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## OUTCOMES OF THE REPORT ON THE ESTIMATION OF FISHING CAPACITY BY TUNA FISHING FLEETS IN THE INDIAN OCEAN

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### PURPOSE

To inform the Scientific Committee (SC) of the report on the estimation of fishing capacity by tuna fishing fleets in the Indian Ocean conducted at IOTC during the months of September and October 2013.

### BACKGROUND

In 1999, the Commission requested the IOTC SC present at its next session “*the best estimate, on the basis of existing data and analyses, of the optimum fishing capacity of the fishing fleet which will permit the sustainable exploitation of tropical tunas.*” Despite improvements in the quantity and quality of the information available over the years, the IOTC SC was unable to revisit the issue until 2009. At that time, thanks to the assistance provided by the Australian government, the IOTC Secretariat comprehensively revised existing estimates of fishing capacity for the region<sup>1</sup>. Estimates of input of fishing capacity were updated in 2013 with a view to assist the Commission in evaluating level of input fishing capacity, as per provisions in IOTC Resolution 09/01<sup>2</sup>:

42. IOTC should establish a stronger policy on fishing capacity to prevent or eliminate excess fishing capacity.
43. Loopholes in the current systems of fishing capacity limitation, such as the establishment of fleet development plans and exemptions for vessels less than 24 meters, should be closed.

### DISCUSSION

Numbers of vessels were calculated for industrial and artisanal fleets (here divided into semi-industrial and artisanal) fishing for tuna and tuna-like species in the Indian Ocean. Fleets were separated by gears and flags where possible, and catches calculated for each component. IOTC Circular 79 was sent to coastal countries to ask for cooperation on the collection of data for their artisanal fleets (*sensu* IOTC) but the response was limited. Because of this, numbers for semi-industrial and artisanal vessels are incomplete and gears could not be assigned for the majority of vessels. The main findings are presented ([Appendix I](#)) for the consideration of the IOTC SC. The complete report is provided for reference in paper IOTC–2013–SC16–INF04.

### RECOMMENDATION/S

That the Scientific Committee **NOTE** paper IOTC–2013–SC16–19 which outlines the main outcomes and findings from the report on estimation of fishing capacity by tuna fishing fleets in the Indian Ocean.

### APPENDICES

**Appendix I:** [Executive Summary of the Report on Estimation of Fishing Capacity by Tuna Fishing Fleets in the Indian Ocean](#)

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<sup>1</sup> Gillett R, Herrera M (2009). Estimating the Fishing Capacity of the tuna fleets in the Indian Ocean (IOTC-2009-SC-INF13) Report presented at the Twelfth Session of the IOTC Scientific Committee, Victoria, Seychelles, 30 November-4 December 2009. 29 pp.

<sup>2</sup> IOTC 2013. Report of the Seventeenth Session of the Indian Ocean Tuna Commission. Mauritius, 6–10 May 2013. IOTC–2013–S17–R[E]: 129 pp. Appendix XV - Update on Progress Regarding Resolution 09/01 – On the Performance Review Follow-up

## APPENDIX I

## EXECUTIVE SUMMARY OF THE REPORT ON ESTIMATION OF FISHING CAPACITY BY TUNA FISHING FLEETS IN THE INDIAN OCEAN

The aim of this study is to produce a new estimate of the fishing capacity of industrial and artisanal fleets that target tuna and tuna-like species in the Indian Ocean. The result of this study, then, is an estimate of active input fishing capacity expressed as the number of tuna fishing vessels in the Indian Ocean, categorised by fleet (gear), vessel length class, and includes associated catches and areas of operation. Associated catches, in conjunction with number of vessels, allows for a comparison of total catches produced by the fleets, a useful validation exercise due to the uncertainty associated to some of the data reported by countries fishing in the region. Furthermore, the relative importance of each fleet on the overall catches of tuna in the Indian Ocean and where future efforts need to be placed to improve reporting systems are also assessed.

The report was based on information extracted from Indian Ocean Tuna Commission (IOTC) databases, input from Contracting Parties and Cooperating Non-Contracting Parties (CPCs), Non-contracting Parties (NCPCs), international organisations, and non-governmental organisations (NGOs), as well as information available online.

The specific objectives of this study were to estimate levels of input fishing capacity<sup>3</sup> for IOTC species and major species of sharks within the IOTC Area, to cover the activities and catches of vessels from all IOTC CPCs, and those of NCPCs fishing in the Area. Information was insufficient to produce estimates of fishing effort therefore we focussed on obtaining estimates of fleet size. In particular we aimed to review and update the estimates for the 2006-08, including number of active vessels, gross tonnage or fish carrying capacity if available, and estimates of average levels of catch for each fleet and vessel category. Also, we strived to calculate levels of fishing capacity for the period 2009-12. The most difficult part of this study was the estimation of fishing capacity for fleets not covered in the previous study, in particular fleets of small-scale, decked, motorized inboard fishing vessels that operate within the Exclusive Economic Zone (EEZ) of their flag states; fleets of vessels powered with outboard engines; and all non-motorized fisheries. In addition to vessel numbers, this study also attempts to estimate total tuna<sup>4</sup> and shark<sup>5</sup> catches per fleet<sup>6</sup> to determine the output capacity of each fleet.

