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REGIONAL FISHERIES COMMISSION

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<b>REGIONAL COMMISSION FOR FISHERIES</b>
<b>Eleventh Meeting of the Working Group on Fisheries Management</b>
<b>Muscat, Sultanate of Oman, 19-21 February 2019</b>
<b>REGIONAL JOINT ASSESMENT OF KINGFISH STOCK: FINDINGS AND RECOMMENDATIONS</b>

**INTRODUCTION**

1. This documents aims to provide the key objectives, findings and recommendations of the Workshop on Regional Joint Assessment of Kingfish (*Scomberomorus commerson*) which was held in Muscat, Sultanate of Oman on 17-18 February 2019.

2. The 7th Session of the Regional Commission for Fisheries (May 2013) acknowledged that the joint assessment bringing together GCC work on narrow-barred Spanish mackerel and that of the other RECOFI members such as Iran (Islamic Republic of) and Iraq, and possibly also Pakistan and Yemen would be the first essential step toward establishing effective management for the stock of this species in the RECOFI region and adjacent areas, with a special emphasis on the importance of good communication and information sharing prior to the workshop. The Commission underlined the joint assessment of kingfish will require by all members full commitment in submitting relevant data and information in a timely manner. The Commission reaffirmed the request made at the sixth session of RECOFI for the Secretariat to invite Pakistan and Yemen to this regional meeting. The Commission ranked the implementation of the kingfish stock assessment as the first priority in the 2013-2014 intersession workplan and acknowledged the kind offer of the Sultanate of Oman to host the meeting. Due to certain obstacles, the joint assessment has not been conducted before 2019. In accordance with the previous request of the Commission, an invitation was sent to Pakistan and Yemen via respective FAO Country Offices.

3. The workshop was attended by 6 participants from the following RECOFI member countries: Iran (IR), Oman, and the United Arab Emirates (UAE)) in addition to the FAO Secretariat. Bahrain did not attend. The primary objectives of the regional stock assessment include the following:

- To provide fishery scientists, managers and decision-makers of the RECOFI countries with an opportunity to meet and discuss the common issues related to

narrow-barred Spanish mackerel fisheries from data collection, research, management strategy and regulations;

- To provide a platform for scientists to work together on real narrow-barred Spanish mackerel data, conduct stock assessment and develop science-based management strategy for the long term sustainability of the fishery and the social and economic benefits of the region;
- To discuss and develop a cost-effective and practical institutional arrangement and a regional plan for cooperation and collaboration in the sustainable management of the shared narrow-barred Spanish mackerel resource.

**Data requested for the assessment:**

<b>Landing and catch data</b>	Years
	Total annual landing by fishing gear
	Length frequency distributions
	Age data
	Discard data
<b>Effort data</b>	Total number of vessels
	Total tonnage of vessels
	Number of days at sea
	Any other Effort Variables?
	Growth parameters
	Size-at-maturity
	Length-weight relationships
<b>Previous assessments</b>	Specify the years in which the assessment was done
	For which geographical area/country was the assessment done?
	Which assessment method was used
<b>Any other studies</b>	Any other data available for example on nursery and spawning areas, spatial and temporal distribution of effort, genetic analysis, market prices, etc.

Economic data (if available)

<b>ECONOMIC DATA</b>	<b>TOTAL VALUE</b>	<b>AVERAGE PER VESSEL</b>	<b>AVERAGE PER DAY</b>
	Yes / No	Yes / No	Yes / No
<b>Revenue</b>			
Value of landings (000\$)			
<b>Employment</b>			
Employment on board (Total)			
<b>Costs (1000\$)</b>			
Energy costs			
Maintenance costs			
Operational costs			
Commercial costs			
Fixed costs			
Crew share (salary)			
Total operating costs			
Economic performance			
Gross cash flow			
Gross value added			
Salary per crew (\$)			

