Study on improvement for the analysis and exploitation of observer reports in EU fisheries from NW African waters

FINAL REPORT

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Study on improvement for the analysis and exploitation of observer reports in EU fisheries from NW African waters

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Final Report

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ACRONYMS

ALI	Fishing hauls targeting *Aristeus varidens*
CECAF	Fishery Committee for the Eastern Central Atlantic
CIPA	Centro de Investigaçao Pesqueira Aplicada (Guinea-Bissau)
CFP	Common Fisheries Policy
CRODT	Centre de Recherches Océanographiques de Dakar-Thiaroye
CS	Coastal states
DCF	Data Collection Framework
DG MARE	EU Directorate-General for Maritime Affairs and Fisheries
DPM	Direction des Pêches maritimes, Senegal
DPSP	Direction de la Protection et de la Surveillance des Pêches, Senegal
DSCPM	Délégation à la Surveillance des Pêches et du Contrôle en Mer, Mauritania
EASME	Executive Agency for Small and Medium-sized Enterprises
EM	Electronic Monitoring
EU	European Union
EU MAP	EU Multi-Annual Programme
FAO	Food and Agriculture Organization of the United Nations
GAM	Fishing hauls targeting *Parapenaeus longirostris*
GNB	Guinea-Bissau
FWC	Framework Contract
GARFO	Greater Atlantic Regional Fisheries Office
INRH	Institut National de Recherche Halieutique du Maroc
IMROP	Institut Mauritanien des Recherches Océanographiques et des Pêches
JC	Joint Committee (of SFPA)
JSC	Joint Scientific Committee (of SFPA)
LAN	Fishing hauls targeting *Penaeus notialis*
MAR	Morocco
MCS	Monitoring, Control and Surveillance
MRT	Mauritania
MS	EU Member States
NL	The Netherlands
LT	Lithuania
LV	Latvia
MPEM	Ministère des Pêches et de l'Economie Maritime, Senegal

NMFRI	Polish National Marine Fisheries Research Institute
PET	Protected, Endangered or Threatened species
RFMO	Regional Fisheries Management Organisation
SC	Specific Contract
SFPA	Sustainable Fisheries Partnership Agreement
VME	Vulnerable Marine Ecosystem
VMS	Vessel Monitoring System

FAO SPECIES CODES, COMMON NAMES AND SCIENTIFIC NAMES-EU TARGET SPECIES

FAO CODE	FAO COMMON NAME	SCIENTIFIC NAME
ARV	Striped red shrimp	*Aristeus varidens*
CVT	Giant African cuttlefish	*Sepia hierredda*
DPS	Deep-water rose shrimp	*Parapenaeus longirostris*
HKB	Benguela hake	*Merluccius polli*
HKM	Senegalese hake	*Merluccius senegalensis*
HMZ	Cunene horse mackerel	*Trachurus trecae*
OCC	Common octopus	*Octopus vulgaris*
PIL	European pilchard (=Sardine)	*Sardina pilchardus*
SAA	Round Sardinella	*Sardinella aurita*
SOP	Southern pink shrimp	*Penaeus notialis*
VMA	Atlantic chub mackerel	*Scomber colias*

GLOSSARY

The terms in this glossary have the following meaning in the context of this report. This is not intended to be an exhaustive list of all fisheries related terms.

Accidental (or incidental) by-catch: non-target species captured during their attempts to take bait or other species already taken by fishing gear, or taken simply through being in proximity to the gear. In the context of this report, it mainly refers to the by-catch of birds, mammals and reptiles and fish protected under Union legislation and international agreements.

Biological information (sampled by observers): length, biological parameters (length, weight, age, sex and maturity), required by catch fraction in the DCF; discard composition. Other biological information as conversion factors, length-weight relationships can be required, when relevant.

By-catch: part of a catch of a fishing unit taken in addition to the target species towards which fishing effort is directed. It may be retained for human use or some or all of it may be returned to the sea as discards, usually dead or dying.

Catch (Total Catch): the total number or weight of fish caught by fishing operations. Catch should include all fish killed by the act of fishing, not just those landed. Thus, it can be further sub-divided into retained catch (or landed catch) and discards.

Discards: animals released or returned to the sea, dead or alive, whether or not such fish are brought fully on board a fishing vessel. Fish (or parts of fish) can be discarded for a variety of reasons such as having physical damage, being a non-target species for the trip, and compliance with management regulations like minimum size limits or quotas.

Exclusive Economic Zone (EEZ): a zone under national jurisdiction (up to 200-nautical miles wide) declared in line with the provisions of 1982 United Nations Convention of the Law of the Sea, within which the coastal State has the right to explore and exploit, and the responsibility to conserve and manage, the living and non-living resources.

Fish stock or **fish resource:** the living resources in the community or population from which catches are taken in a fishery. Use of the term fish stock usually implies that the particular population is more or less isolated from other stocks of the same species and hence self-sustaining. In a particular fishery, the fish stock may be one or several species of fish but here it is also intended to include commercial invertebrates and plants.

Fishing activity: searching for fish, shooting, setting, towing, hauling of a fishing gear, taking catch on board, transhipping, retaining on board, processing on board, transferring, caging, fattening and landing of fish and fishery products.

Fishing effort: the amount of fishing gear of a specific type used on the fishing grounds over a given unit of time for example hours trawled per day or fishing days per month/year.

Fishery information (recorded by observers): include, among others, vessels and gear characteristics, operational details, catch data (by catch fraction) and fishing trip details.

Fishing trip: any voyage by a fishing vessel from a land location to a landing place, excluding non-fishing trips (a trip by a fishing vessel from a location to a land location during which it does not engage in fishing activities and during which any gear on board is securely lashed and stowed and not available for immediate use).

Fishing trip details (recorded by observers): information in relation to the observed fishing trip, including, among others, name of the fishing trip, fishing area (EEZ, FAO division), vessel name and nationality, observer name, and starting and final date of the observed fishing trip.

Fleet: an aggregation of fishing vessels of a particular country (e.g. the European Union fishing fleet) or using a particular gear (e.g. a pelagic trawlers fleet).

End-user of scientific data: a body with a research or management interest in the scientific analysis of data in the fisheries sector.

Incidental (or accidental) by-catch: non-target species captured during their attempts to take bait or other species already taken by fishing gear, or taken simply through being in proximity to the gear. In the context of this report, it mainly refers to the by-catch of birds, mammals and reptiles and fish protected under Union legislation and international agreements.

Landings: weight of what is landed at a landing site. It may be different from the total catch (which includes the discards). Used as retained catch in this report.

Logbook: a detailed, usually official record of a vessel's fishing activity registered systematically on board the fishing vessel, usually including information on catch and its species composition, the corresponding fishing effort and location. Completion of logbooks may be a compulsory requirement for a fishing licence.

Metier: a group of fishing operations targeting a similar (assemblage of) species, using similar gear, during the same period of the year and/or within the same area and which are characterised by a similar exploitation pattern.

Monitoring, Control and Surveillance (MCS): activities undertaken by the fishery enforcement system to ensure compliance with fishery regulations.

Non-target species: species for which the gear is not specifically set, although they may have immediate commercial value and be a desirable component of the catch. Thus, they can be retained or discarded.

Observer: a certified person on board fishing vessels that collects scientific and technical information on the fishing operations and the catch for the Management Authority. Observer programs can be used for monitoring fishing operations (e.g. areas fished, fishing effort deployed, gear characteristics, catches and species caught, discards, etc.). Observers may or not have legal coercion powers and their data may or not be used for non-scientific purposes (e.g. enforcement) depending on the situations.

Operational information (recorded by observers): operational details recorded on in every fishing operation, including: latitude, longitude, depth and time, all at the start and at the end of the fishing operation.

Retained catch: landings, fraction of the total catch that is brought ashore. It can be further sub-divided into retained catch of target species and retained catch of by-catch (non target) species.

Sustainable fisheries: sustainable exploitation of the fisheries stock which will not prejudice the future exploitation or the marine ecosystems.

Sustainable fisheries partnership agreement (SFPA): an international agreement concluded with a third state for the purpose of obtaining access to waters and resources in order to sustainably exploit a share of the surplus of marine biological resources, in exchange for financial compensation from the Union, which may include sectoral support.

Target species: those species that are primarily sought by the fishermen in a particular fishery. They are subject of directed fishing effort in a fishery.

Vessel monitoring system (VMS): as part of modern MCS systems, the VMS is a vessel tracking system (usually satellite-based) which provides management authorities with accurate information on fishing vessels position, course and speed at time intervals. The system is a legal requirement under EC Regulation No. 2244/2003.

Vulnerable species: taxa of various types, including (a) taxa believed likely to move into the "endangered" category in the near future if the relevant causal factors continue to operate. These factors may include overexploitation, extensive destruction of habitat and other environmental disturbances, (b) taxa with populations that have been seriously depleted and whose ultimate security has not yet been assured and (c) taxa with populations that are still abundant but are under threat from severe adverse factors throughout their range.

For other definitions see the FAO fisheries glossary (www.fao.org/fi/glossary/default.asp).

EXECUTIVE SUMMARY

BACKGROUND AND OBJECTIVES

The availability of detailed information on fishing activities and the biology of exploited species is an essential element for fishery resource assessment. Given the diversity of the fleets operating in the Atlantic waters of West Africa, obtaining this information is a challenge.

The protocols for mixed Sustainable Fisheries Partnership Agreements (SFPAs) in West Africa (Morocco, Mauritania, Senegal and Guinea-Bissau) include provisions for observers from these countries to join EU vessels. Member States (MS) must also provide biological information from the exploited resources, under the EU Multi-Annual Programme (EU MAP) for the Data Collection Framework (DCF). For vessels that operate and unload their catches outside EU waters, this information can only be obtained from scientific observers. Although such observer data is analysed, there is considerable scope for further analysis to maximise information obtained. It is therefore necessary to ensure the observer schemes obtain complementary information to provide the data necessary to formulate relevant fisheries management advice in the region.

The main objective of this Specific Contract is twofold: a) to scrutinise and deeply analyse the available information in DG MARE and MS in order to maximise its use; b) to critically analyse the content of these reports to identify strengths and weaknesses in data coverage, with a view to establish a standardised manual for the use of the observers.

IMPLEMENTATION OF THE WORK

To achieve the purposes of the project, the following tasks and subtasks were implemented:

Task 1. Inventory and analysis of information existing and available at EU research centres, EU fisheries administrations and DG MARE

In order to compile the list of obligations for observers in the context of the DCF and the mixed SFPAs, all current (or recently expired) protocols for mixed SFPAs between the EU and West African countries (Morocco, Mauritania, Senegal and Guinea-Bissau), as well as the requirements of the current DCF regulation, were reviewed.

In addition, the information from EU observers on EU vessels that was available in two of the Consortium institutions (IEO and WMR), as well as the CS observers reports available in DG MARE up to June 2019 were compiled at the metadata level and analysed further.

Specific sub-tasks within Task 1 were: 1.1 Inventory of the DCF and SFPA requirements from scientific observers on board EU fleets; 1.2 Search and collection of reports from CS and analysis of the use and transmission of SFPA observer reports; 1.3 Inventory and analysis of metadata available under the SFPA and DCF observer programmes.

Task 2. Assessment of the implementation of the observer schemes

During this task, the appropriateness of existing sampling programmes for demersal and small pelagic fisheries were identified and scope for improvement was assessed. Observer collected data were assessed against SPFA and DCF sampling requirements. This comparison allowed identification of data collection gaps and fleet or country-specific differences in data collection. Observer coverage, i.e. proportion of days observed and sampling intensity, was also assessed.

Task 3. Operations manual for observers

On the basis of the findings of Tasks 1 and 2, the Consortium prepared manuals adapted to the specific requirements of each métier operating under the SFPAs. These draft manuals

clearly outlined *inter alia* the sampling procedures so that they could be easily understood by any potential observer.

Task 4. Workshop for standardisation of observer methodologies

The draft versions of the manuals were used as a baseline to be discussed and improved with the scientists from the SFPA-CS, EU scientists and other relevant stakeholders during a four-day's Workshop held in IEO-Tenerife. The ultimate goal of this task was the harmonisation of methodologies among the EU and West African institutions involved in observer programmes within the four fleets considered.

RESULTS

DCF and SFPA requirements from scientific observers on board EU fleets

The information compiled under Task 1 allowed for the preparation of summary tables screening the data requirements established by the DCF. They were organized by type of data sets (biological data by catch fraction, data to assess the impact of EU fisheries on marine ecosystems and detailed data on EU vessel activity), data requirements by set and observer tasks needed to meet these requirements. The existing DCF observer programmes were analyzed by type of fleet to check how well they are adapted to the DCF requirements in terms of planned observer coverage and task to be performed.

Likewise, summary tables containing information on the requirements for observers on board EU vessels established for the SFPA Protocols of Morocco, Mauritania, Senegal and Guinea-Bissau were prepared. These SFPA texts provide inconsistent information regarding observer function, making the nature of their tasks unclear. Only the Protocol of Mauritania clearly specifies the scientific purpose of the observers' work. However, all protocols include "*biological sampling in the context of scientific programmes*" within the tasks to be performed by observers, to clarify the scientific role of SFPA observers as well as any potential role of Monitoring, Control and Surveillance (MCS).

Use and transmission of SFPA observer reports

Although the SFPA Protocols establish that observers' reports should be transmitted to the EU, only a limited number were available at DG MARE. Thus, the methods of transmission of the SFPA observer reports from the CS to the EU was searched through direct contacts with the CS administrations and/or institution and further clarified during the Observers Workshop.

Reports from Morocco and Senegal are regularly sent from the respective Ministry of Fisheries to DG MARE. Submission failures have been noticed from both countries, as not all reports were received and/or stored in DG MARE. The reports from Mauritanian observers are kept at the Mauritanian Institute of Oceanographic and Fisheries Research (IMROP) and only sent to the EU upon direct request.

The availability of observers' reports to the relevant research institutions in both the EU and some CS has been identified by the concerned Joint Scientific Committees (JSCs) of the SFPA as a recurrent problem, resulting in limited information and thus difficulties for the implementation of their work.

Information available under the DCF and SFPA observer

programmes DCF Observer Programmes

For the purposes of this study the information of 80 DCF-observed fishing trips were available in the concerned EU institutions, containing substantial and detailed information in line with

DCF requirements. The information collected corresponded to four types of métiers: 1) Shrimper trawlers (OTB_CRU_>=40_0_0), operating in Mauritania and Guinea-Bissau; 2) Black hake trawlers (OTB_DEF_>=70_0_0), in Morocco, Mauritania and Senegal; 3) Cephalopod-finfish trawlers (OTB_MCF_>=70_0_0), in Guinea-Bissau and 4) Pelagic trawlers (OTM_SPF_>=40_0_0), in Morocco and Mauritania. A total number of 1,704 fishing days and 7,681 fishing hauls were observed in the 80 fishing trips inventoried.

Metadata obtained from DCF observers reports were classified in two sets corresponding to: a) Data on the fisheries activities observed, including: trip details, operational details such as fishing positions and depth and haul duration, catch information (retained and discarded catch), meteorological details, b) Biological activities, including sampling of the retained and discard fractions of the catch, for length, biological parameters and/or species composition).

SFPA observer programmes

37 reports from SFPA-observers were provided by DG MARE to the Consortium for their analysis in the context of the present study. They correspond to 55 observed fishing trips with more than 1,175 days at sea observed, from three EU fleets: black hake trawlers in Senegal, bottom longliners and pelagic trawlers in Morocco. Most of these reports were of very limited utility as the information collected was very basic and thus not very useful for scientific advice purposes. They focused mainly on fishing activity information (vessel and gear characteristics, area, catch, etc) and did not provide any biological information. The level of detail varied considerably from one report to another and species were not identified consistently.

Observer achievements against DCF and SFPA requirements

DCF Observers

In general, observer performance on individual vessel trips is considered adequate to meet the DCF requirements for all fleets. However, adequate observer coverage of the fleets was often not achieved. The main difficulty with reaching the required coverage levels is due to the reluctance of some vessel owners to take on observers due to the vessel limited space. This space problem is increased by the requirement, under the latest set of protocols, for them to take on a number of seamen from CS and has hindered the continuity and regularity of the observer programmes.

Some gaps in DCF observers' information were identified. Some were related to a lack of clarity in the observer protocols, and these are expected to be solved soon by including clear instructions within the new manuals developed under Task 3. Other data gaps resulting from other logistic circumstances can be more difficult to resolve.

The data collected by DCF observers have been, in general, sufficient to meet CECAF needs. The most important gap was the lack of growth studies for small pelagics, which is a major issue in the region, not only for the EU fleets but for most fisheries in CECAF.

SFPA Observers

The performance of the SFPA observers could only be assessed in relation to the requirements established under the respective SFPA protocols. Some gaps could be identified in relation to the observer coverage, when this was clearly defined in the Protocol (e.g.: Morocco). The fishing information was very limited in the Moroccan reports, although more detailed reports are known to be kept in the Ministry, and the fishing information in the Senegalese reports are more complete. The analyzed reports did not contain any biological information.

Operations manuals for observers

Four manuals for scientific observers were elaborated in French within the framework of the project addressing the particulars of the four métiers concerned (shrimpers, black hake, cephalopods and small pelagic trawlers). These had a common structure consisting of an ***introductory section*** (context, objectives and logistical aspects of the observer programmes and general aspects of the concerned fishery), a section on ***working methods on board***, where the different tasks to be carried out by the scientific observer are detailed and a section with ***annexes*** explaining specific sampling procedures for each fleet.

Workshop for standardization of observers' methodologies

The main goal of the Workshop was to discuss, standardize and implement the guidelines from the draft manuals to be used by observers on board EU demersal and pelagic trawlers operating in West African CS with SFPAs. It took place from 28 to 31 January 2020, in the premises of the IEO in Tenerife and was attended by 26 participants from Morocco (2), Mauritania (4), Senegal (2), The Gambia (1), Guinea-Bissau (2), EU (14 from Spain, The Netherlands, Poland, DG MARE and EASME) and FAO-CECAF (1).

The terms of reference of the Workshop were the following:

1. Learn about and, if needed, improve the content and organization of the national programmes (developed by the CS) and EU programmes (DCF) of observers on board EU demersal and pelagic trawlers, in a coordinated way.

2. Define standard protocols and methodologies that will be used by these observers, ensuring that they follow the requirements of both the EU-DCF and SFPAs and thereby respond to the recurrent recommendation of the SFPA-JSCs and CECAF for harmonisation.

3. Identify the main problems in relation to the implementation and development of these observer programmes (both from EU and from CS).

4. Promote greater coordination between national and DCF programmes to ensure that both temporal and spatial coverage are optimised and meet the stated requirements.

The Workshop was a fruitful exercise involving most of the concerned stakeholders, including end users. Discussions revealed that full implementation of observers' programmes in all concerned countries will require considerably more time and work, although pilot programmes could be considered where possible. Some CS have not implemented scientific programmes so far.

While the produced draft manuals should be considered as a first step towards improved data collection for scientific advice in the context of JSCs and CECAF, the establishment of appropriate and stable scientific observer programmes in all the concerned countries, including the EU, is a condition for further success.

MAIN CONCLUSIONS

1) There are obligations to develop programs of scientific observers onboard EU demersal and pelagic fleets operating in West African fishing grounds through mixed SFPAs, established in the DCF and SFPA Protocols for the EU and CS, respectively. The sampling requirements for the EU observers are specified in the DCF. However, there are no clear specifications on the biological information required in the SFPA Protocols

2) This is the first time that information from EU observers in West African countries with SFPAs has been inventoried, giving a good overview of the amount and quality of the information collected from 2014 to 2018.

3) The quality and quantity of information recorded by observers on board EU vessels in West African waters with SFPAs differs greatly between EU observer programmes (DCF) and CS observer programmes (SFPAs). In contrast to the DCF observer programmes, existing SFPAs observer programmes usually only cover the observation of fishery related data, and so fall under MCS, and do not include scientific tasks such as biological sampling, despite these being required by the SFPA-Protocols.

4) Not all the CS have implemented programmes of scientific observation on board yet, others have recently resumed them, and for others, the collection of scientific information is partial or occasional.

5) The information from SFPA observers provided to the SFPA-JSCs and CECAF is very limited and therefore, these end-users make recurrent recommendations on the implementation of observers' programmes and on the use of standardized methodologies between CS and EU observer programmes.

6) There are clear failures on the transmission of the SFPA observer's reports to the EU in spite of the reporting obligations established in the Protocols. Some CS have not transmitted any information so far, while the information transmitted by other CS is incomplete.

7) In general, information from EU observers can be considered sufficient to meet the DCF requirements and in general, CECAF requirements. However, some shortcomings have been identified in terms of coverage, also noticed in SFPA observers' programmes. In spite of existing legal obligations for EU vessels to take scientific observers, the reluctance of some ship owners to host observers on board their vessels is one of the most significant issues to solve to improve coverage and effectiveness of the observer programmes on board EU vessels in West Africa.

8) Observer manuals for the four fleets with EU (DCF) observers' programmes (shrimper, black hake, cephalopod-finfish and pelagic trawlers) were produced to provide clear sampling protocols harmonized between the EU and CS for each fishery. This will enable the collection of comparable data to contribute effectively to the improvement of stock assessments in CECAF and therefore to obtain the best scientific advice from relevant end-users (JSCs and CECAF).

9) The Workshop for standardization of observer's methodologies involved most of the concerned stakeholders, to produce the final versions of the manuals, to ensure that main sampling principles are followed and so lead to improved data collection. Manuals can be considered as reference documents and can be implemented, where needed, with a certain degree of flexibility.

10)The participation of all relevant stakeholders in the Workshop was crucial to learn about the situation of the different observers' programmes in CS with SFPAs. Observers in Senegal, the Gambia and Guinea-Bissau are deployed exclusively for MCS. Mauritania is the only CS with a programme of scientific observers, which has been recently resumed. The observer programme in Morocco is conceived to ensure both the respect of legal provisions and the provision of elements for scientific advice. The Workshop revisited the data the main end-user (CECAF) needs in the region.

In cases where the same observers are collecting biological data and acting in an MCS role concurrently, collaboration with the crew may be hampered and so reduce the effectiveness of the observer's scientific data collection efforts.

MAIN RECOMMENDATIONS

- The recurrent recommendation from the JSCs addressed to the SFPA Joint Committee (JC), to take the needed measures to impose the requirement that EU vessel owners must allow the embarkment of observers needs to be followed-up by the relevant parties.

- Coordination between the EU and CS to develop DCF and SFPA observer programmes, respectively, is essential to avoid temporal and spatial duplication of effort. Ideally this coordination should also include the use of same methodologies for data collection, through the tools provided during the Observer Workshop, and with follow up by the SFPA JSCs.

- Further steps for coordination among the DCF and SFPA observer programmes were identified during the Workshop. In the short term, mutual exchange of information between EU and CS focal points of deployment of observers (i.e. dates and vessels). In the medium term, possibility to alternate observer deployments between the two programmes may be considered. The possibility of developing annual Workshops should also be contemplated.

- Collaboration between EU and CS institutions in term of capacity building should be considered, especially for those CS where scientific observations have not been implemented so far and training needs have been clearly identified.

- There is a need to clarify the reporting obligations for observer programmes under the current protocols. Ideally, the reports from CS observers should be submitted to the EU in electronic format, to facilitate their analysis. A standard electronic system to store and process the observer information is recommended.

- As recommended by RCG-LDF (2018), the contribution of demersal fisheries in the area from MS other than Spain should be closely followed to determine if other MS fleets should be sampled within the DCF. If so, coordinated observers' programmes similar to the one established for small pelagic fisheries, are recommended.

RESUME EXECUTIF

CONTEXTE ET OBJECTIFS

La disponibilité d'informations détaillées sur les activités de pêche et sur la biologie des espèces exploitées est un élément essentiel pour l'évaluation des ressources halieutiques. Étant donné la diversité des flottes opérant dans les eaux atlantiques de l'Afrique de l'Ouest, l'obtention de ces informations constitue un défi important.

Les protocoles aux Accords de Partenariat pour la Pêche Durable (APPD) mixtes en Afrique de l'Ouest (Maroc, Mauritanie, Sénégal et Guinée-Bissau) contiennent des dispositions pour que les observateurs de ces pays montent à bord des navires de l'UE. Les États membres (EM) sont tenus de fournir des informations biologiques sur les ressources exploitées, dans le cadre du plan pluriannuel de l'UE pour la collecte des données (DCF). Pour les navires qui exploitent et déchargent leurs captures en dehors des eaux de l'UE, ces informations ne peuvent être obtenues que par des observateurs scientifiques. Bien que ces données d'observation soient analysées, il est possible de faire nouvelles analyses pour maximiser les informations obtenues. Il est nécessaire d'assurer que les schémas d'observation obtiennent des informations complémentaires afin de fournir les données nécessaires à la formulation des avis pour la gestion des pêches dans la région.

L'objectif principal du présent contrat spécifique est double : a) d'examiner et d'analyser en profondeur les informations disponibles au sein de la DG MARE et des EM afin de maximiser leur utilisation; b) analyser de manière critique ces informations afin d'identifier les points forts et les points faibles de la couverture des données, en vue d'établir un manuel standardisé pour l'utilisation des observateurs.

EXECUTION DES TACHES

Pour atteindre les objectifs du projet, les tâches suivantes ont été mises en œuvre:

Tâche 1. Inventaire et analyse des informations disponibles dans les centres de recherche de l'UE, les administrations des pêches de l'UE et la DG MARE

Afin d'établir la liste des obligations des observateurs dans le cadre du DCF et des APPD mixtes, tous les protocoles actuels (ou récemment périmés) des APPD entre l'UE et les pays d'Afrique de l'Ouest (Maroc, Mauritanie, Sénégal et Guinée-Bissau), ainsi que les exigences du règlement actuel de la DCF, ont été réexaminés.

En outre, les informations provenant des observateurs de l'UE à bord des navires de l'UE qui étaient disponibles dans deux des institutions du consortium (IEO et WMR), ainsi que les rapports des observateurs des États côtiers (CS, selon son sigle en anglais) disponibles au sein de la DG MARE jusqu'en juin 2019 ont été compilés au niveau des métadonnées et analysés plus en détail.

Les sous-tâches spécifiques de la tâche 1 sont : 1.1 Inventaire des obligations de la DCF et les APPD pour les observateurs scientifiques à bord des flottes de l'UE ; 1.2 Recherche et collecte de rapports des CS et analyse de l'utilisation et de la transmission des rapports d'observation des APPD ; 1.3 Inventaire et analyse des métadonnées disponibles dans le cadre des programmes d'observation des APPD et de la DCF.

Tâche 2. Évaluation de la mise en œuvre des programmes d'observation

Dans cette tâche, la pertinence des programmes d'échantillonnage existants pour les pêcheries démersales et de petits pélagiques a été déterminée et leur marge d'amélioration évaluée. Les données collectées par les observateurs ont été évaluées par rapport aux exigences en matière d'échantillonnage des APPD et de la DCF. Cette comparaison a permis d'identifier les lacunes et

les différences entre les différentes flottilles et pays en matière de collecte de données. La couverture par les observateurs (c-à-d : la proportion de jours observés et l'intensité d'échantillonnage) a été évaluée.

Tâche 3. Manuel d'opérations pour les observateurs

Sur la base des résultats des tâches 1 et 2, le Consortium a élaboré des manuels spécifiques adaptés aux particularités de chacun des métiers opérant dans les APPD. Ces manuels décrivaient les procédures d'échantillonnage, de façon à ce qu'elles puissent être facilement comprises par tout observateur potentiel.

Tâche 4. Atelier pour la standardisation des méthodes d'observation

Les projets de manuels ont été utilisés comme référence pour discuter et améliorer avec les scientifiques des CS- APPD et de l'UE, et d'autres parties concernées au cours d'un atelier de quatre jours tenu dans l'IEO-Ténériffe. L'objectif ultime de cette tâche était l'harmonisation des méthodologies entre les institutions de l'UE et de l'Afrique de l'Ouest impliquées dans des programmes d'observation à bord des quatre métiers examinées.

RÉSULTATS

Obligations des observateurs scientifiques à bord des flottes de l'UE dans la DCF et les APPD

Les informations compilées en la tâche 1 ont permis l'élaboration de tableaux récapitulatifs analysant les exigences en matière de données établies par la DCF. Elles ont été organisées par set de données (données biologiques par type de fraction, données nécessaires pour évaluer les incidences des pêcheries de l'UE sur les écosystèmes marins et de données détaillées sur l'activité des navires de l'UE), les exigences en matière de données per set et la tâche d'observation requises pour satisfaire à ces exigences. Les programmes actuels d'observation de la DCF ont été analysés par type de flotte afin de vérifier leur adéquation aux exigences du DCF.

Des tableaux récapitulatifs contenant des informations sur les exigences applicables aux observateurs à bord des navires de l'UE établis pour les APPD avec le Maroc, la Mauritanie, le Sénégal et la Guinée-Bissau ont été élaborés. Ces APPD ne sont pas uniformes sur la fonction d'observateur, et la nature de leurs tâches ne rend pas claire. Toutefois, tous les protocoles incluent «l'échantillonnage biologique dans le cadre des programmes scientifiques» parmi les tâches à accomplir par les observateurs pour clarifier le rôle scientifique des observateurs des APPD en plus de tout rôle potentiel de suivi, de contrôle et de surveillance (SCS).

Utilisation et transmission des rapports d'observateurs des APPD

Bien que les protocoles des APPD établissent que les rapports des observateurs devraient être transmis à l'UE, un nombre limité d'entre eux étaient disponibles à la DG MARE. Par conséquent, les modalités de transmission des rapports d'observation des APPD par les CS vers l'UE ont été recherchées par des contacts directs avec les administrations et/ou les institutions de ces CS et ont été précisés lors de l'Atelier des observateurs.

Les rapports du Maroc et du Sénégal sont régulièrement transmis par le ministère de la pêche à la DG MARE, mais des erreurs de transmissions ont été constatées. Les rapports des observateurs mauritaniens sont tenus à l'Institut Mauritanien de Recherches Océanographiques et des Pêches (IMROP) et ne sont envoyés à l'UE que sous demande.

La disponibilité des rapports des observateurs auprès des organismes de recherche concernés, tant dans l'UE que dans certaines CS, a été identifiée par les comités scientifiques conjoints

(CSC) des APPD comme un problème récurrent, ce qui se traduit par des informations limitées et des difficultés pour la mise en œuvre de leurs travaux.

Informations disponibles des programmes d'observation de la DCF et des APPD Programmes d'observation de la DCF

Aux fins de la présente étude, les informations d'observateurs DCF sur 80 marées disponibles dans les institutions de l'UE concernées, ont été rassemblées. Ils correspondaient à quatre types de métiers : 1) chalutiers crevettiers (OTB_CRU_>=40_0_0) opérant en Mauritanie et en Guinée-Bissau ; 2) chalutiers merlutièrs (OTB_DEF_>=70_0_0), au Maroc, en Mauritanie et au Sénégal ; 3) chalutiers céphalopodiers (OTB_MCF_>=70_0_0) en Guinée-Bissau et 4) chalutiers pélagiques (OTM_SPF_>=40_0_0), au Maroc et en Mauritanie. Au total, les informations de 1,704 jours de pêche et 7,681 opérations de pêche ont été inventoriées.

Les métadonnées obtenues à partir des rapports des observateurs de la DCF ont été classées en deux catégories : a) données sur les activités de pêche observées contenant des détails concernant les marées, détails opérationnels tels que la position et la profondeur et durée des traits, des captures (retenue et rejetée), météorologiques et, b) activités biologiques, y compris l'échantillonnage des fractions retenue et rejetée de la capture des tailles, des paramètres biologiques et/ou de la composition des espèces.

Programmes d'observation dans le cadre des APPD

La DG MARE a fourni au Consortium 37 rapports provenant des observateurs des APPD, correspondant à 55 marées et plus de 1,175 jours de mer de trois flottes de l'UE : chalutiers merlutièrs au Sénégal, palangriers de fond et chalutiers pélagiques au Maroc. La plupart de ces rapports présentaient une utilité très limitée à fins d'avis scientifique, étant donné que les informations recueillies étaient très élémentaires. Ces rapports portaient principalement les informations relatives aux activités de pêche (caractéristiques des navires et engins, zones, captures, etc.) et ne fournissent pas des informations biologiques. Le niveau de détail varie considérablement d'un rapport à l'autre et les espèces n'étaient pas identifiées de façon consistante.

Bilan des observateurs à l'égard des obligations de la DCF et des APPD Observateurs DCF

D'une manière générale, les résultats des observateurs par marée sont jugés suffisants pour satisfaire aux exigences du DCF pour l'ensemble des flottes. Cependant les niveaux de couverture atteints n'étaient pas toujours appropriés. La principale difficulté à atteindre les niveaux de couverture souhaités ou prévus est liée à la réticence de certains propriétaires de navires à prendre des observateurs à bord en raison de l'espace limité du navire. Ce problème spatial est renforcé par l'obligation, dans le cadre de la dernière série de protocoles, d'embarquer un certain nombre de marins en provenance de l'état côtier et a entravé la continuité et la régularité des programmes d'observation.

Certaines lacunes dans les informations des observateurs de la DCF ont été identifiées. Certaines étaient liées au manque de clarté des protocoles d'observation et devraient être résolus par l'inclusion d'instructions claires dans les nouveaux manuels élaborés. D'autres lacunes sont d'ordre logistique et parfois assez difficiles à résoudre.

Les données collectées par les observateurs DCF ont été, en général, suffisantes pour répondre aux besoins de la COPACE. L'écart le plus important est l'absence d'études d'âge pour les petits pélagiques, qui est un problème majeur dans la région, non seulement pour les flottes de l'UE, mais aussi pour la plupart des pêcheries de la région.

Observateurs des APPD

Les résultats des observateurs des APPD ne pourraient être évalués que par rapport aux exigences établies dans le cadre des protocoles respectifs. Certaines lacunes pourraient être identifiées en ce qui concerne la couverture d'observateurs, quand clairement défini dans le protocole (par exemple: Maroc). Les informations relatives à la pêche étaient très limitées dans les rapports du Maroc, bien que des rapports plus détaillés se trouvent au Ministère, tandis que les informations dans les rapports sénégalais étaient plus complets. Les rapports analysés ne contenaient aucune information biologique.

Manuels d'opérations pour les observateurs

Quatre manuels destinés aux observateurs scientifiques ont été élaborés en français, en tenant compte des particularités des quatre métiers concernés (chalutiers crevettiers, merlutièrs, céphalopodiers et pélagiques). Il s'agissait d'une structure commune composée d'une ***partie introductive*** (contexte, objectifs et aspects logistiques des programmes d'observation et aspects généraux de la pêche concernée), d'une section sur la ***méthode de travail à bord***, dans laquelle les différentes tâches incombant à l'observateur scientifique sont détaillées et d'une section comportant des ***annexes*** expliquant les procédures d'échantillonnage spécifiques pour chaque flotte.

Atelier pour la standardisation des méthodologies des observateurs

L'objectif principal de l'Atelier était de discuter, d'harmoniser et de mettre en œuvre les lignes directrices des projets de manuels destinés à être utilisés par des observateurs à bord des chalutiers démersales et pélagiques de l'UE qui opèrent dans le cadre des APPD en Afrique Occidentale. Les travaux se sont déroulés du 28 au 31 janvier 2020 dans l'IEO-Tenerife avec la présence de 26 participants du Maroc (2), de Mauritanie (4), du Sénégal (2), de la Gambie (1), de la Guinée-Bissau (2), de l'UE (14 d'Espagne, des Pays-Bas, de Pologne, de la DG MARE et de l'EASME) et de la FAO-COPACE (1).

Les ***termes de référence*** de l'atelier étaient les suivants :

1. Apprendre et, le cas échéant, améliorer le contenu et l'organisation des programmes nationaux (mis au point par les CS) et des programmes de l'UE (DCF) d'observateurs à bord des chalutiers démersales et pélagiques de l'UE, de manière coordonnée.

2. Définir des protocoles et des méthodologies standard qui seront utilisés par ces observateurs, en veillant à ce qu'ils respectent à la fois les exigences de la DCF et des APPD et répondent ainsi à la recommandation récurrente des Comités Scientifiques Conjoints (CSC) et de la COPACE quant à l'harmonisation des protocoles.

3. Identifier les principaux problèmes liés à la mise en œuvre et au développement de ces programmes d'observation (tant de l'UE que des états côtiers).

4. Promouvoir une meilleure coordination entre les programmes nationaux des états côtiers et les programmes «DCF» afin d'optimiser la couverture temporelle et spatiale et de répondre aux exigences établies.

L'Atelier a été un exercice fructueux auquel ont participé la plupart des parties concernées. Les discussions ont montré que la mise en œuvre intégrale des programmes d'observation dans tous les pays concernés demande encore du temps et du travail, bien que des programmes pilotes puissent être envisagés dans la mesure du possible. Jusqu'à présent, certains CS n'ont pas mis en œuvre de programmes scientifiques.

Si les projets de manuels élaborés devraient être considérés comme un premier pas vers l'amélioration de la collecte de données pour les avis scientifiques dans le cadre des CSC et de

la COPACE, la mise en place de programmes d'observateurs scientifiques appropriés et stables dans tous les pays concernés, y compris l'UE, est une condition préalable à la réussite de ces programmes.

PRINCIPALES CONCLUSIONS

1) La DCF et les protocoles des APPD contiennent des obligations pour l'UE et pour les CS respectivement en ce qui concerne l'élaboration de programmes d'observateurs scientifiques à bord des flottes de l'UE qui opèrent en l'Afrique de l'Ouest. Les exigences en matière d'échantillonnage pour les observateurs de l'UE sont définies dans la DCF. Toutefois, il n'existe pas de spécifications claires concernant les informations biologiques requises dans les protocoles des APPD.

2) C'est la première fois que les informations provenant des observateurs de l'UE dans les pays d'Afrique de l'Ouest avec APPD ont été inventoriées, ce qui donne un bon aperçu de la quantité et de la qualité des informations recueillies de 2014 à 2018 .

3) La qualité et la quantité des informations enregistrées par les observateurs à bord des navires de l'UE en l'Afrique de l'Ouest avec des APPD diffèrent fortement entre les programmes d'observation de l'UE (DCF) et les programmes d'observation des CS (APPD). Contrairement aux programmes de la DCF, les programmes d'observateurs des APPD existants ne couvrent généralement que l'observation des données relatives à la pêche et relèvent donc du SCS et ne comprennent pas de tâches scientifiques telles que l'échantillonnage biologique, bien que les protocoles des APPD les exigent.

4) Tous les états côtiers n'ont pas encore mis en œuvre des programmes d'observation scientifique, d'autres ont récemment repris, et pour d'autres, la collecte d'informations scientifiques est partielle ou occasionnelle.

5) Les informations des observateurs des APPD fournies aux CSC et à la COPACE sont très limitées et ces utilisateurs finaux formulent des recommandations récurrentes sur la mise en œuvre des programmes d'observation et sur l'utilisation de méthodologies standardisées entre les programmes d'observateurs des CS et de l'UE.

6) Il existe des défaillances manifestes en ce qui concerne la transmission des rapports des observateurs des APPD à l'UE malgré les obligations établies dans les protocoles. Certaines états côtiers n'ont jusqu'à présent pas transmis d'informations, tandis que les informations transmises par d'autres états côtiers sont incomplètes.

7) D'une manière générale, les informations fournies par les observateurs de l'UE suivent les exigences de la DCF, et de la COPACE même si certaines lacunes ont été identifiées en termes de couverture, de même que pour les observateurs APPD. Bien que les obligations juridiques (protocoles DCF et APPD) obligent les navires de l'UE à prendre à bord des observateurs scientifiques, la réticence de certains armateurs est l'un des principaux problèmes à résoudre pour rendre effectifs les programmes d'observateurs à bord des navires de l'UE en Afrique de l'Ouest.

8) Des manuels d'observation pour les quatre flottes ayant des programmes d'observateurs de l'UE (chalutiers crevettiers, merlutièrs, céphalopodiers et pélagiques) ont été élaborés afin de fournir des protocoles d'échantillonnage harmonisés pour orienter la mise en œuvre des activités d'observation, à la fois dans le cadre du DCF ou des APPD. L'objectif final est d'obtenir des informations homogènes et comparables qui puissent contribuer efficacement à l'amélioration de l'évaluation des stocks dans la zone COPACE et, par conséquent, à obtenir les meilleurs avis scientifiques des utilisateurs finaux concernés (CSC et COPACE).

9) L'Atelier sur normalisation des méthodes de l'observateur a impliqué la plupart des parties concernées pour produire les versions finales des manuels, en veillant à ce que les principes de l'échantillonnage soient respectés en vue d'une meilleure collecte de données.
Les manuels peuvent être considérés comme des documents de référence et peuvent, le cas échéant, être mis en œuvre avec une certaine souplesse.

10) La participation de toutes les parties prenantes à l'Atelier a été essentielle pour mieux connaître la situation des différents programmes d'observateurs dans les CS avec APPD.
Des observateurs au Sénégal, en Gambie et en Guinée-Bissau sont déployés exclusivement pour des tâches liées au SCS. La Mauritanie est le seul état côtier doté d'un programme d'observateurs scientifiques, qui a repris récemment. Le programme d'observation au
Maroc est conçu de manière à garantir le respect des dispositions légales et la fourniture d'éléments pour l'avis scientifique. L'Atelier a également réexaminé les données dont le principal utilisateur final (COPACE) a besoin dans la région.

11) Le rôle de SCS des observateurs dans certains pays peut être préjudiciable à la collecte d'informations scientifiques. La mission d'observation pourrait être considérée liée au contrôle et faire obstacle à la collaboration de l'équipage de navire.

PRINCIPALES RECOMMANDATIONS

- La recommandation récurrente des CSC adressée aux Commission mixtes des APPD de prendre les mesures nécessaires pour imposer l'obligation pour les propriétaires de navires de l'UE d'autoriser le débarquement d'observateurs doit faire l'objet de suivi.

- Il est essentiel d'assurer la coordination entre l'UE et les CS afin de mettre au point des programmes d'observation de la DCF et des APPD et d'éviter des duplicités dans le temps et dans l'espace. Idéalement, cette coordination devrait inclure l'utilisation de méthodes similaires pour la collecte de données, par l'intermédiaire des outils fournis lors de l'Atelier des observateurs et avec le suivi des CSC des APPD.

- D'autres étapes pour la coordination entre les programmes d'observation DCF et APPD ont été recensées au cours de l'atelier. À court terme, échange mutuel d'informations entre les points focaux UE et CS quant au déploiement des observateurs (dates et navires). À moyen terme, il convient de prendre en compte la possibilité de travailler à tour de rôle et de développer des ateliers annuels.

- Il convient de prendre en considération la collaboration entre les institutions de l'UE et celles des états côtiers en matière de renforcement des capacités, en particulier pour les
états côtiers où les observations scientifiques n'ont pas été mises en œuvre à ce jour et où les besoins de formation ont été clairement identifiés.

- Il est nécessaire de clarifier les obligations de transmissions des reports des observateurs dans le cadre des protocoles actuels. Idéalement, ces rapports des observateurs des CS devraient être soumis à l'UE sous forme électronique, afin de faciliter leur analyse.

- Comme le recommande le RCG-LDF (2018), la contribution des pêcheries démersales dans la zone des EM autres que l'Espagne devrait être suivie de près pour déterminer si d'autres flottes des EM doivent faire l'objet d'un échantillonnage dans le cadre de la DCF. Si tel est le cas, il est recommandé de mettre en place des programmes d'observation coordonnés, comme fait pour les pêcheries de petits pélagiques.

RESUMEN EJECUTIVO

ANTECEDENTES Y OBJETIVOS

La disponibilidad de información detallada sobre las actividades pesqueras y la biología de las especies explotadas es un elemento esencial para la evaluación de los recursos pesqueros. Dada la diversidad de flotas que operan en las aguas atlánticas de África occidental, la obtención de esta información constituye un reto importante.

Los textos de los protocolos de los Acuerdos de Colaboración de Pesca Sostenible (ACPS) mixtos en África occidental (Marruecos, Mauritania, Senegal y Guinea-Bissau) incluyen disposiciones sobre la presencia de observadores de estos países a bordo de los buques europeos. Los Estados Miembros (EM) están también obligados a proporcionar información biológica de los recursos explotados, en el contexto del plan plurianual de la UE (EU MAP, en sus siglas en inglés) para el programa marco de recopilación de datos (DCF, en sus siglas en inglés). En el caso de los buques que faenan y descargan sus capturas fuera de la UE, esta información solo puede obtenerse a través de observadores científicos. Aunque los datos de observadores se analizan periódicamente, existe un margen para nuevos análisis para maximizar esta información. Es necesario garantizar que los distintos programas de observadores proporcionen la información necesaria para la formulación de consejo científico para la gestión pesquera en la región.

El principal objetivo de este contrato específico es doble: a) examinar y analizar en profundidad la información disponible en DG MARE y en los EM con el fin de aprovecharla al máximo; b) analizar de forma crítica el contenido de esta información para identificar los puntos fuertes y débiles en la cobertura de los datos, con vistas a establecer un manual de observadores estandarizado.

EJECUCIÓN DEL TRABAJO

Para alcanzar los objetivos del proyecto, se realizaron las siguientes tareas y subtareas:

Tarea 1. Inventario y análisis de la información existente y disponible en los centros de investigación y administraciones pesqueras de la UE y en DG MARE

A fin de recopilar las obligaciones de los observadores en el contexto de la DCF y de los ACPS mixtos, se revisaron todos los protocolos actuales (o recientemente expirados) de los acuerdos mixtos entre la UE y los países de África occidental (Marruecos, Mauritania, Senegal y Guinea-Bissau), así como los requerimientos del reglamento actual de la DCF.

Además, se recopiló y se analizó a nivel de metadatos la información de los observadores europeos a bordo de buques de la UE que estaba disponible en dos instituciones del Consorcio (IEO y WMR), así como los informes de observadores de los países ribereños (CS, en sus siglas inglesas) disponibles en DG MARE hasta junio de 2019.

Las subtareas específicas de la Tarea 1 son: 1.1 Inventario de los requerimientos de datos de observadores científicos a bordo de las flotas de la UE establecidos en la DCF y ACPS; 1.2 Búsqueda y recopilación de informes de CS y análisis del uso y la transmisión de informes de observadores de los ACPS; 1.3 Inventario y análisis de metadatos disponibles en el marco de los programas de observadores de los ACPS y de la DCF.

Tarea 2. Evaluación de la implementación de los esquemas de observadores

En esta tarea se analizó la idoneidad de los programas de muestreo existentes para las pesquerías demersales y de pequeños pelágicos para evaluar su margen de mejora. Se evaluaron los datos tomados por los observadores frente a los requerimientos establecidos por los ACPS y la DCF. Esta comparación permitió identificar lagunas y posibles diferencias entre

países o flotas en la toma de datos. También se evaluó la cobertura de observadores (ej.: en proporción de días observados e intensidad del muestreo).

Tarea 3. Manual de operaciones para observadores

En base a las conclusiones de las Tareas 1 y 2, el Consorcio preparó unos manuales adaptados a las particularidades de cada uno de los métiers que operan en el marco de los ACPS. Estos borradores describían claramente los procedimientos de muestreo a seguir por los observadores.

Tarea 4. Taller de estandarización de metodologías de observadores

Estos borradores de manuales se utilizaron como base para ser debatidos y mejorados con los científicos de los CS con SFPA, de la UE y otras partes interesadas, durante un taller de cuatro días celebrado en el IEO de Tenerife. El objetivo último de esta tarea era la estandarización de metodologías entre las instituciones de la UE y de África occidental implicadas en programas de observación a bordo de las cuatro flotas consideradas.

RESULTADOS

Requerimientos de datos de observadores científicos a bordo de las flotas de la UE establecidos en la DCF y en los ACPS

La información recopilada en la Tarea 1 permitió la preparación de tablas resumen de los requerimientos de datos de la DCF, que se organizaron por sets de datos (datos biológicos para cada fracción de la captura, datos para evaluar el impacto de la pesca de la UE en los ecosistemas marinos y datos detallados sobre la actividad de los buques de la UE), requerimientos para cada set de datos y las tareas del observador necesarias para cumplir estos requerimientos. Se analizaron los programas de observación de la DCF existentes, por tipo de flota, para comprobar su adaptación a los requerimientos de la DCF en términos de la cobertura de observadores prevista y de las tareas a realizar.

Asimismo, se prepararon tablas resumen de los requerimientos para los observadores a bordo de los buques de la UE establecidos en los ACPS de Marruecos, Mauritania, Senegal y Guinea-Bissau. Los textos de estos ACPS no son uniformes en relación a la función del observador, por lo que la naturaleza de sus tareas no resulta clara. Solo el protocolo de Mauritania especifica claramente la finalidad científica del trabajo de los observadores. Sin embargo, todos los protocolos incluyen *"muestreo biológico en el contexto de programas científicos"* entre las tareas a realizar por los observadores, lo que puede aclarar el papel científico de los observadores de los ACPS, aparte de cualquier posible función de seguimiento, control y vigilancia (SCV).

Uso y transmisión de los informes de observadores de ACPS

A pesar de que los protocolos de los ACPS establecen que los informes de los observadores deben transmitirse a la UE, solo un número limitado de ellos está disponible en DG MARE. Por ello se investigaron las vías de transmisión de estos informes desde los CS a la UE a través de contactos directos con las administraciones y/o instituciones de los CS, y en mayor medida, durante el Taller.

Los informes de Marruecos y Senegal se envían periódicamente de los respectivos Ministerios de Pesca a DG MARE. Ha habido fallos de trasmisión en ambos casos, ya que no todos los informes han sido recibidos o almacenados en DG MARE. Los informes de los observadores mauritanos están en el Instituto Mauritano de Investigación Oceanográfica y Pesquera (IMROP) y solo se envían a la UE mediante solicitud directa.

Uno de los problemas identificados por los Comités Científicos Conjuntos (CCC) de los ACPS ha sido que los informes de observadores no se envían a los centros de investigación de los CS ni de la UE, lo que ha dificultado la ejecución de su trabajo por falta de información.

Información disponible de los programas de observación de la DCF y de ACPS

Programas de observadores de la DCF

Para el presente estudio se ha recopilado, a través de las instituciones europeas implicadas, información de 80 mareas de pesca observadas en el marco de la DCF. La información recopilada correspondía a cuatro tipos de métiers: 1) arrastreros marisqueros (OTB_CRU_>=40_0_0), en Mauritania y Guinea-Bissau; 2) arrastreros de merluza negra (OTB_DEF_>=70_0_0), en Marruecos, Mauritania y Senegal; 3) arrastreros de cefalópodos y peces de aleta (OTB_MCF_>=70_0_0), en Guinea-Bissau y 4) arrastreros pelágicos (OTM_SPF_>=40_0_0), en Marruecos y Mauritania. Se recopiló información de un total de 1704 días de pesca y 7681 lances de pesca.

Los metadatos obtenidos se clasificaron en dos grupos: a) datos sobre la actividad pesquera observada y en particular, datos de la marea, de la operaciones de pesca (posiciones y profundidad de pesca, duración de los lances, etc.), de las capturas (retenidas y descartadas), meteorológicos; b) actividades biológicas, que incluyen los muestreos de la fracción retenida y descartada de la captura para tallas, obtención de parámetros biológicos y/o composición de especies.

Programas de observadores de los ACPS

DG MARE proporcionó al consorcio un total de 37 informes de observadores de ACPS para su análisis en el contexto del presente estudio. Estos informes corresponden a 55 mareas con más de 1175 días de mar observados en tres flotas europeas: arrastreros de merluza negra en Senegal, palangreros de fondo y arrastreros pelágicos en Marruecos. La mayoría de estos informes tenían una utilidad muy limitada a efectos de asesoramiento científico, ya que la información que contienen es muy básica. Estaban enfocados a la obtención de información sobre la actividad pesquera (características del buque y de los artes, zona de pesca, capturas, etc.) y carecían de información biológica. El nivel de detalle variaba considerablemente de un informe a otro y las especies no se identificaban de forma consistente.

Cumplimientos de los observadores frente a los requerimientos DCF y

ACPS Observadores de la DCF

En general y para todas las flotas, se considera que la información recopilada por los observadores en cada marea es adecuada para cumplir con los requerimientos de la DCF, aunque a veces no se alcanzaron los niveles de cobertura adecuados. La principal dificultad para alcanzar los niveles de cobertura requeridos está relacionada con la reticencia de algunos armadores a embarcar observadores a bordo de sus buques, alegando problemas de espacio. Este problema de espacio se ha visto empeorado en el marco de los últimos protocolos, por la obligación de embarcar a marineros de los CS, dificultando la continuidad y regularidad de los programas de observación.

Se han detectado ciertas lagunas en la información de los observadores de la DCF. Algunas, relacionadas con la falta de claridad en los planes de observación, podrán ser resueltas pronto mediante la inclusión de instrucciones claras en los nuevos manuales elaborados en la Tarea 3. Otras lagunas, relacionadas con circunstancias logísticas, pueden ser más difíciles de resolver.

Los datos tomados por los observadores de la DCF han sido, en general, suficientes para dar respuesta a las necesidades de CPACO. La laguna más importante es la falta de estudios de

crecimiento en especies de pequeños pelágicos, que constituye un gran problema en la región, no solo para las flotas de la UE, sino para la mayoría de las pesquerías de CPACO.

