

**The Regional Organization for the Conservation of the
Environment of the Red Sea and Gulf of Aden Program
on Sustainable Fishery Development in the Red Sea and Gulf of Aden
(SFISH Project) (P178143)**

**Improving fishery statistics, stock assessment/management performance, and
the regional mechanism for collaborative assessment and management of
fisheries in the Red Sea and Gulf of Aden**

SFISH Regional Component (PERSGA)



MISSION REPORT

INTRODUCTION

In line with the Terms of Reference (ToR) of the Data Collection and Stock Assessment Consultancy, a workshop was to be held with the national fisheries experts, the national coordinators, and the PERSGA Secretariat to discuss the status of data collection and stock assessment in the PERSGA Member States.

Upon completion of the Inception Report and the Report on the Questionnaire Analysis, a workshop was held in Jeddah, Kingdom of Saudi Arabia, from 25 to 27 March 2024 to discuss the results of the analysis, the gap analysis, and the way forward for the completion of the various tasks in the ToR.

The workshop was attended by seven national consultants and staff members of various ministries from different countries. The workshop was officially opened by PERSGA's Secretary General, Professor Ziad Abu Ghararah.

The list of participants has been attached in Annex 1.

All Member States presented overviews of their findings and responses to the questions in the questionnaire. The Consultant provided several presentations on the questionnaire analysis, data requirements for production estimation, and basics for stock assessment. The workshop was interactive with ample contributions from the participants to the discussions.

FAO national statistics for the PERSGA Member States require the correct interpretation as Egypt's statistics also include Mediterranean data, Saudi-Arabia's data include catches from the Persian Gulf and Somalia's include data from the Indian Ocean's coastline.

A- NATIONAL PRESENTATIONS ON STATISTICAL DATA COLLECTION

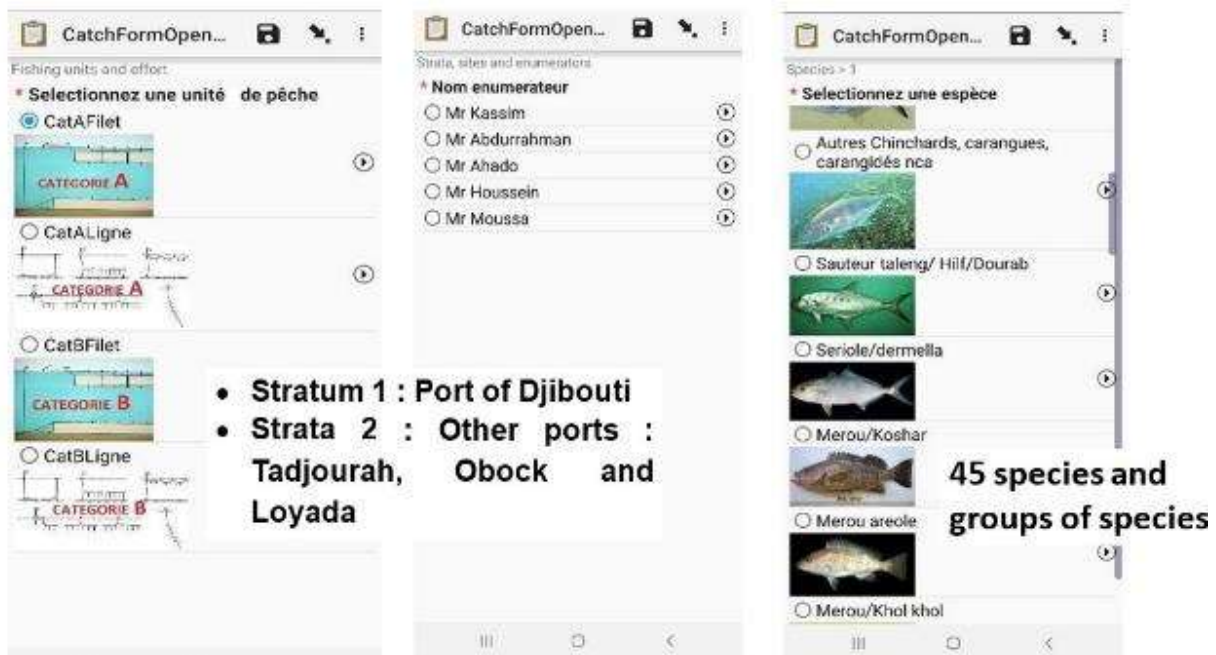
All national consultants had prepared detailed PowerPoint (PPT) presentations with much detail. Their efforts were much appreciated. Interestingly, all presentations showed some gaps in data collection and stock assessment, however, as a whole, many relevant factors had been taken care of, one way or another.

In the following chapters, some excellent results are presented to demonstrate what would ideally be required for the entire PERSGA Region, both for fisheries statistical data collection and stock assessments.

For each Member State recommendations have been formulated regarding their data collection systems.

