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Global Standard for Responsible Supply of Marine Ingredients

Fishery Assessment Methodology and Template Report

Version No.: 2.0 **Date:** July 2017

Fishery Under Assessment	Mauritanian Small Pelagics - Purse seine
Date	10 March 2018
Assessor	Tom Evans

Application details and summary of the assessment outcome				
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Certification Body Details				
Name of Certification Body:		IFFO RS v2		
Assessor Name	**Peer Reviewer**	**Assessment Days**	**Initial/Surveillance / Re-approval**	**Whole fish / By-product**
Tom Evans	Jo Gascoigne	na	na	na
Assessment Period	na			

Scope Details	
Management Authority (Country/State)	Mauritania
Main Species	Round Sardinella (*S.aurita*) Cunene horse mackerel (*T.trecae*) Flat Sardinella (*S.maderensis*) Chub mackerel (*S.japonicus*) European Pilchard (*S.pilchardus*) Atlantic Horse Mackerel (*T.trachurus*) Bonga Shad (*Ethmalosa fimbriate*)
Fishery Location	Area 34
Gear Type(s)	Purse Seine
Outcome of Assessment	
Overall Outcome	Fail
Clauses Failed	M2 - Management B – Round Sardinella B - Cunene horse Mackerel B – Flat Sardinella B – Chub Mackerel B - Atlantic Horse Mackerel B – Bonga Shad D- False Scad F1, F3 - Environment
Peer Review Evaluation	
Recommendation	

Assessment Determination
Peer Review Comments
Notes for On-site Auditor

Note: This table should be completed for whole fish assessments only.

General Results

General Clause	Outcome (Pass/Fail)
M1 - Management Framework	Pass
M2 - Surveillance, Control and Enforcement	Fail
F1 - Impacts on ETP Species	Fail
F2 - Impacts on Habitats	Pass
F3 - Ecosystem Impacts	Fail

Species-Specific Results

Category	Species	% landings (2014-2016)	Outcome (Pass/Fail)
Category B	Round sardinella (*Sardinella aurita)*	36.2	Fail
Category B	Cunene horse mackerel (*Trachurus trecae*)	22.2	Fail
Category B	Flat sardinella (*Sardinella maderensis*)	11.1	Fail
Category B	Chub mackerel (*Scomber japonicus*)	9.3	Fail
Category B	European Pilchard (*Sardina pilchardus*)	8.5	Pass
Category B	Atlantic Horse Mackerel (*Trachurus trachurus*)	7.0	Fail
Category B	Bonga Shad (*Ethmalosa fibricata*)	5.2	Fail
Category D	False Scad (*Caranx rhonchus*)	0.3	Fail
Category D	European Anchovy (*Engraulis encrasicolus*)	0.2	Pass

[List all Category A and B species. List approximate total % age of landings which are Category C and D species; these do not need to be individually named here]

HOW TO COMPLETE THIS ASSESSMENT REPORT

This assessment template uses a modular approach to assessing fisheries against the IFFO RS standard.

Whole Fish

The process for completing the template for a **whole fish** assessment is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table, to determine which categories of species are present in the fishery.
2. ALL ASSESSMENTS: Complete clauses M1, M2, M3: Management.
3. IF THERE ARE CATEGORY A SPECIES IN THE FISHERY: Complete clauses A1, A2, A3, A4 for **each** Category A species.
4. IF THERE ARE CATEGORY B SPECIES IN THE FISHERY: Complete the Section B risk assessment for **each** Category B species.
5. IF THERE ARE CATEGORY C SPECIES IN THE FISHERY: Complete clause C1 for **each** Category C species.
6. IF THERE ARE CATEGORY D SPECIES IN THE FISHERY: Complete Section D.
7. ALL ASSESSMENTS: Complete clauses F1, F2, F3: Further Impacts.

A fishery must score a pass in **all applicable clauses** before approval may be recommended. To achieve a pass in a clause, the fishery/species must meet **all** of the minimum requirements.

By-products

The process for completing the template for **by-product raw material** is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table with the names of the by-product species and stocks under assessment. The '% landings' column can be left empty; all by-products are considered as Category C and D.
2. IF THERE ARE CATEGORY C BYPRODUCTS UNDER ASSESSMENT: Complete clause C1 for **each** Category C by-product.
3. IF THERE ARE CATEGORY D BYPRODUCTS UNDER ASSESSMENT: Complete Section D.
4. ALL OTHER SECTIONS CAN BE DELETED. Clauses M1 - M3, F1 - F3, and Sections A and B do not need to be completed for a by-product assessment.

By-product approval is awarded on a species-by-species basis. Each by-product species scoring a pass under the appropriate section may be approved against the IFFO RS Standard.

SPECIES CATEGORISATION

The following table should be completed as fully as the available information permits. Any species representing more than 0.1% of the annual catch should be listed, along with an estimate of the proportion of the catch each species represents. The species should then be divided into Type 1 and Type 2 as follows:

- **Type 1 Species** can be considered the 'target' or 'main' species in the fishery. They make up the bulk of annual landings and are subjected to a detailed assessment.
- **Type 2 Species** can be considered the 'bycatch' or 'minor' species in the fishery. They make up a small proportion of the annual landings and are subjected to relatively high-level assessment.

Type 1 Species must represent 95% of the total annual catch. Type 2 Species may represent a maximum of 5% of the annual catch (see Appendix B).

Species which make up less than 0.1% of landings do not need to be listed (NOTE: ETP species are considered separately). The table should be extended if more space is needed. Discarded species should be included when known.

The 'stock' column should be used to differentiate when there are multiple biological or management stocks of one species captured by the fishery. The 'management' column should be used to indicate whether there is an adequate management regime specifically aimed at the individual species/stock. In some cases it will be immediately clear whether there is a species-specific management regime in place (for example, if there is an annual TAC). In less clear circumstances, the rule of thumb should be that if the species meets the minimum requirements of clauses A1-A4, an adequate species-specific management regime is in place.

NOTE: If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in the CITES appendices, it **cannot** be approved for use as an IFFO RS raw material. This applied to whole fish as well as by-products.

