SDG indicator metadata

(Harmonized metadata template - format version 1.1)

0. Indicator information (SDG_INDICATOR_INFO)

0.a. Goal (SDG_GOAL)

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

0.b. Target (SDG_TARGET)

Target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

0.c. Indicator (SDG_INDICATOR)

Indicator 14.4.1: Proportion of fish stocks within biologically sustainable levels

0.d. Series (SDG_SERIES_DESCR)

ER_H2O_FWTL - Proportion of fish stocks within biologically sustainable levels (not overexploited) [14.4.1]

0.e. Metadata update (META_LAST_UPDATE)

2026-03-27

0.f. Related indicators (SDG_RELATED_INDICATORS)

Indicator 14.7.1: Sustainable fisheries as a percentage of GDP in small island developing States, least developed countries and all countries

0.g. International organisations(s) responsible for global monitoring (SDG_CUSTODIAN_AGENCIES)

Food and Agriculture Organization of the United Nations (FAO)

1. Data reporter (CONTACT)

1.a. Organisation (CONTACT_ORGANISATION)

Food and Agriculture Organization of the United Nations (FAO)

2. Definition, concepts, and classifications (IND_DEF_CON_CLASS)

2.a. Definition and concepts (STAT_CONC_DEF)

Definition:

The indicator, "Proportion of marine fish stocks within biologically sustainable levels", measures the sustainability of the world's marine capture fisheries by the abundance of the exploited fish stocks with respect to MSY levels.

For each level of reporting (National, Regional, Global) the indicator is calculated as the ratio between the number of exploited fish stocks classified as "within biologically sustainable levels" and the total number

of stocks in the reference list that were classified with a determined status (within/not within "biologically sustainable levels").

$$P_s = \frac{N_s}{N} x100 = \frac{N_s}{N_s + N_u} x100$$

where Ps is the percentage of stocks classified as "within biologically sustainable levels" for the reference list of stocks. Ns is the number of stocks in the reference list classified as "within biologically sustainable levels", Nu is the number of stocks in the reference list classified as "outside biologically sustainable levels" and N = Ns + Nu is the total number of stocks in the reference list that have been classified as within or outside "biologically sustainable levels".

Classifying individual stocks as within/outside "biologically sustainable levels":

In order to keep consistency with the 14.4 target ("at least to levels that can produce maximum sustainable yield as determined by their biological characteristics" and other earlier international agreements, including the United Nations Convention on the Law of the Sea (UNCLOS), a fish stock is classified as "within biologically sustainable levels" if its abundance is estimated (considering uncertainty) to be equal to or greater than the level that can produce the Maximum Sustainable Yield (MSY). In contrast, when abundance falls below the MSY level, the stock is classified as "outside biologically sustainable levels".

A wide array of methods and approaches (including documented expert opinion) is used to classify stock status relative to the abundance producing MSY. This varies among countries, regions and stocks. Nevertheless, the reliability of the classification is assessed by FAO as part of the process of producing the index.

Maximum Sustainable Yield (MSY) is commonly defined as the greatest average amount of catch that can be harvested in the long-term from a stock under constant and current environmental conditions (e.g., habitat, water conditions, species composition and interactions, and anything that could affect birth, growth, or death rates of the stock), without affecting the long-term productivity of the stock. A stock can produce MSY if its abundance is above a certain level, usually around 50% of its unexploited abundance (but actual value can vary around that level, depending on the biological characteristics of the stock). See more at https://www.fao.org/faoterm/en/?defaultCollId=21

MSY-based reference points are the most common type of reference points used in fisheries management today. This is primarily because, for decades, reference points from surplus production models have most often been set based on the concept of MSY and they are the basic benchmarks for the sustainability of fisheries set by the UN Convention on the Law of the Sea (UNCLOS, Article 61(3)). For more on Reference Points in Fish Stock Assessment, see Caddy and Mahon (1995), Cadima (2003) or Haddon (2011).

BMSY: Biomass corresponding to Maximum Sustainable Yield from a production model or from an age-based analysis using a stock recruitment model. Often used as a biological reference point in fisheries management, it is the calculated long-term average biomass value expected if fishing at FMSY.