DJIBOUTI

Djibouti is the only PERSGA Member State to use FAO's *Open ArtFish* for fisheries data collection. One of the slides of interest is the following, which shows the various databases and displays on a mobile data collection device:



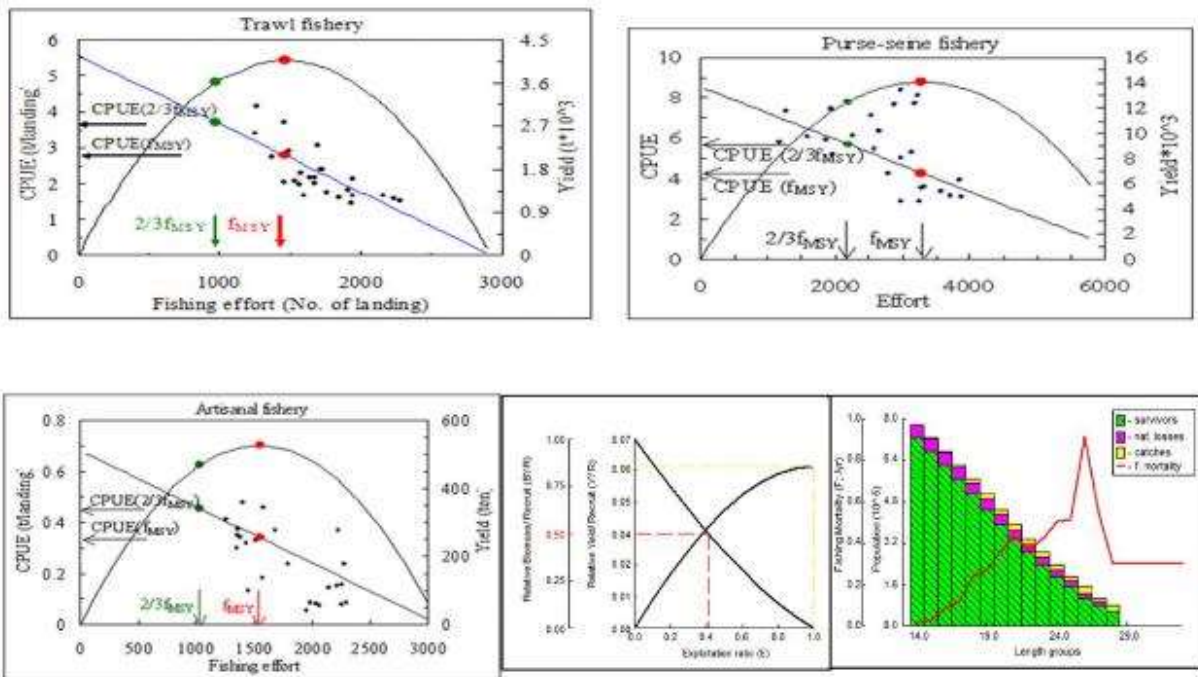
Upon selection of species to monitor in the PERGA Region, this type of display could be adopted by the other Member States.

RECOMMENDATION: It is recommended that species databases be prepared in the Member States to be utilized in mobile data-collection devices.

EGYPT

The presentation contained many pictures of gears and sampling for biological parameters. One slide was of special interest, showing the results of stock assessments dating back to the 1990s. Production models for trawl, artisanal and purse-seine fisheries were presented including Yield per Recruit Models. It would be of interest to re-analyze the datasets from those days and to use the results as a reference point for forthcoming analyses.

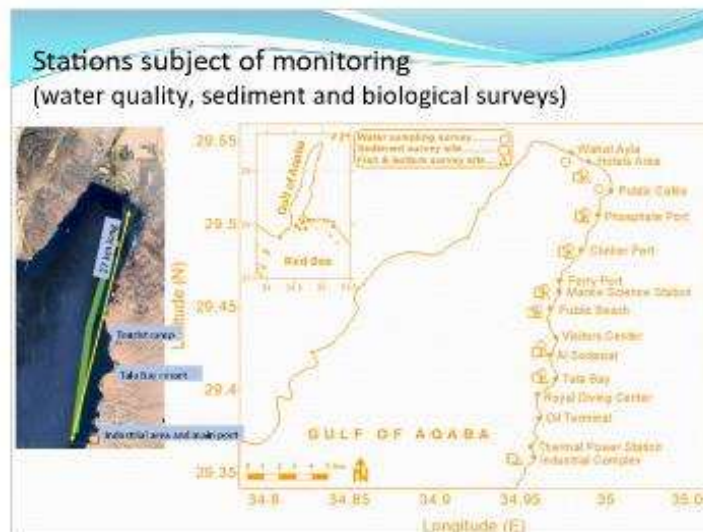
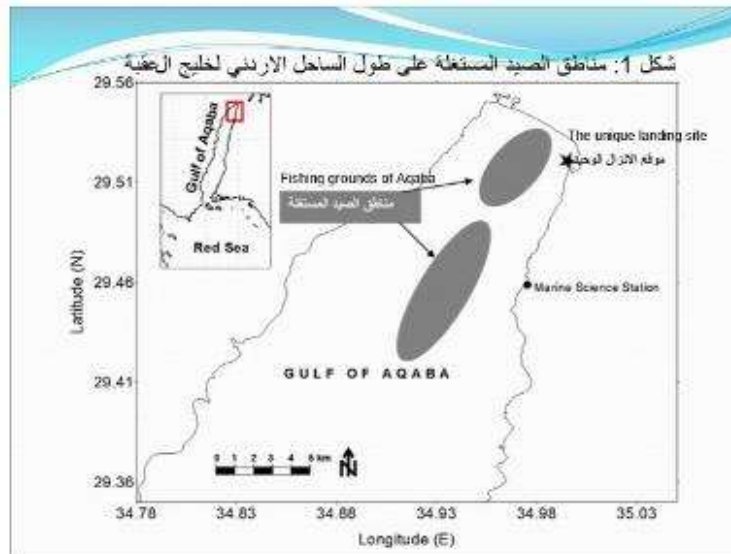
RECOMMENDATION: It is recommended that the original datasets from the 1990s be re-examined with the technologies and software nowadays available.



