

SOCIO-ECONOMIC DATA AND INFORMATION AVAILABLE ON IOTC FISHERIES

IOTC Secretariat

Purpose

To provide participants at the 1st Session of the IOTC Working Party on Socio-Economics (WPSE01) with a review of the availability and status of socio-economic information and data related to fisheries targeting tuna and tuna-like species in the IOTC Area of Competence.

Background

To ensure the conservation and optimum utilisation of the stocks under its management, a key responsibility of the IOTC is to review the socio-economic aspects of tuna and tuna-like fisheries within the IOTC Area of Competence, with particular consideration to the interests of developing Coastal States ([IOTC Agreement](#)).

Noting with concern the limited availability of socio-economic information, which is considered essential for the development and evaluation of IOTC management measures ([IOTC 2017](#)), the Commission adopted [Resolution 18/09](#) at its 22nd session on a scoping study concerning socio-economic data and indicators for IOTC fisheries. The outcomes of the study were limited due to low participation from the CPCs, the complexity of the questionnaires, and a general lack of available information at the national level ([Macfadyen & Defaux 2019](#)).

In 2023, the Commission adopted [Resolution 23/10](#) on the Terms of Reference of a Working Party on Socio-Economics (WPSE) to provide the Commission with information on the socio-economic status and dynamics of fisheries targeting tuna and tuna-like species in the IOTC area of competence. The WPSE will also assess and advise on potential impacts to CPCs arising from the Conservation and Management Measures (CMMs), allocation of quotas and catch limits, and recommendations of the IOTC Scientific Committee (SC).

Socio-Economic & Development Indicators

At the Country Level

The World Bank has compiled 1,400 time series of indicators, known as the World Development Indicators (WDIs), which cover a range of areas including demography, the economy, the environment, and health. These indicators are designed to facilitate comparisons between countries and groups of countries. The data can be accessed via the [World Bank DataBank](#). Although not directly related to tuna fisheries, these indicators may be useful for assessing and comparing the economic status and performance of the IOTC Contracting Parties. For example, Gross National Income (GNI) has been considered in the current draft proposal for criteria used to allocate stock quotas among the IOTC Contracting Parties ([IOTC-2024-TCAC13-REF02](#)). The World Bank Databank also provides population estimates and projections, as well as data on the UN Sustainable Development Goals (SDGs), which may be relevant to the work of the WPSE (e.g., [SDG Indicator 14.7.1](#)).

In addition to the World Bank, other institutions also assess different aspects of a country's development, including the United Nations Development Programme ([UNDP data portal](#)) and the International Monetary Fund ([IMF data](#)

[Portal](#)). For example, Human Development Index ([HDI](#)) developed by the UNDP has been considered as one of the components of the ongoing IOTC allocation process ([IOTC-2024-TCAC13-REF02](#)).

At the Fishery Level

Data on fishing effort, prices, costs, employment, labour conditions, and other socio-economic factors related to tuna fisheries are not routinely or consistently collected across countries ([Macfadyen & Defaux 2019](#)). McCluney et al. ([2019](#)) used a list of 29 economic indicators, along with additional indicators describing ecological and community aspects, to assess the social and economic performance of 21 global tuna fisheries, including four from the IOTC ([Anderson et al. 2015](#)).

In the context of the IOTC, Macfadyen & Defaux ([2019](#)) identified 10 economic and 7 social indicators to assess the socio-economic contribution of Indian Ocean tuna fisheries (Tables 1-2). They also conducted a survey of the CPCs to evaluate the usefulness and feasibility of these indicators as a basis for prioritisation (see Tables 8 and 10 of Macfadyen & Defaux ([2019](#))).