A population is: "A group of individuals of the same species living in the same area at the same time and sharing a common gene pool, with little or no immigration or emigration."

A biological stock is: “A subpopulation of a species inhabiting a particular geographic area, having similar biological characteristics (e.g. growth, reproduction, mortality) and negligible genetic mixing with other adjacent subpopulations of the same species." (FAO, 2004-2021).

The **reference list of s tocks:** it is not possible to classify the sustainability of exploitation for all the exploited stocks from a country, region or the world. Therefore, the indicator must be calculated based on a subset of these stocks. The list of the stocks that are classified for status and used to calculate the indicators is called the "reference list of s tocks".

The reference list of s tocks is built differently for the Regional/Global and the National levels. The process of building the reference list of s tocks for regional and global level are described in FAO (2025). At the National level, countries are requested to define a list of stocks, based on an agreed set of criteria (Appendix 1). National and shared stocks can be included, but not straddling stocks (stocks that are distributed both in national EEZ and Areas Beyond National Jurisdiction), which are included in the Regional/Global reference lists.
The 2025 FAO publication updated and expanded the Regional/Global reference lists, reconciling them to the previous methodology (FAO 2011) by using the finest level of resolution to obtain a more comprehensive list, which includes National level stocks, linking the three levels (national, regional, global) of the indicator.

The detailed description of all necessary concepts can be found in the e-learning course (FAO 2019-2021).

2.b. Unit of measure (UNIT_MEASURE)

Percent (%)

2.c. Classifications (CLASS_SYSTEM)

FAO Major Fishing Areas for Statistical Purposes
ASFIS List of Species for Fishery Statistics Purposes
UNFSA Stock Jurisdictional distribution
FIRMS typology of stock units

3. Data source type and data collection method (SRC_TYPE_COLL_METHOD)

3.a. Data sources (SOURCE_TYPE)

The classification of the status of exploited stocks relative to the abundance that can produce MSY is often established through a formal stock assessment process. The data to inform stock assessments can come from many different sources, including fishery-dependent and fishery-independent sources. Fishery-dependent data are collected from the fishery itself, using both commercial and recreational sources through reporting or sample-based surveys at sea, at landing sites, or within fishing communities. They can include information on removals of fish from the sea, which can include landings and discards, and information on the fleet such as number of boats, number of tows, time spent on the sea, as well as economic and social information like fish prices, fuel expenditures, total sales, employment or other.

Fishery-independent data are obtained in ways not related to any fishing activity and are typically collected by scientists via surveys (often scientific cruises) designed to estimate species abundance and biomass over long time series, and over consistent seasons and geographic areas. Typically, fisheries-independent data also include biological information on the species (age, length, weight, maturity, etc.), and habitat and environmental information (temperature, salinity, depth, etc.).

These data and other information are used by stock assessment scientists to classify the stock status. References on the methods most commonly used can be found in Cadima (2003), Haddon (2011), Sparre and Venema (1998) and other publications dealing with the methods of stock assessment.

The information used for the indicator at the Global/Regional level is based on a different process and data sources than that used for the national level.

Regional/Global :
The Global and Regional methodology (FAO 2025) explicitly splits the reference list of stocks into three "tiers" based on the best data and information available and based on the methods used to classify their stock status, incorporating results from existing classical stock assessment and data-limited methods and performing rapid assessments where existing assessments are lacking. The current reference list of 2570 stocks is reconciled with the more limited 2011 list by using the finest level of resolution of representative assessment units, representing about 74 percent of the global catch. Stock included are from industrial and small-scale fisheries in both developed and developing countries.

National:
The national level indicator, on the other hand, is based exclusively on the stock status reported by countries. A multiplicity of methods are used to classify the stock status, including model-based estimates, empirical indicators and documented expert opinion.
For country reporting, a questionnaire is sent out to all FAO member states with marine boundaries (i.e. 156 FAO member states, 25 non-FAO member states and territories, and three Caspian Sea border countries) on a two-year basis. For the most recent and complete list of questions used to inform this indicator, please visit https://sfcs.fao.org/media-cnt/docs/statisticslibraries/questionnaires/fisheries/sdg_14-4-1_questionnaire_2024_en.xlsx?sfvrsn=155757a2_1&Status=Master .