JORDAN

Two slides drew special attention in the presentation: the indication of the fishing grounds in Jordan as well as the different sampling stations. The two topics could of course be combined into one map.

RECOMMENDATION: It is recommended that the other Member States also map their main fishing grounds as well as their sampling stations. The sampling stations and landing sites may subsequently be presented in the maps identifying the different statistical strata (and sub-strata, if applicable).



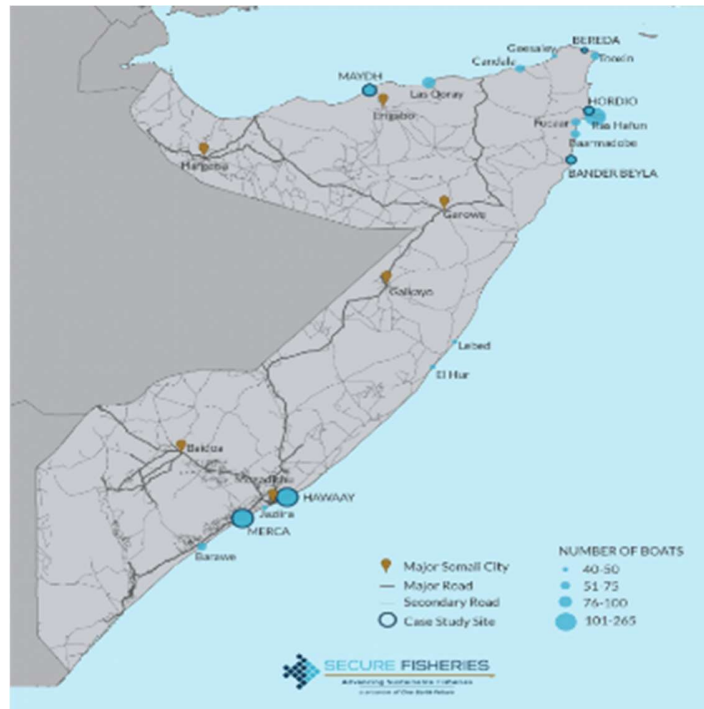
SAUDI ARABIA

The national consultant of Saudi Arabia presented total catches by sampled landing sites along the Saudi coast of the Red Sea. The presentation included also a similar table for catches by species. Precise information is collected by the Coast Guard in most of the fishing ports. However, frame survey data were not presented, if available. Sampled catches were extrapolated to the number of vessels in the port, although it is not known whether the raising factor was used for the total number of **present** or **active** vessels.

RECOMMENDATION: It is recommended to conduct a frame survey along the Saudi Red Sea coast so that the catch and effort data collection can continue and become more accurate.

مواقع انزال الاسماك على السواحل السعودية و الصيد السنوي منها (بالطن) للفترة بين 2016 - 2021