Observadores de los ACPS

El cumplimiento de los observadores de los ACPS solo pudo ser evaluado en relación a los requerimientos establecidos en los respectivos protocolos. Se detectaron fallos en la cobertura de observadores, en los casos en la que estaba claramente definida en el Protocolo (Marruecos). La información pesquera recopilada fue muy limitada en los informes marroquíes (aunque existen informes más detallados en su Ministerio) y en general bastante completa en los informes de Senegal. Ninguno de los informes analizados contenía información biológica.

Manuales de operaciones para observadores

En el marco del proyecto se elaboraron cuatro manuales para observadores científicos en francés, uno para cada pesquería (arrastreros marisqueros, de merluza negra, cefalopoderos y pelágicos). Estos manuales tienen una estructura común que consta de una ***parte introductoria*** (contexto, objetivos y aspectos logísticos de los programas de observadores y aspectos generales de la pesquería en cuestión), una sección sobre el ***método de trabajo a bordo***, donde se detallan las distintas tareas que debe realizar el observador científico y una sección con ***anexos*** que explican los procedimientos de muestreo específicos para cada flota.

Taller de estandarización de metodologías de observadores

El principal objetivo del taller era discutir, estandarizar y aplicar las directrices de los borradores de los manuales para observadores a bordo de los arrastreros demersales y pelágicos de la UE que operan en países de África occidental con ACPS. El Taller tuvo lugar del 28 al 31 de enero de 2020 en el IEO de Tenerife, con la asistencia de 26 participantes de Marruecos (2), Mauritania (4), Senegal (2), Gambia (1), Guinea-Bissau (2), UE (14 de España, Países Bajos, Polonia, DG MARE y EASME) y FAO-CPACO (1).

Los términos de referencia del taller fueron las siguientes:

1. Conocer y, en caso necesario, mejorar de manera coordinada el contenido y la organización de los programas nacionales (desarrollados por los CS) y los programas de la UE (de la DCF) de observadores en arrastreros demersales y pelágicos de la UE.

2. Definir protocolos y métodos estandarizados para los observadores, que se ajusten a los requerimientos de los ACPS y de la DCF y que puedan dar respuesta a las recomendaciones recurrentes de los CCC de los ACPS y de CPACO.

3. Identificar los principales problemas de ejecución y/o desarrollo de estos programas de observadores, tanto de la UE como de los países ribereños.

4. Promover la coordinación entre los programas nacionales y de la DCF para optimizar su cobertura temporal y espacial, cumpliendo los requerimientos establecidos.

El taller fue un ejercicio fructífero que implicó a la mayoría de las partes interesadas, incluidos los usuarios finales. Los debates pusieron de manifiesto que la implementación total de los programas de observadores en todos los países implicados requiere más tiempo y trabajo, si bien se podrían considerar programas piloto en la medida de lo posible. Algunos países carecen de programas científicos hasta el momento.

Si bien los borradores de los manuales deben considerarse como un primer paso para mejorar la toma de datos necesarios para el asesoramiento científico en el contexto de los CCC y de CPACO, es indispensable el establecimiento de programas adecuados y duraderos de observadores científicos en todos los países implicados, incluida la UE.

CONCLUSIONES PRINCIPALES

1) Existen obligaciones de desarrollar programas de observación científica a bordo de las flotas demersales y pelágicas de la UE que faenan en caladeros de África occidental a través de los ACPS mixtos, establecidas en la DCF y en los protocolos de los ACPS, para la UE y para los CS, respectivamente. Los requerimientos de muestreo para los observadores de la UE están especificados en la DCF. Sin embargo, no existen especificaciones claras sobre la información biológica requerida en los ACPS.

2) Es la primera vez que se realiza un inventario de la información de los programas de observadores de la UE en los países de África occidental con ACPS, que ha permitido una buena visión general de la cantidad y la calidad de la información recogida desde 2014 hasta 2018.

3) La calidad y la cantidad de la información de los observadores a bordo de los buques de la UE en aguas de África occidental con ACPS difiere considerablemente entre los programas de observación de la UE (DCF) y los de los países costeros (ACPS). A diferencia de los programas de observadores de la DCF, los programas existentes de los ACPS suelen abarcar únicamente la toma de datos relacionados con la pesca (y por tanto más relacionados con MCS) y no incluyen tareas científicas, como muestreos biológicos, a pesar de ser exigidas por los protocolos de los ACPS.

4) La situación de los programas de observación científica difiere entre los países costeros: no todos los tienen, alguno los han reanudado recientemente y en otros, la recopilación de información científica es parcial u ocasional.

5) La información de observadores de los ACPS facilitada a los CCC y a CPACO es muy limitada. Por ello, estos usuarios finales recomiendan de forma recurrente la implementación o reanudación de los programas de observadores y el uso de metodologías estandarizadas entre los programas de los CS y de la UE.

6) Hay fallos en la transmisión de los informes de observadores de los CS a la UE, a pesar de las obligaciones establecidas en los protocolos. Algunos CS no han transmitido ningún informe hasta el momento, mientras que la información transmitida por otros es incompleta.

7) En general, la información de los observadores de la UE sigue los requisitos de la DCF y en general, los de CPACO, aunque se han detectado algunas deficiencias en términos de cobertura, que son comunes a los programas de los ACPS. A pesar de que los barcos de la UE están legalmente obligados a llevar observadores a bordo, la reticencia de algunos armadores a hacerlo es uno de los mayores problemas a resolver para mejorar la cobertura y efectividad de los programas de observadores a bordo de barcos europeos en África occidental.

8) Se han elaborado manuales de observadores para las cuatro flotas con programas de observadores de la UE (arrastreros marisqueros, de merluza negra, de cefalópodos-peces de aleta y pelágicos), con el fin de proporcionar protocolos de muestreo claros y armonizados entre la UT y los CS para cada pesquería. Esto permitirá la obtención de datos comparables para contribuir eficazmente a la mejora de las evaluaciones de los stocks realizadas en el marco de CPACO y, por tanto, obtener el mejor asesoramiento científico de los usuarios finales (CCC de los ACPS y CPACO).

9) La mayoría de las partes interesadas, incluidos los usuarios finales, participaron activamente en el Taller de estandarización de metodologías de observadores, contribuyendo en la producción de las versiones finales de los manuales y garantizando que se sigan los principios de muestreo para mejorar la toma de datos. Los manuales pueden

considerarse documentos de referencia y pueden utilizarse, cuando sea necesario, con un cierto grado de flexibilidad.

10) La participación de todas las partes interesadas en el taller fue crucial para conocer la situación de los distintos programas de observadores de los CS con ACPS. Los observadores en Senegal, Gambia y Guinea-Bissau solo realizan funciones de SCV. Mauritania es el único país costero con un programa de observación científica, reanudado recientemente. El programa de observadores en Marruecos está concebido para garantizar tanto el cumplimiento de las disposiciones legales como para proporcionar información para el asesoramiento científico. El taller también permitió la revisión de las necesidades de datos de CPACO en la región.

11) En aquellos casos en los que los mismos observadores toman datos biológicos y tienen funciones de SCV, la colaboración de la tripulación podría obstaculizarse y por tanto, reducirse la efectividad del trabajo del observador en la toma de información científica.

RECOMENDACIONES PRINCIPALES

- Las recomendaciones recurrentes de los CCC dirigidas a la Comisiones Mixtas de los ACPS, sobre la adopción de las medidas necesarias para imponer a los armadores de los buques de la UE el embarque de observadores, deben ser objeto de seguimiento.

- La coordinación entre la UE y los CS para desarrollar programas de observación de la DCF y de los ACPS, respectivamente, es esencial para evitar la duplicación temporal y espacial de esfuerzos. Idealmente, esta coordinación debe implicar el uso de las mismas metodologías para la toma de datos, a través de las herramientas proporcionadas durante el Taller y con el seguimiento de los CCC de los ACPS.

- Durante el taller se determinaron algunos pasos para la coordinación entre los programas de observadores de la DCF y de ACPS. A corto plazo, intercambio de información entre puntos focales de la UE y de los CS sobre el embarque de de observadores (fechas y barcos). A medio plazo, debe tenerse en cuenta la posibilidad de alternar los programas de observadores de una misma pesquería y contemplar la posibilidad de realizar talleres anuales.

- Debe considerarse la necesidad de colaboración entre las instituciones de la UE y de los CS en materia desarrollo de capacidades, especialmente en el caso de aquellos países que aún no han implementado las observaciones científicas hasta la fecha y que tienen claras necesidades de formación.

- Es necesario aclarar las obligaciones de trasmisión de informes de observadores de los ACPS en el marco de los protocolos actuales. Lo ideal sería que los informes se presentaran a la UE en formato electrónico para facilitar su análisis. Se recomienda un sistema electrónico estandarizado para almacenar y procesar la información de los observadores.

- De acuerdo con las recomendaciones del RCG-LDF (2018), se debe hacer seguimiento a la contribución de otros EM distintos de España en las pesquerías demersales realizadas en CS con ACPS, para determinar si estos EM deben iniciar muestreos en el marco de la DCF. Si así fuera, se recomienda coordinar los programas de observadores entre los EM, como se realiza para las pesquerías de pequeños pelágicos.

1 INTRODUCTION

The Executive Agency for Small and Medium-sized Enterprises (EASME) has commissioned the AZTI led Consortium (AZTI, IEO, IRD, AGROCAMPUS OUEST, CEFAS, WMR, IPMA, MRAG) for the Framework Contract EASME/EMFF/2016/008 for the "Provision of scientific advice for fisheries beyond EU waters". The present final report refers to the Specific Contract (SC) No 12 within this framework.

The texts of the relevant protocols for mixed SFPAs in West Africa (Morocco, Mauritania, Senegal and Guinea-Bissau) include provisions regarding the presence of observers from these countries on board EU vessels. In addition, Member States (MS) whose vessels operate and unload their catches outside EU waters are obliged to provide biological information from the exploited resources, under the EU Multi-Annual Programme (EU MAP) for the Data Collection Framework (DCF) that only can be obtained through observers on board the fleets concerned[1]. However, the implementation of the observer schemes can be irregular, mainly due to the reluctance of ship owners to admit them on board. Although observer data obtained under the DCF are regularly analysed, there is scope for further analyses to allow maximising the information to be potentially obtained from their reports.

The main objective of this Specific Contract is twofold:

a) to scrutinise and deeply analyse the available information in DG MARE and Member States in order to maximise the use of the information available;

b) to critically analyse the content of these reports to identify strengths and weaknesses in data coverage, with a view to establish a standardised manual for the use of the observers. A Workshop to standardise observer methodologies will be organised including the participation of scientists and/or observers from Morocco, Mauritania, Senegal, Guinea-Bissau and the Gambia.

To achieve the purpose of the project, the following tasks and subtasks were planned:

Task 0. Project management and quality control

0.1 Coordination.
0.2 Meetings.
0.3 Reporting.
0.4 Quality control.

Task 1. Inventory and analysis of information existing and available at EU research centres, EU fisheries administrations and DG MARE

1.1. Inventory of the DCF and mixed SFPA requirements from scientific observers on board EU fleets.
1.2. Inventory and analysis of metadata available under the mixed SFPA and DCF observer programmes.

Task 2. Assessment of the implementation of the observer schemes

Task 3. Operations manual for observers

Task 4. Workshop for standardisation of observer methodologies

[1] For those métiers with first sale taking place at the MS, biological information can be obtained thought landings sampling.

Scope of the study

The study covers West African countries with past or current mixed SFPAs in place, namely Morocco, Mauritania, Senegal, Guinea-Bissau and the Gambia. Demersal and/or small pelagic fisheries developed by the EU in these coastal states (CS) are considered while tuna fisheries are out of the scope of this study.

Objectives and structure of the Final report

The objective of the Final Report is to provide the results from Task 1, Task 2, Task 3 and Task 4. The list of the milestones (MS) for each Task, as planned in the Inception Report, is given in the following table:

Mil. no.	Milestone name	Task no.
MS 1.1	Inventory of the list of obligations for observers established by the DCF and SFPAs	1
MS 1.2	Inventory of the observer metadata from the demersal shrimper trawler fleet	1
MS 1.3	Inventory of the observer metadata from the demersal black hake trawler fleet	1
MS 1.4	Inventory of the observer metadata from the demersal cephalopod-finfish trawler fleet	1
MS 1.5	Inventory of the observer metadata available from the pelagic trawler fleet	1
MS 1.6	List of the reports available from coastal states observers hosted in DG MARE and an inventory of metadata available produced from a sample of the reports	1
MS 2.1	Critical review and assessment of existing data collected under current protocols against previous DCF and SFPA requirements	2
MS 2.2	Assessment of potentially needed changes to data reporting protocols under latest DCF and SFPA requirements	2
MS 2.3	Based on MS 2.1 and 2.2, summary of inputs to be considered for the development of manuals in Task 3	2
MS 3.1	Organization and participation in the internal meeting for standardization of EU observers' protocols	3
MS 3.2	Observer manual for demersal shrimper trawlers	3
MS 3.3	Observer manual for demersal black hake trawlers	3
MS 3.4	Observer manual for demersal cephalopods-finfish trawlers	3
MS 3.5	Observer manual for pelagic trawlers	3
MS 4.1	Organization and participation in the Workshop for standardization of observers' protocols	4

Some relevant documents produced during the development of the project are listed in Annex 13.

The contents of this Final Report have been structured as follows:

- The objectives and methodological approach follow for Task 1, Task 2, Task 3 and Task 4 are presented in Section 2.

- Section 3 presents the results of the four tasks.
- Section 4 summarizes main conclusions of the study.
- Some future recommendations are presented in Section 5.

The work, deliverables and milestones presented in and together with this Final Report was carried out by several partners from the Consortium (IEO, MRAG, WMR and CEFAS). Corten Marine Research (CMR) from the Netherlands participated in the project as a subcontractor, providing expertise in relation to observers on board pelagic trawlers, as this company was contracted for the observer sampling programme on these vessels in CECAF of the DCF during the period 2012-2017.

2 OBJECTIVES AND METHODOLOGICAL APPROACH

2.1 TASK 1 - INVENTORY AND ANALYSIS OF INFORMATION EXISTING AND AVAILABLE AT EU RESEARCH CENTRES AND DG MARE

Objectives

This task's objectives were to compile a list of obligations for observers in the context of the DCF and the mixed SFPAs and to collect and process the information available on demersal and small pelagic fisheries, from EU research institutions, fisheries administrations and DG MARE over the last 5 years.

Specific sub-tasks within Task 1 were as follows:

- 1.1 Inventory of the DCF and SFPA requirements from scientific observers on board EU fleets.
- 1.2 Search and collection of reports from coastal states and analysis of the use and transmission of SFPA observer reports.
- 1.3 Inventory and analysis of metadata available under the SFPA and DCF observer programmes.

Methodology

<u>Sub-task 1.1</u> - Inventory of the DCF and SFPA requirements from scientific observers on board EU fleets

All current (or recently expired) protocols for mixed SFPAs between the EU and West African countries (Morocco, Mauritania, Senegal and Guinea-Bissau), as well as the requirements of the current DCF regulation, were reviewed.

This was facilitated through the development of different templates: the first to outline the type of data required under the DCF and SFPA and the second to include the tasks assigned to EU observers in the existing observers' programmes to meet the DCF requirements.

<u>Sub-task 1.2</u> - Search and collection of reports from coastal states and analysis of the use and transmission of SFPA observer reports.

There is no clear information on where the reports from the SFPA-CS are usually submitted. A small number of reports were held by DG MARE, and were made available to the Consortium. DG MARE was in charge of contacting MS to collect available reports from demersal and small pelagic fisheries. Consortium members from MS with fisheries in the relevant geographic area contacted their national fisheries administrations to search for these reports. Informal contacts were made with the CS institutions to find out where these reports are usually sent to and

other relevant information in relation to the observers' programmes. Once these sources were searched, available observer reports were collected for analysis.

An analysis of the available information on the CS institutions involved in the observer programmes, and the use and transmission of the information from SFPA observer reports was added to this Subtask.

Sub-task 1.3 - Inventory and analysis of metadata available under the SFPA and DCF observers' programmes

The data available under the mixed SFPA and DCF programmes outlined above were compiled at metadata level and analysed. The information available was the following:

a) Information obtained from EU observers on EU vessels operating in West African CS within SFPAs. Two institutions from the Consortium host data for the fleets with observer programmes during the period considered for this study: IEO for demersal fleets and WMR for pelagic trawlers.

b) Information from SFPA-CS observers. All reports available in DG MARE up to June 2019 were provided by DG MARE to the Consortium.

2.2 TASK 2 – ASSESSMENT OF THE IMPLEMENTATION OF THE OBSERVER SCHEMES

Objectives

The objective was to assess implementation of observer schemes in the context of mixed SFPAs and the DCF by identifying the appropriateness of the existing sampling programmes for demersal and small pelagic fisheries and scope for improvement.

This task determined whether observer data is adequate and whether data collection protocols require updating.

Methodology

Data collected by observers against the requirements set out in the latest SFPA and DCF sampling requirements were assessed. Templates developed under Task 1 summarising sampling requirements under the mixed SFPAs and DCF were compared to the metadata inventories containing observer data. This comparison was used to assess implementation of observer programmes and identified data collection gaps and fleet or country-specific differences in data collection. Observer coverage, i.e. proportion of days observed and sampling intensity, was also assessed.

The outputs from this task contributed to development of the manuals (Task 3) and Workshop (Task 4).

2.3 TASK 3 – OPERATIONS MANUAL FOR OBSERVERS

Objectives

The objective was to elaborate standard manuals to guide the implementation of observer activities both under the DCF or SFPAs, and with particular attention to their standardization.

Methodology

Specific manuals were developed for each of the fleets concerned (shrimper, black hake, cephalopod-finfish and pelagic trawlers) due to their different characteristics and the need to adapt the observer's work to vessel conditions and fishing work dynamics. The existing

manuals used for the three demersal fleets (developed by IEO) and for pelagic trawlers (developed by CMR and MIR-Poland) were used as a base to develop the new requested manuals. Clear guidelines were included to avoid the potential limitations in data coverage identified in Task 2.

For the standardization of protocols common to demersal fisheries, an internal two day meeting was carried out in Cádiz (Spain) on the 24th and 25th of September 2019, involving the six IEO relevant key experts of the three demersal fleets with an observer program.

Draft versions of the manuals were prepared by IEO (for demersal fleets) and CEFAS, CMR, WMR and IEO (for pelagic trawlers). Due to the relationship with the work coordinated by the RCG-LDF, the chairman of this RCG (from WMR) and an expert from MIR (Poland), as the coordinating institution of the current multilateral agreement for the DCF of EU pelagic trawlers in the CECAF waters, closely followed the development of the manual for pelagic trawlers, in order to ensure consistency with the work to be performed by MIR observers.

Manuals were prepared in French and outlined the sampling procedures in a very simple manner so they can be easily understood by any potential observer. For quality control, the draft manuals were reviewed by a partner not involved in these observers' programmes (MRAG).

These draft versions were used during the Workshop (Task 4) as a baseline to be discussed and improved with the scientists from the SFPA CS and other relevant stakeholders, in order to standardize methodologies among the EU and West African institutions involved in observer programmes on board the four fleets considered.

2.4 TASK 4 – WORKSHOP FOR STANDARDIZATION OF OBSERVERS' METHODOLOGIES

Objectives

The objective of this task was to organize and hold a workshop to discuss, standardize and implement the guidelines from the draft observer manuals produced ahead of the workshop. For such, it also aimed at bringing together the scientists in charge of observer programmes from the EU as well as from Morocco, Mauritania, Senegal, Guinea-Bissau and the Gambia, with other relevant stakeholders, in order to create a forum of discussion where experiences and insights could be exchanged.

Methodology

The 4-day international Workshop involved the experts from the Consortium (coordinators of observer programmes, DCF contracted experts, RCG-LDF chairman), a Subcontractor (CMR) and an invitation to other EU experts (MIR-Poland), scientists from the relevant institutions of CS with SFPA and other relevant stakeholders (FAO-CECAF, DG MARE, EASME) (see Annex 11).

The Workshop was held at IEO-Tenerife, which facilitated travel for participants from West Africa, as well as good flight connections within Europe. The Workshop was tentatively scheduled between October and November 2019, although it was finally postponed to avoid overlapping with other relevant meetings in the region that involved the attendance of the same participants. The final dates of the Workshop agreed between the Consortium and DG MARE/EASME were 28th-31st January 2020.

Although the Workshop language was mainly French, English was also used to facilitate the attendance of relevant stakeholders (i.e., MIR-Poland, the Gambia, EU participants). Thus, on

contrary to what was initially planned, an interpreter service was contracted, to ensure fluent communications between all attendants.

The Terms of reference and Agenda were prepared by the coordinator and agreed with DG MARE. English and French versions of these documents were sent in advance to all participants, together with the observer draft manuals to be discussed during the Workshop.

3 RESULTS

3.1 TASK 1- INVENTORY AND ANALYSIS OF INFORMATION EXISTING AND AVAILABLE AT EU RESEARCH CENTRES AND DG MARE

3.1.1 SUBTASK 1.1.- INVENTORY OF THE DCF AND SFPA REQUIREMENTS FROM SCIENTIFIC OBSERVERS ON BOARD EU FLEETS

DCF requirements

Sampling requirements were taken from Commission Implementing Decision (EU) 2016/1251 of July 2016 adopting a multiannual Union programme for the collection, management and use of data in the fisheries and aquaculture sectors for the period 2017-2019[1] (EU, 2016) (EU MAP). The last Commission Delegated Decision (EU) 2019/910 of 2019 establishing the multiannual Union programme for the collection and management of biological, environmental, technical and socioeconomic data in the fisheries and aquaculture sectors[2] (EU, 2019) will not be in force until 2020.

Data requirements are established in Chapter III of EU MAP, organized in the three following data sets, in this case, for fleets operating outside EU waters:

a) Biological data by catch fraction, on stocks caught outside EU waters.

b) Data to assess the impact of EU fisheries on marine ecosystems outside EU waters.

c) Detailed data on the activity of EU vessels outside EU waters.

Some of this information, e.g. biological data of discards or catch which is processed before landing, incidental by-catch of seabirds, marine mammals and other protected species, can only be collected by on-board observers. For most fisheries, biological information of the retained catch fraction can also be only obtained by scientific observers, as landings occur at CS ports.

A summary of the data requirements established by the DCF, organized by the above mentioned data sets and with the observer task needed to meet these requirements, is provided in Table 1. Detailed procedures of the tasks to be performed by the observers to achieve the DCF obligations established are described in the specific observers' programmes and summarized in Table 2.

1 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016D1251&from=EN
2 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019D0910&from=EN

Table 1- Summary of data requirements under DCF organized by data sets, with the consequent task of the on board observer to meet them.

DATA SET	REQUIREMENT FOR COMMERCIAL FISHERIES OUTSIDE EU WATERS	OBSERVER TASKS TO MEET THE REQUIREMENTS
Biological data *on stocks caught by Union commercial fisheries:* *(a) Catch quantities by species and biological data from individual specimens enabling the estimation of:*	*(i)* ***Volume and length frequency of all catch fractions*** *(including discards and unwanted catches) for:* - *The stocks listed in Table 1C (EU MAP). In this case: Stocks in marine regions under RFMOS and SFPAs: FAO marine area 34 — CECAF* - *At the aggregation level 6 as set out in Table 2*[1]*.* • Bottom otter trawl targeting crustaceans, mesh size >= 40 mm (OTB_CRU_>=40_0_0) • Bottom otter trawl targeting demersal fish, mesh size >= 70 mm (OTB_DEF_>=70_0_0) • Bottom otter trawl targeting mixed cephalopod and demersal, mesh size >= 70 mm (OTB_MCF_>=70_0_0) • Midwater otter trawl targeting small pelagic fish, mesh size >= 40 mm (OTM_SPF_>=40_0_0) *Temporal resolution coordinated at marine region level based on end-user needs.*	**Retained catch fraction:** - Identification and record weight of all species (both target and by-catch species) in the retained catch fraction, by haul. - Estimation of weight and number, by species in randomly selected hauls. - Length samplings of target and by-catch species in the retained catch fraction, in randomly selected hauls. **Discard fraction:** - Estimation of weight of the discard fraction by haul. - Discard sampling: species identification, estimation of weight and number of all species in discards, in randomly selected hauls. - Length samplings of most important species in discards, in randomly selected hauls. (Minimum: all species in Table 1C).
(ii)	***Mean-weight and age distribution of catches*** *for stocks listed in Table 1C (EU MAP). Selection of stocks and temporal resolution coordinated at marine region level based on end-user needs.*	**Biological samplings** of target species: length, weight, age (small pelagic), sex and maturity[2], in randomly selected hauls. Metiers/stocks: - OTB_CRU_>=40_0_0→ *Penaeus notialis* and *Parapenaeus longirostris* - OTB_DEF_>=70_0_0→ *Merluccius polli* and *M. senegalensis* - OTB_MCF_>=70_0_0→ *M. polli, Trachurus trecae, Octopus vulgaris* and *Sepia hierredda* OTM_SPF_>=40_0_0→ *Sardinella aurita*, *Sardina pilchardus*,
	(iii) ***Sex-ratio, maturity and fecundity data*** *for stocks listed in Table 1C of catches needed for scientific advice.* *Selection of stocks and temporal resolution coordinated at marine region level based on end-user needs.*	

[1] Fishing activity (metier) by region. Levels 1 to 6: Activity (1), Gear class (2), Gear groups (3), Gear type (4), Target assemblage (5), Mesh size and other selective devices (6).

[2] Age and fecundity data of demersal stocks and fecundity data of small pelagic stocks not required by end-user (CECAF) for assessment purpose.

Table 1 (cont.)

DATA SET	REQUIREMENT FOR COMMERCIAL FISHERIES OUTSIDE EU WATERS	OBSERVER TASKS TO MEET THE REQUIREMENTS
Data to assess the impact of Union fisheries on marine ecosystems	*a) For all type of fisheries,* ***incidental by-catch*** *of all birds, mammals and reptiles and fish protected under Union legislation and international agreements, including absence in the catch, during scientific observer trips on fishing ships.*	Record of presence/absence of incidental by-catch of marine mammals, turtles and birds, in all hauls.
	c) Data for estimating the level of fishing and the ***impact of fishing activities on marine biological resources and on marine ecosystems.*** *Data collection coordinated at marine region level based on end-user needs.*	Discard sampling: identification of all species in discards (including benthic invertebrates) at the lowest possible taxonomical level, estimation of weight and number of all species in discards, in randomly selected hauls.
Detailed data on the activity of Union vessels*, as recorded under Regulation (EC) No 1224/2009*	***Variables indicated in Table 4 of EU MAP****. When these data are not collected under this regulation or are of insufficient quality or coverage for scientific use, they shall be collected using appropriate alternative sampling methods. These methods shall allow for the estimation of variables listed in Table 4 and at the lowest relevant geographic level by fleet segment and metier level 6.*	Record the following variables (unit), not available by other sources, by observer trip: Effort: - Hours fished (hours), by fishing operation. - Number of fishing operations (number). - Number of nets/length (number/metres)

Table 2. Summary of DCF planned observer coverage and task to be performed established in observer programmes, by type of fleet.

TYPE OF OBLIGATION		DCF OBSERVERS' COVERAGE AND TASKS			
		Shrimper trawlers	**Black hake trawlers**	**Cephalopod-finfish trawlers**	**Pelagic trawlers**
Observer Coverage	Coverage rate:	1 fishing trip per quarter, trying to cover all months.	1 fishing trip per month ('fresh' fleet) 1 fishing trip per quarter (freezers)	1 fishing trip per quarter	Three trips of at least two weeks by teams of two observers
	Coverage duration:	The length of the fishing trip (45-60 fd)	The length of the fishing trip (6 fd for 'fresh' fleet and 20-30 fd for freezers)	The length of the fishing trip (<30 fd)	The length of the fishing trip (10-40 fd)
	Observations:	Mauritania and Guinea-Bissau, in alternate years.	Mainly planned in Mauritania, as the main fishing ground.	Only in Guinea-Bissau, as the only CS with SFPA	Only in Mauritania, as the programme embarked observers from IMROP.
Fishing information (Work on Bridge)		Record vessels and gear characteristics.			
		Report on operational details of every haul: time, latitude, longitude and depth in start and end of the haul.			
		Record the following catch data by haul: - Total catch (TC) (kg), visually estimated - Retained catch (RC) (kg), by species (scientific names, FAO codes). From logbooks, verified by visual estimation. - Discard (D) (kg), estimated as D= TC- RC - Observe and record incidental by-catch of marine mammals, turtles and birds.			
		Record meteorological data (not required by DCF)			_
		Record trip details (end of the trip).			

Table 2. cont.

TYPE OF OBLIGATION			DCF OBSERVERS COVERAGE AND TASKS			
			Shrimper trawlers	**Black hake trawlers**	**Cephalopod-finfish trawlers**	**Pelagic trawlers**
Biological sampling (work on deck)	Target species for sampling:		SOP, DPS, ARV	HKB, HKM	HKB, HMZ, OCC, CVT	SAA, PIL, HMZ, VMA
	Retained catch	Length – Target spp.	Sample randomly selected. 100-150 individuals/sample (or number needed to reach a consistent modal average). Sampling by sex.	Sample randomly selected, by commercial categories. 30-50 individuals/sample (or number needed to reach a consistent modal average).	Samples randomly selected. Number needed to reach a consistent modal average.	From the sample of 50 kg (1 basket) taken randomly from the catch (see remark in last row)
		Length – Non-target spp.	50-100 individuals/sample (or no. needed to reach the mode), randomly selected.			Length of all species in the random sample measured
		Biological sampling target spp.	Parameters: Length, sex and maturity (weight only if possible). Sample size: 1kg (DPS), 2 kg (SOP, ARV) Stratified by length class.	Parameters: Length, weight, sex and maturity. Stratified by length class: 10 individuals by sex and size range		Parameters: Length, weight, sex, maturity (+ others). Sampling size: 25 individuals. Frequency: 1 sampling/day and target species.
	Discards	Length–Target spp.	2 baskets (~20 kg)/500kg total catch, randomly selected, from different parts of the codend.	Random samples (20-40kg, changed to 50-120kg in 2018), taken from different areas of the codend.	2 baskets (~20 kg)/500kg total catch, randomly selected, from different parts of the codend.	Yes
		Length–Non target spp				Not required in sampling plan.
		Biological sampling target species				
		Discard composition (W and N by species)				From the sample of 50kg.
	Other sampling (relevant for DCF)		Sampling for conversion factors of processed retained species. Sampling for L-W of retained species.	Sampling for conversion factors of processed retained target and by-catch species. Sampling for L-W of retained species.	Sampling for conversion factors of processed retained species.	By-catch of protected species sampled for length.
	Remarks:		At least one of each type of sample each time zone or depth changes.			Sample of approx. 50 kg. Weight by species and catch fraction (RC, D).

Table 2. cont.

TYPE OF OBLIGATION		DCF OBSERVERS' COVERAGE AND TASKS			
		Shrimper trawlers	**Black hake trawlers**	**Cephalopod-finfish trawlers**	**Pelagic trawlers**
Reporting obligations	Submission of data and summary reports.	15 days after the end of the trip.	3 days after the end of the trip.	4 days after the end of the trip.	At the end of the trip
	Processing Software	WinObserver (IEO Cádiz) Input: Observer Processing: IEO	MiniSireno and SIRENO (IEO)		Excel spreadsheet for sorting sampled fish by haul, species and category
	Store Software	SIRENO (IEO)			IMROP
Institution in charge		IEO (C.O. Cádiz)	IEO (C.O. Málaga)	IEO (C.O. Canarias)	CMR (subcontracted by WMR)- DCF Multilateral agreement
Manual (reference)		García-Isarch et al., 2011a, b, 2016, 2018	Fernández-Peralta, 2009; Rey and Fernández-Peralta, 2018	Perales-Raya et al., 2016	IMROP, 2009

SFPA requirements

Requirements for observers on board EU vessels established in the SFPA Protocols of Morocco, Mauritania, Senegal and Guinea-Bissau are summarised in Table 3. The protocols in force during the period of study were:

- Protocol between the EU and the Kingdom of Morocco setting out the fishing opportunities and financial contribution provided for in the Fisheries Partnership Agreement between the EU and the Kingdom of Morocco[1] (EU, 2013).
- Protocol setting out the fishing opportunities and financial contribution provided for in the Fisheries Partnership Agreement between the European Community and the Islamic Republic of Mauritania for a period of four years[2] (EU, 2015).
- Protocol on the implementation of the sustainable fisheries partnership agreement between the EU and the Republic of Senegal[3] (EU, 2014 a).
- Protocol setting out the fishing opportunities and financial contribution provided for in the Fisheries Partnership Agreement between the European Community and the Republic of Guinea-Bissau[4] (EU, 2014 b).

New SFPAs have been signed for Morocco (Council Decision EU 2019/441 of 4 March 2019[5], EU, 2019b), Guinea-Bissau (Council Decision EU 2019/1088 of 6 June 2019[6], EU, 2019c) and The Gambia (Council Decision EU 2019/1332 of 25 June 2019[7], EU, 2019d), Observer requirements are similar for each.

Only the Protocol of Mauritania (EU, 2015), clearly states the purpose and nationality of observers. A system for scientific observation on board EU vessels is established and thus, the scientific purpose of the observers' work is clearly specified. The observers should be Mauritanian.

By contrast, the protocols in force during the study period for Morocco (EU, 2013), Senegal (EU, 2014 a) and Guinea-Bissau (2014 b) do not clearly specify the purpose of the observers and their functions are included in a section for 'observation of fishing activities'. It should be noted that this section is included in a specific Chapter for Control, Monitoring and Surveillance in the Protocol of Senegal. 'Scientific observers' are only mentioned for industrial pelagic fishing in the Moroccan protocol. However, one of the obligations established for observers by these protocols is to undertake biological sampling in the context of scientific programmes, which implies that they should be scientific observers (see Table 3). The current Moroccan Protocol (EU, 2019 b) clearly specifies that on board observers should be 'scientific observers' and that the results of their work may be used for scientific and/or inspection purposes. For the three countries, the protocols establish that observes should be appointed/designated by Morocco, Senegal, and Guinea-Bissau, respectively, with no further indication on their nationality although it is supposed to be from the respective CS.

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1 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22013A1207(01)&from=EN
2 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22015A1201(01)&from=EN
3 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22014A1023(01)&from=EN
4 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22014A1113(01)&qid=1416916918243&from=EN
5 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019D0441&from=EN
6 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019D1088&from=EN
7 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019D1332&from=EN

Table 3- SFPA requirements for observers on board EU vessels established by the Protocols for demersal and small pelagic fisheries.

Type of requirement	SFPA- OBSERVERS' REQUIREMENTS			
	SFPA MOROCCO (Chapter VIII of Protocol)	**SFPA MAURITANIA (Chapter X of Protocol)**	**SFPA SENEGAL (Chapter IV-Section 5)**	**SFPA GUINEA-BISSAU (Chapter X-Protocol)**
Observer coverage	**Coverage rate:** - *Each quarter, 25 % of authorised vessels with a tonnage of more than 100 GT shall take on board observers* (1.1) - *Industrial pelagic fishing vessels shall take a scientific observer on board for the entire period of activity in the Moroccan fishing zone* (1.2). - *Other EU fishing vessels with a tonnage less than or equal to 100 GT shall be observed during a maximum of ten voyages per year and per category of fishing* (1.3). **Coverage duration:** - *Observers shall remain on board pelagic trawlers on a permanent basis.* - *For the other categories of fishing, observers shall spend at one voyage per vessel on board* (2).	**Coverage rate:** *For each fishing category the Parties shall designate at least two vessels per year which shall take on board a Mauritanian scientific observe*r...(2) **Coverage duration:** *The period spent on board a vessel by a scientific observer shall be the length of a trip. However, at the express request of one of the Parties, this embarkation may be spread over several trips depending on the average duration of the trips planned for a particular vessel* (3)	**Coverage rate:** *Senegal shall endeavour not to designate observers for vessels which already have an observer on board...* (2.3) **Coverage duration:** *For deep-sea demersal trawlers the time on board shall not exceed two months. The observers shall not spend more time on board the vessel than is necessary to carry out their duties* (2.4)	**Coverage duration:** *The observers shall not spend more time on board the vessel than is necessary to carry out their duties* (2.2)
Observer Task(Fishinginformation)	*Observe the fishing activities of vessels* (9.1)	*Observe the fishing activities of vessels* (11)	*Observe the fishing activities of vessels* (8.1)	*Observe the fishing activities of vessels* (8.a)
	Verify the position of vessels engaged in fishing operations (9.2)	*Check the position of vessels engaged in fishing operations* (11)	*Verify the position of the vessel during fishing operations* (8.2)	*Verify the position of the vessel during fisheries operations* (8.b)
	Note the fishing gear used (9.4)	*Record particulars of the fishing gear and the mesh sizes of the nets used* (11)	*Note the fishing gear used* (8.4)	*Note the fishing gear used* (8.d)
	Verify the catch data for the Moroccan fishing zone recorded in the logbook (9.5).		*Verify the catch data for the Senegalese fishing zones recorded in the logbook* (8.5)	*Verify the catch data for catches in the Guinea Bissau zone recorded in the logbook* (8.e)

Table 3.- Cont.

Type of requirement	OBSERVERS' REQUIREMENTS (MIXED FISHERIES)			
	SFPA MOROCCO (Chapter VIII-Protocol)	**SFPA MAURITANIA (Chapter X-Protocol)**	**SFPA SENEGAL (Chapter IV-Section 5)**	**SFPA GUINEA-BISSAU (Chapter X-Protocol)**
Observer Task (Biological sampling)	*Perform biological sampling in the context of scientific programmes* (9.3)	*Perform biological sampling in the context of scientific programmes* (11)	*Perform biological sampling in the context of a scientific programme* (8.3)	*Perform operations in the context of scientific programmes, including biological sampling* (8.c)
	Verify the percentages of by-catches and estimate the quantity of discards of species of marketable fin-fish, crustaceans and cephalopods (9.6).		*Verify the percentages of by-catches and estimate the discarded catches* (8.6)	*Verify the percentages of by-catches on the basis of that defined in the datasheets for each category and estimate the discarded catches* (8.f)
Observer Reporting obligations	*Report fishing data by fax or by radio, including the quantity of catches and by-catches on board* (9.7).		*Communicate observations by radio, fax or e-mail at least once a week while the vessel is fishing in the Senegalese zones, including the quantity of catch and by-catch on board* (8.7)	*Report his observations at least once a week by radio, including the quantity of catches and by-catches on board* (8.g)
	..... the observer shall draw up an activity report to be transmitted to the competent authorities in Morocco, with a copy to the Delegation...(13).	*.... the scientific observer shall draw up a report in accordance with the model in Appendix 11 to this Annex... A copy of the report shall be handed to the master of the vessel when the observer is put ashore as well as to the ministry and the European Union* (14)	*The observer shall send his report to Senegal, which shall send a copy of it to the EU within eight days of the observer's disembarkation* (9.2)	*The observer shall submit his report to Guinea-Bissau. The data on the catches and discards shall be sent to the scientific institute (CIPA) in Guinea-Bissau, which, after processing and analysing them, will present them to the Joint Scientific Committee* (9.2).

3.1.2 SUBTASK 1.2.- SEARCH AND COLLECTION OF REPORTS FROM COASTAL STATES AND ANALYSIS OF THE USE AND TRANSMISSION OF SFPA OBSERVER REPORTS

National fishery administrations of MS were contacted about the availability of SPFA observer reports. The Spanish Secretary of Fisheries stated it had never received them but commented on the low general level of coverage. No further information was obtained.

In addition, informal contacts with the CS institutions and/or administrations were made by IEO to find out which channels are used to send these reports to the EU. The answers received by country together with further information on the SFPA observers' programmes and the use of SFPA observer reports are summarised as follows:

Morocco

Reports are regularly sent from the Moroccan Ministry of Fisheries (Ministère de l'Agriculture, de la Pêche Maritime, du Développement Rural et des Eaux et Forêts) to DG MARE. Table 4 summarises the reports sent during the period considered (2014-2018).

Table 4. Reports sent by the Moroccan administration to DG MARE in the period 2014-2018.

Number of reports by Fishing Category and year-MOROCCO	2014	2015	2016	2017	2018
Category No 4-"Demersal fishing"	2	2	0	1	0
Category No 6-"Industrial pelagic fishing"	10	20	17	19	3
TOTAL	12	22	17	20	3

According to the Moroccan administration, seventy two reports were sent from Morocco to the EU. Most were from between 2015 and 2017 with the majority (93%) being from pelagic trawlers, the remainder were from black hake demersal trawlers. The Department of Maritime Fisheries of the Ministry clarified that more detailed reports are available in their premises.

The observer programme coordinated by the Moroccan Fisheries Research institute (Institut National de Recherche Halieutique, INRH) was not familiar to the Consortium. However there are some data from the black hake fisheries (Faraj et al., 2015) and pelagic trawlers (Cervantes et al., 2018) reported to the EU-Morocco JSC that suggest that there is analysis undertaken of observer data looking at catch composition, by-catch and discards.

Mauritania

The Mauritanian Institute of Oceanographic and Fisheries Research (Institut Mauritanien de Recherches Océanographiques et de Pêches, IMROP) stated that observer reports are kept at this institution and emphasized the intermittent nature of their observer programmes since their beginning.

From 1995 to 2009 the Mauritanian programmes were managed by the Delegation of Fisheries Surveillance and Sea Control (Délégation à la Surveillance des Pêches et du Contrôle en Mer, DSCPM). Since 2009 scientific observers have been deployed through IMROP who established a target coverage level of 5,000 fishing days per year (based on 6 months per observer or 10% of the total fishing days) (JSC, 2010). This target was not achieved and there was only partial coverage of the fleets, this was mainly due to the reluctance of vessel owners to have observers on their vessels. This resulted in a limited amount of information being submitted to EU-Mauritania JSCs. No observed trips were undertaken between 2014 and 2017 but they recommenced in 2018. The Consortium was unaware of content of IMROP observer programmes before the Workshop.

Senegal

The Maritime Fisheries Direction (Direction des Pêches maritimes, DPM), of the Senegalese Ministry of Fisheries and Maritime Economy (Ministère des Pêches et de l'Economie Maritime, MPEM) confirmed that all reports from the period 2014-2017 had been sent to the EU. The numbers of fishing trips observed on board black hake 'fresh' trawlers were 24 (2015), 3 (2016) and 1 (2018) together with an unknown number of trips on board one freezer trawler (Fall et al., 2018).

The black hake fishery observer programme is coordinated by the DPSP (Direction de la Protection et de la Surveillance des Pêches) and was developed for Monitoring, Control and Surveillance (MCS) rather than scientific purposes. Sampling protocols were developed under CRODT (Centre de Recherches Océanographiques de Dakar-Thiaroye) but the Consortium had no access to their content. In theory observer reports from DPSP should be regularly transmitted to CRODT for their analysis. However the lack of observers, especially since 2019, means that these data are not always collected or submitted. Some limited analysis has been undertaken based on discard data from 2015 and were provided to the EU-Senegal JSC meeting (CSC, 2016).

Guinea-Bissau

The Applied Fisheries Research Centre (Centro de Investigação Pesqueira Aplicada, CIPA) confirmed that they have not yet established a national programme of on-board scientific observation. The implementation of observers' programmes on all industrial fisheries developed in Guinea-Bissau has been recommended since the first JSC in 2010. This recommendation is still pending on specific training for scientific observers on different areas (biology, fishing, sampling, taxonomy, etc.) (Sobrino et al., 2016, 2017).

Use and submission of SFPA observer reports

Some relevant issues in relation to the use and submission of SFPA observer reports are:

1) Countries with observers on board EU fleets were not always aware of how reports to DG MARE are submitted (e.g. Senegal) or just do not send them (e.g. Mauritania). It is recommended that there is more direct contact between DG MARE and the relevant Delegations from the CS to improve this process.

2) Submission failures can also occur internally. For example, in Senegal, certain coordination problems seem to be hampering the reports transmission from the DPSP to CRODT for their analysis (Cervantes et al., 2017b; Fall et al., 2018).

3) It should be noted the limited use of these SFPA reports, when available. Since the last 3 years, information from DCF has been usually required by Data Calls from DG MARE to MS for the JSCs, most of this coming from the DCF observer programmes (i.e: biological information, length frequency distributions, discards). Sometimes, information from EU observers was essential to give answer to relevant scientific issues requested by the JSCs (i.e: Fernández-Peralta, 2017; Fernández-Peralta et al., 2019b; García-Isarch et al., 2016b,c, 2019). In contrast, information from CS observers provided to these meetings has been limited to the examples given above.

4) The main problem with the SFPA observers' programmes has been in relation to their implementation and so most of the recommendations made by JSCs are based on resolving this rather than actually requiring the data collected. Recent recommendations on the implementation and/or restart of programmes include: programmes on board EU fleets, recommended by the JSC UE-Guinea Bissau (Sobrino et al., 2016, 2017); new observer programmes of all demersal fish fisheries operating in the Mauritanian EEZ and a

restart of observer programmes on board EU pelagic trawlers, this last urgently recommended by the JSC UE-Mauritania (Bouzouma et al., 2018; Cervantes et al., 2017a; Fernández-Peralta et al., 2019a).

There is a recurrent recommendation by the JSCs addressed to the EU to ensure that the EU vessel owners of pelagic and some demersal trawlers take onboard observers as historically they frequently refuse them.

5) The standardization of observer protocols between CS and EU institutions is another need recurrently identified by the JSCs of the four SFPAs. The JSC EU-Morocco recommended the development of a joint scientific programme between INRH and IEO for observers onboard the EU black hake trawlers (Cervantes et al., 2018; Faraj et al., 2015, 2017), with no specific mention to other relevant fleets as the pelagic trawlers. Standardization of the IMROP and IEO observers' programmes on shrimper and black hake trawlers in Mauritanian waters, together with the data analysis is also a recurrent recommendation from the JSC UE-Mauritania (Bouzouma et al., 2018; Cervantes et al., 2017a; Fernández-Peralta et al., 2019a), that could not be done before due to funding and/or time constraints. During last JSC meeting, the Workshop to be held in Task 4 of this project was offered as the starting point for the definition of joint programmes IEO-IMROP to be further developed through bilateral *ad hoc* meetings between both institutions in order to define common analysis methods.

6) Certain recommendations made by JSCs clearly need to be addressed by the analysis of the information collected by observers, this involving both EU and CS observers. Some examples are: analysis of cephalopods by-catch produced by black-hake trawlers (Bouzouma et al., 2018); analysis of the by-catch of black hake produced by pelagic trawlers (Bouzouma et al., 2018; Cervantes et al., 2017a; Fernández-Peralta et al., 2019a) or establishment of standardized conversion factors for black hake (Fernández-Peralta et al., 2019a).

7) The only clear recommendation in relation to the need of making the observers' data available to a JSC was made in last JSC meeting UE-Mauritania, in which data from the EU observer programmes compiled by DG MARE together with those from the Mauritanian (IMROP) observer programme were recommended to be provided to IMROP and to the JSC without delay (Fernández-Peralta et al., 2019b).

8) Data from SFPA observers are not provided to CECAF assessment WGs and thus, CECAF also make recurrent recommendations on ensuring on-board observes and on coordinating among institutions from EU and CS countries to develop the observer methodology to be used, in order to improve efficiency (FAO, 2018, 2019a, b).

3.1.3 SUBTASK 1.3.- INVENTORY AND ANALYSIS OF METADATA AVAILABLE UNDER THE SFPA AND DCF OBSERVER PROGRAMMES

A- INVENTORY AND ANALYSIS OF METADATA AVAILABLE UNDER THE DCF OBSERVER PROGRAMMES

EU FISHERIES OBSERVED UNDER DCF PROGRAMMES

The metadata available under EU observer programmes (annexes 1, 2, 3 and 4) correspond to four types of fisheries (three for demersal and one for small pelagic) following the SFPA Protocols with sampling obligations through the DCF.

As small pelagic resources are exploited by several MS involved in similar fisheries in the CECAF area, the sampling of this fishery was based on a multi-lateral agreement between The Netherlands, Germany, Poland, Latvia and Lithuania, being The Netherlands responsible for sampling pelagic fisheries for these MS. Oppositely, demersal fisheries are mainly carried out by Spain, with a small an intermittent contribution of other MS. Only data collection is required for Spain but no for the other MS with small contribution in demersal fisheries as they are below the thresholds established by EU MA, below which it is not mandatory for MS to collect biological data (stocks landing less than 10% of average total EU landings in the previous 3 years, or the total annual landing is less than 200 tonnes[1]). Spain is the only country so far, with landings of target demersal stocks above the sampling threshold and therefore the only MS with sampling obligation of their demersal fisheries in CECAF waters under the DCF.

The status of the SFPAs over the period of study is outlined below:

- Morocco: the last protocol was in place between the end of 2014 and July 2018.
- Mauritania: the last protocol was in place for the whole period. However, the fishery was only active for one month during 2015.
- Senegal: the last protocol was signed and published in October 2014, but fishing did not start until March 2015.
- Guinea-Bissau: the last protocol was in force between January 2015 and November 2017.

The fleets under analysis are outlined below (métier codes are taken from the DCF, specifically Table 2 of the current EU MAP[2]):

1) **Shrimper trawlers (OTB_CRU_>=40_0_0)-** The fleet operated in Mauritania during 2014 and in December 2015-2018 and in Guinea-Bissau between 2015 and November 2017.

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[1] Chapter II "Thresholds" in EU MAP.

[2] Table 2 "Fishing activity (metier) by Region" in EU MAP.

EU MAP regulation in: COMMISSION IMPLEMENTING DECISION (EU) 2016/1251 of 12 July 2016 adopting a multiannual Union programme for the collection, management and use of data in the fisheries and aquaculture sectors for the period 2017-2019. Official Journal of the European Union 1.8.2016. L207/113-177 (EU, 2016).

In Mauritania, the fishery operated under Fishing Category No 1 ("Vessels fishing for crustaceans other than spiny lobster and crab"). Between eight and 17 EU vessels, usually flagged to Spain, fished this area (Bouzouma et al., 2018). A single Greek vessel operated in 2017 and 2018, which represented less than 2% of EU effort and less than 1% of EU landings, respectively (Fernández-Peralta et al., 2019a).

In Guinea-Bissau, an EU fleet of seven to nine mostly Spanish shrimper trawlers operated between 2015 and November 2017 under the Fishing Category No 2 ("Shrimp trawlers"). One Portuguese vessel was known to be operational in 2016 and 2017 (RCG LDF, 2018; Sobrino et al., 2017). Spanish vessels accounted for 96% of EU effort and 98% of EU landings in the period considered (RCG LDF, 2018).

Spain has an observer programme operating on Spanish shrimpers in Mauritania and Guinea-Bissau that apparently should be representative of all the EU shrimper activity in the area, which is quite intermittent and limited for other MS. This observer programme was initiated by the IEO in 2010 and coordinated by the CECAF-DCF team in the Oceanographic Centre of Cádiz.

2) **Black hake trawlers (OTB_DEF_>=70_0_0)**- This fleet operated in Morocco, Mauritania and Senegal between 2014 and 2018.

In Morocco, the fleet operated under Fishing Category No 4 ("Demersal Fishing"), between October 2014 and July 2018. The number of EU vessels ranged between five and seven, both 'fresh' and freezer trawlers (Cervantes et al., 2018). In 2015, most fishing was undertaken in Morocco, as the Protocol with Mauritania was not in force. Activity subsequently declined from 76 fishing trips in 2015 to 16 in 2018, mainly due to the length of the closed season established by the Moroccan administration (Cervantes et al., 2018).

Mauritania was the main fishing ground over the period considered. The size of the fleet varied between 2 and 4 'fresh' vessels operating under Fishing Category No 2 ("Black hake (non-freezer) trawlers and bottom longliners"). The fleet was inactive between August 2014 and November 2015 once the Protocol had expired. Since an amendment to the Protocol of 2017 that established a new Fishing Category No 2 bis ("Black hake (freezer) trawlers"), six vessels per year were active between July 2017 and June 2018 (Fernández-Peralta et al., 2019a).

In Senegal the fleet started operating in March 2015 under the framework of the last SFPA that allowed the fishery to open up again after a closure of 9 years. This fishery was included in the SFPA under a special fishing category established for two trawlers by year ('fresh' and/or freezer) targeting "deep water demersal species". These vessels used Senegal as an alternative fishing ground, and subsequently did not operate during the period considered for this study.

All vessels operating in these fishing grounds during the period considered were flagged to Spain and carried observers operating under the DCF observer programmes. The Spanish programme of observers on board this fleet was initiated by the IEO in 2003 and is coordinated by the CECAF-DCF team in the Oceanographic Centre of Málaga.

3) **Cephalopod-finfish trawlers (OTB_MCF_>=70_0_0)-** This fishery operated in Guinea-Bissau over the period of this study between 2015 and 2017, under Fishing Category No 1 ("Freezer, fin-fish and cephalopod trawlers") of the Protocol of the SFPA EU-Guinea Bissau.

EU vessels operating with this category were mainly Spanish (10-14 vessels), although one to two vessels flagged to Italy and Greece were also active between 2015 and 2017, which accounted for less than 14% in catches during this period (RCG-LDF, 2018).