3.b. Data collection method (COLL_METHOD)

Regional/Global level:
The fish stocks that FAO monitors represent a wide spectrum of data availability, ranging from data-rich and formally assessed stocks to those that have very little information apart from catch statistics by FAO major fishing area and those with no stock assessment at all. For the purposes of using the best available data and information and maintaining consistency among stocks and assessors, a procedure has been defined to identify relevant stock status information (FAO 2025).

National level:

FAO collects national data through a questionnaire sent to the Principal Focal Point (PFP) of each country. The PFP organizes an institutional set-up which identifies the competent authorities to develop a reference list of stocks and completes the questionnaire.

During the initial stages of national data reporting, the information or data collected through the questionnaire from a country only informed the indicator for the individual countries, acknowledging the need for a learning curve along the few first questionnaire inquiries. As a result, the Regional/Global indicator remained separate from the N ational indicators during these initial stages. However, FAO is working on a convergence (where possible) of the two processes, and a selection of good-quality stock status assessments reported by countries for the national indicators are now included in the Regional/G lobal indicator calculations .

Despite this effort, due to the heterogeneity of reporting from countries in the same FAO Major Fishing Area, and the necessary inclusion of straddling and highly migratory stocks and fisheries in the R egional and G lobal indicator, it is unlikely that a full convergence will be achieved in a short time-frame.

The indicator is applicable for countries with marine borders (or those bordering the Caspian Sea) and therefore excludes landlocked countries from data collection and processing.

3.c. Data collection calendar (FREQ_COLL)

National : Reporting every 2 years beginning in November 2019.
Regional/Global : every 2 years since 2013. The data collection calendar for the national level may be adjusted in the future according to requirements for a convergence between national and global/regional processes.

3.d. Data release calendar (REL_CAL_POLICY)

National: biennially.
Regional/Global : biennially

3.e. Data providers (DATA_SOURCE)

G lobal and R egional data are provided by FAO, international organisations and institutions, and include National-level data. National-level data are generally reported by the National Statistics Office or the Ministry of Fisheries and/or Agriculture.

3.f. Data compilers (COMPILING_ORG)

Food and Agriculture Organization of the United Nations (FAO)

3.g. Institutional mandate (INST_MANDATE)

The Food and Agriculture Organization of the United Nations (FAO) is the lead United Nations agency for agriculture, forestry, fisheries and rural development. As part of its mandate, it fosters global, regional and national sustainable development initiatives to secure responsible fisheries worldwide, which in turn requires maintaining fish stocks at biologically sustainable levels, so that they can contribute fully, and in a

sustainable way, to the food and nutrition security, as well as to social and economic development, of humankind.

Specifically, the mission of FAO Fisheries and Aquaculture Division (NFI) is stated as "To strengthen global governance and the managerial and technical capacities of members and to lead consensus-building towards improved conservation and utilization of aquatic resources".

As part of its mandate, FAO is also tasked with collecting and disseminating data and information for improved planning and management of fisheries, aquaculture and the other food-producing sectors of the economy.

Article I of FAO constitution requires that the organization collect, analyses, interpret and disseminate information relating to nutrition, food and agriculture (the term “agriculture” and its derivatives includes forestry, fisheries and aquaculture, http://www.fao.org/3/K8024E/K8024E.pdf).

The first session of FAO Conference in 1945 provided the basis and rationale for FAO mandate as a custodian agency of this indicator: “If FAO is to carry out its work successfully it will need to know where and why hunger and malnutrition exist, what forms they take, and how widespread they are. Such data will serve as a basis for making plans, determining the efficacy of measures used, and measuring progress from time to time.”

4. Other methodological considerations (OTHER_METHOD)

4.a. Rationale (RATIONALE)

The United Nations (UN) Convention on the Law of the Sea (UNCLOS), the United Nations Fish Stocks Agreement (UNFSA [UN, 1995]) and FAO Code of Conduct for Responsible Fisheries (FAO, 1995a) all require maintaining or restoring fish stocks at levels that are capable of producing their maximum sustainable yield (MSY). To fulfil the objectives of these international treaties, fishery management authorities need to undertake assessment of the state of fish stocks and develop effective policies and management strategies. As a UN Agency with a mandate for fisheries, FAO endeavours to provide the international community with the best information on the state of marine fishery resources.

