

# FAO's approach to science-based evidence for monitoring capture fishery sector ...

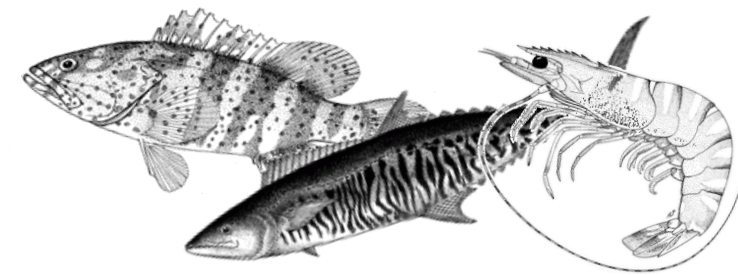
## ... and how FAO can support RECOFI and its Member countries



With contributions from colleagues from FIAS :

- Paula Anton, Fishery Officer
- Aureliano Gentile, Information Officer
- Yann Laurent, Fishery Officer
- Stefania Savoré, Fishery Officer
- Bracken van Niekerk, Fishery Information FIRMS
- Stefania Vannuccini, Senior Fishery Officer

By Marc Taconet, Head FIAS  
FAO Fisheries Statistics and Information Branch





1. Sector needs to data, statistics and information
2. Fishery statistics
  - Monitoring schemes– Global, regional, RECOFI Minimum Data Requirement (MDR)
3. Information on status and trends of fisheries
  - The Fisheries and Resources Monitoring System (FIRMS)
4. Issues and gaps in RECOFI, and how FAO can support
  - RECOFI MDR
  - FIRMS



## Fisheries Management

### Monitoring

- fishing activity
- socio-economics and livelihoods benefits

## Status of fishery resources

### Monitoring

- Health of Fishery resources

- Individual stocks

## Policies - Economic importance

### Monitoring

- Production by Fishing area

## Policies - Environmental

- Regional stock status

### Monitoring

- Production by country
- Contribution to Food security



DATA STATISTICS INFORMATION ASSETS



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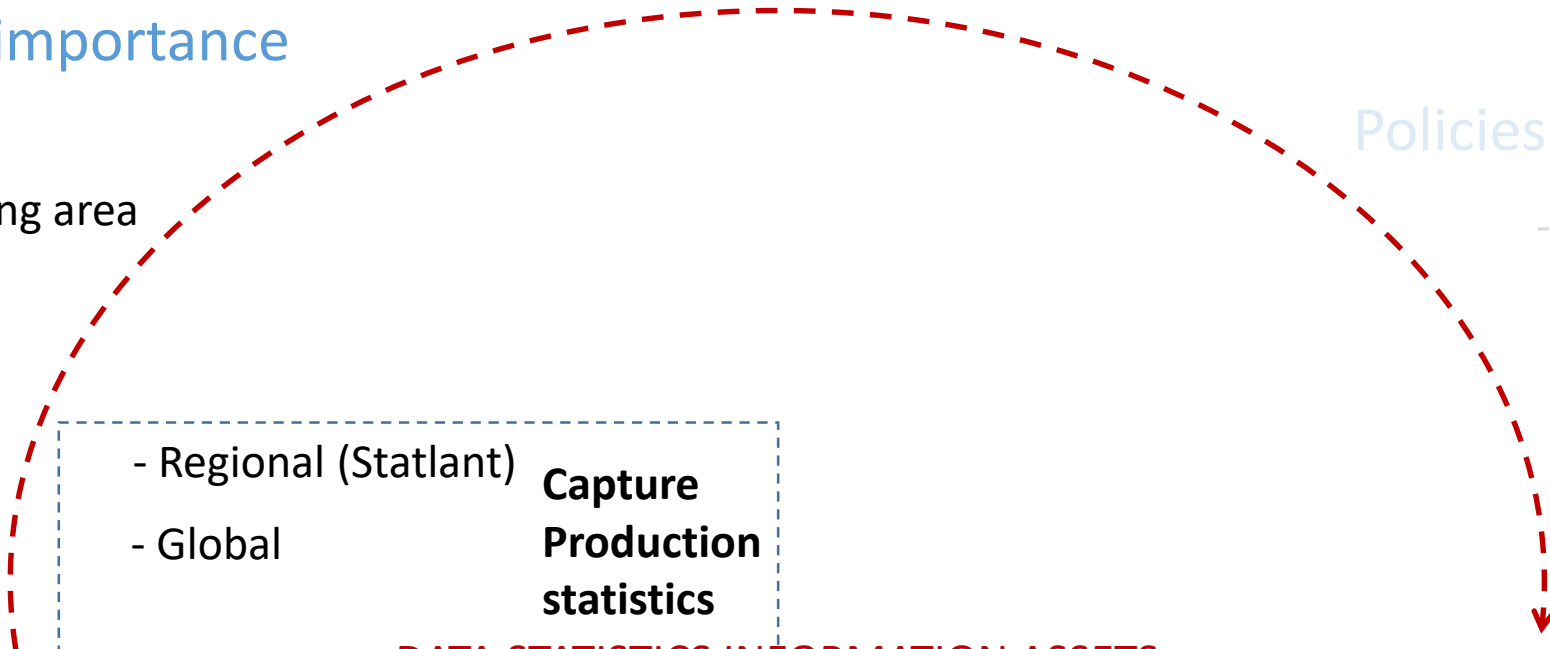
- Production by country
- Contribution to Food security

- Regional (Statlant)

- Global

**Capture  
Production  
statistics**

**DATA STATISTICS INFORMATION ASSETS**





## GLOBAL

### Questionnaire: FishSTAT–FI-NS

(FAO Global Capture production questionnaire)

FISHSTAT-FI-NS1 for Qatar [ 2017 ]

Form for reporting statistics on capture production of fish, crustaceans, molluscs, etc., by species items and major fishing areas

3 ALPHA CODE - ENGLISH NAME	SCIENTIFIC NAME	AREA CODE	UNIT	2014	2015	2016	2017
-----------------------------	-----------------	-----------	------	------	------	------	------

once a year by:

- Country / territory
- Species item (Name, Scientific name, 3-Alpha code)
- FAO Major Fishing Area

**Published:** In **global capture production** dataset through Online Query Panels, FishStatJ and FAO Yearbook Fisheries and Aquaculture Statistics – Once a year

## REGIONAL

### Questionnaire: FAO Statlant 51

questionnaire

FISHSTAT 51A		FORM FOR REPORTING STATISTICS ON CATCHES IN WESTERN INDIAN OCEAN FORMULAIRE POUR LA DÉCLARATION DES STATISTIQUES DES CAPTURES DANS L'OcéAN INDIEN OUEST FORMULARIO PARA INFORMACIÓN ESTADÍSTICA DE CAPTURAS EN EL OcéANO INDICO OCCIDENTAL										
YEAR ANNEE AÑO 20__	COUNTRY PAYS PAIS -----	All commercial, industrial and subsistence fisheries Toute la pêche commerciale, industrielle et de subsistence Toda la pesca comercial, industrial y de subsistencia					Tonnes Tonnes Toneladas					
3-alpha code código	Species items Catégories d'espèces Partidas de especies	TOTAL AREA 51	Subarea Not known Inconnue Desconocida	Subarea 51.1.0 Red Sea	Subarea 51.2.0 Persian Gulf	Division 51.3.1 Oman Sea	Division 51.3.2 South-western Arabian Sea	Subarea 51.4.0 Eastern Arabian Sea, Laccadives	Subarea 51.5.0 Somalia, Kenya & Tanzania	Subarea 51.6.0 Madagascar & Mozambique Channel	Subarea 51.7.0 Oceanic	Subarea 51.8.0 Mozambique

once a year by:

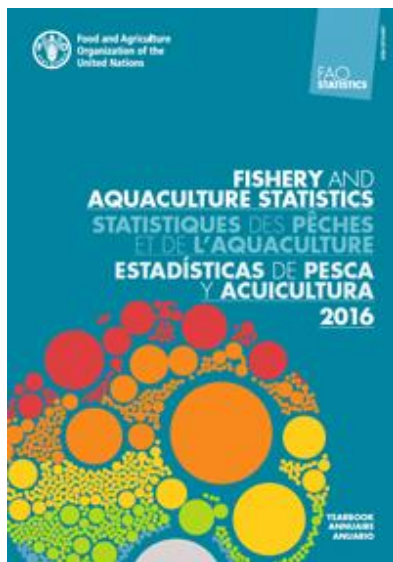
- Country / territory
- Species item (Name, Scientific name, 3-Alpha code)
- Sub-areas: RECOFI statistical division

**Published:** as **RECOFI capture production** dataset in Online Query Panels and FishStatJ– Once a year

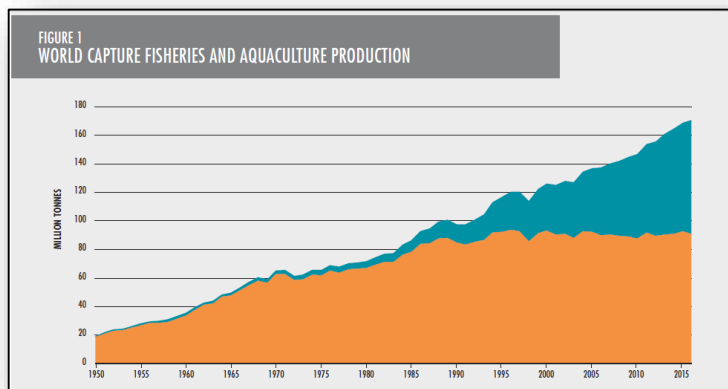


## Supporting trends analysis for national, regional and global policies

*SOFIA 2018* highlights the critical importance of fisheries and aquaculture for the **FOOD, NUTRITION AND EMPLOYMENT** of millions of people, many of whom struggle to maintain reasonable livelihoods.