TYPE 1 SPECIES (Representing 95% of the catch or more)

Category A: Species-specific management regime in place.

Category B: No species-specific management regime in place.

TYPE 2 SPECIES (Representing 5% OF THE CATCH OR LESS)

Category C: Species-specific management regime in place.

Category D: No species-specific management regime in place.

Common name	Latin name	Stock	% of landings (2014-2016) *	Management	Category
Round Sardinella	*S. aurita*	FAO Area 34 - NW Africa	816,000t 36.2%	Management measures are not species specific.	Type 1 Category B
Cunene horse mackerel	*T.trecae*	FAO Area 34 - NW Africa	500,000t 22.2%	Management measures are not species specific.	Type 1 Category B
Flat Sardinella	*S. maderensis*	FAO Area 34 - NW Africa	251,100t 11.1%	Management measures are neither species nor stock specific.	Type 1 Category B
Chub mackerel	*S. japonicus*	FAO Area 34 - NE Atlantic	210,000t 9.3%	Management measures are neither species nor stock specific.	Type 1 Category B
European Pilchard	*S. pilchardus*	FAO Area 34 - NW African Southern Stock	192,000t 8.5%	Management measures are not species specific.	Type 1 Category B
Atlantic Horse Mackerel	*T. trachurus*	FAO Area 34 - NW Africa	157,900t 7.0%	Management measures are not species specific.	Type 1 Category B
Bonga Shad	*E. fimbriata*	FAO Area 34 - NW Africa	118,300t 5.2%	Management measures are not stock specific.	Type 1 Category B
False Scad	*C. rhonchus*	FAO Area 34 - NW Africa	6,800t 0.3%	Management measures are not stock specific.	Type 2 Category D
European Anchovy	*E. encrasicolus*	FAO Area 34 - NW Africa	4,400t 0.2%	Management measures are not stock specific.	Type 2 Category D
		Total	2,256,500t 100%		

* *Data taken from the 2016 Artisanal and semi industrial fleet.*

MANAGEMENT

The two clauses in this section relate to the general management regime applied to the fishery under assessment. A fishery must meet all the minimum requirements in every clause before it can be recommended for approval.

M1	Management Framework – Minimum Requirements		
	M1.1	There is an organisation responsible for managing the fishery	Y
	M1.2	There is an organisation responsible for collecting data and assessing the fishery	Y
	M1.3	Fishery management organisations are publically committed to sustainability	Y
	M1.4	Fishery management organisations are legally empowered to take management actions	Y
	M1.5	There is a consultation process through which fishery stakeholders are engaged in decision-making	Y
	M1.6	The decision-making process is transparent, with processes and results publically available	Y
		Clause outcome:	Pass

Evidence

The organisation responsible for managing the fishery and collecting data is the Ministry of Fisheries and the Marine Economy, who is legally empowered to put in place management measures as required to meet fishery objectives. The Institut Mauritanien de Recherche Océanographique et des Pêches (IMROP) analyses the data and provides scientific advice. At a regional level, stock assessments are carried out by CECAF (COPACE), a FAO working group made up of regional scientists.

In Mauritania, the former Act no. 2000-025 of 24/01/2000, initially establishing the fisheries code amended and supplemented by Edict no. 2007-022 of 09/04/2007 and numerous enforcement decrees, was in large part replaced by Act no. 017·2015 of 29 July 2015 establishing the Fisheries Code and its enforcement decree no. 2015-159. These texts make several mentions of the concern of sustainable management of Mauritanian fisheries and fishing resources, as well as of the ecosystems that accommodate these resources. They mention the need for representation of the governmental and nongovernmental organisations concerned by fisheries conservation and management, such as the Local Advisory Committees (CCLs, no longer operating), the Fisheries Management Support Commission (CAAP, created by Order 0951 dated 22 May 2012), the National Consultation Commission for the sustainable management of Small Pelagics (CNC-PP, created by Order no.950/MPEM of 22 May 2012) and the National Advisory Council for Fisheries Management and Development (CCNADP, established in 2004 as part of Act no. 2000-025 establishing the Fisheries Code). The strategic vision is defined in the five-year plans, the latest being the document on the National Responsible Management Strategy for Sustainable Development of Fisheries and the Marine Economy 2015-2019 (MPEM, 2015).

These texts and the management procedures are transparent and available for the public (website of the Ministry of Fisheries and the Marine Economy http ://www.peches.gov.mr/-textes-juridiques-). This documentation establishes specific measures for pelagic fisheries management, although in practice the essential measures, the implementation of quotas scheduled for 2016, are not applied or are only partially applied. This is notably the case with the artisanal and coastal fishing of small pelagics, with industrial deep-sea fishing demonstrating far better application. There is, however, some evidence that it is not effective at ensuring conservation of the stocks, due to lack of legal power but this is to be

demonstrated further before scoring M1.4 as a fail.

These measures concern both national fleets and foreign fleets operating in Mauritanian waters. Lastly, note that enforcement decree no. 2015-159 explicitly prohibits the use of explosives, poisons and other practices that destroy the habitat and stocks.

In conclusion, an administrative framework is well-established to effectively manage fisheries to ensure their conservation, meeting the basic requirements listed above.