Location	2016	2017	2018	2019	2020	2021
Al Bahariya	3,250,000	3,400,000	2,400,000	3,800,000	4,200,000	3,100,000
Al Bahariya	1,200,000	1,300,000	1,100,000	1,400,000	1,500,000	1,200,000
Al Bahariya	1,500,000	1,600,000	1,400,000	1,700,000	1,800,000	1,500,000
Al Bahariya	1,800,000	1,900,000	1,700,000	2,000,000	2,100,000	1,800,000
Al Bahariya	2,100,000	2,200,000	2,000,000	2,300,000	2,400,000	2,100,000
Al Bahariya	2,400,000	2,500,000	2,300,000	2,600,000	2,700,000	2,400,000
Al Bahariya	2,700,000	2,800,000	2,600,000	2,900,000	3,000,000	2,700,000
Al Bahariya	3,000,000	3,100,000	2,900,000	3,200,000	3,300,000	3,000,000
Al Bahariya	3,300,000	3,400,000	3,200,000	3,500,000	3,600,000	3,300,000
Al Bahariya	3,600,000	3,700,000	3,500,000	3,800,000	3,900,000	3,600,000
Al Bahariya	3,900,000	4,000,000	3,800,000	4,100,000	4,200,000	3,900,000
Al Bahariya	4,200,000	4,300,000	4,100,000	4,400,000	4,500,000	4,200,000
Al Bahariya	4,500,000	4,600,000	4,400,000	4,700,000	4,800,000	4,500,000
Al Bahariya	4,800,000	4,900,000	4,700,000	5,000,000	5,100,000	4,800,000
Al Bahariya	5,100,000	5,200,000	5,000,000	5,300,000	5,400,000	5,100,000
Al Bahariya	5,400,000	5,500,000	5,300,000	5,600,000	5,700,000	5,400,000
Al Bahariya	5,700,000	5,800,000	5,600,000	5,900,000	6,000,000	5,700,000
Al Bahariya	6,000,000	6,100,000	5,900,000	6,200,000	6,300,000	6,000,000
Al Bahariya	6,300,000	6,400,000	6,200,000	6,500,000	6,600,000	6,300,000
Al Bahariya	6,600,000	6,700,000	6,500,000	6,800,000	6,900,000	6,600,000
Al Bahariya	6,900,000	7,000,000	6,800,000	7,100,000	7,200,000	6,900,000
Al Bahariya	7,200,000	7,300,000	7,100,000	7,400,000	7,500,000	7,200,000
Al Bahariya	7,500,000	7,600,000	7,400,000	7,700,000	7,800,000	7,500,000
Al Bahariya	7,800,000	7,900,000	7,700,000	8,000,000	8,100,000	7,800,000
Al Bahariya	8,100,000	8,200,000	8,000,000	8,300,000	8,400,000	8,100,000
Al Bahariya	8,400,000	8,500,000	8,300,000	8,600,000	8,700,000	8,400,000
Al Bahariya	8,700,000	8,800,000	8,600,000	8,900,000	9,000,000	8,700,000
Al Bahariya	9,000,000	9,100,000	8,900,000	9,200,000	9,300,000	9,000,000
Al Bahariya	9,300,000	9,400,000	9,200,000	9,500,000	9,600,000	9,300,000
Al Bahariya	9,600,000	9,700,000	9,500,000	9,800,000	9,900,000	9,600,000
Al Bahariya	9,900,000	10,000,000	9,800,000	10,100,000	10,200,000	9,900,000
Al Bahariya	10,200,000	10,300,000	10,100,000	10,400,000	10,500,000	10,200,000
Al Bahariya	10,500,000	10,600,000	10,400,000	10,700,000	10,800,000	10,500,000
Al Bahariya	10,800,000	10,900,000	10,700,000	11,000,000	11,100,000	10,800,000
Al Bahariya	11,100,000	11,200,000	11,000,000	11,300,000	11,400,000	11,100,000
Al Bahariya	11,400,000	11,500,000	11,300,000	11,600,000	11,700,000	11,400,000
Al Bahariya	11,700,000	11,800,000	11,600,000	11,900,000	12,000,000	11,700,000
Al Bahariya	12,000,000	12,100,000	11,900,000	12,200,000	12,300,000	12,000,000
Al Bahariya	12,300,000	12,400,000	12,200,000	12,500,000	12,600,000	12,300,000
Al Bahariya	12,600,000	12,700,000	12,500,000	12,800,000	12,900,000	12,600,000
Al Bahariya	12,900,000	13,000,000	12,800,000	13,100,000	13,200,000	12,900,000
Al Bahariya	13,200,000	13,300,000	13,100,000	13,400,000	13,500,000	13,200,000
Al Bahariya	13,500,000	13,600,000	13,400,000	13,700,000	13,800,000	13,500,000
Al Bahariya	13,800,000	13,900,000	13,700,000	14,000,000	14,100,000	13,800,000
Al Bahariya	14,100,000	14,200,000	14,000,000	14,300,000	14,400,000	14,100,000
Al Bahariya	14,400,000	14,500,000	14,300,000	14,600,000	14,700,000	14,400,000
Al Bahariya	14,700,000	14,800,000	14,600,000	14,900,000	15,000,000	14,700,000
Al Bahariya	15,000,000	15,100,000	14,900,000	15,200,000	15,300,000	15,000,000
Al Bahariya	15,300,000	15,400,000	15,200,000	15,500,000	15,600,000	15,300,000
Al Bahariya	15,600,000	15,700,000	15,500,000	15,800,000	15,900,000	15,600,000
Al Bahariya	15,900,000	16,000,000	15,800,000	16,100,000	16,200,000	15,900,000
Al Bahariya	16,200,000	16,300,000	16,100,000	16,400,000	16,500,000	16,200,000
Al Bahariya	16,500,000	16,600,000	16,400,000	16,700,000	16,800,000	16,500,000
Al Bahariya	16,800,000	16,900,000	16,700,000	17,000,000	17,100,000	16,800,000
Al Bahariya	17,100,000	17,200,000	17,000,000	17,300,000	17,400,000	17,100,000