Spain was the only MS with a programme of observers on board this fleet during the period of study, being considered as representative of the whole EU fleet so far. However, landings of *Penaeus* spp and *Sepia* spp fished by the Italian fleet in the period 2015-2017 were above 10% of the average total EU landings in the previous 3 years and therefore, these stocks should be considered for sampling by Italy. Thus, the RCG-LDF recommended the following of Italian fishery data once the protocol with Guinea-Bissau was renewed and the Italian fishery in this fishing ground potentially reinitiated (RCG-LDF, 2018) to develop any potential sampling coordination programme between the Spain and Italy, if needed.

The Spanish observer programme was initiated by the IEO in 2015 and coordinated by the CECAF-DCF team in the Oceanographic Centre of Canarias.

4) **Pelagic trawlers (OTM_SPF_>=40_0_0)-** Over the period of this study, this fleet operated both in Morocco and in Mauritania, under the Fishing Category No 6 ("Industrial pelagic fishing") and Fishing Category No 6 ("Pelagic freezer trawlers") of their respective protocols. The EU fleet was composed of vessels from the Netherlands, Lithuania, Latvia, Poland and Germany.

A fleet of eight vessels operated in Morocco from 2014 to July 2018, when the SFPA expired (Cervantes et. al, 2018; Faraj et al., 2015, 2017). EU pelagic trawlers operated in Mauritania during the whole period except for 2015, when there was no agreement through the SFPA between Mauritania and the EU.

The observer programme on board the EU trawlers, based on the multi-lateral agreement between MS with small pelagic fisheries in the area, was coordinated by Corten Marine Research (CMR). CMR acted on behalf of the Dutch institute IMARES (currently WMR), which in turn was assigned responsibility to set up an observer programme on board all EU trawlers in Mauritania. The fishery of EU pelagic trawlers in Morocco was not covered by the DCF since the observer programme was based in Mauritania.

INVENTORIES OF OBSERVER METADATA

Metadata obtained from observers can be organized into two main groups:

a) Data on the fisheries activities observed (recorded and/or estimated)→ fisheries reporting, work on the bridge (Table 5).

b) Data reported from biological activities carried out by the observers. This includes samplings of the retained and discards fractions of the catch, for length, biological parameters and/or species composition. This work is usually performed where the fish is sorted and processed by the fishermen→ biological activities, work on the trawl deck (Table 6).

Table 5. Metadata on the fisheries activities observed (recorded and/or estimated by observers). Fisheries reporting (Work on bridge).

METADATA SETS	METADATA
TRIP DETAILS	FISHING TRIP_Name
	EEZ_Name
	MS Flag_Name
	Vessel_Name
	Observer_Name
	Starting date (dd/mm/yyyy)
	Final date (dd/mm/yyyy)
OPERATIONAL DETAILS	Hauls by fishing trip (number)
	Operational details recorded on in every haul (Y/N)
	Latitude start haul (decimal)
	Longitude start haul (decimal)
	Depth start haul (m)
	Time start haul (hh:mm, GMT)
	Latitude end haul (decimal)
	Longitude end haul (decimal)
	Depth end haul (m)
	Time end haul (hh:mm, GMT)
	Haul duration (minutes)
CATCH DETAILS	Total retained catch (kg)
	No. species retained catch (number)
	Target species "X" retained weight (kg)
	Retained by-catch main species (FAO Code)
	Retained by-catch weight (kg)
	Total discard (kg)
OBSERVER ESTIMATE	Observer estimated total catch independently in every haul (Y/N)
	Reasons given if estimations not 100%
	Observer recorded incidental by-catch in every haul (Y/N)
METEREOLOGICAL DATA	Meteorological data collected in every haul (Y/N)
	Sea state recorded (Y/N)
	Cloud cover recorded (Y/N)
	Wind Speed recorded (Y/N)
	Other (list)

Table 6. Metadata from sampling performed by observers on the retained and discarded fractions of the catch. Biological activities, work on the trawl deck.

METADATA SETS		METADATA
RETAINED CATCH	LENGTH SAMPLING_ Target species	Total weight of target species sample (kg)
		No. individuals of target species sampled (number)
		Length by individual sampled (cm or mm)
	LENGTH SAMPLING_ Non-target species	Total weight of non-target species sample (kg)
		No. individuals of non-target species sampled (number)
		Length by individual sampled (cm or mm)
	BIOLOGICAL SAMPLING- Target species	Total weight of target species sampled (kg)
		Length (L, in cm or mm) of each individual sampled
		Weight (W, in g) of each individual sampled
		Sex (S: male, female, undetermined) of each individual sampled
		Maturity (M, following the species maturity keys) of each individual
DISCARDS	COMPOSITION	Total weight of discards samples (kg)
		Total weight by species (kg)
		No. individuals of by species (number)
	LENGTH SAMPLING_ Target species	Total weight of target species sample (kg)
		No. individuals of target species sampled (number)
		Length by individual sampled (cm or mm)
	LENGTH SAMPLING_ Non-target species	Total weight of non-target species sample (kg)
		No. individuals of non-target species sampled (number)
		Length by individual sampled (cm or mm)
	BIOLOGICAL SAMPLING- Target species	Total weight of target species sampled (kg)
		Length (L, in cm or mm) of each individual sampled
		Weight (W, in g) of each individual sampled
		Sex (S: male, female, undetermined) of each individual sampled
		Maturity (M, following the species maturity keys) of each individual

Annex 1-4 include detailed inventories of DCF observer metadata collected for the demersal shrimper trawlers, demersal black hake trawlers, demersal cephalopod-finfish trawlers and pelagic trawlers fleets, respectively. Table 7 summarizes the metadata inventoried in these annexes and their availability by type of fleet. Percentage of accomplishment is indicated, when information was not fully reported.

Although observer compliance with the sampling programmes was variable between fleets (Section 3.1.2), most EU observers collected the information requested in the DCF. Between-fleet differences were mainly related to metadata such as collection of meteorological information which are not specifically required by the EU MAP. The most shortcomings were found for small pelagic fisheries, for which operational information was missing for some hauls, information on incidental by-catch not always recorded, and some required sampling was not performed.

Table 7. Summary table of metadata collected by DCF observers, by type of fleet.

METADATA SETS	METADATA	SHIMPER TRAWLERS	BLACK HAKE TRAWLERS	CEPHALOPOD-FINFISH TRAWLERS	PELAGIC TRAWLERS
TRIP AND OPERATIONAL DETAILS	Trip details recorded on in every fishing trip (Y/N)	Y	Y	Y	Y
	Operational details recorded on in every haul (Y/N)	Y	Y	Y	N
CATCH DETAILS AND OBSERVER ESTIMATES	Catch details recorded in every haul (Y)	Y	Y	Y	Y
	Observer estimated total catch independently in every haul (Y/N)	Y	Y	Y	Y
	Observer recorded incidental bycatch in every haul (Y/N)	Y	Y	Y	N
METEREOLOGICAL DATA	Meteorological data collected in every haul (Y/N)	N	Y (>90%)	Y (>87%)	N
RETAINED CATCH SAMPLINGS	Length samplings of target species performed in all trips (Y/N)	Y	Y	Y	Y
	Length samplings of non target species performed in all trips(Y/N)	Y	Y	Y	N
	Biological samplings of target species performed in all trips(Y/N)	Y	Y	Y	Y (>92%)
DISCARDS SAMPLINGS	Samplings of discard composition performed in all trips (Y/N)	Y	Y	Y (75%)	Y
	Length samplings of target species performed in all trips (Y/N)	Y/N (50%)	Y (78%)	Y (75%)	Y
	Length samplings of non target species performed in all trips (Y/N)	Y	Y	Y (75%)	N
	Biological samplings of target species performed in all trips (Y/N)	Y/N (50%)	Y	Y/N (50%)	N
RELEVANT COMMENTS	Relevant comments recorded	Y	Y	N	N
	Target species	SOP, DPS, ARV	HKB, HKM, HKX	HKB, HMZ, OCC, CVT	SAA, PIL, HMZ, VMA
	Provide any general relevant comment, if any.	Operational, catch details and discard composition by type of haul (LAN, GAM, ALI)			No OD* recorded in 1 trip. % of hauls with OD recorded around 50% in other fishing trips.

*OD=Operational details.

ANALYSIS OF DCF OBSERVERS' METADATA

The following sets of metadata have been studied from the inventories compiled in Annex 1, Annex2, Annex 3 and Annex 4:

1. Fishing trips
2. Operational information (fishing areas, fishing depth, haul duration)
3. Meteorological data
4. Catch information (retained catch, discarded catch)
5. Length and biological information by catch fraction (retained catch, discarded catch)
6. Discard composition

The main results of these analyses, including comparisons between the four fleets studied and most relevant particularities of each fleet, are summarized in subsections A.1 to A.6.

A.1 OBSERVED FISHING TRIPS

All fishing trips carried out by EU observers over the period of this study are shown in Tables 1 of Annexes 1, 2, 3 and 4. 80 observed fishing trips were carried out between the four fleets over this period, encompassing 1,704 fishing days and 7,681 hauls (Table 8). For confidentiality issues, both vessel and observer names are coded in the metadata inventory. The shrimper fleet had the greatest number of days and hauls observed while the lowest observer coverage was for the cephalopod-finfish fleet.

Table 8. Summary of fishing trips with DCF observers by type of fleet.

FLEET	Fishing trips	Fishing days	Mean duration (days/trip)	No Hauls	Mean No of hauls by trip
Shrimper trawlers	22	971	45	5,250	239
Black hake trawlers	36	272	8	941	26
Cephalopod-finfish trawlers	8	157	20	824	103
Pelagic trawlers	14	273	20	666	48
TOTAL	80	1,704	-	7,681	-

Shrimper trawlers- Observed fishing trips

Observer deployments were rotated amongst the vessels, and selected by the vessel owners. Observers worked on 12 out 17 vessels which operated in both fishing grounds, eight of 17 vessels operating in Mauritania and six of 13 vessels that operated in Guinea-Bissau. There was no fishing activity in Guinea-Bissau either in 2014 or in 2018, as the Protocol of the SFPAs was not active those years. The entire fleet moved to Mauritania during this time with no activity in Guinea-Bissau (Fernández-Peralta et al., 2019a).

The specifications of the 12 vessels on which the observers worked (average 30m length, 245 GT, 135 GRT, power of 585 hp and mean age of 14 years) were representative of the fleet as a whole. It should be noted that the size and condition of the vessels, combined with the reduction in space available due to the fact they had to take on board fishers from the CS, made living and working conditions of the observers very difficult.

Observer deployments annually alternated between the two fishing grounds. This allowed information to be gathered from both EEZs, meeting the DCF requirements to collect data

"From Morocco to Guinea Bissau". Table 9 shows the observed trips in both fishing grounds (Mauritania and Guinea-Bissau), on a monthly basis. It should be noted that last trip of 2018 finished in 2019.

Scientific observers worked on 22 fishing trips, 14 in Mauritania and eight in Guinea-Bissau. A total of 971 fishing days were observed, 64% in Mauritania and 36% in Guinea-Bissau. The mean length of each trip was 45 fishing days, ranging from 10 to 68 fishing days, being quite similar in both fishing grounds. Observers usually worked over the entire fishing trips performed by the vessels.

Eight different observers worked during the period considered. All of them had a university degree (in Biology, Marine Sciences or similar) and were previously trained in the C.O. Cádiz of the IEO, which hosts the team in charge of the Programmes of Observers on board the shrimper fleet.

Table 9. DCF Observer coverage on shrimpers by month, year and fishing ground in the period 2014-2018.

EEZ	YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Observed trips	Sea days	Fishing days
MRT	2014													4	199	195
GNB	2015													4	185	179
GNB+MRT	2016													6	227	226
MRT+GNB (1)	2017													4	185	183
MRT	2018													4	192	188
MRT	2019													–(2)	–	–
TOTAL	2014-2018													22	988	971

MAURITANIA G. BISSAU

(1) End of the SFPA UE-Guinea Bissau in November 2017

(2) Last fishing trip in 2018 lasts until 2019.

Black hake trawlers- Observed fishing trips

Observers on black hake trawlers worked on 36 fishing trips (272 fishing days) between 2016 and 2018. 29 fishing trips were conducted in Mauritania, six in Morocco and one in Senegal.

Most observer deployments were on 'fresh' trawlers, the more numerous for black hake fisheries. The DCF requires information from the black hake fishery as a whole, to include both 'fresh' and freezer trawlers. However, due to the different characteristics of the fisheries, IEO organised observer deployments on 'fresh' and freezer trawlers, and in different EEZs, with different levels of observer coverage (Table 10).

The small size of 'fresh' trawlers (with average characteristics of 31m length, 258 GT, 191 GRT, 585 hp and mean age of 17 years) resulted in some reluctance to host observers, citing lack of space. Observers worked on board three of the four vessels from this 'fresh' fleet. As the average trip duration within this fleet was six days, the plan was to embark one observer for one fishing trip per month. The periods of inactivity of the 'fresh' fleet, especially in Mauritania, meant the observer programme could not be re-initiated until 2016.

The mean duration of the freezer fleet trips is between 20 and 30 fishing days. Observer deployments were planned on a quarterly basis. These vessels are bigger than the 'fresh' trawlers with an average length of 40m, GT of 487 tonnes, GRT of 306 tonnes and power of 1009 hp. Although it was initially planned to observe a representative number of trips, the operational characteristics of the fishery and the lack of continued cooperation from the sector meant only three trips were observed.

Three different observers worked during the period considered, one of whom specialized in the 'fresh' fleet. All had a university degree and had been previously trained in the C.O. Málaga of the IEO.

Table 10. DCF Observer coverage on black-hake trawlers by month, year and fishing ground in the period 2016-2018.

EEZ	YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Observed trips	Sea days	Fishing days
MRT	2016													10	50	50
MRT+SEN+MOR	2017													13	115	115
MRT+MOR	2018													13	107	107
TOTAL	2016-2018													36	272	272

MAURITANIA MOROCCO SENEGAL

Cephalopod-finfish trawlers- Observed fishing trips

After decades of activity without scientific observations, the sector agreed to collaborate with the IEO Programme of scientific observers on board cephalopod-finfish trawlers, which was initiated by the mid-2015. This was carried out in waters off Guinea-Bissau, the only fishing ground within an SFPA where this fishery was allowed for the EU during the period of this study.

Observer deployments were planned to be rotated amongst the vessels and finally selected by the vessel owners. Observers were deployed on four different vessels from a fleet of 10-14. Technical characteristics of the vessels on which the observers worked (average values of 46.5m length, 555.7 GT, 419.5 GRT, power of 957 hp and mean age of 17.5 years) were similar to the fleet as a whole.

Table 11 shows the presence of observers on board cephalopod-finfish trawlers on a monthly basis, during the period 2015-2017, when the fleet was active in Guinea-Bissau. Observer coverage progressively increased from the beginning of the Programme in 2015 to 2017, when the SFPA Protocol expired.

Five different observers worked over the period of the study, usually during complete fishing trips. All of them had a university degree and had been previously trained in the C.O. Canarias of the IEO, which hosts the team in charge of the Programme of observers on board the cephalopod-finfish fleet.

Table 11. DCF Observer coverage on cephalopod-finfish trawlers in Guinea-Bissau, by month and year, in the period 2015-2017.

EEZ	YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Observed trips	Sea days	Fishing days
GNB	2015													1	17	13
GNB	2016													3	84	48
GNB	2017													4	109	96
TOTAL	2015-2017													8	210	157

G. BISSAU

End of the SFPA UE-Guinea Bissau in November 2017

Pelagic trawlers- Observed fishing trips

CMR coordinated the DCF-observer programme on board pelagic trawlers in CECAF waters, during the period considered for this study, i.e. 2014-2018. This was based on a multi-lateral agreement between The Netherlands, Germany, Poland, Latvia and Lithuania in which the

Dutch fishery institution in charge (WMR, former IMARES) took the responsibility of this programme by subcontracting CMR. All observers worked in Mauritanian waters as the programme used observers provided by the Mauritanian institute, IMROP. Sampling aimed for coverage of the entire fishing season as well as complete spatial coverage and covering all flags present in the area.

Two observers were deployed on each of three trips, each with a duration of at least two weeks. Vessels were selected according to their ability to host observers. Observers worked on seven different vessels, from The Netherlands (mainly), Lithuania and Latvia.

Observations were carried out in 2014, 2016 and 2017 (Table 12). Most observations were carried out in 2014. No observations could be made in 2015 as the fleet was not fully operative in Mauritania that year. In 2016, observers worked on six fishing trips. Most deployment were on Dutch vessels (Table 13).

Table 12. DCF Observer coverage on pelagic trawlers in Mauritania, by month and year in the period 2014-2018. Nationality of observed vessels is indicated.

EEZ	YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Observed trips	Sea days	Fishing days
MRT	2014													7	136	128
MRT	2015*													0	0	0
MRT	2016													6	118	115
MRT	2017													1	30	30
TOTAL	2014-2018													14	284	273

NL LTV LIT

Table 13. Percentages of observed fishing trips and fishing days by EU fishing country operating with pelagic trawlers in Mauritania in 2015-2017.

EU fishing country	FISHING TRIPS	FISHING DAYS
LATVIA	7%	11%
LITHUANIA	21%	13%
THE NETHERLANDS	71%	76%

A.2 OPERATIONAL INFORMATION AND ANALYSIS

Operational and catch information was recorded from all hauls performed when observers were on board. The recorded operational information is indicated in Table 1 of Annexes 1, 2, 3 and 4.

Shrimper fleet- Operational information

The number of hauls observed ranged from 45 to 357 hauls (average of 239 hauls, see Table 8), dependent on trip length. The Spanish shrimper fleet carries out three types of hauls, designated as LAN (targeting *Penaeus notialis*), GAM (targeting *Parapenaeus longirostris*) and ALI (targeting *Aristeus varidens*). All three haul types can be performed during the same day, although there is certain seasonality in relation to the abundance of each target species. LAN and GAM haul types are carried out with outriggers ("tangones"), usually during the day, while ALI haul types are usually performed at night using classic bottom otter trawls ("baka" type) (Sobrino and García, 1992 a, b). Due to the significant operational and catch differences between these three types of hauls, they were also analysed separately for a better understanding of the fishery (see Tables 3, 4 and 5 in Annex 1). Almost half of the total of

5,250 hauls observed were GAM type (46%), while LAN and ALI types accounted for 27% each.

Black hake trawlers- Operational information

Most fishing trips were observed on 'fresh' vessels. The number of observed hauls oscillated between eight and 27, with a mean of 19 hauls by trip. The number of hauls observed in the three fishing trips on freezer vessels were more variable, ranging between 77 and 150 hauls (mean of 104 hauls), as these vessels carry out longer fishing trips, between 20 and 33 fishing days (mean of 28 fishing days). A total of 941 hauls targeting black hakes (*Merluccius polli* and *M. senegalensis*) were registered, 82% of which were performed in Mauritania, 10% in Morocco and only 8% in Senegal. Two thirds of the hauls were carried out on the 'fresh' fleet and one third on the freezer fleet.

Cephalopod-finfish trawlers- Operational information

Observers on board this fleet recorded 824 hauls, mostly in 2017. The average number of hauls observed by fishing trip was 103, ranging between 53 and 313 hauls by trip (Table 8). This fleet targets species that are fished at different depth ranges, distributed in three main depth strata: the shallowest depths for fishing cephalopods, intermediate depths for horse mackerel and deeper for black hakes.

Pelagic trawlers- Operational information

Observers on pelagic trawlers provided information for a total of 666 hauls, ranging from 15 to 105 hauls, with a mean of 48 hauls per trip (see Table 8). Although all pelagic trawlers use the same gear, there is a difference in fishing strategy between the 'Dutch-type' and the 'Russian-type' trawlers. The 'Dutch-type' vessels target primarily sardinella and sardine. The 'Russian-type' vessels target higher valued species such as horse mackerel and mackerel although have lower processing capacity. Table 14 indicates the observed trawlers by type of fishing strategy.

Table 14. Type of fishing strategy of the observed by pelagic trawlers in each fishing trip in Mauritania (2014-2017).

YEAR	NUMBER OF OBSERVED TRIPS	NUMBER OF OBSERVED VESSELS	FLAG	FISHING STRATEGY
2014	5	3	NL	Dutch type
	1	1	LV	Russian type
	1	1	LT	Russian type
2016	5	3	NL	Dutch type
	1	1	LT	Russian type
2017	1	1	LT	Russian type

The main operational information recorded (latitude, longitude, depth and trawls length is analysed separately below.

A.2 1. Fishing areas (fishing stations with observers):

Annex 6 show the fishing stations recorded by observers by fleet and fishing ground for the period considered.

Shrimper fleet- Fishing areas

Figure 1 and Figure 2 of Annex 6 show the position of hauls observed in Mauritania and Guinea-Bissau, respectively. The positions of the three types of fishing hauls (LAN, GAM and ALI) are differentiated by colour.

Two main fishing areas of *P. notialis* (shallower LAN hauls) can be inferred: the north area, which seems more important and is located around Cape Timiris, between 19°N to 19°50'N; and the south area (south Nouakchott), mainly between 17°30'N and 17°N. GAM hauls, were more abundant near the canyon system south of Cape Timiris and extending southwards to the border with Senegal. ALI hauls were also mainly conducted south of Cape Timiris, but in deeper waters between 18°30'N and 19°N and in two southern areas in south Nouakchott.

In Guinea-Bissau, LAN hauls were exclusively carried out in the north (north 11°N) while GAM and ALI hauls were conducted on the Bissauan shelf, being more abundant in the south (south 11°N), where the deep shelf and slope are much wider.

Black hake trawlers- Fishing areas

Figure 3, Figure 4 and Figure 5 of Annex 6 show the position of the fishing hauls carried out in Mauritania, Morocco and Senegal, respectively.

In Mauritania, a main fishing area is observed in the north, between the canyon system of Tanoûdêrt (around 20º26'N) and Cape Blanc (around 21ºN) and to the south of the canyons system of Timiris to 17ºN.

In Morocco, observed fishing activity was concentrated south of 24°N, always deeper than 200m. Most observed hauls were between 21°10'N and 21°40'N.

The only freezer vessel observed in Senegal showed a preference for the zone north of 15°N, with little activity in the south of 14°30'N.

Cephalopod-fin fish trawlers- Fishing areas

Figure 6 of Annex 6 shows the fishing positions recorded by observers on cephalopod-finfish trawlers in Guinea-Bissau. Most hauls targeting benthic cephalopods (*S. hierredda* and *O. vulgaris*) were concentrated in the North area (northern 11ºN), while hauls targeting horse mackerel (*T. trecae*) were distributed around the whole area, with higher concentrations in the South zone, where most of the hauls targeting black hakes were carried out.

Pelagic trawlers- Fishing areas

Fishing positions were not available for some fishing trips (see Table 1 of Annex 4) or were not properly recorded by observers. With the information available, Figure 7 of Annex 6 shows the main fishing area for the observed pelagic trawlers. Most of the sampling was conducted in the northernmost part of the Mauritanian EEZ. This pattern reflects very much the distribution of 'Dutch-type' trawlers, which had the best coverage by observers.

A.2. 2. Fishing depth

Table 15 shows depth ranges and mean depth values of the fishing operations carried out with observers on board the four fleets under study. It should be noted that observers recorded bottom depth, which in the case of pelagic trawlers do not correspond to the fishing depth. Therefore, this parameter is not directly comparable with demersal fleets.

Only considering demersal fisheries, the **shrimper fleet** operated in the widest depth range (13-1,000m). Depths fished were variable according to the type of haul performed and the target species (Table 15).

For **black hake fisheries**, two different fishing zones were observed, located at different depths in relation to two typical fishing strategies: a) one shallower and less frequented zone occurring at depths between 100-200 m, in which several more coastal species are targeted and, b) a deeper and more frequented zone, at depths between 500 and 700 m, where mainly black hake is targeted. For all fishing grounds, 'fresh' vessels fish at greater depths than freezer vessels.

Different depth-dependent fishing strategies were also observed for the **cephalopod-finfish fishery**: benthic cephalopods are targeted in shallower waters (20-100m), horse mackerel in deeper waters up to 200m and black hake in the deepest hauls, usually at depths greater than 300m.

The two types of **pelagic fishing** strategies are also depth-related. Thus, the 'Russian-type', is usually carried out in deeper waters, mainly targeting mackerel and horse mackerel; and the 'Dutch type', conducted in shallower waters, mainly fishing sardine.

Table 15. Depth ranges (and mean value) of fishing bottoms during observed trawl operations, by fleet and fishing ground. 2014-2018.

FLEET/FISHING GROUND	MOROCCO	MAURITANIA	SENEGAL	GUINEA-BISSAU
Shrimper trawlers	–	15-1060 (315)	–	13-800 (352)
Black hake trawlers	446-789 (673)	93-844 (547)	207-719 (550)	–
Cephalopod-finfish	–	–	–	20-640 (165)
Pelagic trawlers*	–	25-1500 (146)	–	–

*Bottom depths do not correspond to fishing depths for pelagic trawlers.

Table 16. Depth ranges (and mean value) of fishing bottoms during observed trawl operations on the shrimper fleet, by haul type and fishing ground. 2014-2018.

Haul Type	FISHING GROUND	DEPTH (m)
LAN	MAURITANIA	15-63 (43)
	GUINEA-BISSAU	13-75 (33)
	TOTAL	13-75 (42)
GAM	MAURITANIA	130-329 (250)
	GUINEA-BISSAU	100-399 (262)
	TOTAL	100-399 (254)
ALI	MAURITANIA	414-1060 (797)
	GUINEA-BISSAU*	357-786 (575)
	TOTAL	357-1060 (723)

* ALI-hauls of LANGABISS_0217, not included in the analysis. See "additional comment" in Table 2 of Annex 1.

A.2.3. Haul duration:

The duration of the fishing operations observed by fleet and fishing ground is shown in Table 17. The shortest hauls were performed by shrimper and pelagic trawlers, while black hake trawlers performed the longest hauls. For the shrimper fleet, haul duration was also dependent on depth; while average duration of LAN and GAM hauls is around 2h 30m, the deepest hauls (ALI) last more than 4h 40m average.

Table 17. Haul duration ranges (mean value) (hours:minutes) during trawl operations recorded by observers, by fleet and fishing ground. 2014-2018.

FLEET/FISHING GROUND	MOROCCO	MAURITANIA	SENEGAL	GUINEA-BISSAU
Shrimper trawlers	–	00:25 – 09:45 (03:00)	–	00:40 – 08:55 (03:16)
Black hake trawlers	01:24-08:27 (05:35)	00:35-09:37 (05:02)	01:15-10:30 (04:51)	–
Cephalopod-finfish trawlers	–	–	–	01:09-09:00 (03:50)
Pelagic trawlers	–	00:15-18:00 (03:36)	–	–

A.3 METEOROLOGICAL DATA

Although meteorological information is not required by the DCF, observers of demersal trawlers are also usually requested to collect this information. Tables 2 of Annex 1 and Annex 4 and Tables 3 of Annex 2 and Annex 3 show the type of meteorological data recorded and the proportion of hauls where this information is recorded by fishing trip. The type of meteorological information recorded differs considerably between fleets.

A.4 CATCH INFORMATION AND ANALYSIS

Catch information is given in the metadata inventoried in Tables 2 of Annexes 1, 2, 3 and 4. This includes information on total catch, retained catch and discards, together with information on target and by-catch species in the retained catch, with indication of the name of these species.

Target species by each fleet are shown in Table 18.

Table 18- Target species by EU observed fleet.

FLEET	COASTAL STATE EEZ	TARGET SPECIES	FAO CODE
Shrimper trawlers	Mauritania Guinea-Bissau	*Parapenaeus longirostris*	DPS
		Penaeus notialis	SOP
		Aristeus varidens	ARV
Black hake trawlers	Morocco Mauritania Senegal	*Merluccius polli*	HKB
		M. senegalensis	HKM
Cephalopods-finfish trawlers	Guinea-Bissau	*Merluccius polli*	HKB
		Trachurus trecae	HMZ
		Octopus vulgaris	OCC
		Sepia hierredda	CVT
Pelagic trawlers	Mauritania	*Sardinella aurita*	SAA
		Sardina pilchardus	PIL
		Trachurus trecae	HMZ
		Scomber colias	VMA

All these species except *A. varidens* are in the list of stocks listed in Table 1C for the FAO marine area 34 (CECAF) of EU MAP, for which biological variables must be collected.

Tables 2 of Annexes 1 to 4 show the catch details recorded by the observers by fishing trip for each type of fleet. This information was collected in all hauls of the four fleets considered. The catch details and observer estimates reported by the observers are indicated in Table 5 and analysed below.

A.4.1 ***Retained catch***

Data from retained catch in Table 19 show a degree of specialisation in most studied fisheries. The only exception are cephalopod-finfish trawlers, which is the fleet with the lowest proportion of target species in retained catches and the one with the highest number of species retained. The black hake fishery seems to be the most specialized, with 86% of black hakes in the retained catch, while the fleet of pelagic trawlers is the one with the lowest number of species retained (Table 19).

Table 19. Percentages and number of retained species in the total retained catch (RC) by type of fleet.

	Shrimper trawlers		Black hake trawlers		Cephalopod-finfish trawlers		Pelagic trawlers	
% by fishing trip	% target species in RC	No species in RC	% target species in RC	No species in RC	% target species in RC	No species in RC	% target species in RC	No species in RC
Min	37%	6	61%	3	16%	17	10%	6
Max	93%	19	97%	24	92%	40	100%	8
Mean	71%	10	86%	14	51%	31	73%	2

Some considerations should be noted for the four fleets:

Shrimper fleet– Retained catch

The relevance of target species and by-catch species in the retained fraction of the catch was analysed (Table 20). *P. longirostris* was the most abundant target species in catches for both fishing grounds. The proportion of *P. notialis* was higher in Mauritania while that of *A. varidens* was greatest in Guinea-Bissau. It should be noted that no fishery of *P. notialis* was observed in Guinea-Bissau in the fishing trips carried out in 2017.

Table 20. Shrimper fleet. Percentages of the three target species in the retained catch (RC) and by type of fishing haul, by fishing ground and in the total sampled area.

FISHING GROUND		% SOP in RC	% DPS in RC	% ARV in RC	LAN Hauls		GAM hauls		ALI Hauls	
					% SOP in RC	No species in RC	% DPS in RC	No species in RC	% ARV in RC	% No species in RC
ALL	min	0%	1%	0%	33%	2	86%	1	1%	3
	max	72%	93%	57%	93%	13	100%	7	81%	7
	mean	11%	46%	14%	63%	4	98%	3	31%	5
MRT	min	2%	5%	1%	39%	2	96%	1	9%	3
	max	72%	85%	39%	93%	9	100%	5	81%	7
	mean	14%	41%	14%	64%	4	99%	3	33%	5
GNB	min	0%	1%	0%	33%	7	86%	1	1%	4
	max	23%	93%	57%	72%	13	100%	7	62%	6
	mean	4%	53%	14%	52%	10	96%	3	28%	5

In general, GAM hauls were the most specialized in the fishery of their target species (*P. longirostris*), meaning the lowest number of species were retained. ALI hauls were the ones with the lowest retention of their target species (*A. varidens*), and the highest retained by-catch and number of retained species. There were a greater number of species retained in LAN hauls in Guinea-Bissau compared to Mauritania.

Table 1 of Annex 7 shows the most common by-catch species of this fleet. The composition of retained by-catch varied with depth and therefore, by type of fishing haul. *O. vulgaris* and *L. vulgaris* were the most common retained by-catch species from the shallowest LAN hauls. The predominant by-catch species retained in GAM hauls were *C. maritae, L. vaillanti* and *O. vulgaris*, although always in very small proportions. Main by-catch retained species registered for ALI hauls were *L. vaillanti, C. maritae, G. marsupialis* and *A. edwardsiana* (Tables 3, 4 and 5 of Annex 1).

Black hake trawlers– Retained catch

Merluccius polli is the dominant species in retained catches of black hake (90%) (Table 21) as the distribution of this species includes the greatest depths (Fernández-Peralta et al., 2017). Table 2 of Annex 7 shows the percentage of occurrence of most important retained by-catch species, following the criterion of being among the five most abundant in each observed trip (see Table 2 in Annex 2). A total of 30 species followed this criterion, indicating the great diversity of the retained by-catch, although some differences were found in the species composition between fishing grounds and fleet types ('fresh' or freezer trawlers).

Table 21. Proportion of both black hake species (*M. polli* and *M. senegalensis*) in target catch, by fishing ground and by the total sampled area. Freezer trips in Senegal not included.

FISHING GROUND		% HKB in hake catch	% HKM in hake catch
ALL AREA	Min	54%	0%
	Max	100%	44%
	Mean	90%	10%
MOROCCO	Min	90%	3%
	Max	97%	10%
	Mean	95%	5%
MAURITANIA	Min	54%	0%
	Max	100%	44%
	Mean	89%	11%

Cephalopod-finfish trawlers– Retained catch

Among the four target species of this fleet, *T. trecae* was the most abundant in catches, followed by *M. polli*, *O. vulgaris* and *S. hierredda* (Table 22). The main retained species for commercial use are listed in Table 3 of Annex 7. Great variability in the composition of the retained by-catch was recorded, related to the different depth-dependent strategies followed. A total number of 23 species follows the criterion of being among the five main retained by-catch species in the fishing trip (different species might be among the five most important species in different trips) were recorded (Table 3 of Annex 3). However, only three of them were relatively frequent in all fishing trips: the bearded brotula *Brotula barbata* (75%), the Canary drum *Umbrina canariensis* (50%) and the Angolan dentex *Dentex angolensis* (37%).

Table 22. Percentages of target species in the total retained catch of cephalopod-finfish trawlers in Guinea-Bissau.

FISHING GROUND		% HKB in RC	% HMZ in RC	% OCC in RC	% CVT in RC
GUINEA-BISSAU	Min	0	0	0	0
	Max	91	85	24	10
	Mean	12	29	7	2

Small pelagic trawlers– Retained catch

Table 1Table 23 shows the variable nature of the pelagic fishery. The catch composition depends on the type of trawler ('Dutch-type' or 'Russian-type'), on the season and on the availability of the various species in a particular year and season. However, the European sardine *S. pilchardus* was the species with the highest average proportion among the observed fishing trips.

Although there is no clear pattern in the retained by-catch species recorded, some of the most frequent by-catch species were: the Atlantic horse mackerel *Trachurus trachurus* (HOM) in 64% of the fishing trips, the Atlantic pomfret *Brama brama* (POA, 50%), the black hake *M. polli,* the False scad *Caranx rhonchus* (HMY), and the Madeiran sardinella *Sardinella maderensis* (SAE), retained for commercial use in 21% of the observed trips, each one (Table 2 of Annex 4).

Table 23. Percentages of target species in the retained catch (RC) of pelagic trawlers in Mauritania.

FISHING GROUND		% SAA in RC	% PIL in RC	% HMZ in RC	% VMA in RC
MAURITANIA	Min	0	0	0	0
	Max	32	94	50	54
	Mean	8	39	10	17

A.4.2 Discarded catch

The inventory of metadata in Annex 1 to 4, contain information on weights of total retained catch and of discards, that allowed the estimation of discards rates (%) by fishing trip. These rates were summarized by minimum, maximum and mean values by fishing trip and fishing grounds and for the total area in Table 24.

Shrimper trawlers produced the highest percentages of discards and cephalopod-finfish and pelagic trawlers the lowest. For the shrimper fleet, a greatest mean discard rate was estimated in Mauritania than in Guinea-Bissau. Variations by type of fishing haul (LAN, GAM, ALI) are known to occur in both fishing grounds. A higher discard rate was found in the Moroccan black hake fishery than in the Mauritanian fishery.

Table 24. Percentages of discards in total catch (minimum, maximum and mean values by fishing trip), by fleet and fishing ground, and for the total area.

FISHING GROUND	% Discards by fishing trip	Shrimper trawlers	Black hake trawlers*	Cephalopod -finfish	Pelagic trawlers
ALL	Min	47	12	15	5
	Max	88	51	38	63
	Mean	72	36	26	28
MOROCCO	Min	–	41	–	–
	Max	–	51	–	–
	Mean	–	45	–	–
MAURITANIA	Min	63	12	–	5
	Max	88	51	–	63
	Mean	75	35	–	28
GUINEA-BISSAU	Min	47	–	18	–
	Max	83	–	38	–
	Mean	67	–	26	–

*Black hake trawlers in Senegal not included, as only one fishing trip was carried out.

A.5 LENGTH AND BIOLOGICAL SAMPLING

Target species of the four fleets that require length and biological sampling by the DCF are:

- *Merluccius polli* (HKB) and *M. senegalensis* (HKM) for black hake trawlers.
- *Penaeus notialis* (SOP) and *Parapenaeus longirostris* (DPS) for the shrimper fleet.
- *M. polli* (HKB)*, T. trecae* (HMZ)*, Octopus vulgaris* (OCC) and *Sepia hierredda* (CVT) for cephalopods-finfish trawlers.
- *Sardinella aurita* (SAA), *Sardina pilchardus* (PIL), *Trachurus trecae* (HMZ) and *Scomber colias* (VMA) for pelagic trawlers.

In addition, species included in Table C of the current EU-MAP[1] for FAO marine area 34-(CECAF), should be sampled for length.

A.5.1 Retained catch

Table 6 of Annex 1, Table 4 of Annex 2 and 3 and Table 3 of Annex 4 show metadata recorded in relation to **length sampling of retained species** (Table 6), for the four fleets, and by fishing trip. The recorded values allowed estimation of mean weights of sampled target species by fishing trip and for each fleet (maximum, minimum and average values). These were

[1] Stocks in marine regions under Regional fisheries management organisations (RFMOs) and Sustainable Fishing Partnership Agreements (SFPAs). Biological Data.

calculated as the ratio between the values recorded for sample weights and the number of sampled individuals (Tables 1 to 4, in Annex 8).

Table 7 of Annex 1, Tables 5 of Annex 2 and 3 and Table 4 of Annex 4 show metadata related to **biological sampling of retained target species**, by fishing trip and for the four fleets. They include the number of hauls in which the species were sampled in order to provide the biological parameters required by the DCF (length, weight, sex, maturity) for the target species.

Age (otolith) and maturity data of demersal stocks were not recorded as these were not required by the end-user (CECAF). However, a recurrent recommendation from CECAF is to strength and/or restart age reading programmes for sardine, sardinella and mackerel, among other small pelagic species (FAO, 2019). DCF observers on board pelagic trawlers did not collect otoliths during the study period, as there was no available institute able to read them.

A.5.2 Discarded catch

Metadata recorded for **length sampling of discarded species** (Table 6) are shown in Table 8 of Annex 1, Tables 6 of Annex 2 and 3 and Table 5 of Annex 4.

Table 9 of Annex 1, Tables 7 of Annex 2 and 3 and Table 6 of Annex 4 show the number of hauls in which **discarded target species were sampled for biology**.

For both types of sampling, metadata are presented by type of fleet and by fishing trip.

For some required stocks, length and biological sampling could not be performed in certain fishing trips, due the absence of the target species in the catches of the observed vessel. This was the case of *P. notialis* in some fishing trips performed by the shrimper fleet in Guinea-Bissau, of *M. polli, T. trecae* ad *S. hierredda* in trips from cephalopod-finfish trawlers, and of *S. aurita, S. pilchardus* and T*. trecae* in some trips from pelagic trawlers.

A.6 DISCARD COMPOSITION

Table 10 of Annex 1, Tables 7 of Annex 2 and 3 and Table 6 of Annex 4 show the metadata in relation to discard composition (Table 6), by the total fishing trips for the four fleets and also by type of fishing hauls for the shrimper fleet. All this information is summarized in Table 25, by minimum, maximum and mean values by each fishing ground and over the fishery as a whole where appropriate.

The shrimper fleet displayed the highest discard diversity due to the wide range of fishing depths where it operates. By contrast, pelagic trawlers had the lowest discard diversity which might be related to the fishing strategy of targeting single-species schools. The greatest mean proportion of discards of commercial species was recorded for the cephalopod-finfish fleet, while the lowest was for the small pelagic fishery.

Table 25. Number of discarded species and proportion of commercial species in discards by the fleet by fishing ground and in the total sampled zone. 2014-2018.

FISHING GROUND		SHRIMPER TRAWLERS		BLACK HAKE TRAWLERS*		CEPHALOPOD-FINFISH TRAWLERS		SMALL PELAGIC TRAWLERS	
		No. of discarded species	% commercial species in discards	No. of discarded species	% commercial species in discards	No. of discarded species	% commercial species in discards	No. of discarded species	% commercial species in discards
ALL	min	18	15%	14	25%	30	19%	6	7%
	max	272	50%	100	70%	87	58%	45	44%
	mean	148	32%	59	37%	58	43%	17	23%
MAR	min	–	–	16	25%	–	–	–	–
	max	–	–	67	43%	–	–	–	–
	mean	–	–	51	33%	–	–	–	–
MRT	min	18	28%	14	28%	–	–	6	7%
	max	272	50%	100	70%	–	–	45	44%
	mean	163	35%	61	37%	–	–	17	23%
GNB	min	70	15%	–	–	30	19%	–	–
	max	165	36%	–	–	87	58%	–	–
	mean	122	27%	–	–	58	43%	–	–

* Black hake trawlers in Senegal not included, as only one fishing trip was carried out.

The discard composition is analysed more in detail by fleet below.

Shrimper fleet – Discard composition

In general, both the diversity of discards and the proportion of species of commercial interest in discards were greater in Mauritania than in Guinea-Bissau (Table 25 and Table 26). Potential variations also analysed by type of fishing haul (Table 26). Regardless of the fishing ground, discards diversity decreased with depth. Thus, the shallowest LAN hauls registered the highest diversity of discarded species, followed by GAM hauls and the deepest ALI hauls. This decrease with depth also occurred for discarded commercial species. The same trend was found in Mauritania, while in Guinea-Bissau, highest diversity was found in GAM hauls, followed by ALI hauls and LAN hauls. This may be explained by the low number of LAN hauls observed.

Black hake trawlers – Discard composition

The diversity of discards was greater in Mauritania than in Morocco (Table 25), probably due to the greater number of trips observed, which covered a greater depth range. The proportion of commercial species was also higher in Mauritania. Senegal's low discard diversity reflects only a single fishing trip.

Cephalopod-finfish trawlers – Discard composition

A relatively high proportion of the discarded species was considered of commercial interest (Table 25). The fishing trips carried out at greater depths were those with the highest diversity but with the lowest proportion of commercial species (see Tables 1 and 2 of Annex 3).

Pelagic trawlers – Discard composition

Both the mean number of species in discards of pelagic trawlers and the proportion of commercial species in discards were much lower for pelagic trawlers than for demersal fleets (Table 25).

Table 26. Number of discarded species and proportion of commercial species in discards (D) produced by the shrimper fleet, by type of fishing haul (LAN, GAM, ALI), by fishing ground and in the total sampled zone. 2014-2018.

FISHING GROUND		LAN Hauls		GAM Hauls		ALI hauls	
		No. of discarded species	% of commercial species in D	No. of discarded species	% of commercial species in D	No. of discarded species	% of commercial species in D
ALL	min	45	30%	18	14%	17	12%
	max	150	45%	128	54%	96	36%
	mean	76	37%	77	35%	53	24%
MRT	min	45	30%	18	32%	17	12%
	max	150	45%	127	54%	81	31%
	mean	78	37%	72	40%	52	25%
GNB	min	52	40%	36	14%	21	14%
	max	75	41%	128	34%	96	36%
	mean	64	41%	87	27%	54	22%

B- INVENTORY AND ANALYSIS OF METADATA AVAILABLE UNDER THE SFPA OBSERVER PROGRAMMES

Information from SFPA observers on board EU mixed fisheries gathered correspond to a 37 reports hosted by DG MARE and provided to the Consortium in paper format. No more reports could be collected from other sources although some other reports were known be sent from the Moroccan administration to the EU

The reports available are from three types of fleets, developed under two SFPAs:

- Black hake trawlers (Senegal)
- Bottom longliners (Morocco)
- Pelagic trawlers (Morocco)

The metadata available for the three fleets were inventoried in Tables 1, 2 and 3 of Annex 5. The templates for the inventories were adapted to the report content and qualitative information was provided, which was considered enough for the purpose of Task 2. Table 27 summarizes the metadata inventoried in Annex 5 and their availability by type of fishery.

Main issues than can be inferred from the reports of observers from CS are:

1) In general, all observers reported the most relevant information on the fishing trip, as detailed in Table 27.

2) It was often not possible to know from the reports if observers were on board for the full duration of the fishing trip (e.g. reports of Moroccan observers on pelagic trawlers and some reports of Senegalese observers on black hake trawlers).

3) Information on vessels characteristics was quite complete for the three fleets, being specially detailed by Senegalese observers.

4) The details given on the fishing gears characteristics varied from:

- null (eg. Moroccan observers on bottom longliners),
- limited, only providing mesh size of trawlers and sometimes only indicating the one established in the Protocol (eg. Moroccan observers on pelagic trawlers),
- detailed information (eg. Senegalese observers).

5) Information on fishing area varied from:

- null (eg. Moroccan observers on bottom longliners),
- limited, only referring to the fishing areas as established in the Protocol (eg. most observers on pelagic trawlers)
- detailed, with positions registered by fishing haul (Senegalese observers).

6) The aggregation level of the information reported varied from:

- fishing haul (Senegalese observers) to
- fishing trip (Moroccan observers).

7) The quantity of catch details varied from:

- Very low→ only weights of global retained catch and discards of the whole fishing trip and unofficial common names of target species reported (eg. Moroccan observer on bottom longliner);

- low - medium→ catch details by fishing trip. In general, more complete information on the weight of both target and by-catch species retained, from discards (in most reports) and on the target species names. Information of main by-catch retained and discarded species provided only in around half of the reports but with no indication of weight by discarded species (eg. most Moroccan observers on pelagic trawlers);

- medium - high→ weight of all catch fractions reported by fishing haul. Names of target and by-catch species provided. Names of most important discard species recorded in most fishing hauls (eg. Senegalese observers on black hake trawlers).

8) The species nomenclature used also varied between the fleets analyzed:

- Non-official common names were used for species, with no indication of catch weight by species. This are used for target and by-catch species of bottom longliners and retained by-catch and discard species (when reported) of other fleets;

- Common names of species or groups of species were used for target species of pelagic trawlers and black hake trawlers, with indication of their weights or percentages in total catch for each species. In the first case, mackerels, horse mackerels, sardines, and sardinelles, there is no separation in species for mackerels, horse mackerels and sardinellas, that can group more than one species. Black hake is reported as "merlu" (hake) by Senegalese observers on black hake trawlers, with no separation of catches among the two black hake species (*Meluccius polli* and *M. senegalensis*).

9) Official common names (scientific names, FAO common name or FAO codes) were not used. Non official common names were used by all observers. Different observers reported the same species with different common names (e.g. Senegalese observers).

10) No biological information was provided in any of the reports available.

11) Information of some reports was illegible.

Taking into account these considerations, it can be concluded that there are clear differences in the quantity of information reported, between Moroccan and Senegalese observers, being greater in Senegal than in Morocco. However, it should be reminded the existence of "more detailed reports" from Moroccan observers, kept in Morocco and not sent to the EU, was indicated by the Department of Maritime Fisheries of the Moroccans Ministry (section 3.1.2) and the information contained in those reports is unknown.

Table 27. Summary table of metadata recorded in SFPA observer programmes implemented by the CS.

METADATA SETS	METADATA	BLACK HAKE TRAWLERS	BOTTOM LONGLINER	PELAGIC TRAWLERS
TRIP DETAILS	EEZ_Name	SENEGAL	MOROCCO	MOROCCO
	MS Flag_Name (Y/N)	Y	Y	Y
	Vessel_Name	Y	Y	Y
	Observer_Name	Y	Y	Y
	Starting date (dd/mm/yyyy)	Y	Y	in > 90% reports
	Final date (dd/mm/yyyy)	Y	Y	in > 90% reports
	Days at sea (number)	Y	Y	Y
	Fishing days (number)	Y	Y	in 12% reports
	Has the observer been onboard the length of the fishing trip? (Y/N)	Y or NA	Y	NA
	Additional details	– Number of Senegalese seamen – Working conditions on board – Habitability conditions on board – Relationship with captain	– Port of embarkation and debarkation – Number of Moroccan seamen	*Sometimes:* – Port of embarkation and debarkation – Number of Moroccan seamen
VESSEL AND GEAR DETAILS	Vessels characteristics recorded (Y/N). If yest, list them.	– Registration number – Registration Port – Identifier – GrossTonnage (GT) – Power (kw and/or hp) – Length (m) – Breadth (m) – Draught (m) – Captain name – Captain nationality – Name of fishing option (licence)	– Registration number – Registration Port – Identifier – Gross Tonnage (GT) – Power (hp) – Number of fishing licence – Captain name – Captain nationality	– Registration number – Registration Port – Identifier – Gross Tonnage (GT) – Power (hp) – Number of fishing licence *Sometimes:* – Captain name – Captain nationality – IMO
	Fishing gear recorded (Y/N)	Y	Y	Y
	Fishing gear particulars recorded (Y/N). If yes, list them.	– Mesh size of codend and of other net sections – Gear total length – Headrope and footrope lengths	N	Mesh size, most times as established in the Protocol

Table 27. Cont.

METADATA SETS	METADATA	BLACK HAKE TRAWLERS	BOTTOM LONGLINER	PELAGIC TRAWLERS
OPERATIONAL DETAILS	Hauls by observer trip recorded (Y/N)	Y	N	in 12% reports
	Positions recorded in every haul (Y/N)	Y	N	N
	If not position recorded, fishing zone by trip (Y/N)	Y	As established in the Protocol	As established in the Protocol
CATCH DETAILS	Total retained catch weight (Y/N)	Y	Y	Y
	Retained target species weight (Y/N)	Y	N	Y
	Retained bycatch species weight (Y/N)	Y	N	Y
	Retained target species name recorded	Y	Y	Y
	Retained bycatch- main species names	Y	N	in 38% reports
	Type of nomenclature used for species	Non official common names	Non official common names	Common name, by group of species
	Total discard weight (Y/N)	Y	Y	in 84% reports
	Discard species recorded	Y (> 95 % reports)	N	in 54% reports
	Aggregation level of data recorded	By fishing haul and by fishing trip	By fishing trip	By fishing trip
BIOLOGICAL SAMPLING	Biological information available (Y/N)	N	N	N
RELEVANT COMMENTS	Relevant commets recorded (Y/N)	Usually, general summary reports provided, with comments on the work development, incidents or further catch and discards details.	N	Mostly N
	Number of reports available	10	1	26
	Reports years	2015, 2016, 2017, 2018	2017	2015, 2016, 2017, 2018
	Target species	HKX	CGZ, ZEX, HKX, PAX, etc.	MAZ, HAX, PIL, SIX, JAX
	Provide any general relevant comment, if any.	– Some reports are unreadable. – Non completely standardized reporting procedures. Certain forms only used in some fishing trips. – Dicards species reported: usually 2-3 main species + diverse		– Although the type of forms used is quite standard, the type and way of reporting varies among observers. – Catch recorded by species or group species. Retained catch frequently reported by fraction: frozen catch and "fausse pêche" (bycatch of non target

SUMMARY OF REPORTS AVAILABLE

The metadata collected from the SFPA reports (Tables 1, 2 and 3 of Annex 5) are from 55 observer fishing trips carried out in the period 2015-2018. A minimum of 1,122 days observed could be estimated from the inventory, as some observed dates were missing in some reports (Table 28).

Table 28. Summary table of the SFPA observer reports hosted in DG MARE. 2015-2018.

EEZ	FLEET	No of reports	EU fishing countries	Years	No. of observed trips	Days observed (fishing days or days at sea)
SENEGAL	Black hake trawlers	10	Spain	2015, 2016, 2017, 2018	28	247 fishing days
MOROCCO	Bottom longliners	1	Portugal	2017	1	6 fishing days
	Pelagic trawlers	26	Germany, Latvia, Lithuania, Poland, The Netherlands	2015, 2016, 2017, 2018	26	> 869 days at sea
TOTAL		37			75	> 1,122 days at sea

More information is given by fleet type below.

Black hake trawlers

Information from the EU black hake fishery comes from Senegalese observers on board Spanish vessels during the period from 2015, when the fishing activity of the EU fleet started after the signature of the last Protocol, to 2018. Metadata inventory of these reports is provided in Tables 1a and 1b of Annex 5.

A total number of ten reports were received, some of them containing information from several fishing trips. Table 29 summarizes the number of reports, fishing trips, and fishing days by year and type of black hake trawlers ('fresh' or freezer), the total coincident with the one reported to the JSC (Fall et al., 2018).

Table 29. Number of reports, observed fishing trips and fishing days by year and fleet covered by the Senegalese observers on EU black hake trawlers (2015-2018).

