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FISHERY COMMITTEE FOR THE EASTERN CENTRAL ATLANTIC

Twenty-third Session

Monrovia, Liberia, 11–14 July 2023

Outcomes of the 9th Scientific Sub-Committee

SUMMARY

This document is the summary of the final report of the ninth session of the Scientific Sub-Committee of the Fisheries Committee for the Eastern Central Atlantic (CECAF), which was held in Nouakchott, Mauritania from 5 to 9 December 2022. The final report is available (CECAF/XXIII/2023/Inf.1). The first day of the Scientific Sub-Committee was dedicated to a special event on the EAF-Nansen Programme, during which an overview of the Programme was presented along with the 2023 workplan. Main topics discussed at the 9th session of the Scientific Sub-Committee were: (i) the reports of the assessment Working Groups on small pelagics and demersal species, presented by the Working Group Chairs, and the report of the artisanal fisheries Working Group; (ii) fishery management advice in the CECAF region; (iii) presentation and discussion on the 2022 meeting regarding the reformulation of the CECAF management structure; (iv) an overview of several ongoing research activities under other projects/programmes in the CECAF region, along with of work of research institutions or scientific groups in CECAF member countries; and (v) future programme of work in the region.

Introduction

1. The ninth session of the Scientific Sub-Committee (SSC) of the Fishery Committee for the Eastern Central Atlantic (CECAF) was held at the Hotel Nouakchott in Nouakchott, Mauritania from 05 to 09 December 2022. The first day of the meeting was dedicated to a full-day session on the EAF-Nansen Programme.
2. Mr Carlos Alberto Monteiro of Cabo Verde chaired the Session, supported by Vice-Chair Mr Emmanuel K. Dovlo of Ghana. A total of 38 participants from 21 CECAF member countries and representatives from regional organizations attended the Session.
3. On behalf of the Director-General, Mr Qu Dongyu, the FAO Representative to Mauritania, Mr Alexandre Huynh, welcomed the participants on behalf of FAO and thanked the Government of the Islamic Republic of Mauritania for hosting the ninth session of the SSC. On behalf of His Excellency, the Minister of Ministry of Fisheries and Maritime Economy of Mauritania, the Interim Secretary General Mr DAH Alioune, expressed delight for the choice of Nouakchott to host the session. After welcoming all participants, he thanked FAO for its continued commitment to the Government of Mauritania and stressed the role of the Science Sub-Committee and science in the sustainable management of the fisheries resources.

MAIN OUTCOMES OF THE WORKING GROUPS

4. The **three assessment categories** adopted by the CECAF scientific Working Groups were recalled:
 - a. **Not-fully exploited:** When the stock is in good condition and fishing pressure can be increased without affecting the sustainability. All increases must be seen in the context of the general environmental situation.
 - b. **Fully exploited:** The fishery operates within the limits of sustainability. Current fishing pressure seems sustainable and can be maintained.
 - c. **Overexploited:** The fishery is in an undesired state both in terms of biomass and fishing mortality. Fishing pressure should be reduced to allow the stock to grow.

SMALL PELAGICS WORKING GROUP – NORTH

5. The 2022 Working Group was held from 13–16 September 2022 in Dakar, Senegal. The Working Group analysed and assessed the following species: sardine (*Sardina pilchardus*), sardinella (*Sardinella aurita* and *Sardinella maderensis*), horse mackerel (*Trachurus trecae*, *Trachurus trachurus* and *Caranx rhonchus*), chub mackerel (*Scomber colias*), bonga (*Ethmalosa fimbriata*) and anchovy (*Engraulis encrasicolus*) in the region between the southern border of Senegal and the northern Atlantic border of Morocco and including Sardinella (*Sardinella* spp.) and horse mackerel (*Trachurus* spp.) from the Canary Islands.

6. A total of 10 stocks were analyzed by the Group when the data was available.
7. The results of the assessments show:
 - a. Five (5) stocks are **overexploited**: round sardinella (*Sardinella aurita*), flat sardinella (*S. maderensis*), *Sardinella* spp., Atlantic horse mackerel (*Trachurus trecae*), and bonga (*Ethmalosa fimbriata*).
 - b. Three (3) stocks are **fully exploited**: Cunene horse mackerel (*Trachurus trachurus*), Chub mackerel (*Scomber colias*), and anchovy (*Engraulis encrasicolus*).
 - c. Two (2) stocks of sardine (*Sardina pilchardus*) are **not fully exploited** for Zone A+B and Zone C.
8. Total catch of the main small pelagic fish in the region saw a slight decrease in catches from 2.8 million tonnes in 2019 to 2.6 million tonnes in 2020. The average total catch for the period 1990–2021 has been fluctuating with an average of around 2 million tonnes, while the average for the last five years (2017–2021) was 2.6 million tonnes.
9. Sardine dominated the catch at 48 percent of the total catch (1.1 million tonnes in 2021), followed by chub mackerel (21 percent; 480 000 tonnes in 2021), *S. maderensis* (12 percent; 286 000 tonnes in 2021), and Cunene horse mackerel (7 percent; 156 000 tonnes in 2021). Lower levels of catches were with species of *S. aurita* (49 000 tonnes), *Caranx rhonchus* (13 000 tonnes), bonga (85 000 tonnes), and anchovy (49 000 tonnes).

SMALL PELAGICS WORKING GROUP – SOUTH

10. The fifth meeting of the FAO/CECAF Working Group on the Assessment of Small Pelagic Fishes - Southern Subgroup was held in Abidjan, Côte d'Ivoire from 22 November to 1 December 2022. The Working Group was preceded by a digital meeting with the EAF-Nansen program on 29 and 30 November 2021 to review the results of the 2019 regional survey conducted by the R/V Dr Fridtjof Nansen.
11. A total of 9 species or groups of species and 22 stocks were analyzed by the Working Group when data were available: sardinella (*Sardinella aurita*, *Sardinella maderensis*, and *Sardinella* spp.), bonga (*Ethmalosa fimbriata*), anchovy (*Engraulis encrasicolus*) and horse mackerel (*Trachurus trecae* and *Decapterus rhonchus*) and other Carangidae.
12. The results of the assessments show that:
 - a. Thirteen (13) stocks are found to be **overexploited** (*S. aurita* northern, western, central, and southern stocks; *S. maderensis* northern and western stocks; *Sardinella* spp. northern stock; *E. fimbriata* central and western stocks; *E. encrasicolus* western stock; *Trachurus trecae* northern and western stocks; and *Caranx* spp. northern stock).

- b. Seven (7) stocks were estimated to be **fully exploited** (*S. maderensis* central stock; *E. fimbriata* northern, western, and southern stocks; *E. encrasicolus* southern stock; other Carangidae northern stock; and *Caranx* spp. northern stock).
 - c. Zero (0) stocks were assessed as **not fully exploited**.
 - d. For one (1) stock, the data did not provide reliable results (*Decapterus* spp. northern stock).
 - e. For one (1) stock, the available data were not sufficient to apply an assessment model (*Trachurus trecae* southern stock).
13. Total catches of the main small pelagic fish studied at this meeting decreased by 29 percent, from 1.7 million tonnes in 2020 to 1.2 million tonnes in 2021. The trend observed since 1999 has been fairly stable until 2018, when there was a sudden increase in catches, mainly due to the increase in species classified as other Carangidae. The average total catch for the last five years is around 1.2 million tonnes. The total catch is dominated by other Carangidae and *Sardinella* spp. (17 percent and 16 percent of total catch, respectively).
14. In 2021, the species considered under the category of other Carangidae and *Sardinella* spp. dominated in the region, representing 17 percent each (203 000 tonnes and 200 000 tonnes, respectively) of total catch in the region in 2021. This is a 75 percent decrease from total catch of other Carangidae in 2020 (805 000 tonnes) but represents no change for *Sardinella* spp. catch. This catch for other Carangidae is also much higher than the average catch of the species group over the last five years (74 000 tonnes).
15. Round sardinella (*S. aurita*) comprise the second most important species for the region in terms of catch (171 000 tonnes, 14 percent of total catch in 2021). This is a 13 percent increase in catch from 2020 levels (152 000 tonnes).
16. Flat sardinella (*S. maderensis*), *Trachurus trecae*, bonga (*Ethmalosa fimbriata*), and *Caranx* spp. represent the third most important species for the region, comprising of the total catch, respectively, of: 10 percent (119 000 tonnes), 12 percent (149 tonnes), 12 percent (148 000 tonnes), and 10 percent (115 000 tonnes).