Al Bahariya	17,400,000	17,500,000	17,300,000	17,600,000	17,700,000	17,400,000
Al Bahariya	17,700,000	17,800,000	17,600,000	17,900,000	18,000,000	17,700,000
Al Bahariya	18,000,000	18,100,000	17,900,000	18,200,000	18,300,000	18,000,000
Al Bahariya	18,300,000	18,400,000	18,200,000	18,500,000	18,600,000	18,300,000
Al Bahariya	18,600,000	18,700,000	18,500,000	18,800,000	18,900,000	18,600,000
Al Bahariya	18,900,000	19,000,000	18,800,000	19,100,000	19,200,000	18,900,000
Al Bahariya	19,200,000	19,300,000	19,100,000	19,400,000	19,500,000	19,200,000
Al Bahariya	19,500,000	19,600,000	19,400,000	19,700,000	19,800,000	19,500,000
Al Bahariya	19,800,000	19,900,000	19,700,000	20,000,000	20,100,000	19,800,000
Al Bahariya	20,100,000	20,200,000	20,000,000	20,300,000	20,400,000	20,100,000
Al Bahariya	20,400,000	20,500,000	20,300,000	20,600,000	20,700,000	20,400,000
Al Bahariya	20,700,000	20,800,000	20,600,000	20,900,000	21,000,000	20,700,000
Al Bahariya	21,000,000	21,100,000	20,900,000	21,200,000	21,300,000	21,000,000
Al Bahariya	21,300,000	21,400,000	21,200,000	21,500,000	21,600,000	21,300,000
Al Bahariya	21,600,000	21,700,000	21,500,000	21,800,000	21,900,000	21,600,000
Al Bahariya	21,900,000	22,000,000	21,800,000	22,100,000	22,200,000	21,900,000
Al Bahariya	22,200,000	22,300,000	22,100,000	22,400,000	22,500,000	22,200,000
Al Bahariya	22,500,000	22,600,000	22,400,000	22,700,000	22,800,000	22,500,000
Al Bahariya	22,800,000	22,900,000	22,700,000	23,000,000	23,100,000	22,800,000
Al Bahariya	23,100,000	23,200,000	23,000,000	23,300,000	23,400,000	23,100,000
Al Bahariya	23,400,000	23,500,000	23,300,000	23,600,000	23,700,000	23,400,000
Al Bahariya	23,700,000	23,800,000	23,600,000	23,900,000	24,000,000	23,700,000
Al Bahariya	24,000,000	24,100,000	23,900,000	24,200,000	24,300,000	24,000,000
Al Bahariya	24,300,000	24,400,000	24,200,000	24,500,000	24,600,000	24,300,000
Al Bahariya	24,600,000	24,700,000	24,500,000	24,800,000	24,900,000	24,600,000
Al Bahariya	24,900,000	25,000,000	24,800,000	25,100,000	25,200,000	24,900,000
Al Bahariya	25,200,000	25,300,000	25,100,000	25,400,000	25,500,000	25,200,000
Al Bahariya	25,500,000	25,600,000	25,400,000	25,700,000	25,800,000	25,500,000
Al Bahariya	25,800,000	25,900,000	25,700,000	26,000,000	26,100,000	25,800,000
Al Bahariya	26,100,000	26,200,000	26,000,000	26,300,000	26,400,000	26,100,000
Al Bahariya	26,400,000	26,500,000	26,300,000	26,600,000	26,700,000	26,400,000
Al Bahariya	26,700,000	26,800,000	26,600,000	26,900,000	27,000,000	26,700,000
Al Bahariya	27,000,000	27,100,000	26,900,000	27,200,000	27,300,000	27,000,000
Al Bahariya	27,300,000	27,400,000	27,200,000	27,500,000	27,600,000	27,300,000
Al Bahariya	27,600,000	27,700,000	27,500,000	27,800,000	27,900,000	27,600,000
Al Bahariya	27,900,000	28,000,000	27,800,000	28,100,000	28,200,000	27,900,000
Al Bahariya	28,200,000	28,300,000	28,100,000	28,400,000	28,500,000	28,200,000
Al Bahariya	28,500,000	28,600,000	28,400,000	28,700,000	28,800,000	28,500,000
Al Bahariya	28,800,000	28,900,000	28,700,000	29,000,000	29,100,000	28,800,000
Al Bahariya	29,100,000	29,200,000	29,000,000	29,300,000	29,400,000	29,100,000
Al Bahariya	29,400,000	29,500,000	29,300,000	29,600,000	29,700,000	29,400,000
Al Bahariya	29,700,000	29,800,000	29,600,000	29,900,000	30,000,000	29,700,000
Al Bahariya	30,000,000	30,100,000	29,900,000	30,200,000	30,300,000	30,000,000
Al Bahariya	30,300,000	30,400,000	30,200,000	30,500,000	30,600,000	30,300,000
Al Bahariya	30,600,000	30,700,000	30,500,000	30,800,000	30,900,000	30,600,000
Al Bahariya	30,900,000	31,000,000	30,800,000	31,100,000	31,200,000	30,900,000
Al Bahariya	31,200,000	31,300,000	31,100,000	31,400,000	31,500,000	31,200,000
Al Bahariya	31,500,000	31,600,000	31,400,000	31,700,000	31,800,000	31,500,000
Al Bahariya	31,800,000	31,900,000	31,700,000	32,000,000	32,100,000	31,800,000
Al Bahariya	32,100,000	32,200,000	32,000,000	32,300,000	32,400,000	32,100,000
Al Bahariya	32,400,000	32,500,000	32,300,000	32,600,000	32,700,000	32,400,000
Al Bahariya	32,700,000	32,800,000	32,600,000	32,900,000	33,000,000	32,700,000
Al Bahariya	33,000,000	33,100,000	32,900,000	33,200,000	33,300,000	33,000,000
Al Bahariya	33,300,000	33,400,000	33,200,000	33,5		