10 July 2019



10<sup>th</sup> Session of the Regional Commission for Fisheries (RECOFI)



Rome, Italy



# Sector needs for data, statistics and information

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## Policies - Economic importance

- SOFIA**
- Monitoring
- Production by Fishing area

**FishStatJ**

- Monitoring
- Production by country
- Contribution to Food security

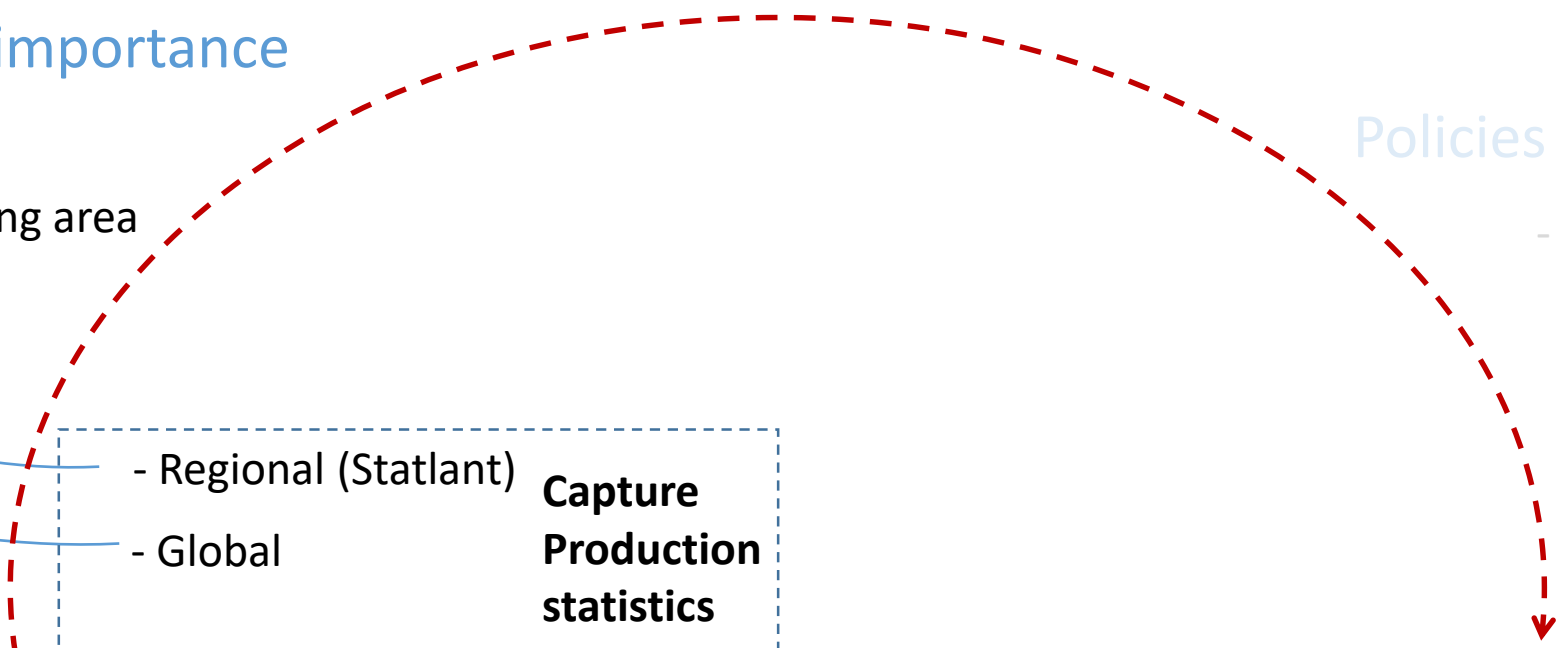
- Regional (Statlant)
- Global

**Capture  
Production  
statistics**

**DATA STATISTICS INFORMATION ASSETS**

## Policies - Environmental

- Regional stock status







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RECOFI MDR  
Catch & Effort statistics

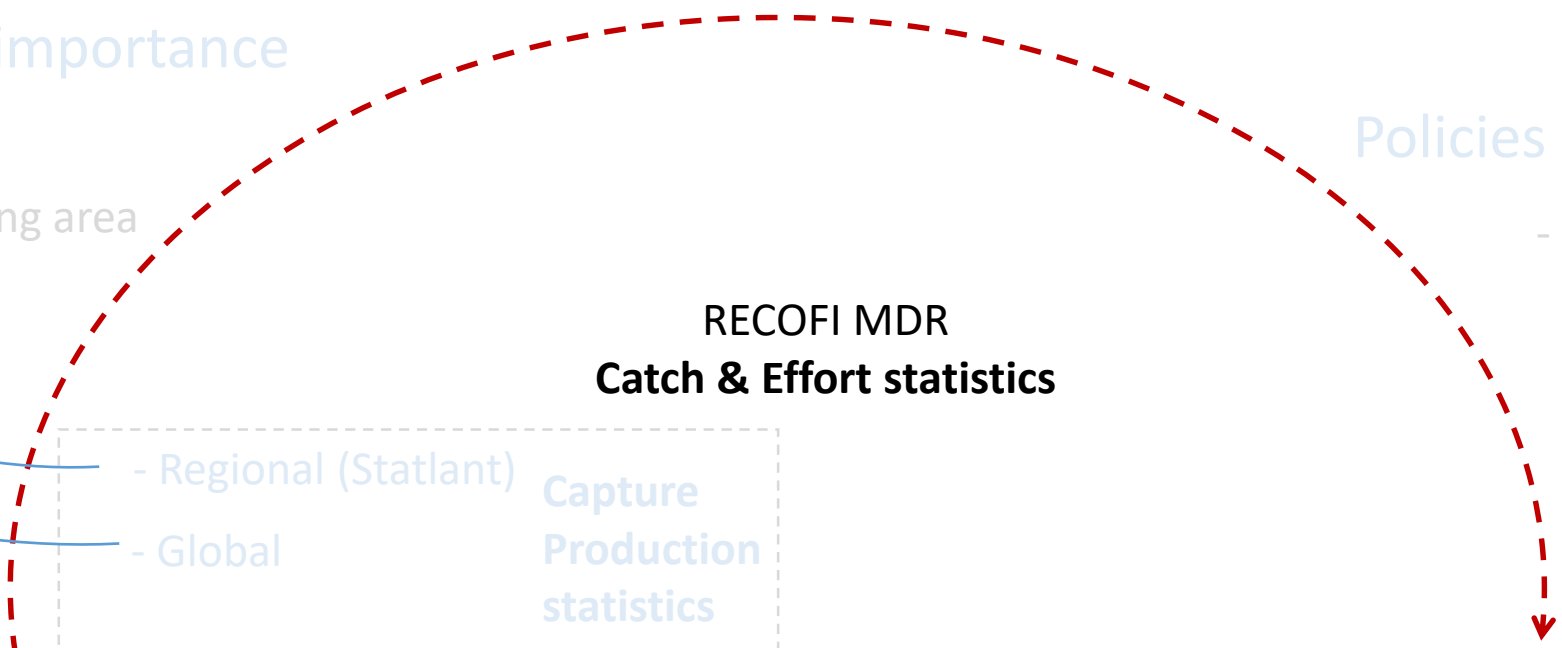
- Regional (Statlant)

- Global

Capture  
Production  
statistics

DATA STATISTICS INFORMATION ASSETS

SOFIA





- The RECOFI Recommendation on Minimum Data Reporting (MDR)
  - established to support pragmatic management scheme based on EAF
  - with principles of adaptive management procedures.
- RECOFI 2009 Workshop on Stock Indicators and Stock Status Reporting (Tehran, Islamic Republic of Iran, 26–29 July 2009)
  - reviewed data and statistics availability in the region and stock status reporting
  - recognized the lack of information commonly accessible through the region.
  - three key issues identified:
    - i) the impact of **shrimp trawls**,
    - ii) status of general **finfish resources**, signified with **emperors** and **groupers**, biologically vulnerable component
    - iii) status of **priority species**
- RECOFI 6, in 2011 (Rome, Italy, 10-12 May 2011)
  - endorsed Recommendation RECOFI/6/2011/1, entitled: “**Recommendation on minimum data reporting in the RECOFI area**”. (RECOFI MDR)



