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# AFRICAN COMMISSION ON AGRICULTURAL STATISTICS

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# SDG INDICATOR 14.4.1 "PROPORTION OF FISH STOCKS WITHIN BIOLOGICALLY SUSTAINABLE LEVELS"

**SUMMARY**

The indicator - Proportion of fish stocks within biologically sustainable levels - measures the sustainability of the world's marine capture fisheries by their abundance. It aims at monitoring Target 14.4 based on the concept of "within biologically sustainable levels", i.e., that abundance of the fish stock is at or higher than the level that can produce the maximum sustainable yield (MSY). When a stock is fished at biologically sustainable level, it produces good yield without impairing the stock's reproductivity, reaching a good balance between human use and ecological conservation. The proportion of the stocks is calculated based on stock numbers, without weighting either by its production volume or stock abundance, that is every fish stock is considered of the same importance.

With SDG14.4.1, countries will report on the status of stocks within their EEZs. Shared / straddling stocks under Regional Fisheries Bodies (RFB) mandates are excluded from SDG14.4.1. It's Tier I indicator, however, the challenges concern the continued effort still required to adapt the indicator in its present form, as present in the FAO publication, The State of the World Fisheries and Aquaculture (SOFIA), to make it usable by countries and comparable at global scale. Also in terms of data source the challenge is associated to the great effort that must be made to collect data that are needed for stock assessment at country level. FAO is currently work to developing a capacity building plan for member countries and to help address current challenges with the methodology.

## I. INTRODUCTION

The indicator **Proportion of fish stocks within biologically sustainable levels** measures the sustainability of the world's marine capture fisheries by their abundance, hence it aims at monitoring Target 14.4 which is "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.

The concept of "within biologically sustainable levels" means that abundance of the fish stock is at or higher than the level that can produce the maximum sustainable yield (MSY).

Fish stock assessment science defines the long term sustainability of fish resources as their abundance is fished at the level that produces the maximum sustainable level. For fisheries policy and management purposes, the concept of maximum sustainable yield (MSY) is well established (e.g. in the United Nations Convention on the Law of the Sea, the UN Fish Stocks Agreement and the FAO Code of Conduct for Responsible Fisheries [the Code]). Management objectives are commonly set to maintain fishing mortality at or below levels associated with MSY and to ensure stock abundance is also at least at the MSY level.

With SDG14.4.1, countries will report on the status of stocks within their EEZs. Shared / straddling stocks under Regional Fisheries Bodies (RFB) mandates are excluded from SDG14.4.1.

## II. METHODOLOGY

### a. Rationale for the SDG Indicator 14.4.1

The indicator measure the sustainability of fish resources based on two major considerations: yield and reproduction. When a stock is fished at biologically sustainable level, it produces good yield without impairing the stock's reproductivity, reaching a good balance between human use and ecological conservation. The proportion is just calculated based on stock numbers, without weighting either by its production volume or stock abundance, that is every fish stock is considered of the same importance.

### b. Concepts

Fish stock assessment science defines the long term sustainability of fish resources as their abundance is fished at the level that produces the maximum sustainable level. The basic benchmarks for the sustainability of fisheries are set by the UN Convention on the Law of the Sea (UNCLOS, Article 61(3)).

### c. Computation method

Fishery sustainability is defined based on stock abundance. To know stock abundance, one needs to carry out stock assessment that uses fish catch statistics, fishing effort data and biological information and fit the data to a population dynamics model. After completing stock assessment for all stocks concerned, fish stocks that have abundance at or above the level associated with the maximum sustainable yield are counted as biologically sustainable, and otherwise are considered as overfished.

When stock assessment information and biological reference points are missing for a given stock the computational method should follow an alternate approach based on Species Catch Trend by FAO area. Several aspects related with the computational method are still under discussion.

Currently FAO regularly reports as part of its biennial SOFIA publication the state of fish stocks at global level, based on a time series starting in 1974. The global indicator is based on 584 fish stocks which were estimated around the world since 1974, representing 70% of global landings. Each stock was estimated using the method described in FAO Technical Paper 569 (http://www.fao.org/docrep/015/i2389e/i2389e.pdf). If the stock has abundance below the level that can produce maximum sustainable yield, it was counted as overfished. The indicator measures the % of the assessed stocks are within biologically sustainable levels.

### d. Interpretation

Fishery sustainability is defined based on stock abundance. To know stock abundance, one needs to carry out stock assessment that uses fish catch statistics, fishing effort data and biological information and fit the data to a population dynamics model. After completing stock assessment for all stocks concerned, fish stocks that have abundance at or above the level associated with the maximum sustainable yield are counted as biologically sustainable, and otherwise are considered as overfished.

The concept of "within biologically sustainable levels" means that abundance of the fish stock is at or higher than the level than can produce the MSY. A fish stock of which abundance is at or greater than the level, that can produce the maximum sustainable yield (MSY) is classified as biologically sustainable. In contrast, when abundance falls below the MSY level, the stock is considered biologically unsustainable.

### e. Treatment of missing values

At country level – In principle, a fixed number of fish stocks is monitored and assessed in terms of their status. No interpolation is carried out for missing data.

### f. Regional aggregates

At regional and global levels - A fixed number of fish stocks is monitored and assessed in terms of their status.

### g. Limitations

The current methodology described above for the SOFIA indicator is applied at a regional level and is not easily applicable to country level assessment, particularly to many developing countries, because (i) stock assessment is highly technical and many countries lack of such skills, and (ii) many countries do not have sufficient data to support stock assessment. Continued effort is still required to adapt the indicator in its present form to make it usable by countries and comparable at global scale.

Challenges/limitations also concern the framework required for consistent monitoring across stocks assessed at different scales (national stocks, regional shared stocks) and time.

## III. DATA SOURCES

Stock assessment needs several different kinds of data that come from different sources. For example, catch data are often reported to FAO by member countries, but fishing effort data and other biological data may come from other sources. A great effort must be made to collect data that are needed for stock assessment. Also, it is worth noting that this indicator cannot be directly calculated from the data, but only through stock assessment which is a mathematical modelling process.

The State of the World Fisheries and Aquaculture (SOFIA) reports biennially the status of fish stocks at the global level using maximum sustainable yield (MSY) reference points.

SOFIA's indicator is the result of a methodology based on:

- Status of shared or straddling stocks assessed under RFMO/RFBs mandates
- Status of national stocks assessed under national mandates,

and in absence of stock assessment

- Analysis of species catch trends by FAO area (FAO catch statistics)

Stock units are defined at a granularity of [FAO Major Fishing Areas X Species]. The proportion is just calculated based on stock numbers, without weighting either by its production volume or stock abundance, that is every fish stock is considered of the same importance.

## IV. CONCLUSION

The indicator measure the sustainability of fish resources based on two major considerations: yield and reproduction. However, no such assessments have been done at country level and no methods and guidance of assessment at country level have been established because stock assessment requires numerical modelling skills and is highly data demanding so that the majority of developing countries do not have the capacity of carrying out its own stock assessment.

FAO is currently work to developing a capacity building plan for member countries and to help address current challenges with the methodology. A global workshop will be hosted in November 2017 involving regional experts to endorse methodology, train experts as trainers and to review reporting framework and options. FAO Focal Points: Yimin Ye/ Marc Taconet