<i>Capacity</i>			
Volume of landings (Kg)			
Effort (fishing days)			
Fleet - number of vessels (Tot)			
Fleet - number of vessels (active)			
Fleet - total HP			
Fleet - total Gross tonnage			
Invested capital (1000\$)			
	INDICATORS		
	Yes / No		
Employment per vessel			
Landings per crew (t)			
Revenue per crew (\$)			
Salary/crew/day (\$)			
Salary/crew/year (\$)			
Crew/Gross tonnage			
Added Value/Revenue			
Landings per vessel (ton)			
Landings per GT (ton)			
CPUE (kg)			
Revenue per vessel (\$)			
Revenue per GT (\$)			
RPUE (\$)			
Average price (\$/Kg)			
Energy cost per vessel (\$)			
Energy cost per day (\$)			
Fuel consumption per vessel (l)			
Fuel consumption per day (l)			
Maintenance cost per vessel (\$)			
Fuel efficiency of seafood landings			

### Summary of the joint assessment of kingfish stock in RECOFI area

4. A first attempt to assess the status of kingfish stock in the RECOFI region was based on the application of a production model based on the CMSY method (Froese et al., 2017). A pseudo-cohort analysis was also carried out as a way to start accounting for the length/age structure of the landings of different member countries and fishing gears. Data used in the analyses were the following:

- official FAO annual landings of RECOFI countries for the period 1986-2015, revised and integrated with 2016-2017 landings data provided by workshops participants;
- length frequency data of the landings by Country and gear for the period 2013-2018.

### Assessment method

5. CMSY is a method for data-poor stock assessment based on the Schaefer production model. CMSY is a method for data-poor stock assessment based on the Schaefer production model. CMSY estimates biomass, exploitation rate, MSY and related fisheries reference points from catch data and resilience of the species. Probable ranges for the maximum intrinsic rate of population increase ( $r$ ) and

for unexploited population size or carrying capacity ( $k$ ) are filtered with a Monte Carlo approach to detect ‘viable’  $r$ - $k$  pairs. The  $r$  and  $k$  parameters estimated by CMSY summarise these life-history traits in a certain marine area, given the species’ interactions in that specific environment. Thus, the CMSY estimates indirectly involve natural mortality caused by predation and somatic growth depending on available food resources, and recruitment conditioned by environmental conditions and by parental egg production. One general criticism of surplus production models is that they do not account for size and age structure. The effect of this assumption is a typical tendency to overestimate sustainable productivity, especially in stocks where overfishing has truncated the age structure, reduced regeneration time and age at maturity, reduced competition for food, and consequently increased somatic growth. Differently from most of the surplus models, CMSY tries to account for this effect by explicitly reducing recruitment at small stock sizes and simulating depletion and stock collapse at low biomass levels (Froese *et al.*, 2017).

**KEY FINDINGS**

6. Results of the analysis (Fig. 1) indicate a Maximum Sustainable Yield (MYS) value of 27300 tons which is lower than the current annual landing (2017) in the RECOFI area of 36293 tons. The stock biomass show a decreasing trend in the last ten years with the current biomass very close to biomass at MSY (BMSY):  $B/BMSY = 1.06(1.0-1.31)$ . The estimated  $F/FMSY$  is 1.21 (1.01 -1.32) indicating that the current fishing mortality ( $F$ ) exceeds the  $F$  required to exploit the stock at MSY.