	Shrimp Trawl		Gillnets, Wire-traps, Hook-and-line		Wire-traps	
<b>Fleet capacity</b>	2-a-ii	Number of vessels by types and size categories				
<b>Fishing Effort</b>	2-a-iii	Average tow duration by vessel type/ category	3-a	Number of days at sea	4-a-iii	Catch, effort and fork length composition of targeted gears
		Average number of tows per day by vessel type/ category		Alternative annual efforts		
		Total number of days at sea by vessel type/ category				
<b>Catch</b>	2-a-iv	Catch of shrimp	3-b	Total catch	4-a-i	Annual catch
		Catch of narrow-barred Spanish mackerel		Catch of narrow-barred Spanish mackerel		Monthly catch
		Catch of swimming crab, cuttlefish, emperors, groupers, sharks, and rays		Catch of emperors, groupers, sharks, and rays		
		Catch of other finfishes				
<b>Ecosystem</b>	5-a	Shrimp species composition				
	2-a-v	Amount of discards	5-b	Species composition of discards		
	2-a-vi	Species composition of bycatch and discard		Amount of discards	4-a-ii	Fork length composition
<b>Management</b>	2-a-i	Opening/closing dates				
	2-b	BRD related information				
	4-b	Relevant information on narrow-barred Spanish mackerel				



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Capture  
Production  
statistics

Fisheries assessments

RECOFI MDR

Catch & Effort statistics

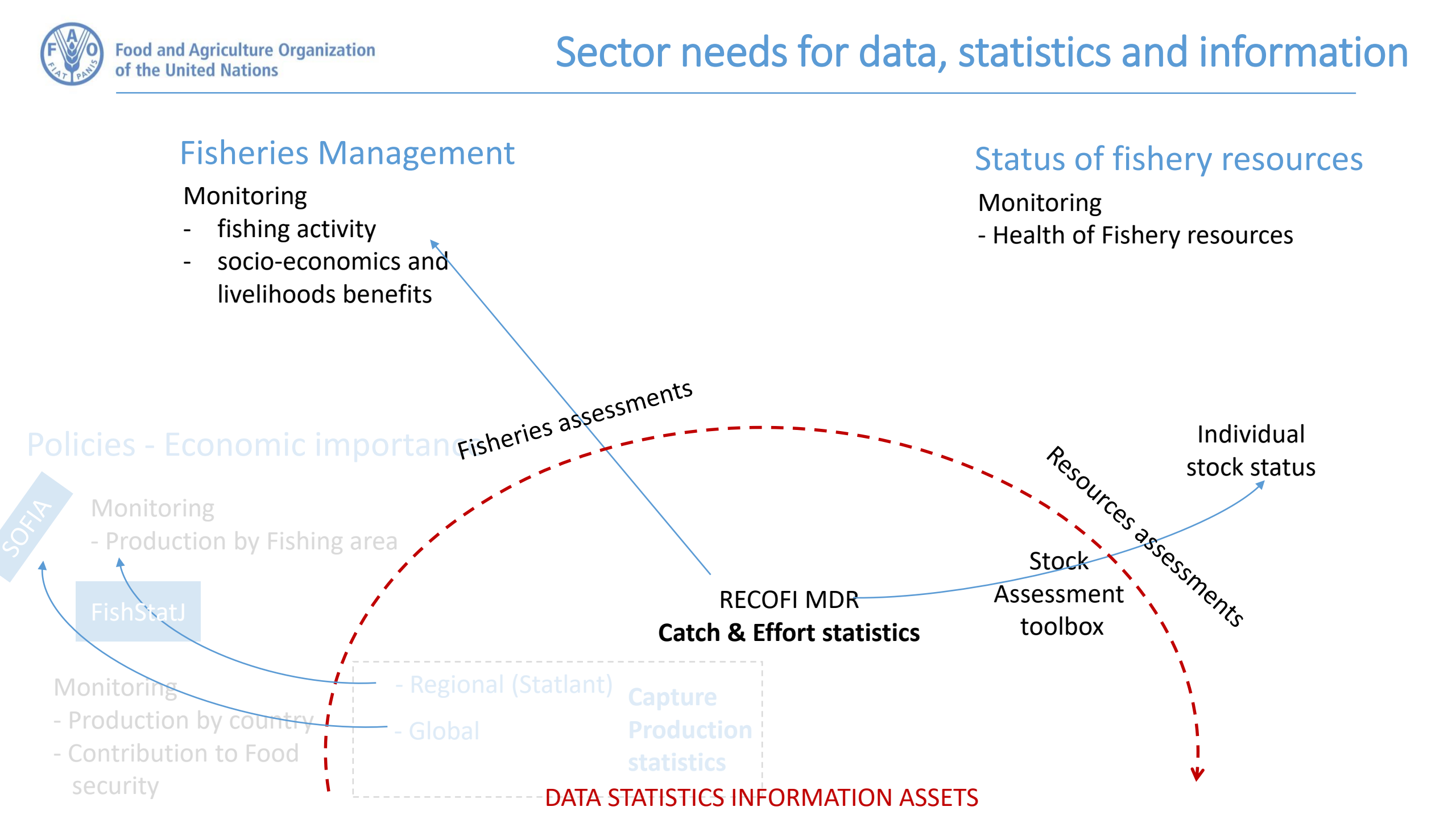
Stock

Assessment  
toolbox

Resources assessments

Individual  
stock status

DATA STATISTICS INFORMATION ASSETS





# Sector needs for data, statistics and information

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Capture  
Production  
statistics

