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# COMMITTEE ON FISHERIES

## SUB-COMMITTEE ON FISHERIES MANAGEMENT

### First Session

15-18 January 2024

## IMPROVING FAO'S PERIODIC ASSESSMENT OF THE STATE OF WORLD FISHERY RESOURCES: UPDATES TO THE FAO STATE OF STOCKS INDEX (SoSI)

### Executive Summary

This paper covers essential elements of the updated State of Stocks Index (SoSI) reported biennially in the FAO's State of World Fisheries and Aquaculture (SOFIA) publication. FAO has revisited the approach developed in the 1970s to make it more transparent, representative, and participatory through a series of technical workshops at the FAO Area level. The improvements include: (i) an updated and expanded list of monitored stocks; (ii) improved process of data and information collation; (iii) improved method and process for stock status categorization; (iv) improved reporting process. We illustrate progress on this new approach over the last year and present a plan for its completion by 2025.

### Suggested action by the Sub-Committee

The Sub-Committee is invited to:

- review, provide comments and support the methodological updates for estimating the State of the Stocks; and
- agree to the suggested timeline for release.

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## I. BACKGROUND

1. Since 1971, FAO has been publishing regular analyses of the state of exploited fish stocks (SoS)<sup>1</sup>, including the summary updates presented in the FAO flagship publication "The State of World Fisheries and Aquaculture" (SOFIA) Report<sup>2</sup>. To promote consistency and comparability across time, these analyses have been based on a fixed list of monitored stocks (which account for over 70% of global fish landings), and a process and methodology that has only had minor adjustments since the start of the series<sup>3</sup>.

2. However, the fisheries sector is now appreciably different compared to the 1970s. First, the dominant species, stocks, and modes of exploitation have changed. Second, the tools and the requirements for estimating and presenting global sustainability information are constantly evolving, including the need for increasing transparency and the use of local knowledge. Third, FAO Members have made substantial technical and institutional improvements to rigorously assess the state of many exploited stocks, some of which are not included in the original list of monitored stocks. Finally, the monitoring of Sustainable Development Goal (SDG) Indicator 14.4.1, has generated parallel monitoring processes that are worth connecting. Thus, FAO considers that the time is right to conduct a methodological update to compute and report on the state of world fish stocks, better aligned with national SDG reporting initiatives, with broader expert participation and transparency, while maintaining the crucial integrity of the time series.

## II. NEW STATE OF THE STOCKS MONITORING PROCESS

3. In 2021, FAO initiated a process to consider updates in the methodology used to generate "State of the World Fisheries Resources" analyses. The first phase included an attempt to develop and use a single standardized tool for classifying stock status using mostly official landings. However, trials have shown that this methodology can be applied only for a very limited number of stocks for which good-quality landings and ancillary data are available. During this first phase, it also became clear that, in addition to methodological updates, the process needed to foster transparency, facilitate buy-in from national and regional actors and support alignment with other related initiatives such as SDG 14.4.1 monitoring by FAO members. The updated methodology will continue to generate SoSI at global and FAO regional fishing areas, where gaps in knowledge on the state of stocks due to capacity limitations on assessment can be identified and narrowed over time in a process of continuous improvement. Four parallel activities will be implemented as per below.

### Review the reference list of stocks

4. Although the original list of stocks agreed to in the 1970s (the "Reference List") was quite comprehensive, it is time to revise the list in each region so that the index is calculated from a more representative set of stocks that reflects the current social, economic and ecological context of fisheries in different parts of the world. This process of information collation has been carried out in full consultation with national and regional fisheries agencies and other relevant institutions and includes clear criteria to identify which stocks to include in the Reference Lists. These criteria are: (a) stocks with a formal assessment report, (b) stocks included in the national reports for SDG Indicator 14.4.1, (c) stocks of national or regional importance, as indicated by the level of current and historical landings; and (d) other stocks, selected to improve the representativeness of the list as a sample from all the exploited fish stocks in each Fishing Area. The Stocks included in the Reference lists will correspond as much as possible to actual Management or Operational Units, thus enhancing the linkages between the FAO Index and the assessment and management initiatives at the national or regional level.