Tab. 1. List of economic indicators identified by Macfadyen and Defaux (2019). IO = Indian Ocean

Indicator	Description	Unit	Data
Landings in CPCs of tuna caught in the IO	Value of landed catch from IOTC fisheries in CPCs by national vessels	USD	Ex-vessel prices and landed volumes
Landings of tuna in coastal States caught by third country vessels in the IO	Value of catch from IOTC fisheries landed by third countries in IOTC coastal States	USD	Ex-vessel prices and landed volumes
Exports by CPCs of tuna catches made in the IO	Contribution to foreign exchange earnings and balance of payments from catches in the IO by CPC vessels	USD	Exported prices and exported volumes
Net profit in catching sector from tuna catches in the IO	Profitability of CPC tuna fleets operating in the IO	USD/t	Costs and earnings data
Net profit from provision of inputs to the tuna catching sector in the IO	Profitability of supplying the IOTC tuna catching sector, and income multiplier effects in CPCs of catching on sector upstream businesses	USD	Costs and earnings data for input suppliers
Net profit from processing tuna caught in the IO	Profitability of downstream processing of tuna caught in IOTC fisheries, and income multiplier effects in CPCs of the catching sector in IOTC fisheries on downstream processing	USD/t	Costs and earnings data for processors
Total access/license fees paid by domestic tuna fishers	Resource rents being generated for governments from their nationals engaged in the IOTC tuna fishery	USD	Payments made to government by domestic tuna fishers
Total access fees paid by foreign tuna vessels to coastal States	Resource rents being generated for coastal state governments from third countries from the IOTC tuna fishery	USD	Payments made by third country governments/companies
Port revenues from third country tuna fleets visiting/landing in coastal States	National income in IOTC coastal States from port-related activity due to third country tuna vessels	USD	Payments made by third country vessels
Income taxes to governments from tuna-related activity	National income in IOTC CPCs from income taxes in upstream, catching and downstream sector from the IOTC tuna fishery	USD	Payments made by businesses to governments

Tab. 2. List of social indicators identified by Macfadyen and Defaux (2019). IO = Indian Ocean

Indicator	Description	Unit	Data
Employment in CPCs' own tuna catching sector operating in the IO on vessels they flag	Number of people directly dependent on domestic tuna catching sector in CPCs	FTE	Numbers of people employed (and their full-time, part-time or occasional nature by fleet type)
Employment in CPCs on third country tuna vessels operating in the IO	Number of people from coastal States directly dependent on third country vessels	FTE	Numbers of people employed (and their full-time, part-time or occasional nature by fleet type)
Employment in CPCs in businesses supplying tuna fleets operating in the IO	Number of people in CPCs directly dependent on businesses supplying the tuna catching sector, and employment multiplier effects of catching sector activity	FTE	Numbers of people employed and their full-time, part-time or occasional nature)
Employment in CPCs in businesses processing/marketing tuna caught in the IO	Number of people directly dependent on downstream tuna sector processing in CPCs, and marketing and employment multiplier effects of catching sector activity	FTE	Numbers of people employed and their full-time, part-time or occasional nature)
Tuna caught in the IO available for local consumption in coastal States	Contribution of CPC catching sector (coastal and non-coastal states) to food security in coastal States	t	Quantities of domestic landings and tuna imports/third country landings minus exported quantities
Annual crew earnings in tuna catching sector for fleets operating in the IO	Attractiveness of tuna catching sector as a form of employment, and contribution to household wellbeing	USD/year/person	Average crew earnings per year (by fleet type)
Retail sale prices of tuna from the IO	Affordability of tuna from IOTC fisheries to consumers in CPCs	USD/kg	Prices per kg at retail markets (by species)

Model-Based Indicators

National account data can be complemented by statistical frameworks and analytical tools to improve the representation of the economic contribution of the marine fisheries at the national and regional levels ([Sweenarain 2021](#)). Supply-Use Tables (SUTs), Social Accounting Matrices (SAMs), and Computable General Equilibrium Models (CGEMs) serve as valuable analytical tools for assessing the contribution of fisheries by elucidating the intricate relationships between production, consumption, and income distribution within the sector, thereby facilitating a comprehensive understanding of its economic impact on broader social and economic systems ([Grafton et al. 2016](#)). These approaches are valuable for developing model-based indicators (e.g., economic multipliers) that assess the socio-economic contributions of tuna fisheries to the CPCs.