DEMERSAL SPECIES WORKING GROUP – NORTH

17. The FAO/CECAF Working Group on the Assessment of Demersal Resources in the Northern Zone of CECAF was held in Dakar, Senegal, from 6 to 10 June 2022. The results of the analysis are presented in four subgroups: shrimps, cephalopods, hake and other demersal fish. A total of 24 stocks and species groups were analyzed by the Working Group.
18. The results of the evaluations show that:
- a. Nine (9) stocks were considered **overexploited**: *Merluccius merluccius* (Morocco stock), *Merluccius* spp. (stock Morocco, Mauritania, Senegal,

Gambia), *Epinephelus aeneus* (stock Mauritania, Senegal, Gambia), *Brama brama* (stock Mauritania, Morocco), *Parapenaeus longirostris* (stock Morocco), *Octopus vulgaris* (stock Cap Blanc and stock Senegal, Gambia), *Loligo vulgaris* (Dakhla stock and Cap Blanc stock).

- b. Seven (7) stocks were considered **fully exploited**: *Plectorhynchus mediterraneus* (Mauritania, Morocco, Senegal, Gambia stock), *Pagellus bellotti* (Mauritania, Senegal, Gambia stock), *Penaeus notialis* (Mauritania stock and Senegal, Gambia stock), *Octopus vulgaris* (Dakhla stock), *Sepia* spp. (Dakhla stock and Cap Blanc stock).
- c. Seven (7) stocks were considered **not fully exploited**: *Pagrus caeruleostictus* (Mauritania stock, Senegal), *Dentex macropthalmus* (Mauritania stock, Senegal, Gambia), *Pagellus acarne* (Morocco stock), *Parapenaeus longirostris* (Mauritania stock and Senegal stock, Gambia), *Aristeus varidens* (Mauritania stock), *Sepia* spp. (stock Senegal, Gambia).
- d. One (1) stock has not been assessed: *Loligos vulgaris* (Senegal stock, Gambia).

19. The total catch of demersal resources for 2021 analyzed by the Working Group in 2022 was approximately 240 000 tonnes. The total catch of these resources has shown an upward trend since 2012. In 2021 there was a decrease of 10 percent compared to 2020 (260 000 tonnes in 2020 and 240 000 tonnes in 2021). From 1990 to 2021, the catch of demersal resources has fluctuated around an average of 215 000 tonnes.
20. Cephalopod species accounted for most of the region's total catch in 2021, at 53 percent (127 000 tonnes). This is a slight decrease of 12 percent from the 2020 catch level (145 000 tonnes).
21. In 2021, demersal fish species accounted for 28 percent (66 000 tonnes) of the total catch. The trend has remained relatively stable for the species since 2010, with a slight increase from 2015 to 2019, followed by a decrease. There has been a 17 percent decrease in total fish catch between 2020 (79 000 tonnes) and 2021 (66 000 tonnes).
22. Hake species accounted for 12 percent of the total catch in 2021 (29 000 tonnes), and with a slight increase of 5 percent from 2020 catch levels (27 000 tonnes). Catch levels have remained relatively stable since the start of the time series.
23. Finally, shrimp species account for the smallest portion of total catches at 7 percent (16 000 tonnes), an increase of 33 percent from 2020 levels (12 000 tonnes). Catch levels have remained relatively stable since the start of the time series.

DEMERSAL SPECIES WORKING GROUP – SOUTH

24. The fifth meeting of the FAO/CECAF Working Group on the Assessment of Demersal Resources, Subgroup South, met in Praia, Cabo Verde from 20 to 29 September 2022.
25. The fifth meeting of the FAO/CECAF Working Group on the Assessment of Demersal Resources, Subgroup South, met in Praia, Cabo Verde from 20 to 29 September 2022.

A total of 60 stocks were analyzed by the Working Group when data were available. Thirty-four (34) stocks could not be assessed using any of the models because the data available to the Working Group was not in the correct format and/or was not sufficient to be used in valuation models.

26. The results of the evaluations show that:

- a. Eight (8) stocks were considered **overexploited**: *Pseudotolithus elongatus* (Guinea, Guinea-Bissau, Sierra Leone, Liberia), *Pomadasys* spp. (Guinea, Guinea-Bissau, Sierra Leone, Liberia), *Cynoglossus* spp. (Guinea, Sierra Leone, Liberia), *Galeoides decatactylus* (Côte d'Ivoire, Ghana, Togo, Benin), *Pseudotolithus* spp. (Côte d'Ivoire, Ghana, Togo, Benin), *Merluccius* spp. (Angola), coastal shrimps (Cameroon), *Sepia* spp. (Guinea-Bissau).
- b. Fifteen (15) stocks are **fully exploited**: *Galeoides decatactylus* (Guinea, Guinea-Bissau, Sierra Leone, Liberia), *Sparidae* (Guinea, Guinea-Bissau, Sierra Leone, Liberia), *Muraenidae* (Cabo Verde), *Brachydeuterus auritus* (Côte d'Ivoire, Ghana, Togo, Benin), *Dentex* spp. (Côte d'Ivoire, Ghana, Togo, Benin), *Pagellus bellotti* (Côte d'Ivoire, Ghana, Togo, Benin), *Galeoides decatactylus* (Nigeria, Cameroon, São Tomé, Equatorial Guinea), *Brachydeuterus auritus* (Nigeria), *Arius* spp. (Nigeria, Cameroon), *Arius* spp. (Gabon, Congo), *Pentanemus quinquarius* (Gabon, Congo), *Parapenaeus longirostris* (Guinea, Guinea-Bissau), *Penaeus notialis* (Congo), *Aristeus varidens* (Angola), *Octopus vulgaris* (Guinea-Bissau).
- c. Three (3) stocks are **not fully exploited**: *Penaeus notialis* (Guinea-Bissau), *Penaeus notialis* (Gabon), *Sepia* spp. (Guinea).

27. The total catch of demersal resources for 2021 analyzed by the Working Group in 2022 was approximately 240 000 tonnes. The total catch of these resources has shown an upward trend since 2012. However, in 2021 there was a decrease of 10 percent compared to 2020 (260 000 tonnes in 2020 and 240 000 tonnes in 2021). From 1990 to 2021, the catch of demersal resources has fluctuated around an average of 215 000 tonnes.

28. The species included in Fish Group 1 showed a relatively stable trend until around 2017 (112 000 tonnes), when there was an increase that continued until 2021 (125 000 tons). In 2021, these species accounted for 42 percent of the total catches of demersal species in the southern region of CECAF, which represents only a slight decrease of 4 percent compared to the total levels of 2020 (130 000 tonnes).

29. Species included in Fish Group 2 have experienced a relatively stable trend in catches until 2021 (46 000 tonnes). In 2021, these species accounted for 16 percent of the total catches of demersal species in the Southern CECAF region, an increase of 74 percent compared to 2020 catch levels (27 000 tonnes).

