March 2023

APFIC/23/04 **E**

联合国粮食及农业组织 | Food and Agriculture Organization of the United Nations | Organisation des Nations Unies pour l'alimentation et l'agriculture | Продовольственная и сельскохозяйственная организация Объединенных Наций | Organización de las Naciones Unidas para la Alimentación y la Agricultura | منظمة الأغذية والزراعة للأمم المتحدة

ASIA-PACIFIC FISHERY COMMISSION

Thirty-seventh Session

Qingdao 13-15 June 2023

Improving understanding on the status of regional stocks and outcomes of capacity building for regional assessments

BACKGROUND

1. The fisheries of Asia are a critical component of food security and the broader Asian economies. Asian marine fishery landings reported to FAO (wild capture, not including aquaculture) have averaged 38 million tonnes per year since the mid-1990s, accounting for nearly 49% of the worlds marine capture fishery production, which directly involves over 50 million people and a regional population of billions.

2. Despite the importance of fisheries to the Asian economy, scientific monitoring and management are modest, with most stocks lacking modern scientific stock assessments. During the period from 1980 to 2000, stock assessment programmes were carried out in most countries assisted by regional and international scientists in the Asian region.

3. National stock assessment programmes have continued since then and there are still active stock assessment scientists in the region, however very few stock assessment reports have been published in recent years. One of the global results of having limited information on recent stock assessments is that there is a lack of assessments from the Asian region to contribute into FAO's global analyses of the status of world fish stocks. These analyses are in turn, used to inform on the global progress towards achieving SDG14.

4. Part of the reason may be confidentiality, but it is also because this work is not being made internationally accessible. The weak representation of Asia and developing countries data in the global assessments contributes to conflicting conclusions from different assessments of the status of global fish stocks. These assessments have concluded that the level of overfished stocks might be one-third of global stocks, up to as much as two-thirds. This uncertainty highlights how global and regional assessments of stock status remain limited by the lack of publicly available and reliable fisheries data.

5. The 36th Session of the Asia-Pacific Fishery Commission (APFIC) recognized this and "*emphasized the importance of fishery management grounded on science for sustainable marine and inland fisheries. It acknowledged the challenges related to lack of adequate capacity for conducting stock assessment and analyses*".

6. The 36th Session recommended that capacity building in stock assessment be a focus for support in the region. This was endorsed by the 37th FAO Asia-Pacific Regional Conference (APRC), which recommended to *"…build capacity for development and implementation of sustainable fisheries*

management plans, fisheries stock assessment and sustainable aquaculture systems, in cooperation with relevant regional fishery bodies".

7. The FAO Regional Office for Asia and the Pacific (FAORAP), with the support of the FAO Fishery and Aquaculture Division (NFI) is working towards a long-term goal of establishing an organized network of stock assessment practitioners that will regularly communicate and cooperate in capacity building and sharing knowledge on applying appropriate methods for assessing the status of stocks in the Asian region.

8. As part of this support, FAO convened the "*Regional workshop for a network of practitioners on fishery stock assessment*" *("FAO Regional Assessment workshop")* from 23 to 25 January 2023, bringing together an identified group of regional stock assessment practitioners from across the Asian region, to review their methods and preliminary findings on the status of fisheries that they study in their countries. This workshop built on two FAO and SEAFDEC co-organized regional training workshops on stock assessment, that developed the first level understanding of the current status and regional capacity on stock assessment and examined available data sets. It also drew on other complementary work under parallel initiatives funded by other donors and FAO.

9. The workshop also sought to reinvigorate some historic or existing networks of stock assessment practitioners at regional and national levels. The strategic value to FAO is that the network members will contribute to improving the assessment of fishery resources in the Asian region and assist with sharing this information with FAO. It is expected that this will support FAO's global process of collating stock assessment information and reporting on the state of global fisheries.

10. The network could also contribute to regional capacity development using tools and methods to contribute to improved national stock assessments for fishery management and national reporting requirements for the SDG 14 fisheries indicator.

11. There were 38 participants present at the workshop with a further 41 participants joining the plenary online presentation and discussion sessions. The draft report of the FAO Regional Workshop is presented as APFIC/23/Inf-06.