FLEET	YEAR	No. OBSERVER REPORTS	No. OBSERVERD TRIPS	No. OBSERVED FISHING DAYS
'fresh' trawlers	2015	4	22	159
Freezer trawlers		1	1	27
TOTAL BLACK HAKE	2015	5	23	186
'fresh' trawlers	2016	1	1	4
Freezer trawlers		1*	1*	11
TOTAL BLACK HAKE	2016	1.5*	2	15
'fresh' trawlers	2017	1	1	3
Freezer trawlers		1*	1*	23
TOTAL BLACK HAKE	2017	1.5*	1	26
'fresh' trawlers	2018	0	0	0
Freezer trawlers		2	2	20
TOTAL BLACK HAKE	2018	2	2	20
TOTAL	2015-2018	10	28	247

*One report of a trip on a freezer vessel observed between 2016 and 2017

Most reports and observed fishing trips were from 2015, mostly from 'fresh' trawlers. All were from the same vessel, as this was the only one active in Senegal. The number of observed fishing trips drastically dropped from 2015 to 2016-2018, this decrease in accordance with the reduction of the fishing activity, especially of the 'fresh' trawlers (Fall et al., 2018).

The mean duration of fishing trips was six fishing days for 'fresh' trawlers, and 31 fishing days for freezer trawlers, although the last could be inferred only from two trips.

Bottom longliners

Only one report of this type was available. Metadata are provided in Tables 2a and 2b of Annex 5. The report is from one fishing trip (Table 30), on a Portuguese bottom longliner fishing in Morocco with Fishing Category No 4 "Demersal fishing", as it could be inferred from the gear used, target species and fishing zones, because this information was not indicated.

Table 30. Fishing days covered by the SFPA observer on the bottom longliner fleet in Morocco. 2017.

FLEET	YEAR	No. OBSERVED TRIPS	No. OBSERVEDFISHING DAYS
Bottom longliner	2017	1	6

Pelagic trawlers

A total number of 26 reports (one per observer fishing trip) from Moroccan observers on board of EU pelagic trawlers fishing in South Morocco under Fishing Category No 6 during the period 2015-2018 were available in DG MARE, much less than the 59 reports indicated to have been sent by the Moroccan administration for the same period (Table 4). The inventory of metadata from the 26 reports is provided in Tables 3a and 3b of Annex 5. 14 observers reported on 26 fishing trips across 10 vessels (Table 31).

Table 31. Number of fishing trips and fishing days by year and EU fishing country covered by the SFPA observers on the pelagic trawlers fleet in Morocco (2015-2018).

YEAR	EU fishing country	OBSERVERS' FISHING TRIPS	OBSERVERS' DAYS AT SEA
2015	LATVIA	1	47
Total 2015	LV	1	47
2016	LATVIA	1	100
	LITHUANIA	3	> 39*
	POLAND	1	61
	THE NETHERLANDS	3	> 30*
Total 2016	LV, LT, PL, NL	8	> 230
2017	LATVIA	3	172
	LITHUANIA	4	321
	POLAND	1	30
	THE NETHERLANDS	8	194
Total 2017	LV, LT, PL, NL	16	717
2018	GERMANY	1	27
2018	DE	1	27
2015-2018	LV, LT, PL, NL, DE	26	> 1,021

* Dates and duration of one "observer" fishing trip unknown

Most reports were from 2017. Little information was available from 2015 and 2018. Most observers did not report on the number of fishing days. The time that the observer was embarked ranged between 11 and 128 days at sea, with an average of 43 days at sea per fishing trip.

Observed vessels were from five nationalities (Table 31). Most observed fishing trips were on board the Dutch fleet, although observers worked during longer periods on Lithuanian and Latvian vessels (Table 32).

Table 32. Percentages of SFPA-observers' fishing trips and SFPA-observer days at sea by EU fishing country operating with pelagic trawlers in Morocco in 2015-2017.

EU fishing country	OBSERVER FISHING TRIPS	OBSERVED DAYS AT SEA*
GERMANY	4%	3%
LATVIA	19%	31%
LITHUANIA	27%	35%
POLAND	8%	9%
THE NETHERLANDS	42%	22%

* Dates and duration of one observed fishing trip unknown. Information missing for 2 fishing trips.

3.2 TASK 2- ASSESSMENT OF THE IMPLEMENTATION OF THE OBSERVER SCHEMES

3.2.1 COVERAGE LEVELS- DCF and SFPA observers

The levels of observer coverage should be proportionate to the relative effort and variability of the catches of the metier. Coverage levels can be measured in a number of different ways; trips observed, vessels observed, days observed or proportion of catch observed. These have been examined for both the DCF and SFPA programmes. Additional analysis was also undertaken on the DCF data looking at the temporal and spatial coverage and the proportion of the catch which is biologically sampled (e.g. for length, sex and maturity). These additional data were not available for the SFPA programmes.

The requirements for data collection under the DCF are outlined under Section 3.1.1 which highlights that they should be appropriate for the assessment of the state of the exploited marine biological resources, the effect on the ecosystem and the socio-economic performance of the fishery. Taken from literature, some **recommended coverage levels** to meet the first two objectives, are:

a) To assess the status of the exploited resources: a coverage level of 15% of all trips (GARFO, 2018).

b) To assess the effects on the ecosystem, specifically the incidental mortality of PET (Protected, Endangered or Threatened) species, Debski et al. (2016) determined that: i) Coverage levels of 5% of fishing effort may be adequate to collect information identifying some by-catch risks and issues; ii) coverage levels ≥ 20% of fishing effort may be necessary to robustly estimate by-catch levels of more frequently caught species; iii) Coverage levels of 50%-100% may of fishing effort be necessary to estimate by-catch of species caught infrequently. These coverage levels were established for longline fisheries and effort unit was number of hooks but could be applied to trawl fisheries, considering the number of fishing operations as effort unit. However, the number of hauls was not available

for none of the fisheries under study and the adequateness of the coverage level to assess the effects on the ecosystem could not be evaluated.

DCF Observers

Table 33, Table 34**, Table 35 and**

Table 36 summarise the DCF observer coverage for the four fleets, in the four ways previously mentioned (trips, vessels, days, catch).

The coverage for the **shrimper fleet**, as the proportion of trips observed varied between 2% and 13%, with the highest level of coverage in 2016, this also corresponds to the highest percentage of days and catch observed. There has been a slight decreasing trend since then. Comparing the number of different vessels to the number of trips it appears that there was a reasonable range of vessels sampled from (Table 33).

The coverage from **black hake trawlers** is shown in Table 34. The proportion of trips observed has remained constant, ranging between 6% and 9%, for all the fishing grounds for all years. Over 80% of the observation effort was in Mauritania, which was proportional to the fishing effort.

Observer coverage in the **cephalopod-finfish** fishery was quite limited, although it increased over the study period, from 1% in 2015 to 4% in 2017 of the trips, fishing days and total catch observed (Table 35).

The only information available on fishing effort deployed by the EU **pelagic trawlers** in Mauritania was in number of fishing units, as no data on fishing trips or fishing days were available from the JSC reports (

Table 36). In general, though, it can be seen that overall observation effort has gone down in proportion with the fishing effort in the region.

The coverage level (≥ 15% fishing trips) recommended to assess the status of the exploited resources was usually higher than those currently being achieved by observers on board EU vessels in West Africa, that had year maximal proportions ranging from 4% to 13%, depending on the fleet.

SFPA observers

Coverage levels were assessed in relation to those established in the respective Protocols and whether they reach the level recommended to assess stock status (15% of fishing trips).

MOROCCO-*Pelagic trawlers*

The level of coverage established for Moroccan observers on EU pelagic trawlers is understood from the SFPA protocol as 100%, which states that *"Observers to remain on board pelagic trawlers on permanent basis"* and "*for the entire period of activity in the Moroccan fishing zone*" (see Table 3).

The coverage levels of Moroccan observers onboard EU pelagic trawlers, obtained from the analysed reports, is shown in

Table 36. Data from the EU pelagic trawlers in Morocco were obtained from the last JSC-SFPA report (Cervantes et al., 2018). Information on the fishing trips carried out by the fleet was not available. An annual increase of the observer coverage occurred from 2015 to 2017, both in the proportions of vessels and fishing days observed (100% and 86%, respectively).

From the reports analysed it would appear that the levels of coverage by year (in terms of days observed) are below those required by the Protocol. However this may not be the case as the number of reports sent to DG MARE by the Moroccan administration (Table 4) is not the same that the Consortium has received and therefore the real coverage could be higher.

Table 33. Shrimper fleet observer coverage (by year).

Fishing ground	Year	Trips Obs.	Total trips*	% Trips Obs.	Vessels Obs.	Total vessels *	% Vessels Obs.	Days Obs.	Days Fished *	% Days Obs.	Catch Obs. (t)*	Retained catch (t)	% Catch Obs.
Mauritania	2014	4	78	5%	3	15	20%	195	3465	6%	120	1802	7%
	2015		6			6			141			85	
	2016	5	39	13%	3	6	50%	188	1671	11%	98	984	10%
	2017	1	46	2%	1	13	8%	47	1884	2%	35	1343	3%
	2018	4	100	4%	4	15	27%	208	4343	5%	115	2446	5%
Guinea-Bissau	2015	4	63	6%	3	9	33%	179	2639	7%	104	1335	8%
	2016	1	41	2%	1	6	17%	38	1706	2%	31	799	4%
	2017	3	61	5%	3	8	38%	136	1972	7%	119	1586	8%

*Source: Spanish Secretary of Fisheries analysed by IEO.

Table 34. Black hake trawler observer coverage.

Fishing ground	Year	Trips Obs.	Total trips*	% Trips Obs.	Vessels observ.	Vessels in fishery*	% vessels observ.	Days Observ.	Days Fished*	% days fished observ.	Catch observ. (t)*	Total retained catch (t)	% catch observ.
Senegal	2016	0	4	0%	0	2	0%	0	200	0%	0	174	0%
	2017	1	12	8%	1	4	25%	20	246	8%	112	1896	6%
	2018	0	9	0%	0	3	0%	0	180	0%	0	1392	0%
Morocco	2016	3	33	9%	1	7	14%	13	388	3%	94	2821	3%
	2017	2	23	9%	1	7	14%	9	247	4%	35	1467	2%
	2018	1	16	6%	1	5	20%	6	141	4%	40	823	5%
Mauritania	2016	7	113	6%	2	3	67%	37	709	5%	370	7399	5%
	2017	10	141	7%	3	9	33%	86	1086	7%	619	9311	7%
	2018	12	203	6%	2	10	20%	101	1817	6%	881	15191	6%

*Source: Spanish Secretary of Fisheries analysed by IEO.

Table 35. Cephalopod– finfish observer coverage.

Fishing ground	Year	Trips Obs.	Total trips*	% Trips Obs.	Vessels observ.	Vessels in fishery*	% vessels observ.	Days Observ.	Days Fished*	% days fished observ.	Catch observ.	Total retained catch (t)*	% catch observ.
Guinea-Bissau	2015	1	96	1%	1	10	10%	13	1795	1%	96	14351	1%
	2016	3	117	3%	3	11	27%	48	2237	2%	762	20802	4%
	2017	4	100	4%	2	14	14%	96	2226	4%	614	17254	4%

*Source: Spanish Secretary of Fisheries analysed by IEO.

Table 36. Pelagic trawler observer coverage.

Fishing ground	Year	Trips Obs.	Total trips	% Trips Obs.	Vessels observed	Vessels in fishery*	% vessels observed	Days Observed	Days Fished	% days fished observed	Catch observed	Total retained catch (t)*	% catch observed
Mauritania	2014	7	NA	NA	5	18	28%	136	NA	NA	5572	259604	2%
	2015	0	NA	0%	0	13	0%	0	NA	0%	0	2127	0%
	2016	6	NA	NA	4	12	33%	118	NA	NA	3897	135967	3%
	2017	1	NA	NA	1	11	9%	30	NA	NA	772	82423	1%
	2018	0	NA	0%	0	12	0%	0	NA	0%	0	127576	0%

*Source: JSC UE-Mauritania 2019 (Fernández-Peralta et al., 2019)

Table 37. Pelagic trawler SFPA observer coverage in Morocco (by year).

Year	Trips Obs.	Total trips	% Trips observ.	Vessels observ.	Vessels in fishery	% vessels observ.	Days observ.	Days Fished	% days fished observ.
2015	1	NA	NA	1	8	13%	47	829	6%
2016	8	NA	NA	5	8	63%	>230*	627	> 37%*
2017	16	NA	NA	8	8	100%	717	829	86%
2018	1	NA	NA	1	NA	NA	27	NA	NA

* Dates and duration of one "observer" fishing trip unknown. Information missing for 2 fishing trips.

MOROCCO-*Bottom longliners*

Only one trip was observed on the EU longline fleet operating in Morocco. It was in 2017 and represented just six days of fishing. No information on this fishery was available, and thus, coverage level is unknown.

SENEGAL-*Black hake trawlers*

No coverage levels are defined for Senegal in the Protocol, just a limitation of time that can be spent on one trip *("For deep-sea demersal trawlers, maximum observer time on board is two months"*, Table 3). This was accomplished in all fishing trips, as the maximum time on board was 52 days, according to the metadata inventory in Annex 5.

Data from the Spanish fleet in Senegal were provided by IEO and can be consulted in Fall et al. (2018). Most reports from Senegalese observers on Spanish black hake trawlers were from 2015, with a maximum observed coverage of 88% of the fishing trips and 93% of the fishing days observed (Table 38). All reports available in Senegal (Fall et al., 2018) were sent to DG MARE.

Table 38. Black hake trawler SFPA observer coverage in Senegal (by year).

Year	Trips Obs.	Total trips	% Trips observ.	Vessels observ.	Vessels in fishery	% vessels observ.	Days Observ.	Days Fished	% days fished observ.
2015	23	26	88%	2	3	67%	186	200	93%
2016	2*	4	50%	2	2	100%	15	20	75%
2017	2*	12	8%	1	4	25%	26	246	11%
2018	2	9	22%	2	3	67%	20	180	11%

*One trip in a freezer vessel carried out between 2016 and 2017

Whether the recommended coverage level (≥ 15% of fishing trips) was met could not be ascertained for Moroccan observers due to a lack of information on the number of trips carried out by the fleets. The aggregation level of the data, by fishing trip rather than haul by haul, is also not adequate to carry out any meaningful assessments. However, with the exception of 2017, Senegalese observers on EU black hake trawlers have generally exceeded the recommended 15% coverage level, and so in theory their data should be considered adequate to assess stock status.

3.2.2 TEMPORAL COVERAGE- DCF Observers

The Commission Decision 2010/93/EU (EU, 2010), on which the DCF sampling programmes were based, stated that a minimum of one fishing trip should be sampled per month where trips are shorter than two weeks or one per quarter for longer trips.

The mean trip lengths and requirements for each of the fleets are summarised in Table 39. Among the four fleets analysed, only black hake trawlers have a mean trip length of under two weeks (although some individual trips of freezer vessels go over this) and would therefore require at least one observed trip per month, the rest require one per quarter.

Table 39. Temporal sampling requirements under DCF.

Fleet	Mean trip length	Requirement
Shrimper trawlers	45	One fishing trip per quarter
Black hake trawlers ('fresh')	8	One fishing trip per month
Cephalopod – finfish trawlers	20	One fishing trip per quarter
Pelagic trawlers	20	One fishing trip per quarter

The actual temporal sampling distributions for the four fleets by country are summarised in Table 40 to Table 43.

Table 40. Shrimper fleet - temporal distribution of observed fishing on a quarterly basis-2014-2018.

YEAR/QUARTER	1st QUARTER	2nd QUARTER	3rd QUARTER	4th QUARTER
2014	MRT	MRT	MRT	MRT
2015	GNB	GNB	GNB	GNB
2016	GNB and MRT	MRT	MRT	MRT
2017	MRT	GNB	GNB	GNB
2018	MRT	MRT	MRT	MRT

Table 41. Black hake fleet – temporal distribution of observed fishing on a monthly basis-2016-2018. Months covered by more than one vessel are indicated.

YEAR/ MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2016	MRT	MRT	MRT	MRT	–	MRT (2)	–	–	–	MRT	MAR (3)	–
2017	–	MRT (2)	–	MRT (2)	–	MRT (2)	–	–	MRT (2+F)	–	MRT SEN(F)	MAR (2)
2018	MRT	MRT	MRT	MRT (1+F)	MRT	MAR	MRT	MRT	MRT	MRT	MRT	MRT

Fishing trips on freezer vessels are indicate with "F".

Table 42. Cephalopod-finfish fleet – temporal distribution of observed fishing in Guinea-Bissau, on a quarterly basis - 2014-2018

YEAR/QUARTER	1st QUARTER	2nd QUARTER	3rd QUARTER	4th QUARTER
2014	*	*	*	*
2015	-	-	GNB	-
2016	GNB	GNB	GNB	-
2017	GNB	GNB	GNB	-
2018	*	*	*	*

* No Protocol in force.

Table 43. Pelagic fleet – temporal distribution of observed fishing in Mauritania, on a quarterly basis – 2014-2018. Quarters covered by more than one vessel are indicated.

YEAR/QUARTER	1st QUARTER	2nd QUARTER	3rd QUARTER	4th QUARTER
2014	MRT (5)	MRT	MRT	–
2015	*	*	*	*
2016	MRT	MRT (3)	MRT (2)	–
2017	–	MRT	–	–
2018	–	–	–	–

* No fishing activity in Mauritania

With the exception of the **shrimper fleet** (Table 40), none of the fleets were able to meet sampling intensity requirements, mainly due to the lack of suitable vessels.

- In spite of not meeting the requirements in the whole sampled period, the coverage on **black hake trawlers** very much improved from 2016 to 2018, where monthly observations for the 'West Africa' fishing ground were reached. Most observed trips were undertaken on 'fresh' trawlers in Mauritania, which is in accordance with the frequency and intensity of the fishing activity

- For **cephalopod-finfish trawlers**, full coverage at the required frequency was not possible during the period considered, although coverage has progressively increased since the beginning of the Programme in 2015 to 2017.

- The decrease in observer coverage **on pelagic trawlers** between 2016 and 2018 was mainly due to the reluctance of vessel captains to take observers on board. This was aggravated by a new Mauritanian regulation requiring foreign fishing vessels to ensure that at least 60% of their crew members were Mauritanian. There was a lack of coordination on the Mauritanian side as IMROP sometimes did not have a team available when there was a ship in port. This also meant that the sampling coverage on all MS fleets was very uneven (Table 14) and out of the 14 fishing trips observed, only four were carried out on board 'Russian-type' vessels, which in practice take the bulk of the EU catch in Mauritania.

3.2.3 SPATIAL COVERAGE- DCF Observers

To ensure representative sampling in the fleets, observer coverage should be distributed according to the fishing effort rather than being concentrated in one area. The following charts

compare observed hauls (hauls where an observer has been on board) to the fishing intensity, taken from VMS data combined over the study period.

Shrimper fleet-spatial coverage

Figure 1 compares the observed and total fishing effort in both the fishing grounds for the shrimper fleet, for both areas. There appears to be a good level of observer coverage in comparison to the fishing effort.

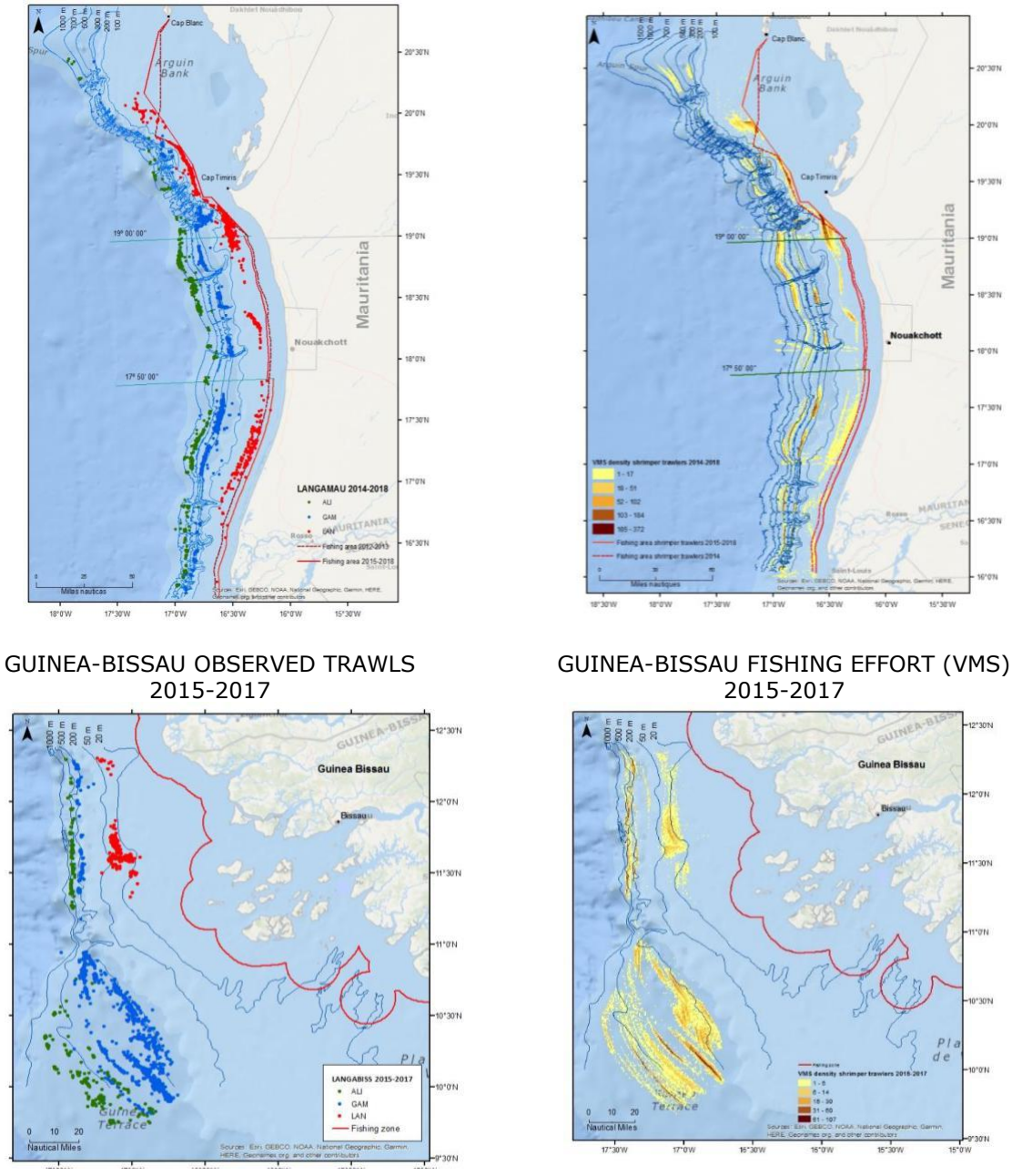


Figure 1. Shrimper fleet – comparison of the observed and total fishing effort in Mauritania and Guinea Bissau. Source observed trawls: IEO. Source VMS: Spanish Secretary of Fisheries, analysed by IEO.

Black hake trawlers-spatial coverage

Figure 2 compares the observed and total fishing effort for the three fishing grounds used by the black hake trawlers over the period of this study. There appears to be a good level of observer coverage in comparison to the fishing effort.

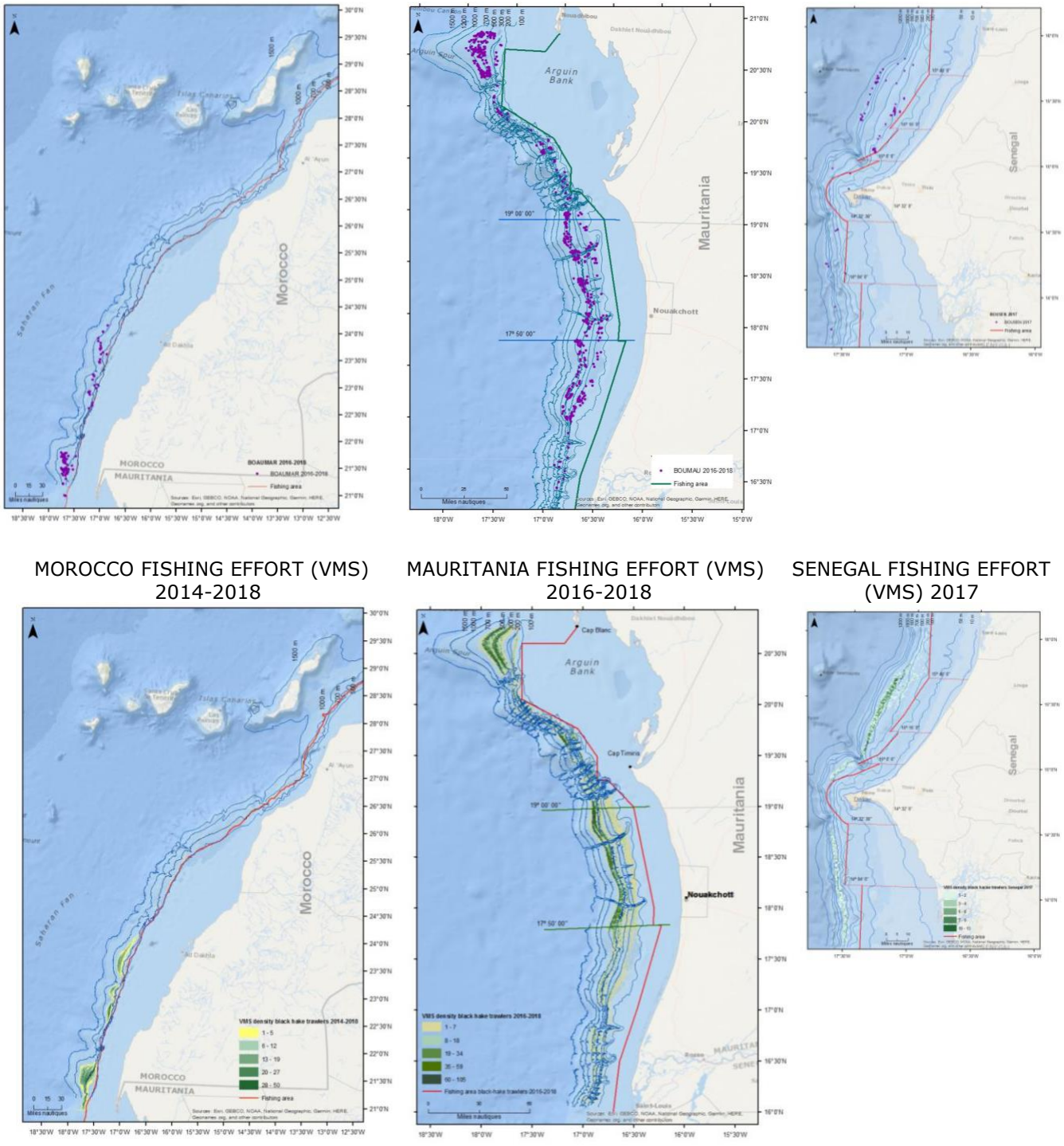
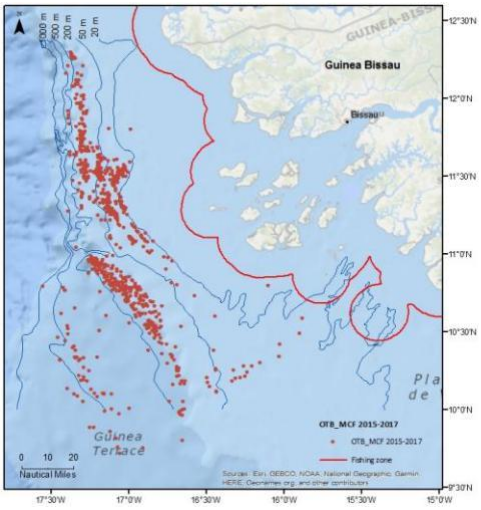


Figure 2. Black hake trawlers – Comparison between the observed and total fishing effort in Morocco, Mauritania and Senegal. Source observed trawls: IEO. Source VMS: Spanish Secretary of Fisheries, analysed by IEO.

Cephalopod – finfish trawlers-spatial coverage

Figure 3 compares the observed and total fishing effort from the cephalopod – finfish trawlers in Guinea-Bissau and while the coverage is limited it does appear to be representative of the fleet as whole, with the higher levels of sampling corresponding to the higher levels of fishing effort.

GUINEA-BISSAU OBSERVER COVERAGE 2015-17



GUINEA BISSAU FISHING EFFORT (VMS) 2015-2017

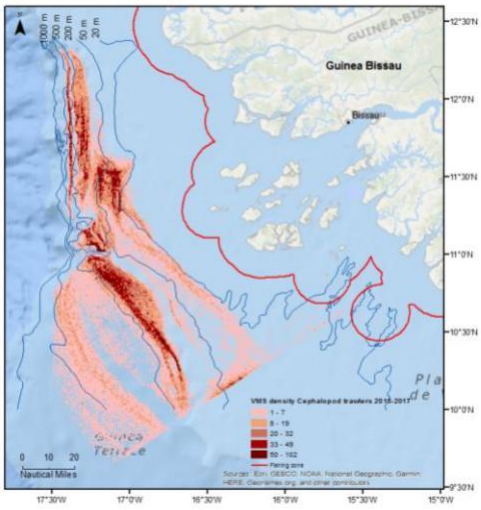
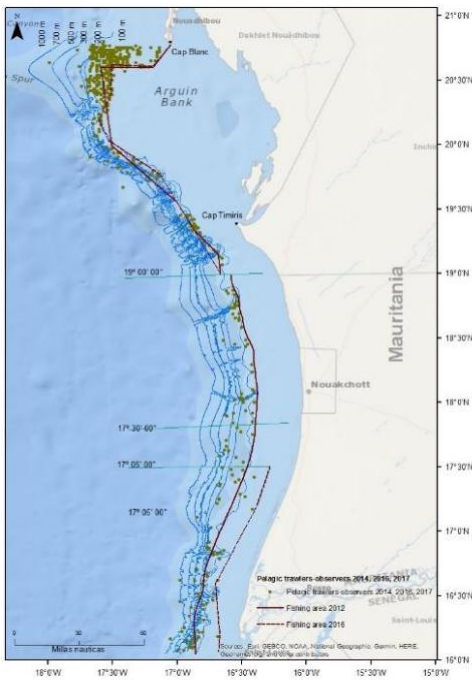


Figure 3. Cephalopod – finfish trawler comparison between the observed and total fishing effort in Guinea Bissau. Source observed trawls: IEO. Source VMS: Spanish Secretary of Fisheries, analysed by IEO.

Small pelagic trawlers-spatial coverage



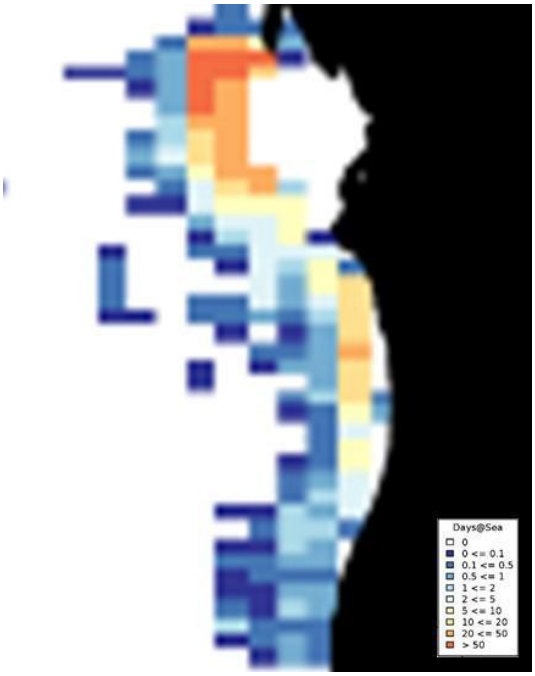


Figure 4. Small pelagic fleet comparison between the observed and total fishing effort (Dutch fleet only). Source observed trawls: CMR. Source VMS: Netherlands Food and Consumer Product Safety Authority, Ministry of Agriculture, Nature and Food Quality, analysed by WMR.

Data on the fishing effort (Figure 4) are limited to the Dutch fleet between 2014 and 2018 and are aggregated as days at sea by 1/8th by 1/8th of a degree blocks (~15km x 15km). It can be seen however that the observation intensity in Mauritania does correspond with the fishing effort, with the majority being concentrated to the north. The area south of the Banc d'Arguin, which used to be an important fishing area for pelagic trawlers, is now only fished by vessels of the 'Russian-type'. Because of the low coverage of these vessels, the number of observed hauls in this part of the EEZ is low.

3.2.4 COVERAGE OF LENGTH AND BIOLOGICAL SAMPLINGS- DCF Observers

a) Retained catch

Table 44 gives a summary of all the hauls where retained target species have been sampled for length and biologicals, across all the fleets. This is given in more detail on a fleet by fleet basis in Table 1 to Table 6 of Annex 9.

Table 44. Comparison of retained catch sampling between different EU fleets.

FISHING GROUND		SHRIMPER TRAWLERS		BLACK HAKE TRAWLERS		CEPHALOPOD-FINFISH TRAWLERS		SMALL PELAGIC TRAWLERS	
		% hauls sampled target species-Length	% hauls sampled target species-Biology	% hauls sampled target species-Length	% hauls sampled target species-Biology	% hauls sampled target species-Length	% hauls sampled target species-Biology	% hauls sampled target species-Length	% hauls sampled target species-Biology
ALL	min	3%	2%	17%	10%	10%	4%	40%	0%
	max	35%	25%	77%	56%	45%	41%	100%	100%
	mean	16%	12%	48%	29%	27%	22%	66%	38%
MAR	min	–	–	17%	10%	–	–	–	–
	max	–	–	77%	56%	–	–	–	–
	mean	–	–	46%	28%	–	–	–	–
MRT	min	3%	5%	50%	22%	–	–	40%	0%
	max	16%	16%	59%	47%	–	–	100%	100%
	mean	11%	12%	54%	32%	–	–	66%	38%
SEN	*	–	–	51%	31%	–	–	–	–
GNB	min	6%	2%	–	–	10%	4%	–	–
	max	35%	25%	–	–	45%	41%	–	–
	mean	23%	13%	–	–	27%	22%	–	–

*Only one fishing trip

The pelagic trawlers had the highest sampling level by fishing trip and the shrimper fleet the lowest, although this is more a reflection on the nature of the respective fisheries and their operational characteristics than on the observers themselves. The number of hauls performed

in one trip is much higher on shrimper vessels than on pelagic trawlers. In general, the proportions of retained catch sampled should be considered adequate for the DCF requirements.

b) Discarded catch: composition, length and biological sampling

Table 45 gives a summary of all the fishing trips where discarded species have been sampled for discard composition, for both the proportion of hauls by trip and the proportion of discarded weight sampled, across all the fleets. This, along with the length and biological data taken, is given in more detail on a fleet by fleet basis in Tables 13 to 16 of Annex 9.

Table 45. Comparison of discard-composition sampling between different fleets.

FISHING GROUND		SHRIMPER TRAWLERS			BLACK HAKE TRAWLERS			CEPHALOPOD-FINFISH TRAWLERS			SMALL PELAGIC TRAWLERS		
		% hauls sampled for discards	% discard weight sampled	% commercial species in discards	% hauls sampled for discards	% discard weight sampled	% commercial species in discards	% hauls sampled for discards	% discard weight sampled	% commercial species in discards	% hauls sampled for discards	% discard weight sampled	% commercial species in discards
ALL	min	4%	0.3%	15%	7%	0.09%	25%	4%	0%	19%	40%	0.04%	NA
	max	23%	5%	50%	96%	9%	70%	34%	2%	58%	100%	0.47%	NA
	mean	14%	1%	32%	42%	2%	37%	15%	0.43%	43%	66%	0.20%	NA
MAR	min	–	–	–	38%	1%	25%	–	–	–	–	–	–
	max	–	–	–	56%	6%	43%	–	–	–	–	–	–
	mean	–	–	–	45%	2%	33%	–	–	–	–	–	–
MRT	min	4%	0.3%	28%	7%	0.09%	28%	–	–	–	40%	0.02%	NA
	max	23%	3%	50%	96%	9%	70%	–	–	–	100%	100%	NA
	mean	13%	1%	35%	42%	2%	37%	–	–	–	66%	7%	NA
SEN	*	–	–	–	32%	1%	25%	–	–	–	–	–	–
GNB	min	9%	3%	15%	–	–	–	4%	0%	19%	–	–	–
	max	22%	5%	36%	–	–	–	34%	2%	58%	–	–	–
	mean	16%	2%	27%	–	–	–	15%	0.43%	43%	–	–	–

*Only one fishing trip

3.2.5 SUMMARY OF OBSERVER ACHIEVEMENTS AGAINST DCF AND SFPA REQUIREMENTS

DCF observers

In order to evaluate the various DCF observer programmes, data collected by the observers were compared to each observer task required to meet the DCF requirements. This is summarised in Table 46, requirements that have not been achieved or where insufficient data were available to make an assessment are highlighted in blue. Coverage levels examined in previous sections have also been considered.

In general, observer performance on individual vessel trips should be considered adequate to meet the DCF requirements for all fleets. It appears that no problems with species identification have been raised. The main problem is related to whether the actual level of coverage provided sufficient information. While the coverage has improved for some fisheries (cephalopod-finfish and black hake trawlers) it has decreased for others (pelagic trawlers). Most programmes have been let down by vessel availability meaning that not all fisheries could be sampled over the required time periods. The lack of availability of vessels is mainly due to limited space, which has been difficult to resolve. The reluctance of some vessel owners to take on observers is increased by the requirement, under the latest set of protocols, for them to take on a number of seamen from CS and has hindered the continuity and regularity of the observer programmes. This problem is particularly acute in the demersal fisheries where the vessels' size and living conditions, combined with the reduction in space due to the additional crew, make working and living conditions very difficult for the observers, sometimes they were even unhealthy. Over time this has led to problems with both observer retention and recruitment as, for the same salary, they will naturally prefer to work on vessels with much better working and living conditions. Shared living space means the vessels are also reluctant to have female observers on board. The absence of available observers is becoming a major problem in certain fleets and as a result some months cannot be covered. An added difficulty for EU observer placement is related to the presence of CS observers in the same fleet. Careful coordination between EU and CS institutions is therefore necessary to avoid overlapping in time and space.

Some gaps could be identified, either related to fails or unclearness of the observer plans established or either to logistic circumstances met by the observers in their work on board, some of them quite difficult to solve.

Main data gaps identified and summarised in Table 46 are outlined below.

Gaps in Biological Data

i) Volume and length frequency of all catch fractions:

- Observers on demersal fisheries did not sample the retained catch for weight and number of all retained species in randomly selected hauls. In general, observers used weight and number estimations of the species sampled for length, but they never carried out length samplings of all the species retained in a haul. This issue will be addressed in the new sampling manuals to be developed in Task 3

- In general, the coverage of length samplings seems adequate, both in terms of hauls sampled and of the weight of the target retained catch. However, on some fishing trips, the observer was not able to fulfil the sampling requirements for a specific target species, as this was underrepresented in the catch, due to the vessel particular fishing strategy during that fishing trip. This hampered the collection of length and biological data for *P. notialis* by

shrimper trawlers in some fishing trips with no catches of the species. The same happened for *M. polli, Trachurus trecae ad S. hierredda* in trips from cephalopod-finfish trawlers, as the fishing strategy changed very much from one trip to another. This was also the case for *S. aurita, S. pilchardus* and *T. trecae* in some trips from pelagic trawlers, as the fishing strategy is very variable depending on the season, area and vessel type (Dutch vs Russian type) of the observed vessel. These shortcomings are not possible to solve as they are a reflection of the nature of the strategy followed by the vessel observed.

- Discard composition was not sampled by observers on board pelagic trawlers, although these samplings were included in the sampling programmes.

- Although discard composition was sampled for the cephalopod-finfish, observers had problems to access to all the discard fraction, due to space constraints in the fishing desk and this might have affected to the weight estimation of the discarded species.

- Length of non-target species from the small pelagic fisheries was not sampled by observers on board this fleet. At least species of Table 1C of EU MAP should be sampled and this should be clearly specified in the new manuals for pelagic trawlers.

ii) Mean-weight and age distribution of catches

This is for stocks listed in Table 1C of EU MAP, which are targeted by EU fleets and information required by end-user (CECAF). The main gaps identified were:

- Individual weight of target species of the shrimper fleet (*P. longirostris* and *P. notialis*) could not be registered, due to the small size of these species. They cannot be weighted on board these fishing vessels, due to their instability. Because of the recurrent failure to comply this data requirement, this parameter has already been eliminated in the Spanish National Program.

- No samples were collected for age from small pelagic stocks required by CECAF. The reason was that there was no institute to read the otoliths.

- No biological samplings of discarded target species were carried out by observers on board pelagic trawlers and these were missing in 42%-50% of the fishing trips observed on demersal trawlers. In some cases, this was due to the absence of target species in discards (e.g. discards of *P. notialis* produced by shrimper fishery are very limited) while in other cases this might be due to not clear specifications in the sampling programmes.

Gaps in Data to assess the impact of EU fisheries on marine ecosystems

The observer is required to register the presence/absence of incidental by-catch of marine mammals, turtles and birds, in all hauls.

- This was not done by observers on board pelagic trawlers due to operational difficulties in the fishery itself, meaning most animals are released, dead, back into the water before the observer can see them. This requires greater cooperation with the officers and crew on the vessels or the introduction of electronic monitoring (EM).

- For demersal trawlers, only the presence of marine mammals, turtles and birds was registered but not the remaining species of fish protected under EU programmes, and international agreements, as specified in EU MAP. In addition, observers registered the presence of these animals when they are working and able to see the catches. Seamen are asked to record any observations in the absence of the observer, although it is unclear to what level this is done. Clear specifications on the species to be registered and indications

of the presence/absence of the observer in each fishing operation should be considerations for the new manuals.

- Recording of benthos species, at least at a general taxonomic level was done by observers on board demersal fisheries, while was not applicable to small pelagic fisheries. However, to estimate the impact of fisheries on marine ecosystem, more detailed information, especially on the indicator species of vulnerable marine ecosystem (VME) should be considered for the revised manuals for demersal fisheries, including identification guides of these species or specific instructions to collect samples to be further identified in the laboratory.

Gaps in detailed data on the activity of the EU vessels

- Operational details were only recorded in 47% of the trips carried out by observers on board pelagic trawlers. Clear recommendations on recording operational details of every fishing operation should be included in the new manuals for pelagic trawlers.

- Although other gear characteristics were generally recorded by observers on board demersal and pelagic fleets, particulars on the number of nets and length (metres) were not always taken. These fields should be included in the specific forms where gear characteristics are recorded.

The potential solutions to solve the gaps identified should be considered for the development of the manuals for Task 3, and new tasks clearly specified when needed, in these manuals.

The information collected by DCF observers across the four fleets over the period of the study can be considered sufficient to meet the DCF requirements in terms of the actual data collected. The regional requirements are outlined in the CECAF reports and the types of data collected when the observer is on board have been, in general, sufficient to meet the end-user's needs. The most important gap was the lack of age studies for small pelagic, which is a major issue in the region, not only for the EU fleets but for most fisheries in CECAF.

Table 46. Summary/ overview of DCF scientific observers' achievements against DCF requirements.

DATA SET	DCF requirements	OBSERVER TASK	OBSERVER ACHIEVEMENT			
			SHRIMPER TRAWLERS	BLACK HAKE TRAWLERS	CEPHALOPOD-FINFISH TRAWLERS	PELAGIC TRAWLERS
Biological data (I)	**VOLUME AND LENGTH FREQUENCY OF ALL CATCH FRACTIONS**					
	Retained catch fraction (RC)	Identification and weight register of all species (both target and by-catch) in the RC fraction, by haul	On 100% of all hauls on observed trips.			
		Estimation of weight and number, by species in randomly selected hauls.	No hauls with all weight and number of ALL species collected. Weight and number of retained species registered in hauls with length samplings (indicated below).			On 61% of hauls on observed trips.
		Length samplings of target and by-catch species in the retained catch fraction, in randomly selected hauls.	On 16% of hauls on observed trips. Means of 14% & 17% of SOP & DPS- RC weight sampled by trip.	On 25% of hauls on observed trips. Means of 35% & 18% of KHB & KHM- RC weight sampled by trip.	On 42% of hauls on observed trips. Means of 6%, 15%, 7% and 8% of HKB, HMZ, OCC & CVT- RC W sampled by trip.	On 61% of hauls on observed trips. Means of 22%, 20%, 39% & 22% of SAA, HMZ, PIL and VMA- RC weight sampled by trip.
	Discard fraction (D)	Estimation of W of the discard fraction by haul.	Weight of discards recorded on ~100% of hauls on observed trips.			
		Discard samplings: species identification, estimation of Wt and number of all species in discards, in randomly selected hauls.	On 14% of hauls on observed trips. Mean of 1% of D weight sampled by trip.	On 35% of hauls on observed trips. Mean of 2% of D weight sampled by trip.	On 4% of hauls. Mean of 0.4% of D weight sampled by trip.	Discard composition was biologically sampled on one haul (<1%) on observed trips. Mean of 0.2% of D weight sampled by trip.
		Length samplings of most important species in D, in randomly selected hauls. (Minimum: all species in Table 1C, EU MAP).	On 10% of hauls on observed trips. Length of target species on 82% of trips.	On 35% of hauls on observed trips. Length of target species on all trips.	On 35% of hauls on observed trips. Length of target species on 75% of trips.	On 35% of hauls on observed trips. No non-target species sampled.

Table 46. Cont.

DATA SET	DCF REQUIREMENTS AND OBSERVER TASK	OBSERVER ACHIEVEMENT			
		SHRIMPER TRAWLERS	**BLACK HAKE TRAWLERS**	**CEPHALOPOD-FINFISH TRAWLERS**	**PELAGIC TRAWLERS**
Biological data (II)	**MEAN-WEIGTH AND AGE DISTRIBUTION OF CATCHES, SEX-RATIO, MATURITY AND FECUNDITY DATA for stocks listed in Table 1C EU MAP** Selection of stocks and temporal resolution coordinated at marine region level based on end-users needs).				
		Bio. data of D target spp on 55% of trips. No weight sampling.	Bio. data of D target spp on 58% of trips.	Bio. data of D target spp on 50% of trips.	No biological samplings of target species in discards. No age samplings.
Data to assess the impact of Union fisheries on marine ecosystems	Register of presence/absence of incidental by-catch of marine mammals, turtles and birds, in all hauls.	Incidental by-catch recorded on ~ 100% of hauls on observed trips.			Incidental by-catch usually not recorded due to operational difficulties.
	Discard sampling: identification of all species in discards (including benthic invertebrates) at the lowest possible taxonomical level, estimation of weight and number of all species in discards, in randomly selected hauls.	On 14% of hauls on observed trips. Mean of 1% of D- W sampled by trip.	On 35% of hauls on observed trips. Mean of 2% of D- W sampled by trip.	On 4% of hauls. Mean of 0.4% of D weight sampled by trip.	Not applicable to benthic species.
		Benthic species not identified at the lowest taxonomical level, due to time constraints on board and lack of specific knowledge.			
Detailed data on the activity of Union vessels.	Register of the following variables (unit), not available by other sources, by observer trip: Effort: - Hours fished (hours), by fishing operation. - Number of fishing operations (number). - Number of nets/Length (number/metres)	Operational details (hours fished; number of fishing operations recorded in 100% of all trips by fishing gear type).			Operational details in 49% of all trips
		Other operational details, recorded by haul: time, latitude, longitude and depth in start and end of the haul.			
		In addition: Vessels and gear characteristics reported by fishing trip. Trip details.			
		Number of nets/Length not recorded (0% trips).		Number of nets/Length recorded in 38% of trips.	Not known if number or length of nets is recorded.

SFPAs observers

The Consortium had no information on the sampling protocols or manuals used by the CS operating observer programmes so it was not possible to analyse observer performance in relation to these. Performance could be only assessed in relation to the requirements established under the respective SFPA protocols, these are summarized in Table 47.

Reports hosted in DG MARE and analysed by the Consortium were from only two of the four fishing states with SFPAs. No reports were received from Mauritania where, as informed by IMROP, observer programmes were re-initiated in 2018. Guinea-Bissau has not implemented a scientific observer programme so far.

Reports received through Morocco were from two of the five small pelagic/demersal fisheries operating in its EEZ. Reports from Senegal were from black hake fisheries, the only non-tuna fishery allowed under this SFPA.

This has meant that only a limited quantitative assessment has been possible for SFPA observers, these are summarised in (Table 47) and outlined below.

Gaps in observer coverage and duration

Reports hosted in DG MARE do not meet the observer coverage rates and duration established for vessels with different GT and pelagic trawlers in the protocol. Only one report of one fishing trip of a demersal vessel was received. For small pelagic fisheries, the coverage rate was not reached if we understand "*on a permanent basis"* as 100% of the fishing days. If "*on a permanent basis"* refers to the number of vessels, this level was only reached in 2017 (Table 47- I).

It should be remembered that DG MARE sent to the Consortium 27 reports, while the Moroccan administration informed to have sent 72.

There is no information to assess if the specific requirement in relation to the observer coverage by the Senegalese protocol was achieved.

Gaps in fishing information

The information on the observations of the fishing activities by Moroccan observers was very limited. No information on positions of fishing hauls were recorded and catch was always reported by fishing trip. No relevant gaps were identified for the Senegalese reports (Table 47-II).

Gaps in biological information

- No information on biological samplings was available on the reports received in DG MARE from Morocco and Senegal (Table 47-II).

- Among the Moroccan reports, there were no consistency in the way of reporting by-catch and discards. Discard weight was not always estimated and discards species only reported in around half of the fishing trips observed (Table 47-II).

It should be remained that the Department of Maritime Fisheries of the Moroccan Ministry informally informed to the Consortium on the existence of more detailed reports in their premises, that could contain biological information or more complete fishery information.

Gaps in observer reporting obligations

All SFPAs are aware of the requirement to submit observer reports to the EU, however the mechanism for doing this is not always clear or consistent (Table 47-III). The Moroccan protocol specifies that submissions should be done through the Delegation, while Mauritanian and Senegalese protocols indicate only that copies should be sent "to the EU" without specifying how this should be done or who should do it. The Senegalese protocol also outlines the submission deadlines. The Guinea-Bissau protocol stated that the observer information, processed and analysed by CIPA should be presented to the JSC but there was no direct reference that it should be submitted to the EU. This has been rectified in the new protocol (EU, 2019) which requires that a copy of the observer's report shall be sent electronically to the EU.

Not many reports were received by the Consortium from DG MARE, which may be due to the lack of consistency between the SFPA submission requirements. In the case of Morocco, which indicated that the number of reports sent to DG MARE was more than double that received by the Consortium, it is unclear where the problem occurred.

While different EEZs have different fleets and gears targeting different species, some standardisation in the SFPA reporting protocols, including the submission formats, between the four countries examined in this study should be considered for the future. This would go along with standardising the training, manual and recording forms across all areas, to be further developed as part of this project (Task 3 and Task 4).

Table 47. Observer achievements (reports hosted in DG MARE) against SFPA requirements. I: Observer coverage.

Type	SFPA MOROCCO		SFPA MAURITANIA		SFPA SENEGAL		SFPA GUINEA-BISSAU	
	SFPA REQUIREMENT	OBSERVER ACHIEVEMENT	SFPA REQUIREMENT	OBSERVER ACHIEVEMENT	SFPA REQUIREMENT	OBSERVER ACHIEVEMENT	SFPA REQUIREMENT	OBSERVER ACHIEVEMENT
Observer coverage	**Observer coverage rate**							
	25% of authorised vessels of >100GT→each quarter.	No	At least two vessels/year per fishing category shall take on board a Mauritanian scientific observer	No reports available	Observer not to be designated to vessels which already have an observer on board, or which will require an observer for activities outside Senegalese zones.	Unknown	N/A	No observer programme implemented
	Other EU vessels <100 GT→ max. 10 trips per year and per fishing category	No						
	Pelagic trawlers→ on a permanent basis	No						
	Observer coverage duration							
	Pelagic trawlers→ on a permanent basis.	Unknown	Period spent on board is the length of a trip	No reports available	Two months is the maximum observer time on board deep sea demersal trawlers.	Yes	N/A	No observer programme implemented
	For other vessels, observers to spend one voyage per vessel on board.	No						

Table 47. Observer achievements (reports hosted in DG MARE) against SFPA requirements. II: Observer Tasks.

Type	SFPA MOROCCO		SFPA MAURITANIA		SFPA SENEGAL		SFPA GUINEA-BISSAU	
	SFPA REQUIREMENT	OBSERVER ACHIEVEMENT	SFPA REQUIREMENT	OBSERVER ACHIEV.	SFPA REQUIREMENT	OBSERVER ACHIEVEMENT	SFPA REQUIREMENT	OBSER. ACHIEV.
information) Observer Task (Fishing	Observe fishing activities of the vessels	Information on vessel activity limited	Observe fishing activities of vessels	No reports available	Observe fishing activities of the vessels	Yes	Observe fishing activities of the vessels	No observer programmes implemented
	Verify vessel positions	Positions not recorded.	Check position of vessels when fishing		Verify vessel positions	Yes. Positions recorded on each haul	Verify vessel positions	
	Record fishing gear used	Yes	Record fishing gear particulars, including mesh sizes on nets		Record fishing gear used	Yes	Record fishing gear used	
	Verify catch data recorded in fishing log book	Catch only reported by fishing trip	–		–	–	–	
Observer Task (Biological sampling)	Perform biological sampling in context of scientific programmes	No information on biological sampling in reports available.	Perform biological sampling in context of scientific programmes	No reports available	Perform biological sampling in the context of the programme	No information on biological sampling recorded.	Perform biolog.sampling in the context of the program.	No observer programmes implemented
	Verify percentage of by-catch	By-catch reported but inconsistent between trips.	–		Verify by-catch percentages and estimate D	Yes. All fields recorded by haul and trip.	Verify by-catch percentages and estimate D	
	Estimate discard quantity of marketable finfish, crustaceans and cephalopods	Discards W estimated in 85% of fishing trips on pelagic trawlers and in the only trip on the longliner. Discards species reported in 54% of fishing trips on pelagic trawlers. Always by fishing trip. Inconsistent between trips.	–		– –	–		

Table 47. Observer achievements (reports hosted in DG MARE) against SFPA requirements. III: Observer Reporting obligations.