30. Catches of species included in Fish Group 3 also experienced a relatively stable trend until 2021 (52 000 tonnes). In 2021, these species accounted for 18 percent of the total catches of demersal species in the Southern CECAF region, representing a minor increase of 4 percent from 2020 catch levels (50 000 tonnes).

31. Catches of species included in Fish Group 4 also experienced a relatively stable trend in catches until 2021 (58 000 tonnes). In 2021, these species accounted for 20 percent of the total catches of demersal species in the southern CECAF region, an increase of 18 percent compared to 2020 catch levels (50 000 tonnes).
32. The catches of shrimp species assessed in the working group have been relatively stable since the start of the time series until 2021 (6 000 tonnes). In 2021, these species accounted for only 2 percent of the total catches of demersal species in the southern CECAF region, a decrease of 10 percent compared to 2020 catch levels (6 600 tonnes).
33. The catches of cephalopod species assessed in the working group have also been relatively stable from the start of the time series until 2021 (10 000 tonnes). In 2021, these species accounted for only 4 percent of the total catches of demersal species in the southern CECAF region, but this represents a 154 percent increase from 2020 catch levels (4 000 tonnes).

ARTISANAL FISHERIES WORKING GROUP

34. The sixth session of the CECAF Artisanal Fisheries Working Group was held in Accra, Ghana from the 1–3 October 2019. Fifteen CECAF member countries as well as FAO, the Sub-Regional Commission on Fisheries (SRCF), the Fisheries Committee for the West Central Gulf of Guinea (FCWC), the Regional Platform of Non-State Actors in the Fisheries and Aquaculture Sector in West Africa (WANSAFA) and the Regional Platform of Non-State Actors of the Fisheries and Aquaculture Sector in Central Africa (CANSAFA) participated in the meeting.
35. The 6th Artisanal Fisheries Working Group focused on deliberating issues relating to the indicators and methods of data collection, definition, and characterization of small-scale fisheries as well as priority studies to be carried out. To summarize:
 - a. A short list of priority indicators with the appropriate methods/approaches was proposed.
 - b. The actions to be undertaken towards the definition and characterization of small-scale fisheries were discussed and highlighted the need to apply the FAO matrix in all countries.
 - c. From four studies to be conducted, two socio-economic focused have been suggested.
 - d. The ongoing action plan was discussed and renewed.

FORMULATION OF ADVICE ON FISHERY MANAGEMENT MEASURES IN THE CECAF REGION

36. The Scientific Sub-Committee highlighted the need to explore mechanisms and ways to strengthen the dialogue between scientists and fisheries managers to improve the

understanding of the scientific advice provided by CECAF, and to support the development of options for how the recommendations can be implemented in practice, considering national and regional dimensions. It was recognized that the role of the Working Groups is to make recommendations to managers based on the scientific information available, while the management decisions are taken with a broad range of considerations, including socio-economic issues, that may vary among regions and stocks.

STRENGTHENING CECAF SCIENTIFIC ADVICE AND MANAGEMENT RECOMMENDATIONS

37. Following the discussions held at the 8th Scientific Sub-Committee in 2018 on options in terms of scientific advice and management recommendations, CECAF has facilitated several actions as a follow up to recommendations.
38. A review was conducted on the different methods potentially usable in the context of CECAF. Some of these methods (e.g., CMSY, LBB) have been tested by the CECAF working groups. Thus, some stocks were assessed for the first time using CMSY with available catch data (in the absence of data on fishing effort). JABBA and SPiCT were also applied to the demersal and small pelagic Northern sub-groups. The Southern Demersal Resource Assessment Working Group used the LBB which is based on size frequency data, as well as PSA, SPiCT, JABBA. The results of testing these methods show that there has been an increase in the number of stocks assessed, a decrease in uncertainty about the status of the stocks on which these methods have been applied, as well as an improvement in the robustness of the results obtained.
39. Following the indications of the 8th Scientific Sub-Committee, the 9th Sub-Committee session determined to continue the work on improving the formulation of advice on fisheries management measures:
 - a. For CECAF fisheries that catch a large portion of juvenile fish, it would be relevant to explore alternative reference points (e.g., 30-40 percent of maximum spawning potential) that may be more effective for maintaining productive fisheries, although information on spawning stock is currently limited.
 - b. CECAF advice should account for scientific uncertainty, minimize risk and could consider a general harvest control rule with explicit precautionary targets to derive more consistent advice among stocks.
 - c. For data-poor CECAF stocks with unknown status, empirical management procedures may be a viable alternative. It would be relevant to continue exploring the use of alternative assessment methods for data poor contexts.
 - d. Environmental conditions should continue to be considered in CECAF advice, particularly for small pelagic stocks.
 - e. The provision of scientific advice should be updated based on a decision by CECAF to incorporate alternative assessment methods, updated reference points, as well as a harvest control rule.

INTERSESSIONAL MEETING ON REFORMULATION OF THE CECAF STRUCTURE-MAIN COST BENEFIT ANALYSIS RESULTS AND IMPLICATIONS FOR THE SCIENTIFIC SUB-COMMITTEE

40. The CECAF held the above intersessional meeting from 28 to 29 June 2022 in Dakar, Senegal, with fourteen delegates from CECAF Member Nations, the CECAF Secretariat and was chaired by the Republic of Gabon.
41. The following four options, reduced from the range of options presented in the initial cost-benefit analysis, were presented to the Scientific Sub-Committee for further consideration:
 - a. Maintaining CECAF as an Article VI advisory body – mainly for coastal living resources.
 - b. Establishment of single Article XIV regional fisheries body – for areas under and beyond national jurisdiction.
 - c. Establishment of a regional fisheries body (i.e., Article XIV) competent for only areas beyond national jurisdiction/high seas.
 - d. Establishment of regional fisheries management commission outside FAO for areas under and beyond national jurisdiction.
42. The Scientific Sub-Committee endorsed the outcome of the intersessional meeting on moving forward with Option A – “Maintaining CECAF as an Article VI advisory body – mainly for coastal living resources” supported with the following actions and interventions:
 - a. Update CECAF’s statutes and review its legal framework to match current context.
 - b. Develop sustainable funding mechanisms.
 - c. Support capacity building actions driven by the requests of Member States.
 - d. Ensure CECAF recommendations are implemented by Member States.
 - e. Strengthen collaboration and synergies between partner regional fishery bodies, RFMOs, regional economic commissions across the CECAF region.
 - f. Strengthen visibility and communications pathways between the CECAF secretariat, Member States, and related organizations.

PROGRAMME OF WORK IN THE REGION – WORKING GROUPS AND ACTIVITIES

43. The Scientific Sub-Committee appreciated the progress made in the assessment of several stocks and commended CECAF for having conducted sessions of all the four assessment working groups in 2022. The Sub-Committee also took note of the efforts made to address the research recommendations of CECAF, directly by the Committee and its members or through partnerships with other Programmes and Projects. At the same time the Sub-Committee took note of recurrent constraints reported by the Working Groups that requires immediate or medium-term corrective action.
44. CECAF should seek opportunities for capacity development in relation to the above and the development of good practice frameworks as well as for the implementation of the workplan for the artisanal fisheries working groups, including in collaboration with partner projects and Programmes.
45. The Scientific Sub-Committee approved the calendar for the Working Groups proposed for the next intersessional period:
- a. The **Artisanal Working Group** is expected to meet in 26–28 April 2023 in Senegal.
 - b. The **Small Pelagics Working Group sub-group North** is expected to meet from 24–28 July 2023 in Tenerife, Spain.
 - c. The **Small Pelagics Working Group sub-group South** is planned for 1–10 November 2023 in Togo.
 - d. A 2024 meeting of the **Small Pelagics Working Group sub-group North** is expected to meet in May/June 2024, venue TBC.
 - e. A meeting of the **Demersal Working Group sub-group North** is proposed for 4–12 June 2024 in Morocco, pending confirmation of funding.
 - f. The **Demersal Species Working Group sub-group South** meeting is planned for 1–10 September 2024 in Cameroon, pending funding.
46. Mr Carlos Alberto Monteiro (Cabo Verde) was re-elected as Chair of the Scientific Sub-Committee, and Mr Emmanuele Dovlo (Ghana) was re-elected as Vice-Chair. The Scientific Sub-Committee tasked the Chair to work closely with the CECAF Secretariat to set a date (tentatively Q4 in 2024) and venue for the 10th session.