Since 1974, FAO has been periodically assessing and reporting the state of marine fishery resources using a wide spectrum of methods from numerical models to data-limited approaches. FAO global and regional estimates were also used as an MDG indicator for Goal 7 on environment during the period 2000-2015. This facilitated its approval as a Tier I SDG indicator by the 2nd IAEG-SDG in October 2015.

The indicator has a peculiar nature compared to more conventional SDG indicators. The indicator estimates the sustainability of fish stocks that often move across national boundaries. This led the indicator to be initially reported only at global and regional levels, with regions not corresponding to continental MDG or SDG regions but to marine regions termed “FAO Major Fishing Areas”.

The Global SDG Indicator Framework is a voluntary mechanism, but countries are required to report if data are available. As a custodian agency, FAO works to put in action the 2030 Agenda’s emphasis on country ownership and raise the incentive to take action at national , regional and global levels. FAO has developed, since 2019, a questionnaire approach to allow individual countries to report on the sustainability of fish stocks. The approach 1) provides a framework for meaningful country-level reporting

that complements and informs the core methodology of SDG indicator 14.4.1 at the Regional/Global levels (FAO, 2025), and 2) provides countries with simplified methods to carry out fish stock assessment in data-limited contexts, to some extent overcoming the technical barriers that traditional methods have presented. This is because country-level reporting will be limited to the assessment of stocks that are found only within a country's EEZ and/or shared with neighbouring countries' EEZs, and therefore do not include straddling stocks, highly migratory species, or stocks in Areas Beyond National Jurisdiction (ABNJ). As a result, national data alone cannot be meaningfully aggregated at global/regional levels, but it can be used to inform country progress on fish stock sustainability within the EEZ.

In 2019, FAO began sending a questionnaire to countries to collect national data with the aim to help countries in the reporting process.

4.b. Comment and limitations (REC_USE_LIM)

The indicator measures the sustainability of fishery resources, and as an end-result, is a measure of Target 14.4. Its derivation requires catch and fishing effort data and/or other biological or technical data and parameters together with the scientific expertise necessary to correctly perform stock assessment. The indicator at the G lobal level is estimated by FAO based on methodology updated in 2025 . Similar to regular updates carried out with the previous method to incorporate technical advances and changes in major fish species, some discrepancies between regions may occur in the representativeness of the reference list. However, this will not pose a large impact on the reliability of the indicator's temporal trends.

For the national level, the composition of stocks within the reference list of stocks and the selection criteria used to develop the list will vary between countries, making the indicator suitable for checking countries' own progress over time.

4.c. Method of computation (DATA_COMP)

FAO currently reports the G lobal and R egional indicators calculated from FAO's assessment of a selected reference list of fish stocks around the world. The methodology is described in FAO Technical Paper (FAO 2025), updated from FAO, 2011, and involved 19 regional workshops and online consultations, with around 650 in-person experts representing some 90 countries and 200 organizations. The updated methodology was developed with capacity development at its core, particularly benefiting data- and capacity-limited regions. Early engagement with national and regional institutions strengthened their ability to contribute to stock status assessments and supported greater standardization of the process. This collaborative and transparent approach enhances the credibility of the FAO methodology and confidence in its results.

FAO has worked to develop the new approach for National -level reporting since 2017, and has consulted with countries in three dedicated expert consultation workshops: in November 2017, FAO convened a workshop to exchange views with national practitioners on the proposed new analytical methods to produce Indicator 14.4.1 at country level[1]. In February 2019, FAO convened an expert consultation workshop[2] on development of the methodologies for the global assessment of fish stock status, with participants from countries and regional fisheries organizations. In order to help countries

[1] Full report accessible here: http://www.fao.org/documents/card/en/c/I8714EN/
[2] Full report accessible here: http://www.fao.org/3/ca4355en/ca4355en.pdf

reporting on the indicator, FAO then organized a series of capacity development workshops on stock status assessment and estimation methods of SDG Indicator 14.4.1 for most regions.

In November 2019, FAO dispatched the first SDG14.4.1 questionnaire calling countries to report on their national indicator. Eighty-three countries submitted their questionnaire and three reported independently.