Fishing Gear							Gillnet mesh sizes	
Fishing Gear Type	Adale	Hoby	Kismayo	Miexa	Mogadishu	Totals	Mesh size (cm)	
Bottom Gillnet	21	60	4	0	0	85	14	
Bottom Longline	0	4	1	0	3	8	18	
Floating Gillnet	174	109	108	475	362	1311	20	
Handline	250	97	26	2	7	382	32	
Horizontal Longline	1	13	25	0	63	102	51	
Other	1	44	8	0	0	48	77	
Total	447	327	232	475	435	1931		

RECOMMENDATION: Frame survey forms to be adjusted and separation to be applied for catches from PERSGA area and Indian Ocean.

SUDAN

The software PASGEAR is used for data collection, which originated from the 1990s. The presentation contained a slide on the fishing effort in the form of numbers of boats, but as may be inferred from the following slide, the numbers of boats are rather crude and fluctuating considerably from year to year. However, the catches of coral-reef fish species in the subsequent

table vary considerably from the data in the former. There is room for improvement for estimations of total catches for coral reef fisheries. This is likely also valid for other types of fisheries.

RECOMMENDATION: It is recommended that a Frame Survey be conducted to estimate total production more accurately.

Year	Number of boats (effort)	Catch of coral reef fishes (tonnes)	Catch/effort (coral reef fishes)
2002	1,000	4,510	4.51
2003	600	4,620	7.70
2004	700	4,660	6.66
2005	650	5,660	8.71
2006	750	6,340	8.45
2007	800	3,979	4.97
2008	900	3,904	4.34
2009	775	3,936	5.08
2010	950	3,888	4.09
2011	1,000	3,800	3.80
2012	1,100	3,600	3.27

Catch per unit of effort for coral reef fishes in Sudanese Red Sea coast (source: Red Sea Fisheries Research Center)

7 April 2024 1b
 Strengthening Capacities and Regional Cooperation in Fisheries Statistics and Fish Stock

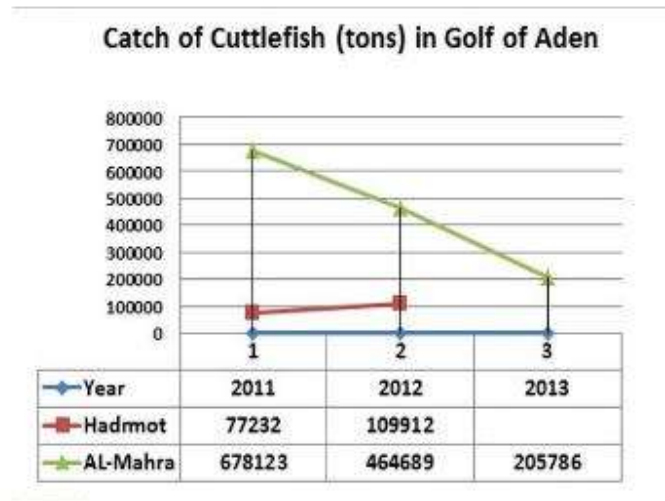
Year	Marine fish capture production by fishery (in tonnes)					Total
	Coral reef fishery	Trawl fishery	Sardine fishery	Shell fishery	Shrimp fishery	
2001	369	0	0	378	31	778
2002	373	359	0	367	4	1,103
2003	371	807	717	364	13	2,271
2004	452	1,404	1,638	336	61	3,891
2005	507	782	1,466	385	46	3,186
2006	616	0	0	301	0	917
2007	497	92	0	280	6	875
2008	488	623	0	312	23	1,446
2009	492	319	335	42	18	1,206
2010	487	0	0	13	0	500
2011	948	511	0	240	0	1,699
2012	409	0	0	151	0	560
2013	910	0	0	173	0	1,083
2014	1,156	0	0	252	0	1,408
2015	1,302	470	517	276	0	2,565
2016	1,182	642	642	134	0	2,600
2017	1,273	387	1,665	41	20	3,386

Annual marine fish production in Sudan (from 2001 to 2017) – source: Red Sea State Fisheries administration

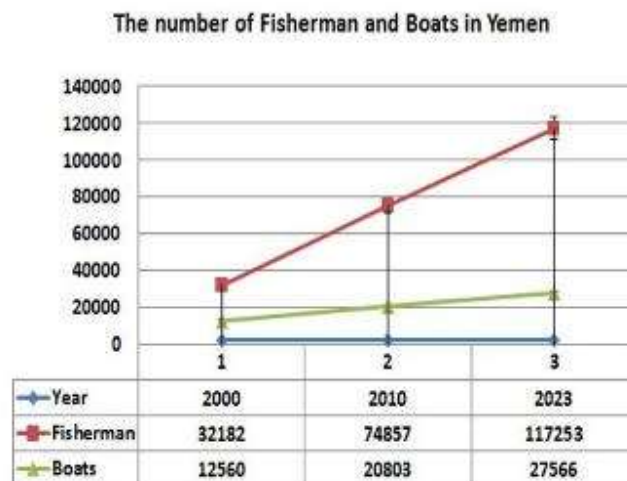
7 April 2024 1c
 Strengthening Capacities and Regional Cooperation in Fisheries Statistics and Fish Stock

YEMEN

The PPT of the Yemeni colleague showed interesting slides, but for too many detailed situations. It would be of interest to put all the catch figures into one figure. In certain graphs sharp increments in fishing effort can be seen, while catches of cuttlefish tumbled.