ACTIONS REQUESTED FROM THE COMMITTEE

47. The Committee is asked to consider reviewing and endorsing the report of the 9th session of the Scientific Sub-Committee in relation to:
- a. Status of stocks and resulting management recommendations as well as priority areas for research, as presented in the 9th report.
 - b. Suggested workplan for the interim session and any related recommendations in relation to CECAFs Working Groups and its reporting.

- c. Recommendations related to the other areas of work discussed at the 9th session.
- d. Take note of the activities of the different regional organizations, national institutions and projects in the CECAF region, and the new and upcoming projects and initiatives.

APPENDIX D OF THE REPORT OF THE SCIENTIFIC SUB-COMMITTEE

Summaries of the assessments and management recommendations for each stock

Table 1: Small pelagics Working Group - CECAF North					
Stock	2021 catch in 1 000 tonnes (2017–2021 avg.)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
Sardine** <i>S. pilchardus</i> Zone A+B	344 (419)	152%	39%	Not fully exploited	The stock is considered not fully exploited in 2021. However, there is a decrease in CPUEs and a decrease in the average size of sardines caught in the central zone. This observation calls for vigilance with regard to the exploitation of this stock whose biomass levels fluctuate. Projections show that the stock could sustain an increase in catches. However, the variability of the resource vis-à-vis hydroclimatic changes requires the adoption of a precautionary approach. The working group maintains the recommendation not to exceed a level of 550 000 tonnes.
Sardine** <i>S. pilchardus</i> Zone C	760 (827)	135%	54%	Not fully exploited	The stock was considered not fully exploited in 2021. An 8 percent decrease in catch was recorded in 2021 compared to 2020. Biomass has improved but significant catches have been recorded in recent years with the emergence of an inshore fleet in Mauritania. In this last zone, abundance indices are lacking. The average size of the sardine caught showed an overall downward trend, hence the need to be vigilant in the exploitation of this stock. This stock is strongly influenced by environmental factors and exhibits fluctuations in biomass independent of fishing. For this reason, the total allowable catch must be adapted to the natural variations of the stock. Stock structure and abundance should also be closely monitored through fishery-independent methods, such as coordinated acoustic surveys throughout the species' range.

Table 1: Small pelagics Working Group - CECAF North

Stock	2021 catch in 1 000 tonnes (2017–2021 avg.)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
Sardinella**					
<i>S. aurita</i>	50 (272)	-	-	Overexploited	The assessment and the historical series on sardinella show that the stock of round sardinella is in a critical situation marked by heavy overexploitation. The Working Group reiterates the recommendations of previous years for the management of the stock and advocates a substantial and immediate reduction in fishing effort and mortality. The Working Group cannot quantify exactly how much fishing effort should be reduced, but in view of the degraded situation of this stock, and as a precautionary approach, it proposes a reduction of at least 60 percent in mortality current exerted on this stock. As for the flat sardinella, the level of fishing mortality has been high in the last two years. In the absence of the round sardinella, it would seem that the fishing effort is directed towards the flat sardinella. Therefore, the working group also recommends the reduction of fishing effort directed towards the flat sardinella. In order to improve the state of sardinella stocks, it is recommended to prohibit their use for the manufacture of fishmeal. The Working Group also recommends that national governments assume their responsibilities with regard to the sustainable management of sardinella and launch consultations on the joint management of this fundamental resource.
<i>S. maderensis</i>	287 (229)	-	-	Overexploited	
<i>Sardinella</i> spp.	336 (499)	-	-	Overexploited	
Whole subregion					
Horse mackerel					
<i>T. trachurus</i>	80 (90)	111%	71%	Fully exploited (<i>T. trachurus</i>)	Model results show that <i>T. trecae</i> stocks are overexploited while <i>T. trachurus</i> is fully exploited. Given the multi-specific nature of these fisheries and the results of the projections, the working group recommends not to exceed 300 000 tonnes for both species.
<i>T. trecae</i>	156 (213)	74%	86%	Overexploited (<i>T. trecae</i>)	
Whole subregion					

Table 1: Small pelagics Working Group - CECAF North

Stock	2021 catch in 1 000 tonnes (2017–2021 avg.)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
Chub mackerel <i>Scomber colias</i> Whole subregion	481 (450)	90% (Biodyn/Global) 102% (XSA) - (ICA)	142% (Biodyn/Global) 83% (XSA) - (ICA)	Fully exploited	The Working Group concluded, based on the results of the production model and other analytical models, that the stock is fully exploited. The results of the projections show that the current level of capture is not sustainable and would induce a decrease in spawning biomass and target biomass (B_{0.1}). To this end, the Working Group recommends curbing the general upward trend in catches and recommends, as a precaution, renewing the recommendation made in previous years, namely limiting the maximum catch to 340 000 tonnes, which corresponds to a 29 percent reduction from catches recorded across the subregion in 2021. In addition, the Working Group has observed for several years a significant fishing of juveniles, which have not yet reached their first maturity, and recommends the implementation of urgent measures (spatio-temporal measures, revision of the minimum size of the catch on landing, etc.) aimed at reducing the fishing mortality exerted on this vulnerable fraction of the stock in order to improve its biological productivity.
Anchovy <i>Engraulis encrasicolus</i> Whole subregion	48 (32)	N/A	86% (LCA-Y/R)	Fully exploited	The anchovy assessment was based on information from the North+A+B area. After examining the results of the model, the evolution of the biomass of the stock and the catches, the anchovy is considered to be fully exploited. Given that the availability of anchovy is highly dependent on environmental factors, that it is exploited opportunistically and that catches vary considerably from year to year, the Working Group recommends adjusting the effort of fishing to the natural fluctuations of this stock.
Bonga <i>Ethmalosa fimbriata</i> Whole sub-region	85 (65)	N/A	145% (LCA-Y/R) Mauritania +Senegal	Overexploited	The Working Group considers that bonga is overexploited at the scale of the sub-region. The Working Group recommends that effort and catches be reduced by 50 percent compared to 2021, which will allow a sustainable level of exploitation.