KEY CONCLUSIONS OF THE REGIONAL WORKSHOP

An improved approach for the FAO assessment of global fish stocks and the results of a pilot for Area 57

12. FAO started publishing its regular analysis of the state of global fish stocks in 1971 and has included an updated summary analysis in its biennial FAO flagship publication "The State of World Fisheries and Aquaculture" (SOFIA) since that time. To promote consistency and comparability across time, these analyses have used a fixed list of stocks (which account for over 70% of global fish landings) and a clear process and methodology, which has undergone only minor adjustments since the start of the time-series.

13. The global fisheries sector in 2022 is now appreciably different compared to that of the 1970s and the dominant fish stocks that comprise the majority of current global landings, their location and modes of their exploitation have now changed considerably. There has been the continuous evolution of the tools and the requirements for calculating and presenting global sustainability information. This has transformed our ability to assess fish stocks, use data poor methodologies, assess multispecies fisheries and also take into account some of the complex interactions between target and non-target species and related ecosystem effects.

14. Greater recognition of the importance of the world's oceans and their living resources, now means there is much closer attention to fisheries sustainability. The has been accompanied by an increasing expectation and requirement for transparency in how stocks are assessed and recognition of the need to incorporate local knowledge. The adoption of the Sustainable Development Goals (SDGs) and SDG 'fish stocks sustainability' Indicator 14.4.1 (*Proportion of marine fish stocks within biologically sustainable levels*), has also created a requirement for countries to report on their marine fish stocks every few years to evaluate progress on this indicator.

15. It is increasingly evident that not only is there a need to update the list of stocks that form the global assessment, but also the manner in which they are assessed. FAO considers that the time is right to conduct a methodological update to compute and report on the state of world fish stocks, that is better aligned with national SDG reporting initiatives, has broader expert participation and transparency, but which crucially, maintains the integrity of the time series.

16. This new methodology will continue to generate stock status indices at FAO fishing regions level, and is designed to narrow current gaps in assessment over time through a process of continuous improvement. As part of the piloting activities FAO has developed 'proof of concept' reports for the updated analysis that has been completed in two fishing areas (Area 37 & 31). FAO has also demonstrated the new index generated from Fishing Area 57, (Eastern Indian Ocean).

17. This new analysis has increased from 39 aggregated stocks used in the previous SOFIA analysis, to a total of 335 stocks (these comprise: 203 finer resolution stocks, an additional 121 aggregated stocks and 11 stocks assessed using CMSY). This gives individual stocks more weight than the aggregate stocks and the new results suggest that the new overfished component for Area 57 is around 28% as opposed to 31% reported in the 2022 SOFIA.

18. The analysis concluded that as more stocks were included, the proportions of overfishing did not change significantly, however there was a significant change in the proportion of underfished and maximally sustainably fished stocks from 5% to 32% and from 64% to 40% respectively. This was primarily because the additional disaggregated stocks that were added were assessed as underfished but they represent only a relatively small proportion of the total regional catch. The overall message however is that aggregation of the stocks into sustainably and unsustainably fished results in a similar overall outcome for Area 57, compared with the previous SOFIA analysis based on the 39 aggregated stocks.

Marine fish stock assessment has been undergoing a quiet revolution in Asia.

19. Marine fishery stock assessment has for some time been perceived as being given ever decreasing priority in the Asian region. This has been driven by frustration in national fishery agencies that single stock assessment approaches were unsuited to assessing (tropical/low latitude) complex multispecies multi-gear fisheries and were unable to provide useful advice for the management of such fisheries. The workshop recognized that this is not the case and that there has been a quiet revolution and revitalization in marine fishery stock assessments and their application to fishery management, but this has not been communicated widely outside of national systems. The reasons for this are due to a number of factors primarily related to:

i. Increased accessibility to modelling due to much greater computing power and ability to manipulate data;
ii. New multi-species modelling, ecosystem models that allow greater understanding of effects within mixed stocks and the identification of indicator species;
iii. Development of data poor assessment methods, capable of using the types of data that are most commonly available, or easier to collect;
iv. Great access to other forms of data and information that can inform assessments or management decision-making (e.g. remote-sensing, vessel and other electronic data).