Fisheries  
inventories



Stocks  
inventories

Stock

RECOFI MDR

Catch & Effort statistics

Assessment  
toolbox

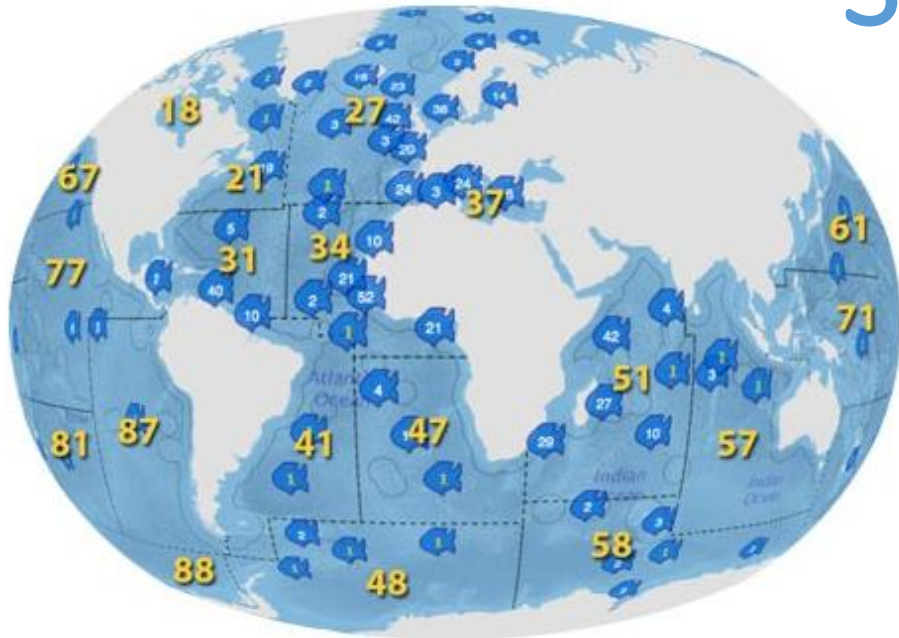
Individual stock  
status

DATA STATISTICS INFORMATION ASSETS



# Fisheries and Resources Monitoring System (FIRMS)

*Founded in 2004, 15 years of experience...*



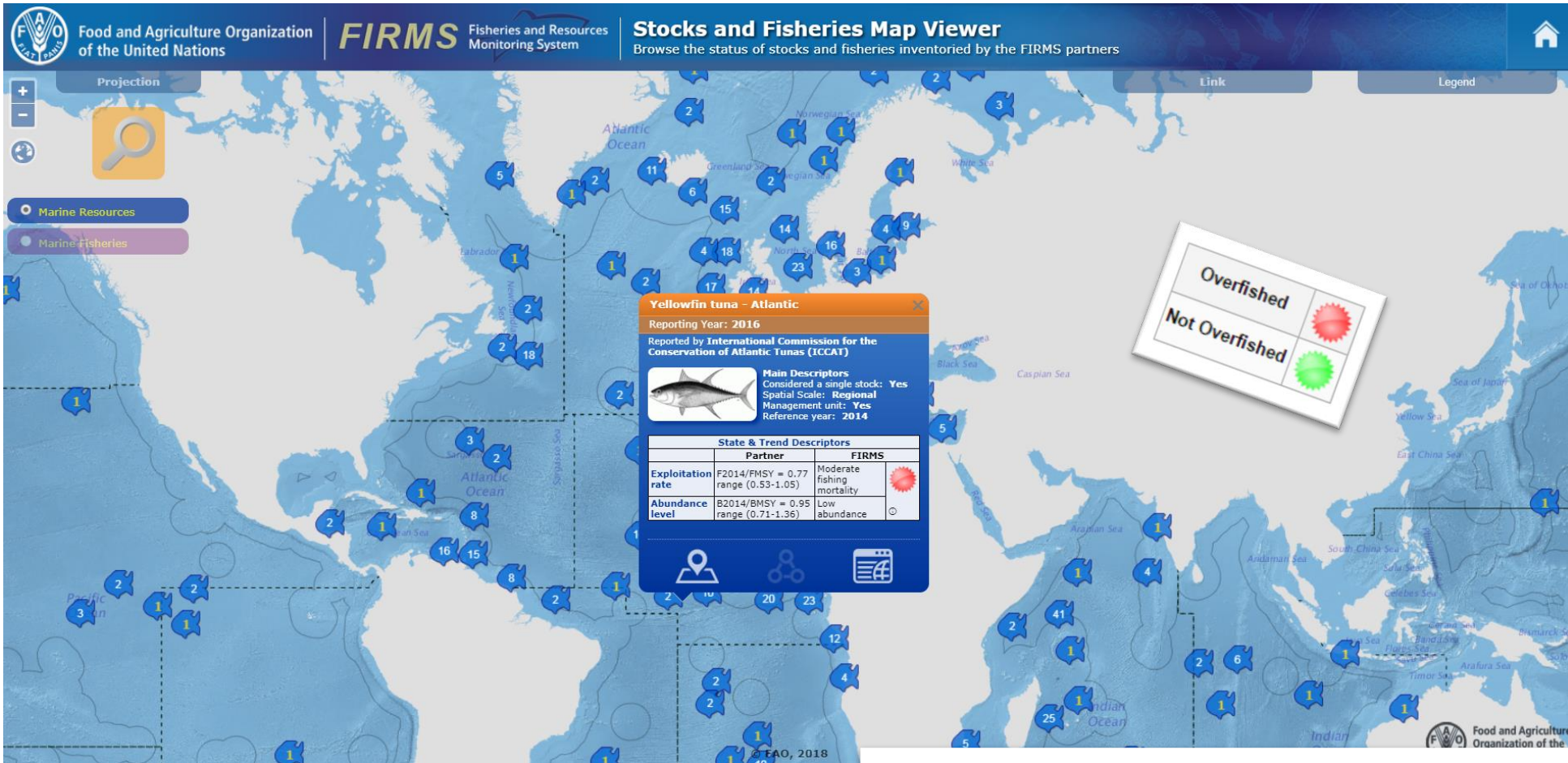
FIRMS aims to facilitate access to high-quality information on the status and trends of marine resources and fisheries

for decision makers and other relevant stakeholders to develop effective fisheries policies and management plans

16 intergovernmental organizations / 21 RFBs.

RECOFI as FAO associated Member (Commission 7, 2013)

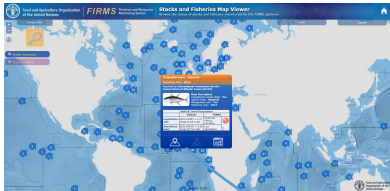




FIRMS supports the need for **easy access to high quality information** for the development/enhancement of fisheries policies and management plans at national and regional levels.

State and trends of global marine resources and fisheries to develop effective fisheries policies and management plans

High fishing mortality	Not Overfished	Overfished	Overfished	Overfished
Moderate fishing mortality	Not Overfished	Overfished	Overfished	Overfished
No or low fishing mortality	Not Overfished	Overfished	Not Overfished	Overfished
	Pre-exploitation biomass or high abundance	Intermediate abundance	Low abundance	Depleted



## Marine Resource Fact Sheet

Search Print PDF XML

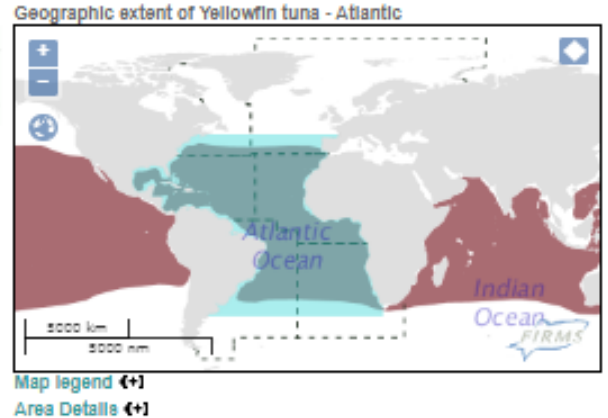
Stock status report 2016  
**Yellowfin tuna - Atlantic**  
*Yellowfin tuna in the Atlantic* Citation

Owned by International Commission for the Conservation of Atlantic Tunas (ICCAT) – [More](#)  
Related observations [Locate in Inventory](#)

Species:  
*Thunnus albacares*



FAO Name: en - Yellowfin tuna, fr - Albacore, es - Rabil, ru - Тунец желтоперый



**Main Descriptors**  
Considered a single stock: Yes Spatial Scale: Regional  
Management unit: Yes Reference year: 2014

**Table of Contents**  
[Water Area Overview](#) - [History](#) - [Habitat and Biology](#) - [Geographical Distribution](#) - [Resource Structure](#) - [Exploitation](#) - [Assessment](#) - [Management](#) - [Biological State and Trend](#) - [Source of information](#)

### Biological State and Trend

State & Trend Descriptors			
	Partner	FIRMS	
Exploitation rate	F2014/FMSY = 0.77 range (0.53-1.05)	Moderate fishing mortality	
Abundance level	B2014/BMSY = 0.95 range (0.71-1.36)	Low abundance	

### History

A stock assessment for yellowfin tuna was conducted in 2016, at which time catch and effort data through 2014 were available. The catch table presented in this Executive Summary has been updated to include reported catches through 2015, including revisions to Ghanaian catches for the period 1973-2014 that have been incorporated since the last assessment. The revisions to Ghanaian yellowfin tuna catches for 2015 are still pending review by the SCRS. Readers interested in more complete summary of the state of the resource available for this stock should consult the detailed

FIRMS supports the need for **easy access to high quality information** for the development/enhancement of fisheries policies and management plans at national and regional levels.





The screenshot shows the 'Stocks and Fisheries Map Viewer' interface. At the top, there are logos for the Food and Agriculture Organization of the United Nations and FIRMS (Fisheries and Resources Monitoring System). The main title is 'Stocks and Fisheries Map Viewer' with a subtitle 'Browse the status of stocks and fisheries inventoried by the FIRMS partners'. On the left, there are navigation controls for projection, zoom, and a sidebar with 'Marine Resources' and 'Marine Fisheries' (the latter is selected). The map displays the Red Sea and Arabian Sea with several fishery icons. A popup window is open over one icon, providing details for 'Qatar Skiffs wire fish trap crab fishery - Gulf Qatari waters'. The popup includes the reporting year (2012), the reporting organization (FAO), the approach (Fishing Activity), fishing activity (Barriers, fences, weirs, etc.), type of production system (Artisanal), fishery area (Gulf Qatari waters; Qatar; Gulf subarea), harvested resource, target species (Marine crabs net), means of production, and vessel type (Other fishing vessels). At the bottom of the popup are icons for location, share, and data table. The bottom of the map shows coordinates (lon: 53.53, lat: 26.20) and a copyright notice (© FAO, 2019).

**Browse up-to-date information on stocks and fisheries**

**At regional level:**

RECOFI-FIRMS is providing the first experience/opportunity of a **web-based information sharing system** on fisheries among RECOFI countries.

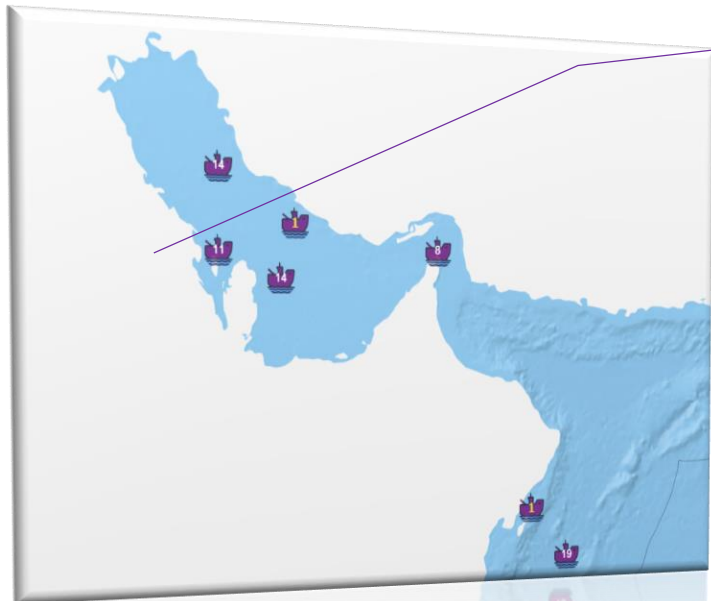
<http://firms.fao.org/firms/stocks-fisheries-map-viewer>