Table 2: Small pelagics Working Group - CECAF South					
Stock	Last year catch in tonnes (5-year average)	$B_{cur}/B_{0.1}$ %	$F_{cur}/F_{0.1}$ %	Assessment	Management recommendation
Sardinella					
<i>S. aurita</i>					
North (Guinea, and Liberia)	48 919 (27 117)	54 B_{cur}/B_{MSY} 60	136 F_{cur}/F_{MSY} 124	Overexploited	Catch and abundance in the last three years declined. Current catch of <i>S. aurita</i> is too high. Reduce catch of 36% to reach F_{MSY} (31 300 tonnes)
West (Ghana, Togo and Benin)	23 976 (34477)	19	174	Overexploited	Considering the lack of data from some countries the Working Group recommends the fishery should be closed as precautionary measure.
Central (Nigeria)	49 818 (51 713)**	53 B_{cur}/B_{MSY} 59	136 F_{cur}/F_{MSY} 124-	Overexploited	Current catch of <i>S. aurita</i> are not sustainable. Catch will have to be reduced to avoid future depletion of the stock. As a precautionary measure, a reduction of fishing mortality by 36% to reach $F_{0.1}$ is recommended (31 800 tonnes).
South (Congo)	9 442 (13 409)***	88	123	Overexploited	Considering the lack of data from some countries, not exceed the catch of the estimated surplus production (8 800 tonnes).
<i>S. maderensis</i>					
North (Guinea, and Liberia)	40 789 (27 629)	119	82	Overexploited	Considering the reducing trend of catch and biomass and the lack of data from some countries, not to exceed the estimated average for the last five years (27 600 tonnes).
West (Ghana, Togo and Benin)	10 197 (7 730)	29	334	Overexploited	The Working Group considers the stock is in very bad condition the fishery should be closed.
Central (Nigeria, Cameroon)	22 598 (23 310)*	97 B_{cur}/B_{MSY} 107-	85 F_{cur}/F_{MSY} 77	Fully exploited	As a precautionary measure, considering the missing data from some countries, do not exceed the average of the 5 last years (23 300 tonnes).
South (Congo)	1 525 (2 019)***	93	35	Fully exploited	As a precautionary measure, considering the missing data from some countries, do not exceed the average of the 5 last years (2 000 tonnes).
<i>Sardinella</i> spp.					
North	95 370 (82 141)	52	523	Overexploited	The Working Group considers the stock is in bad condition. As a precautionary measure and due to the fact this is a group of species,

Table 2: Small pelagics Working Group - CECAF South					
Stock	Last year catch in tonnes (5-year average)	$B_{cur}/B_{0.1}$ %	$F_{cur}/F_{0.1}$ %	Assessment	Management recommendation
(Guinea Bissau, Guinea, and Liberia)					do not exceed fishing level for 2017 (60 000 tonnes) as for previous recommendation.
Bonga (<i>E. fimbriata</i>)					
North (Guinea)	96 196 (75 012)	122	83	Fully exploited	Considerig data from some countries were not included in the assessment, not exceed the catch of the average of the 5 last years (75 012 tonnes).
Central (Nigeria, Cameroon)	42 128 (44 020)	65 B_{cur}/B_{MSY} 71	195 F_{cur}/F_{MSY} 178-	Overexploited	Current catch are not sustainable. Catch will have to be reduced to avoid future depletion of the stock. As a precautionary measure, reduce catch by 78% is recommended (9 200 tonnes)
West (Ghana, and Benin)	492 (343)	24 B/B_{MSY} 27	331 F/F_{MSY} 298	Overexploited	Current catch are not sustainable. Catch will have to be reduced to avoid future depletion of the stock. As a precautionary measure, reduce catch at the surplus production estimated for the current biomass level (280 tonnes)
South (Gabon, Congo)	8 589 (10 168)	60	56	Fully exploited.	As a precautionary measure and due to the lack of data from some conutries , do not increase catches of this species from the average of the last 5years (10 168 tonnes).
Anchovy (<i>E. encrasicolus</i>)					
West (Ghana, Togo and Benin)	67 281 (58 456)	56 B_{cur}/B_{MSY} 62	163 F_{cur}/F_{MSY} 148	Overexploited	A reduction of 63% of fishing mortality is necessary. The species is caought together with Sardinella species. Given the state of the stock the Working Group considers the fishery should be closed.
South (Congo)	1 525 (2 678)	60	40	Fully exploited	Because the lack of data from some conutries, as a precautionary measure the catch level should not exceed the average of the last 5years (2 678 tonnes).
Horse mackerel and other <i>Carangidae</i>					
<i>Trachurus trecae</i>					
North (Guinea Bissau, Guinea)	35 251 (29 194)	71	161	Overexploited	As a precautionary measure, the same recommendation of previous Working Group is retained, reduce the catches at the 2014 level (13 000 tonnes), and reduce effort
West (Ghana, Togo, and Benin)	4 248 (4 568)	B/B_{msy} 98.7	F/F_{msy} 168-	Overexploited	Considering the lack of data from some countries, the Working Group recommend reducing the fishing mortality to return to sustainability. A reduction of the catch of 68% is recommended (1 350 tonnes).
South (Congo)	487 (482)	-	-	No assessment made as no effort data was available for the region	As a precautionary measure, the recommendation of previous working group is maintained, catch levels should decrease.
<i>Decapterus spp.</i>					
North	10 490 (8 217)	-	-	No acceptable results from models.	As a precautionary measure, the catch levels should not increase more than the average of the last 5 years (8 217 tonnes).

Table 2: Small pelagics Working Group - CECAF South					
Stock	Last year catch in tonnes (5-year average)	$B_{cur}/B_{0.1}$ %	$F_{cur}/F_{0.1}$ %	Assessment	Management recommendation
(Guinea, and Liberia)					
<i>Carangidae</i>					
North (Guinea, Guinea Bissau)	4 364 (9 798)	25	76	Fully exploited	Assessment based on data from one country only. Given the low level of abundance of the last years and the lack of data from other countries, as a precautionary measure, the catch levels should not increase more than the value of the last year (4 364 tonnes).
<i>Caranx spp.</i>					
North (Guinea Bissau)	1 201 (1 445)	90	24	Fully exploited	Assessment based on the data of one country only. Given the low level of abundance of the last years and the lack of data from other countries, as a precautionary measure, the catch levels should not increase more than the average of the last 5 years (1 445 tonnes).
Central (Nigeria, Cameroon)	763 (833)	49 B_{cur}/B_{MSY} 54	208 F_{cur}/F_{MSY} 189	Overexploited	Considering the lack of data from some countries, the Working Group recommend to reduce the fishing mortality to return to sustainability. A reduction of the catch of 89% is recommended (84 tonnes).

Table 3: Demersals Working Group - CECAF North

Stock	2021 catch in tonnes 2021 (avg. 2017–2021)	*B _{cur} /B _{0.1}	B _{cur} /B _{MSY}	*F _{cur} /F _{0.1}	F _{cur} /F _{MSY}	LCA/Yield-per- Recruit (F _{cur} /F _{0.1})	Assessment	Management recommendations <i>(A reduction in fishing mortality implies either a reduction in effort or the introduction of measures such as closed fishing seasons)</i>
Hake <i>Merluccius merluccius</i> Morocco	7 405 (6 162)	129%	142%	117%	105%	The model gives a high exploitation rate due to the exploitation of juveniles	Overexploited	The working group recommends reducing the fishing mortality of the coastal trawling fleet targeting juveniles through strengthening compliance with fishing regulations.
<i>Merluccius</i> spp. (<i>M. polli</i> and <i>M. senegalensis</i>) Morocco Mauritania Senegal Gambia	21 225 (20 808)	61%	67%	252%	227%	345%	Overexploited (LCA: overexploitation of large sizes)	The working group recommends a significant reduction in fishing effort and a reduction in catch to reach a sustainable catch level (MSY). Given the importance of by-catches (2021= 5 700 tonnes), the working group recommends that the necessary measures be taken to reduce by-catches from other fisheries (particularly pelagic) to the level of the period 2002-2014 (about 900 tons). Consider restrictive measures to reduce fishing mortality. In particular, zoning and spatio-temporal closures to protect periods of spawning and recruitment.
Demersal fish <i>Epinephelus aeneus</i> Mauritania Senegal Gambia	4 844 (6 415)	65%	71%	151%	136%	-	Overexploited	Working group recommends not to exceed 2021 catch level.

