

# IFFO RS V2.0



## FISHERY ASSESSMENT METHODOLOGY AND TEMPLATE REPORT

<b>Fishery Under Assessment</b>	<b>Sardine (<i>Sardina pilchardus</i>)</b>
<b>Date</b>	<b>September 2017</b>
<b>Assessor</b>	<b>Deirdre Hoare</b>

Application details and summary of the assessment outcome				
Name:				
Address:				
Country: Morocco		Zip:		
Tel. No.		Fax. No.		
Email address:		Applicant Code		
Key Contact:		Title:		
Certification Body Details				
Name of Certification Body:		SAI Global Ireland		
Assessor Name	Peer Reviewer	Assessment Days	Initial/Surveillance/ Re-approval	Whole fish / By-product
Deirdre Hoare	Virginia Polonio	1	Surveillance	By-product
Assessment Period	2016-2017			
Scope Details				
Management Authority (Country/State)		Morocco		
Main Species		Sardine ( <i>Sardina pilchardus</i> )		
Fishery Location		FAO 34		
Gear Type(s)		Pelagic Trawl		
Outcome of Assessment				
Overall Outcome		Pass		
Clauses Failed		None		
Peer Review Evaluation		Maintain approval		
Recommendation		Maintain approval		

**Assessment Determination**

Sardine in Morocco is managed as a component of the small pelagic fishery. The fishery has a range of target species – sardine, sardinella, horse mackerel, anchovy and mackerel, of which sardine is much the most important. The fishery is, however, managed as a multi-species fishery. There are, to summarise, two broad management zones for the fishery of interest here: the zone 'Atlantique centre' (central zone, zones A+B) and the zone 'Atlantique sud' (south zone, zone C), as well as three fleets: the coastal seiner fleet (all zones), the RSW trawler fleet (zone C) and the EU / Russian freezer trawler fleet operating under agreements with Morocco (zone C). The fishery in zone C is managed under a management plan which includes a TAC (all species combined), bycatch limits and species restrictions, spatial zoning and closed areas. The fishery in zone A+B is also managed via a management plan, but using limits on effort rather than a TAC. There are also regulations in place to limit landing of bycatch and to protect endangered species (monk seals, some sharks).

Management measures are applied to the fishery but it is not clear the extent to which these are species-specific. Species-specific research is conducted and is sufficient to indicate stock status. This species is categorized as Least Concern by the IUCN Red List.

**Peer Review Comments****Notes for On-site Auditor**

### General Results

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

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

### Species-Specific Results

Category	Species	% landings	Outcome (Pass/Fail)	
Category A			A1	
			A2	
			A3	
			A4	
Category B				
Category C	Sardine	NA	C	
Category D				

[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.

### 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. All species regularly\* caught in the fishery 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. **Type 1 species must represent 95% of the total catch. Type 2 species may represent a maximum of 5% of the 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	Management	Category
Sardine	<i>Sardina pilchardus</i>	Moroccan stocks FAO 34	NA	Morocco	C

Category A species are assessed through an examination of the data collection, stock assessment, management measures, and stock status relating to the species. Category B species are assessed using a risk-based assessment covering similar areas. Category C species are assessed on stock status only. Category D species are assessed using a PSA analysis as described in the relevant section of this document.

## CATEGORY C SPECIES

In a whole fish assessment, Category C species are those which make up less than 5% of landings, but which are subject to a species-specific management regime. In most cases this will be because they are a commercial target in a fishery other than the one under assessment. In a by-product assessment, Category C species are those which are subject to a species-specific management regime, and are usually targeted species in fisheries for human consumption.

Clause C1 should be completed for **each** Category C species. If there are no Category C species in the fishery under assessment, this section can be deleted. A Category C species does not meet the minimum requirements of clause C1 should be re-assessed as a Category D species.

Species Name		Sardine	
C1	<b>Category C Stock Status - Minimum Requirements</b>		
	C1.1	Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible.	Yes
	C1.2	The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	Yes
			<b>Clause outcome:</b> Pass
<b>Evidence</b>			
<p>Fishery removals of Sardine are included in the stock assessment process.</p> <p>Fishery-dependent data: Licensed fishing vessels are required to submit logbooks and landings declarations, and there appear on this basis to be good statistics on catch and effort. There is no evidence of significant problems of fishing by unlicensed vessels. One issue may be under declaration of catch by the artisanal fleet, which is usually very difficult to monitor (lots of small vessels landing mixed catches at many small landing sites); but in any cases, sardine catches by this fleet appear to be negligible. There is also regular sampling of length composition in the catch.</p> <p>Fishery-independent data: There are annual acoustic surveys for small pelagic stock assessment in Moroccan waters by the Moroccan research vessel N/V Al Amir Moulay Abdellah (INRH 2015). There have also been international research surveys carrying out other biological work such as estimates of recruitment. Russian scientists have worked on size-age relationships in this stock, via analysis of otoliths (INRH 2012 and 2015, CECAF 2012). CECAF and INRH use a Schaefer dynamic production model to evaluate the stocks, but have also experimented with other models as shown above, and may expand to use more up-to-date Bayesian analysis techniques in the future. The stock assessment for the moment is relatively basic, but probably suited to the amount and type of data available. CECAF also evaluate data quality; it was reportedly better for the south zone than for the central zone (CECAF 2012, but the most recent stock assessment is more detailed for the central zone; INRH 2015).</p> <p>The CECAF working group adopted limit reference points for the stock in 2011: BMSY and FMSY (equilibrium biomass and fishing mortality producing maximum sustainable yield MSY).</p> <p>For the central zone stock (A+B), INRH fit a Schaeffer model ('Biodyn') (using two methods – Excel as normally used by CECAF, and a method using R developed by ICCAT) as well as the model ASPIC, also using R (also from ICCAT). To summarise the conclusions; all three models suggest that the current (2014) catch is more or less at the MSY level. Likewise, the general conclusion is that 2014 biomass is roughly at BMSY (the most pessimistic suggests it is ~8% below, while the most optimistic estimates it at ~30% above), while F is approximately at F0.1 (a reasonable</p>			

proxy for FMSY) – the range is ~24% below to ~21% above. INRH reach the appropriate conclusion that the stock is fully exploited.

The south zone stock (C) was evaluated using two of the three methods above (Biodyn / Excel and ASPIC), giving rather contradictory results. The Biodyn model (as used by CECAF) suggests that the stock is being exploited at below FMSY, with biomass above BMSY, while the ASPIC analysis suggests a situation much closer to the MSY level, with both F and B estimated to be slightly above the MSY level. The ASPIC assessment estimates trends in F and B relative to MSY reference points.

Overall, the precautionary conclusion is that the stock is also fully exploited, although the direct observations from the acoustic survey of biomass compared to catch, as well as size structure, suggest that it is likely to be less heavily exploited than the central stock.

#### References

Moroccan sardine fishery : assessment in relation to the MSC standard UPDATED – February 2016 Jo Gascoigne  
<http://fisheryimprovementprojects.org/wp-content/uploads/Sustainability-evaluation-Fev2016.pdf>

IUCN Red List <http://www.iucnredlist.org/details/198580/0>

*Standard clauses 1.3.2.1 - 1.3.2.4*



## **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.

## 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  $r_m$ . 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 approach 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.**