References

Association pour la Promotion et la Responsabilisation des Acteurs de la Pêche Artisanale Maritime, website, accessed: https://www.aprapam.org/2015/07/27/le-code-de-la-peche-maritime-de-2015 / CAAP, created by Order 0951 dated 22 May 2012
MPEM, 2015

Standard clauses 1.3.1.1, 1.3.1.2

M2	Surveillance, Control and Enforcement - Minimum Requirements		
	M2.1	There is an organisation responsible for monitoring compliance with fishery laws and regulations	Y
	M2.2	There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken	Y
	M2.3	There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing	N
	M2.4	Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.	N
		Clause outcome:	Fail

Evidence

In Mauritania, there is an organisation responsible for monitoring compliance by the Ministry of Mauritania with support from the Mauritanian Coast Guard. The control and rules execution system are explicitly included and detailed in the legal texts, particularly in Decree 2015-159 (Section 7: The amendment of penalties within the limits provided for by law; Section 8: Penalties applicable to breaches of the provisions of the present decree). Examples in the case of deep-sea pelagic fishing include the monitoring of landings (prohibition of transhipments), the mandatory presence of observers, the obligation to have a satellite monitoring system (VMS) and to make daily reports on fishing operations (in this case research trawls) and catches per species, and the obligation to have licences. The Mauritanian Coast Guard conducts the control and monitoring of fisheries in principle. It has resources at sea, both on the high sea and in coastal areas. It can also mobilise the air force's aerial resources and the dispatch boats of the National Navy for control and/or inspection missions. Furthermore, industrial fishing vessels must submit a counterfoil of their fishing logbook before leaving Mauritanian waters. Vessel entry and exit points are controlled. Transhipments (now prohibited at sea in the case of fishing products) are also conducted in the presence of the Mauritanian Coast Guard. In addition, there is monitoring of the artisanal fleet, at the level of the Directorate of Artisanal and Coastal Fisheries, which is strictly based on licence applications. When licences are established, data on the fishing capacity and the technical characteristics of boats are collected (type and power of the engine, fishing gear, landing site, number of crew members). There is also monitoring by the IMROP of catches during landings at certain sites and controls conducted by the Delegation for Fisheries Monitoring and Control at Sea (DSPCM) (Ould Taleb Sidi et al., 2010). For example, within the Baie du Repos Port Establishment (EPBR), the DSPCM has introduced controls on entries and exits of boats by issuing fishing zone exit vouchers. By conducting standard surveillance (patrol boats and dispatch boats) and electronic surveillance (radars), the DSPCM manages to delimit each fishing segment in the zone assigned to it, which has resulted in a limitation of usage conflicts and a decrease in incidents at sea.

However, this control system does not always function effectively, and it is regularly criticised by various NGOs. The system is very poorly applied to artisanal and coastal fishing, with many vessels undoubtedly conducting illegal fishing. The same is true of the control of rules applied to fish meal factories. The department regularly highlights shortcomings in the establishment and regulation of the technical characteristics of fishing gear (sizes, meshes, number of nets in a series, etc.) used by the various fleets. The necessities and methods for improving the current situation are included in the ministerial document "National Responsible Management Strategy for Sustainable Development in Fisheries and the Maritime Economy 2015-2019". There is also the question of regional coordination. Fishing vessels operating illegally in Mauritania or their neighbours (most likely Senegal) can seek refuge in another country to escape on-board controls. Better regional coordination of maritime surveillance, strengthened by active collaboration between the four countries' Customs Departments, would effectively combat IUU (illegal, unreported and unregulated) fishing, which does not appear to be completely eradicated in the region, except possibly in Morocco (e.g. Ndiaye, 2014; http://www.hubrural.org/Senegal-Pechesillicites-

non.html).

In conclusion, it can be considered that a system to manage fisheries control and the execution of rules is well-established, but it is not efficient or effective, hence the fail score for M2.3 and M2.4.

References

Ndiaye, 2014; Website: http://www.hubrural.org/Senegal-Pechesillicites-non.html

Ould Taleb Sidi M., Ould A.K Souleimane, Ba S.A and M.E Ould Abderahmane – 2010: Comparative study of the regulation of marine fisheries in the North-West Africa zone (Morocco - Mauritania - Senegal), 2010, 34 pages

Standard clause 1.3.1.3

CATEGORY A SPECIES

There are no Category A species.

CATEGORY B SPECIES

Category B species are those which make up greater than 5% of landings in the applicant raw material, but which are not subject to a species-specific research and management regime sufficient to pass all Category A clauses. If there are no Category B species in the fishery under assessment, this section can be deleted.

Category B species are assessed using a risk-based approach. The following process should be completed once for each Category B species.

If there are estimates of biomass (B), fishing mortality (F), and reference points

It is possible for a Category B species to have some biomass and fishing mortality data available. When sufficient information is present, the assessment team should use the following risk matrix to determine whether the species should be recommended for approval.

Table B(a) - F, B and reference points are available

Biomass is above MSY / target reference point	Pass	Pass	Pass	Fail	Fail
Biomass is below MSY / target reference point, but above limit reference point	Pass, but re-assess when fishery removals resume	Pass	Fail	Fail	Fail
Biomass is below limit reference point (stock is overfished)	Pass, but re-assess when fishery removals resume	Fail	Fail	Fail	Fail
Biomass is significantly below limit reference point (Recruitment impaired)	Fail	Fail	Fail	Fail	Fail
	Fishery removals are prohibited	**Fishing mortality is below MSY or target reference point**	**Fishing mortality is around MSY or target reference point, or below the long-term average**	**Fishing mortality is above the MSY or target reference point, or around the long-term average**	**Fishing mortality is above the limit reference point or above the long-term average (Stock is subject to overfishing)**

If the biomass / fishing pressure risk assessment is not possible

Initially, the resilience of each Category B species to fishing pressure should be estimated using the American Fisheries Society procedure described in Musick, J.A. (1999). This approach is used as the resilience values for many species and stocks have been estimated by FishBase, and are already available online. For details of the approach, please refer to Appendix A. Determining the resilience provides a basis for estimating the risk that fishing may pose to the long-term sustainability of the stock. Table B(b) should be used to determine whether the species should be recommended for approval.

Table B(b) - No reference points available. B = current biomass; Bav = long-term average biomass; F = current fishing mortality; Fav = long-term average fishing mortality.