## Assessment of RECOFI-FIRMS reporting status

### 68 published fisheries status reports

Source: FIRMS-RECOFI workshop held in Cairo on July 2009

- The fact sheets, with reporting year = 2012, were produced by **Bahrain** (11), **Iran** (15), **Oman** (28) and **Qatar** (14).
- 37 more estimated from 2011 workshop from **Iraq**, **Kuwait**, **Saudi Arabia** and **UAE**



10 July 2019

**RECOFI Fisheries Reports 2012**  
**Bahrain Skiffs gillnets small pelagics and Spanish mackerel fishery - Gulf Bahraini waters (1-20/40m)**

Owned by Food and Agriculture Organization (FAO) → more»

Related observations

Location of Bahrain Skiffs gillnets small pelagics and Spanish mackerel fishery - Gulf Bahraini waters (1-20/40m)

**APPROACH: FISHERY MANAGEMENT UNIT**

Fishing Activity  
Fishing Gear: Gillnets and entangling nets → more»  
Type of production system: Artisanal  
Fishery Area: Bahraini gulf waters (1 - 20 m and 40 m); Gulf Subarea, Bahrain

Seasonality: All Year

Harvested Resource  
Target Species: Siganiidae; Haribekis net; Needlefishes, etc. net → more»

Means of Production  
Vessel Type: Fishing vessels not specified

Fishery Indicators  
Fleet size: Not specified

Geographic reference: Bahrain  
Spatial Scale: National  
Reference year: 2012

---

**Fishery Fact Sheet**

**RECOFI Fisheries Reports 2012**  
**Iran Dhows trawl shrimp fishery - Gulf Iranian waters**

Owned by Food and Agriculture Organization (FAO) → more»

Related observations

Location of Iran Dhows trawl shrimp fishery - Gulf Iranian waters

**APPROACH: FISHERY MANAGEMENT UNIT**

Fishing Activity  
Fishing Gear: Beam trawls → more»  
Type of production system: Artisanal  
Fishery Area: Gulf Iranian waters; Gulf subarea, Iran (Islamic Rep. of)

Seasonality: About one month...

Harvested Resource  
Target Species: Shrimp shrimp; Kola shrimp; Indian white prawn → more»

Means of Production  
Vessel Type: Shrimp trawlers → more»

Fishery Indicators  
Nominal Effort: Number of vessels  
Employment: Number of fishermen  
Production: Landed Volume

Geographic reference: Iran  
Spatial Scale: National  
Reference year: 2012

Table of Contents  
Fishing Activity - Management - Bibliography

10<sup>th</sup> Session of the Regional Commission for Fisheries (RECOFI)

**RECOFI Fisheries Reports 2012**  
**Oman Artisanal fisheries - Arabian Sea Omani waters**

Owned by Food and Agriculture Organization (FAO) → more»

Related observations

Location of Oman Artisanal fisheries - Arabian Sea Omani waters

**APPROACH: FISHERY MANAGEMENT UNIT**

Jurisdictional framework  
Management Body/Authority(ies): Ministry of Agriculture and Fisheries  
Mandate: Management  
Area under national jurisdiction: Oman  
Maritime Area: Exclusive Economic Zone Areas (EEZ)

Harvested Resource  
Fishery Area: Arabian Sea Omani waters, Oman

Geographic reference: Oman  
Spatial Scale: National  
Reference year: 2012

---

**RECOFI Fisheries Reports 2012**  
**Oman Artisanal skiff shrimp fishery - Arabian Sea Omani waters**

Owned by Food and Agriculture Organization (FAO) → more»

Related observations

Location of Oman Artisanal skiff shrimp fishery - Arabian Sea Omani waters

**APPROACH: FISHERY MANAGEMENT UNIT**

Fishing Activity  
Fishing Gear: → more»  
Type of production system: Artisanal  
Fishery Area: Arabian Sea Omani waters, Oman

Seasonality: September to December

Harvested Resource  
Target Species: Green tiger prawn; Indian white prawn

Means of Production  
Vessel Type: Other fishing vessels

Fishery Indicators  
Nominal Effort: Number of vessels  
Employment: Number of fishermen  
Production: Landed Volume

Geographic reference: Oman  
Spatial Scale: National  
Reference year: 2012

Rome, Italy



Indicators/topics	RECOFI Minimum data requirements	FIRMS inventory
Priority species data	✓	
Nb Vessel / type / size (for shrimp trawler fisheries)	✓	✓
Catch & Effort / priority species – sp. group / country & EEZ / GearType / [----- Fishing unit -----]	✓	✓
Discard data, Seasonal data	✓	✓
Vessel and gear information	✓	✓
Management Measures	✓	✓
other socio-economic	✓	✓
Stock status and Scientific Advices		✓

FIRMS inventories,

if properly articulated with the RECOFI MDR database,

can provide a powerful analytical and reporting structure in support to resource assessments and fishery management.

Fact sheet



## Fisheries Management

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- socio-economics and livelihoods benefits

Reference list fishing units

## Policies - Economic importance

SOFIA

Monitoring  
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FishStatJ

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Capture  
Production  
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DATA STATISTICS INFORMATION ASSETS



RECOFI MDR  
Catch & Effort statistics

Stock  
Assessment  
toolbox

## Status of fishery resources

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- Health of Fishery resources

Reference list of stocks

Individual stock status



Fact sheet



## ... and how FAO can support

- Discrepancies in reported total
- Multiple reporting:
  - redundancies?
  - Consistency across databases ?
  - Doesn't reporting burden undermine some of these data sets?
- No agreed upon Data submission formats
- No functional regional database
- No capacity to disseminate and exchange



## Multiple reporting:

- redundancies?
- Consistency across databases ?
- Doesn't reporting burden undermine some of these data sets?

Indicators/topics	FAO Global	FAO RECOFI Regional	RECODI Minimum data requirements
Capture / all species / country / FAO statistical areas	✓		
Capture / all species / country / FAO statistical sub-areas		✓	
Priority species data			✓
Catch & Effort / priority species – groups / country & EEZ / GearType / [----- Fishing unit -----]			✓
Discard data, Seasonal catch data			✓



## Discrepancies in reported total

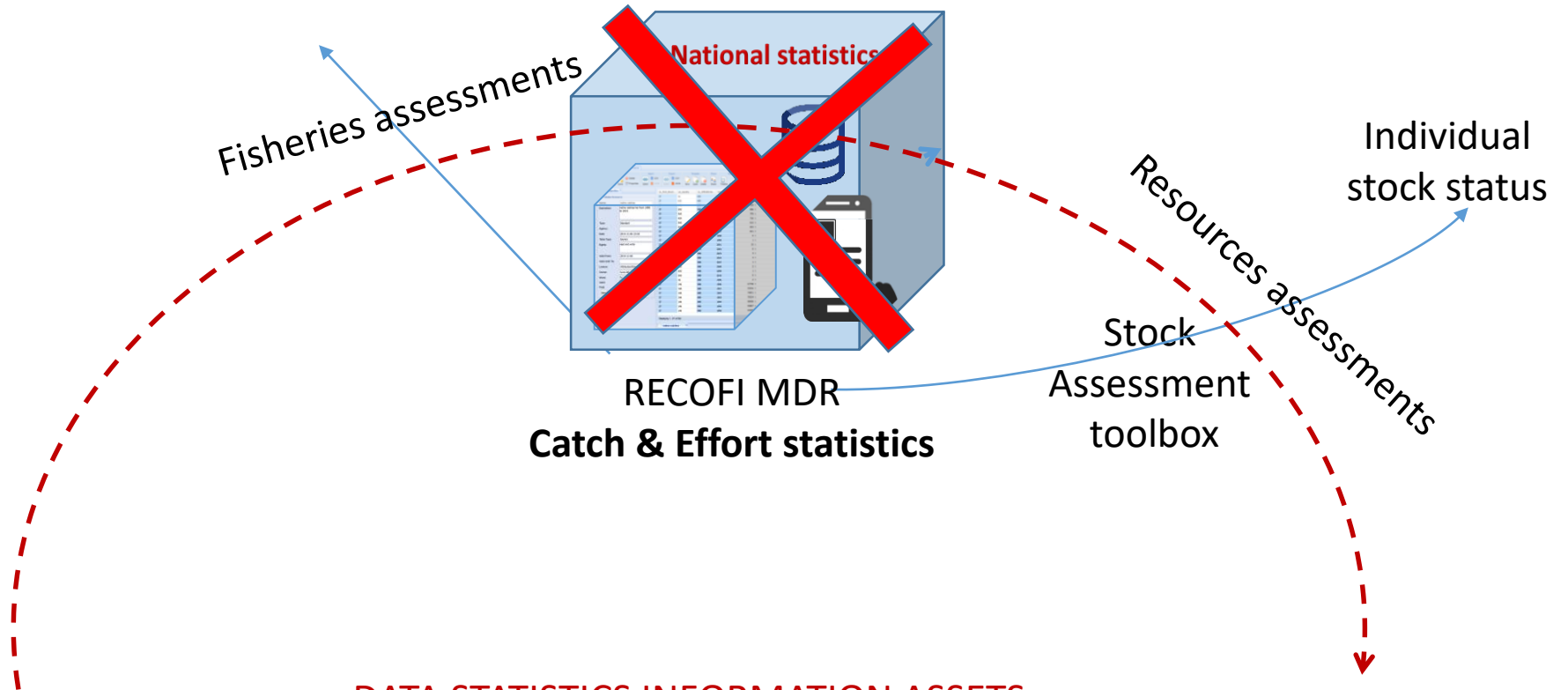
Coverage in Catch amount [Min Data reporting]/[Regional Capture production DB]