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<sup>1</sup> Gulland, J.A. 1971. The fish resources of the ocean. West Byfleet, UK, Fishing News Books. 255 pp.

<sup>2</sup> <https://www.fao.org/3/ca9229en/ca9229en.pdf>

<sup>3</sup> <https://www.fao.org/fishery/en/publications/45897>

### **Improve the process for collation of data and information**

5. Enhanced engagement with national and regional fisheries institutions has taken place to help assemble the data and information used to derive stock categorization, to develop and document a database used to derive inference, and to reinforce the legitimacy of the process. Development of capacity at the national and regional level will be a significant part of this approach, consistent with the 2021 COFI Declaration for Sustainable Fisheries and Aquaculture<sup>4</sup>.

### **Improve the process for classification of the stocks**

6. A standardized approach for the classification of stocks into the current three categories of State of Exploitation<sup>5</sup>: (i) overexploited, (ii) maximally sustainably exploited, and (iii) underexploited, will continue, but it would be more clearly described and communicated. Three tiers that define the level of quality and availability of data and information will be used to make decisions on the methodology used to derive stock status: **Tier 1**: Traditional stock assessments are available and deemed reliable. The status for stocks in this tier will be derived directly from national or, when applicable, regional assessments; **Tier 2**: No formal and reliable stock assessments are available, but catch data accompanied by good-quality adequate supplementary information that can be used to infer stock status is available. The status for stocks in this tier will be inferred by Production-type models adapted to data-limited situation<sup>6</sup>; and **Tier 3**: Amount, detail and/or quality of data is insufficient for either Tier 1 or Tier 2 approaches. The status of stocks in this tier will be categorized by applying a “weight-of-evidence approach”<sup>7</sup> coupled with a rigorous peer-review process. The stocks will be classified into one of the tiers using a clear decision matrix, and the process will be carried out in a well-documented transparent framework, allowing for full transparency of choices and assumptions, peer-review and future revisions.

### **Improve the process for reporting on the results of the analyses**

7. Two major activities will be implemented to improve the process for reporting: (1) each Assessment will be fully documented, with data, indicators used, and justification for the classification obtained. These data will be stored and retrievable through FAO data systems, and (2) New processes and visual representation of the results, making use of recent advances in communication approaches, will be adopted.

8. The State of Stocks will continue to be reported through the FAO SOFIA report, at global level and for each of the FAO fisheries areas.

## **III. ROADMAP AND EXPECTED RESULTS**

9. The work outlined above is being implemented in three consecutive phases with activities described below:

10. **Phase 1 (Q1 2021-Q2 2022)**: Development and full documentation of the updated methodology, as well as transparent and replicable processes to support it has been conducted. Outputs: (a) Two technical papers documenting the need for better data for this process were completed outlining the

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<sup>4</sup> <https://www.fao.org/3/cb3767en/cb3767en.pdf>

<sup>5</sup> <https://www.fao.org/3/i2389e/i2389e.pdf>

<sup>6</sup> <https://doi.org/10.3390/su13116101>

<sup>7</sup> The Weight of Evidence (WoE) approach is a high-level approach to support evidence-based decision-making. [https://daff.ent.sirsidynix.net.au/client/en\\_AU/search/asset/1027248/12](https://daff.ent.sirsidynix.net.au/client/en_AU/search/asset/1027248/12)

approach to be pursued <sup>89</sup>(b) A full (internal) Technical Document for the detailed application of the new methodology. This has been completed successfully with internal documents produced for NFI.