Table 3: Demersals Working Group - CECAF North

Stock	2021 catch in tonnes 2021 (avg. 2017–2021)	*B _{cur} /B _{0.1}	B _{cur} /B _{MSY}	*F _{cur} /F _{0.1}	F _{cur} /F _{MSY}	LCA/Yield-per- Recruit (F _{cur} /F _{0.1})	Assessment	Management recommendations <i>(A reduction in fishing mortality implies either a reduction in effort or the introduction of measures such as closed fishing seasons)</i>
<i>Pagrus caeruleostictus</i> Mauritania Senegal	7 280 (10 221)	130%	143%	50%	45%	-	Not fully exploited	The working group recommends maintaining the current level of catch.
<i>Dentex macrophthalmus</i> Mauritania Senegal Gambia	6 153 (5 245)	175%	192%	12%	11%	-	Not fully exploited	A gradual increase in catches can be envisaged.
<i>Plectorhynchus mediterraneus</i> Mauritania Morocco Senegal Gambia	12 684 (12 295)	92%	101%	121%	109%	-	Fully exploited	The working group recommends reducing catches to the MSY level (11 000 tonnes). The LCA model applied to data from Morocco shows a significant fishing mortality (F _{cur} /F _{0.1} = 217%).
<i>Pagellus bellottii</i> Mauritania Senegal Gambia	11 302 (11 147)	104%	114%	99%	84%	-	Fully exploited	The working group recommends not to exceed the maximum sustainable catch level (11 000 tonnes).

Table 3: Demersals Working Group - CECAF North

Stock	2021 catch in tonnes 2021 (avg. 2017–2021)	*B _{cur} /B _{0.1}	B _{cur} /B _{MSY}	*F _{cur} /F _{0.1}	F _{cur} /F _{MSY}	LCA/Yield-per- Recruit (F _{cur} /F _{0.1})	Assessment	Management recommendations <i>(A reduction in fishing mortality implies either a reduction in effort or the introduction of measures such as closed fishing seasons)</i>
<i>Pagellus acarne</i> Morocco	1 835 (1 498)	152%	168%	32%	29%	-	Not fully exploited	The working group recommends not to exceed the maximum sustainable catch level (3 800 tonnes). The LCA model used on the data from Morocco shows a high fishing mortality (F _{cur} /F _{0.1} = 278%).
<i>Brama brama</i> Mauritania Morocco	3 889 (4 805)	67%	73%	153%	137%	-	Overexploited	The working group recommends reducing catches to the MSY level (3 800 tonnes). As a precautionary measure, the group recommends a 30 percent reduction in the catch from its 2021 level.
Shrimps <i>Parapenaeus longirostris</i> Morocco	8 358 (5 416)	47%	52%	179%	161%	286%	Overexploited	The Group recommends a reduction in the current catch to the level of 2018 (4 900 tonnes).
<i>Parapenaeus longirostris</i> Mauritania	497 (717)	175%	193%	8%	7%	-	Not fully exploited	The working group concluded that a gradual increase in catches could be considered up to the level of catches in 2011 (2 500 tonnes).

Table 3: Demersals Working Group - CECAF North

Stock	2021 catch in tonnes 2021 (avg. 2017–2021)	*B _{cur} /B _{0.1}	B _{cur} /B _{MSY}	*F _{cur} /F _{0.1}	F _{cur} /F _{MSY}	LCA/Yield-per- Recruit (F _{cur} /F _{0.1})	Assessment	Management recommendations <i>(A reduction in fishing mortality implies either a reduction in effort or the introduction of measures such as closed fishing seasons)</i>
<i>Parapenaeus longirostris</i> Senegal Gambia	1 645 (1 780)	126%	139%	64%	58%	65%	Not fully exploited	Do not exceed the MSY catch level (2 000 tonnes).
<i>Penaeus notialis</i> Mauritania	923 (587)	92 % (2019)	102% (2019)	13% (2019)	12% (2019)	-	Fully exploited (2019)	Given the improvement in abundance in recent years, the group concluded that an increase in catches could be considered.
<i>Penaeus notialis</i> Senegal Gambia	4 399 (4 016)	112% (2019)	124% (2019)	93% (2019)	84% (2019)	-	Fully exploited (2019)	The working group recommends not to increase the catch level compared to 2021 (4 400 tonnes). The assessments conducted in 2022 with the JABBA model show a situation of not fully exploited with B _{cur} /B _{MSY} = 171% and F _{cur} /F _{MSY} = 77%.
<i>Aristeus varidens</i> Mauritania	164 (219)	146%	161%	41%	37%	-	Not fully exploited	The Working Group recommends not to exceed the MSY catch level (280 tonnes).
Cephalopods <i>Octopus vulgaris</i> Dakhla	39 285 (33 048)	94%	103%	104%	93%	-	Fully exploited	Maintain catches at the same level as 2021.

Table 3: Demersals Working Group - CECAF North

Stock	2021 catch in tonnes 2021 (avg. 2017–2021)	*B _{cur} /B _{0.1}	B _{cur} /B _{MSY}	*F _{cur} /F _{0.1}	F _{cur} /F _{MSY}	LCA/Yield-per- Recruit (F _{cur} /F _{0.1})	Assessment	Management recommendations <i>(A reduction in fishing mortality implies either a reduction in effort or the introduction of measures such as closed fishing seasons)</i>
<i>Octopus vulgaris</i> Cap Blanc	22 328 (32 963)	40%	44%	165%	149%	-	Overexploited	Reduce captures from current level.
<i>Octopus vulgaris</i> Senegal Gambia	3 822 (3 711)	44%	40%	323%	291%	-	Overexploited	The working group recommends a substantial reduction in fishing mortality and between taking spatio-temporal closure measures.
<i>Sepia</i> spp. Senegal Gambia	6 048 (5 452)	153%	168%	50%	45%	-	Not fully exploited	As a precautionary measure, maintain the current level of catch.
<i>Sepia</i> spp. Dakhla	27 914 (26 617)	141%	155%	74%	67%	-	Fully exploited	As a precautionary measure, reduce catches by 10% compared to the last year.
<i>Sepia</i> spp. Cap Blanc	2 685 (3 180)	105%	115%	30%	27%	-	Fully exploited	A gradual increase in catches can be envisaged.
<i>Loligo vulgaris</i> Senegal Gambia	189 (254)	-	-	-	-	-	No assessment	Based on operating indicators, the situation appears to have been stable over the past two years. As a precautionary measure, it is recommended not to increase catches.

Table 3: Demersals Working Group - CECAF North

Stock	2021 catch in tonnes 2021 (avg. 2017–2021)	*B _{cur} /B _{0.1}	B _{cur} /B _{MSY}	*F _{cur} /F _{0.1}	F _{cur} /F _{MSY}	LCA/Yield-per- Recruit (F _{cur} /F _{0.1})	Assessment	Management recommendations <i>(A reduction in fishing mortality implies either a reduction in effort or the introduction of measures such as closed fishing seasons)</i>
<i>Loligo vulgaris</i> Dakhla	22 617 (14 532)	32%	36%	370%	333%	-	Overexploited	Reduce catches from the current level to a level comparable to the average catch made between 2017 and 2020 (12 500 tonnes).
<i>Loligo vulgaris</i> Cap Blanc	2 514 (3 887)	74%	82%	94%	85%	-	Overexploited	Reduce captures from current level.

