OOS2025-790, updated on 13 Jun 2025
https://doi.org/10.5194/oos2025-790
One Ocean Science Congress 2025

FAO partnerships and Virtual Research Environments to support global monitoring of state of fishery stocks

Marc Taconet[1], Rishi Sharma[1], Aureliano Gentile[1], Anne-Elise Nieblas[1], Kiran Viparthi[1], Anton Ellenbroek[1], Bracken van Niekerk[1], Emmanuel Blondel[1], Yann Laurent[1], Arturo Muñoz[1,5], Emmanuel Chassot[1,8], Fabio Fiorellato[2], Julien Barde[3], Yannis Marketakis[4], Braddock Spear[5], Susana Segurado[5], Michael Melnychuk[6], and Pasquale Pagano[7]

[1]FAO, Fisheries and Aquaculture Division, Rome, Italy (marc.taconet@fao.org)
[2]ICCAT, International Commission for the Conservation of Atlantic Tuna, Madrid, Spain
[3]IRD, Institut de Recherche pour le Développement Durable (IRD)
[4]FORTH, Foundation for Research and Technology – Hellas, Heraklion, Crete, Greece
[5]SFP, Sustainable Fisheries Partnerships, Honolulu, Hawaii, USA
[6]UW, University of Washington, Seatle, Washington, USA
[7]CNR-ISTI, Consiglio Nazionale delle Ricerche, Istituto di scienza e tecnologie dell'informazione "Alessandro Faedo", Pisa, Italy
[8]IOTC, Indian Ocean Tuna Commission, Victoria, Seychelles

Since 1974, FAO has been publishing regular analyses of the state of fishery stocks, including the summary updates presented in FAO's flagship publication "The State of World Fisheries and Aquaculture" Report (SOFIA). The fisheries sector is now appreciably different compared to the 1970s, and FAO considers that the time is right for a methodological update to compute and report on the state of world fish stocks, better aligned with national Sustainable Development Goal (SDG) reporting initiatives, with broader expert participation, more local knowledge and increased transparency, while maintaining the crucial integrity of the time series.

FAO's State of Stocks Index (SoSI) will now rely on a much-expanded Reference List of Stocks amounting to around 2700 stock units assessed by national or regional agencies. The updated SoSI will be published as part of SOFIA 2026. From thereon, FAO faces the challenge to ensure its regular update and dissemination on a biennial basis.

Thanks to its role of custodian agency to SDG indicator 14.4.1 "Proportion of fish stocks within biological sustainable levels", to its global collaborations for information sharing organized around its Resources and Fisheries Monitoring System (FIRMS), and to the iMarine research infrastructure enabling collaborative science, FAO is equipped to address this challenge.

FAO must first respond to capacity building needs of its members for data collection, assessment and reporting on national indicator SDG14.4.1. This is a relatively complex indicator which requires at least a time series of catch or length data, effort data where possible, biological data, and analytical capacities for stock assessment. With systems such as Calipseo, FAO helps countries

deploy their national fishery statistics and management information systems. Regional training workshops on the use of assessment methods in data limited situations are enabled through iMarine Virtual Research Environments (VREs) where trainees can run online stock assessment algorithms during group sessions. Also with VREs, FAO empowers Regional Fishery Bodies with their regional databases for data sharing in support of assessment of shared stocks.

Another challenging aspect is the periodic collation of stock-by-stock status which must be performed to prepare each biennial edition. This is being built upon two major dataflows, namely national reporting on SDG indicator 14.4.1 and reporting by Regional Fishery Bodies on shared stocks as part of their FIRMS membership. Some data components may however remain difficult to obtain (e.g. country based that is not covered in SDG reporting) and workarounds need to be developed. In this process, the standard Universally Unique IDentifiers published by the Global Record of Stocks and Fisheries (an iMarine VRE) play a critical role for data sharing, collaborative data management, quality control, interoperability, efficiency, and finally sustainability of collation updates.

Using this platform, the data workflow could be traceable as it is designed following FAIR principles, however data access agreements for some proprietary data may keep some sources of this information confidential. With the SOFIA 2026 edition, these efforts will materialize through the FAO FIRMS website which will eventually disseminate the global and regional breakdown of SoSI in accordance with such agreements.