Type	SFPA MOROCCO		SFPA MAURITANIA		SFPA SENEGAL		SFPA GUINEA-BISSAU	
	SFPA REQUIREMENT	OBSERVER ACHIEVEMENT	SFPA REQUIREMENT	OBSERVER ACHIEVEMENT	SFPA REQUIREMENT	OBSERVER ACHIEVEMENT	SFPA REQUIREMENT	OBSER. ACHIEV.
Observer Reporting obligations	Report fishing data including catch/by-catch quantity by fax or radio	Unknown	Produce report before disembarkation in accordance with agreed format, to be signed by observer and vessel master. Report to be provided to vessel master, the ministry and EU upon disembarkation	Intermittent programmes since the beginning and no programmes 2014 and 2017, re-initiated in 2018. No reports received in DG MARE	Report weekly by radio, fax or email, including catch and by-catch quantity	Unknown	Report weekly by radio, including catch and by-catch quantity	No observer programmes implemented
							Observers to produce draft activity report to transmit to Guinea-Bissau authorities	
	Produce and transmit activity report (signed by observer and vessel master) to the competent authorities in Morocco, with a copy to the Delegation.	27 trip reports hosted in DG MARE, 26 from pelagic trawlers and 1 from bottom longliner. 72 reports indicated to be sent to DG MARE by the Moroccan Ministry.			Produce report and send report (signed by observer and vessel master) to Senegal, which shall send a copy to the EU within eight days of the observer's disembarkation.	10 reports of 28 fishing trips between 2014 and 2017 hosted in DG MARE.	Observers to produce report to be submitted to Guinea-Bissau. The data on the catches and discards shall be sent to CIPA, which, after processing and analysing them, will present them to the Joint Scientific Committee	

3.3 TASK 3- OPERATIONS MANUAL FOR OBSERVERS

Four manuals for scientific observers were developed within the framework of the project:

- Manuel à l'usage des observateurs scientifiques à bord des bateaux crevettiers dans les eaux d'Afrique occidentale (García-Isarch et al., 2020).

- Manuel à l'usage des observateurs scientifiques à bord des bateaux merluttières dans les eaux d'Afrique occidentale (Fernández-Peralta et al., 2020).

- Manuel à l'usage des observateurs scientifiques à bord des bateaux céphalopodiers dans les eaux d'Afrique occidentale (Perales-Raya et al., 2020).

- Manuel à l'usage des observateurs scientifiques à bord des chalutiers pélagiques dans les eaux d'Afrique occidentale (Laptikhovsky et al., 2020).

The manuals were drafted in French and mainly consisted of:

- An **introduction section**, explaining:
  - **Context** in which the manuals were developed
  - **Objectives** of the scientific observer programmes
  - **Logistical aspects** of the observer programmes
  - **General aspects of each specific fishery** in West Africa:
    - Fishery context and fleets
    - Fishing areas
    - Target species
    - Fishing gears and fishing operations

- A section explaining the **working method on board**, where the different tasks to be carried out by the scientific observer are detailed. This was done following the same structure for all the fleets, but taking into account the specific aspects of each fishery. This section was structured as follows:
  - General aspects to be considered by the observer
  - Study area
  - Tasks to be performed on board and priorities.
    - Work on the bridge
    - Work on deck or sorting area
      - Retained catch
      - Discards
      - Incidental by-catch
  - Additional tasks
  - Schematic summary of tasks to be developed on board
  - Incident reports and data computerizing.

- A section with **annexes** explaining specific sampling procedures for each fleet and others containing other relevant and practical information, as (among others):
  - Procedures for length sampling

- Procedures for biological sampling of target species
- Procedures for discard sampling
- List of species to be monitored under protection programmes in the EU or under international obligations (Table 1D of the DCMAP, EU 2019a).
- Sampling forms
- List of material for observers
- List of species identification guides, etc.

The final versions of the manuals are provided together with this final report, as standalone documents.

3.4 TASK 4- WORKSHOP FOR STANDARDIZATION OF OBSERVERS' METHODOLOGIES

3.4.1 WORKSHOP TERMS OF REFERENCES, AGENDA AND PARTICIPANTS

The main goal of the Workshop was to discuss, standardize and implement the guidelines from a set of draft manuals to be used by observers on board EU demersal and pelagic trawlers operating in CS with EU-SFPAs.

It took place from 28 to 31 January in the premises of the IEO in Tenerife and was attended by 26 participants from Morocco (2), Mauritania (4), Senegal (2), The Gambia (1), Guinea Bissau (2), EU (14 from Spain, The Netherlands, Poland, DG MARE and EASME) and FAO-CECAF (1).

Two interpreters assured the simultaneous bilingual translation of the presentations and discussions (French-English).

The **terms of reference** of the Workshop were the following:

5. Learn about and, if needed, improve the content and organization of the national programmes (developed by the CS) and EU programmes (DCF) of observers on board EU demersal and pelagic trawlers, in a coordinated way.

6. Define standard protocols and methodologies that will be used by these observers, ensuring that they follow the requirements of both the EU-DCF and SFPAs and thereby respond to the recurrent recommendation of the SFPA-JSCs and CECAF for harmonisation.

7. Identify the main problems in relation to the implementation and development of these observer programmes (both from EU and from CS).

8. Promote greater coordination between national and DCF programmes to ensure that both temporal and spatial coverage are optimised and meet the stated requirements.

The **agenda**, agreed among participants during the first day, is included in Annex 10. The **list of participants** is included in Annex 11.

The **minutes** of the Workshop are presented in Annex 12. A summary report is presented below.

A list of documents and/or presentations used in the Workshop is provided in Annex 13.

3.4.2 SUMMARY REPORT OF THE WORKSHOP FOR STANDARDIZATION OF OBSERVERS' METHODOLOGIES

The first day was devoted to the presentation of the Workshop and its objectives, within the context of the project, highlighting the relevance of the work of scientific observers and of having harmonized approaches in the region in order to improve the current knowledge of commonly exploited resources.

The requirements of the **current legal provisions (DCF and SFPAs)** in terms of scientific information were detailed.

This was followed by the **presentation of the national observer programmes of the CS** with special emphasis on their organization, report submission and main problems faced. A summary by country is given below:

- **Morocco**- Observer programmes are coordinated by the Direction des Pêches Maritimes (DPM) of the Moroccan Ministry of Fisheries. There are currently three ongoing programmes on board the EU, Russian and Japanese fleets. Within the EU fleets, pelagic trawlers have the highest coverage rates. The observer tasks are diverse and include reporting on fishery activity, mainly technical and catch information by vessel and fishing operation. The programme is designed to both monitor legal aspects of the fishery (MCS) and provide elements of scientific advice for the INRH. No biological information is regularly collected apart from some specific missions developed by INRH.

- **Mauritania-** Since 1996, the Mauritanian observer programme is devoted to scientific observation and the observers are fisheries biologists. Until 2009 the programme was for MCS and thus, managed by the Fisheries Control and Surveillance (DSPCM). After 2009 it was transferred to IMROP and more scientifically orientated. Observer coverage within the programme has been variable over time: between 2011-2017 observations were very limited, however since 2018 there has been a concerted effort to cover the whole fishery. The programme is designed for the collection of both fishery information (operational data, volume of catch fractions by haul) and biological information.

- **Senegal-** The observer programme in Senegal is managed by the Directorate of Fisheries Protection and Surveillance (DPSP). Senegalese observers have a double function of MCS and collection of fishery information, although they have no power to establish infringement procedures. No biological information is collected by observers.

- **The Gambia-** The current national programme is managed by the FD, in collaboration with the Association of Fisheries Observers. To date it has not implemented any programme on board EU black hake trawlers. Observers collect data that can be used for both scientific and compliance purposes (MCS).

- **Guinea-Bissau-** Although the objectives and general methods to be used on the scientific observer programmes are defined for CIPA, the scientific programme has not been implemented so far due to financial difficulties. Only data from MCS observers are being collected for the time being.

CECAF observer data collection requirements were presented by the representative of CECAF, with an emphasis on the data required to improve the knowledge of stocks in the region. The information considered most useful by CECAF to meet this requirement included among other things: total catch (as observers can provide an estimation of the discard levels of the target species), length frequency distributions of both the target species and by-catch, composition and distribution of catch species and their sex and maturity stages.

The final discussion of the first day was focused in some relevant common or recurrent issues identified as the main constraints for the implementation and/or development of EU and CS observer programmes:

- The reluctance of some ship owners to have observers on board their vessels.
- The ageing population of observers (i.e: in Mauritania and Senegal).
- The lack of coordination between different observer programmes.
- The lack of scientific observers in certain countries, where only control observers are currently working.
- The question of report submission from the CS to the EU; the different formats used for this were highlighted by the EU.

Day 2 and part of Day 3 were devoted to the presentation of the observer manuals, both those proposed by the Consortium and those already existing in some CS. First, the general methodology of the proposed observer manuals was introduced, followed by a presentation on specific details by each type of fishery. The manuals presented were:

- **Manual for observers on board shrimper trawlers**: methods used by Mauritania and manual proposed by the Consortium
- **Manual for observers on board black hake trawlers**: methods used by Morocco, Mauritania and Senegal and manual proposed by the Consortium
- **Manual for observers on board cephalopod-finfish trawlers**: manual proposed by the Consortium.
- **Manual for observers on board pelagic trawlers**: methods used by Morocco, Mauritania, by the DCF-Observers' Programme for small pelagic and manual proposed by the Consortium.

Some methodological issues where discussed for each fishery. Although not directly focused on the manual methods, some issues related to the proper development of the observers' programmes were raised.

Work in subgroups was mainly undertaken in Day 3 and part of Day 4. Four subgroups were established, one for each fishery, with participation of the most relevant countries and stakeholders involved in each one (see Table 48). The objective was to work on the draft manuals, making all pertinent corrections, adding relevant information, if missing, that might useful for all the countries and simplifying those aspects that could be confusing. Subgroup coordinators were identified for each subgroup.

Most of Day 4 was devoted to the presentation of the work developed by each subgroup. Main issues raised by each subgroup were the following

- **Subgroup pelagic trawlers:** The subgroup found that the need for a new manual differed from one country to another. While in Mauritania scientific observation has been in place over the last few years (although irregularly), in Morocco the observers' main function on board is collecting data related to MCS with limited input to the scientific process. The proposed manual was considered as a valuable reference document but with room for simplification, allowing for a certain degree of flexibility. Mauritanian observers would presumably continue using their manual, but incorporating some useful aspects of the new EU manual. Poland had produced its own manual for DCF in 2018, and would probably do the same. Despite these apparent differences it was globally agreed that the different manuals should ensure common objectives and outcomes. The discussion within the

subgroup was more focused on other aspects of the observer programmes than on the methodological aspects of the manual.

- **Subgroup black hake trawlers:** the proposed document was reviewed and some amendments/recommendations were made. It was agreed to send the document corrected with these inputs, for a second reading, to the members of the subgroup, for any further comments, and this was done after the Workshop.

- **Subgroup shrimper trawlers:** the draft manual was reviewed and some minor remarks were made. Some forms were amended and some confusing issues on certain samplings were agreed to be better explained.

- **Subgroup cephalopod-finfish trawlers:** after reviewing the document, some minor amendments were proposed and agreed.

After, some issues in relation to the main problems identified and potential solutions were discussed. A way forward after the Workshop was proposed.

Finally, the Workshop conclusions were agreed by all participants.

Table 48- Subgroups established by type of fishery and participant institutions by subgroup.

FISHERY SUBGROUP	PARTICIPANTS
Shrimper trawlers	IMROP-Mauritania (Subgroup Coordinator) CIPA-Guinea-Bissau IEO-Spain (Consortium)
Black hake trawlers	INRH- Morocco IMROP- Mauritania CRODT- Senegal (Subgroup Coordinator) DPSP- Senegal FD- The Gambia EU IEO-Spain (Consortium)
Cephalopod-finfish trawlers	IMROP- Mauritania CIPA-Guinea-Bissau IEO-Spain (Consortium, Subgroup Coordinator)
Pelagic trawlers	DPM- Morocco IMROP- Mauritania FAO-CECAF EU MIR & RCG-LDF-Poland Ad Corten (Consortium, Subgroup Coordinator) WMR (Consortium) IEO-Spain (Consortium)

3.4.3 WORKSHOP CONCLUSIONS

1) The Workshop was a fruitful exercise involving most of the concerned stakeholders, including end-users.

2) Discussions revealed that for the time being there is a long way to run before being ready for full implementation of observers' programmes in all concerned countries although pilot programmes could be considered where possible. Some countries have not implemented scientific programmes so far.

3) The produced draft manuals should be considered as a first step towards an improved data collection programme for scientific advice in the context of JSCs and CECAF.

4) First versions of manuals are to be refined in the future following, *inter alia,* the advice of the end-users (CECAF and JSC) and the expertise from the involved scientific institutions.

5) Further training might be required periodically for scientific observers.

6) The establishment of appropriate and stable scientific observer programmes in all the concerned countries, including the EU, is a condition for further success.

7) There is a need for operators to embark observers onboard, which is compulsory under the DCF.

8) There is a need for clarifying obligations in the Protocols as regards to observers and reporting issues.

9) There is a need of coordination between EU and CS. First steps for coordination were identified:

- In the short term: information exchange between EU and CS focal points related to the deployment of observers (i.e.: dates and vessels).

- In the medium term: when the DCF and SFPA observer programs are well implemented for the same fishery, the possibility to work in turns and share the information should be considered (i.e: observations on shrimpers in Mauritania, turned annually between IEO and IMROP).

- The group emphasized the usefulness of the setting of this project and suggested to continue such meetings with the same type of participants regularly in the future, to further harmonize scientific methods and to jointly coordinate scientific observer coverage/embarking in the future.

4 CONCLUSIONS

1) There are obligations to develop programs of scientific observers onboard EU demersal and pelagic fleets operating in West African fishing grounds thought mixed SFPAs, established in the DCF and SFPA Protocols for the EU and CS, respectively. The sampling requirements for the EU observers are specified in the DCF. However, there are no clear specifications on the biological information required in the SFPA Protocols.

2) This is the first time that information from EU observers in West African countries with SFPAs has been inventoried. Even if they were produced at metadata level, these inventories give a good overview of the amount and quality of the information collected from 2014 to 2018.

3) The quality and quantity of information recorded by observers on board EU vessels in West African waters with SFPAs differs greatly between EU observer programmes (DCF) and CS observer programmes (SFPAs). In contrast to the DCF observer programmes, existing SFPAs observer programmes usually only cover the observation of fishery related data, hence mainly fall under MCS, and do not include scientific tasks such as biological sampling. Biological information was missing in all reports provided by CS to DG MARE.

4) No biological information is collected by CS observer programmes in Senegal or Guinea-Bissau. The CS observer programme in Mauritania includes the collection of biological data, although observations as a whole were very limited until 2018. For Morocco, the collection of scientific information is partial or occasional and only collected to answer to specific scientific questions.

5) As a consequence of the problems above, the information from SFPA observers provided to the SFPA-JSCs and CECAF is very limited and therefore, these end-users make recurrent recommendations on the implementation/resume of observers' programmes and on the use of standardized methodologies between CS and EU observer programmes.

6) There are clear failures on the transmission of the SFPA observer's reports to the EU in spite of the reporting obligations established in the Protocols. Some CS have not transmitted any information so far, while the information transmitted by other CS is incomplete.

7) A number of gaps in the biological sampling within the DCF programmes were identified, for example discard composition, length measurements from non-target species or samples for age/growth studies were not obtained from the small pelagic fisheries, and incidental by-catch of marine mammals, turtles and birds was not always performed adequately. Some gaps were related to lack of clarity within the observer manuals, which are expected to be solved in the short term as the new observer manuals developed within the project specifically address these issues. Other gaps were due to logistic circumstances, some of them quite difficult to solve.

8) In general, information from EU observers follows the requirements of the DCF, although some shortcomings have been identified in terms of coverage, also verified in SFPA observers' programmes. In spite of existing legal obligations for EU vessels to take scientific observers on board, the shortcomings are still very much due to the reluctance of some ship owners to host observers onboard their vessels alleging problems of space availability. This reluctance is one of the more significant issues to solve to improve coverage and effectiveness of the observer programmes on board EU vessels in West Africa. Issues with observer recruitment and retention were also identified.

9) In spite of the identified shortcomings, the information collected by DCF observers across the four fleets over the period of the study can be considered sufficient to meet the DCF requirements in terms of the actual data collected and in general, to meet CECAF needs.

10) Observer manuals for the four fleets with EU (DCF) observers' programmes (shrimper, black hake, cephalopod-finfish and pelagic trawlers) were produced to provide clear sampling protocols harmonized between the EU and CS for each fishery. This will enable collection of comparable data to contribute effectively to the improvement of stock assessments in CECAF and therefore to obtain the best scientific advice from relevant end-users. The RCG-LDG was involved in the production of the observer manual for pelagic trawlers, due to its significant role in coordinating the DCF observer program on this fleet, developed through a multilateral agreement between all MS with small pelagic fisheries in the CECAF waters.

11) The Workshop for standardization of observer's methodologies, organized within the framework of this project was a fruitful exercise. It involved most of the concerned stakeholders, including end-users, to produce the final versions of the manuals, ensuring that main sampling principles are followed leading to improved data collection for scientific advice. Manuals can be considered as reference documents and can be implemented, where needed, with a certain degree of flexibility. This means that for those countries with no scientific programmes developed so far, these manuals may constitute useful guidelines for the implementation process (i.e. Senegal, The Gambia, Guinea-Bissau). However, some other countries with already well developed programmes (i.e. Mauritania) would probably continue using their own manuals which provide the same type of required information.

12) The participation of all relevant stakeholders in the Workshop was crucial to learn about the situation of the different observers' programmes in CS with SFPAs. From the CS presentations during the Workshop it was concluded that observers in Senegal, the Gambia and Guinea-Bissau are deployed exclusively for MCS, although the Gambia has not started observations within the EU fleet yet. Mauritania is the only CS with a programme of scientific observers, which has been recently resumed and aims to cover the entire fleet fishing in Mauritanian waters, i.e. Mauritanian, EU and other foreign fleets. The observer programme in Morocco is conceived to ensure both the respect of legal provisions and the provision of elements for scientific advice, and aims to cover the entire fleet, with a current focus on the EU, Russian and Japanese fleets. The Workshop has revealed also instrumental to revisit what are the data end-users needs in the region, as CECAF data requirements for stock assessment were presented by the FAO-CECAF representative.

13) In cases where the same observers are collecting biological data and acting in an MCS role concurrently, collaboration with the crew may be hampered and so reduce the effectiveness of the observer's scientific data collection efforts.

5 RECOMMENDATIONS

Some recommendations are made to solve the main difficulties and shortcomings found in the information collected by observers on board EU fleets in West Africa and during discussions in the Observer Workshop.

- A major barrier to meeting the required levels of observer coverage is the reluctance of some ship owners to board their vessels. On smaller vessels, concerns about lack of space may be legitimate, however there are also larger vessels operating which should be able to accommodate observers. The recurrent recommendation from the JSCs addressed to the

SFPA Joint Committee (JC), to take the needed measures to impose the requirement that EU vessel owners must allow the embarkment of observers, needs to be followed-up by the relevant parties. Systems should be put in place to encourage vessels to host observers (i.e.: preferential quotas for vessels which embark an observer), or to discourage them from refusing observers (i.e.: the presence of an observer as a requirement for obtaining a fishing licence). Even once legislated for, such measures would also require the cooperation of the relevant bodies in their enforcement.

- Poor retention and recruitment of scientific observers leading to a lack of available observers was also identified as a factor reducing coverage. Many potential observers prefer to work in other observer programmes with better conditions and/or pay. Suggestions to improve observer availability, and therefore coverage, include improved pay for observers working on board pre-identified vessels with hard working and living conditions.

- Coordination between observer programmes run under the DCF and SFPAs is essential to avoid spatial and temporal duplication of effort. As recommended by SFPAs-JSCs and CECAF, these programs should be harmonized through the tools provided during the Observer Workshop, by adopting the same requirements for data collection within their respective protocols. This should be followed up by the JSCs.

- Further steps for coordination were identified during the Workshop, specifically: DCF and SFPA observer focal points should share information on upcoming deployments (e.g. dates, embarkation location, vessel identity and contact details) to better coordinate observer deployments. The sharing of deployments between the DCF and SFPA observer programmes by alternating them between the two programmes may be considered (i.e. observations on shrimpers in Mauritania, annually alternated between IEO and IMROP). This coordination needs to be closely followed by the RCG-LDF. Depending on funding availability, the development of annual workshops should be considered.

- Collaboration between EU and CS institutions in term of capacity building should be also considered, especially for those CS where scientific observations have not been implemented so far and training needs have been clearly identified. These training activities could be promoted through the respective JSC.

- The disparity between the number of observer deployments performed and the number of available reports highlights an urgent need to clarify the reporting obligations for observer programmes under the current protocols. Reporting procedures should be implemented in a full and transparent fashion. To maximise the utility and transparency of the observer programmes, 100% of observer reports and data should be available for independent scrutiny where appropriate. Ideally, the reports from CS observers should be submitted to the EU in electronic format, to facilitate their analysis. A standard electronic system to store and process the observer information is recommended. This system could be proposed by the JSCs and should be developed between the CS and the MS in cooperation with the observer programmes.

- As recommended by RCG-LDF (2018), the contribution of demersal fisheries in the area from MS other than Spain should be closely followed after the reopening of fishing grounds and/or potential changes on the fleet strategies. This is needed to determine if other MS fleets should be sampled within the DCF (e.g. Italian fleet, in Guinea-Bissau) and if this was the case, coordinated observers' programmes, as the one established for small pelagic fisheries, are recommended.

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ANNEX 1. INVENTORY OF THE OBSERVERS' METADATA FROM THE DEMERSAL SHRIMPER TRAWLERS FLEET (DCF)

Table 1- Inventory of metadata from shrimper trawlers. Trip details and operational details. Total Hauls.

TRIP DETAILS									OPERATIONAL DETAILS-TOTAL HAULS											
FISHING TRIP	YEAR	EEZ	Flag	Vessel Code	Observer Code	Starting date	Final date	DURATION (fishing days)	No. Hauls	Proportion of hauls operational details recorded on (%)	Latitude min (decimal)	Latitude max (decimal)	Longitude min (decimal)	Longitude max (decimal)	Depth min (m)	Depth max (m)	Depth average (m)	Haul duration min (minutes)	Haul duration max (minutes)	Haul duration average (minutes)
LANGAMAU_0114	2014	MAURITANIA	Spain	SHR_018	PEM	22/03/2014	16/05/2014	56	288	100	16.2410	20.0047	-17.6362	-16.2705	30	950	361	35	555	179
LANGAMAU_0214	2014	MAURITANIA	Spain	SHR_014	JSM	05/07/2014	02/09/2014	57	262	100	16.0450	20.0450	-17.3617	-16.0467	34	958	451	30	585	215
LANGAMAU_0314	2014	MAURITANIA	Spain	SHR_003	PEM	22/09/2014	20/11/2014	59	313	100	16.3725	19.9967	-17.0162	-16.0463	31	945	276	70	345	197
LANGAMAU_0414	2014	MAURITANIA	Spain	SHR_003	PEM	22/11/2014	14/12/2014	23	125	100	17.0612	19.1200	-16.8495	-16.3047	45	700	394	57	410	194
LANGABISS_0115	2015	GUINEA-BISSAU	Spain	SHR_005	DSI	20/03/2015	27/04/2015	39	245	100	9.8083	12.3048	-17.4500	-16.7213	26	576	216	70	400	154
LANGABISS_0215	2015	GUINEA-BISSAU	Spain	SHR_005	DSI	01/05/2015	10/06/2015	41	312	100	9.9683	12.2568	-18.9725	-16.7765	13	640	91	41	330	148
LANGABISS_0315	2015	GUINEA-BISSAU	Spain	SHR_018	PEM	02/08/2015	26/09/2015	51	297	100	9.7967	12.8283	-17.4883	-16.0002	100	725	288	40	515	176
LANGABISS_0415	2015	GUINEA-BISSAU	Spain	SHR_002	DSI	02/10/2015	18/11/2015	48	209	100	9.7292	11.9995	-17.5908	-16.7508	294	786	666	58	389	257
LANGABISS_0116	2016	GUINEA-BISSAU	Spain	SHR_002	PEM	16/01/2016	22/02/2016	38	176	100	9.7383	10.8967	-17.5900	-16.7650	195	760	615	118	337	244
LANGAMAU_0116	2016	MAURITANIA	Spain	SHR_017	IAG	21/03/2016	29/03/2016	10	45	100	16.2333	18.8235	-17.3600	-16.1870	34	900	232	85	439	167
LANGAMAU_0216	2016	MAURITANIA	Spain	SHR_017	IAG	03/04/2016	24/05/2016	52	271	100	16.3498	20.5867	-17.6530	-16.1807	18	1020	311	25	510	165
LANGAMAU_0316	2016	MAURITANIA	Spain	SHR_017	PEM	27/05/2016	27/07/2016	62	320	100	16.2133	20.5033	-17.8762	-16.1853	27	950	252	25	465	166
LANGAMAU_0416	2016	MAURITANIA	Spain	SHR_005	SGR	19/08/2016	20/09/2016	33	217	100	16.2367	19.7300	-17.0343	-16.2267	25	874	126	51	372	172
LANGAMAU_0516	2016	MAURITANIA	Spain	SHR_018	IAG	20/11/2016	20/12/2016	31	182	100	17.2515	20.0080	-17.1838	-16.3033	15	980	191	30	320	153
LANGAMAU_0117	2017	MAURITANIA	Spain	SHR_017	SGR	27/01/2017	14/03/2017	47	298	100	18.0415	20.0067	-17.2350	-16.2567	20	1015	224	35	370	143
LANGABISS_0117	2017	GUINEA-BISSAU	Spain	SHR_013	IAG	10/04/2017	30/05/2017	49	222	100	9.7493	12.2675	-17.3800	-16.7037	51	488	271	54	378	182
LANGABISS_0217	2017	GUINEA-BISSAU	Spain	SHR_009	SGR	03/07/2017	06/08/2017	35	187	100	9.8183	10.4250	-17.2833	-16.7300	214	516	324	105	455	199
LANGABISS_0317	2017	GUINEA-BISSAU	Spain	SHR_016	JFL	10/09/2017	31/10/2017	52	261	100	10.0363	12.2713	-17.5358	-16.7217	147	800	348	105	535	211
LANGAMAU_0118	2018	MAURITANIA	Spain	SHR_017	IAG	10/01/2018	13/03/2018	60	292	100	16.3470	20.5450	-18.0300	-16.1667	26	1035	339	30	540	181
LANGAMAU_0218	2018	MAURITANIA	Spain	SHR_004	FPO	07/05/2018	14/07/2018	68	357	100	17.0157	19.7695	-17.1153	-16.2578	34	1060	358	30	541	198
LANGAMAU_0318	2018	MAURITANIA	Spain	SHR_001	EFL	26/09/2018	12/11/2018	48	218	100	16.0933	20.0250	-17.2533	-16.2333	20	950	599	80	380	213
LANGAMAU_0418	2018	MAURITANIA	Spain	SHR_007	PEM	19/12/2018	19/01/2019	32	153	100	16.0668	20.0483	-17.3292	-16.2582	15	980	302	50	470	176

Table 2- Inventory of metadata from shrimper trawlers. Catch details, observer estimates, meteorological data and additional comments. Total Hauls.

FISHING TRIP	CATCH DETAILS (Total Hauls)								OBSERVER ESTIMATE (Total Hauls)				METEREOLOGICAL DATA (Total Hauls)			ADDITIONAL COMMENTS
	Total retained catch (kg)	No. species retained catch	SOP retained weight (kg)	DPS retained weight (kg)	ARV retained weight (kg)	Retained bycatch- main species (FAO Code)	Retained bycatch weight (kg)	Total discard (kg)	Proportion of hauls observer estimatedtotalcatchindependently(%)	If estimations not100%givereason	Proportion of haulsobserverrecordedincidentalbycatch(%)	Species-group-incidentalbycatch(Marinemammals, Seabirds, Turtles)	Proportion of hauls meteorological data collected (%)	Sea state recorded (Y/N)	Other (please list)	
LANGAMAU_0114	43257	10	961	18606	5506	GFU, MVA, CGE	18184	122708	100	–	100	0	96	Y	Moon phase	3 null hauls not considered
LANGAMAU_0214	36014	11	3308	10593	13507	CGE, MVA, OCC	8606	60721	100	–	100	0	100	Y	Moon phase	4 null hauls not considered
LANGAMAU_0314	23850	9	6201	2257	6162	CGE, MVA, OCC, SQR	9231	172549	100	–	100	0	100	Y	Moon phase	1 null haul not considered
LANGAMAU_0414	16401	9	306	4668	1962	MVA, CGE	9464	79329	100	–	100	0	100	Y	Moon phase	
LANGABISS_0115	26580	13	2861	17656	151	MVA, GOA, PVJ	5913	39335	100	–	100	0	49	Y	Moon phase	
LANGABISS_0215	25174	19	5858	6550	127	PVQ, GOA, TGS, GIT, YOX	12570	50800	100	–	100	0	27	Y	Moon phase	2 null hauls not considered
LANGABISS_0315	28342	8	0	23440	1284	MVA, SSH	3618	133290	100	–	100	0	100	Y	Moon phase	3 null hauls not considered
LANGABISS_0415	24073	7	0	599	13640	MVA, SSH	9834	21692	100	–	100	0	12	Y	Moon phase	1 null haul not considered
LANGABISS_0116	30649	7	0	170	11303	MVA, SSH	19176	61535	100	–	100	0	100	Y	Moon phase	
LANGAMAU_0116	4784	7	279	3630	92	OCC, GFU, MVA, CGE	783	21616	100	–	100	0	91	Y	Moon phase	1 null haul not considered
LANGAMAU_0216	26347	9	1131	11341	1950	GFU, MVA, OCC, CGE	11925	106100	100	–	100	0	99	Y	Moon phase	3 null hauls not considered
LANGAMAU_0316	25564	9	4907	9648	2750	GFU, MVA, CGE, OCC, SQR	8259	131946	100	–	100	0	99	Y	Moon phase	1 null haul not considered
LANGAMAU_0416	21547	8	15621	1142	2764	SQR, CGE	2020	65016	100	–	100	0	78	Y	Moon phase	
LANGAMAU_0516	19650	8	6970	9012	288	GFU, OCC	3380	43502	100	–	100	0	100	Y	Moon phase	
LANGAMAU_0117	34582	9	1538	29514	468	OCC,MVA, GFU	3062	66520	100	–	100	0	93	Y	Moon phase	3 null hauls not considered
LANGABISS_0117	45947	6	0	42693	18	MVA, SSH	3237	109219	100	–	100	0	100	Y	Moon phase	
LANGABISS_0217	38114	8	0	30641	371	MNZ, SSH	7102	54458	100	–	100	0	95	Y	Moon phase	"ALI" hauls are 60 hauls targeting SSH, at shallower depths than traditional "ALI" hauls and using outriggers
LANGABISS_0317	35237	8	0	25187	3697	MVA, SSH	6353	173593	100	–	100	0	97	Y	Moon phase, rain	2 null hauls not considered
LANGAMAU_0118	34016	12	1574	18389	1477	GFU, OCC, MVA	12576	138904	100	–	100	0	100	Y	Moon phase	
LANGAMAU_0218	33172	9	968	18602	7824	MVA, OCC, CGE, GFU	5773	110416	100	–	100	0	100	Y	Moon phase	2 null hauls not considered
LANGAMAU_0318	19212	10	1110	1948	7557	GFU, MVA, OCC, CGE	8597	37828	100	–	100	0	0	N	Only moon phase	4 null hauls not considered
LANGAMAU_0418	28333	17	1421	15856	1086	GFU, OCC, MVA	9970	65144	100	–	100	0	94	N	Moon phase	2 null hauls not considered

Table 3- Inventory of metadata from shrimper trawlers. Operational details and Catch details. LAN Hauls.

			Operational details LAN-hauls										Catch details LAN-hauls				
FISHING TRIP	No. Hauls	Proportion of hauls operational details recorded on (%)	Latitude min (decimal)	Latitude max (decimal)	Longitude min (decimal)	Longitude max (decimal)	Depth min (m)	Depth max (m)	Depth average (m)	Haul duration min (minutes)	Haul duration max (minutes)	Haul duration average (minutes)	Total retained catch (kg)	No. species retained catch	Retained bycatch-main species (FAO Code)	Retained bycatch weight (kg)	Total discard (kg)
LANGAMAU_0114	34	100	18.2648	20.0047	-17.3380	-16.2705	30	55	43	90	210	150	1465	3	OCC	504	14097
LANGAMAU_0214	61	100	16.1167	20.0450	-17.3617	-16.2633	34	55	43	115	220	167	4926	3	OCC, SQR	1618	14862
LANGAMAU_0314	171	100	16.9413	19.9967	-17.0162	-16.3110	31	62	44	90	297	168	8387	4	OCC, SQR, JOD	2187	78863
LANGAMAU_0414	11	100	17.9597	19.1200	-16.5683	-16.5047	45	54	49	98	200	161	381	2	OCC	75	1569
LANGABISS_0115	61	100	11.5078	12.3048	-17.2302	-16.9888	26	49	38	70	240	166	3998	7	GOA, GIT	1138	8260
LANGABISS_0215	223	100	11.3333	11.8750	-17.9983	-16.9550	13	75	29	41	330	147	18009	13	PVQ, GOA, TGS,GIT, YOX	12151	29892
LANGABISS_0315	0	–	–	–	–	–	–	–	–	–	–	–	0	–	–	–	–
LANGABISS_0415	0	–	–	–	–	–	–	–	–	–	–	–	0	–	–	–	–
LANGABISS_0116	0	–	–	–	–	–	–	–	–	–	–	–	0	–	–	–	–
LANGAMAU_0116	8	100	17.121	18.368	-16.4380	-16.2742	34	57	51	125	190	164	532	2	OCC	253	2828
LANGAMAU_0216	56	100	16.547	20.587	-17.4288	-16.2372	18	58	41	45	255	154	2029	3	OCC	898	15061
LANGAMAU_0316	142	100	16.655	20.088	-17.9570	-16.1853	27	55	42	34	245	141	5953	3	OCC, SQR	1046	50009
LANGAMAU_0416	181	100	17.220	19.730	-16.9875	-16.2267	25	53	43	70	265	164	17006	3	SQR	1385	51361
LANGAMAU_0516	92	100	17.252	20.008	-17.1838	-16.3033	15	53	41	44	235	166	7503	4	OCC, SQR	533	16861
LANGAMAU_0117	92	100	18.042	20.007	-17.1783	-16.2567	20	62	40	35	210	139	2988	3	OCC, SQR	1450	21226
LANGABISS_0117	0	–	–	–	–	–	–	–	–	–	–	–	0	–	–	–	–
LANGABISS_0217	0	–	–	–	–	–	–	–	–	–	–	–	0	–	–	–	–
LANGABISS_0317	0	–	–	–	–	–	–	–	–	–	–	–	0	–	–	–	–
LANGAMAU_0118	96	100	16.357	20.035	-17.327	-16.167	26	63	50	85	240	165	4052	5	OCC, SQR	2478	33676
LANGAMAU_0218	64	100	17.016	19.770	-17.053	-16.258	34	53	44	116	225	161	2028	3	OCC, SQR	1060	30867
LANGAMAU_0318	47	100	17.138	20.025	-17.253	-16.233	20	56	36	125	205	169	2255	3	OCC, SQR	1145	10365
LANGAMAU_0418	57	100	16.108	20.021	-17.329	-16.258	15	58	37	60	310	176	2883	9	OCC, CET	1462	24013

Table 4- Inventory of metadata from shrimper trawlers. Operational details and Catch details. GAM Hauls.

			Operational details GAM-hauls										Catch details-GAM-hauls				
FISHING TRIP	No. Hauls	Proportion of hauls operational details recorded on (%)	Latitude min (decimal)	Latitude max (decimal)	Longitude min (decimal)	Longitude max (decimal)	Depth min (m)	Depth max (m)	Depth average (m)	Haul duration min (minutes)	Haul duration max (minutes)	Haul duration average (minutes)	Total retained catch (kg)	No. species retained catch	Retained bycatch-main species (FAO Code)	Retained bycatch weight (kg)	Total discard (kg)
LANGAMAU_0114	182	100	16.2410	19.8307	-17.6362	-16.4985	130	305	237	35	240	133	19322	5	CGE	735	72655
LANGAMAU_0214	73	100	16.0450	16.4450	-16.9617	-16.7983	241	325	280	30	180	145	10620	3	CGE	27	16575
LANGAMAU_0314	52	100	17.4275	19.9252	-16.8125	-16.5783	210	315	288	80	207	153	2315	2	MVA	58	46636
LANGAMAU_0414	64	100	17.0612	18.9292	-16.7998	-16.5208	230	305	268	57	225	140	4717	2	MVA	49	46563
LANGABISS_0115	166	100	9.9170	12.2645	-17.3867	-16.7213	148	399	256	75	270	141	19260	4	PVJ, MVA	1631	26090
LANGABISS_0215	83	100	10.0087	12.2568	-18.9725	-16.7765	115	311	226	100	255	148	6616	5	OCC, PVJ	66	19322
LANGABISS_0315	269	100	9.8983	12.3008	-17.3933	-16.0002	100	395	256	40	302	158	24659	3	MVA	1219	119961
LANGABISS_0415	9	100	9.9108	10.0125	-16.8458	-16.7508	294	313	304	120	160	133	599	1	–	–	1676
LANGABISS_0116	7	100	9.9467	10.6300	-17.0083	-16.7650	195	290	235	118	160	133	173	2	OCC	3	1962
LANGAMAU_0116	35	100	16.2333	18.8083	-17.3600	-16.1870	160	285	242	85	225	156	3630	1	–	–	17260
LANGAMAU_0216	163	100	16.3498	20.1612	-17.6530	-16.3017	172	318	232	25	235	137	11803	4	CGE	462	58853
LANGAMAU_0316	119	100	16.5750	20.5033	-18.0950	-16.4073	155	290	234	25	220	141	9747	4	OCC	99	58820
LANGAMAU_0416	12	100	19.0788	19.6992	-17.0343	-16.7215	143	256	218	51	140	69	1142	1	–	–	5055
LANGAMAU_0516	76	100	17.4188	19.7630	-17.1218	-16.5570	173	314	251	30	195	121	9012	1	–	–	20096
LANGAMAU_0117	183	100	18.0533	19.8037	-17.1128	-16.5148	170	329	241	45	225	133	29524	3	OCC	10	40464
LANGABISS_0117	200	100	9.8967	12.2675	-17.3800	-16.7037	155	292	250	54	310	167	42693	1	–	0	104105
LANGABISS_0217	127	100	9.9117	10.4250	-17.2067	-16.7400	214	397	298	105	372	174	32035	7	MNZ, OCC	2215	41786
LANGABISS_0317	209	100	10.0363	12.2713	-17.4775	-16.7217	147	395	267	105	300	178	29251	4	MVA	4064	147395
LANGAMAU_0118	128	100	16.3470	19.7543	-17.1203	-16.3720	177	316	242	30	225	139	18464	4	OCC	75	53567
LANGAMAU_0218	188	100	17.0687	19.7538	-17.1153	-16.5008	175	320	234	30	226	138	18665	2	OCC	63	53324
LANGAMAU_0318	20	100	16.0933	18.1817	-16.9817	-16.5183	225	304	273	80	175	144	1948	1	–	–	4982
LANGAMAU_0418	69	100	16.0668	19.0807	-16.9905	-16.4367	200	300	267	50	470	142	16101	4	PVJ	245	28381

Table 5- Inventory of metadata from shrimper trawlers. Operational details and Catch details. ALI Hauls.

			Operational details ALI-hauls												Catch details ALI-hauls		
FISHING TRIP	No. Hauls	Proportion of hauls operational details recorded on (%)	Latitude min (decimal)	Latitude max (decimal)	Longitude min (decimal)	Longitude max (decimal)	Depth min (m)	Depth max (m)	Depth average (m)	Haul duration min (minutes)	Haul duration max (minutes)	Haul duration average (minutes)	Total retained catch (kg)	No. species retained catch	Retained bycatch-main species name (FAO Code)	Retained bycatch weight (kg)	Total discard (kg)
LANGAMAU_0114	72	100	16.2445	19.0517	-16.9667	-16.5080	645	950	822	155	555	308	22471	7	CFU, MVA, CGE	16964	35957
LANGAMAU_0214	128	100	16.1567	19.8767	-17.1817	-16.0467	658	958	743	90	585	278	20469	7	CGE, MVA	6962	29284
LANGAMAU_0314	90	100	16.3725	18.7680	-16.9985	-16.0463	660	945	709	70	345	277	13149	4	CGE, MVA	6986	47051
LANGAMAU_0414	50	100	17.0813	18.6040	-16.8495	-16.3047	610	700	632	198	410	270	11303	6	MVA, CGE	9340	31198
LANGABISS_0115	18	100	9.8083	10.7602	-17.4500	-16.8585	357	576	445	166	400	241	3323	4	MVA, SSH	3172	4985
LANGABISS_0215	6	100	9.9683	11.4702	-17.3950	-17.0212	472	640	518	173	263	207	549	5	MVA, DPS, SSH, CGE	422	1586
LANGABISS_0315	28	100	9.7900	12.8283	-17.4483	-16.8217	435	725	598	210	515	348	3683	6	MVA, SSH, CGE	2399	13330
LANGABISS_0415	200	100	9.7292	11.9995	-17.5908	-16.9508	563	786	682	58	389	263	23474	6	MVA, SSH	9834	20015
LANGABISS_0116	169	100	9.7383	10.8967	-17.5900	-16.8833	500	760	631	189	337	249	30477	5	MVA, SSH	19173	59574
LANGAMAU_0116	2	100	17.3985	18.8235	-16.9570	-16.7157	642	900	793	295	439	367	622	4	GFU, MVA, CGE	530	1528
LANGAMAU_0216	52	100	16.6632	19.7085	-17.3378	-16.1807	414	1020	848	175	510	266	12515	4	GFU, MVA, CGE	10565	32185
LANGAMAU_0316	59	100	16.2133	20.4233	-17.8903	-16.6333	615	950	790	134	465	276	9864	5	GFU, MVA	7114	23117
LANGAMAU_0416	24	100	16.2367	16.8150	-16.9292	-16.8742	642	874	704	258	372	278	3400	4	CGE, MVA	636	8600
LANGAMAU_0516	14	100	17.3035	18.7717	-16.9572	-16.7170	669	980	848	170	320	239	3135	3	GFU, MVA	2847	6545
LANGAMAU_0117	23	100	18.3683	19.8003	-17.2350	-16.2845	594	1015	820	90	370	243	2070	5	MVA, CFU	1602	4830
LANGABISS_0117	21	100	9.7493	10.7263	-17.3057	-16.8553	463	488	476	243	378	321	3254	5	SSH, EKW	3237	5114
LANGABISS_0217	60	100	9.8183	10.3917	-17.2833	-16.7300	214	516	381	130	455	254	6078	6	MNZ, SSH	5729	12672
LANGABISS_0317	52	100	10.3333	11.8700	-17.5358	-17.3670	509	737	676	249	535	347	5986	5	MVA, CGE	2289	26198
LANGAMAU_0118	68	100	16.6367	20.5450	-18.0300	-16.6367	675	1035	931	155	540	280	11499	5	GFU, MVA, CGE	10022	51661
LANGAMAU_0218	105	100	17.0758	19.0738	-16.9557	-16.6165	634	1060	772	175	541	326	12474	6	MVA, CGE, GFU	4650	26225
LANGAMAU_0318	151	100	16.1508	19.7050	-17.2333	-16.7467	626	950	817	85	380	235	15009	6	GFU, MVA, CGE	7452	22481
LANGAMAU_0418	28	100	18.0778	19.0475	-16.9650	-16.7023	770	980	932	165	320	261	9349	4	GFU, MVA, CGE	8263	12750

Table 6 - Inventory of metadata from shrimper trawlers. Length samplings-Retained Catch.

GENERAL				LENGTH-Target species				LENGTH - Retained non-target species			
FISHING TRIP	No. hauls retained species were sampled for length	No. samples of SOP	Total weight of SOP sampled (kg)	No. individual SOP sampled (no. ind)	No. samples of DPS	Total weight of DPS sampled (kg)	No. individual DPS sampled (no. ind)	No. of species measured for non target sampling	No. samples taken for measuring of non target species	Weight of non target species measured (kg)	No. individual non target species measured
LANGAMAU_0114	30	7	18	543	26	61.8	7417	4	30	165	5972
LANGAMAU_0214	39	12	116.1	4769	21	71.8	9146	6	48	518	11470
LANGAMAU_0314	45	28	68.9	2469	11	16.9	2459	6	38	730	2614
LANGAMAU_0414	16	3	6.0	247	10	16.5	2681	3	12	552	1323
LANGAMAU_0116	4	1	1.3	34	2	1.3	186	1	1	6	17
LANGAMAU_0216	24	3	16.4	372	16	15.9	1999	3	5	124	394
LANGAMAU_0316	32	4	21.3	883	13	24.4	3847	6	15	289	1311
LANGAMAU_0416	28	13	44.5	1904	2	2.1	459	4	13	89	1155
LANGAMAU_0516	21	1	5.2	217	11	10.6	1970	4	9	47	348
LANGAMAU_0117	35	5	7.9	414	30	16.3	2800	0	0	0	0
LANGAMAU_0118	9	2	4.1	146	16	14.1	2253	3	9	244	446
LANGAMAU_0218	42	13	34.2	1218	26	35.8	4756	6	51	419	3924
LANGAMAU_0318	35	7	13.6	419	4	6.8	1010	7	57	973	5494
LANGAMAU_0418	16	10	33.8	1096	16	22.8	3716	5	18	218	2039
LANGABISS_0115	61	13	12.3	345	34	14.5	2293	9	27	92	398
LANGABISS_0215	93	57	38.9	1041	16	9.5	1319	9	71	112	573
LANGABISS_0315	53	–	–	–	39	90.2	11907	4	9	146	1106
LANGABISS_0415	50	–	–	–	2	2.7	325	4	128	785	2496
LANGABISS_0116	57	–	–	–	2	3.2	460	3	54	1907	5727
LANGABISS_0117	0	–	–	–	14	14.9	2135	0	–	–	–
LANGABISS_0217	30	–	–	–	29	12.3	2225	1	1	9.6	2
LANGABISS_0317	92	–	–	–	67	96.3	12293	5	32	1010	2605

Table 7 - Inventory of metadata from shrimper trawlers. Biological samplings-Retained Catch.

GENERAL		BIOLOGICAL SAMPLING- Target species											
FISHING TRIP	No. hauls retained species were biologically sampled	No. samples of SOP	Total weight of SOP sampled (kg)	No. Individuals sampled SOP				No. samples of DPS	Total weight of DPS sampled (kg)	No. Individuals sampled DPS			
				Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity
LANGAMAU_0114	46	7	18	543	0	543	543	39	23.9	3204	0	3204	3204
LANGAMAU_0214	36	16	39	1620	0	1601	1601	20	8.9	2001	0	2001	998
LANGAMAU_0314	43	32	68	2555	0	2543	2543	11	8.5	893	0	893	893
LANGAMAU_0414	17	3	3	207	0	207	207	14	7.4	1388	0	1388	1388
LANGABISS_0115	50	13	12	338	0	335	335	37	17.3	1856	0	1856	1856
LANGABISS_0215	77	57	53	1029	0	1041	1041	20	11.6	1319	0	1319	1319
LANGABISS_0315	50	–	–	–	–	–	–	50	39.7	4498	0	4498	4498
LANGABISS_0415	4	–	–	–	–	–	–	4	4.0	325	0	325	325
LANGABISS_0116	4	–	–	–	–	–	–	4	2.9	285	0	285	285
LANGAMAU_0116	5	2	3	71	0	71	71	3	1.5	235	0	235	235
LANGAMAU_0216	22	4	8	199	0	199	199	18	14.4	1582	0	1582	1582
LANGAMAU_0316	46	21	45	1808	0	1805	1805	25	15.5	2299	0	2299	2299
LANGAMAU_0416	25	22	93	1936	0	1917	1917	3	1.1	240	0	240	211
LANGAMAU_0516	16	7	12	543	0	542	542	9	6.9	1073	0	1073	1073
LANGAMAU_0117	37	5	9	371	0	371	358	32	21.4	2268	0	2268	2268
LANGABISS_0117	14	–	–	–	–	–	–	14	8.8	1381	0	1381	1381
LANGABISS_0217	29	–	–	–	–	–	–	29	10.3	1848	0	1848	1848
LANGABISS_0317	39	–	–	–	–	–	–	39	13.7	1950	0	1950	1950
LANGAMAU_0118	16	2	4	146	0	146	146	14	12.0	1705	0	1705	1705
LANGAMAU_0218	42	13	34	1218	0	1218	1218	29	37.5	4439	0	4439	4439
LANGAMAU_0318	12	7	14	419	0	419	419	5	4.8	515	0	515	515
LANGAMAU_0418	24	9	22	811	0	810	810	15	7.5	1330	0	1330	1330

Table 8 - Inventory of metadata from shrimper trawlers. Length samplings-Discarded Catch.

GENERAL		LENGTH - Discarded target species						LENGTH - Discarded non-target species			
FISHING TRIP	No. hauls discarded species were sampled for length	No. samples of SOP	Total weight of SOP sampled (kg)	No. individual SOP sampled	No. samples of DPS	Total weight of DPS sampled (kg)	No. individual DPS sampled (no. fish)	No. of species measured for non target sampling	No. samples taken for measuring of non target species	Weight of non target species measured (kg)	No. of individual non target fish measured (no. fish)
LANGAMAU_0114	19	0	–	–	0	–	–	8	46	225	2040
LANGAMAU_0214	4	0	–	–	14	5.6	2251	10	11	54	136
LANGAMAU_0314	16	0	–	–	0	–	–	14	24	219	1418
LANGAMAU_0414	10	0	0	0	3	0.8	260	10	25	98	1074
LANGABISS_0115	48	5	0.05	7	31	2.2	437	120	613	623	6170
LANGABISS_0215	43	7	0.22	12	14	0.8	126	131	595	641	5089
LANGABISS_0315	29	–	–	–	5	0.4	126	32	102	360	3732
LANGABISS_0415	46	–	–	–	2	0.1	32	97	731	448	3517
LANGABISS_0116	18	–	–	–	0	0	0	14	99	246	1641
LANGAMAU_0116	4	0	–	–	0	–	–	4	1	46	84
LANGAMAU_0216	28	0	–	–	0	–	–	28	15	603	826
LANGAMAU_0316	34	0	–	–	5	0.76	230	34	23	353	2324
LANGAMAU_0416	39	0	–	–	0	–	–	39	32	310	1074
LANGAMAU_0516	11	0	–	–	0	–	–	11	10	83	460
LANGAMAU_0117	50	0	–	–	0	–	–	50	58	1189	1906
LANGABISS_0117	4	–	–	–	0	–	–	5	7	12	65
LANGABISS_0217	10	–	–	–	0	–	–	15	31	24	93
LANGABISS_0317	65	–	–	–	46	5.46	1030	29	97	196	335
LANGAMAU_0118	10	0	–	–	14	1.784	335	13	17	121	581
LANGAMAU_0218	34	0	–	–	1	0.1	17	31	84	352	426
LANGAMAU_0318	16	0	–	–	0	–	–	26	79	400	615
LANGAMAU_0418	11	3	0.045	5	11	3.855	772	17	33	73	1519

Table 9 - Inventory of metadata from shrimper trawlers. Biological samplings-Discarded Catch.