$B > B_{av}$ and $F < F_{av}$	Pass	Pass	Pass	Fail
$B > B_{av}$ and F or F_{av} unknown	Pass	Pass	Fail	Fail
$B = B_{av}$ and $F < F_{av}$	Pass	Pass	Fail	Fail
$B = B_{av}$ and F or F_{av} unknown	Pass	Fail	Fail	Fail
$B > B_{av}$ and $F > F_{av}$	Pass	Fail	Fail	Fail
$B < B_{av}$	Fail	Fail	Fail	Fail
B unknown	Fail	Fail	Fail	Fail
Resilience	**High**	**Medium**	**Low**	**Very Low**

Assessment Results

Round sardinella		
B1	Species Name	*Sardinella aurita*
	Table used (Ba, Bb)	Ba
	Outcome	Fail

Evidence

The most recent publicly-available CECAF assessment for round sardinella was in 2017 (FAO, 2017). The working group tried various assessment approaches, but data were insufficient to carry out an assessment in all cases. In 2015, CECAF succeeded in assessing the stock using length-frequency data from catches sampled during 2012-2014, with a length cohort (LCA) model and yield per recruit analysis to estimate fishing mortality (FAO, 2016). The result from this assessment indicated fishing mortality (F) to be 250% above the reference point (F0.1), reflecting an overexploited status for the *S.aurita* stock. Application of a catch curve analysis supported this result.

In other words, fishing mortality is unknown but likely to be significantly above the target level (F0.1). Under Table B(a), this results in a fail.

References

FAO, 2016. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Casablanca, Morocco, 20-25 July 2015. FAO Fisheries and Aquaculture Report No. 1122. Rome, Italy.

FAO, 2017. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Nouadhibou, Mauritania, 22-27 May 2017. FAO Fisheries and Aquaculture Report No. R1221. Rome, Italy.

Standard clauses 1.3.2.1 - 1.3.2.4

Cunene horse mackerel		
B1	Species Name	*Trachurus trecae*
	Table used (Ba, Bb)	Ba
	Outcome	Fail

Evidence

Cunene horse mackerel (*Trachurus trecae*) is the most important species of horse mackerel reported in the catches, constituting about 9 percent (approximately 236 000 tonnes) of the total catch of the main small pelagic fish in 2016 across the whole region (FAO, 2017). The Working Group continues to assume that each of the two horse mackerel species in the region is a single stock, since data on stock identity are not available. In 2016, no coordinated regional survey to assess the small pelagic resources was conducted in the sub-region.

CECAF estimated stock status for *T. trecae* using a Schaefer model fit to Russian CPUE in Mauritanian waters (FAO, 2017). Biomass was estimated at is at 76% of the biomass target reference point B0.1. The current fishing mortality was estimated to be 9% higher than the one producing a maximum sustainable yield (FMSY) and exceeds by 21 percent the fishing mortality at F0.1. Despite a small improvement in stock abundance of Cunene horse mackerel in 2016 (Russian CPUEs standardised), the results again show that the stock of Cunene horse mackerel is overexploited so fails the clause B1.

References

FAO, 2017. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Nouadhibou, Mauritania, 22-27 May 2017. FAO Fisheries and Aquaculture Report No. R1221. Rome, Italy.

Standard clauses 1.3.2.1 - 1.3.2.4

Flat Sardinella		
B1	Species Name	*Sardinella maderensis*
	Table used (Ba, Bb)	Ba
	Outcome	Fail

Evidence

The most recent publicly-available CECAF assessment for flat sardinella was in 2017 (FAO, 2017). The working group tried various assessment approaches, but data were insufficient to carry out an assessment in all cases. This has also been the case in previous CECAF assessments. In 2017, the working group noted:
This recurring situation of insufficient data to assess this stock is of great concern to the Working Group. In order to make more reliable management recommendations, the Working Group insists on the need to improve the basic data for the models (sampling, acoustic surveys, reading of otholiths, etc.). Currently and as a precaution, the Working Group recommends to maintain last year's recommendation for a reduction in fishing mortality for all fleet segments. (FAO, 2017, page 26).

The lack of reliable data for flat sardinella species has always limited the assessment of the stock. For example, in 2012 a global production model was applied to the round sardinella and to both species of sardinella combined, although a good fit was not achieved in either case (FAO, 2013a). In 2011, the same exercise achieved a good match and enabled it to be concluded that the stock of *S. aurita* was overexploited, "as is in all likelihood the stock of *S. maderensis*" (FAO, 2013b). Since these assessments, only the round sardinella stock has been assessed. However, the IMROP continues to diagnose overexploitation of the flat sardinella stock based on the results of a global model produced in 2010 based on standardised but not updated catches per unit effort.

Based on Table B(b), resilience of the stock is medium-high, but biomass is unknown, fishing mortality is unknown and catches across the sub-region have been consistently increasing year-on-year since ~2005 (see figure below). On this basis, this scores a fail.

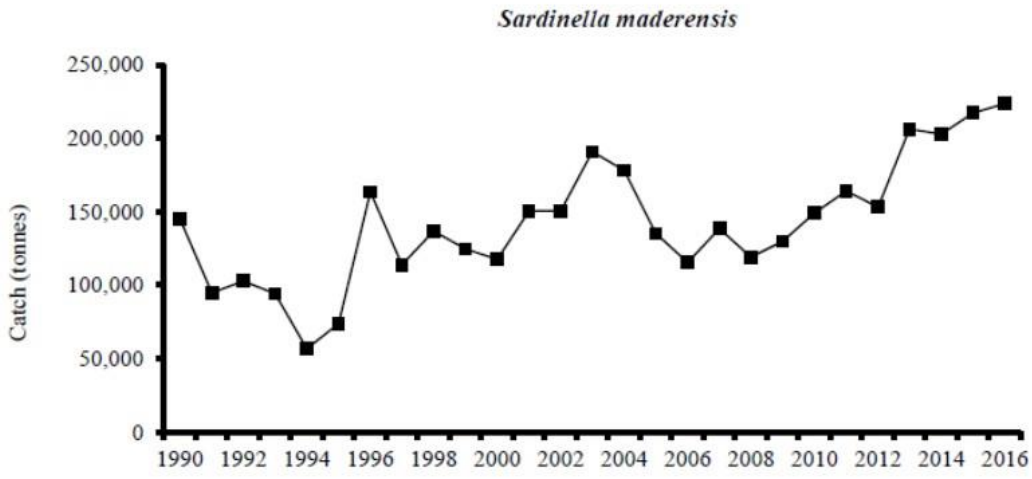

Figure above: Total catch of flat sardinella across the CECAF northern sub-region (FAO, 2017)

References

FAO, 2013a. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Dakar, Senegal 21–25 May 2012. FAO Fisheries and Aquaculture Report No. 1036. 245 pp.