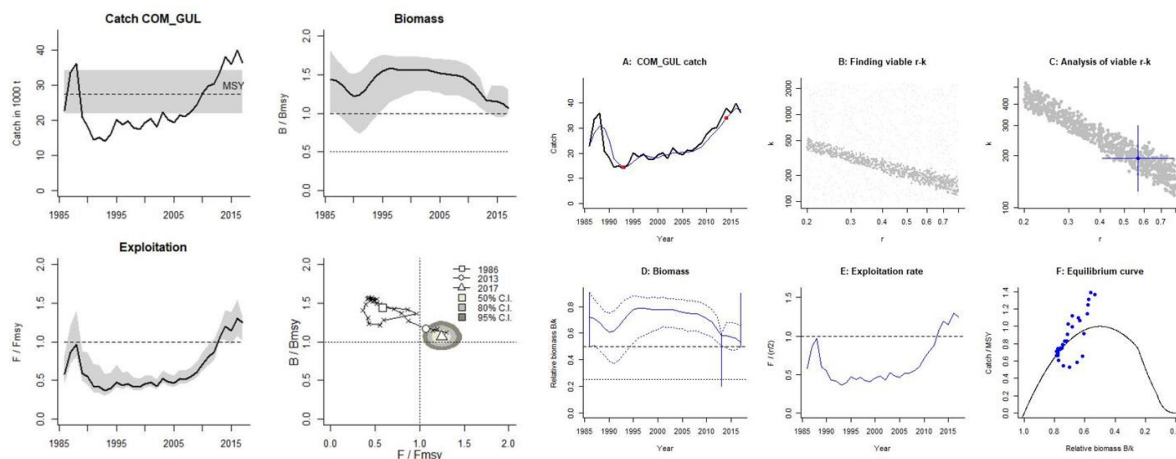


Fig.1. Results of the CMSY analysis

7. The results reveals that the stock appears to be in a overexploitation status with the current fishing mortality and landings exceeding the levels required to exploit the stock at MSY.

**WORKSHOP RECOMMENDATIONS**

8. Each Member State, starting in 2019 and for each subsequent year shall provide to the RECOFI Secretariat, prior to 1st July, previous year national data on catch, effort and length frequency information on kingfish,

9. The quality of data submitted pursuant to this recommendation shall be regularly analyzed, with stock assessment methodology every year with a view to ensuring the formulation of scientific advice for the Commission.

10. In order to facilitate the standardized collection of data for stock assessment purposes and socio-economic aspects of kingfish fishery, the RECOFI Secretariat shall develop a standard protocol for the collection of kingfish data. The rationale behind the design of the data collection protocol is to focus the data requirements for stock assessment and fishery

management purposes and encompass them into a single, simple and easy-to-understand manual, providing Member States with the necessary indications for the collection and transmission of data related to fisheries to the RECOFI Secretariat. Moreover, the information gathered should be sufficient and reliable enough to review the status of the stock, to assess the economic and social dimensions of the fleets and to provide scientific advice on the status of the resources, as well as to allow the Commission to develop recommendations to manage this resource. The main characteristics of the protocol should include:

- clear identification of the main thematic areas of the data collection (defined as “tasks”) together with the definition of their purposes
- detailed description of all the data variables;
- simplified level of data aggregation for requested variables;
- a fleet segmentation scheme;
- simple measures of fishing effort;
- well-defined data collection practices;
- online data transmission procedure.

11. Establish a permanent RECOFI Working Group on Stock Assessment under the WGFM in order to assess the kingfish stock on a regular basis.

12. Following a technical discussions, the WS on kingfish stock assessment in RECOFI area agreed on key recommendations for the consideration of the WGFM:

- Considering that the preliminary stock assessment showed that the stock is exploited above MSY, with an estimate (F/F<sub>msy</sub>) ratio of 1.25 the fishing mortality has to be reduced by 20% as minimum, the workshop recommends among the other likely management and conservation measures, to introduce a closed season on an annual basis.
- Seeing that there is already an annual closed season for kingfish fishery in some RECOFI Member countries, an option could be to have the closed season during the same period which is from the 15th of August to the 15th of October, for all the fishing gears exploiting the stock.
- Accordingly, the group recommends the annual closed season in the RECOFI Area for kingfish fishery should be between 45 and 60 days.
- These measures shall apply to all the fleets including commercial and recreational fishing.
- These measures shall be reviewed annually and may be amended by the Commission based on the results of the stock assessment.

### **SUGGESTED ACTION BY THE WGFM**

13. The meeting is invited to (i) review the key findings and recommendation the above-mentioned workshop; and (ii) generate management and conservation recommendations on kingfish stock in the RECOFI Area for the consideration of the Commission. .