GENERAL		BIOLOGICAL SAMPLING -discarded target species											
				No. individuals sampled SOP						No. individuals sampled DPS			
FISHING TRIP	No. hauls discarded species were biologically sampled	No. samples of SOP	Total weight of SOP sampled (kg)	Length	Weight	Sex	Maturity	No. samples of DPS	Total weight of DPS sampled (kg)	Length	Weight	Sex	Maturity
LANGAMAU_0114	0	0	0	0	0	0	0	0	0	0	0	0	0
LANGAMAU_0214	16	0	0	0	0	0	0	16	6.0	1562	0	1562	745
LANGAMAU_0314	0	0	0	0	0	0	0	0	0	0	0	0	0
LANGAMAU_0414	0	0	0	0	0	0	0	3	0.8	260	0	260	0
LANGABISS_0115	36	5	0.05	7	0	7	7	31	2.9	437	0	436	0
LANGABISS_0215	21	7	0.22	12	0	12	12	14	0.8	126	0	126	126
LANGABISS_0315	5	–	–	–	–	–	–	5	0.4	126	0	126	0
LANGABISS_0415	2	–	–	–	–	–	–	2	0.1	32	0	32	32
LANGABISS_0116	0	–	–	–	–	–	–	0	0	0	0	0	0
LANGAMAU_0116	0	0	–	–	–	–	–	0	–	–	–	–	–
LANGAMAU_0216	0	0	–	–	–	–	–	0	–	–	–	–	–
LANGAMAU_0316	5	0	–	–	–	–	–	5	0.76	230		230	–
LANGAMAU_0416	0	0	–	–	–	–	–	0	–	–	–	–	–
LANGAMAU_0516	0	0	–	–	–	–	–	0	–	–	–	–	–
LANGAMAU_0117	0	0	–	–	–	–	–	0	–	–	–	–	–
LANGABISS_0117	0	–	–	–	–	–	–	0	0	0	0	0	0
LANGABISS_0217	0	–	–	–	–	–	–	0	0	0	0	0	0
LANGABISS_0317	46	–	–	–	–	–	–	46	5.5	1030	0	1030	0
LANGAMAU_0118	14	0	–	–	–	–	–	14	1.784	335	0	335	0
LANGAMAU_0218	1	0	–	–	–	–	–	1	0.1	17	0	17	0
LANGAMAU_0318	0	0	–	–	–	–	–	0	–	–	–	–	0
LANGAMAU_0418	14	3	0.045	5	0	5	0	11	3.855	772	0	772	0

Table 10 - Inventory of metadata from shrimper trawlers. Composition of discarded catch. All hauls and by haul type (LAN, GAM, ALI).

FISHING TRIP	ALL HAULS				LAN hauls				GAM hauls				ALI hauls			
	DISCARDS COMPOSITION				DISCARDS COMPOSITION				DISCARDS COMPOSITION				DISCARDS COMPOSITION			
	No. hauls where discards composition was sampled	Total weight of discards samples (kg)	No. species	No. commercial species	No. hauls where discards composition was sampled	Total weight of discards samples (kg)	No. species	No. commercial species	No. hauls where discards composition was sampled	Total weight of discards samples (kg)	No. species	No. commercial species	No. hauls where discards composition was sampled	Total weight of discards samples (kg)	No. species	No. commercial species
LANGAMAU_0114	51	2369	209	66	6	80	67	20	35	1499	127	46	10	790	81	25
LANGAMAU_0214	47	621	177	49	9	149	71	24	17	275	65	21	21	197	75	16
LANGAMAU_0314	40	1223	222	72	22	497	113	38	8	334	56	20	10	391	74	22
LANGAMAU_0414	19	479	137	46	2	17	45	19	12	276	64	24	5	186	50	14
LANGABISS_0115	41	1868	149	46	5	33	52	21	33	1571	100	27	3	263	21	3
LANGABISS_0215	41	1127	165	59	24	230	75	31	16	868	85	26	1	29	22	7
LANGABISS_0315	43	1265	160	41	–	–	–	–	41	1102	128	35	2	163	52	9
LANGABISS_0415	43	829	115	21	–	–	–	–	2	41	36	5	40	788	92	17
LANGABISS_0116	21	617	96	14	–	–	–	–	0	–	–	–	21	617	96	14
LANGAMAU_0116	2	73	18	9	0	–	–	–	2	73	18	9	0	–	–	–
LANGAMAU_0216	46	3195	205	65	8	309	88	29	28	2076	101	42	10	810	56	14
LANGAMAU_0316	39	1930	272	86	15	542	150	51	18	1060	116	44	6	328	75	19
LANGAMAU_0416	28	243	118	50	23	203	77	35	3	16	26	14	2	23	32	10
LANGAMAU_0516	24	743	146	58	10	194	81	35	13	395	68	31	1	154	17	2
LANGAMAU_0117	35	518	178	57	8	73	68	21	25	378	120	42	2	67	32	7
LANGABISS_0117	21	880	70	24	0	–	–	–	21	880	70	24	0	–	–	–
LANGABISS_0217	32	305	81	24	0	–	–	–	27	267	74	20	5	38	36	13
LANGABISS_0317	57	439	140	39	0	–	–	–	48	302	115	35	9	137	56	13
LANGAMAU_0118	16	931	145	46	4	130	52	21	15	575	69	22	4	226	41	8
LANGAMAU_0218	34	840	124	51	6	313	61	27	11	243	59	30	10	284	35	10
LANGAMAU_0318	16	555	129	39	3	75	51	17	3	38	38	13	12	442	60	17
LANGAMAU_0418	35	518	205	62	5	71	89	30	11	253	87	28	4	194	54	12

ANNEX 2- INVENTORY OF THE OBSERVERS' METADATA FROM THE DEMERSAL BLACK HAKE TRAWLERS FLEET (DCF)

Table 1- Inventory of metadata from black hake trawlers. Trip details and operational details.

TRIP DETAILS									OPERATIONAL DETAILS										
FISHING TRIP	YEAR	EEZ	FLAG	Vessel Code	Observer Code	Starting date	Final date	DURATION (fishing days)	No. Hauls	Proportion of hauls operational details recorded on (%)	Latitude min (decimal)	Latitude max (decimal)	Longitude min (decimal)	Longitude max (decimal)	Depth min (m)	Depth max (m)	Depth average (m)	Haul duration min (minutes)	Haul duration max (minutes)	Haul duration average (minutes)
BOUMAU_1601	2016	MAURITANIA	Spain	BHT_003	RGC	30/01/2016	03/02/2016	5	19	100	18.0592	19.7041	-17.2441	-16.6264	104	725	609.89	102	368	286
BOUMAU_1602	2016	MAURITANIA	Spain	BHT_003	RGC	07/02/2016	10/02/2016	4	13	100	18.3837	19.7196	-17.1763	-16.7210	334	781	562.77	106	325	254
BOUMAU_1603	2016	MAURITANIA	Spain	BHT_003	RGC	25/03/2016	30/03/2016	6	26	100	17.0276	19.7192	-17.1915	-16.4209	102	712	404.38	59	360	198
BOUMAU_1604	2016	MAURITANIA	Spain	BHT_003	RGC	01/04/2016	06/04/2016	6	24	100	17.0293	19.6924	-17.2007	-16.4762	112	688	406.94	89	383	226
BOUMAU_1606	2016	MAURITANIA	Spain	BHT_003	RGC	10/06/2016	14/06/2016	5	20	100	18.3904	19.0694	-16.9052	-16.6067	112	716	460.5	109	362	264
BOUMAU_1606_2	2016	MAURITANIA	Spain	BHT_003	RGC	17/06/2016	22/06/2016	6	23	100	17.0699	19.0837	-16.8982	-16.5888	121	697	411.72	120	383	243
BOUMAU_1610	2016	MAURITANIA	Spain	BHT_001	RGC	06/10/2016	10/10/2016	5	20	100	20.3333	20.7610	-17.9333	-17.6426	112	735	512.65	140	380	276
BOUMAR_1611	2016	MARRUECOS	Spain	BHT_001	RGC	16/11/2016	17/11/2016	2	8	100	22.5300	23.5918	-17.3117	-17.0833	595	725	680.44	240	380	292
BOUMAR_1611_1	2016	MARRUECOS	Spain	BHT_001	RGC	19/11/2016	23/11/2016	5	18	100	21.1500	21.6103	-17.7807	-17.5188	506	753	651	235	365	299
BOUMAR_1611_2	2016	MARRUECOS	Spain	BHT_001	RGC	25/11/2016	30/11/2016	6	21	100	21.1561	23.8668	-17.7982	-16.9373	502	763	623.02	105	507	299
BOUMAU_1702	2017	MAURITANIA	Spain	BHT_001	RGC	09/02/2017	14/02/2017	6	25	100	17.7767	20.7438	-17.8583	-16.5812	98	697	491	90	425	215
BOUMAU_1702_2	2017	MAURITANIA	Spain	BHT_001	RGC	16/02/2017	22/02/2017	7	27	100	18.3857	20.7584	-17.9726	-16.5423	106	670	456.7	35	420	222
BOUMAU_1704	2017	MAURITANIA	Spain	BHT_003	RGC	07/04/2017	12/04/2017	6	20	100	17.7683	20.7350	-17.9245	-16.6356	502	787	651.05	82	475	307
BOUMAU_1704_2	2017	MAURITANIA	Spain	BHT_003	RGC	14/04/2017	19/04/2017	7	22	100	18.3821	20.7458	-17.9364	-16.7050	493	725	605.07	205	395	276
BOUMAU_1706	2017	MAURITANIA	Spain	BHT_003	RGC	02/06/2017	07/06/2017	6	22	100	18.3833	20.6081	-17.8500	-16.6000	106	707	524.98	113	395	267
BOUMAU_1706_2	2017	MAURITANIA	Spain	BHT_003	RGC	09/06/2017	14/06/2017	6	23	100	20.3106	20.7613	-17.9605	-17.7380	478	740	596.43	218	331	296
BOUMAU_1709	2017	MAURITANIA	Spain	BHT_001	RGC	15/09/2017	20/09/2017	6	22	100	20.3248	20.7620	-17.9667	-17.6333	115	707	463.23	105	370	255
BOUMAU_1709_2	2017	MAURITANIA	Spain	BHT_001	RGC	21/09/2017	24/09/2017	4	16	100	17.7553	19.7007	-17.1932	-16.4833	132	725	542.78	94	300	199
BOUMAU_1709_3_C	2017	MAURITANIA	Spain	BHT_001C	RGC	13/09/2017	03/10/2017	33	86	100	17.0783	18.9517	-16.8800	-16.6083	515	632	583.22	130	380	246
BOUSEN_1711_C	2017	SENEGAL	Spain	BHT_002C	DSI	07/11/2017	26/11/2017	20	77	100	13.7087	15.7888	-17.6450	-17.0235	207	719	550.23	75	630	291
BOUMAU_1711	2017	MAURITANIA	Spain	BHT_003	RGC	24/11/2017	28/11/2017	5	18	100	17.7746	19.7101	-17.2353	-16.6165	521	725	646.22	108	490	285
BOUMAR_1712	2017	MARRUECOS	Spain	BHT_001	RGC	01/12/2017	06/12/2017	5	17	100	21.0820	23.6055	-17.7670	-17.1252	446	740	669.38	220	419	322
BOUMAR_1712_2	2017	MARRUECOS	Spain	BHT_001	RGC	08/12/2017	11/12/2017	4	13	100	21.2099	23.9841	-17.8081	-16.8445	558	789	713.5	84	426	313
BOUMAU_1801	2018	MAURITANIA	Spain	BHT_002	RGC	26/01/2018	31/01/2018	6	18	100	17.7967	20.7446	-17.9700	-16.6306	225	768	644.86	179	498	325
BOUMAU_1802	2018	MAURITANIA	Spain	BHT_002	RGC	02/02/2018	07/02/2018	6	21	100	18.2795	20.6428	-17.8992	-16.5827	93	697	478.05	65	430	298
BOUMAU_1803	2018	MAURITANIA	Spain	BHT_002	RGC	22/03/2018	28/03/2018	7	20	100	17.7983	19.8713	-17.3062	-16.5480	100	787	459.18	47	528	311
BOUMAU_1804_C	2018	MAURITANIA	Spain	BHT_003C	JJG	26/03/2018	25/04/2018	31	150	100	16.3410	19.0074	-16.8977	-17.5283	231	763	520	194	426	300
BOUMAU_1804	2018	MAURITANIA	Spain	BHT_002	RGC	29/03/2018	04/04/2018	7	23	100	19.9051	20.6943	-17.9917	-16.4260	103	630	297.25	67	487	219
BOUMAU_1805	2018	MAURITANIA	Spain	BHT_002	RGC	24/05/2018	29/05/2018	6	15	100	20.9990	20.7560	-17.9442	-17.7740	651	800	733.37	388	530	467
BOUMAR_1806	2018	MARRUECOS	Spain	BHT_002	RGC	07/06/2018	12/06/2018	6	18	100	20.7863	23.0687	-17.8003	-17.2177	476	779	702.78	277	480	335
BOUMAU_1807	2018	MAURITANIA	Spain	BHT_002	JJG	26/07/2018	31/07/2018	6	21	100	20.3110	20.7298	-17.9375	-17.7444	362	732	537.62	202	502	328
BOUMAU_1808	2018	MAURITANIA	Spain	BHT_002	JJG	02/08/2018	07/08/2018	6	16	100	18.6291	20.7499	-17.8646	-16.6745	304	690	482.41	45	485	337
BOUMAU_1809	2018	MAURITANIA	Spain	BHT_002	RGC	26/09/2018	02/10/2018	7	18	100	20.3059	20.7333	-17.9929	-17.7432	407	770	631.31	179	539	413
BOUMAU_1810	2018	MAURITANIA	Spain	BHT_002	RGC	03/10/2018	09/10/2018	6	14	100	20.3200	20.7333	-17.9624	-17.7430	409	781	645.29	136	540	401
BOUMAU_1811	2018	MAURITANIA	Spain	BHT_002	RGC	28/11/2018	04/12/2018	7	15	100	20.3431	20.7640	-17.9007	-17.7566	683	805	749.67	436	577	505
BOUMAU_1812	2018	MAURITANIA	Spain	BHT_002	RGC	05/12/2018	10/12/2018	6	12	100	20.2587	20.7631	-17.9015	-17.7742	675	844	760.04	485	568	528

C= Fishing trip on a freezer trawler

Table 2- Inventory of metadata from black hake trawlers. Catch details and observer estimates.

	CATCH DETAILS							OBSERVER ESTIMATE				
FISHING TRIP	Total retained catch (kg)	No. species retained catch	HKB retained weight (kg)	HKM retained weight (kg)	HKX retained weight (kg)	Retained bycatch - main species (FAO Code)	Retained bycatch weight (kg)	Total discard (kg)	Proportion of hauls observer estimated total catch independently (%)	If estimations not 100% give reason	Proportion of hauls observer recorded incidental bycatch (%)	Species-group-incidental bycatch (Marine mammals, Seabirds, Turtles)
BOUMAU_1601	49336	24	43997	5	0	DEA,MVA,JOD,SKA,SHX	5334	24565	100	-	100	0
BOUMAU_1602	47908	18	41132	4003	0	GXW,MVA,SKA,SHX,TZY	2773	25497	100	-	100	0
BOUMAU_1603	51858	22	36404	1571	0	JOS,JOD,JAX,BRD,MVA	13883	53004	100	-	100	0
BOUMAU_1604	51228	21	33957	3445	0	JAX,JOD,JOS,BRD,MVA	13826	54002	100	-	100	0
BOUMAU_1606	45604	23	34047	1316	0	DEA,UAE,SHX,GUQ,MVA	10241	33906	100	-	100	0
BOUMAU_1606_2	56170	21	41403	1278	0	DEA,HMZ,JOD,BRD,MVA	13489	52164	100	-	100	0
BOUMAU_1610	68404	18	60133	4545	0	DEA,MVA,SKA,JOD,SHX	3726	43484	100	-	100	0
BOUMAR_1611	16056	9	13220	448	0	TZY,SKA,GUQ,MVA,SHX	2388	16644	100	-	100	0
BOUMAR_1611_1	44238	9	40655	1565	0	MVA,SKA,TZY,SHX,BRF	2018	30361	100	-	100	0
BOUMAR_1611_2	33615	11	29440	1872	0	MVA,TZY,SKA,GUQ,BRF	2303	28727	100	-	100	0
BOUMAU_1702	52118	22	42331	4075	0	DEA,JOS,UCA,JOD,MVA	5712	51326	100	-	100	0
BOUMAU_1702_2	53065	20	45316	1028	0	BRF,DEL,JO,DEA,MVA	6721	55098	100	-	100	0
BOUMAU_1704	45665	10	42342	538	0	GUQ,MVA,SHX,SKA,CYO	2785	26733	100	-	100	0
BOUMAU_1704_2	44309	11	39775	2070	0	GUQ,SHX,MVA,GUP,SKA	2464	23155	100	-	100	0
BOUMAU_1706	36266	18	28446	3786	0	DEA,JOS,MVA,SHX,SKA	4034	29791	100	-	100	0
BOUMAU_1706_2	47158	9	35594	9648	0	SHX,MVA,GUQ,JOS,SKA	1916	26997	100	-	100	0
BOUMAU_1709	46587	10	23260	19101	1026	JOD,MVA,BRF,SKA,DEA	3200	22633	100	-	100	0
BOUMAU_1709_2	29582	11	16590	2354	6102	JOS,JOD,MVA,SKA,EZS	4536	14968	100	-	100	0
BOUMAU_1709_3_C	229365	3	0	0	220989	MVA,SQE,BRF	8376	34730	41.9	The observer was on board from haul No. 50	41.9	0
BOUSEN_1711_C	111942	5	57270	565	0	TDQ,JOS,BRF,MVA,SVG	54107	19341.23	100	-	100	0
BOUMAU_1711	35208	10	30628	2420	0	MVA,CYO,SHX,BRF,TZY	2160	11377	100	-	100	0
BOUMAR_1712	23993	12	17319	1081	0	RJO,TZY,GUQ,MVA,SKA	5594	17667	100	-	100	0
BOUMAR_1712_2	11995	11	7071	203	0	TZY,GUQ,RJO,HKE,MVA	4721	10794	100	-	100	0
BOUMAU_1801	24926	13	21401	296	0	MVA,CPU,SHX,GUP,TZY	3229	17454	100	-	100	0
BOUMAU_1802	46022	22	30155	6572	0	CYP,DEA,DEL,MVA,JOD	9295	25979	100	-	100	0
BOUMAU_1803	37845	24	23227	5214	0	JOD,DEA,JOS,HOM,MVA	9405	16559	100	-	100	0
BOUMAU_1804_C	439954	19	0	0	276500	JAX,TDQ,BRD,JOS,DEX	163453	395977.58	100	-	100	0
BOUMAU_1804	43002	17	32404	3252	0	MVA,SHX,GUQ,RJB,TZY	7346	24566	100	-	100	0
BOUMAU_1805	29272	5	24987	120	0	SHX,MVA,GUQ,SKA,TZY	4165	21828	100	-	100	0
BOUMAR_1806	40133	8	31557	3329	0	RJB,SHX,TZY,MVA,GUQ	5247	28167	100	-	100	0
BOUMAU_1807	45419	5	32761	9835	0	MVA,SHX.EZS,SKA,RFL	2823	14379.52	100	-	100	0
BOUMAU_1808	36828	5	28007	6577	0	MVA,SHX,EZS,,SKA,GXW	2244	20772.24	100	-	100	0
BOUMAU_1809	54789	6	43923	8790	0	MVA,SHX,RJX,GUQ,GUP	2076	10010	100	-	100	0
BOUMAU_1810	49348	7	33208	14713	0	MVA,SHX,SKA,GUP,GUQ	1427	6610	100	-	100	0
BOUMAU_1811	50357	9	46551	8	0	MVA, GUQ,SKA,JAD	3798	8116	100	-	100	0
BOUMAU_1812	22797	11	19891	0	0	MVA,GUQ,SKA,JAD,TZY	2906	7202	100	-	100	0

Table 3- Inventory of metadata from black hake trawlers. Meteorological data and additional comments.

FISHING TRIP	METEREOLOGICAL DATA							ADDITIONAL COMMENTS
	Proportion of hauls meteorlogical data collected (%)	Sea state recorded (Y/N)	Current direction recorded (Y/N)	Water temperature recorded (Y/N)	Cloud cover recorded (Y/N)	Wind Speed recorded (Y/N)	Wind direction recorded (Y/N)	
BOUMAU_1601	100	Y	Y	N	Y	Y	Y	
BOUMAU_1602	100	Y	Y	N	Y	Y	Y	
BOUMAU_1603	100	Y	Y	N	Y	Y	Y	
BOUMAU_1604	100	Y	Y	N	Y	Y	Y	
BOUMAU_1606	100	Y	Y	N	Y	Y	Y	
BOUMAU_1606_2	100	Y	Y	N	Y	Y	Y	
BOUMAU_1610	100	Y	Y	Y	Y	Y	Y	
BOUMAR_1611	100	Y	Y	Y	Y	Y	Y	
BOUMAR_1611_1	100	Y	Y	Y	Y	Y	Y	
BOUMAR_1611_2	100	Y	Y	Y	Y	Y	Y	
BOUMAU_1702	100	Y	Y	N	Y	Y	Y	
BOUMAU_1702_2	100	Y	Y	N	Y	Y	Y	
BOUMAU_1704	100	Y	Y	N	Y	Y	Y	
BOUMAU_1704_2	100	Y	Y	N	Y	Y	Y	
BOUMAU_1706	100	Y	Y	N	Y	Y	Y	
BOUMAU_1706_2	100	Y	Y	N	Y	Y	Y	
BOUMAU_1709	100	Y	Y	Y	Y	Y	Y	
BOUMAU_1709_2	100	Y	Y	Y	Y	Y	Y	Sea Surface Temperature recorded in 69% of hauls
BOUMAU_1709_3_C	100	Y	Y	Y	Y	Y	Y	Sea Surface Temperature recorded in 97% of hauls
BOUSEN_1711_C	100	Y	N	Y	Y	Y	N	Sea Surface Temperature recorded 64% hauls. Wind speed recorded 4% hauls
BOUMAU_1711	100	Y	Y	N	Y	Y	Y	
BOUMAR_1712	100	Y	Y	N	Y	Y	Y	
BOUMAR_1712_2	100	Y	Y	N	Y	Y	Y	
BOUMAU_1801	100	Y	Y	Y	Y	Y	Y	Sea Surface Temperature recorded in 83% hauls
BOUMAU_1802	100	Y	Y	Y	Y	Y	Y	
BOUMAU_1803	100	Y	Y	Y	Y	Y	Y	
BOUMAU_1804_C	0	N	N	N	N	N	N	All recorded as HKX, just one HKB biological sample
BOUMAU_1804	100	Y	Y	Y	Y	Y	Y	
BOUMAU_1805	100	Y	Y	Y	Y	Y	Y	
BOUMAR_1806	100	Y	Y	Y	Y	Y	Y	
BOUMAU_1807	0	N	N	N	N	N	N	
BOUMAU_1808	0	N	N	N	N	N	N	
BOUMAU_1809	100	Y	Y	Y	Y	Y	Y	
BOUMAU_1810	100	Y	Y	Y	Y	Y	Y	
BOUMAU_1811	100	Y	Y	Y	Y	Y	Y	
BOUMAU_1812	100	Y	Y	Y	Y	Y	Y	

Table 4 - Inventory of metadata from black hake trawlers. Length samplings-Retained Catch.

GENERAL				LENGTH - Retained target species				LENGTH - Retained non-target species			
FISHING TRIP	No. hauls retained species were sampled for length	No. samples of HKB	Total weight of HKB sampled (kg)	No. individual HKB sampled (no. fish)	No. samples of HKM	Total weight of HKM sampled (kg)	No. individual HKM sampled (no. fish)	No. of species measured for non target sampling	No. samples taken for measuring of non target species	Weight of non target species measured (kg)	No. of individual non target fish measured (no. fish)
BOUMAU_1601	8	6	658	852	1	1	1	10	15	599	716
BOUMAU_1602	10	7	559	765	6	247	319	10	28	594	521
BOUMAU_1603	16	4	365	501	6	223	196	13	21	1100	1055
BOUMAU_1604	15	7	379	456	9	349	297	15	23	961	1051
BOUMAU_1606	11	4	328	402	2	91	93	12	15	463	703
BOUMAU_1606_2	5	5	426	533	2	64	50	7	16	308	195
BOUMAU_1610	11	6	513	666	4	168	200	3	4	123	202
BOUMAR_1611	4	3	150	141	0	0	0	2	3	207	285
BOUMAR_1611_1	9	8	764	840	3	169	146	2	5	65	192
BOUMAR_1611_2	12	12	979	1195	8	158	167	2	17	287	643
BOUMAU_1702	10	3	396	499	2	108	176	9	12	343	798
BOUMAU_1702_2	7	3	421	600	0	0	0	6	12	268	700
BOUMAU_1704	7	6	699	708	1	21	30	3	9	392	289
BOUMAU_1704_2	7	7	464	649	6	115	169	1	3	165	189
BOUMAU_1706	9	5	426	525	2	43	47	7	16	384	651
BOUMAU_1706_2	9	6	572	626	4	85	100	3	6	257	330
BOUMAU_1709	7	5	256	458	4	195	290	3	4	125	322
BOUMAU_1709_2	6	3	194	365	2	20	41	3	3	244	222
BOUMAU_1709_3_C	15	14	743	1068	5	33	18	2	7	278	287
BOUSEN_1711_C	39	34	502	1211	12	10	23	5	43	553	838
BOUMAU_1711	8	8	608	816	2	44	54	2	2	32	69
BOUMAR_1712	10	10	641	685	7	55	92	2	7	238	488
BOUMAR_1712_2	7	6	447	401	3	35	39	1	1	60	119
BOUMAU_1801	11	11	1420	1461	1	5	7	3	5	128	202
BOUMAU_1802	12	7	859	1058	6	393	623	7	9	323	683
BOUMAU_1803	11	6	520	579	3	195	346	8	9	353	642
BOUMAU_1804_C	41	14	113	237	10	149	277	10	29	340	756
BOUMAU_1804	11	7	684	734	3	171	239	5	8	336	435
BOUMAU_1805	9	9	1204	1010	1	63	70	1	1	14	36
BOUMAR_1806	10	10	1236	1185	9	399	563	2	4	105	228
BOUMAU_1807	10	10	335	435	7	121	183	0	0	0	0
BOUMAU_1808	9	8	255	380	5	99	168	0	0	0	0
BOUMAU_1809	10	8	699	654	4	149	194	0	0	0	0
BOUMAU_1810	6	6	386	384	3	193	279	0	0	0	0
BOUMAU_1811	10	6	799	650	0	0	0	6	7	152	93
BOUMAU_1812	5	5	398	401	-	-	-	5	7	165	107

Table 5 - Inventory of metadata from black hake trawlers. Biological samplings-Retained Catch.

GENERAL		BIOLOGICAL SAMPLING- Target species											
FISHING TRIP	No. hauls retained species were biologically sampled	No. samples of HKB	Total weight of HKB sampled (kg)	No. individuals sampled HKB				No. samples of HKM	Total weight of HKM sampled (kg)	No. individuals sampled HKM			
				Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity
BOUMAU_1601	5	4	234	282	82	282	282	1	1	1	1	1	0
BOUMAU_1602	6	5	177	216	134	216	216	4	86	120	116	120	120
BOUMAU_1603	8	3	140	171	65	171	171	6	250	196	18	190	189
BOUMAU_1604	11	6	237	242	7	241	241	8	334	249	5	249	248
BOUMAU_1606	4	3	122	120	70	120	120	1	51	50	50	50	50
BOUMAU_1606_2	3	3	135	122	72	122	122	1	1	1	1	1	1
BOUMAU_1610	8	4	234	237	0	237	237	4	201	200	46	200	200
BOUMAR_1611	3	3	150	141	50	141	141	0	0	0	0	0	0
BOUMAR_1611_1	6	4	189	175	125	175	175	3	124	105	55	105	105
BOUMAR_1611_2	5	5	223	205	70	205	205	3	66	57	35	57	57
BOUMAU_1702	6	5	179	169	0	169	169	2	57	57	0	57	57
BOUMAU_1702_2	6	3	166	150	0	150	150	3	52	62	0	61	61
BOUMAU_1704	8	7	252	212	25	212	212	1	35	50	0	49	48
BOUMAU_1704_2	9	6	174	176	176	176	176	4	20	20	6	20	20
BOUMAU_1706	5	3	146	120	0	120	120	2	113	100	0	100	100
BOUMAU_1706_2	6	4	135	139	0	139	139	4	98	91	0	91	91
BOUMAU_1709	4	3	77	85	15	85	85	3	133	114	35	114	114
BOUMAU_1709_2	4	4	134	152	26	152	152	4	37	48	24	48	48
BOUMAU_1709_3_C	12	12	287	364	254	304	304	3	32	14	14	13	13
BOUSEN_1711_C	24	24	187	455	311	310	310	6	3	8	8	7	7
BOUMAU_1711	10	11	135	180	80	180	180	0	0	0	0	0	0
BOUMAR_1712	8	8	157	152	30	152	152	1	1	1	1	1	1
BOUMAR_1712_2	4	4	14	8	8	8	8	0	0	0	0	0	0
BOUMAU_1801	5	5	275	232	0	232	232	1	5	7	0	7	7
BOUMAU_1802	7	3	164	150	50	150	150	4	63	73	0	73	73
BOUMAU_1803	5	4	135	147	38	147	147	1	20	20	20	20	20
BOUMAU_1804_C	15	14	102	223	223	223	223	12	158	291	291	291	291
BOUMAU_1804	4	4	188	175	100	175	175	1	27	28	0	28	28
BOUMAU_1805	4	4	254	200	200	200	200	0	0	0	0	0	0
BOUMAR_1806	4	4	186	150	150	150	150	3	42	50	0	50	50
BOUMAU_1807	4	4	20	41	41	41	41	4	20	33	33	33	33
BOUMAU_1808	5	4	74	85	85	85	85	3	34	47	47	47	47
BOUMAU_1809	8	6	201	192	83	192	192	4	132	136	67	136	136
BOUMAU_1810	4	4	69	63	61	63	63	2	59	54	54	54	54
BOUMAU_1811	3	3	171	130	30	126 130	130	0	0	0	0	0	0
BOUMAU_1812	3	3	54	54	54	54	54	-	-	-	-	-	-

Table 6 - Inventory of metadata from black hake trawlers. Length samplings-Discarded Catch.

GENERAL		LENGTH - Discarded target species						LENGTH - Discarded non-target species			
FISHING TRIP	No. hauls discarded species were sampled for length	No. samples of HKB	Total weight of HKB sampled (kg)	No. individual HKB sampled (no. fish)	No. samples of HKM	Total weight of HKM sampled (kg)	No. individual HKM sampled (no. fish)	No. of species measured for non target sampling	No. samples taken for measuring of non target species	Weight of non target species measured (kg)	No. of individual non target fish measured (no. fish)
BOUMAU_1601	8	7	25	62	2	5	69	15	8	33	102
BOUMAU_1602	6	6	21	70	–	–	–	8	6	42	129
BOUMAU_1603	13	10	73	257	8	16	79	14	13	23	111
BOUMAU_1604	11	11	108	391	6	6	15	12	11	24	128
BOUMAU_1606	8	5	7	46	3	38	123	16	8	33	218
BOUMAU_1606_2	11	7	44	252	1	0.4	1	14	11	70	352
BOUMAU_1610	9	9	57	151	5	42	142	10	9	20	171
BOUMAR_1611	3	2	1	2	–	–	–	9	3	37	184
BOUMAR_1611_1	8	–	–	–	–	–	–	10	8	26	195
BOUMAR_1611_2	10	–	–	–	–	–	–	11	10	56	544
BOUMAU_1702	12	10	40	330	7	101	422	16	12	73	422
BOUMAU_1702_2	14	10	55	422	8	112	512	16	14	60	634
BOUMAU_1704	9	2	17	85	–	–	–	9	9	40	199
BOUMAU_1704_2	12	6	51	236	–	–	–	8	12	42	433
BOUMAU_1706	10	5	28	164	2	18	55	12	10	43	335
BOUMAU_1706_2	11	3	10	41				8	11	23	334
BOUMAU_1709	10	4	6	26	1	5	20	9	10	34	425
BOUMAU_1709_2	6	5	10	64	1	10	39	8	6	39	212
BOUMAU_1709_3_C	15	13	124	515	3	5	14	6	15	34	189
BOUSEN_1711_C	20	6	3	26	–	–	–	6	20	13	120
BOUMAU_1711	8	3	12	59	–	–	–	9	8	29	151
BOUMAR_1712	7	–	–	–	–	–	–	12	7	48	242
BOUMAR_1712_2	6	–	–	–	–	–	–	11	6	41	126
BOUMAU_1801	6	4	2	10	–	–	–	9	6	41	77
BOUMAU_1802	9	5	7	30	3	3	17	14	9	42	239
BOUMAU_1803	9	7	9	62	4	5	26	10	9	26	228
BOUMAU_1804_C	11	1	0.2	1	–	–	–	37	22	476	3065
BOUMAU_1804	22	17	162	1026	10	40	171	9	11	68	289
BOUMAU_1805	7	–	–	–	–	–	–	3	7	4	39
BOUMAR_1806	9	–	–	–	–	–	–	3	9	19	160
BOUMAU_1807	5	3	12	61	3	17	81	7	5	58	267
BOUMAU_1808	3	3	2	10	1	0	3	6	3	26	183
BOUMAU_1809	7	2	13	104	2	4	21	4	7	13	156
BOUMAU_1810	6	3	6	50	3	2	10	2	6	16	202
BOUMAU_1811	4	–	–	–	–	–	–	3	4	3	40
BOUMAU_1812	3	–	–	–	–	–	–	3	3	2	33

Table 7 - Inventory of metadata from black hake trawlers. Biological samplings-Discarded Catch.

GENERAL		BIOLOGICAL SAMPLING - Discarded target species											
FISHING TRIP	No. hauls discarded species were biologically sampled	No. samples of HKB	Total weight of HKB sampled (kg)	No. individuals sampled HKB				No. samples of HKM	Total weight of HKM sampled (kg)	No. individuals sampled HKM			
				Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity
BOUMAU_1601	1	0	–	–	–	–	–	1	16.1	53	40	53	3
BOUMAU_1602	1	1	1.8	6	6	6	6	–	–	–	–	–	–
BOUMAU_1603	6	3	7.5	28	28	28	28	3	14.7	44	38	44	44
BOUMAU_1604	1	1	0.7	2	2	2	2	0	–	–	–	–	–
BOUMAU_1606	2	0	0.0	0	0	0	0	2	10.9	33	33	33	33
BOUMAU_1606_2	5	3	16.6	51	51	51	51	2	5.9	14	7	14	14
BOUMAU_1610	3	3	12.0	35	25	35	35	1	0.8	2	0	2	2
BOUMAR_1611	0	0	–	–	–	–	–	–	–	–	–	–	–
BOUMAR_1611_1	–	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAR_1611_2	–	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1702	5	4	5.5	31	14	31	31	4	9.4	32	31	32	32
BOUMAU_1702_2	3	0	–	–	–	–	–	3	25.4	59	0	59	59
BOUMAU_1704	1	1	3.0	12	0	12	12	–	–	–	–	–	–
BOUMAU_1704_2	3	3	7.9	37	0	37	37	–	–	–	–	–	–
BOUMAU_1706	3	3	14.8	66	0	66	66	1	10.1	32	0	32	32
BOUMAU_1706_2	0	0	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1709	0	0	–	–	–	–	–	0	–	–	–	–	–
BOUMAU_1709_2	0	0	–	–	–	–	–	0	–	–	–	–	–
BOUMAU_1709_3	0	0	–	–	–	–	–	0	–	–	–	–	–
BOUSEN_1711	6	6	2.9	26	26	26	25	–	–	–	–	–	–
BOUMAU_1711	0	0	–	–	–	–	–	–	–	–	–	–	–
BOUMAR_1712	–	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAR_1712_2	–	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1801	0	0	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1802	0	0	–	–	–	–	–	0	–	–	–	–	–
BOUMAU_1803	0	0	–	–	–	–	–	0	–	–	–	–	–
BOUMAU_1804_C	0	0	–	–	–	–	–	0	–	–	–	–	–
BOUMAU_1804	0	0	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1805	–	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAR_1806	–	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1807	0	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1808	0	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1809	0	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1810	0	–	–	–	–	128	–	–	–	–	–	–	–
BOUMAU_1811	–	–	–	–	–	–	–	–	–	–	–	–	–
BOUMAU_1812	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 8 - Inventory of metadata from black hake trawlers. Composition of discarded catch.

FISHING TRIP		DISCARDS COMPOSITION		
	No. hauls where discards composition was sampled	Total weight of discards samples (kg)	No. species	No. commercial species
BOUMAU_1601	8	270	100	41
BOUMAU_1602	6	255	65	18
BOUMAU_1603	10	230	85	36
BOUMAU_1604	10	260	85	31
BOUMAU_1606	8	193	83	35
BOUMAU_1606_2	9	249	74	30
BOUMAU_1610	7	217	51	21
BOUMAR_1611	3	112	42	18
BOUMAR_1611_1	8	229	51	17
BOUMAR_1611_2	10	1617	66	21
BOUMAU_1702	12	452	85	35
BOUMAU_1702_2	14	540	86	37
BOUMAU_1704	9	291	62	20
BOUMAU_1704_2	12	371	69	20
BOUMAU_1706	11	310	90	34
BOUMAU_1706_2	11	243	64	19
BOUMAU_1709	10	585	77	27
BOUMAU_1709_2	6	199	59	23
BOUMAU_1709_3_C	11	258	57	17
BOUSEN_1711_C	25	130	48	12
BOUMAU_1711	8	232	69	21
BOUMAR_1712	7	221	67	22
BOUMAR_1712_2	6	197	61	20
BOUMAU_1801	6	202	54	18
BOUMAU_1802	9	322	89	34
BOUMAU_1803	9	1491	95	33
BOUMAU_1804_C	11	367	65	24
BOUMAU_1804	22	730	40	28
BOUMAU_1805	7	754	14	4
BOUMAR_1806	10	1191	16	4
BOUMAU_1807	5	260	37	17
BOUMAU_1808	3	138	34	14
BOUMAU_1809	7	669	19	10
BOUMAU_1810	6	397	18	9
BOUMAU_1811	7	430	17	6

BOUMAU_1812	4	263	16	5

ANNEX 3- INVENTORY OF THE OBSERVERS' METADATA

FROM THE DEMERSAL CEPHALOPOD-FINFISH TRAWLERS FLEET (DCF)

Table 1- Inventory of metadata from cephalopod-finfish trawlers. Trip details and operational details.

TRIP DETAILS									OPERATIONAL DETAILS										
FISHING TRIP	YEAR	EEZ	FLAG	Vessel Code	Observer Code	Starting date	Final date	DURATION (fishing days)	No. Hauls	Proportion of hauls operational details recorded on (%)	Latitude min (decimal)	Latitude max (decimal)	Longitude min (decimal)	Longitude max (decimal)	Depth min (m)	Depth max (m)	Depth average (m)	Haul duration min (minutes)	Haul duration max (minutes)	Haul duration average (minutes)
OTB_MCF_1508	2015	GUINEA-BISSAU	Spain	CPL_001	SPT	24/08/2015	09/09/2015	13	53	100%	9.4312	12.0800	-17.2736	-17.0318	29	640	472	129	504	293
OTB_MCF_1603	2016	GUINEA-BISSAU	Spain	CPL_002	MGP	01/03/2016	30/03/2016	18	84	100%	10.0974	12.1273	-17.7544	-16.1053	87	552	162	74	450	200
OTB_MCF_1604	2016	GUINEA-BISSAU	Spain	CPL_003	MGP	01/04/2016	30/04/2016	9	66	100%	10.1324	12.1784	-17.3302	-16.0698	99	487	155	90	540	260
OTB_MCF_1609	2016	GUINEA-BISSAU	Spain	CPL_004	DSI	30/09/2016	23/10/2016	21	78	100%	9.5540	11.2640	-17.4100	-15.8200	20	540	143	78	450	266
OTB_MCF_1703	2017	GUINEA-BISSAU	Spain	CPL_002	FQP	13/03/2017	06/04/2017	24	98	100%	9.5908	11.5603	-17.5845	-16.3437	77	205	144	135	426	242
OTB_MCF_1704	2017	GUINEA-BISSAU	Spain	CPL_002	FQP	09/04/2017	27/04/2017	17	64	100%	10.1567	12.0973	-17.5455	-16.4098	82	188	145	141	480	245
OTB_MCF_1707	2017	GUINEA-BISSAU	Spain	CPL_005	IDH	15/07/2017	26/07/2017	8	68	100%	11.1310	11.5830	-17.1920	-17.0020	26	101	45	69	240	163
OTB_MCF_1708	2017	GUINEA-BISSAU	Spain	CPL_005	IDH	05/08/2017	26/09/2017	47	313	100%	10.4700	12.1710	-17.5850	-16.4310	20	192	56	69	315	174

Table 2- Inventory of metadata from cephalopod-finfish trawlers. Catch details and observer estimates.

	CATCH DETAILS									OBSERVER ESTIMATE			
FISHING TRIP	Total retained catch (kg)	No. species retained catch	HKB retained weight (kg)	HMZ retained weight (kg)	OCC retained weight (kg)	CVT retained weight (kg)	Retained bycatch - main species (FAO Code)	Retained bycatch weight (kg)	Total discard (kg)	Proportion of hauls observer estimated total catch independently (%)	If estimations not 100% give reason	Proportion of hauls observer recorded incidental bycatch (%)	Species-group-incidental bycatch (Marine mammals, Seabirds, Turtles)
OTB_MCF_1508	95967	17	87745	0	390	0	OMZ, MVA, YOX, CIL, JOS	7832	16889	100	–	100	*Tursiops truncatus*
OTB_MCF_1603	276332	26	0	41065	2266	0	SCS, DEA, UCA, BRD, SFS	233002	159833	100	–	100	
OTB_MCF_1604	290492	32	2931	61440	3383	0	SCS, DEA, UCA, BRD, DEM	222738	93485	100	–	100	
OTB_MCF_1609	195431	39	11142	68145	1254	1642	LHT, PQR, BRD, DHZ	113247	49073	100	–	100	
OTB_MCF_1703	251765	36	2888	190820	7794	0	BRD, UCA, QZU, SVV, LHT	50264	157171	100	–	100	*Lepidochelys olivacea*
OTB_MCF_1704	263279	30	1253	224180	9622	0	BRD, LHT, SVV, DEA, UCA	28224	111609	100	–	100	
OTB_MCF_1707	19362	26	0	0	4410	1340	GOA, GAL, YGL, YOE, CKL	13612	4728	100	–	100	
OTB_MCF_1708	80060	40	0	377	18834	7616	GOA, YGL, AWJ, BRD, OCM	53233	22635	100	–	100	

Table 3- Inventory of metadata from cephalopod-finfish trawlers. Meteorological data.

FISHING TRIP	METEREOLOGICAL DATA				
	Proportion of hauls meteorlogical data collected (%)	Sea state recorded (Y/N)	Cloud cover recorded (Y/N)	Wind Speed recorded (Y/N)	Other (please list)
OTB_MCF_1508	0	N	N	N	N
OTB_MCF_1603	80	Y	Y	N	N
OTB_MCF_1604	44	Y	Y	N	N
OTB_MCF_1609	100	Y	Y	Y	Moon phase
OTB_MCF_1703	100	Y	Y	Y	N
OTB_MCF_1704	100	Y	Y	Y	N
OTB_MCF_1707	100	Y	Y	Y	N
OTB_MCF_1708	100	Y	Y	Y	N

Table 4 - Inventory of metadata from cephalopod-finfish trawlers. Length samplings-Retained Catch.

GENERAL					LENGTH- Retained target species									LENGTH - Retained non-target species			
FISHING TRIP	No. hauls retained species were sampled for length	No. samples of HKB	Total weight of HKB sampled (kg)	No. individual HKB sampled (no. fish)	No. samples of HMZ	Total weight of HMZ sampled (kg)	No. individual HMZ sampled (no. fish)	No. samples of OCC	Total weight of OCC sampled (kg)	No. individual OCC sampled (no. fish)	No. samples of CVT	Total weight of CVT sampled (kg)	No. individual CVT sampled (no. fish)	No. of species measured for non target sampling	No. samples taken for measuring of non target species	Weight of non target species measured (kg)	No. of individual non target fish measured (no. fish)
OTB_MCF_1508	16	9	248	520	0	–	–	0	–	–	0	–	–	6	14	676	899
OTB_MCF_1603	24	0	–	–	12	510	879	0	–	–	0	–	–	12	18	769	1891
OTB_MCF_1604	12	1	50	163	10	506	769	0	–	–	0	–	–	7	6	1646	503
OTB_MCF_1609	35	3	96	191	17	477	570	22	1575	216	7	38	110	22	32	2235	1796
OTB_MCF_1703	32	5	35	211	19	461	890	4	112	124	0	–	–	26	30	2456	2593
OTB_MCF_1704	22	1	7	49	11	269	488	3	114	99	0	–	–	21	22	738	1576
OTB_MCF_1707	7	0	–	–	0	–	–	7	81	190	6	40	106	10	7	168	589
OTB_MCF_1708	51	0	–	–	4	12	47	39	714	1090	24	130	452	20	48	999	3867

Table 5 - Inventory of metadata from cephalopod-finfish trawlers. Biological samplings-Retained Catch.

GENERAL		BIOLOGICAL SAMPLING- Target species																					
FISHING TRIP	No. hauls retained species were biologically sampled	No. samples of HKB	Total weight of HKB sampled (kg)	No. individuals sampled HKB				No. samples of HMZ	Total weight of HMZ sampled (kg)	No. individuals sampled HMZ				No. samples of OCC	Total weight of OCC sampled (kg)	No. individuals sampled OCC				No. samples of CVT	Total weight of CVT sampled (kg)	No. individuals sampled CVT			
				Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity
OTB_MCF_1508	14	11	112	216	216	216	216	0	–	–	–	–	–	2	11	28	28	28	26	0	–	–	–	–	–
OTB_MCF_1603	15	0	–	–	–	–	–	8	42	125	131	131	131	8	219	216	216	194	194	0	–	–	–	–	–
OTB_MCF_1604	10	1	16	47	47	47	47	6	66	147	147	147	147	4	97	128	128	78	78	0	–	–	–	–	–
OTB_MCF_1609	27	3	97	191	191	191	191	12	348	415	415	415	415	17	136	153	153	153	145	3	10	25	25	25	5
OTB_MCF_1703	28	3	14	116	116	116	116	14	259	508	508	508	508	12	316	311	311	311	311	0	–	–	–	–	–
OTB_MCF_1704	26	3	23	132	132	131	131	13	275	527	527	527	525	10	441	366	366	366	364	0	–	–	–	–	–
OTB_MCF_1707	3	0	–	–	–	–	–	0	0	0	0	0	0	3	11	13	13	13	9	1	0.7	1	1	1	1
OTB_MCF_1708	30	0	–	–	–	–	–	5	8	28	28	28	25	24	180	238	238	238	114	15	28	90	90	90	45

Table 6 - Inventory of metadata from cephalopod-finfish trawlers. Length samplings-Discarded Catch.

GENERAL		LENGTH - Discarded target species												LENGTH - Discarded other species			
FISHING TRIP	No. hauls discarded species were sampled for length	No. samples of HKB	Total weight of HKB sampled (kg)	No. individual HKB sampled (no. fish)	No. samples of HMZ	Total weight of HMZ sampled (kg)	No. individual HMZ sampled (no. fish)	No. samples of OCC	Total weight of OCC sampled (kg)	No. individual OCC sampled (no. fish)	No. samples of CVT	Total weight of CVT sampled (kg)	No. individual CVT sampled (no. fish)	No. of species measured for non target sampling	No. samples taken for measuring of non target species	Weight of non target species measured (kg)	No. of individual non target fish measured (no. fish)
OTB_MCF_1508	7	3	16	43	0	–	–	0	–	–	0	–	–	12	5	239	157
OTB_MCF_1603	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
OTB_MCF_1604	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
OTB_MCF_1609	7	4	1.1	25	0	–	–	0	–	–	0	–	–	45	7	32	665
OTB_MCF_1703	6	0	–	–	0	–	–	0	–	–	0	–	–	6	6	19	270
OTB_MCF_1704	5	0	–	–	0	–	–	0	–	–	0	–	–	5	5	10	250
OTB_MCF_1707	3	0	–	–	0	–	–	0	–	–	0	–	–	28	3	81	561
OTB_MCF_1708	6	0	–	–	1	0.67		0	–	–	0	–	–	8	6	21	135

Table 7 - Inventory of metadata from cephalopod-finfish trawlers. Biological samplings-Discarded Catch.

GENERAL		BIOLOGICAL SAMPLING- Discarded target species																						
FISHING TRIP	No. hauls discarded species were biologically sampled	No. samples of HKB	Total weight of HKB sampled (kg)	No. individuals sampled HKB				No. samples of HMZ	Total weight of HMZ sampled (kg)	No. individuals sampled HMZ				No. samples of OCC	Total weight of OCC sampled (kg)	No. individuals sampled OCC				No. samples of CVT	Total weight of CVT sampled (kg)	No. individuals sampled CVT			
				Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity
OTB_MCF_1508	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
OTB_MCF_1603	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
OTB_MCF_1604	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
OTB_MCF_1609	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
OTB_MCF_1703	1	1	1.3	10	10	10	10	–	–	–	–	–	–	0	–	–	–	–	–	0	–	–	–	–	–
OTB_MCF_1704	7	6	16.3	109	109	109	109	1	10.1	35	35	35	35	0	–	–	–	–	–	0	–	–	–	–	–
OTB_MCF_1707	1	0	-	-	-	-	-	1	0.5	3	3	3	2	0	–	–	–	–	–	2	1.9	17	17	17	1
OTB_MCF_1708	21	0	-	-	-	-	-	3	5.1	37	37	37	34	0	–	–	–	–	–	0	–	–	–	–	–

Table 8 - Inventory of metadata from cephalopod-finfish trawlers. Composition of discarded catch.

FISHING TRIP		COMPOSITION - All species		
	No. hauls where discard composition was sampled	Total weight of discarded samples (kg)	No. species	No. commercial species
OTB_MCF_1508	18	255.0	74	14
OTB_MCF_1603	4	0	50	23
OTB_MCF_1604	3	0	48	23
OTB_MCF_1609	7	33.5	63	17
OTB_MCF_1703	20	18.6	55	29
OTB_MCF_1704	21	9.6	59	26
OTB_MCF_1707	3	81.3	30	14
OTB_MCF_1708	27	21.3	87	51

ANNEX 4- INVENTORY OF THE OBSERVERS' METADATA FROM THE PELAGIC TRAWLERS FLEET (DCF)

Table 1- Inventory of metadata from pelagic trawlers. Trip details and operational details.

		TRIP DETAILS							OPERATIONAL DETAILS										
FISHING TRIP	YEAR	EEZ	Vessel Code	FLAG	Observer Code	Starting date	Final date	DURATION (fishing days)	No. Hauls	Proportion of hauls operational details recorded on (%)	Latitude min (decimal)	Latitude max (decimal)	Longitude min (decimal)	Longitude max (decimal)	Depth min (m)	Depth max (m)	Depth average (m)	Haul duration min (minutes)	Haul duration max (minutes)	Haul duration average (minutes)
SPF_01	2014	Mauritania	PT_004	NL	DLA	17/01/2014	16/02/2014	31	84	49	19.51	20.45	17.13	17.4	30	416	77	70	390	185
SPF_02	2014	Mauritania	PT_001	NL	HAR	31/01/2014	09/02/2014	10	39	46	20.13	20.45	17.22	17.39	50	90	66	30	290	163
SPF_03	2014	Mauritania	PT_002	NL	YES	11/02/2014	21/02/2014	11	25	56	19.57	20.48	17.25	17.37	60	416	73	70	135	238
SPF_04	2014	Mauritania	PT_001	NL	MCH	24/04/2014	05/05/2014	15	15	0	–	–	–	–	–	-	-	–	–	–
SPF_05	2014	Mauritania	PT_004	NL	SAH	06/06/2014	01/07/2014	25	62	47	17.24	20.45	16.24	17.39	35	1300	178	62	450	215
SPF_06	2014	Mauritania	PT_006	LV	DLA	27/08/2014	08/09/2014	19	42	67	20.16	20.46	17.16	17.44	35	260	128	110	560	273
SPF_07	2014	Mauritania	PT_007	LT	YOE	20/11/2014	14/12/2014	25	33	50	18.4	20.41	16.24	17.41	40	750	140	20	420	165
SPF_08	2016	Mauritania	PT_001	NL	AMA	04/02/2016	17/02/2016	14	30	41	19.25	20.46	16.53	17.39	25	140	68	35	755	200
SPF_09	2016	Mauritania	PT_003	NL	DLA & YOE	24/03/2016	06/04/2016	17	21	51	19.48	20.45	17.11	17.46	42	600	108	60	310	178
SPF_10	2016	Mauritania	PT_001	NL	MMM & SMA	28/03/2016	13/04/2016	17	32	41	20.1	20.46	14.12	17.38	35	100	71	15	285	157
SPF_11	2016	Mauritania	PT_003	NL	MML & MMM	20/05/2016	02/06/2016	14	39	54	16.11	20.45	16.24	17.59	60	1000	111	30	231	144
SPF_12	2016	Mauritania	PT_007	LT	MNO & DDI	07/06/2016	04/07/2016	28	80	40	17.49	20.47	16.37	17.54	110	1500	470	20	620	315
SPF_13	2016	Mauritania	PT_005	NL	SAH & MAH	17/06/2016	14/07/2016	28	59	41	19.34	20.45	17.02	17.49	50	300	145	110	1080	340
SPF_14	2017	Mauritania	PT_007	LT	HEV & SMA	18/04/2019	17/05/2019	30	105	51	16.05	20.47	16.25	17.45	45	1100	267	20	590	237

Table 2- Inventory of metadata from pelagic trawlers. Catch details, observer estimates and meteorological data.