For each level of reporting (national, regional, global) the indicator is calculated as the ratio between the number of exploited fish stocks classified as "within biologically sustainable levels" and the total number of stocks in the reference list that were classified with a determined status (within/not within "biologically sustainable levels").

$$P_s = \frac{N_s}{N} x100 = \frac{N_s}{N_s + N_u} x100$$

where Ps is the percent of stocks classified as "within biologically sustainable levels" for the reference list of stocks. Ns is the number of stocks in the reference list classified as "within biologically sustainable levels", Nu is the number of stocks in the reference list classified as "outside biologically sustainable levels" and N = Ns + Nu is the total number of stocks in the reference list that have been classified as within or outside "biologically sustainable levels".

To classify individual stocks as within/outside "biologically sustainable levels":

To keep consistency with the 14.4 target ("at least to levels that can produce maximum sustainable yield as determined by their biological characteristics" and other earlier international agreements, including the United Nations Convention on the Law of the Sea (UNCLOS)), a fish stock is classified as "within biologically sustainable levels" if its abundance is estimated to be (considering uncertainty) at or greater than the level that can produce the Maximum Sustainable Yield (MSY). In contrast, when abundance falls below the MSY level, the stock is classified as "outside biologically sustainable levels".

A wide array of methods and approaches (including documented expert opinion) is used to classify stock status relative to the abundance producing MSY. This varies among countries, regions and stocks. Nevertheless, the reliability of the classification is assessed by FAO as part of the process of producing the index.

Global/Regional:

Until 2025, Global and R egional estimates of stock sustainability have been performed for 584 fish stocks around the world , representing 70% of global landings. The status of each stock is estimated using the methodology described in FAO Technical Paper (FAO, 2011). From 2025, the Global and Regional estimates have been performed for 2 570 assessment units around the world, representing a more granular list covering 74% of global landings. The stock status of each stock estimated using the methodology described in FAO Technical Paper (FAO, 2025).

National:

Countries are requested to report the status of a reference list of fish stocks defined by each country on the basis of the criteria presented in Appendix 1.

4.d. Validation (DATA_VALIDATION)

FAO carries out a series of validations to assure that the data and information are provided by countries in line with the questionnaire instructions. The validation process consists of: (i) identification of errors, mistakes and missing values in the data and, (ii) correcting errors, mistakes and missing values in close consultation with the countries concerned. Each country is asked either to confirm that the data provided are correct or to provide remarks and / or revise data accordingly if they identify any errors.

4.e. Adjustments (ADJUSTMENT)

No adjustments were applied for the time series

4.f. Treatment of missing values (i) at country level and (ii) at regional level (IMPUTATION)

- **At regional and global levels**

To ensure completeness of regional and global information on stocks, FAO gathers additional information outside of what is provided by each country, in particular concerning the highly migratory and straddling fish stocks. For shared stocks, FAO may consult with international organisations and regional fisheries bodies (RFBs), who are mandated to assess and manage stocks with their contracting parties, in order to receive information and data and conduct stock assessments when necessary.

- **At country level**

This indicator examines marine fish stocks. If a country has no marine capture fisheries, then the indicator is not calculated for that country and FAO reports it to UNSD with the flag “N” (Not relevant), with the exception of countries surrounding the Caspian Sea. When data are missing at the national level, no imputation is performed to derive estimates. From 2025, t he indicator at regional and global levels includes stock statuses from country questionnaires as part of a systematic assessment of a reference list of stocks selected globally by FAO.

4.g. Regional aggregations (REG_AGG)

As explained in the “Rationale” section, national data alone cannot be meaningfully aggregated at global/regional levels because country-level reporting will be limited to the assessment of stocks that are found only within a country’s EEZ (including stocks shared with neighbouring countries’ EEZs), and will therefore not include straddling stocks, highly migratory species, or stocks in Areas Beyond National Jurisdiction (ABNJ). Therefore, regional “aggregates” by FAO Major Fishing Area and the global indicator value are calculated with a specific approach, as described in the FAO Technical Paper (FAO 2025).