Table 4: Demersals Working Group - CECAF South

Group Fish 1						
Stock	Region	Catch (tonnes) 2021 (2017-2021 average)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
<i>Pseudotolithus elongatus</i>	Guinea + Guinea-Bissau, Sierra Leone, Liberia	17 631 (15 542)*	6%	143%	Overexploited	The working group recommends reducing the fishing effort.
<i>Pseudotolithus</i> spp.	Guinea + Guinea-Bissau, Sierra Leone, Liberia	15 133 (13 867)	-	-	No results from the assessment model and no conclusion can be made based on available data	As a precautionary measure and in anticipation of more complete and reliable data series being collected and available for all fisheries for the next meeting, the Working Group recommends that the catch does not exceed the average over the last 5 years (13 800 tonnes).
<i>Galeoides decadactylus</i>	Guinea + Guinea-Bissau, Sierra Leone, Liberia	16 348 (20 193)	110%	64%	Fully exploited	As a precautionary measure, the Working group recommends limiting the catches to a lower value than the last year (15 000 tonnes).
<i>Arius</i> spp.	Guinea + Guinea-Bissau Sierra Leone Liberia	51 711 (38 651)	-	-	No fit of the model	As a precautionary measure, the Working Group recommends a strong reduction in the catches that should not exceed 25 000 tonnes which corresponds to the 2016 catches.
<i>Pomadasys</i> spp.	Guinea + Guinea-Bissau, Sierra Leone, Liberia	11 519 (10 740)	47%	122%	Overexploited	The Working Group recommends a reduction of fishing effort and reiterates the 2017 recommendation to limit the catches at a maximum of 1 300 tonnes, as the stock was already overexploited in 2017.
<i>Cynoglossus</i> spp.	Guinea, Sierra Leone and Liberia	11 829 (8 917)	6%	87%	Overexploited	The Working Group recommends a reduction in fishing effort and to limit the catches to the minimum value over the period 2017-2021 (6 000 tonnes).
<i>Sparidae</i>	Guinea-Bissau, Guinea, Sierra Leone, Liberia	12 531 (17 110)	111%	89%	Fully exploited	The Working Group recommends that the fishing effort should not exceed the current level and that total catch should not exceed the level of the mean catch over the last five years (17 000 tonnes).
<i>Brachydeuterus auritus</i>	Guinea-Bissau, Guinea, Sierra Leone, Liberia	2 410 (1 336)	-	-	No fit of the model	As a precautionary measure, the Working Group recommends a reduction in fishing effort.

Table 4: Demersals Working Group - CECAF South

Group Fish 1						
Stock	Region	Catch (tonnes) 2021 (2017-2021 average)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
<i>Cephalopholis taeniops</i>	Cabo Verde	170 (in 2019 last data available) (234)***	-	-	No fit of the model	As a precautionary measure the Working Group recommends that the fishing effort does not exceed the current level and that total catch should not exceed the level of 2015 (200 tonnes).
Muraenidae	Cabo Verde	104 (2019) (127)***	139%	52%	Fully exploited	The Working Group recommends that the fishing effort should not exceed the current level and that total catch should not exceed the average of the last five years (130 tonnes).
<i>Pseudopenus prayensis</i>	Cabo Verde	52 (2019) (92)***	66%	68%	Model fits but results are not reliable	As a precautionary measure the Working Group recommends that the fishing effort should not exceed the current level and that total catch should not exceed the average of the 5 last years (90 tonnes).
<i>Seriola</i> spp.	Cabo Verde	113 (2019) (141)	-	-	Model does not fit the data	As a precautionary measure the Working Group recommends that the fishing effort should not exceed the current level and that total catch should not exceed the average of the 5 last years (140 tonnes).
<i>Diplodus</i> spp.	Cabo Verde	25 (2019) (30)	20%	113%	Model fits but results are not reliable	As a precautionary measure the Working Group recommends that the fishing effort should not exceed the current level and that total catch should not exceed the average of the 5 last years (30 tonnes).

Table 4: Demersals Working Group - CECAF South

Group Fish 2						
Stock	Region	Catch (tonnes) 2021 (2017-2021 average)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
<i>Brachydeuterus auritus</i>	Côte d'Ivoire + Ghana + Togo + Benin	18 045 (16 094)	98%	123%	Fully exploited	As a precautionary measure the Working Group recommends a reduction in fishing effort in order not to exceed the average catch of the last five years (16 094 tonnes).
<i>Galeoides decadactylus</i>	Côte d'Ivoire + Ghana + Togo + Benin	5 723 (4 096)	95%	149%	Overexploited	Given that this species was considered overfished in 2017 and the analysis of the different available CPUE shows similar trends, the Working Group recommends that the catch does not exceed the average of the last 5 years (4 096 tonnes)
<i>Dentex</i> spp.	Côte d'Ivoire + Ghana + Togo + Benin	6 248 (3 721)	94%	106%	Fully exploited	Despite the apparent improvement in stock status compared to 2008 and 2011 assessments, as a precautionary measure, the Working Group recommends not to increase fishing effort and that the catch of this species should not exceed the average of the last five years (3 721 tonnes).
<i>Pagellus bellottii</i>	Côte d'Ivoire + Ghana + Togo + Benin	6 472 (5 101)	139%	63%	Fully exploited	Considering the results obtained in the CPUE assessments and trends, the Working Group recommends that the catch do not exceed the current levels (5 102 tonnes).
<i>Pseudotolithus</i> spp.	Côte d'Ivoire + Ghana + Togo + Benin	9 859 (8 775)	80%	188%	Overexploited	The Working Group recommends not to increase the fishing effort and that the catch is maintained at the level recommended by the 2017 assessment (2 600 tonnes).

Table 4: Demersals Working Group - CECAF South**Group Fish 3**

Stock	Region	Catch (tonnes) 2021 (2017-2021 average)	*B_{cur}/B_{0.1}	*F_{cur}/F_{0.1}	Assessment	Management recommendations
<i>Pseudolithus</i> spp.	Nigeria + Cameroon	21 263 (22 443)	-	-	The Model did not fit the data	As a precautionary measure, the Working Group recommends not to increase the mean catch of the last five years (22 500 tonnes).
<i>Galeoides decadactylus</i>	Nigeria + Cameroon S. Tome & Equatorial Guinea	9 796 (10 177)	-	-	No results for the assessment model. Based on other information available the Working Group considerer that the stock is fully exploited	As a precautionary measure, the Working Group reiterates the recommendation of the last Working Group not to increase the catch beyond the 7 000 tonnes.
<i>Cynoglossus</i> spp.	Nigeria + Cameroon, Equatorial Guinea	9 588 (9 948)	-	-	No fit of the model	As a precautionary measure the Working Group recommends that the catch does not go beyond the mean catch of the last five years (10 000 tonnes).
<i>Dentex</i> spp	Sao Tome & Principe and Equatorial Guinea	110 (no data) (247)	-	-	No assessment	In the absence of updated information, the Working Group is not in position to give any recommendation in relation to catch or effort level for <i>Dentex</i> spp.
<i>Pagellus</i> spp	Equatorial Guinea, Sao Tome& Principe	82 (134)	-	-	No assessment	The Working Group is not in position to give any recommendation in relation to catch or effort level for <i>Pagellus</i> spp.
<i>Brachydeuterus auritus</i>	Nigeria	3 113 (3 257)	96%	92%	Fully exploited	The Working Group recommends not to increase the fishing effort of 2021. The total catch should not exceed the 2021 catch (3 000 tonnes).
<i>Arius</i> spp	Nigeria + Cameroon	11 820 (12 187)	-	-	No reliable results for the assessment model. Based on other information available the Working Group considers the stock fully exploited	The Working Group recommends not to increase the fishing effort of 2016. The total catch should not exceed the average catch of the last 5 years (12 000 tonnes).
<i>Pomadasy</i> spp.	Nigeria and Sao Tome & Principe	7 914 (8 280)	-	-	No reliable results for the assessment model	As a precautionary measure the Working Group recommends not to exceed the average catch of the last 5 years (8 000 tonnes).