	Bahrain	Iraq	Iran	Oman	Qatar	Saudi Arabia
<b>Total catch</b>	100%	38%	54%	99%	132%	92%
<b>Shrimp</b>	100%	100%	89%	97%	n.a.	85%
<b>Kingfishes</b>	100%	-	93%	105%	126%	67%
<b>Groupers</b>	100%	-	82%	84%	121%	119%
<b>Emperors</b>	100%	-	76%	327%	366%	122%



# Issues and gaps in RECOFI - MDR

- No agreed upon Data submission formats**
- No functional regional database**
- No capacity to disseminate and exchange**





## ... How can FAO support

- **CWP** - FAO body in charge of setting fishery statistical standard

Best practices for streamlined data flows

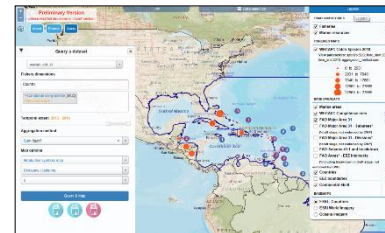
CWP Reference Harmonization Standard for:

→ Capture production, Catch, Catch and Effort

- **Regional standards** - Technical support to the development of regional

Data Collection Reference Framework – GFCM, WECAFC experiences

- FAO can make available the **infrastructure for a Regional Database**



- FAO provides **capacity building** for statistical data collection and national information systems



Concepts



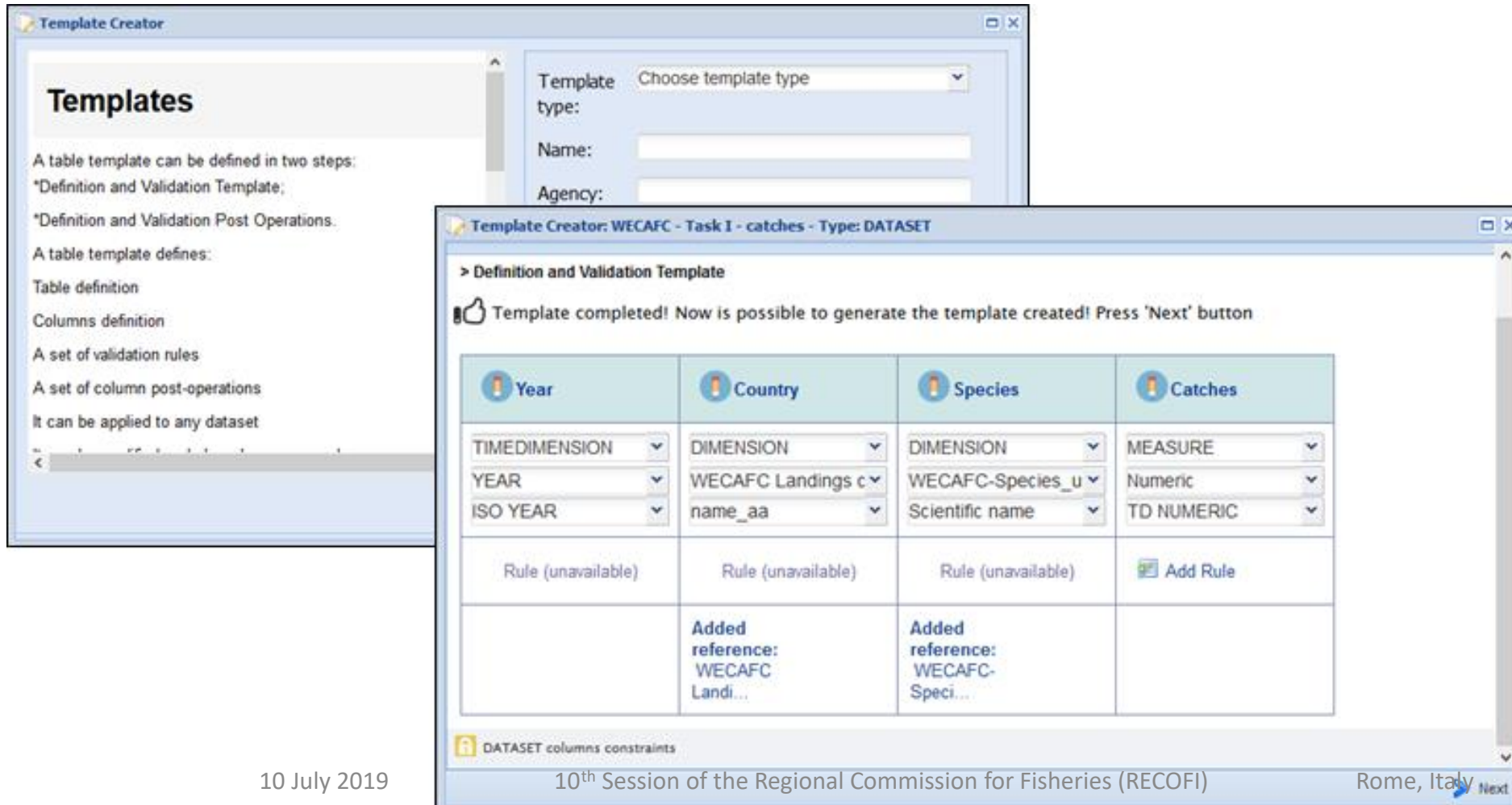
Methodologies



Classifications



## FAO can make available the infrastructure for a Regional Database - a series of tools developed to support reporting and publication



**Template Creator**

Template: Choose template type  
type:  
Name:  
Agency:

**Templates**

A table template can be defined in two steps:  
\*Definition and Validation Template;  
\*Definition and Validation Post Operations.

A table template defines:  
Table definition  
Columns definition  
A set of validation rules  
A set of column post-operations  
It can be applied to any dataset

**Template Creator: WECAFC - Task I - catches - Type: DATASET**

> Definition and Validation Template

👍 Template completed! Now is possible to generate the template created! Press 'Next' button

Year	Country	Species	Catches
TIMEDIMENSION	DIMENSION	DIMENSION	MEASURE
YEAR	WECAFC Landings c	WECAFC-Species_u	Numeric
ISO YEAR	name_aa	Scientific name	TD NUMERIC
Rule (unavailable)	Rule (unavailable)	Rule (unavailable)	Add Rule
	Added reference: WECAFC Landi...	Added reference: WECAFC-Speci...	

DATASET columns constraints

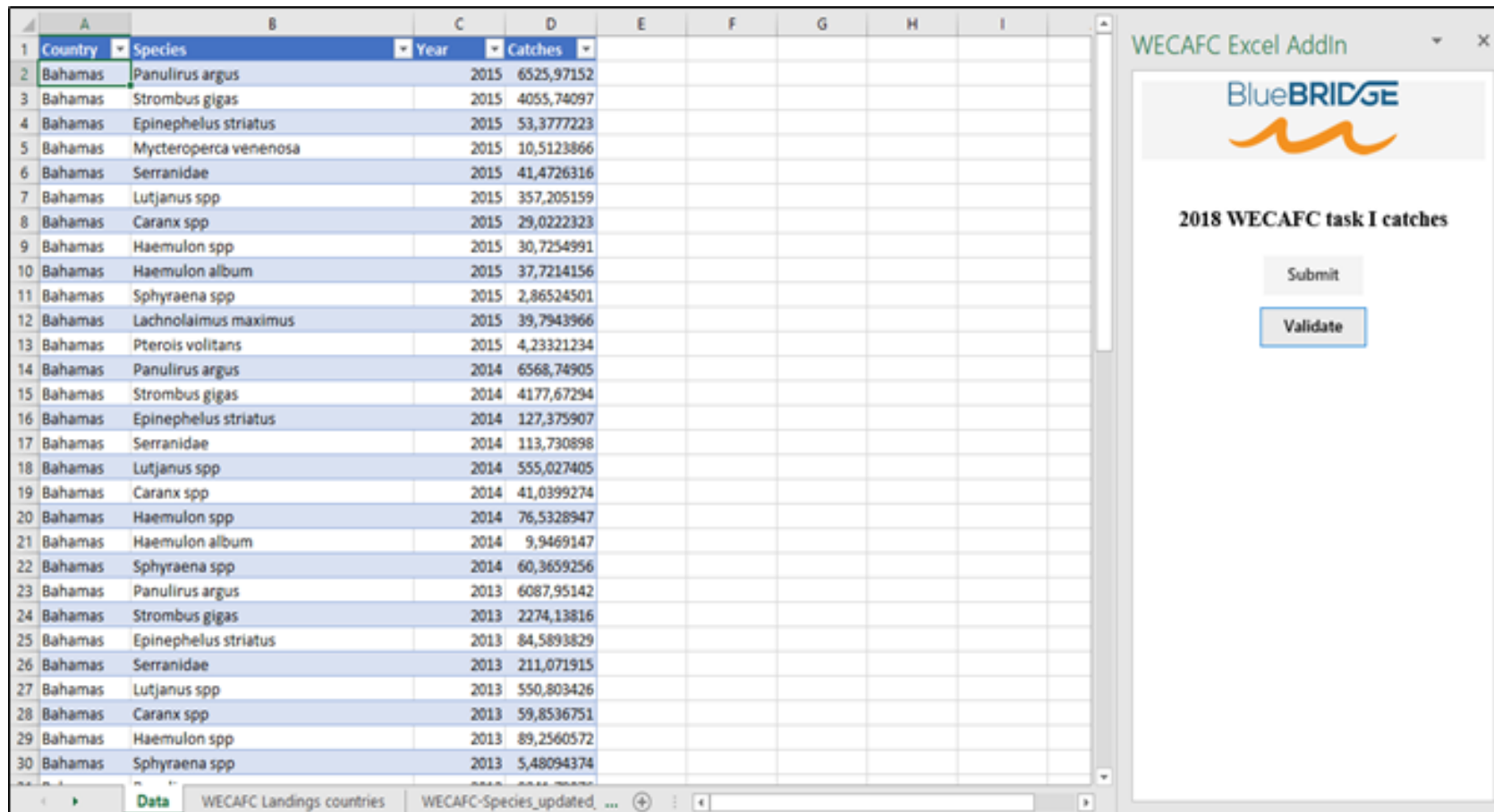
10<sup>th</sup> Session of the Regional Commission for Fisheries (RECOFI) Rome, Italy