4.h. Methods and guidance available to countries for the compilation of the data at the national level (DOC_METHOD)

In each country, the data available for each stock and expertise level to conduct different types of assessments will differ. Some countries may have classic stock assessments already conducted for many of their stocks, while others may have very few or no assessments available.

For some countries, little stock assessment has been done. To help these countries and to facilitate their reporting, FAO prepared online materials and tools, including a selection of methods that can be used to

evaluate stock status with data limited methods such as length-based and catch-only methods and an online platform for hands-on practice. The strengths and limitations of these methods are discussed in an eLearning course[3] (Lesson 4), and caveats were also provided to avoid misuse and encourage caution in their use. Furthermore, capacity development workshops have been organized to provide support to countries in stock assessment and reporting on the Indicator SDG 14.4.1. FAO continues to work on the development on online tools and updated eLearning.

4.i. Quality management (QUALITY_MGMNT)

FAO has in place the necessary frameworks and procedures for quality assurance of the SDG indicators data, according to the Fundamental Principles of Official Statistics and the FAO Statistics Quality Assurance Framework (SQAF) available at: http://www.fao.org/docrep/019/i3664e/i3664e.pdf.

FAO is systematically carrying out quality assessments to ensure the quality of the SDG indicator data sets.

For this indicator, a systematic cross-checking of the various source data was carried out during the overall compilation process of national and regional data.

4.j Quality assurance (QUALITY_ASSURE)

FAO carries out a quality assurance review to help with consistency and correctness of this reporting process. The review is performed in two steps to quantify the level of confidence that can be attributed to national reporting: 1) to verify that the questionnaire has been correctly and sufficiently filled out and complies with the reporting guidelines, and 2) to assess the reliability of the responses relative to the supporting information reported by the country. Reliability is based on the compliance to the guidelines in developing the reference list of stocks, the proportion of stocks with official assessments, the source of stock assessments (e.g. RFB, peer-reviewed, expert knowledge), the amount of data available at the stock level, and the consistency with regional assessments (for shared stocks). FAO provides feedback to respondents, who have an opportunity to adjust their submission.

4.k Quality assessment (QUALITY_ASSMNT)

Quality assessment reveals that quality is highly dependent on the primary data which undergoes the applicable validation procedures before dissemination. The outcomes of the calculations are also controlled and compared inside and among FAO fishing areas. Global and regional aggregates are assessed by considering and evaluating the contributions of regional fisheries bodies while ensuring consistency of the entire time series for the global indicator, with reference to the published methodology (FAO, 2025). In addition, an internal summary report on the annual assessment of the quality of country data is also produced.

5. Data availability and disaggregation (COVERAGE)

[3]eLearning course: https://elearning.fao.org/course/view.php?id=502

Data availability:
Global/regional: the indicator has global and regional data on a biennial basis from 1974 to 2021. Regional breakdown is by FAO major fishing area. The regional and global indicators were calculated based on the reference list of fish stocks FAO established in 1974. Countries are not directly involved in the computation of the indicator at global/regional level.

National: the national-level questionnaire was dispatched for the first time in November 2019 and then on a biennial basis since 2022; FAO identifies countries and territories with a marine border, including 156 FAO member states, 25 non-FAO member states, which includes three countries with Caspian Sea border, as being eligible, in principle, to report. Of these, data for the indicator has been reported at least once for about three quarters .

Time series:
Global/regional level: from 1974 to 2021.
National level: On a biennial basis since 2019

Disaggregation:
By FAO major marine fishing areas for statistical purposes[4].
Taxonomically, FAO publishes the indicator separately for straddling stocks (mostly tuna and tuna like species).

6. Comparability / deviation from international standards (COMPARABILITY)

Sources of discrepancies:
The indicator is estimated by FAO based on the methodology developed in the 1980s (FAO, 2011) and updated in 2025 (FAO, 2025). Although regular updates were carried out to incorporate technical advances and changes in major fish species, some discrepancies between regions may occur in the representativeness of the reference list of stocks. However, this will not pose a large impact on the reliability of the global indicator's temporal trends, which covers 74 % of global landings.