FAO, 2013b. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Casablanca, Morocco, 24-28 May 2011. FAO Fisheries and Aquaculture Report No. 1026. Rome. 253 pp.

FAO, 2017. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Nouadhibou, Mauritania, 22-27 May 2017. FAO Fisheries and Aquaculture Report No. R1221. Rome, Italy.

Standard clauses 1.3.2.1 - 1.3.2.4

Chub mackerel		
B1	Species Name	*Scomber japonicus*
	Table used (Ba, Bb)	Ba
	Outcome	Fail

Evidence

The catch of chub mackerel over the last ten years has shown a general increasing trend across the whole region, from around 137 000 tonnes in 2002 to 344 000 tonnes in 2014 and 400 000 tonnes in 2016, the highest catch of the time series. The Working Group considers that there are two stocks of chub mackerel (northern stock between Cape Bojador and the north of Morocco and the southern stock between Cape Bojador and the south of Senegal), but due to a lack of information on migration and exchanges between the two stocks, the Working Group since 2003 has done a joint assessment of the two stocks (FAO, 2017).

The results of two analytic models indicate that fishing mortalities (estimated to be 0.19 for the XSA and 0.27 for ICA) are below the target fishing mortality F0.1 (0.28) and the precautionary level Fpa (0.54). These mortalities are also below those estimated for 2015. The yield per recruit model estimates that the current fishing mortality (Fcur) is close to F0.1 (Fcur/F0.1 = 97 percent, assuming M=0.37/year). This situation indicates that the mackerel stock is most likely fully exploited (FAO, 2017).

Biomass relative to reference points was estimated via a Schaefer dynamic production model. Fitting the model to different time series (Russian CPUE vs. Nansen survey index) or using different techniques led to different outcomes, giving estimates of Bcurrent / BMSY (limit reference point) in the range 42-116% and Bcurrent / B0.1 (target reference point) in the range 38-105%. The majority of estimates put current biomass approximately at or below both target and limit reference points. This results in a fail.

References

FAO, 2017. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Nouadhibou, Mauritania, 22-27 May 2017. FAO Fisheries and Aquaculture Report No. R1221. Rome, Italy.

Standard clauses 1.3.2.1 - 1.3.2.4

European Pilchard/Sardine		
B1	Species Name	*Sardina pilchardus*
	Table used (Ba, Bb)	Ba
	Outcome	Pass

Several studies have been conducted to understand European pilchard stock structure, however further research is needed considering uncertainties (Kasapidis et al., 2012; ICES, 2014b). Sardine stocks distinguished by the Working Group were the same as those used during the previous Working Groups: the northern stock (35°45'-32°N), the central A+B stock (32°N-26°N) and the southern stock C (26°N- the southern extent of the species distribution) (FAO,2017). Only the southern stock is relevant to this fishery.

Stock C

The results of the LCA model for assessing stock C were not conclusive and were not retained by the Working Group. The results of the dynamic production model using the two series of indices were better. Estimates of stock status in relation to reference points derived from the model show that the current biomass level is above the target biomass B0.1 and the current fishing mortality is below the target level F0.1 (Bcurrent / B0.1 = 144%; Fcurrent / F0.1 = 69%, based on fitting Nansen data 1995-2016) (FAO,2017). On this basis, the stock scores a pass.

References

FAO, 2017. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Nouadhibou, Mauritania, 22-27 May 2017. FAO Fisheries and Aquaculture Report No. R1221. Rome, Italy.

Standard clauses 1.3.2.1 - 1.3.2.4

Atlantic Horse Mackerel		
B1	Species Name	*Trachurus trachurus*
	Table used (Ba, Bb)	Ba
	Outcome	Fail

Evidence

Overall reported captures for this species in the Eastern Central Atlantic reached a high of 550,000 tonnes in 1995 and have since declined to approximately 160,000 tonnes in 2016 (FAO Fishfinder, Species Datasheet; FAO 2017).

The CECAF assessment fit a Schaefer model to Russian CPUE in Mauritanian waters. The results estimate the current biomass at 76% of B0.1. Current fishing mortality is estimated to be 121% F0.1, and 187% of the limit value (FMSY). These results show that the stock is overexploited (FAO, 2017). The score is therefore a fail.

References

FAO, 2017. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Nouadhibou, Mauritania, 22-27 May 2017. FAO Fisheries and Aquaculture Report No. R1221. Rome, Italy.

Standard clauses 1.3.2.1 - 1.3.2.4

Bonga Shad		
B1	Species Name	*Ethmalosa fibricata*
	Table used (Ba, Bb)	Bb
	Outcome	Fail

Evidence

In Mauritania, the bonga shad is still exploited for the fish meal industry in Nouadhibou. Landings have decreased by 8 percent. Besides, there has been a reduction in fishing effort in this locality. The length of the fish reduced in 2014 and the percentage of bonga in the total catch of small pelagics for fishmeal has declined since 2012 (FAO, 2017).

In Mauritania catches have followed an upward trend since 2008 from a catch of around 2 900 tonnes to over 35 000 tonnes in 2010. After a small decrease in 2011, the catch reached a record figure in relation to the series of more than 90 000 tonnes in 2013. Nonetheless, in 2014, the catch decreased by nearly 50 percent compared with 2013. In 2015, catches also declined by 16 percent compared with 2014. In 2016, catches again increased by 6 percent compared with 2015 from 36 000 tonnes to 38 000 tonnes. This marked increase in bonga catches in Mauritania from 2009 is attributed to the establishment of several fishmeal factories, 13 of which were operational in 2012 and 18 in 2013. However, the last two years were marked by a decline in catches.

The current exploitation level (Fcur) is far above the precautionary exploitation level (F0.1). The results of the three stock scenarios show that the bonga stock in the sub-region is overexploited.