Available Fisheries Economics Data

Fish Prices

IOTC Data

As early as 2014, the Secretariat designed the IOTC Form [7PR](#) for CPCs to voluntarily report fish price data. The form includes information on the price of commercialised species, types of processing and product, preservation methods, fish size, as well as the origin, type of market, and destination. Few historical data of fish prices have been received at the Secretariat, with the notable exception of time series of monthly prices by species, fishing gear, and region reported by Oman since 2015. Some annual price data have recently been made available by Malaysia since 2018 and by Bangladesh, Indonesia, Kenya, Madagascar, Mauritius, Sri Lanka, Tanzania, and Thailand for the statistical year 2023.

In addition, some information on the value of marine fishery landings has been collected by the Southeast Asian Fisheries Development Center (SEAFDEC) since the late 1970s. Annual price data (USD) are available for some neritic tunas and seerfish in Thailand between 2009 and 2017 but the information remains sparse and mostly indicative of the differences of value between species as the series are not complete.

FFA Data

The Fisheries Development Division of the Pacific Islands Forum Fisheries Agency (FFA) collates monthly time series of tuna prices for key markets. These include (i) Thai import prices for whole round frozen skipjack and yellowfin tunas (USD/t, cost and freight), (ii) Japanese import prices for fresh and frozen bigeye and yellowfin tunas (YEN/kg, cost, insurance and freight) and (iii) US import prices for fresh (chilled) bigeye and yellowfin tunas from Oceania (USD/kg, free on board). Data kindly provided by FFA can be downloaded [here](#).

FAO Data

The FAO Fish Price Index ([FPI](#)) is a measure of the monthly change in international prices of a basket of seafood commodities considered to be representative of global seafood prices. The index consists of the average of price indices for some major fish commodities (fresh and frozen white fish, salmon, crustaceans, pelagic fish excluding tuna, tuna, and a broad category of other fish) weighted by the average export shares of each of the groups over 2014-2016 ([Tveterås et al. 2012](#)). Sources of the raw data for the FPI include EUMOFA, INFOFISH, INFOPESCA, INFOYU, and Statistics Norway. Data kindly provided by FAO can be downloaded [here](#).

Crude Oil Prices

The FFA also collates monthly crude oil prices, a major driver of operating costs in tuna fisheries. The price is based on the arithmetic average of the Brent, Dubai, and West Texas crude oil prices. Data kindly provided by FFA can be downloaded [here](#).

References

Anderson JL, Anderson CM, Chu J, Meredith J, Asche F, Sylvia G, Smith MD, Anggraeni D, Arthur R, Guttormsen A, McCluney JK, Ward T, Akpalu W, Eggert H, Flores J, Freeman MA, Holland DS, Knapp G, Kobayashi M, Larkin S, MacLauchlin K, Schnier K, Soboil M, Tveteras S, Uchida H, Valderrama D (2015) [The Fishery Performance Indicators: A Management Tool for Triple Bottom Line Outcomes](#). PLOS ONE 10:e0122809.

Grafton RQ, Kirkley J, Squires D (2016) [Economics for Fisheries Management](#). Routledge, London.

IOTC (2017) [Report of the 21st session of the Indian Ocean Tuna Commission](#). IOTC, Yogyakarta, Indonesia, 22–26 May 2017.

Macfadyen G, Defaux V (2019) [Scoping study of socio-economic data and indicators of IOTC fisheries](#). IOTC, p 55

McCluney JK, Anderson CM, Anderson JL (2019) [The Fishery Performance Indicators for Global Tuna Fisheries](#). Nature Communications 10:1641.

Sweenarain S (2021) Development of a blue economy fisheries satellite account for East-Africa, southern Africa and the Indian Ocean region. Indian Ocean Commission, Ebène, Mauritius.

Tveterås S, Asche F, Bellemare MF, Smith MD, Guttormsen AG, Lem A, Lien K, Vannuccini S (2012) [Fish Is Food - the FAO's Fish Price Index](#). PLOS ONE 7:e36731.