### Regional data manager

- 1- Creates a template according to the agreed format (Commission recommendations, Species Working group templates)
- 2- Creates the data call or collection

FAO can make available the infrastructure for a Regional Database

- simple to use data exchange formats



Country	Species	Year	Catches
Bahamas	Panulirus argus	2015	6525,97152
Bahamas	Strombus gigas	2015	4055,74097
Bahamas	Epinephelus striatus	2015	53,3777223
Bahamas	Mycteroperca venenosa	2015	10,5123866
Bahamas	Serranidae	2015	41,4726316
Bahamas	Lutjanus spp	2015	357,205159
Bahamas	Caranx spp	2015	29,0222323
Bahamas	Haemulon spp	2015	30,7254991
Bahamas	Haemulon album	2015	37,7214156
Bahamas	Sphyraena spp	2015	2,86524501
Bahamas	Lachnolaimus maximus	2015	39,7943966
Bahamas	Pterois volitans	2015	4,23321234
Bahamas	Panulirus argus	2014	6568,74905
Bahamas	Strombus gigas	2014	4177,67294
Bahamas	Epinephelus striatus	2014	127,375907
Bahamas	Serranidae	2014	113,730898
Bahamas	Lutjanus spp	2014	555,027405
Bahamas	Caranx spp	2014	41,0399274
Bahamas	Haemulon spp	2014	76,5328947
Bahamas	Haemulon album	2014	9,9469147
Bahamas	Sphyraena spp	2014	60,3659256
Bahamas	Panulirus argus	2013	6087,95142
Bahamas	Strombus gigas	2013	2274,13816
Bahamas	Epinephelus striatus	2013	84,5893829
Bahamas	Serranidae	2013	211,071915
Bahamas	Lutjanus spp	2013	550,803426
Bahamas	Caranx spp	2013	59,8536751
Bahamas	Haemulon spp	2013	89,2560572
Bahamas	Sphyraena spp	2013	5,48094374

The screenshot shows an Excel spreadsheet with columns for Country, Species, Year, and Catches. The data is for Bahamas from 2013 to 2015. A 'WECAFC Excel Addin' window is open on the right, displaying the BlueBRIDGE logo and the text '2018 WECAFC task I catches'. It has two buttons: 'Submit' and 'Validate'.

## National data manager

- Uses the Excel plugin to upload, validate and publish data in the Regional Database for the selected call



## FAO can make available the infrastructure for a Regional Database

### - Publishing data

### Regional data manager

- Validate or reject the published data

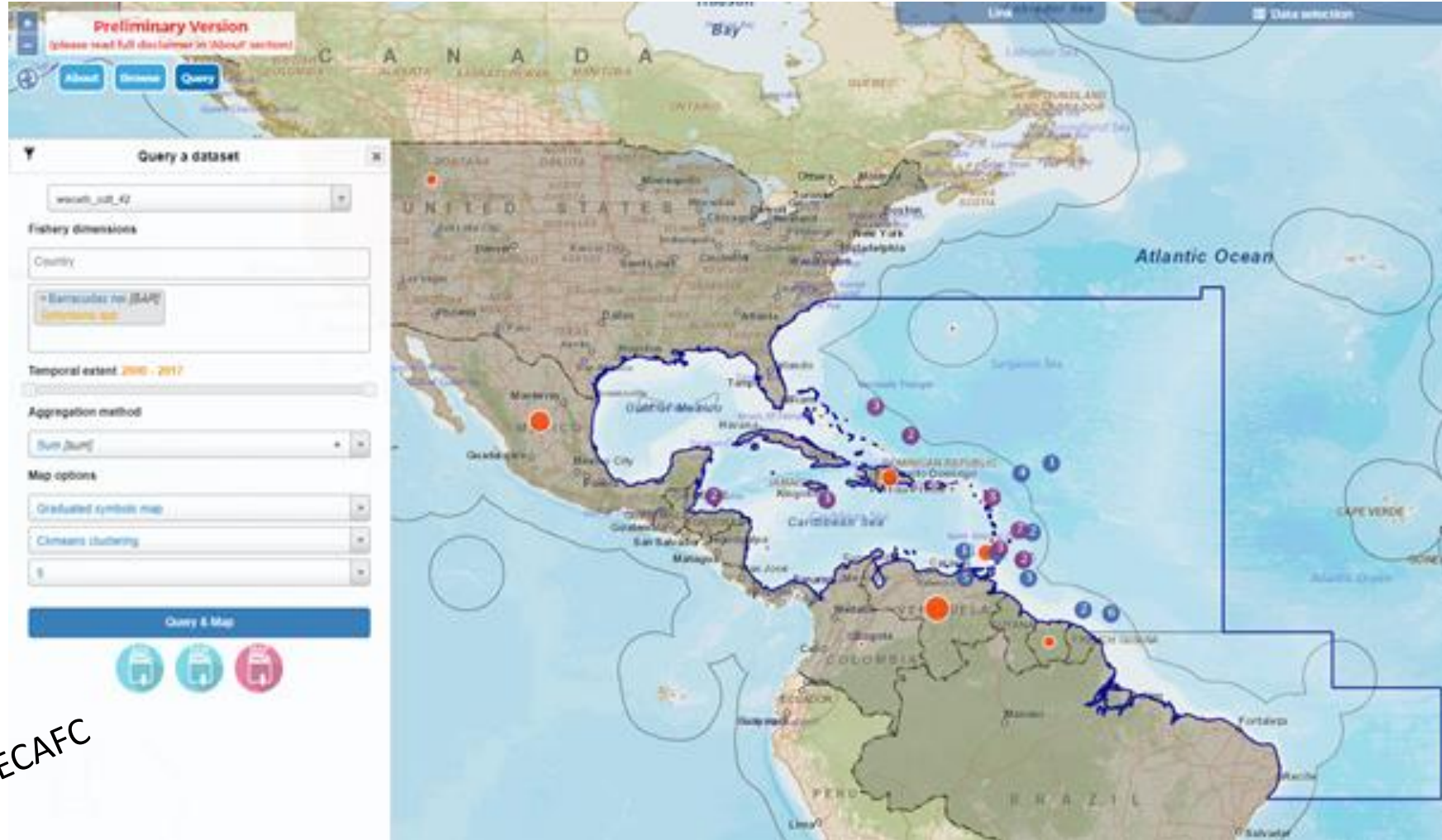
The screenshot displays the 'Regional data manager' interface. At the top, there are four main navigation tabs: 'Data Collections' (Manage data collections), 'Data Submissions' (Manage data submissions), 'Data Models' (Manage data models), and 'Users' (Manage users). Below these, a dropdown menu shows 'Data Collection: WECAFC task I Catches'. A toolbar contains several actions: 'View selected', 'View all', 'Approve', 'Reject', 'Export selected as CSV', 'Export all as CSV', and 'Export all to TabMan'. A search bar is located on the right side of the toolbar. Below the toolbar is a table with the following columns: 'Author', 'Status', 'Submitted At', and 'Completed At'. The table contains three entries:

Author	Status	Submitted At	Completed At
Edison Deleveaux	TEMPORARY		
FAO	VALIDATED		
Grenada	TEMPORARY		