Stock/Unit	Fcur/F0.1	Fcur/FMax
Mauritania and Senegal	139%	79%
Senegal	130%	45%
Mauritania	154%	51%

References

FAO, 2017. Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Nouadhibou, Mauritania, 22-27 May 2017. FAO Fisheries and Aquaculture Report No. R1221. Rome, Italy.

Standard clauses 1.3.2.1 - 1.3.2.4

CATEGORY C SPECIES

There are no Category C species.

CATEGORY D SPECIES

In a whole fish assessment, Category D species are those which make up less than 5% of landings and are not subject to a species-specific management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings. In a by-product assessment, Category D species are those which are not subject to a species-specific management regime. In both cases, the comparative lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

The process for assessing Category D species involves the use of a Productivity-Susceptibility Analysis (PSA) to further subdivide the species into 'Critical Risk', 'Major Risk' and 'Minor Risk' groups. If there are no Category D species in the fishery under assessment, this section can be deleted.

Productivity and susceptibility ratings are calculated using a process derived from the APFIC document "Regional Guidelines for the Management of Tropical Trawl Fisheries, which in turn was derived from papers by Patrick *et al* (2009) and Hobday *et al* (2007). Table D1 should be completed for each Category D species as follows:

- Firstly, the best available information should be used to fill in values for each productivity and susceptibility attribute.
- Table D2 should be used to convert each attribute value into a score between 1 and 3.
- The average score for productivity attributes and the average for susceptibility attributes should be calculated.
- Table D3 should be used to determine whether the species is required to meet the requirements of Table D4. A species which does not need to meet the requirements of D4 is automatically awarded a pass.
- Table D4 should be used to assess those species indicated by Table D3 to determine a pass/fail rating.
- Any Category D species which has been categorised by the IUCN Red List as Endangered or Critically Endangered, or which appears in the CITES appendices, automatically results in a fail.

D1	False Scad	*Caranx rhonchus*	
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)	?	3
	Average maximum age (years)	?	3
	Fecundity (eggs/spawning)	500,000	1
	Average maximum size (cm)	60	2
	Average size at maturity (cm)	23	2
	Reproductive strategy	Broadcast Spawner	1
	Mean trophic level	3.6	3
		Average Productivity Score	**2.14**
	Susceptibility Attribute	**Value**	**Score**
	Overlap of adult species range with fishery	<25%	1
	Distribution	Eastern Atlantic	2
	Habitat	They occur frequently near the bottom, mostly in depths of 30 to 50 m. Also, pelagic and found near the surface at times	3
	Depth range	30-50m	3
	Selectivity	2cm	3
	Post-capture mortality	Most dead or retained	3
		Average Susceptibility Score	**2.5**
		PSA Risk Rating (From Table D3)	**Table D4**
		Compliance rating	**Fail**

References

Smith-Vaniz, W.F., J.-C. Quéro and M. Desoutter, 1990. Carangidae. p. 729-755. In J.C. Quero, J.C. Hureau, C. Karrer, A. Post and L. Saldanha (eds.) Check-list of the fishes of the eastern tropical Atlantic (CLOFETA). JNICT, Lisbon; SEI, Paris; and UNESCO, Paris. Vol. 2. (Ref. 7097)

Standard clauses 1.3.2.1 - 1.3.2.4

D1	European Anchovy	*Engraulis encrasicolus*	
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)	1	1
	Average maximum age (years)	5 years	1
	Fecundity (eggs/spawning)	Multiple Spawning >10000	1
	Average maximum size (cm)	14cm	1
	Average size at maturity (cm)	9.7cm	1
	Reproductive strategy	Pelagic spawners - Gametogenesis is continuous, multiple spawning	1
	Mean trophic level	3.1	2
		Average Productivity Score	**1.14**
	Susceptibility Attribute	**Value**	**Score**
	Overlap of adult species range with fishery	>50% of stock in area fished	3
	Distribution	Eastern Atlantic	1
	Habitat	Throughout water column to ~400m	2
	Depth range	High overlap	3
	Selectivity	2cm	3
	Post-capture mortality	Most dead or retained	3
		Average Susceptibility Score	2.5
		PSA Risk Rating (From Table D3)	**Pass**
		Compliance rating	**Pass**

References

Fishbase. Engraulis encrasicolus - European anchovy profile. http://www.fishbase.org/Summary/SpeciesSummary.php?ID=66&AT=european+anchovy Downloaded on 10 April 2018

Nedreaas, K., Florin, A., Cook, R., Fernandes, P. & Lorance, P. 2015. *Engraulis encrasicolus*. The IUCN Red List of Threatened Species 2015: e.T198568A45083771. Downloaded on 10 April 2018.

Report of the FAO Working Group on the Assessment of Small Pelagic Fish off Northwest Africa. Casablanca. Morocco, 24–28 May 2011. FAO Fisheries and Aquaculture Report, No. 1026. Rome. 253

Standard clauses 1.3.2.1 - 1.3.2.4

Table D2 - Productivity / Susceptibility attributes and scores.

Productivity attributes	Low productivity/ High risk	Medium productivity/ Medium risk	High productivity/ Low risk
	Score 3	Score 2	Score 1
Average age at maturity (years)	>4	2 to 4	<2
Average maximum age (years)	>30	10 to 30	<10
Fecundity (eggs/spawning)	<1 000	1 000 to 10 000	>10 000
Average maximum size (cm)	>150	60 to 150	<60
Average size at maturity (cm)	>150	30 to 150	<30
Reproductive strategy	Live bearer, mouth brooder or significant parental investment	Demersal spawner "berried"	Broadcast spawner
Mean trophic level	>3.25	2.5–3.25	<2.5

Susceptibility attributes		High susceptibility/ High risk	Medium susceptibility/ Medium risk	Low susceptibility/ Low risk
		Score 3	Score 2	Score 1
Availability	1) Overlap of adult species range with fishery	>50% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	<25% of stock occurs in the area fished
	2) Distribution	Only in the country/ fishery	Limited range in the region	Throughout region/ global distribution
Encounterability	1) Habitat	Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom)	Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs)	Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic)
	2) Depth range	High overlap with trawl fishing gear (20 to 60 m depth)	Medium overlap with trawl fishing gear (10 to 20 m depth)	Low overlap with trawl fishing gear (0 to 10 m, >70 m depth)
Selectivity		Species >2 times mesh size or up to 4 m length	Species 1 to 2 times mesh size or 4 to 5 m length	Species <mesh size or >5 m length
Post capture mortality		Most dead or retained Trawl tow >3 hours	Alive after net hauled Trawl tow 0.5 to 3 hours	Released alive Trawl tow <0.5 hours

Note: Availability 2 is only used when there is no information for Availability 1; the most conservative score between Encounterability 1 and 2 is used.

