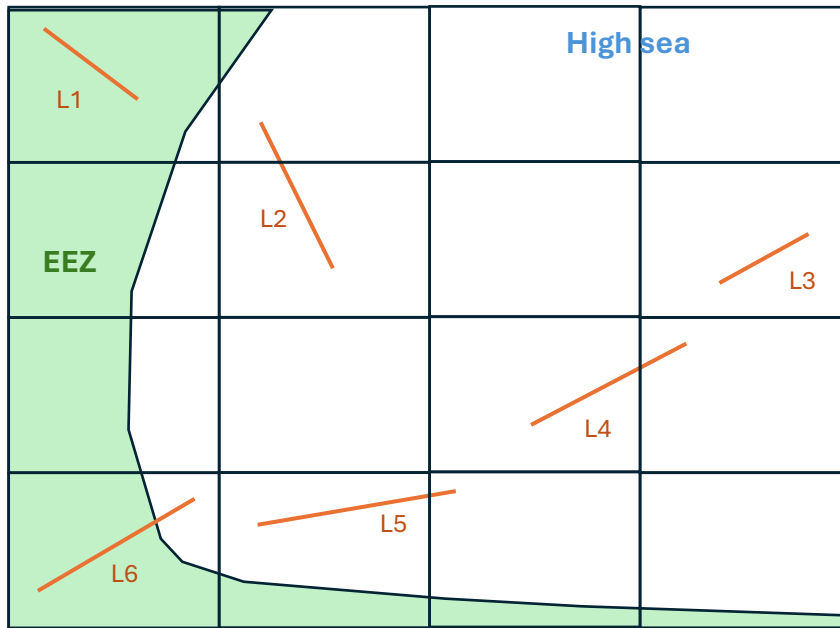
Figure 1: IOTC reporting squares in high seas (white) and EEZ (green) areas, with 6 theorical longlines sets illustrated (L1 to L6).

When the squares are fully in the high seas, the catch information in SIOFA is fully captured (cases of L3 and L4). However, if the squares where catches have been reported are overlapping the high sea and an EEZ, it is not obvious to know which part of the catch has been made in the EEZ and which part come from the high seas (case of L1, L2, L5 and L6).

A way to adjust SIOFA catches is to use the EEZ/high-sea area ratio. It provides an estimate of the catch made in the high sea. E.g. if the square is 20% in the high seas, then 20% of the catch would be in the high sea.
However, this assessment would be wrong for the catch made by L1 which is fully set in an EEZ, it would also be wrong for L5 which has been set only in the high sea. But it would be about right for L6.

If haul-by-haul data were available, this assessment would be much more accurate, where lines fully within EEZ would not be accounted, and lines fully set in high-seas would be accounted to SIOFA area. There will still be some catch split estimates needed for the lines that would run across high-seas and EEZ.

The provision of catch data at a finer scale (e.g. 20-minutes squares) would also be a way to increase the accuracy. The finer the resolution, the less area would be left overlapping the high-seas and the EEZs. Figures 2 and 3 illustrate the difference, the

less area is left overlapping between EEZ and High-sea, the less uncertainties are left in the catch to be split in EEZ and in High-Sea.
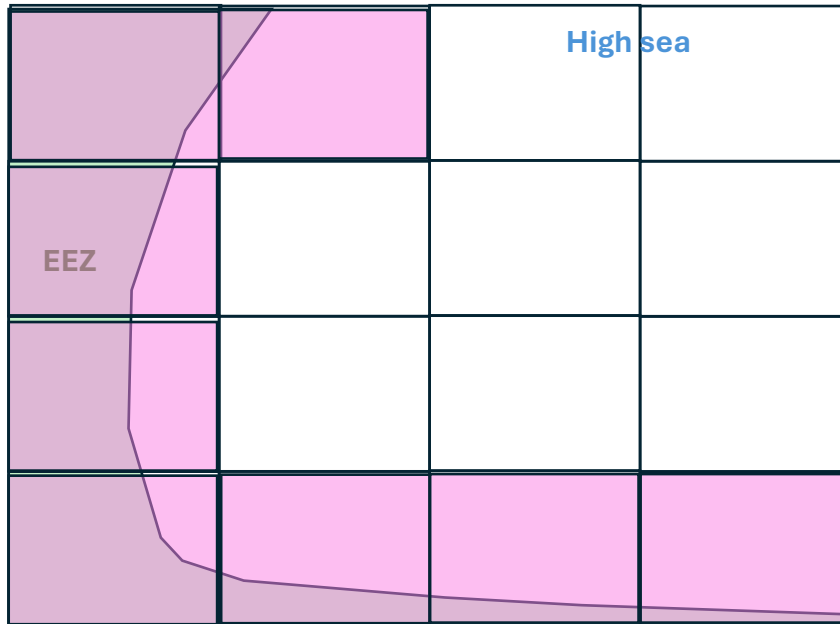