	CATCH DETAILS									OBSERVER ESTIMATE			METEREOLOGICAL DATA
FISHING TRIP	Total retained catch (kg)	No. species retained catch	SAA retained weight (kg)	PIL retained weight (kg)	HMZ retained weight (kg)	VMA retained weight (kg)	Retained bycatch- main species (FAO Code)	Retained bycatch weight (kg)	Total discard (kg)	Proportion of hauls observer estimated total catch independently (%)	Proportion of hauls observer recorded incidental	Species-group-incidental bycatch (Marine mammals, Seabirds, Turtles)	Proportion of hauls meteorological data collected (%)
SPF_01	1301482	5	337505	939659	14049	6047	SAE	4222	513025	100	100	Marine mammals	0
SPF_02	1232616	4	151885	1041150	3893	35689		0	212308	100	0	–	0
SPF_03	727653	5	34715	429	788	37911	HOM	653810	105723	100	0	–	0
SPF_04	755250	3	32261	712614	0	10374		0	179710	100	0	–	0
SPF_05	324241	7	57300	202377	15521	43969	POA, SAE, HOM	5074	199282	100	0	–	0
SPF_06	498765	6	23016	0	348	229682	POA, HMY, BON	245719	164236	100	0	–	0
SPF_07	732906	8	0	0	109965	369956	HMY, POP, HOM, POA, VAD, HKB	252985	67775	100	0	–	0
SPF_08	740294	8	68	352251	333	59529	POA, VAD, HMY, HOM	328113	19375	100	0	–	0
SPF_09	253478	8	10651	127965	0	9177	FRI, POA,HKB, BFT, HOM	105685	90037	100	0	–	0
SPF_10	367850	5	0	345555	438	9223	BON, HOM	12634	37715	100	0	–	0
SPF_11	812576	8	260808	238460	123400	44460	FRI,VAD, SAE, LHT	145448	440687	100	0	–	0
SPF_12	906216	4	0	0	460082	105095	LHT, HOM	341039	176784	100	0	–	0
SPF_13	816809	5	0	23885	138373	323373	POA, HOM	331178	410504	100	0	–	0
SPF_14	772312	6	0	52881	248718	362559	POA, HKB, HOM	108154	136374	100	0	–	0

Table 3 - Inventory of metadata from pelagic trawlers. Length samplings-Retained Catch.

GENERAL		LENGTH-Target species												LENGTH - Retained non-target species
FISHING TRIP	No. hauls retained species were sampled for length	No. samples SAA	Total weight of SAA sampled (kg)	No. individual SAA sampled (no. fish)	No. samples PIL	Total weight of PIL sampled (kg)	No. individual PIL sampled (no. fish)	No. samples HMZ	Total weight of HMZ sampled (kg)	No. individual HMZ sampled (no. fish)	No. samples VMA	Total weight of VMA sampled (kg)	No. individual VMA sampled (no. fish)	No. of species measured for non target sampling
SPF_01	41	26	443	2285	45	941	8552	13	81	538	2	39	128	0
SPF_02	18	18	72	504	27	419	3891	2	1	12	7	16	79	0
SPF_03	14	6	38	174	11	27	670	3	4	68	9	70	371	0
SPF_04	15	3	24	222	15	501	3833	0	–	–	2	9	28	0
SPF_05	62	9	109	426	15	176	1264	7	71	348	10	107	311	0
SPF_06	42	3	20	218	0	–	–	7	79	493	11	386	2191	0
SPF_07	33	0	–	–	0	–	–	20	231	684	26	868	2610	0
SPF_08	15	1	1	6	0	–	–	1	2	12	11	67	208	0
SPF_09	21	4	22	87	12	190	1941	0	–	–	20	208	968	0
SPF_10	13	0	0	0	15	737	6855	1	4	36	7	33	109	0
SPF_11	21	14	50	341	12	136	692	9	39	349	2	5	34	0
SPF_12	32	0	–	–	0	–	–	20	652	2188	21	240	467	0
SPF_13	24	0	–	–	2	39	133	16	250	1155	18	488	1034	0
SPF_14	53	0	–	–	3	63	584	37	749	2732	39	951	2117	0

Table 4 – Inventory of metadata from pelagic trawlers. Biological samplings-Retained Catch.

GENERAL		BIOLOGICAL SAMPLING- Target species																					
FISHING TRIP	No. hauls retained species were biologically sampled	No. samples of SAA	Total weight of SAA sampled (kg)	No. individuals sampled SAA				No. samples of PIL	Total weight of PIL sampled (kg)	No. individuals sampled PIL				No. samples of HMZ	Total weight of HMZ sampled (kg)	No. individuals sampled HMZ				No. samples of VMA	Total weight of VMA sampled (kg)	No. individuals sampled VMA			
				Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity
SPF_01	41	16	81	416	416	416	416	34	90	828	828	828	828	8	24	146	146	146	146	4	21	75	75	75	75
SPF_02	18	4	10	48	48	48	48	18	48	441	441	441	441	0	–	–	–	–	–	0	–	–	–	–	–
SPF_03	6	1	4	14	14	14	14	3	6	55	55	55	55	0	–	–	–	–	–	2	5	25	25	25	25
SPF_04	0	0	–	–	–	–	–	0	–	–	–	–	–	0	–	–	–	–	–	0	–	–	–	–	–
SPF_05	5	2	18	60	60	60	60	2	12	88	88	88	88	0	–	–	–	–	–	0	–	–	–	–	–
SPF_06	27	3	18	60	60	60	60	0	–	–	–	–	–	5	26	142	142	142	142	12	50	282	282	282	282
SPF_07	17	0	–	–	–	–	–	4	16	117	117	117	117	0	–	–	–	–	–	6	114	172	172	172	172
SPF_08	11	0	–	–	–	–	–	6	19	180	180	180	180	0	–	–	–	–	–	1	6	30	30	30	30
SPF_09	21	2	15	59	59	59	59	10	19	183	183	183	183	0	–	–	–	–	–	8	21	128	128	128	128
SPF_10	13	0	0	0	0	0	0	8	27	240	240	240	240	1	4	30	30	30	30	4	21	120	120	120	120
SPF_11	14	1	4	30	30	30	30	6	25	180	180	180	180	3	10	90	90	90	90	2	37	60	60	60	60
SPF_12	22	0	–	–	–	–	–	0	–	–	–	–	–	8	61	215	215	215	215	4	75	120	120	120	120
SPF_13	10	0	–	–	–	–	–	1	5	30	30	30	30	3	22	90	90	90	90	4	45	120	120	120	120
SPF_14	33	0	–	–	–	–	–	3	10	90	90	90	90	11	90	330	330	330	330	11	124	313	313	313	313

Table 5 - Inventory of metadata from pelagic trawlers. Length samplings-Discarded Catch.

GENERAL		LENGTH - Discarded target species												LENGTH - Discarded non-target species
FISHING TRIP	No. hauls discarded species were sampled for length	No. samples of SAA	Total weight of SAA sampled (kg)	No. individual SAA sampled (no. fish)	No. samples of PIL	Total weight of PIL sampled (kg)	No. individual PIL sampled (no. fish)	No. samples of HMZ	Total weight of HMZ sampled (kg)	No. individual HMZ sampled (no. fish)	No. samples of VMA	Total weight of VMA sampled (kg)	No. individual VMA sampled (no. fish)	No. of species measured for non target sampling
SPF_01	41	35	89	653	31	312.0	3411	32	58	674	33	126	718	0
SPF_02	18	3	1	3	17	32	449	10	3	29	17	49	308	0
SPF_03	14	12	16	174	15	43	542	8	2	13	0	–	–	0
SPF_04	15	5	20	406	14	56	1211	0	–	–	12	35	667	0
SPF_05	62	9	31	286	17	98	1154	9	31	248	18	80	523	0
SPF_06	42	12	19	67	0	–	–	15	29	277	19	65	505	0
SPF_07	33	3	1	3	7	64	424	6	9	184	5	92	791	0
SPF_08	15	0	–	–	1	20	155	1	1	3	0	–	–	0
SPF_09	21	6	18	263	16	44	665	3	1	58	16	95	970	0
SPF_10	13	1	2	39	0	–	–	0	–	–	12	147	1139	0
SPF_11	21	2	2	74	3	57	186	2	11	54	17	300	2365	0
SPF_12	32	0	0	0	0	–	–	2	1	3	3	1	2	0
SPF_13	24	1	17	254	0	–	–	7	6	35	17	218	1201	0
SPF_14	53	0	–	–	3	14	280	24	72	684	30	106	1102	0

Table 6 - Inventory of metadata from pelagic trawlers. Biological samplings-Discarded Catch.

GENERAL		BIOLOGICAL SAMPLING - Discarded target species																							
FISHING TRIP	No. hauls discarded species were biologically sampled	No. samples of SAA	Total weight of SAA sampled (kg)	No. individuals sampled SAA				No. samples of PIL	Total weight of PIL sampled (kg)	No. individuals sampled PIL				No. samples of HMZ	Total weight of HMZ sampled (kg)	No. individuals sampled HMZ				No. samples of VMA	Total weight of VMA sampled (kg)	No. individuals sampled VMA			
				Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity			Length	Weight	Sex	Maturity
SPF_01	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_02	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_03	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_04	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_05	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_06	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_07	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_08	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_09	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_10	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_11	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_12	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SPF_13	1	1	2	30	30	30	30	0	–	–	–	–	–	0	–	–	–	–	–	0	–	–	–	–	–
SPF_14	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 7 - Inventory of metadata from pelagic trawlers. Composition of discarded catch.

FISHING TRIP	DISCARDS COMPOSITION			
	No. hauls where discards composition was sampled	Total weight of discards samples (kg)	No. species	No. commercial species
SPF_01	41	672	18	4
SPF_02	18	94	10	4
SPF_03	14	145	13	4
SPF_04	15	131	8	3
SPF_05	62	322	9	4
SPF_06	42	404	45	3
SPF_07	33	278	21	3
SPF_08	15	8	12	1
SPF_09	21	298	23	3
SPF_10	13	178	6	2
SPF_11	21	322	8	3
SPF_12	32	283	20	2
SPF_13	24	662	28	3
SPF_14	53	464	20	2

ANNEX 5- INVENTORY OF METADATA AVAILABLE UNDER THE SFPA OBSERVER PROGRAMMES

Table 1.a- Inventory of metadata available on the black hake trawlers fleet. Trip details and vessels and operational details.

FISHING REPORT	TRIP DETAILS											VESSELS AND OPERATIONAL DETAILS				
	No Fishing trips reported	EEZ	Flag	YEAR	Vessel Code	Observer Code	Starting date	Final date	DURATION ONBOARD (fishing days)	FISHING TRIP DURATION (fishing days)	Has the observer been onboard the length of the fishing trip? (Y/N)	Vessels characteristics recorded (Y/N)	Fishing gear recorded (Y/N)	Fishing gear particulars recorded including mesh sizes (Y/N)	No. Hauls (Y/N)	% of hauls with vessel positions recorded
Black hake trawler (Fresh)_Senegal_1	6	SENEGAL	SPAIN	2015	BHT_004	ASN	19/03/2015	17/05/2015	52	9	Y	Y	Y	Y	Y	100
Black hake trawler (Fresh)_Senegal_2	2	SENEGAL	SPAIN	2015	BHT_004	SAO	18/05/2015	03/06/2015	15	8	Y	Y	Y	Y	Y	100
Black hake trawler (Fresh)_Senegal_3	8	SENEGAL	SPAIN	2015	BHT_004	NDA	11/08/2015	05/10/2015	51	6	Y	Y	Y	Y	Y	100
Black hake trawler (Fresh)_Senegal_4	6	SENEGAL	SPAIN	2015	BHT_004	CHD	05/10/2015	17/11/2015	41	7	Y	Y	Y	Y	Y	100
Black hake trawler (Fresh)_Senegal_5	1	SENEGAL	SPAIN	2016	BHT_004	LID	28/03/2016	02/04/2016	4	4	Y	Y	Y	Y	Y	100
Black hake trawler (Fresh)_Senegal_6	1	SENEGAL	SPAIN	2017	BHT_004	MAN	27/03/2017	01/04/2017	3	3	Y	Y	Y	Y	Y	100
Black hake trawler (Freezer)_Senegal_1	1	SENEGAL	SPAIN	2015	BHT_004C	ASN	08/10/2015	06/11/2015	27	27	Y	Y	Y	Y	Y	100
Black hake trawler (Freezer)_Senegal_2	1	SENEGAL	SPAIN	2016	BHT_004C	MON	19/12/2016	24/01/2017	34	34	Y	Y	Y	Y	Y	100
Black hake trawler (Freezer)_Senegal_3	1	SENEGAL	SPAIN	2018	BHT_001C	MAN	17/09/2018	01/10/2018	14	14	NA	Y	Y	Y	Y	100
Black hake trawler (Freezer)_Senegal_4	1	SENEGAL	SPAIN	2018	BHT_004C	MOG	06/12/2018	23/12/2018	6	6	NA	Y	Y	Y	Y	100

Table 1.b- Inventory of metadata available on the black hake trawlers fleet. Catch data, biological sampling and comments.

FISHING REPORT	CATCH DATA								BIOLOGICAL SAMPLING	COMMENT
	Total retained catch weight (Y/N)	Retained target species weight (Y/N)	Retained bycatch species weight (Y/N)	No. species retained catch recorded (Y/N)	Retained target species (FAO Code, in order of abundance)	Retained bycatch-main species names recorded (Y/N)	Total discard weight (Y/N)	Aggregation level columns Q-->W - By fishing trip - By fishing haul - Both	Biological sampling perfomed (Y/N)	Give additional relevent comments
Black hake trawler (Fresh)_Senegal_1	Y	Y	Y	Y	HKX	Y	Y	By fishing haul	N	Unreadable information on paper.
Black hake trawler (Fresh)_Senegal_2	Y	Y	Y	Y	HKX	Y	Y	By fishing haul	N	
Black hake trawler (Fresh)_Senegal_3	Y	Y	Y	Y	HKX	Y	Y	Both	N	
Black hake trawler (Fresh)_Senegal_4	Y	Y	Y	Y	HKX	Y	Y	By fishing haul	N	
Black hake trawler (Fresh)_Senegal_5	Y	Y	Y	Y	HKX	Y	Y	Both	N	
Black hake trawler (Fresh)_Senegal_6	Y	Y	Y	Y	HKX	Y	Y	Both	N	
Black hake trawler (Freezer)_Senegal_1	Y	Y	Y	Y	HKX	Y	Y	Both	N	Information recorded is from the "observer fishing-trip", being the same than the vessel fishing trip, as known from Spanish logbooks.
Black hake trawler (Freezer)_Senegal_2	Y	Y	Y	Y	HKX	Y	Y	Both	N	
Black hake trawler (Freezer)_Senegal_3	Y	Y	Y	Y	HKX	Y	Y	Both	N	Information recorded is from the "observer fishing-trip", being shorther than the vessel fishing trip (duration known from Spanish logbooks) .
Black hake trawler (Freezer)_Senegal_4	Y	Y	Y	Y	HKX	Y	Y	Both	N	Information recorded is from the "observer fishing-trip", but the correspondance with the vessel fishing trip is unknown.

Table 2.a- Inventory of metadata available on the bottom longliners fleet. Trip details and vessels and operational details.

FISHING REPORT	TRIP DETAILS										VESSELS AND OPERATIONAL DETAILS				
	No Fishing trips reported	EEZ	Flag	YEAR	Vessel Code	Observer Code	Starting date	Final date	DURATION (dishing days)	Has the observer been onboard the length of the fishing trip? (Y/N)	Vessels characteristics recorded (Y/N)	Fishing gear recorded (Y/N)	Fishing gear particulars recorded including mesh sizes (Y/N)	No. Hauls (Y/N)	% of hauls with vessel positions recorded
Bottom longliner_Morocco_1	1	MOROCCO	PORTUGAL	2017	LL_001	EKR	20/10/2017	25/10/2017	6	Y	Y	N	N	N	0

Table 2.b- Inventory of metadata available on the bottom longliners fleet. Catch data, biological sampling and comments.

FISHING REPORT	CATCH DATA								BIOLOGICAL SAMPLING	COMMENT
	Total retained catch weight (Y/N)	Retained target species weight (Y/N)	Retained bycatch species weight (Y/N)	No. species retained catch recorded (Y/N)	Retained target species (FAO Code, in order of abundance)	Retained bycatch- main species names recorded (Y/N)	Total discard weight (Y/N)	Aggregation level columns Q-->W - By fishing trip - By fishing haul - Both	Biological sampling perfomed (Y/N)	Give additional relevent comments
Bottom longliner_Morocco_1	Y	N	N	N	CGZ, ZEX, HKX, PAX, etc.	N	Y	By fishing trip	N	Very limited information on vessel characteristics. Only some common names of caugth species could be interpreted. Two species reported in discards.

Table 3.a- Inventory of metadata available on the pelagic trawlers fleet. Trip details and vessels and operational details (1 of 2).

FISHING REPORT	TRIP DETAILS										VESSELS AND OPERATIONAL DETAILS				
	No Fishing trips reported *	EEZ	FLAG	YEAR	Vessel Code	Observer Code	Starting date	Final date	DURATION (days at sea)	Has the observer been onboard the length of the fishing trip? (Y/N)	Vessels characteristics recorded (Y/N)	Fishing gear recorded (Y/N)	Fishing gear particulars recorded including mesh sizes (Y/N)	No. Hauls (Y/N)	% of hauls with vessel positions recorded
Pelagic trawler_Morocco_1	1	MOROCCO	LV	2015	SPT_013	AFA	10/10/2015	26/11/2015	47	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_2	1	MOROCCO	LT	2016	SPT_007	HZI	NA	NA	NA	NA	Y	Y	Not precise info (> 40 mm)	N	0
Pelagic trawler_Morocco_3	1	MOROCCO	LV	2016	SPT_013	SOU	20/07/2016	28/10/2016	100	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_4	1	MOROCCO	NL	2016	SPT_003	AFA	03/10/2016	20/10/2016	17	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_5	1	MOROCCO	NL	2016	SPT_003	NAH	21/10/2016	03/11/2016	13	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_6	1	MOROCCO	PL	2016	SPT_009	AFA	20/10/2016	20/12/2016	61	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_7	1	MOROCCO	NL	2016	SPT_003	HZI	NA	NA	NA	NA	Y	Y	Not precise info (> 40 mm)	N	0
Pelagic trawler_Morocco_8	1	MOROCCO	LT	2016	SPT_012	MAH	09/12/2016	28/12/2016	19	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_9	1	MOROCCO	LT	2016	SPT_007	SOU	10/12/2016	30/12/2016	20	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_10	1	MOROCCO	PL	2017	SPT_009	ABO	18/02/2017	20/03/2017	30	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_11	1	MOROCCO	NL	2017	SPT_003	ALA	08/03/2017	22/03/2017	14	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_12	1	MOROCCO	LT	2017	SPT_012	AEJ	01/03/2017	03/05/2017	63 (55 fd)	NA	Y	Y	Not precise info (> 40 mm)	Y	0
Pelagic trawler_Morocco_13	1	MOROCCO	NL	2017	SPT_003	MAT	02/04/2017	24/04/2017	22	NA	Y	Y	Y	N	0

* Information recorded is from the "observer fishing-trip", but the correspondence with the vessel fishing is unknown.

Table 3.a- Inventory of metadata available on the pelagic trawlers fleet. Trip details and vessels and operational details (2 of 2).

	TRIP DETAILS										VESSELS AND OPERATIONAL DETAILS				
FISHING REPORT	No Fishing trips reported *	EEZ	FLAG	YEAR	Vessel Code	Observer Code	Starting date	Final date	DURATION (days at sea)	Has the observer been onboard the length of the fishing trip? (Y/N)	Vessels characteristics recorded (Y/N)	Fishing gear recorded (Y/N)	Fishing gear particulars recorded including mesh sizes (Y/N)	No. Hauls (Y/N)	% of hauls with vessel positions recorded
Pelagic trawler_Morocco_14	1	MOROCCO	NL	2017	SPT_008	OIS	11/04/2017	16/05/2017	35	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_15	1	MOROCCO	NL	2017	SPT_003	RME	02/05/2017	02/06/2017	31	NA	Y	N	N	N	0
Pelagic trawler_Morocco_16	1	MOROCCO	NL	2017	SPT_003	AFA	08/06/2017	03/07/2017	25	NA	Y	Y	Not precise info (> 45 mm)	N	0
Pelagic trawler_Morocco_17	1	MOROCCO	NL	2017	SPT_008	AAZ	29/06/2017	16/07/2017	17	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_18	1	MOROCCO	LV	2017	SPT_014	ABO	23/06/2017	08/08/2017	46	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_19	1	MOROCCO	LV	2017	SPT_010	AEJ	06/07/2017	31/08/2017	56 (49 fd)	NA	Y	N	Not precise info (> 40 mm)	Y	0
Pelagic trawler_Morocco_20	1	MOROCCO	LT	2017	SPT_007	MAH	14/07/2017	10/11/2017	119	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_21	1	MOROCCO	LT	2017	SPT_012	RME	04/08/2017	10/12/2017	128	NA	Y	Y	Not precise info (> 40 mm)	N	0
Pelagic trawler_Morocco_22	1	MOROCCO	LV	2017	SPT_014	ALA	08/08/2017	17/10/2017	70	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_23	1	MOROCCO	NL	2017	SPT_001	AEJ	14/09/2017	17/10/2017	33 (19 fd)	NA	Y	N	Not precise info (> 40 mm)	Y	0
Pelagic trawler_Morocco_24	1	MOROCCO	NL	2017	SPT_008	AAZ	29/06/2017	16/07/2017	17	NA	Y	Y	Y	N	0
Pelagic trawler_Morocco_25	1	MOROCCO	LT (reported as RU)	2017	SPT_012	RRA	10/12/2017	21/12/2017	11	NA	Y	Y	Not precise info (> 45 mm).	N	0
Pelagic trawler_Morocco_26	1	MOROCCO	DE	2018	SPT_011	BFA	13/01/2018	09/02/2018	27	NA	Y	Y	Y	N	0

* Information recorded is from the "observer fishing-trip", but the correspondence with the vessel fishing is unknown.

Table 3. b- Inventory of metadata available on the pelagic trawlers fleet. Catch data, biological sampling and comments (1 of 2).

FISHING REPORT	CATCH DATA								BIOLOGICAL SAMPLING	COMMENT
	Total retained catch weight (Y/N)	Retained target species weight (Y/N)	Retained bycatch species weight (Y/N)	No. species retained catch recorded (Y/N)	Retained target species (FAO Code, in order of abundance)	Retained bycatch-main species names recorded (Y/N	Total discard weight (Y/N)	Information aggregation level - By fishing trip - By fishing haul - Both	Biological sampling perfomed (Y/N)	Additional information recorded or additional relevent comments
Pelagic trawler_Morocco_1	Y	Y (in %)	Y	Y	MAZ, JAX, PIL	N	Y	By fishing trip	N	Names of main discard group of species.
Pelagic trawler_Morocco_2	Y	Y	Y	N	JAX, MAZ, PIL, SIX	N	Y	By fishing trip	N	
Pelagic trawler_Morocco_3	Y	Y	Y (in %)	Y	MAZ, JAX, PIL, SIX	Y	Y	By fishing trip	N	Names of main retained bycatch and discard species or group of species.
Pelagic trawler_Morocco_4	Y	Y	Y	N	PIL, MAZ, JAX, SIX	N	N	By fishing trip	N	Names of main discard group of species.
Pelagic trawler_Morocco_5	Y	Y	Y	N	PIL, MAZ, JAX, SIX	N	Y	By fishing trip	N	
Pelagic trawler_Morocco_6	Y	Y	Y	N	MAZ, PIL, JAX, SIX	N	N	By fishing trip	N	
Pelagic trawler_Morocco_7	Y	Y	Y	N	PIL, MAZ, JAX	N	N	By fishing trip	N	
Pelagic trawler_Morocco_8	Y	Y	Y	N	MAZ, JAX, PIL, SIX	Y	Y	By fishing trip	N	Names of main retained bycatch and discard species or group of species.
Pelagic trawler_Morocco_9	Y	Y	Y	N	MAZ, JAX, PIL, SIX	N	Y	By fishing trip	N	Names of main retained bycatch and discard species or group of species.
Pelagic trawler_Morocco_10	Y	Y	Y	N	MAZ, JAX	N	Y	By fishing trip	N	Names of main retained bycatch and discard species or group of species.
Pelagic trawler_Morocco_11	Y	Y	Y	Y	PIL, MAZ, SIX, JAX	Y	Y	By fishing trip	N	Names of main retained bycatch and discard species or group of species.
Pelagic trawler_Morocco_12	Y	Y	Y	N	JAX, MAZ	N	Y	By fishing trip	N	Fishing days, total fishing time, most frequent fishing zones.
Pelagic trawler_Morocco_13	Y	Y	Y	Y	PIL, MAZ, SIX, JAX	Y	Y	By fishing trip	N	Names of main retained bycatch and discard species or group of species.

Table 3. b- Inventory of metadata available on the pelagic trawlers fleet. Catch data, biological sampling and comments (2 of 2).

FISHING REPORT	CATCH DATA								BIOLOGICAL SAMPLING	COMMENT
	Total retained catch weight (Y/N)	Retained target species weight (Y/N)	Retained bycatch species weight (Y/N)	No. species retained catch recorded (Y/N)	Retained target species (FAO Code, in order of abundance)	Retained bycatch-main species names recorded (Y/N	Total discard weight (Y/N)	Aggregation level columns Q-->W - By fishing trip - By fishing haul - Both	Biological sampling perfomed (Y/N)	Additional information recorded or additional relevent comments
Pelagic trawler_Morocco_14	Y	Y	Y	Y	PIL, SIX, MAZ, JAX	Y	Y	By fishing trip	N	Weight of discards by species.
Pelagic trawler_Morocco_15	Y	Y	Y	Y	PIL, JAX, MAZ, SIX	N	Y	By fishing trip	N	
Pelagic trawler_Morocco_16	Y	Y	Y	N	PIL, MAZ, SIX, JAX	N	N	By fishing trip	N	
Pelagic trawler_Morocco_17	Y	Y	Y	Y	JAX, MAZ	Y	Y	By fishing trip	N	Names of main retained bycatch group of species.
Pelagic trawler_Morocco_18	Y	Y	Y	N	JAX, MAZ	N	Y	By fishing trip	N	Names of main retained bycatch and discard species or group of species.
Pelagic trawler_Morocco_19	Y	Y	Y	N	JAX, MAZ	N	Y	By fishing trip	N	Fishing days, total fishing time, most frequent fishing zones.
Pelagic trawler_Morocco_20	Y	Y	Y	Y	MAZ, JAX	Y	Y	By fishing trip	N	Names of main retained bycatch and discard species or group of species.
Pelagic trawler_Morocco_21	Y	Y	Y	N	MAZ, JAX, PIL, SIX	N	Y	By fishing trip	N	
Pelagic trawler_Morocco_22	Y	Y	Y	Y	MAZ, JAX	Y	Y	By fishing trip	N	Names of main retained bycatch and discard species or group of species.
Pelagic trawler_Morocco_23	Y	Y (in %)	Y (in %)	N	MAZ, JAX, PIL, SIX	N	Y	By fishing trip	N	Fishing days, total fishing time, most frequent fishing zones.
Pelagic trawler_Morocco_24	Y	Y (in %)	Y (in %)	N	JAX, MAZ	Y	Y	By fishing trip	N	Names of main retained bycatch species or group of species.
Pelagic trawler_Morocco_25	Y	Y	Y	N	MAZ, JAX	Y	Y	By fishing trip	N	Names of main retained bycatch and discard group of species.
Pelagic trawler_Morocco_26	Y	Y (in %)	Reported as 0.	Y	PIL, SIX, MAZ, JAX	Reported as 0.	Y	By fishing trip	N	Names of main discard group of species.

ANNEX 6- FISHING AREAS (FISHING STATIONS WITH DCF OBSERVERS)

Figures 1 to 7 show the fishing stations recorded by observers by fleet and fishing ground for the period considered.

Shrimper fleet

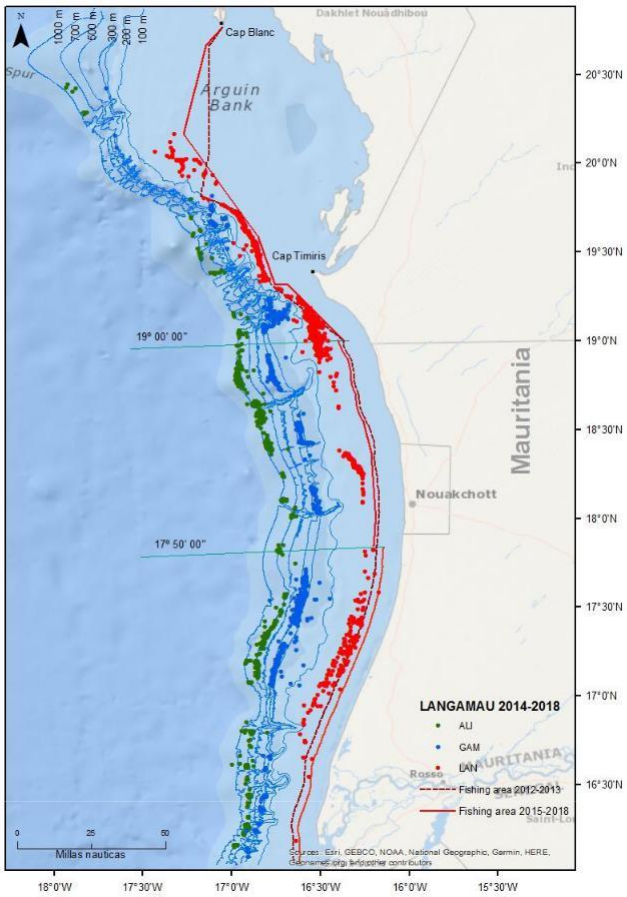

Figure 1. Shrimpers fishing stations with observers in Mauritania in 2014-2018. LAN hauls are indicated in red, GAM hauls in blue and ALI hauls in green.

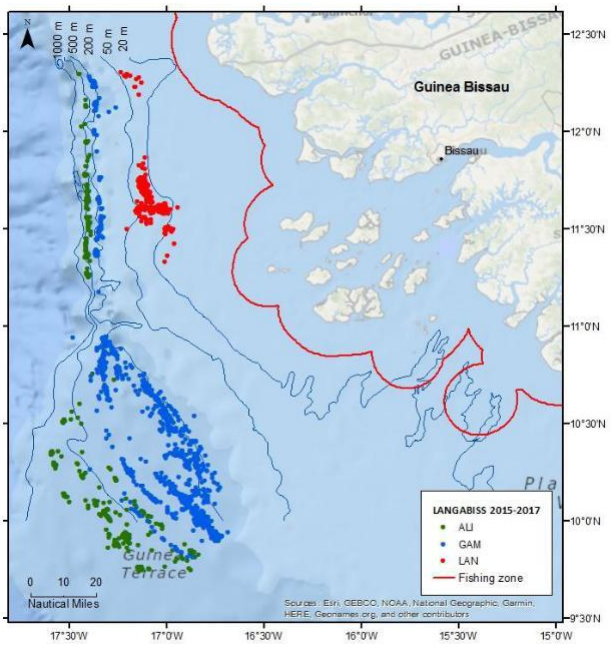

Figure 2. Shrimpers fishing stations with observers in Guinea-Bissau in 2015-2017. LAN hauls are indicated in red, GAM hauls in blue and ALI hauls in green.

Black hake trawlers

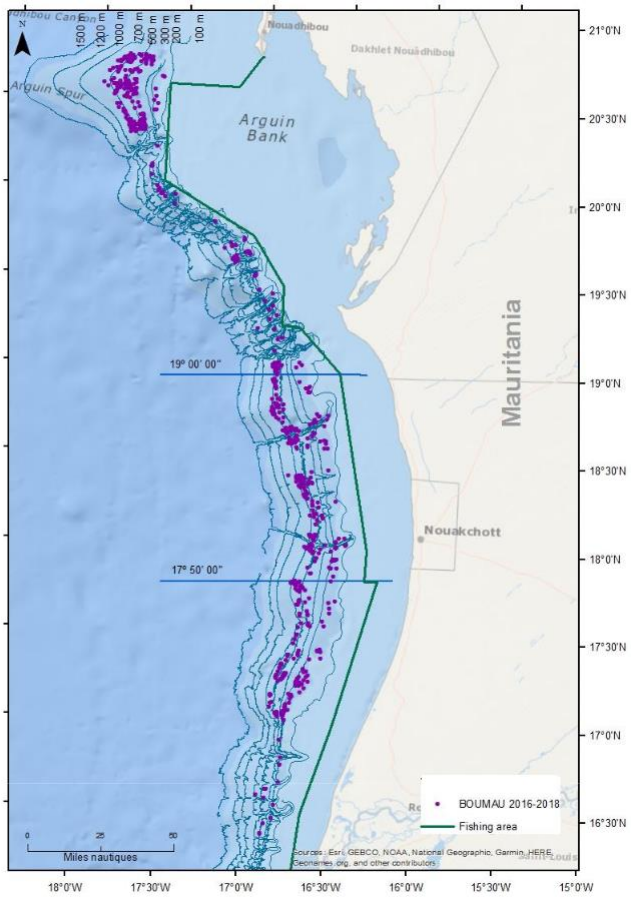

Figure 3. Black-hake trawlers fishing stations with observers in Mauritania. 2016-2018.

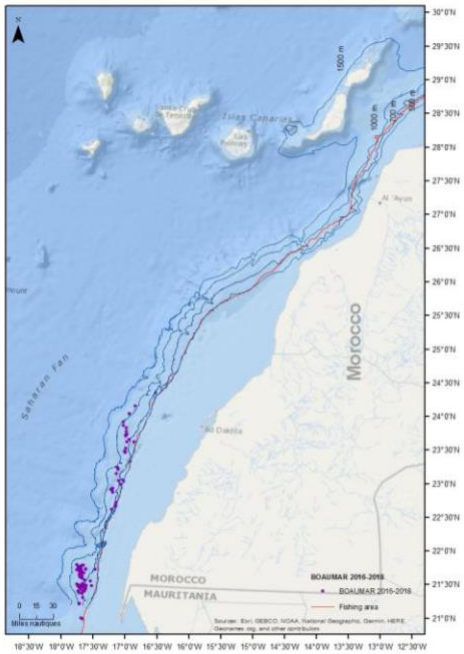

Figure 4. Black-hake trawlers fishing stations with observers in Morocco. 2016-2018.

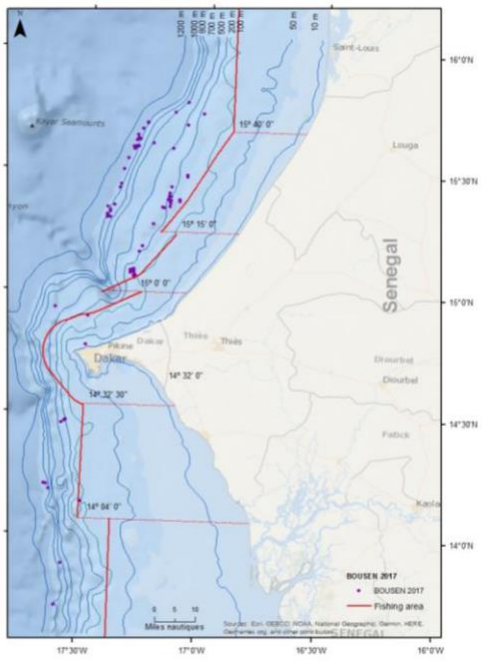

Figure 5. Black-hake trawlers fishing stations with observers in Senegal. 2017.

Cephalopod-fin fish trawlers

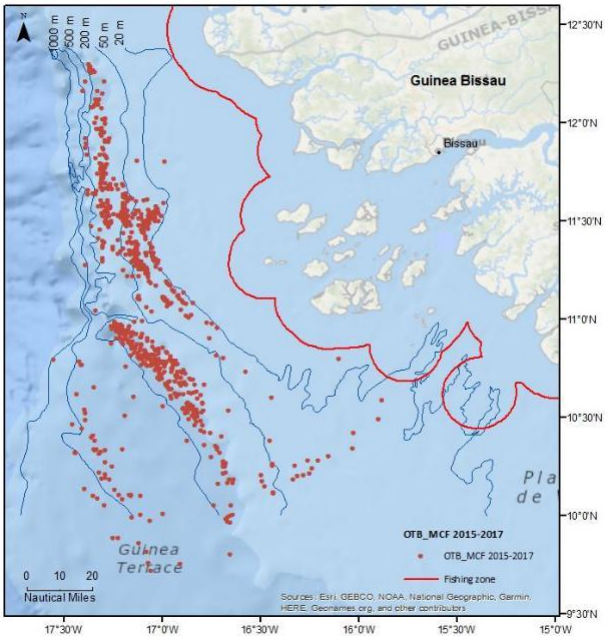

Figure 6. Cephalopod-finfish trawlers fishing stations with observers in Guinea-Bissau in 2015-2017.

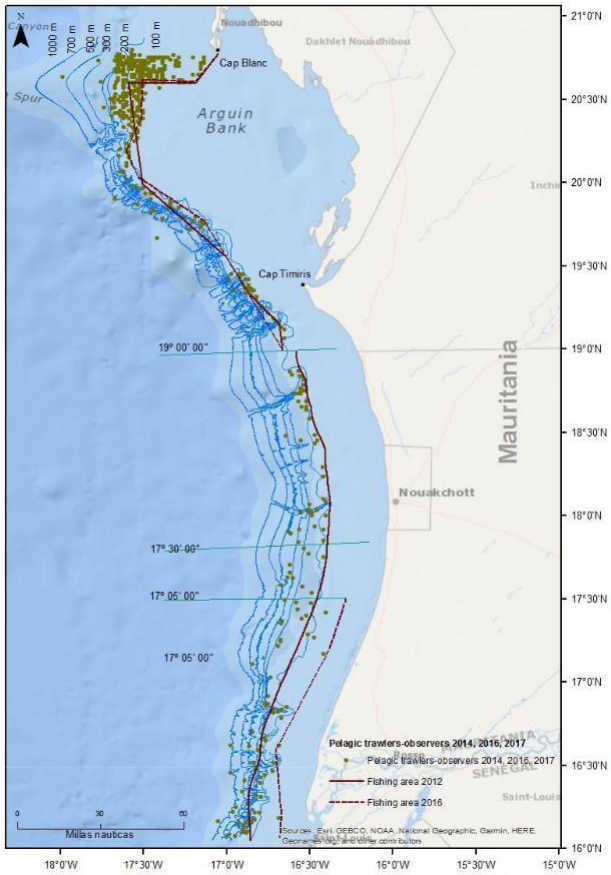

Figure 7. Pelagic trawlers fishing stations with observers in Mauritania in 2014, 2016 and 2017.

ANNEX 7- MAIN BY-CATCH SPECIES BY TYPE OF FLEET

Table 1. Percentage of occurrence of retained by-catch species in all fishing trips of the shrimper trawler in each fishing ground.

FAO-CODE	Species	Total	Mauritania	Guinea-Bissau
MVA	*Lophius vaillanti*	82%	86%	75%
CGE	*Chaceon maritae*	45%	71%	–
OCC	*Octopus vulgaris*	45%	71%	–
GFU	*Glyphus marsupialis*	41%	64%	–
SSH	*Aristaeopsis edwardsiana*	27%	–	75%
SQR	*Loligo vulgaris*	14%	21%	–
GOA	*Pseudupeneus prayensis*	9%	–	25%
PVJ	*Plesionika narval*	5%	–	13%
TGS	*Penaeus kerathurus*	5%	–	13%
GIT	*Penaeus monodon*	5%	–	13%
YOX	*Cynoglossus spp*	5%	–	13%

Table 2. Percentage of occurrence of retained by-catch species in all fishing trips of the black hake trawlers ('fresh' and freezer fleet), by fishing ground and for the total zone.

FAO-CODE	Species	'fresh' fleet			Freezer fleet
		Total	Mauritania	Morocco	Total
MVA	*Lophius vaillanti*	100%	100%	100%	67%
SKA	*Raja* spp	61%	59%	67%	–
SHX	*Squaliformes*	58%	59%	50%	–
GUQ	*Centrophorus squamosus*	45%	37%	83%	–
JOD	*Zeus faber*	39%	48%	–	–
TZY	*Trachyscorpia cristulata*	36%	22%	100%	–
DEA	*Dentex angolensis*	30%	37%	–	–
JOS	*Zenopsis conchifer*	24%	30%	–	67%
BRF	*Helicolenus dactylopterus*	15%	11%	33%	67%
GUP	*Centrophorus granulosus*	12%	15%	–	–
BRD	*Brotula barbata*	9%	11%	–	33%
EZS	*Scorpaena elongate*	9%	11%	–	–
GXW	*Gephyroberyx darwinii*	6%	7%	–	–
JAX	*Trachurus* spp	6%	7%	–	33%
CYO	*Centroscymnus coelolepis*	6%	7%	–	–
RJB	*Dipturus batis*	6%	4%	17%	–
RJO	*Dipturus oxyrinchus*	6%	–	33%	–
DEL	*Dentex macrophthalmus*	3%	4%	–	–
HOM	*Trachurus trachurus*	3%	4%	–	–
UAE	*Brachiostegus semifasciatus*	3%	4%	–	–
HMZ	*Trachurus trecae*	3%	4%	–	–
UCA	*Umbrina canariensis*	3%	4%	–	–
RFL	*Raja straeleni*	3%	4%	–	–
CYP	*Centroscymnus crepidater*	3%	4%	–	–
CPU	*Centrophorus uyato*	3%	4%	–	–
HKE	*Merluccius merluccius*	3%	–	17%	–
TDQ	*Toradopsis eblanae*	–	–	–	67%
SQE	*Todarodes sagittatus*	–	–	–	33%
SVG	*Setarches guentheri*	–	–	–	33%
DEX	*Dentex* spp	–	–	–	33%

Table 3. Percentage of occurrence of main retained by-catch species in all fishing trips of the cephalopod-finfish fleet in Guinea-Bissau.

FAO-CODE	Species	Guinea-Bissau
BRD	*Brotula barbata*	75%
UCA	*Umbrina canariensis*	50%
DEA	*Dentex angolensis*	37%
GOA	*Pseudupeneus prayensis*	25%
LHT	*Trichiurus lepturus*	25%
SCS	*Scorpaena* spp	25%
YGL	*Syacium guineensis*	25%
AWJ	*Arius parkii*	13%
CIL	*Citharus linguatula*	13%
CKL	*Pseudotolithus senegallus*	13%
DEM	*Dentex maroccanus*	13%
DHZ	*Dicologlossa hexophthalma*	13%
GAL	*Galeoides decadactylus*	13%
JOS	*Zenopsis conchifer*	13%
MVA	*Lophius vaillanti*	13%
OCM	*Eledone* sp	13%
OMZ	*Ommastrephidae*	13%
PQR	*Priacanthus arenatus*	13%
QZU	*Spicara alta*	13%
SFS	*Lepidopus caudatus*	13%
SVV	*Scorpaena stephanica*	13%
YOE	*Cynoglossus senegalensis*	13%
YOX	*Cynoglossus* spp	13%

ANNEX 8- ANALYSES OF LENGTH SAMPLINGS FROM DCF OBSERVERS

Tables 1 to 4 show the mean weights of the sampled target species by fishing trip and for each fleet (maximum, minimum and average values). These were calculated as the ration between the values registered for sample weights and the number of sampled individuals from the retained catch.

Table 1. Number of individuals and mean weight of SOP and DPS sampled by observers on shrimper trawlers, by fishing trip.

FISHING GROUND		No. individual SOP sampled (no. ind)	SOP mean wt. (g)	No. individual DPS sampled (no. ind)	DPS mean wt. (g)
All	Min	34	19.1	186	4.5
	Max	4769	44	12293	8.3
	Mean	1007	27.4	3530	7.2
MRT	Min	34	19.1	186	4.5
	Max	4769	44	9146	8.3
	Mean	1052	26.5	3193	7.1
GNB	Min	345	35.7	325	5.5
	Max	1041	37.3	12293	8.2
	Mean	693	36.9	4120	7.4

Table 2. Number of individuals and mean weight of HKB and HKM sampled by observers on black hake trawlers, by fishing trip.

FISHING GROUND		No. individual HKB sampled (no. ind)	HKB mean wt. (g)	No. individual HKM sampled (no. ind)	HKM mean wt. (g)
All	Min	141	415	0	447
	Max	1461	1230	623	1820
	Mean	670	839	547	813
MAR	Min	141	819	0	598
	Max	1195	1115	663	1157
	Mean	741	981	168	862
MRT	Min	237	475	0	477
	Max	1461	1230	623	1820
	Mean	637	825	160	817
SEN*	Min	–	–	–	–
	Max	–	–	–	–
	Mean	1211	415	23	447

*Only one fishing trip.

Table 3. Number of individuals and mean weight of HKB, HMZ, OCC and CVT sampled by observers on cephalopod-finfish trawlers in Guinea-Bissau, by fishing trip.

Fishing ground		No. individual HKB sampled (no. ind)	HKB mean wt. (g)	No. individual HMZ sampled (no. ind)	HMZ mean wt. (g)	No. individual OCC sampled (no. ind)	OCC mean wt. (g)	No. individual CVT sampled (no. ind)	CVT mean wt. (g)
GNB	Min	0	141	0	256	0	426	0	287
	Max	520	503	890	838	1090	1146	452	377
	Mean	142	319	455	567	215	805	84	337

Table 4. Number of individuals and mean weight of HKB and HKM sampled by observers on cephalopod-finfish trawlers, by fishing trip.

Fishing ground		No. individual SAA sampled (no. ind)	SAA mean wt. (g)	No. individual PIL sampled (no. ind)	PIL mean wt. (g)	No. individual HMZ sampled (no. ind)	HMZ mean wt. (g)	No. individual VMA sampled (no. ind)	VMA mean wt. (g)
MRT	Min	0	92	0	40	0	59	28	147
	Max	2285	256	8552	293	2732	338	2610	514
	Mean	305	175	2030	133	615	181	761	307

ANNEX 9- COVERAGE OF LENGTH AND BIOLOGICAL SAMPLING OF RETAINED AND DISCARDED CATCH

Retained catch: length sampling → Table 1 to Table 6 summarise all the hauls where retained target species were sampled for length, by minimum, maximum and mean values by fishing trip, for each fishing ground and over the fishery as a whole. The proportion of hauls sampled for length is given, together with the proportion of hauls in which each target species was sampled. For each target species and fleet, weight of the sampled species in relation to its total catch was estimated (%). Average weights and the numbers of individuals of each sample were provided.

Table 1. Shrimper trawlers – Retained catch length sampling.

Fishing ground		% hauls sampled	LAN				GAM				% wt. sampled non-target
			% hauls SOP sampled	% weight SOP sampled	SOP sample mean wt. (kg)	No. SOP per sample	% hauls DPS sampled	% weight DPS sampled	DPS sample mean wt. (kg)	No. DPS per sample	
All	Min	3%	1%	0.07%	0.7	18	6%	0.03%	0.4	67	0%
	Max	35%	27%	4%	9.7	397	32%	1.89%	3.4	436	16%
	Mean	16%	14%	1%	2.5	90	17%	0.32%	1.4	191	4%
MRT	Min	3%	1%	0.07%%	1.3	34	6%	0.04%	0.5	93	0%
	Max	16%	27%	4%	9.7	397	29%	0.75%	3.4	436	11%
	Mean	11%	10%	1%	3.6	135	15%	0.26%	1.6	219	4%
GNB	Min	6%	21%	0.43%	0.7	18	7%	0.03%	0.4	67	0%
	Max	35%	26%	0.66%	0.9	27	32%	1.89%	2.3	305	16%
	Mean	23%	25%	0.55%	0.7	20	19%	0.43%	1.2	162	5%

Table 2. Black hake trawlers – Retained catch length sampling.

Fishing ground		% hauls sampled	% hauls HKB sampled	% weight HKB sampled	HKB sample mean wt. (kg)	No. HKB per sample	% hauls HKM sampled	% weight HKM sampled	HKM sample mean wt. (kg)	No. HKM per sample	% wt. sampled non-target
All	Min	17%	9%	0.85%	8	17	0%	0%	1	1	0%
	Max	77%	61%	6.63%	140	200	50%	52.28%	65	115	21.42%
	Mean	48%	35%	2.00%	83	98	18%	6.36%	32	41	5.12%
MRT	Min	17%	9%	0.85%	8	17	0%	0%	1	1	0%
	Max	77%	61%	6.63%	140	200	46%	52.28%	65	115	21.4%
	Mean	46%	32%	1.74%	85	103	16%	5.94%	33	45	5.20%
MAR	Min	50%	38%	1.13%	50	47	0%	0.00%	8	13	1.27%
	Max	59%	59%	6.32%	124	119	50%	17.34%	56	63	12.47%
	Mean	54%	50%	3.38%	82	84	28%	8.94%	28	32	5.31%
SEN	Min	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-
	Mean	51%	44%	0.88%	15	36	16%	1.82%	1	2	1.02%

*Only one fishing trip

Table 3. Cephalopod – finfish trawlers – Retained catch length sampling (HKB/HMZ).

Fishing ground		% hauls sampled	% hauls HKB sampled	% weight HKB sampled	HKB sample mean wt. (kg)	No. HKB per sample	% hauls HMZ sampled	% weight HMZ sampled	HMZ sample mean wt. (kg)	No. HMZ per sample
GNB	Min	10%	2%	0.28%	7	42	1%	0.12%	3	11
	Max	45%	17%	1.70%	50	163	22%	3%	50	77
	Mean	27%	6%	0.92%	25	75	15%	1%	28	48

Table 4. Cephalopod – finfish trawlers – Retained catch length sampling (OCC/CVT/non-target).

Fishing ground		% hauls OCC sampled	% weight OCC sampled	OCC sample mean wt. (kg)	No. OCC per sample	% hauls CVT sampled	% weight CVT sampled	CVT sample mean wt. (kg)	No. CVT per sample	% wt. sampled non-target
GNB	Min	0%	1%	12	10	8%	2%	5	16	0.33%
	Max	28%	15%	72	33	9%	3%	7	19	9%
	Mean	7%	5%	33	26	8%	2%	6	17	3%

Table 5. Small pelagic trawlers – Retained catch length sampling (SAA/HMZ).

Fishing ground		% hauls sampled	% hauls SAA sampled	% weight SAA sampled	SAA sample mean wt. (kg)	No. SAA per sample	% hauls HMZ sampled	% weight HMZ sampled	HMZ sample mean wt. (kg)	No. HMZ per sample
MRT	Min	40%	3%	0.02%	1	6	3%	0.03%	1	6
	Max	100%	46%	1.47%	17	88	61%	23%	33	109
	Mean	66%	22%	0.26%	7	43	20%	2%	10	47

Table 6. Small pelagic trawlers – Retained catch length sampling (PIL/VMA/non-target).

Fishing ground		% hauls PIL sampled	% weight PIL sampled	PIL sample mean wt. (kg)	No. PIL per sample	% hauls VMA sampled	% weight VMA sampled	VMA sample mean wt. (kg)	No. VMA per sample	% wt. sampled non-target
MRT	Min	0%	0%	2	58	2%	0.01%	2	11	0%
	Max	100%	6%	49	457	95%	2%	35	199	0%
	Mean	39%	1%	20	167	32%	0.35%	14	50	0%

Retained catch: Biological sampling→ Biological sampling includes collecting data on the length, weight, sex and maturity of the target species, although not all these parameters may be measured during one sampling period. A detailed breakdown of the sampling carried out by fleet is given in Table 7 to Table 12. Length measurements are not included as they have been covered.

Table 7. Shrimper trawlers – Retained catch biological sampling.

Fishing ground		% hauls sampled	LAN						GAM					
			% hauls SOP sampled	% wt. SOP sampled	SOP sample mean wt. (kg)	No. SOP sex per sample	No. SOP wt. per sample	No. SOP mat. per sample	% hauls DPS sampled	% wt. DPS sampled	DPS sample mean wt. (kg)	No. DPS sex per sample	No. DPS weight per sample	No. DPS mat. per sample
All	Min	2%	0%	0.07%	1	18	0	18	6%	0.03%	0.43	50	0	50
	Max	25%	18%	4%	10	100	0	100	32%	1.9%	3	153	0	153
	Mean	12%	4%	1%	3	69	0	68	18%	0.3%	1	88	0	85
MRT	Min	5%	1%	0.07%	1	36	0	36	6%	0.04%	0.54	71	0	50
	Max	16%	10%	4%	10	100	0	100	29%	0.8%	3	153	0	153
	Mean	12%	4%	1%	3	75	0	75	16%	0.3%	1	97	0	93
GNB	Min	2%	5%	0.43%	1	18	0	18	7%	0.03%	0.43	50	0	50
	Max	25%	18%	1%	1	26	0	26	32%	1.9%	2	99	0	99
	Mean	13%	12%	1%	1	22	0	22	21%	0.4%	1	71	0	71

Table 8. Black-hake trawlers – Retained catch biological sampling.