Showing 1 to 3 of 3 entries

## FAO can make available the infrastructure for a Regional Database

### - Publishing data



**National data manager**

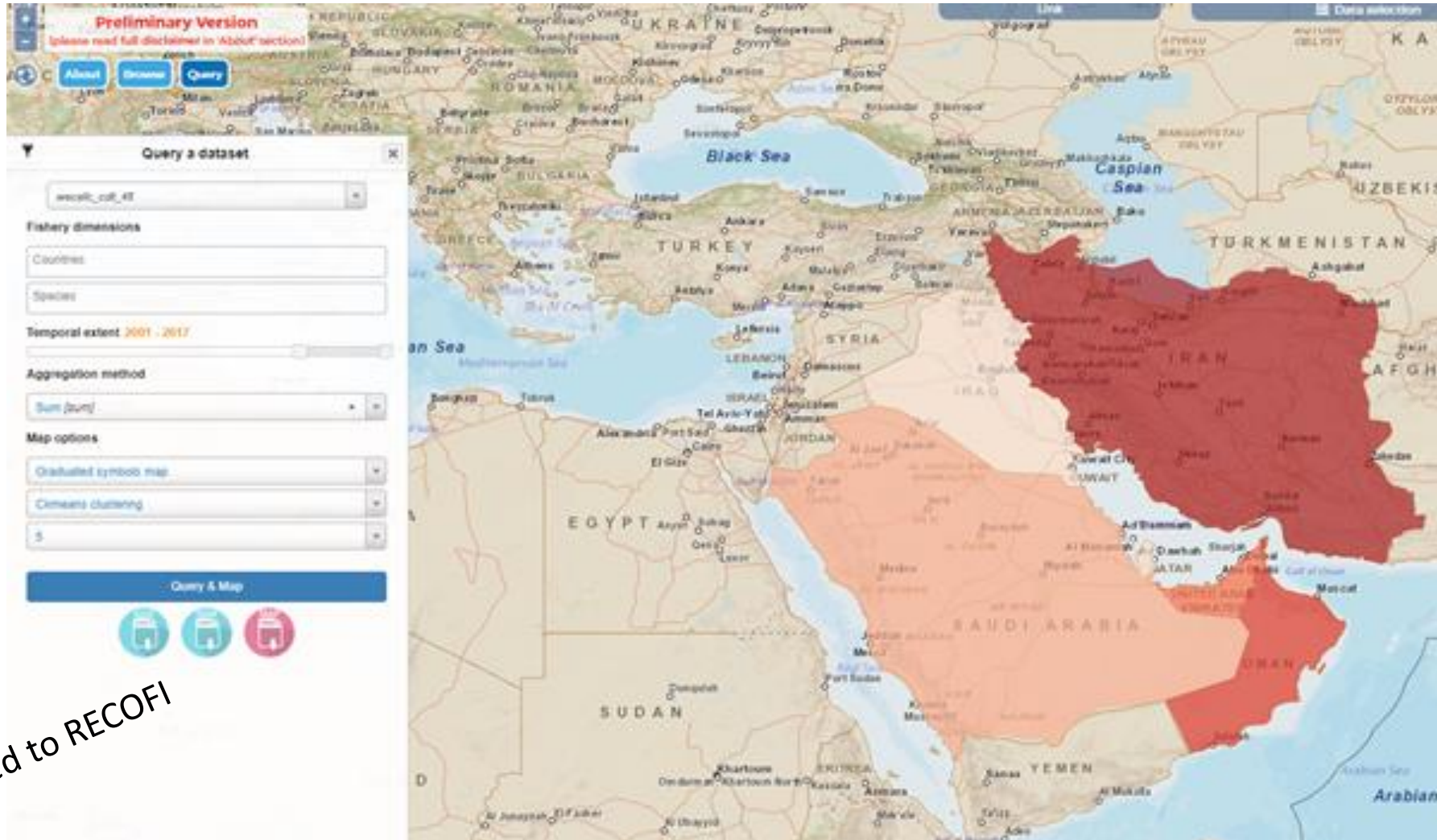
- Can view the data in the on-line viewer

WECAFC



## FAO can make available the infrastructure for a Regional Database

### - Publishing data



### National data manager

- Can view the data in the on-line viewer

Adapted to RECOFI



## Fisheries inventories

- **Not updated, incomplete**
- **Weak ownership**
- **No active network of RECOFI-FIRMS National Focal Points;**

## Marine resources inventory

- **inventory of stocks still to start,**
- **Lack of regional leadership**
- **Policy driver incentive missing ?**



## ... How can FAO support

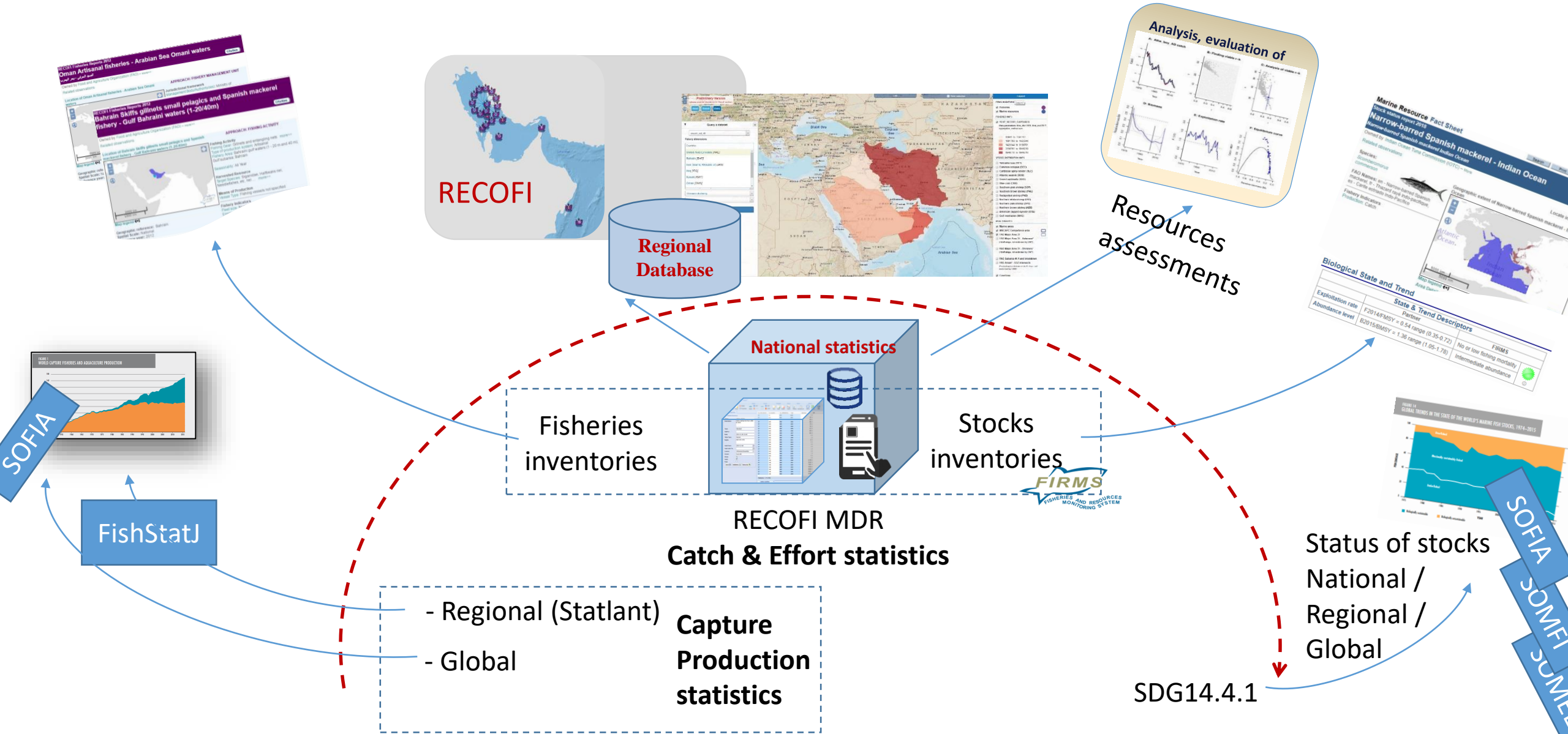
- ToRs now available for RECOFI-FIRMS Regional Focal Point
- With FIRMS Secretariat support:
  - Inventory could be initiated for stocks assessed at regional level in the RECOFI area during the past ten years
- Capacity building in relation with SDG Indicator 14.4.1
  - SDG14.4.1 could be policy framework incentive to help develop Reference list of stocks at national level, aware of RECOFI priority species, and noting that RECOFI-FIRMS can support dissemination on the SDG Indicator 14.4.1

### **An opportunity to get started with SDG14.4.1 reporting?**





# A comprehensive monitoring system is achievable





# Thank You



Data  
standards



Partnerships for New technologies  
data sharing and platforms



[www.fao.org/fishery](http://www.fao.org/fishery)