Table 4: Demersals Working Group - CECAF South

Group Fish 4						
Stock	Region	Catch (tonnes) 2021 (2017-2021 avg.)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
<i>Pseudotolithus</i> spp.	Angola+Congo+Gabon	18 960 (19 251)	-	-	No fit of the model	As a precautionary measure and given that this group of species was considered overexploited in the last existing assessment (2011), the Working Group reiterates the recommendation to reduce fishing effort.
<i>Galeoides decadactylus</i>	Angola+Congo+Gabon	2 746 (2 733)	-	-	No reliable results for the assessment model	The Working Group reiterated the 2017 recommendation to reduce fishing effort.
<i>Cynoglossus</i> spp.	Gabon +Congo+ Angola	760 (1 150)	-	-	No reliable results for the assessment model	The Working Group recommends decreasing the fishing effort.
<i>Dentex</i> spp.	Congo+ Gabon+Angola	663 (821)	-	-	No satisfactory fit	The Working Group recommends a reduction in fishing effort. Since data from Angola were missing, the Working Group recommends that special attention be given to the fishery in that country.
<i>Dentex macrophthalmus</i>	Angola	12 943 (12 506)	-	-	No reliable results for the assessment model	The Working Group recommends not to increase the fishing effort.

Table 4: Demersals Working Group - CECAF South

Group Fish 4						
Stock	Region	Catch (tonnes) 2021 (2017-2021 avg.)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
<i>Brachydeuterus auritus</i>	Congo+Angola	9 254 (6 223)	-	-	No reliable results for the assessment model	The Working Group recommends that the total catch should not exceed the average over the last 5 years (6200 tonnes).
<i>Pomadasyss spp.</i>	Gabon+Congo+ Angola	4 063 (2 609)	-	-	No fit of the model	The Working Group recommends to reduce fishing effort.
<i>Arius spp</i>	Gabon and Congo	597 (447)	95%	133%	Fully exploited	As a precautionary and tempting measure, given that the previous Working Group had concluded not fully exploited, the Working Group reiterates the recommendation of previous groups not to exceed a catch level of 500 tonnes.
<i>Merluccius spp.</i>	Angola	12 889 (11 848)	79%	132%	Overexploited	The Working Group recommends to decrease the fishing effort and carry out proper monitoring of the catch
<i>Pentanemus quinquarius</i>	Congo and Gabon	441 (514)	111%	74%	Fully exploited	As a precautionary measure, the Working Group recommends not to increase the fishing effort and not to exceed the level of 2021 (440 tonnes).
<i>Pagellus belotti</i>	Angola and Gabon	205 (1 191)			No reliable results for the assessment model	Given the lack of reliable assessment results, the Working Group is not able to provide recommendations on catch and effort. The working group recommends improving the quality of catch and effort data and reinforce the sampling in landing sites (research).

Table 4: Demersals Working Group - CECAF South

Shrimps						
Stock	Region	Catch (tonnes) 2021 (2017-2021 avg.)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
<i>Parapenaeus longirostris</i>	Guinea-Bissau Guinea	980 (1 309)	106%	76%	Fully exploited	As a precautionary measure, the Working Group recommends that catches do not exceed the level of the average of the last five years (1 300 tonnes).
	Congo	330 (350)	-	-	No result from the assessment model	The Working group decided to keep the last recommendation of not to exceed the catch levels of 2016 (500 tonnes).
	Angola	586 (650)	-	-	No fit of the model	Due to the uncertainty of the stock status and as a precautionary measure, the Working Group recommends that catches do not exceed the average value over the last five years (650 tonnes).
<i>Penaeus notalis</i>	Guinea- Bissau	557 (400)	163%	28%	Not fully exploited. Stock seems to be in good condition, but assessments were accepted with caution because of low fit of the model	The Working Group recommends that the catch should not exceed the mean catch of the last five years (400 tonnes). This should be considered with caution due to the lack of artisanal fishery information and incomplete or not accurate data from some industrial fleets.
	Sierra Leone	1 (6)	-	-	As there are gaps in information on catch and CPUE, the Working Group was not able to conduct any assessment	No recommendation.
	Ghana	1 235 (564)	-	-	No assessment	Given the uncertainty in the data and as a precautionary measure the Working Group recommends not to increase catches above the average of the last five years (550 tonnes).

Table 4: Demersals Working Group - CECAF South

Shrimps						
Stock	Region	Catch (tonnes) 2021 (2017-2021 avg.)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
	Gabon	234 (336)	146%	34%	Not fully exploited	According to the assessments the Working Group considers the stock could sustain a controlled increase in catch adjusted gradually to the effort level recommended in the National shrimp management plan (idem in 2022).
	Nigeria	1 490 (1 369)	-	-	No fit of the model	Given the uncertainty in the data, as a precautionary measure, the working group recommends not to increase catches above the average of the last five years (1 370 tonnes).
	Congo	226 (285)	100%	81%	Fully exploited	The Working Group recommends –that the catch does not exceed the average level of the last five years (285 tonnes).
<i>P. notialis</i>	Angola	229 (259)	-	-	No new assessment due to data gaps.	As a precautionary measure, the Working Group recommends that the catch does not exceed the average over the last five years (260 tonnes).
<i>Coastal shrimps</i>	Guinea	- (-)	-	-	No fishery.	The Working Group was not in a position to provide specific management advice.
	Benin	0.4 (0.8)	-	-	No fit of the model	The Working Group was not in a position to provide specific management advice.
	Nigeria	4 789 (4 019)	-	-	No fit of the model	The Working Group was not in a position to provide specific management advice.
	Cameroon	302 (337)	52%	175%	Overexploited	The Working Group reiterates the recommendation of the last Working Group to decrease the catch to a level below the level recommended in 2017 (300 tonnes).
<i>Palinurus charlestoni</i>	Cabo Verde	0 (0)	-	-	Closed fishery	The Working Group recommends to keep the fisheries closed until new signs of recovery of the stock.

Table 4: Demersals Working Group - CECAF South						
Shrimps						
Stock	Region	Catch (tonnes) 2021 (2017-2021 avg.)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
<i>Aristeus varidens</i>	Guinea Bissau and Guinea	256 (163)	-	-	No assessment	Taking into account the uncertainty on the stock status, as a precautionary measure, the Working Group recommends that catches do not exceed the average value over the last five years (160 tonnes).
	Congo	239 (230)			No fit of the model	Taking into account the uncertainty on the stock status and as a precautionary measure, the Working Group recommends that catches do not exceed the average value over the last five years (230 tonnes).
	Angola	1 514 (1 385)	98%	99%	Fully exploited	Given that this fleet has shown a clear change of the fishing strategy in the period 2013-2021, targeting this species instead <i>P. longirostris</i> , and given the uncertainty in the data, the Working Group recommends not to exceed the minimum value of catches reported in 2013-2021 (1 000 tonnes).

Table 4: Demersals Working Group - CECAF South						
Cephalopods						
Stock	Region	Catch (tonnes) 2021 (2017-2021 avg.)	*B _{cur} /B _{0.1}	*F _{cur} /F _{0.1}	Assessment	Management recommendations
<i>Sepia</i> spp.	Ghana	1 655 (2 116)	-	-	No fit of the model	The fishing effort should not exceed the 2021 effort, or the catch should not exceed the average of the last 5 years (2 100 tonnes).
	Guinea-Bissau	3 490 (1 891)	85%	237%	Overexploited	The working group recommends a reduction of fishing effort.
	Guinea	2 717 (1 740)	158%	27%	Not fully exploited	The working group was unable to provide an advice because in the last five years effort dropped significantly as compared to the previous years.
<i>Octopus vulgaris</i>	Guinea-Bissau	2 462 (1 620)	99%	111%	Fully exploited	As a precautionary measure the working group recommends that catch does not exceed the average of the last 5 years (1620 tonnes).
	Guinea	6 (28)	-	-	No fit of the model	The working group was unable to provide an advice because in the last five years effort dropped significantly as compared to the previous years.