Fishing ground		% hauls sampled	% hauls HKB sampled	% wt. HKB sampled	HKB sample mean wt. (kg)	No. HKB sex per sample	No. HKB wt. per sample	No. HKB mat. per sample.	% hauls HKM sampled	% wt. HKM sampled	HKM sample mean wt. (kg)	No. HKM sex per sample	No. HKM wt. per sample	No. HKM mat. per sample
All	Min	10%	9%	0.06%	4	2	0	2	0%	0%	1	1	0	0
	Max	56%	61%	1.29%	64	71	50	71	33%	16%	57	50	50	50
	Mean	29%	24%	0.51%	36	35	14	35	12%	2.79%	23	23	9	23
MRT	Min	10%	9%	0.06%	5	10	0	10	0%	0%	1	1	0	0
	Max	56%	61%	1.29%	64	71	50	71	33%	16%	57	50	50	50
	Mean	28%	22%	0.48%	37	37	14	37	12%	3.03%	24	24	9	23
MAR	Min	22%	22%	0.20%	4	2	2	2	0%	0%	1	1	0	0
	Max	47%	47%	1.13%	50	47	38	47	17%	7.94%	41	35	18	35
	Mean	32%	31%	0.68%	35	32	18	32	9%	2.14%	20	18	8	18
SEN*	Min	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mean	31%	31%	0.33%	8	13	13	13	8%	0.60%	1	1	1	0

*Only one fishing trip

Table 9. Cephalopod-finfish trawlers - Retained catch biological sampling (HKB/HMZ).

Fishing ground		% hauls sampled	% hauls HKB sampled	% wt. HKB sampled	HKB sample mean wt. (kg)	No. HKB sex per sample	No. HKB wt. per sample	No. HKB mat. per sample.	% hauls HMZ sampled	% wt. HMZ sampled	HMZ sample mean wt. (kg)	No. HMZ sex per sample	No. HMZ weight per sample	No. HMZ mat. per sample.
GNB	Min	4%	2%	0.13%	5	20	20	20	0%	0.1%	2	0	0	0
	Max	41%	21%	2%	32	64	64	64	20%	2%	29	41	41	40
	Mean	22%	7%	1%	14	43	43	43	10%	1%	14	24	24	23

Table 10. Cephalopod-finfish trawlers - Retained catch biological sampling (OCC/CVT).

Fishing ground		% hauls OCC sampled	% wt. OCC sampled	OCC sample mean wt. (kg)	No. OCC sex per sample	No. OCC wt. per sample	No. OCC mat. per sample.	% hauls CVT sampled	% wt. CVT sampled	CVT sample mean wt. (kg)	No. CVT sex per sample	No. CVT weight per sample	No. CVT mat. per sample.
GNB	Min	4%	0.25%	4	4	4	3	1%	0.05%	1	1	1	1
	Max	22%	11%	44	37	37	36	5%	1%	3	8	8	3
	Mean	10%	5%	18	18	20	17	3%	0.35%	2	5	5	2

Table 11. Small pelagic trawlers - Retained catch biological sampling (SAA/HMZ).

Fishing ground		% hauls sampled	% hauls SAA sampled	% wt. SAA sampled	SAA sample mean wt. (kg)	No. SAA sex per sample	No. SAA wt. per sample	No. SAA mat. per sample.	% hauls HMZ sampled	% wt. HMZ sampled	HMZ sample mean wt. (kg)	No. HMZ sex per sample	No. HMZ weight per sample	No. HMZ mat. per sample.
MRT	Min	0%	0%	0.00%	3	12	12	12	0%	0%	3	18	18	18
	Max	100%	19%	0.14%	9	30	30	30	12%	7%	8	30	30	30
	Mean	38%	6%	0.03%	5	23	23	23	5%	1%	6	28	28	28

Table 12. Small pelagic trawlers - Retained catch biological sampling (PIL/VMA)

Fishing ground		% hauls PIL sampled	% wt. PIL sampled	PIL sample mean wt. (kg)	No. PIL sex per sample	No. PIL wt. per sample	No. PIL mat. per sample.	% hauls VMA sampled	% wt. VMA sampled	VMA sample mean wt. (kg)	No. VMA sex per sample	No. VMA weight per sample	No. VMA mat. per sample.
MRT	Min	0%	0%	2	18	18	18	0%	0%	3	13	13	13
	Max	48%	1%	6	44	44	44	38%	0.35%	19	30	30	30
	Mean	16%	0.14%	3	28	28	28	10%	0.08%	10	25	25	25

Discarded catch: composition, length and biological sampling → Tables 13 to 16 give details on a fleet by fleet basis of all the fishing trips where discarded species have been sampled for discard composition, for both the proportion of hauls by trip and the proportion of discard weight sampled, along with the length and biological data taken. As with the retained catches, all data are summarised by minimum, maximum and mean values by fishing trips and given by each fishing ground and over the fishery as a whole where appropriate.

Table 13. Shrimper discarded length and biological data.

Fishing ground		% hauls sampled discard comp.	% wt. sampled discard composition	% hauls sampled discarded length	% hauls sampled discard bios	% hauls LAN sampled for length	% hauls LAN sampled bios	% hauls GAM sampled for length	% hauls GAM sampled bios
All	Min	4%	0.25%	2%	0%	0%	0%	0%	0%
	Max	23%	5%	25%	18%	8%	8%	22%	22%
	Mean	14%	1%	10%	3%	1%	1%	6%	6%
MRT	Min	4%	0.34%	2%	0%	0%	0%	0%	0%
	Max	23%	3%	18%	9%	5%	5%	19%	22%
	Mean	13%	1%	9%	2%	0.38%	0%	4%	4%
GNB	Min	9%	0.25%	2%	0%	3%	3%	0%	0%
	Max	22%	5%	25%	18%	8%	8%	22%	22%
	Mean	16%	2%	13%	5%	6%	6%	10%	10%

Table14. Black hake discarded length and biological data.

Fishing ground		% hauls sampled discard comp.	% wt. sampled discard composition	% hauls sampled discarded length	% hauls sampled discard bios	% hauls HKB sampled for length	% hauls HKB sampled bios	% hauls HKM sampled for length	% hauls HKM sampled bios
All	Min	7%	0.09%	7%	0%	1%	0%	3%	0%
	Max	96%	9%	96%	23%	74%	16%	43%	16%
	Mean	42%	2%	42%	6%	27%	4%	17%	4%
MRT	Min	7%	0.09%	7%	0%	1%	0%	3%	0%
	Max	96%	9%	96%	23%	74%	16%	43%	16%
	Mean	42%	2%	42%	6%	27%	4%	17%	4%
MAR	Min	38%	1%	38%	0%	25%	0%	0%	0%
	Max	56%	6%	50%	0%	25%	0%	0%	0%
	Mean	45%	2%	44%	0%	25%	0%	0%	0%
SEN*	Min	–	–	–	–	–	–	–	–
	Max	–	–	–	–	–	–	–	–
	Mean	32%	1%	26%	8%	8%	8%	NA	NA

*Only one fishing trip

Table 15. Cephalopod – finfish discarded length and biological data.

Fishing ground		% hauls sampled discard compos.	% wt. sampled discard compos.	% hauls discard. length	% hauls sampled discard bios	% hauls OCC sampled length	% hauls OCC sampled bios	% hauls HKB sampled bios	% hauls HKB sampled length	% hauls HMZ sampled bios	% hauls HMZ sampled length	% hauls CVT sampled bios	% hauls CVT sampled length	% hauls sampled non-target length	% wt sampled non-target length
GNB	Min	4%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Max	34%	2%	34%	11%	0%	0%	9%	6%	2%	0%	3%	0%	58%	2%
	Mean	15%	0.43%	15%	3%	0%	0%	1%	1%	0.50%	0.04%	0.37%	0%	17%	0.41%

Table 16. Small pelagic discarded length and biological data.

Fishing ground		% hauls sampled discard compos.	% wt. sampled discard compos.	% hauls discard. length	% hauls sampled discard bios	% hauls SAA sampled length	% hauls SAA sampled bios	% hauls PIL sampled length	% hauls PIL sampled bios	% hauls HMZ sampled length	% hauls HMZ sampled bios	% hauls VMA sampled length	% hauls VMA sampled bios	% hauls sampled non-target length	% wt sampled non-target length
MRT	Min	40%	0.04%	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Max	100%	0.47%	100%	2%	48%	2%	93%	0%	38%	0%	80%	0%	0%	0%
	Mean	66%	0.20%	66%	0.12%	16%	0.12%	27%	0%	16%	0%	34%	0%	0%	0%

ANNEX 10- WORKSHOP FOR STANDARDIZATION OF OBSERVERS' METHODOLOGIES-AGENDA

WORKSHOP FOR STANDARDIZATION OF OBSERVERS' METHODOLOGIES

Tenerife, 28-31 January 2020

Agenda

Chairperson: Eva García Isarch

General time schedule:

Tuesday 28th January –Friday 31st January

09:00 - 17:00	**Meeting time (09:00 - 14:00, on Friday 31st)**
11:00- 11:30	Coffee break
14:00 - 15:00	Lunch break

Tuesday, 28th January 2020

09:00 - 11:00

- Welcome, introduction of the participants, organization and housekeeping rules.
- Discussion on the proposed ToRs, adoption of the agenda.

Presentations from DG MARE and from the Consortium:

- Presentation of the project "Study on improvement for the analysis and exploitation of observers' reports in EU fisheries from NW African waters": I- Objectives and expectations. Eva García (Consortium).
- Presentation of the project "Study on improvement for the analysis and exploitation of observers' reports in EU fisheries from NW African waters". II- DCF and SFPA information requirements from scientific observers on board EU fleets. Eva García (Consortium).

Presentations from SFPA- coastal States

- Programmes on observers on board EU demersal and pelagic fleets in Morocco. Organization, reports transmission and main problems faced. Fatima Kasri (MPM).

11:30 – 14:00

Presentations from SFPA- coastal States (cont.)

- Programmes on observers on board EU demersal and pelagic fleets in Mauritania. Organization, reports transmission and main problems faced. Beyah Habib (IMROP).
- Programme on observers on board EU black-hake fleet in Senegal. Organization, reports transmission and main problems faced. Cheikh Fall (DPSP).
- Programme on observers on board EU black-hake fleet in The Gambia. Implementation status. Momodou S. Jallow (FD)
- Programmes on observers on board EU demersal and pelagic fleets in Guinea-Bissau. Implementation status and main problems faced. Josepha Pinto (CIPA)

15:00 – 17:00

- Scientific data from observers required by CECAF. Merete Tandstad

(FAO). Open discussion:

- Main problems faced for the implementation and/or development of EU and Coastal states programmes of observers on board UE fleets.
- Potential solutions and specific needs.
- Transmission of observer information established in SFPAs.
- Use of observer information by end-users (CECAF, JSCs).

Wednesday, 29th January 2020

09:00 – 11:00

- General methodology followed by EU observers on board EU fleets in West Africa. Generalities of draft manuals. Lourdes Fernández (Consortium).

- **Manual for observers onboard shrimper trawlers**

- Manuals used by Mauritania. Djimera Lassana (IMROP)
- Manual proposal from the Consortium. Eva García (Consortium).
- Discussion of main points for standardization between Mauritania, Guinea-Bissau and EU.

11:30 – 14:00

- **Manual for observers onboard black hake trawlers**

- Manuals used by Morocco. Amina Najd (INRH)
- Manuals used by Mauritania. Abdelkérim Ould Souleymane (IMROP)
- Manuals used by Senegal. Cheikh Fall (DPSP)
- Manual proposal from the Consortium. Javier Rey (Consortium)
- Discussion of main points for standardization between Morocco, Mauritania, Senegal, The Gambia and EU.

- **Manual for observers onboard cephalopod-finfish trawlers**

- Manual proposal from the Consortium. Catalina Perales (Consortium)
- Discussion of main points for standardization between Guinea-Bissau and EU.

15:00 – 17:00

- **Manual for observers onboard pelagic trawlers**

- Manuals used by Morocco. Fatima Kasri (MPM)/ Amina Najd (INRH).
- Manuals used by Mauritania. Djimera Lassana/Abdelkérim Ould Souleymane (IMROP)
- Manual proposal from the Consortium. Ad Corten (Consortium).
- Joint sampling programme in the CECAF area (EU pelagic fishery). Irek Wójcik (RCG-LDF)
- Discussion of main points for standardization between Morocco, Mauritania, Guinea-Bissau and EU.

Thursday, 30th January 2020

09:00 - 17:00

Work in subgroups to develop standardized version of the manuals:

- Subgroup “Shrimper fleet”: Mauritania, Guinea-Bissau, Spain. Coordinated by IMROP.

- Subgroup “Black hake trawlers”: Morocco, Mauritania, Senegal, The Gambia, Spain. Coordinated by CRODT.

- Subgroup “Cephalopod-fin fish trawlers”: Guinea-Bissau, Spain. Coordinated by IEO.

- Subgroup “Pelagic trawlers”: Morocco, Mauritania, Guinea-Bissau, The Netherlands, Poland. Coordinated by Ad Corten.

Friday, 31st January 2020

09:00 – 11:00

Manuals presentation by subgroup coordinators:

- Subgroup "Shrimper fleet": IMROP.
- Subgroup "Black hake trawlers": CRODT
- Subgroup "Cephalopod-fin fish trawlers": IEO
- Subgroup "Pelagic trawlers": Ad Corten.

11:30 – 14:00

Final discussion

- Proposals for coordination of national programmes (developed by the coastal States) and DCF programmes of observations on board (developed by the EU) to optimize efforts, avoid spatial-temporal overlapping and duplications.

- Proposals for ensuring that relevant West African and EU research centres have timely and complete access to the observer reports/information.

ANNEX 11- LIST OF PARTICIPANTS TO THE WORKSHOP FOR STANDARDIZATION OF OBSERVERS' METHODOLOGIES

NAME	INSTITUTION	COUNTRY	E-MAIL
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ANNEX 12- MINUTES OF THE WORKSHOP FOR STANDARDIZATION OF OBSERVERS' METHODOLOGIES

MINUTES OF THE WORKSHOP FOR STANDARDIZATION OF OBSERVERS' METHODOLOGIES

Day 1

1.- Introduction

- The chairperson, Eva Garcia (EG), on behalf of the Consortium, opened the meeting and gave the floor to the different participants, who introduced themselves giving their background and experience with scientific observer programmes.

- EG presented the draft terms of reference, stressing the relevance of the topic and how important it would be for the participants to share their experience which would contribute towards achieving the objectives of the meeting.

- EG recalled the importance of optimizing the work of observers through the whole CECAF area, as that would provide relevant means of improving the current knowledge of commonly exploited resources.

- The representative of DG MARE C3 emphasized the relevance of having harmonized approaches in the region in order to improve our knowledge of the state of resources.

- Following the adoption of the terms of reference the proposed agenda was discussed and adopted (Annex 2).

2.- Presentation and discussion on the main elements of the study

- EG introduced the general objectives and expectations of the study for all the relevant SFPAs: analysis and assessment of available observer reports, identification of weaknesses, exploration of the possible scope for improvement and harmonization between the programmes and eventually the agreement on a common methodology/format for observer reports.

- In addition, the requirements under the current legal provisions (DCF and SFPAs) in terms of scientific information collection were examined.

- Regarding the DCF, the different sets of information to be collected (biological data and proportion of by-catch for stocks caught outside EU waters; data to assess the impact of EU fisheries on marine ecosystems and detailed data on the activity of EU vessels) together with the observer sampling tasks needed to provide the required data were presented. In summary, there is a set of common rules governing the framework to ensure the provision of standardized and comparable information and the best and most informed advice to the relevant end-users (CECAF and JSCs of SFPAs), in line with the main principles of the EU CFP.

- Concerning SFPA's requirements, it was noted that not all agreements provide the same level of detail regarding requirements on the collection of scientific information, which makes it difficult to have a uniform approach. EG underlined that the observers' tasks include "to perform biological sampling in the context of scientific programmes" in the five SFPA protocols.

- In this context, it was mentioned that the most recently signed SFPA agreement (The Gambia) includes, *inter alia*, the collection of information on the environmental impact of the fishing activity as well as the requisite that the content of the observer reports should be endorsed by the Joint Committee.

- During the introductory discussion, an EU participant recalled the basic principle that the scientific observers are not fisheries inspectors and that these two functions should be clearly separated.

- In this regard, a Mauritanian participant stated that in his country the role of the scientific observers and inspectors were well differentiated. However, a Senegalese participant stated that in Senegal the situation is different and the role of the Senegalese observers relates mainly to MCS functions. It seems also to be the case in The Gambia.

- In Morocco observer data is used for control purposes, namely for quota uptake, however the observer does not have the power to actually issue infraction reports. These are issued by the Ministerial authorities based on the information provided by the observer. Some of the information collected is also used for complementing the work of the INRH scientists.

3.- Presentation of the national programmes of the coastal countries in the context of SPFAs

As requested to the participants from CS by the communication established before the Workshop, an expert from each country presented the observer programme implemented in his/her country (if any), their organization, reports submitting and the main problems faced.

Morocco

- Fatima Kasri (FK), from the Direction des Pêches Maritimes (DPM) of the Moroccan Ministry of Fisheries, presented the Moroccan observer programme, coordinated by her institution. It has been established since the late 80s and there are currently three ongoing programmes on board EU, Russian and Japanese fleets. Observers can be used for both scientific and MCS purposes and, where necessary, two observers may be on board undertaking separate tasks.

- The highest observer coverage on EU fleets is pelagic trawlers. Observers' tasks are diverse including recording fishing information as technical and catch information by vessel and fishing operation. Given the low activity of the few vessels of the hake fleet which sometimes switch from Morocco to Mauritania it is difficult for Morocco to plan the deployment of observers in time and to implement their activity longer than a few days.

- Reports include a descriptive section (particulars of the vessel, bridge equipments, crew, fishing gears, description of fishing operations, processing of catches), an analytical section (fishing area, fishing effort, catch by fishing trip and by month, analyses of catches) conclusions and annexes. Data transmission can be done by different means (radio, fax, email and handover).

- FK explained that this programme constitutes a useful means to ensure both the respect of legal provisions for the Ministry and the provision of data for scientific advice for the INRH.

- Reports are provided to the EU for monitoring and follow up actions where relevant.

Mauritania

- Beyah Meissa (BM), as the coordinator of the IMROP Programme of observers onboard, made a presentation on the scientific observation in Mauritania, with special attention to their history, current situation and perspectives. Prior to 1996, observers had exclusively MCS functions. Since then, a Mauritanian programme has been focused on scientific observation and the observers are fisheries biologists. Until 2009 the programme was managed by the Delegation for Fisheries Surveillance and Control at Sea (DSPCM). In 2009 it was transferred to IMROP.

- Observer coverage was high in 2009-10, covering all type of vessels. It suddenly decreased in 2011 and was limited to a few pelagic trawlers per year during the period 2011-2017. Since 2018, an effort has been made to increase coverage to the whole of the operating fleet again.

- Data are entered into Excel sheets by the observers while they are on board and are transferred to a centralised data base once they return. A scientific report should then be prepared by the observer and submitted to the coordinator of the observer programme, who officially submits it the IMROP Director. Regular summaries on the results obtained are produced.

- The main problems facing the implementation of this programme were the reluctance of vessel owners to accept observers on board due to space constraints, the ageing of experienced observers and the reluctance of professionals to work onboard due to the poor salaries received for a hard work in hard conditions. It was also underlined that there was a need for better coordination and for financial support.

- Other difficulties are related to security at sea, the difficulties of working on paper sheets in a wet environment and the lack of proper working spaces.

- Some specific needs were emphasized, such as ensuring the safety of the observer (need for training in maritime safety); capacity strengthening of observers by continuous training in collecting and analyzing data; salary reinforcements for motivating the observers; reinforcement of the observer equipments, etc.

Senegal

- Cheikh Fall (CF), Head of the Division of Inspections and Control in the DPSP, presented the Senegalese observer program which covers the EU black hake trawlers, looking at the organization, report submission and problems encountered. Senegalese observers have a duel role of MCS and collection of fishery data, although they have not the power to the power to fine or detain the vessel if infringements are detected.

- Observers have three main tasks: to ensure the strict application of the regulations, to collect scientific information and to draft a report after the observed fishing trip.

- Data collected includes, among other things, mesh size, fishing areas, operational data, catch data (target and retained by-catch species, discards) and environmental data.

- There is a process in place for report transmission. After the fishing trip, the observer produces a data collection sheet and a trip report, which are transmitted to the DPSP. This institution provides this information: i) to CRODT and ii) to the Ministry of Fisheries (Ministère des Pêches et de l'Economie maritime, MPEM), which finally submits them to the EU.

- The main problems identified were the large volumes of discards, including undersize hake, the limited number of current observers (only five) and the general lack of observers and more specifically, of observers with a scientific background. They are exploring the possibility of recruiting experts on fishing technology from fisheries schools.

The Gambia

- Momodou S. Jallow (MJ), from the FD presented information on the observer programmes in place on board industrial vessels in The Gambia. The current national programme is managed by the FD, in collaboration with the Association of Fisheries Observers. The FD coordinates the observer tasks and the type of information to be collected. The observer data are transmitted to the Ministry, which is the owner of this information. The observer programme has not been implemented so far on board EU black hake trawlers.

- Fishery data collected by observers include: retained catch (quantity in tonnes by species), fishing effort, fishing positions and depth, number of sets, type of fishing gear, etc. Only the most important discard species are recorded. Biological information is not collected by all observers.

- Observers report on infringements and draft a report at the end of the fishing trip.

- Main shortcoming identified in the observer programme by MJ was that observers are not strictly scientific observers and their tasks are more related to MCS.

- Finally, the way forward for the implementation of the Gambia EU- observer programme was outlined as follows: a) to establish a unit of scientific observers; b) to train observers on the biological sampling of target species and how to record fisheries by-catch.

Guinea-Bissau

- Josepha Pinto (JP), from CIPA, updated the Workshop on the observer programme operating in Guinea-Bissau. The national programme was introduced in 2012 with some training activities carried out by CIPA in collaboration with IEO. This was intended to address the main aspects related to the observation of the EU fleets, including a manual for scientific observers. On the basis of the same methods and objectives designed by the IEO for observers on board the EU demersal fleet, CIPA aims to implement the national programme of scientific observations on board on all the fleets operating in the EEZ of Guinea-Bissau.

- The programme targets the 5 types of industrial métiers identified in Guinea-Bissau: 1) EU and Senegalese shrimpers, 2) EU and Senegalese cephalopod trawlers, 3) Chinese demersal fleet, 4) other nationalities-demersal fleets and 5) pelagic trawlers. Considering a target coverage of 10% of each fleet, the number of vessels by métier to be annually observed was estimated, according to the fleet size in 2016.

- The objectives of the programme are clearly defined. In summary, they aim to get information on the fishing strategy of the fleet, identify and quantify the retained and discarded species by fishing operation and increase the biological knowledge of the target species. The work plan includes a number of tasks to be performed on the bridge (register information for all fishing operations) and sampling to be performed on a number of randomly selected hauls (discards, length-frequencies, biological sampling).

- The scientific programme has not been implemented so far due to financial difficulties. Only data from MCS observers has being collected for the time being. Additional problems encountered in the implementation of the observer programmes are the lack of: trained observers, a detailed description of all the components of the program, expertise on species identification, an adequate database, etc.

- Some potential solutions identified by JP were training scientific observers and support the observer programme by including it in the funds for the sector support. In fact, the implementation of the observer programme is foreseen in the near future through the recruitment of a consultant, to prepare the program, train observers, create a database system, support the implementation and processing of the data collected. The problem of species identification is in the process of being solved with the elaboration of a pocket guide to be prepared by IEO, with EU funds and in cooperation with FAO.

- Finally, JP summarized the observer requirements included in the SFPA UE-Guinea Bissau, emphasizing that so far, they are only observers of the fishing activity, from the Fisheries Surveillance Department (FISCAP) but not scientific observers.

4.- CECAF requirements

- The FAO/CECAF participant, Merete Tandstad (MT) made an overview of CECAF Assessment Working Groups and recommendations on collection of scientific data of relevance that could be obtained through observer programmes. She explained the CECAF structure and in particular the dynamics and the process linked to the provision of scientific information (data collection schemes, target species, concerned fleets) and how the information is further processed, including the models used by the relevant assessment WGs and for the SSC.

- She also gave an overview of some examples of data requirements for the improved knowledge of stocks in the region.

- Most problems with stock assessment in the region are related to data collection, in particular getting information on time, species separation (namely demersal but also some small pelagic), effort data, lack of length sampling, lack of adequate age data and irregular sampling schemes in terms of fleets, space and time.

- In line with the deficiencies above, the small pelagic WG has repeatedly recommended intensifying the biological sampling, in particular for some emblematic species such as sardinella and horse mackerel for fleets that are not currently sufficiently covered.

- Regarding demersal species the improvement of sampling programmes, the studies on discards and the intensification of the biological sampling appear to have the greatest need for improvement.

- Against this background, a set of observer information is considered as very useful to overcome the above difficulties: total catch (as observers can provide estimates of the discard rates of target species), length distributions of target species and by-catch, separation of catch species and distribution of species and different life stages (size/age classes through knowledge on position of each trawl). In addition, if observers are well trained, they can identify all species in each haul, helping to split the species groups.

Discussion

Some relevant issues discussed were related to the problems faced for the implementation and/or development of EU and CS programmes of observers on board UE fleets.

*1. A recurrent problem faced by most countries is the **ship owner's reluctance** to have observers on board their vessels. In relation to this:*

- *The attention of the EC was drawn on the issue of how could be ensured that vessels owners allow the presence of observers on board. The EC responded that this is a core matter for them and that is a long process. In the framework of the discussions in negotiations and joint committee meetings they are working on ensuring the regular presence of the observers in the percentage and frequency established in the terms of the respective protocols.*

- *One of the EU participants stated that probably one of the reasons that scientific observers are not welcome on board the EU pelagic fleet might be because they may move into "closed areas" they can easily report this infraction. This impression seems to be shared by other participants. However, EG stated that this is not the case according to the information obtained within this project from Moroccan observers, as many reports analysed were from the fleet of this particular nationality.*

*2. An additional problem, mentioned both by Mauritania and by Senegal was the **ageing population of observers**. In order to overcome this situation, Mauritania has the*

intention of involving new young scientists progressively in the programme. A training workshop is planned for 2020.

*3. The problem of the **lack of coordination** was also raised. As an example, Ad Corten (AC) mentioned the EU programme (DCF) for observers on board the small pelagic fleet in Mauritania. At the beginning, he was in charge of it and recruited Mauritanian observers. It resulted in an effective programme but it eventually failed due to the lack of coordination. The programme was resumed by Poland in 2018.*

*4. The **lack of scientific observers** in certain countries, where only control observers are currently working was mentioned:*

- *In Senegal, five observers are in principle only in charge of MCS tasks on EU vessels though some of them have been trained to implement scientific-like functions. However, it seems evident that there are gaps in such training, so that the observers have serious difficulties for identifying the discarded species. There is however the intention of properly implementing the scientific observations although further efforts are needed at national level.*

- *In The Gambia there is the intention of establishing a unit of scientific observers to comply with the protocol. A training programme will be probably launched in 2020.*

- *The question of **different formats** used by different countries was also discussed. One EC representative proposed standardized and legible formats. Reports transmitted from Senegal are hand written and sometimes not readable. Mauritania produces mission reports with summary tables, which are stored in IMROP and provided to the EU, only under request.*

- *Finally, the question of the **reports submission** from the CS to the EU was highlighted. The EC reminded that there is a clear obligation in the text of the protocol of providing the observers reports on a regular basis, which is not being complied with by the different CS.*

Day 2

5.- Presentation of observer manuals

5.1.- General methodology of the proposed observer manuals

- Lourdes Fernández (LF), from IEO, introduced the general methodology used by the EU observers as well as the objectives of the different manuals to be presented during the day session. In particular she recalled the need to obtain technical and biological information in the context of the DCF and SFPAs as well for the end-users (CECAF and JSCs) requirements.

- The different EU fleets involved in the concerned SFPAs were screened and their target species and characteristics were described.

- Regarding the tasks of EU observers she insisted in the absolute scientific nature of their work, being subject to confidentiality rules and subject to the cooperation of the crew, where possible.

- The main concepts (trip and trawl set) and the type of work in the different areas of the vessel (bridge/working deck) were presented with visual support explaining the main elements of the data collection process.

- In the bridge observers shall collect fishery information, including operational data and catch data (total catch, retained catch of target and non-target species, total discards and incidental by-catch of protected species).

- In the sampling area observers shall register the species composition in weight and number of the different fractions and obtain the length frequencies of the main species (CECAF priority species) and, where feasible, collect biological information. She also stressed the importance of collecting information on vulnerable species.

- In the context of the presentation, she took the opportunity of showing the set of forms to be filled for each type of observer activity.

Discussion

- *Following the request of Mauritania to the Consortium on which is the best dynamics to ensure that the discards information is registered before it is returned to the sea, the issue of the cooperation of the crew appeared as crucial.*

- *The choice of sample sizes of the different species/fractions appear a difficult task in particular for the hake trawlers where a part of the catch is processed depending of the commercial categories. In this case again the cooperation of the crew (subject to right instructions from the observer) is essential. The ideal situation appears however implementing the sampling before the fish has been sorted/processed by the crew.*

- *In the case of discards it appears useful registering in the information sheet the reason for discarding.*

5.2.- Manual for observers on board shrimper trawlers

Mauritania

- The description of the observer methods adopted by Mauritania was presented by Lassana Djimera (LD), an experienced observer from IMROP. Among other tasks, observers should collect information on: fishing operations, estimation of retained and/or discarded catch, incidental by-catch of big animals (sea birds, mammals, turtles, etc ...) and collection of environmental parameters.

- A list of the materials need was presented. The forms used for recording vessel characteristics, fishing gear, fishing operation, operational details, catch sampling, biological sampling, environmental information (debris), presence and sampling of big animals were shown.

- The methods followed for the estimation of total catch, sampling strategies, species composition, length frequencies and biological sampling were detailed. For catch and length distribution, the sampling method, sample choice and extrapolation methods were explained. For catch composition species are categorized in: target, non-target or discarded.

- For length frequency distributions, samples are chosen randomly and the cephalothorax length is measured. For biological sampling a maturity key of four stages is applied for females while for males only the mature/immature stages are used.

- Data collected by the observer during the trip are recorded in real time in Excel format. They are transmitted at the end of the mission to the coordinator of the observer program. At the end of each mission, the observer is required to produce a detailed report in a short delay, which should provide all relevant information related to the tasks performed.

- Main constrains found by the observers are the lack of security at sea, linguistic barriers, lack of samplings space to work in good conditions and the difficulties related to work in a wet environment (e.g. the use of paper forms). The issue of the high volume of discards produced by this fleet was raised, in particular the fact that the crew are quick in discarding making it difficult for the observer to access and record certain species.

Manual proposed by the Consortium

- EG presented the manual proposed by the Consortium in the framework of the observer project, which contains a general part (already presented by LF) and a specific section for shrimpers observations.

- Most EU shrimpers working in context of the Mauritania and Guinea-Bissau SFPAs are Spanish. This fleet is quite homogeneous, so that the extrapolation of observers' information to the whole fleet is relatively simple.

- The main characteristics of the fishing trips performed by the fleet, landing places in each CS and how the catches are transported and sold in Spain were described. The main target and retained by-catch species were detailed as well as the two types of fishing gears used, depending on the target species and their depth distribution.

- The proposed working plan intends to ensure a coverage of observation throughout the year (at least 1 fishing trip per quarter and four fishing trips per year) and that the observer is in each case on board during the whole duration of the trip.

- Specific forms for recording the information on the bridge (operational details and catch details) were shown for this type of fishery. Other sampling issues that are specific for this type of fishery were detailed, i.e. frequency and sample size recommended for each type of sampling; methods used for sampling the species composition (weight and number) and length of target and by-catch species of both catch fractions (retained catch and discards); biological sampling of the three target species; specific forms to be used for each sampling, etc. Summary tables, filled forms, pictures and other visual resources were used for an easy understanding.

5.3.- Manual for observers on board black hake trawlers

Morocco

- Amina Najd (AN), from INRH, presented the method used by Moroccan observers onboard EU black hake trawlers. Observers are inspectors from the Fisheries Department (DPM) and not scientists from INRH. Main tasks assigned to the observers are: description of technical characteristics of vessels and fishing operations, analysis or data reporting, collection of certain documents and drafting a mission report.

- For the descriptive work, different forms are used: vessel specifications and equipment, description of fishing operations, catch processing, embarking of Moroccan sailors. For the analytical work, information on fishing effort, fishing area, state and daily composition of catches, state and daily composition of production, state of production and yields, discards and legal aspects, should be collected by the observer.

- Daily catches composition and weight as well as processing details are recorded. Regarding discards, observers note the quantities, percentage and global composition.

- Observers also check the conformity of the vessel and its operations with the provisions of the SFPA.

- Observer report is produced and is signed by the observer and the captain and sent to the authorities in Morocco and the EU.

Mauritania

- The IMROP sampling protocol for observers onboard black hake trawlers was presented by Abdelkerim Ould Souleimane (AOS), an IMROP technician with an extensive experience as an observer on board different industrial fleets.

- AOS presented the outcomes of a one-week mission of observation on a Spanish black hake trawler carried out in January 2020. The method followed during this mission included a fist stage of work on the bridge, where the observer recorded the operational details together with catch details (total catch, black hake catch, other fish catch, in number of boxes) of all fishing operations. The second stage of the observer work was undertaken in the sorting room, where 3-5 buckets were randomly selected for catch sampling, once a day. The sample was sorted by species, and weight recorded for each one. Length samplings were performed, establishing a number of 100 individuals per species. A subsample of 30 individuals was taken for biological sampling.

- The final results of catches, length composition, catch quantities and composition, and some biological information were shown.

Senegal

- Observers on board EU vessels in Senegal are inspectors and their tasks are mostly related to MCS issues. Only fishery information (catch and effort data) are reported by these observers. It is the intention of Senegal to implement in the future a scientific observer scheme in cooperation with the CRODT.

- Information of catches for both target and by-catch species as well as for discards is collected on a haul basis.

Manual proposed by the Consortium

- Javier Rey (JR), from IEO, presented the draft manual proposed by the Consortium in the context of the study for observers on board black hake trawlers, also focusing on the specific issues of sampling this fleet.

- JR made a description of the main technical characteristics of the EU vessels (all Spanish) targeting black hake in West Africa (freezer and 'fresh' vessels) and the areas where they operate (Morocco, Mauritania and Senegal). The duration of a fishing trip is six days for fresh trawlers and 25-35 days for freezers and they are covered with observers on a ratio of 1 trip per month and 1 trip per quarter, respectively.

- Sampling activities on the deck concern all the catch fractions on a frequency of 1 haul per day (or 1 of each 3 hauls). Catch per haul is recorded (retained and not retained) in weight and/or number, with special care to separate both species of black hake (*M. polli* and *M. senegalensis)*.

- Length frequencies are recorded for both target and not target species (ideally within the same haul). For black hake, sampling takes place in the 'fresh' vessels after separation by species and by categories, while for freezers sampling takes place prior to the separation by categories.

- For discards, species composition and length frequencies for black hake and priority species should be sampled. Two different strategies are considered for sampling discards: a) in the first, 30 kg of discards are sampled, this being more efficient in terms of taxonomic identification; b) in the second a bigger quantity of discards (60 kg) is sampled, this ensuring higher sampling coverage (7%), in detriment of the taxonomic level of identification (groups of families, instead species).

- The main morphological differences between both black hake species were detailed. Conversion factors were also explained and documented.

5.4.- Manual for observers on board cephalopod-finfish trawlers

As the EU fishery of cephalopods-finfish is only carried out in Guinea-Bissau and CIPA has not implemented any observer manual so far, only the manual proposed by the Consortium was presented.

Manual proposed by the Consortium

- Catalina Perales (CP), from IEO, gave an overview of the provisions of the EU-Guinea Bissau SFPA and presented the general aspects related to the fleet and to the fishing area, target species, etc. A relevant issue of this fleet is that three group of species are targeted, at different depth ranges, being from shallower to deeper waters: cephalopods (octopus and cuttlefish), horse mackerel and black hake. Other specific issues of this fleet relevant for sampling purposes were explained.

- The observer frequency established is one fishing trip per quarter with presence of the observer in the whole fishing trip.

- Sampling scheme respect four pre-established zones: North-shallow, North-deep, South-shallow and South-deep.

- Minimal frequencies and weights/numbers were given for different types of sampling. Sampling of species composition and lengths in as many hauls as possible by zone (minimum of one haul per zone), both in the retained and discarded fractions of the catch.

- Procedures for length and biological sampling of the three groups of target species were explained and the maturity scale used for octopus was shown. As for the other manuals, summary tables, filled forms, pictures and other visual resources were used.

5.5.- Manual for observers on board pelagic

trawlers Morocco

- FK explained the method followed by observers on board pelagic trawlers in Morocco. Observers are always present on board EU and Russian pelagic trawlers.

- The tasks to be performed by the observers are exactly the same that the ones outlined for black hake trawlers: description of technical characteristics of vessels and fishing operations, analysis or data reporting, documents collection and the elaboration of a mission report.

- The forms to be filled in by the observers are also the same, with some changes only related to the name of the retained species.

Mauritania

- LD presented the methods used by IMROP observers on board pelagic trawlers. He reminded the two fishing types for small pelagic fisheries, depending in the target species: Russian-type, targeting horse mackerel with semi-pelagic trawls and the Dutch-type targeting clupeids with pelagic trawls.

- The objectives and methods followed are the same as outlined for black hake and shrimper trawlers. Some specific aspects for the pelagic fishery are detailed below.

- Ideally two observers should be embarked by fishing trip.

- The sheets to be used by the observers were shown. Some of them were forms to directly record the information, i.e.: station characteristics. Other were Excel sheets where the observer should directly computerize in the information while he is on board, i.e. catch sampling and summary sheet (only for Dutch trawlers). They include the weighting factor for length frequency samples made. These sheets were based on the ones implemented by the "Ad Corten" programme in the past.

- The different methods to visually estimate the total catch by fishing type were explained. Catch estimation for Russian-type consists in observing the trawl when it is completely extended on the deck and by counting the number of sections of net between rings containing fish, from the codend to the mouth of the trawl. The distance between two rings is considered to contain 10 tonnes of fish. Catch estimation for type Dutch is different as the fish is pumped on board and the gear does not touch the vessel. In this case the estimation is made by counting all the tanks containing fish from the catch.

- Three strategies for catch sampling are implemented by the different observers: a) random sampling: the sample is taken before sorting and removing large individuals; b) Stratified sampling: operation carried out by two observers, by taking the sample synchronously from the conveyor belts; c) Systematic sampling: operation carried out by two observers, by taking the sample synchronously every 25 minutes on the conveyor belts from the start to the end of the catch treatment. It is needed to adopt one single strategy to harmonize the observation data.

- For biological sampling, a key of 5 scales is used. Keys of adiposity and stomach repletion were also shown.

- The main constrains identified by LD were related to the waiting time for processing the tanks targeted by the sampling, as the observer is required to wait until they are filled in. The main need is to harmonize sampling plans and catch estimates.

Manual proposed by the Consortium

- Ad Corten (AC) provided a historical overview of the observers' activity in EU pelagic trawlers operating in Mauritanian waters. The first observer programme was implemented in 1996, with the arrival of the Dutch pelagic fleet to Mauritania. There was a training programme of Mauritanian observers in the framework of a Dutch project. 35 Mauritanian observers were recruited in 2009.

- Regarding the new manual proposed within the framework of this project, AC explained that it largely based on the old IMROP manual, with some lost elements and some new added elements.

- The priority order to be established in data collection is: 1) catches and length frequencies of commercial species; 2) biological data and 3) by incidental by-catch of protected species.

- Regarding reports and data storage, AC expressed his concerns on who will manage the databases and publish the data (European institutes, African institutes or the EC). In relation to the submitting to end-users, a provisional treatment of the data in order to get the information as soon as possible appears as a good solution rather than waiting to the final outcomes.

- In relation to reporting protected "big animals", the main difficulty is that they are sent back from the gear to the sea directly without coming on board and it is necessary that the observer is on the deck in order to ensure that their capture is registered.

- Finally, AC emphasized that an observer programme is more than a manual and the need for coordination between all stakeholders involved (observers, coordinators, scientists, ministries, etc).

Day 3

DCF-Observer Programme for small pelagic

- Following the presentation of observer programmes for pelagic trawlers, Irek Wójcik (IW), from MIR-Poland, introduced the joint sampling programme for small pelagic in CECAF, by explaining that in the context of the DCF, data collection in CECAF area was mandatory only as from the 2010's and the relevant activities were framed in the Regional Coordination Meeting (RCM), currently changed to Regional Coordination Group (RCG) of Long Distance Fisheries (LDF).

- First discussions in the RCM were devoted to screening the activities of the concerned MS in the CECAF fisheries and to explore the scope for cooperation between concerned MS (Poland, The Netherlands, Latvia, Lithuania and Germany). This resulted in The Netherlands taking the lead for coordinating the small pelagic data collection in the region as from 2011. Costs related to the data collection were shared among the concerned MS via a coordinated programme. The joint observer programme was put in place in 2012 and 2013, following a recommendation of the RCM, and was implemented through an independent contractor: CMR, the AC's company, in cooperation with IMROP.

☐ This joint programme was adapted and extended in subsequent years. Poland has taken over the coordination of the scheme for the period 2018-20. Observers from Poland are deployed on board EU pelagic trawlers fishing in CECAF area, Poland is responsible for data-entry and storage of the sampling data and The Netherlands is responsible for data validation, data processing and data delivery to the relevant end-users. Cooperation protocols and other relevant documents can be consulted in the Polish institute (MIR) web page: http://dcf.mir.gdynia.pl/

- Observers implementing the joint scheme are required to have competence in fisheries science and as seamen. The current agreements have provisions regarding confidentiality and identify the relevant end-users (EC and CECAF).

- The sampling protocol and the relevant manual contain details on the information to be collected and recorded, including formats, transfer and reporting provisions. The software already developed by The Netherlands was provided to Poland as a more powerful platform than Excel.

- The agreement took some time to be implemented so that only one trip was observed in 2018 and two in 2019 due to some reluctance from the vessel owners. The situation seems to be improving in the last time so that the objective has been fixed in two trips per quarter/per area following the fleet dynamics.

- Details on the number of hauls, number of fish sampled for length and for biological parameters were provided. Although for the time being the data being collected are beyond current CECAF requirements. it appears necessary to continue collecting a maximum of information for future improvements.

Discussion

- *The importance of ensuring permanent and stable biological data collection (including otoliths collection and reading) was stressed during the discussion as it is in line with CECAF requirements with a view to build up data series in the near future.*

- *The issue of the attitude of some vessel owners and the negative impact in the data collection activities was also one of the hot topics and the possibility of preventing these vessels to get a license as a penalization was evoked by some of the participants. The risk that such a negative attitude could be adopted by other owners seems possible.*

- *Quantification of hake discards by the small pelagic trawlers is a very relevant issue. Observers are requested to collect as much information as possible on this species (including biological data where possible). CECAF recommendations and initiatives to address the regional aspects of the small pelagic fishery are accessible via the new CECAF webpage (http://www.fao.org/cecaf/en/).*

During the rest of the day, work was developed by subgroups (one for each fishery), with participation of the most relevant countries and stakeholders involved and with a view to fine tune the proposed documents and make them adapted to the relevant fisheries.

Day 4

6.- Presentation of work developed by subgroups

6.1.- Subgroup pelagic trawlers

- The subgroup appreciated the initiative of the EU to organise this workshop, which presented an excellent opportunity to learn from each other experiences in the field of observer programmes.

- The subgroup found that the need for a new manual differed from one country to another. The situation in the most concerned countries (Morocco and Mauritania) is very different. While in Mauritania the scientific observation is implemented (although irregularly during the last few years), in Morocco the observers on board have a control function with very limited input to the scientific process (only catches and effort data are usable).

- The proposed manual was considered as a valuable guide (a reference document) but too huge and with room for simplification and improvement to make it less prescriptive. This would allow for a certain degree of flexibility and provide some scope to the observer interpretation of the different situations. In this regard, the number of forms and annexes was recommended to be reduced.

- Mauritanian would therefore presumably continue using their own manual, but incorporating some useful aspects of the new EU manual. Poland had produced its own manual for DCF in 2018, and would probably do the same.

- The discussion within the subgroup was more focused on other aspects of the observer programmes than on the methods proposed in the manual. The lack of cooperation of captains and ship owners was emphasized. The subgroup coordinator (AC) presented a figure illustrating an example of how the flow of information from EU and IMROP to end-users should work. In summary, AC emphasized that the programme is well beyond the manual itself but has to take into account all the subsequent process of data processing and transmission to end-users.

- Regarding the use of national manuals, it is essential that they do not contradict each other.

6.2.- Subgroup black hake trawlers

- The proposed document was reviewed and some amendments/recommendations were made: i) update the section in relation to 'context and fleets´; ii) reduce the number of forms; iii) reformulate some paragraphs; iv) include national legislation regarding observers, apart for DCF and SFPA legislations; v) for protected species: only big animals will be considered for incidental by-catch to be reported in a haul basis, while other small protected species should be reported when they appear in catch-discard samples ; vi) in discards samplings, the reason of discards (small size, damaged, not commercial species, etc.) should be reported.

- It was agreed to send the corrected document for a second reading to the members of the subgroup, for any further comments.

- Other future recommendations were that all countries must put in place scientific (not only control) observers and to organize a training workshop for scientific observers.

6.3.- Subgroup shrimper trawlers

- Both the Mauritanian and the EU manuals are very similar with slight differences in the sampling methods. The proposed manual was reviewed by the group and some minor remarks on certain topics were made. Some forms were reviewed and amended.

- The method used by Mauritania for the estimation of total catch (average between the visual estimations of the observer, the captain and the second) was accepted as the one to be proposed in the manual.

- For biological sampling of target species, the stratified sampling method proposed was decided to be simplified for observers: samples to be randomly chosen but with special attention to sample all length classes established. This means that if certain sizes are not present in the random samples, the observer should specifically search for them and add it to that sample, in the same or in further trawls, in order to cover all length classes with the required frequency.

6.4.- Subgroup cephalopod-finfish trawlers

- After reviewing the document in detail, some minor amendments were proposed, notably by including some clarifications in specific forms included in the annexes and improvements to the tables and paragraphs for length sampling in retained catches.

7.- Way forward

- Those parties with ongoing programmes of scientific observers (EU and Mauritania) would already start coordinating in order to optimize effort, avoiding duplication and burdens and making it easier the access to the vessel. IEO committed to inform IMROP each time there is an observer on board an EU vessel. IMROP will reciprocate. Focal points are EG (IEO) for shrimper fleet, LF (IEO) for black hake trawlers and IW (MIR) for pelagic trawlers. Focal point in Mauritania will be BM, the coordinator of the scientific observer programme in IMROP.

- There are prospects of other coastal countries that for the time being are not implementing scientific observer programmes. Senegal has the wish to put in place in the short time observers on a regular basis even if they could play double role science/control (not confirmed so far). Focal points are LF for EU and NT pour Senegal.

- Holding annual workshops on observer issues were considered as a good practice. The way to obtain the necessary funds for such workshops needs to be explored.

8.- Workshop Conclusions

1. The Workshop was a fruitful exercise involving most of the concerned stakeholders, including end-users.

2. Discussions revealed that for the time being there is a long way to run before being ready for full implementation of observer programmes in all concerned countries although it could be consider a pilot implementation where possible. Some countries have not implemented scientific programmes so far.

3. The draft manuals should be considered as a first step towards an improved data collection for scientific advice in the context of JSCs and CECAF.

4. First versions of manuals are to be refined in the future following inter alia the advice of the end-users (CECAF and JSC) and the expertise from the involved scientific institutions.

5. Further training might be required periodically for scientific observers.

6. The establishment of appropriate and stable scientific observer programmes in all the concerned countries, including the EU is a condition for further success.

7. There is a need of operators to embark observers, which is compulsory by the DCF.

8. There is a need of clarifying obligations in Protocols as regards observers and reporting issues.

9. There is a need of coordination between EU and CS. 1st steps for coordination were identified:

- In the short term: mutual information between EU and CS focal points of deployment of observers (dates and vessels).

- In the medium term: possibility to work in turns should be considered (i.e: observations on shrimpers in Mauritania, turned annually between IEO and IMROP).

- The possibility of developing annual workshops was considered, depending on funding availability.

Before the closure of the Workshop, the chairperson thanked the active involvement of all participants, which undoubtedly contributed to learning on the different observer programmes, end-user needs and to improve the proposed manuals, in a coordinated way. She thanked the EU for funding the project and also for their interest and contribution to the Workshop. The IEO hosts in Tenerife were also thanked for the facilities during the Workshop. The efficient help of AZTI in logistic arrangements was appreciated. And finally, the professionalism of the two interpreters was especially thanked.

The Workshop was closed at 14:00.

ANNEX 13- LIST OF DOCUMENTS PRODUCED IN THE PROJECT

The following table presents the list of all the documents produced during the development of the project. Some of them are the deliverables/reports submitted to EASME and DG-MARE thought the course of the project. Others were milestones required for specific tasks. Finally, the list of documents presented to the Workshop for standardization of observers' methodologies is presented.

DOCUMENT TYPE: DELIVERABLE (Report)	
Del.no.	**Deliverable name**
D 01	Inception Report
D 02	Interim Report
D 03	Draft Final Report
D 04	Final Report and Executive Summary
DOCUMENT TYPE: Milestone (Observer manual)	
Mil. no.	**Milestone name**
MS 3.02	Manuel à l'usage des observateurs scientifiques à bord des bateaux crevettiers dans les eaux d'Afrique occidentale
MS 3.03	Manuel à l'usage des observateurs scientifiques àbord des bateaux merluttières dans les eaux d'Afrique occidentale
MS 3.04	Manuel à l'usage des observateurs scientifiques àbord des bateaux céphalopodiers dans les eaux d'Afrique occidentale
MS 3.05	Manuel à l'usage des observateurs scientifiques à bord des chalutiers pélagiques dans les eaux d'Afrique occidentale
	DOCUMENT TYPE: Workshop documents (Presentations)
WS Doc no.	**Workshop document name and author's institution**
WS 4.01	Study on improvement for the analysis and exploitation of observers' reports in EU fisheries from NW African waters. I: Objectives an expectations of the Workshop (Consortium)
WS 4.02	Study on improvement for the analysis and exploitation of observers' reports in EU fisheries from NW African waters. II: DCF and SFPA information requirements from scientific observers on board EU fleets (Consortium)
WS 4.03	Organisation et transmission des données par l'observateur scientifique en Maroc (MPM)
WS 4.04	Observation scientifique en Mauritanie : Historique, bilan et perspectives (IMROP)
WS 4.05	Programmes des observateurs à bord de la flottille de l'UE ciblant le merlu noir au Sénégal : Organisation, transmission des rapports et problèmes rencontrés (DPSP)
WS 4.06	Observers Programs on board Industrial fishing vessels in the Gambia (FD)
WS 4.07	Programmes des observateurs à bord des flottilles demersales et pélagiques de l'UE en Guinée-Bissau. État de la mise en œuvre et problèmes rencontrés (CIPA)
WS 4.08	Scientific data from observers required by CECAF (FAO)
WS 4.09	Méthodologie générale suivie par les observateurs de l'UE à bord des flottes européennes en Afrique de l'ouest : généralités des projets de manuels (Consortium)
WS 4.10	Manuel pour observateurs à bord des chalutiers crevettiers en Mauritanie (IMROP)

DOCUMENT TYPE: Workshop documents (Presentations) Cont.	
WS Doc no.	**Workshop document name and author's institution**
WS 4.11	Projet de manuel pour les observateurs scientifiques à bord des bateaux crevettiers dans les eaux d'Afrique occidentale (Consortium)
WS 4.12	Manuel pour observateurs à bord des chalutiers ciblant les merlus noirs-Maroc (MPM - INRH)
WS 4.13	Protocole d'échantillonnage à bord d'un merlutier-Mauritanie (IMROP)
WS 4.14	Manuel pour les observateurs scientifiques à bord des bateaux merlutièrs dans les eaux d'Afrique occidentale (Consortium)
WS 4.15	Manual for scientific observations on board the cephalopod fleet in West African waters (Consortium)
WS 4.16	Manuel pour observateurs à bord des chalutiers pélagiques-Maroc (MPM - INRH)
WS 4.17	Manuel pour observateurs mauritaniens à bord des chalutiers pélagiques (IMROP)
WS 4.18	Manuel pour les observateurs scientifiques à bord des chalutiers pelagiques dans les eaux d'Afrique occidentale (Consortium)
WS 4.19	Joint sampling programme in the CECAF area-EU pelagic fishery (RCG-LDF)
WS 4.20	Presentation of work in subgroups: Pelagic trawlers (Consortium)
WS 4.21	Presentation of work in subgroups: Black hake trawlers (CRODT)
WS 4.22	Presentation of work in subgroups: Shrimper trawlers (IMROP)
WS 4.23	Presentation of work in subgroups: Cephalopod trawlers (Consortium)

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