D3		Average Susceptibility Score		
		1 - 1.75	1.76 - 2.24	2.25 - 3
Average Productivity Score	1 - 1.75	PASS	PASS	PASS
	1.76 - 2.24	PASS	PASS	TABLE D4
	2.25 - 3	PASS	TABLE D4	TABLE D4

D4	Species Name	False Scad	
	Impacts On Species Categorised as Vulnerable by D1-D3 - Minimum Requirements		
	D4.1	The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.	No
	D4.2	There is no substantial evidence that the fishery has a significant negative impact on the species.	No
		Outcome:	Fail

Evidence

No potential impact of the fishery is currently known in relation to false scad, with none being considered during management decisions.

Due to this lack of knowledge it must fail clause D4.

References

Smith-Vaniz, W.F., J.-C. Quéro and M. Desoutter, 1990. Carangidae. p. 729-755. In J.C. Quero, J.C. Hureau, C. Karrer, A. Post and L. Saldanha (eds.) Check-list of the fishes of the eastern tropical Atlantic (CLOFETA). JNICT, Lisbon; SEI, Paris; and UNESCO, Paris. Vol. 2. (Ref. 7097)

Standard clause 1.3.3.3

FURTHER IMPACTS

The three clauses in this section relate to impacts the fishery may have in other areas. A fishery must meet the minimum requirements of all three clauses before it can be recommended for approval.

F1	Impacts on ETP Species - Minimum Requirements		
	F1.1	Interactions with ETP species are recorded.	No
	F1.2	There is no substantial evidence that the fishery has a significant negative effect on ETP species.	Yes
	F1.3	If the fishery is known to interact with ETP species, measures are in place to minimise mortality.	Yes
		Clause outcome:	Fail

Evidence

Purse seiners interactions with ETP species are limited coming into contact with few demersal species. However, the rumours of large catches of jewfish by coastal seine boats must be verified. Although the risks of accidental catches of monk seal (a species classified as threatened) and dolphins by purse seines are not negligible, for this gear they are rarely fatal, provided that the crew releases them from the seine in time.

Attention must be paid to the small risk of accidental and fatal catches of monk seals and dolphins by purse seiners, as well as the risks of catching turtles and ETP demersal species (for example, *Epinephelus aeneus*). Note also that in Morocco, the use of explosives or poisons is banned and subject to disciplinary action, and the level of information on rejections and interactions with threatened species has been significantly improved by a research project within the FIP in progress, which is continuing. In this country, also note that Order no. 2806-09 of kaada 1430 (10 November 2009) concerns the temporary (10 years) and partial ban on the fishing of monk seals and other marine mammals, as well as certain other marine species (Official Bulletin No. 5796 of 17 December 2009)[1]. Further to this defined in the Moroccan law, from 2012 to 2017, protected sharks cannot be captured in accordance with commitments and recommendations made by the International Commission for the Conservation of Atlantic Tunas and the General Fisheries Commission for the Mediterranean.

Main issues arise around data quality and quantity with much lacking, as a precaution F1.1 is failed until proven otherwise. As interactions with ETP species are not recorded but there is no substantial evidence that the fishery has a significant negative effect on ETP species this clause can be seen to fail. Measures are in place to reduce any interaction with ETP species.

References

M. Ben-Yami 1994 "Purse seining manual" FAO and Fishing News Books Ltd.

Standard clause 1.3.3.1

[1] The ban only applies to a coastal strip of a distance of 12 nautical miles calculated based on baselines off the coast situated between parallels 21° 23' 00" and 20° 54' 40".

F2	Impacts on Habitats - Minimum Requirements		
	F2.1	Potential habitat interactions are considered in the management decision-making process.	Yes
	F2.2	There is no substantial evidence that the fishery has a significant negative impact on physical habitats.	Yes
	F2.3	If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts.	Yes
		Clause outcome:	Pass

Evidence

The gear within the fishery used is purse seine. A purse seine is made of a long wall of netting framed with a lead line of equal or longer length than the float line. Because of this the fishing gear rarely touches the seabed meaning that there is no substantial evidence that the fishery has a negative impact on the environment.

Management measures are in place to protect habitats such as, enforcement decree no. 2015-159 explicitly prohibiting the use of explosives, poisons and other practices that destroy the habitat and stocks. Physical damage to the habitat resulting from the use of purse seine nets and pelagic trawl nets is exceptional and limited. Further, Moroccan law bans pelagic or semi-pelagic bottom trawls from being "used to drag the seabed or drawn by several vessels", and the maximum percentage of by-catches is set at 2% or 5% of the total volume of catches landed during a single tide, depending on the type of boat (Order no. 3279). In Senegal, the 2015 Fisheries Code prohibits and issues penalties for the use of explosives or toxic substances for fishing purposes, or their transportation on board fishing vessels. In Gambia, the use of explosives and toxic substances is also banned, as are the use of industrial driftnets and the release of waste into the sea.

Potential habitat interactions are considered in the management decision-making process and the gear type means interactions with the habitat are low causing this clause to pass.