7. References and Documentation (OTHER_DOC)

URL:
FAO 2016-2021. Sustainable Development Goals. Indicator 14.4.1 - Proportion of fish stocks within biologically sustainable levels. http://www.fao.org/sustainable-development-goals/indicators/1441/en/

FAO 2019-2021. SDG 14.4.1 eLearning course. https://elearning.fao.org/course/view.php?id=502

FAO 2015-2021. CWP handbook of fishery statistical standards. Fishing areas for statistical purpose. https://www.fao.org/cwp-on-fishery-statistics/handbook/general-concepts/main-water-areas/en/
FAO 2015-2021. CWP handbook of fishery statistical standards. Identifiers for aquatic animals and plants: http://www.fao.org/cwp-on-fishery-statistics/handbook/general-concepts/identifiers-for-aquatic-animals-and-plants/en/

[4] https://www.fao.org/fishery/en/area/search and https://www.fao.org/cwp-on-fishery-statistics/handbook/general-concepts/main-water-areas/en/

FAO 2004-2021. FIRMS Information Management Policy - Annex 1.2 - List of reference terms for Marine Resources. Updated June 2019. http://www.fao.org/3/a-ax530e.pdf

Questionnaire for national reporting of SDG indicator 14.4.1: https://www.fao.org/fileadmin/user_upload/faoweb/statistics/questionnaires/SDG_14.4.1_questionnaire_2022_en.xlsx

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FAO (2024) The State of World Fisheries and Aquaculture – Blue Transformation in Action

FAO (2025) Review of the state of world marine fishery resources – 2025. FAO Fisheries and Aquaculture Technical Paper. No. 721. Rome. FAO

Haddon, M. (2011). Modelling and Quantitative Methods in Fisheries 2nd Edition. Chapman and Hall/CRC. 465 p.

Hilborn, R., R.O. Amoroso, C.M. Anderson, J.K. Baum, T.A. Branch, C. Costello, C.L. de Moor, et al. 2020. “Effective Fisheries Management Instrumental in Improving Fish Stock Status.” Proceedings of the National Academy of Sciences of the United States of America 117 (4): 2218–24. https://doi.org/10.1073/pnas.1909726116.

Sparre P. & Venema, S.C. (1998). Introduction to tropical fish stock assessment. Part 1. Manual. FAO Fisheries Technical Paper. No. 306.1, Rev. 2. Rome, FAO. 407p.

UN (1995) Agreement for the implementation of the provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks. 40 pp.

Appendix 1

Guidelines to establish reference list of stocks.

The reference list of stocks should include only marine species of national stocks, i.e. a biological stock distributed within a country's national jurisdiction area; or shared stocks if the biological stock is distributed across the national jurisdictions of neighbouring countries, and/or possibly the competence area of a regional fisheries management organization. This list of fish stocks will ideally include existing assessment units or management units, and also possibly other unassessed fish stocks that are fished in a given country. The list will exclude stocks straddling in the high seas, mostly tuna and tuna-like species.

This list should:

a. Include finfish, crustaceans, molluscs and other aquatic animals, and exclude aquatic mammals, reptiles, seaweeds and other aquatic plants;
b. Represent at least 60% (a higher percent is preferred when possible) of the national total landed and/or reported catch (Total in Tonnes excluding landings from straddling stocks). Information should be provided on all of the stocks that contribute to this top 60% (or more) of landings regardless of whether their status is known. Stocks should be input from left to right on the spreadsheet in the order of the largest to smallest total landings for each stock, by Tonnes. Species with multiple different stocks should be input as separate stocks.
c. Contain stocks of major importance in terms of catch, ecosystem role, economic value, historical importance, representative geographic distribution, stocks from both industrial and artisanal fisheries, and social/cultural considerations. If possible, the list should represent stocks of each of these categories for a given country. For example, care should be taken to include fish stocks that are important to small-scale fisheries as well as large-scale industrial fisheries. Consideration for these different categories will vary between countries.
d. Remain unchanged (i.e. for at least 5 years) to better reflect changes in stock status at the national level and minimize the effect of changing the reference list of stocks (i.e., adding, deleting, merging stocks) into the SDG indicator. This will ensure consistency in the indicator calculation and better reflect fish stock sustainability over time.
e. Include at least 5 assessed stocks that complies with the above guidelines unless justification for fewer stocks can be given.