Industrial, semi-industrial, and artisanal-subsistence fleets<sup>7</sup> are presented separately. Although better documented, there is a paucity of data for the industrial fleet, as it is not known whether all registered vessels are active. Furthermore, not all CPCs have made their lists of active vessels available to the IOTC. In this case, we used numbers from the authorised list as a proxy. Nonetheless, these estimates are thought to be more accurate than for the other two fleets. A confusing aspect of the definition of industrial vs. artisanal stems from the fact that vessels of the same characteristics (vessels below 24 m) may fit in one category or the other depending on whether they fish outside (industrial) or inside (artisanal) their EEZ.

Estimation of fishing capacity is certainly applicable to industrial fleets that have structured operations and fixed gears, and partially so to semi-industrial fleets. However, there is considerable uncertainty behind the estimation of output capacity from the size of artisanal fleets, and its use should be treated with extreme caution. The use of the size of an artisanal fleet to estimate catches or to estimate output fishing capacity in the absence of reported captures by flag states is highly questionable. First, there are many uncertainties about the numbers of artisanal boats in many countries in the Indian Ocean area due to a lack of reliable information from the countries concerned. Second, even if the numbers were accurate, semi-industrial and artisanal fleets suffer from a series of maladies that industrial fleets do not experience: **a.** they are highly affected by small economic fluctuations (*e. g.* changes in prices of fish), **b.** are more influenced by weather conditions due to the smaller sizes of the vessels, **c.** they are more susceptible to changes in the ranges of certain fish species as a result of global warming, and **d.** because they are opportunistic this translates in a high degree of uncertainty on the species they target and gears they use. Previous trips by the authors to ports and landing sites in the Indian Ocean, have shown large fleets in port for long periods of time due to any of the above issues, conditions that make it hard to forecast catches year to year and country to country. Flexibility, opportunism

<sup>3</sup> Input fishing capacity is defined as the amount of fishing units/fishing effort devoted to catch a given resource over a period of time (*e.g.* a year or a fishing season) (Gillett and Herrera 2009)

<sup>4</sup> In the context of this study the word tuna refers to the IOTC species, including 16 species of tuna and tuna-like species, as defined by the Commission ([https://www.iotc.org/Common/dataforms/Guidelines%20Data%20Reporting%20IOTC\[E\].pdf](https://www.iotc.org/Common/dataforms/Guidelines%20Data%20Reporting%20IOTC[E].pdf))

<sup>5</sup> In the context of this study the word sharks refer to all species of Elasmobranchs caught by fisheries directed at IOTC species, in particular species of pelagic sharks, as identified by the Commission

<sup>6</sup> We loosely define fleet as a group of fishing crafts of the same type that use the same fishing gear, target similar species and are flagged in an IOTC CPC or other Party.

<sup>7</sup> For explanation on these fleets please see section 2. Characterisation of tuna fishing fleets.

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and vulnerability to a range of factors make it problematic to confidently estimate size, activity levels, and catches of artisanal fleets even when gear composition is known, a factor that in most cases is rarely understood.

Sources for details on industrial and artisanal fleets (as per IOTC definition) are different as the latter are not requested by the IOTC and, although available in some cases, many gaps in information exist. The revised numbers show substantial changes in the reported capacity. An average increase of 70% was observed between this and the previous capacity study (Gillett and Herrera 2009). The average fleet capacity for purse seine, longline, pole and line, oceanic gillnet and gillnet/longline was 7,078 vessels from 2009-2012. These results are presented in detail for each fleet component in the Results section.

The semi-industrial fleet here proposed, part of the artisanal component in the IOTC context, has shown a tremendous increase in the last few years, and it is the constituent of the total fleet that deserves the most attention. Better information is required for this part of the total fleet as it is made of many vessels that catch considerable quantities of IOTC species and that exhibit more defined targeting, compared to truly artisanal fleets that are mostly opportunistic. Fleets that merit increased monitoring are the fresh-tuna longline from Indonesia and Taiwan Province of China, gillnet from India, Indonesia, Iran, Oman and Pakistan, pole and line from Maldives, coastal purse seines from Indonesia, Malaysia and Thailand, and gillnet/longline from Sri Lanka. Furthermore, semi-industrial fleets have the potential to leave the EEZs of their flag countries and there is a need to better monitor their activities. Thus the Commission has a need to establish standards for the collection of individual vessel data for this fleet. If limitations of input capacity are to be effective in the future, the IOTC will need to monitor numbers of active semi-industrial vessels fishing in the Indian Ocean.

Artisanal fleet numbers are much harder to estimate and their gears, and catches by species can only be speculated for most of the countries, as there is little information available on this subject for the Indian Ocean. To further complicate the issue, artisanal fleets are opportunistic and will change gears and target species very rapidly according to local conditions, making any forecasting difficult, and in some cases impossible. Nonetheless there is the need to at least compile total numbers of active craft for the artisanal component as it catches considerable amounts of the species of concern to the IOTC.

Countries fishing in the region put forth fleet development plans (FDPs) as proposed in IOTC Resolution 12/11 *On the implementation of a limitation of fishing capacity of Contracting Parties and Cooperating non-Contracting Parties*. If said plans are completed in the proposed timeline, and countries already fishing in the area keep their current levels of capacity, the fleets fishing for tuna and tuna-like species in the Indian Ocean by the year 2020 will be 251% over the baseline capacity from 2006, obviously an untenable position for stocks of tuna and tuna-like species in the area.