References

M. Ben-Yami 1994 "Purse seining manual" FAO and Fishing News Books Ltd.

Standard clause 1.3.3.2

F3	Ecosystem Impacts - Minimum Requirements		
	F3.1	The broader ecosystem within which the fishery occurs is considered during the management decision-making process.	No
	F3.2	There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.	No
	F3.3	If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.	Yes
		Clause outcome:	Fail

Evidence

The largest issues are that a number of other target species, although caught in lower proportions, are overexploited throughout the West African region. These include: Round sardinella, (INRH 2015). TACs are not species-specific and apply to small pelagics generally and it is not known if the management plan and TAC for the Moroccan multi-species fishery is suitable for all stocks within the ecosystem.

Discarding is indicated to be low, based on limited study (Gascoigne 2016) with bycatch limits defined for each of the Moroccan and Mauritanian fisheries. Closed areas, considering artisanal and industrial fishing sectors, are defined in each of the countries.

Purse-seining and pelagic trawling is not expected to have effects on the seabed ecosystem.
No-fishing areas are established (2009-2019) to protect marine mammals and monk seal which is considered as critically endangered by IUCN. Interaction of the fishery with protected species, while indicated to be low, is unknown. Occurrence is considered likely with some sharks and manta rays but data on discarding and bycatch is limited. However, the target species are overexploited, so altogether there must be a significant reduction of forage species in the ecosystem; which is bound to have an impact on predator populations. However, the majority of target species are overexploited, so altogether there must be a significant reduction of forage species in the ecosystem; which is bound to have an impact on predator populations causing F3.2 to fail.

References

Gascoigne, J. 2016. Moroccan sardine fishery: assessment in relation to the MSC standard UPDATED – February 2016, Moroccan Sardine FIP, 28pp. http://fisheryimprovementprojects.org/wp-content/uploads/Sustainability-evaluation-Fev2016.pdf

Standard clause 1.3.3.3

SOCIAL CRITERION

In addition to the scored criteria listed above, applicants must commit to ensuring that vessels operating in the fishery adhere to internationally recognised guidance on human rights. They must also commit to ensuring there is no use of enforced or unpaid labour in the fleet(s) operating upon the resource.

We currently know nothing regarding the social elements of the fishery.

Any research must be completed to adhere to the social criterion to comply to internationally recognised guidance on human rights and committing to ensuring there is no use of enforced or unpaid labour in the fleet(s) operating upon the resource.

Appendix A - Determining Resilience Ratings

The assessment of Category B species described in this assessment report template utilises a resilience rating system suggested by the American Fisheries Society. This approach was chosen because it is also used by FishBase, and so the resilience ratings for many thousands of species are freely available online. As described by FishBase, the following is the process used to arrive at the resilience ratings:

"*The American Fisheries Society (AFS) has suggested values for several biological parameters that allow classification of a fish population or species into categories of high, medium, low and very low resilience or productivity (Musick 1999). If no reliable estimate of r_m (see below) is available, the assignment is to the lowest category for which any of the available parameters fits. For each of these categories, AFS has suggested thresholds for decline over the longer of 10 years or three generations. If an observed decline measured in biomass or numbers of mature individuals exceeds the indicated threshold value, the population or species is considered vulnerable to extinction unless explicitly shown otherwise. If one sex strongly limits the reproductive capacity of the species or population, then only the decline in the limiting sex should be considered. We decided to restrict the automatic assignment of resilience categories in the Key Facts page to values of K, t_m and t_{max} and those records of fecundity estimates that referred to minimum number of eggs or pups per female per year, assuming that these were equivalent to average fecundity at first maturity (Musick 1999). Note that many small fishes may spawn several times per year (we exclude these for the time being) and large live bearers such as the coelacanth may have gestation periods of more than one year (we corrected fecundity estimates for those cases reported in the literature). Also, we excluded resilience estimates based on r_m (see below) as we are not yet confident with the reliability of the current method for estimating rm. If users have independent r_m or fecundity estimates, they can refer to Table 1 for using this information.*"

Parameter	High	Medium	Low	Very low
Threshold	0.99	0.95	0.85	0.70
r_{max} (1/year)	> 0.5	0.16 - 0.50	0.05 - 0.15	< 0.05
K (1/year)	> 0.3	0.16 - 0.30	0.05 - 0.15	< 0.05
Fecundity (1/year)	> 10,000	100 - 1000	10 - 100	< 10
t_m (years)	< 1	2 - 4	5 - 10	> 10
t_{max} (years)	1 - 3	4 - 10	11 - 30	> 30

[Taken from the FishBase manual, "Estimation of Life-History Key Facts", http://www.fishbase.us/manual/English/key%20facts.htm#resilience]

Appendix B – Background on the 5% catch rule

The proposed fishery assessment methodology uses a species categorisation approach to divide the catch in the assessment fishery into groups. These groups are:

- **Category A:** "Target" species with a species-specific management regime in place.
- **Category B:** "Target" species with no species-specific management regime in place.
- **Category C:** "Non-target" species with a species-specific management regime in place.
- **Category D:** "Non-target" species with no species-specific management regime in place

The distinction between 'target' and 'non-target' species is made to enable the assessment to consider the impact of the fishery on all the species caught regularly, without requiring a full assessment be conducted for each. Thus 'target' species are subjected to a more detailed assessment, while 'non-target' species are considered more briefly. For the purposes of the IFFO RS fishery assessment, 'target' and 'non-target' species are defined by their prevalence in the catch, by weight. Applicants must declare which species are considered 'target' species in the fishery, and the combined weight of these must be at least 95% of the annual catch. The remaining 5% can be made up of 'non-target' species. Note also that ETP species are considered separately, irrespective of their frequency of occurrence in the catch.

The proposed use of 5% as a limit for 'non-target' species is one area in which feedback is being sought via the public consultation. The decision to propose a value of 5% ensures consistency with other fishery assessment programmes, such as the MSC which uses 5% to distinguish between 'main' and 'minor' species (see MSC Standard, SA3.4 and GSA3.4.2); and Seafood Watch, which uses 5% when defining the 'main' species for the assessment (see Seafood Watch Standard, Criterion 2). The value is also consistent with the approached used in Version 1 of the IFFO RS Standard, in which up to 5% of the raw material could be comprised of 'unassessed' species.

Comments on this proposition are welcomed along with any other feedback on the proposed approach.