11. **Phase 2 (Q3 2021-Q2 2023):** a pilot phase, where the methodology developed in phase 1 was refined and tested on a set of regions (4 regions tested were, Area 31, Area 41, Area 34 and Area 57) for which adequate information and expertise was available locally and through a local expert. Output: 4 Regional Technical papers, presenting and discussing the revised methodology in detail, list of stocks used by Tier, as well as the results of the new state of stocks has been produced. These four areas have draft reports available and outcomes are included in this document.

12. **Phase 3 (Q3 2023-Q4 2025):** A full rollout phase, implementing the methodology in all FAO fishing areas and producing a complete set of indicators. Output: A new and updated edition of the FAO Technical paper "The State of World Fishery Resources" is released in 2025. The improved index will be updated biennially starting with the SOFIA Report of 2026.

13. To improve legitimacy and buy-in of this process, FAO is making the most efforts to directly involve fisheries staff from FAO Decentralized Offices and the national and regional fisheries management institutions in the whole process. This has resulted in (i) a coordinated and achievable framework for collecting and processing information for the SoS index and for SDG 14.4.1 monitoring; (ii) a capacity development programme that reinforces the capacity of fisheries institutions of Member countries for collecting, managing, and processing data and information for assessing and reporting on the state of fisheries and fish stocks; and (iii) a transparent portal documenting all data and information used, as well as the justifications for the classifications obtained, that facilitate peer-review, open-access, revision and auditing in the process of estimating the state of stocks in each region.

#### IV. PRELIMINARY RESULTS OF PILOT PHASE

14. In 2023, the updated approach was piloted in four FAO major Fishing Areas (31, 34, 41 and 57) plus preliminary analysis of two more (37 and 51) and compared with the results presented in SOFIA 2022 (reflecting Stock Status in 2019). As Table 1 and Figure 1 show the four areas indicate varying level of differences with previous assessment using current methodology: (i) Area 41 went from 39.3% to 40% overfished, Area 31 from 37% to 32% overfished, Area 57 from 34% to 29% overfished, and Area 34 from 40% to 49% overfished. Percentages in the other two categories (underfished and maximally sustainably fished) had minor differences but the sum of the two remained relatively stable over the new index produced.

15. In regions where there is a low number of stocks assessed, adding more stocks can have a substantial effect. For example, Area 31 went from 39 to 99 assessed stocks and Area 57 went from 39 to 335 assessed stocks. In these 2 areas, smaller stocks are being added to the list that are important regionally and are being sustainably fished (or underfished), while the same number of stocks overfished are now a smaller proportion of the overall stocks assessed.

16. Area 41 and 34 also substantially increased the number of stocks assessed. Area 41 went from 14 to 68 assessed stocks, but this had very little change in the percent of overfished stocks, however there were new stocks added which were now classified as "underfished". Area 34 went from 36 to 135 assessed stocks but had a substantial number that were overfished and underfished which changed the distribution of stocks in all 3 categories. The analysis conducted in both Area 34 and Area 41 included a significantly larger number of regional experts, with increased overall buy-in from the region. See Table 1 and Figure 1 below for detailed information.