There are a wide variety of stock assessments being conducted in the region.

20. Country overviews indicated that assessments are being completed on a wide range of fisheries, a wide range of species, and a use a range of metrics to assess stock status. These assessments are completed in the larger geographic areas of the declared country Fishery Management Areas (FMAs).

Very few fisheries in the region appear to be underfished and preliminary results are in line with the FAO assessments

21. The preliminary results from the data provided to the workshop indicate that the stock assessments correspond to the FAO assessments regarding the proportion of fisheries that are overfished, sustainably fished, with some fisheries rebuilding. Very few, if any, stocks were identified as being underfished.

Country overviews indicated that the findings from stock assessments were in general, not well connected to management decision making and action.

22. This is due to a number of identified reasons relating to institutional disconnections, poor science to policy communication and failure to link assessment results to real world outcomes. It was noted that the results of stock assessments may be poorly communicated to fishery managers, policy decision makers and fishers. The assessment communication does not provide sufficient options for management action and likely impact of different decisions. Part of this is that there is typically limited linkage between stock assessment and the economic implications. This is important as management agencies and Government ministries also take social and economic considerations into account when establishing management measures.

An important strategy to increase impact is to link stock assessment results into harvest strategy process, to create a stronger relationship between science and management.

23. The linking stock assessments to harvest strategies provides a focus for developing effective management actions that can be adopted as subsequent assessment information is generated. Some notable examples where assessments were linked to effective management action were primarily in smaller geographic areas (e.g. Blue Swimming Crabs in the north-west of Sri Lanka and Grouper fisheries in Saleh Bay, Indonesia). Harvest strategies were developed that involved information sharing and collaborations and partnerships among researchers, government, fishers, fishing industry and non-government organizations.

Single species assessment and single species management in isolation from the other species in the fishery is rarely applicable in the tropical/Asian context.

24. Single species models may not provide meaningful results for multispecies fishery management, it also creates questions about sustainability of a fishery when some species may be underfished, but others are overfished. The Regional Workshop identified the need for bio-economic modelling and ecosystem modelling approaches to inform management of fisheries, particularly the multi-species, multi-method fisheries that are common throughout the region. New exciting models have been developed and are available for addressing multi-species, multi-gear fisheries. These include multi-species maximum sustainable yield (MMSY), evaluating groups of species with similar trophic levels (the species hub), application of Ecopath with Ecosim and indicator species approaches.

Fishery data systems have been historically developed and designed for the purpose of a particular type of assessment and his may limit application of other assessment models

25. The suite of models that are being used in the region fall into two major groupings: those based on catch or catch effort indicators, have biomass indicators and which have a times series of catch and effort available; and those using length distributions and determine an estimate of spawning potential ratio and the ratio of fishing to natural mortality (*F/M*) as indicators and reference points. The information that is generated is not always fit for purpose, or may lack essential additional variables, when used in models for which the data collected was not designed. There is a need to evaluate data collection systems and their suitability for the stock assessment models (e.g., length data collected as part of a catch/effort data collection system may not be suitable for length-based assessment methods).

Fishery independent surveys are underutilized and under-appreciated at the moment.

26. The Regional workshop noted that fishery independent surveys are an invaluable source of information to understand baselines for fisheries, ecosystem change and provide an indicator of stock changes to evaluate in conjunction with catch/effort statistics. These are currently underutilized and under-appreciated.

Assessment results may need to be interpreted with caution, especially if there are many underlying assumptions

27. Generally the presentation of stock assessment results is not accompanied by necessary warnings and caveats for the models to indicate the degree of confidence in the results and whether the information returned by the models presenting an overly optimistic or pessimistic result of stock status.

The application of (prior) assumptions may introduce significant errors in the outputs generated by the models. This requires more evaluation of priors and model assumptions and sensitivities when designing data collection systems and selecting models for assessment. It also requires the use of sensitivity analysis.

SUGGESTED ACTION BY THE COMMISSION

28. The Commission is invited to comment on the actions and types of capacity building that might be required for improving the quality and reporting stock assessment in the region and consider how to improve the incorporation of stock assessment data into fisheries management decision-making.

29. The Commission may consider options or opportunities for strengthening a network of stock assessment practitioners in the region.