The number of Fisherman and Boats in Yemen



The PPT also presents production figures for recent years, which cannot be found back in the FAO statistical yearbook.

RECOMMENDATION: It is recommended to combine comparable production figures into one graph. As the available information shows that the total number of fishers has increased, a frame survey ought to be carried out soonest. Another component of the SFISH programme will conduct such a survey in the foreseeable future, thus a collaboration with this component is strongly recommended.

B- NATIONAL PRESENTATIONS ON STOCK ASSESSMENT DATA COLLECTION

Noteworthy slides have been copied from the national presentations and presented here for information sharing purposes regarding stock assessments.

DJIBOUTI

A study in 1996 resulted in the following Biomass, Natural Mortality and MSY estimates:

MARINE ECOSYSTEM

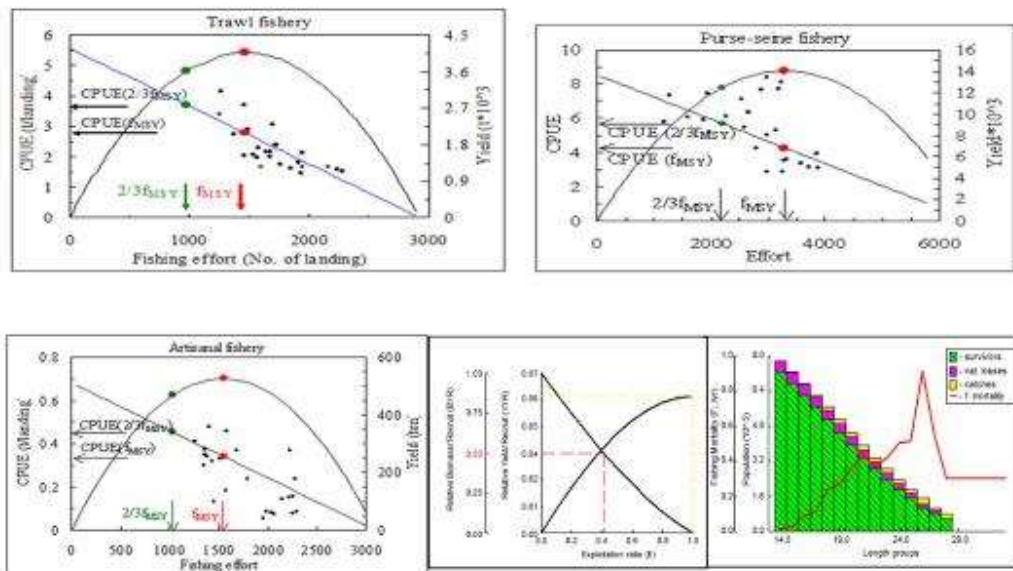
There is a total of 192 fish species in Djibouti's water. According to a detailed scientific study on the fisheries conducted in 1996 by the German Cooperation (GTZ), Djibouti marine resources is represented in this tableau:

Species/Fishes	Estimated biomass	Effort (ton)	Yield (ton)
Pilchodichthys	4,944	1	3,892
Merluccius	4,824	2	3,826
[Unidentified]			
Merluccius	2,584	0.5	1,590
Graph. Omnisax	2,324	1	1,852
[Unidentified]			
Merluccius	4,394	4.5	1,286
Merluccius	2,224		1,074
[Unidentified]	36	1	58
Merluccius	14,500	0.5	4,826
Merluccius	18,500		30,026
Merluccius	18,734		30,690

Table 1: Maximum sustainable yield (MSY) of Djibouti's fishery resources, calculated from biomass and natural mortality (M)

EGYPT

The PPT showed some production models, but the MSY could not be deducted as the level of effort at the time was not determined, as presented in the following graphs:



JORDAN

No stock assessments undertaken in Jordanian waters.

SAUDI ARABIA

No stock assessments undertaken in Saudi waters.

SUDAN

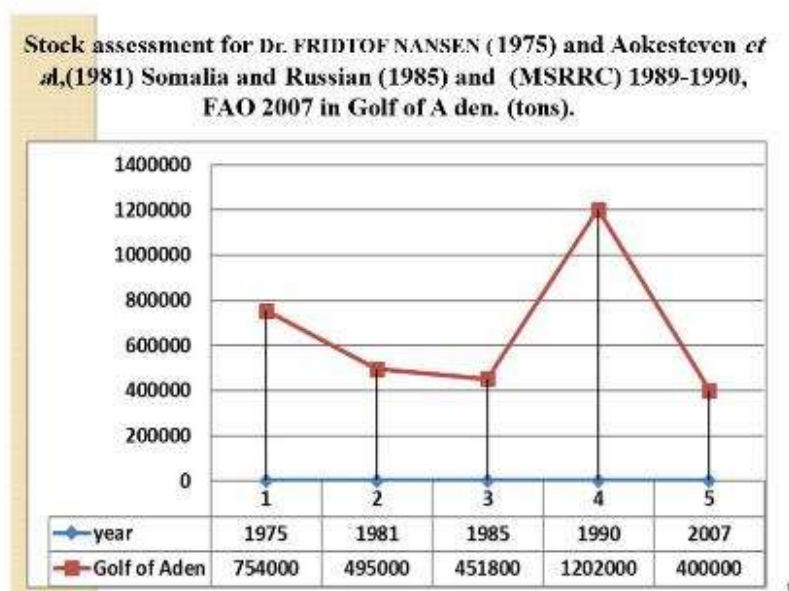
In 1985 it was estimated that the Sudanese marine fish potential ranged between 10,000 and 35,000 tonnes.