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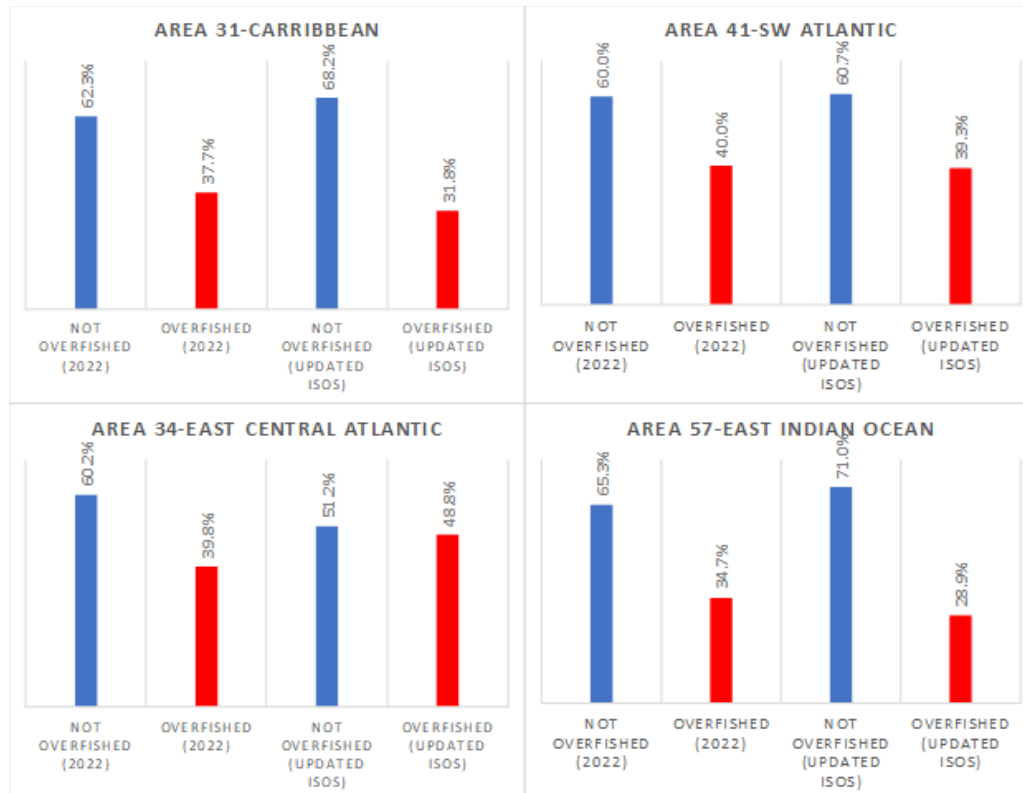
<sup>8</sup> <https://doi.org/10.1111/faf.12593>

<sup>9</sup> <https://doi.org/10.3390/su13116101>

**Table 1: Comparisons of current versus updated methodology in pilot FAO regions (Reflecting Stock Status in catch year 2019/SOFIA 2022 report)**

Area	Number of stocks current approach	Number of stocks updated approach	Current (as per SOFIA 2022) State of Stocks Index						Updated State of Stocks Index					
			Maximally Sustainably Fished			Not Overfished			Maximally Sustainably Fished			Not Overfished		
			Underfished	Fished	Overfished	Underfished	Overfished	Underfished	Fished	Overfished	Underfished	Fished	Overfished	
37*	30	158	2%	34%	63%	37%	63%	0%	32%	67%	33%	67%		
31	39	99	8%	55%	38%	62%	38%	14%	54%	32%	68%	32%		
41	15	68	0%	60%	40%	60%	40%	10%	51%	39%	61%	39%		
34	36	135	8%	52%	40%	60%	40%	15%	36%	49%	51%	49%		
51*	30	298	0%	62.5%	37.5%	62.5%	37.5%	22%	47%	30%	70%	30%		
57	39	335	10%	55%	35%	65.3%	34.7%	33.5%	37.5%	28.9%	71%	29%		
Total	189	1093												

\* Preliminary analysis



**Figure 1:** Comparisons of the State of the Stocks Index using current approach and the updated approach for the four FAO Areas completed (Area 31,34,41and 57).

## V. CONCLUSIONS

17. As a consequence of the proposed methodological updates the following is noted:

- The updated methodology is more transparent and replicable as all the data for the analysis will be archived in a database.
- For Tier 1 stocks, classifications are based on national or regional formal stock assessments and the FAO index will include no changes to the reported stock status in these assessments.
- The process is highly participatory. For example, 63 countries participated, and ca. 250 scientists were involved in the six FAO Areas piloted with the updated methodology.
- The rollout of this approach will enable countries to contribute to the estimation of the SoS index by building capacity to evaluate stock status. Over time the updated SoSI will align with SDG 14.4.1 national reporting efforts.
- This approach will support and direct capacity building efforts and can lead to improved fisheries data and assessment programme to support local and regional fisheries management plans.