Figure 2: Areas of the squares that are overlapping between EEZ and high sea when large reporting squares are used, in this scenario 50% of the total area (in pink) is overlapping between EEZ and high sea.
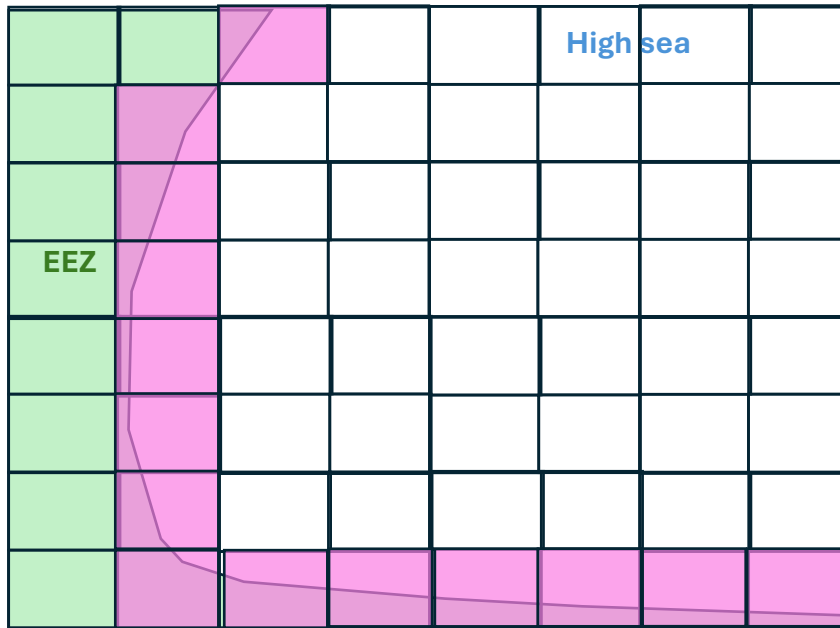
Figure 3: Areas of the squares that are overlapping between EEZ and high sea when finer reporting squares are used, in this scenario 22% of the total area (in pink) is overlapping between EEZ and high sea.

3.2. Species identification accuracy

The species identification is a challenge for all organisation which want to apply species-level management measures.

The main issue for SIOFA is to distinguish the IOTC species from the others when species aggregate codes are being used. The usage of the aggregate code (like AG60 or OTHR) must be avoided to the extent possible as they may contain mixed species. Table 2 provides the top10 species caught within the OTHERS main group code used by IOTC.

Table 2: Details of 10 top species within the IOTC OTHERS large group code and catch level in the SIOFA area

Year	GROUP	CODE	NAME_EN	CATCH (T)
2022	OTHERS	OTHR	Other non tuna-like fishes nei	6282.68
2022	OTHERS	RUS	Indian scad	999.7
2022	OTHERS	RRU	Rainbow runner	451.28
2022	OTHERS	OIL	Oilfish	329.25
2022	OTHERS	AG60	Other bony fish nei	316.07
2022	OTHERS	TUX	Tuna-like fishes nei	311.43
2022	OTHERS	MZZ	Marine fishes nei	133.9
2022	OTHERS	CNT	Ocean triggerfish	119.95
2022	OTHERS	LAG	Opah	70.13
2022	OTHERS	DOL	Common dolphinfish	14.08

It is not possible to identify the species reported as OTHR, AG60 or MZZ and they constitute the biggest part of the total bycatches.

If the industry is not able to provide a better taxonomic accuracy, and that the usage of these codes cannot be avoided, it would be desirable that tools are developed or information are collected, that would enable to disaggregate such information to more accurate species taxa.

The involvement of observers may provide useful information that could be used to assess what is the actual species composition of these catches.

3.3. Weight and numbers

It has already been noted that many bycatch are reported by number of fish, it increases the complexity for computing total weight. For now, the catch provided in number has not been converted to weight, for this to be possible it would require sampling protocols and effort. IOTC is aware of this issue and is working on this topic.

3.4. Vessels that are both fishing for SIOFA and IOTC species

A potential issue has been identified with members that have fishing vessels registered both in IOTC and in SIOFA, and that are reporting catch and effort for the same fisheries to the 2 organisations. In such case there is a strong risk of double counting for SIOFA.