SOMALIA

The only potential yield figures mentioned in the PPT are the following: Annual inshore lobster catches could total around 500 tons per year, while deep-sea lobster could yield 680–900 tons per year.

YEMEN

Several stock assessments have been conducted between 1975 and 2007, which are summarized in the following graph:



It may be clear from the national presentations that no recent stock assessments took place. This was discussed with the participants and it is unlikely that any assessment will be carried out in the near future. Suggestions have been made to charter a commercial fishing vessel (e.g. a trawler) to cover trawlable grounds along fixed transects for a period of a year at different depths. Applying the so-called swept-area method might yield estimates of standing stock of demersal fish and invertebrate resources (under certain escapement scenarios). However, the project's budget would not allow such research costs.

RECOMMENDATION: In absence of research vessels in the PERSGA area and due to the high costs of chartering a fishing vessel, it is recommended to estimate fish and shrimp growth parameters based on sampling of length frequencies of species to be monitored. Length-converted catch curves may assist in providing insight into exploitation levels, which could be indicative of the state of the stocks.

C- QUESTIONNAIRE ANALYSIS

- The results of the analysis of the questionnaire, duly completed by all national consultants, were presented and discussed, especially the gaps, which appeared many. The methods applied by the Member States to arrive at the capture fisheries production figures were not clearly explained. This likely is a result of not having worked with the raw data but rather with aggregated data. Due to the lack of up-to-date fishing effort data (as results of frame surveys or fisheries inventories) it is difficult to raise catch-effort sample data to the entire (operational) fleet of fishing vessels. The majority of the countries use EXCEL spreadsheets for data treatment. Sudan uses PASGEAR and Djibouti Open ArtFish for their production estimations.
- All countries submit their catch statistics to FAO's Statistical Yearbook Service, although it seems that there are some backlogs for Somalia and Yemen (although recent statistics have been provided during the workshop, thus somewhere there are hurdles to be taken). Regarding the FAO statistics, catches are reported for both Mediterranean and Red Sea in the case of Egypt, Persian Gulf and Red Sea in the case of Saudi Arabia, and Gulf of Aden and Indian Ocean coast for Somalia. This will be one of the challenges during the present SFISH Project.
- Although licensing systems seem to be in place, not all countries use Vessel Monitoring Systems.
- Not all countries have ratified or endorsed the Port State Measures Agreement.
- Several countries have undersigned certain International Plans of Action, but still the capture of sharks seems rampant.
- Frame Survey results are non-existent or outdated, except for Somalia.
- Some countries had the benefit of foreign collaboration for research in the Red Sea, but the collaboration did not appear sustainable.
- As regards biological data collection, the questions may have been misunderstood as some interesting information appeared during the workshop which were not adequately reported in the questionnaire (e.g. otolith research in Egypt; length frequency collection in some countries as well as length-weight relationships).

- Some countries realised that their marine fisheries resources are under considerable pressure and introduced or are planning the introduction of marine aquaculture and even restocking of certain species.

The discussion on the harmonization of data collection systems was interesting. The question is whether all countries should have the same choice of database software or that they can continue with their systems, but in an amended way, to allow comparison and to allow regional assessments. Apart from PASGEAR (Sudan) and Open ArtFish (Djibouti) there is presently a new package, Calipseo, already used by Egypt in the Mediterranean. Unfortunately, there are no manuals yet for the use of that package, let alone demonstration cases. Investigations are ongoing, in close collaboration with FAO, to find out to what extent this package could be introduced without a complete overhaul of existing systems.

WAY FORWARD

It is important to start as soon as possible with the length frequency data collection for certain commercial species (e.g. demersal fish species, pelagic species, shrimp species), taking into account mesh or hook sizes of fishing gear (selectivity), importance of the species to be monitored in the region (migration), strata and sub-strata, etc.

Six species were selected by the consultants 2 pelagic, 2 demersal & 2 crustaceans as follow:

Pelagic species

1. *Euthynnus affinis* (Kawakawa, Mackerel tuna)
2. *Scomberomorus commerson* (Spanish mackerel)

Demersal species

3. *Lethrinus mahsena* (Sky emperor)
4. *Lutjanus bohar* (Two-spot red snapper)

Crustacean species

5. *Penaeus semisulcatus* (Green tiger prawn)
6. *Panulirus homarus* (Scalloped spiny lobster)