To alleviate such risks, each catch records would need to have sufficient information to be unequivocally identified in both data submissions. Again, a haul-by-haul data reporting would enable to achieve this, when a haul is already accounted in a SIOFA dataset, the same haul would be ignored in the IOTC dataset. But it requires the data to be collected and reported on a haul-by-haul basis.
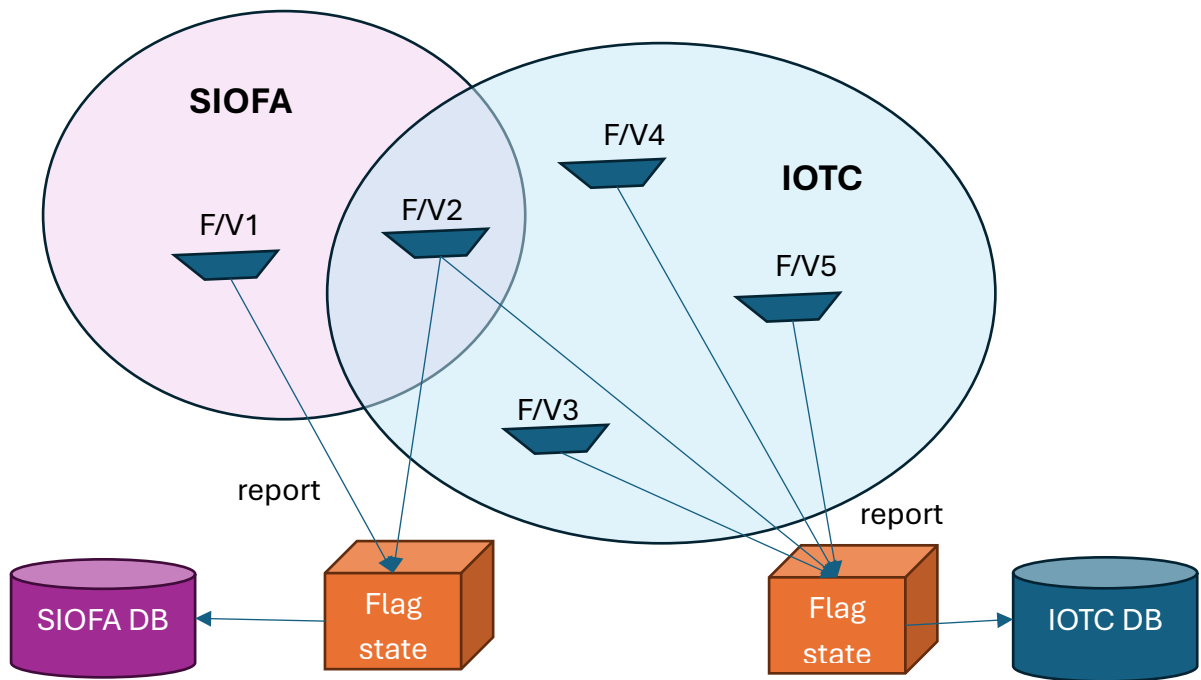
Figure 4: catch reporting by vessels registered to SIOFA and to IOTC

The provision of information on the fishing vessel can also be very useful. If a flag state has vessels registered to both IOTC and SIOFA (illustrated as F/V 2 in figure 4), its catch would be reported to IOTC <u>and</u> SIOFA. If SIOFA would like to use IOTC data, then either the catch reported to SIOFA or the catch reported to IOTC would need to be ignored to avoid double counting. This is only possible if the vessels are clearly identified in both reports.

3.5. Reporting

Ideally all catches of non-IOTC species made by its CPCs in the SIOFA area would be reported to SIOFA. There are two options for doing this:
  A. direct data submission from the flag state to SIOFA
  B. via data requests the IOTC Secretariat

Option A will greatly increase the burden on member states. It would require them to sort out SIOFA data and provide it to SIOFA. It may also require them to register their vessel to SIOFA and, as a consequence, to comply with all other SIOFA CMMs.

Option B is more straightforward and may be appropriate in the context of science. SIOFA asks IOTC for the data relevant to its area, a catch dataset is produced and provided by IOTC, and SIOFA uses it for informing its Scientific Committee.

The latter option has already been practised and the SIOFA Scientific Committee encouraged to continue this process with IOTC, and in particular for reporting oilfish data (SC9 report, para 230).Likewise SIOFA can provide IOTC relevant data should the Commission ask for it.

In all situation, the species and catches data reported to IOTC by its CPCs should be improved for SIOFA to be able to make a good use of IOTC data.

Conclusion

Ideally IOTC will gradually report its high-seas fishery data on a haul-by-haul basis. This would be useful for the 2 organisations as haul-by-haul data give better information than aggregates.

For data management improvements and to enable SIOFA to make a better usage of IOTC bycatch data, several improvements are proposed below:

- Fishing activities that are taking place in the high sea are recorded and reported on a finer scale (ideally haul-by-haul), and that catch records have a vessel identifier
- The provision of catch by individual number is limited or complemented by weight for SIOFA main species (e.g. oilfish)
- The species are identified to finer taxon level, or that species aggregation codes that may contains a mix of IOTC and SIOFA species are not used, or that species disaggregation tools are made available.

The implementation of these improvements is not straightforward and would bring additional burden: flag states would need to collect and provide finer resolution data; the current data collection framework and data processing systems would need to be adjusted to consider the changes.

It is worth noting that several IOTC members are also parties to SIOFA, and that these flag-states are already able to provide SIOFA with hi-resolution data (haul-by-haul) as per SIOFA CMMs requirements.