



CopeMed II report of the tenth meeting of the Coordination Committee

30-31 October 2017
Algiers, Algeria

CopeMed II Technical Documents N°47
GCP/INT/028/SPA; GCP/INT/270/EC

**REPORT OF THE TENTH MEETING OF THE
COPEMED II COORDINATION COMMITTEE**

Algiers, Algeria 30-31 October 2017

October 2017

The conclusions and recommendations given in this document and in other documents in the *Co-ordination to Support Fisheries Management in the Western and Central Mediterranean* CopeMed II Project series are those considered appropriate at the time of preparation. They may be modified in the light of further knowledge gained in subsequent stages of the Project. The designation employed and the presentation of material in this publication do not imply the expression of any opinion on the part of Food and Agriculture Organization of the United Nations, FAO, the Government of Spain or the Commission of the European Union concerning the legal status of any country, territory, city or area, or concerning the determination of its frontiers or boundaries. This document has been financed by the European Union and the Government of Spain. The views expressed herein can in no way be taken to reflect the official opinion of the European Union or the Government of Spain.

Preface

The CopeMed II Project on *Co-ordination to Support Fisheries Management in the Western and Central Mediterranean* is executed by the Food and Agriculture Organization of the United Nations (FAO) and funded by the Government of Spain, represented by the Secretaría General de Pesca (M^o de Agricultura, Alimentación y Medio Ambiente, MAGRAMA), and the European Union, represented by the European Commission (EC). The premises of the project at the Subdelegación del Gobierno in Málaga (Spain) are part of the Spanish contribution included in the agreement with the FAO.

The objective of the project is to maintain the sustainability of the marine fisheries in the central and western Mediterranean Sea and its ecosystem, taking into consideration environmental, biological, economic, social and institutional issues. In addition, the project will continue to reinforce the collaboration among the participating countries of the sub-region by facilitating their participation in the activities of the Scientific Advisory Committee (SAC) and in the General Fisheries Commission for the Mediterranean (GFCM).

Regions covered by CopeMed II are the western and central sub-regions of the Mediterranean. Participating countries are Algeria, France, Italy, Libya, Malta, Morocco, Tunisia and Spain. The main beneficiaries are the fishery policy-makers, managers and fishery administrations in the western and central Mediterranean countries. The project is also contributing to the strengthening of regional collaboration by supporting the participation of the countries in relevant regional scientific organizations, such as the FAO's General Fisheries Commission for the Mediterranean (GFCM). Secondary beneficiaries include the national research institutes, fishers and fishers' associations, and industrial organizations.

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CopeMed II project publications are issued in the CopeMed Technical Documents series and are related to meetings, missions and research organized or conducted within the framework of the CopeMed II Projects.

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Preparation of this document

This document is the final version of the report of the 10th meeting of the Coordination Committee of the FAO-Project CopeMed II held in Algiers (Algeria) the 30-31 October 2017 adopted by the participants. The finalisation of this CopeMed Technical Document was made in collaboration with the participants and the FAO staff of CopeMed II in Malaga and Rome.

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ABSTRACT

The tenth meeting of the CopeMed II Coordination Committee was held in Algiers (Algeria) on 30-31 October 2017. The annual meeting was attended by representatives of the Spanish Donor, the Secretaria General de Pesca, the SAC chair on behalf of GFCM Secretariat, representatives from the participating countries Algeria, Spain and Tunisia. Written contributions were received from Italy, Libya, Malta, Morocco which could not attend and excused their absence, the Project Acting Coordinator and the fishery expert of CopeMed II. The Committee reviewed the activities implemented during the inter-sessions period and adopted a series of activities for the next period of the project until the end of 2018 which, among the most relevant includes: working groups on stock assessment of shared stocks, a research project for the identification of stock boundaries in Alboran sea and different training activities. The country representatives recognized the important contributions of CopeMed II to the development of the national and regional capacity and particularly the advances in analysing data and produce assessment of shared stocks. The regional cooperation and the key role of the project in support to increasing scientific knowledge on fishery resources and ecosystems and the valuable support to the GFCM activities was underlined.

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REPORT OF THE 10TH COORDINATION COMMITTEE MEETING OF COPEMED II

Algiers, Algeria
30-31 October 2017

Opening of the meeting, election of the Chairperson and adoption of the Agenda

1. The 10th meeting of Coordination Committee (CC) of the CopeMed II Project was held in the Sheraton Club des Pins Resort in Algiers from 30-31 October 2017. It was attended by representatives of the Spanish Donor (Secretaría General de Pesca), the SAC Chair on behalf of GFCM, delegations from Algeria, Spain and Tunisia, the Project Acting Coordinator and the fishery expert of CopeMed II. Written contributions were received from Italy, Libya, Malta and Morocco which could not attend and excused their absence. List of participants is enclosed as Annex 1.
2. On behalf of the Spanish Government, the Ambassador of Spain in Algiers, Mr Carlos Cabanas, thanked the hosting country and authorities present at the inception session for the organization of the meeting, highlighting that it was the 10th Coordination Committee, a number that deserved special celebration, and furthermore it was the first time that a coordination meeting of the Project was held in Algeria. He also recalled that altogether both phases of the Project CopeMed II accounted for nearly 20 years of duration, and many positive outcomes had been achieved so far, being Spain the pioneer in the launching of the FAO Fisheries Cooperation projects with the first CopeMed. He pointed out how FAO projects help to strengthen national capacities and improvement of scientific data, which in the end contributes to a better management of fisheries resources in the Mediterranean region. He also expressed that one of the main outputs achieved was the close and friendly relationships between countries and experts involved, what constituted a success of this initiative. He finalized wishing a fruitful session to the participants.
3. The Representative of the General Secretary for Fisheries Spanish Ministry for Agriculture and Fisheries, Food and Environment, as one of the donors of the Project, Mrs Encarnación Benito expressed her gratitude to the Algerian authorities for their offer to host the meeting and kind hospitality in such a nice venue. She congratulated the Project for its 10th anniversary meaning that, although initially foreseen for a three years period, the Project had been able to continue for ten years thanks to the support of the donors, both Spain and EU Commission (DG MARE), but also thanks to the constant collaboration, work and support of all the people from the different administrations and research institutes of countries involved. She also recalled the important work of FAO staff and coordinators of the Project, first Juancho Camiñas, and now Pilar Hernández. She highlighted the goals ahead regarding fisheries management in the Mediterranean facing the bad situation of our resources, already reflected in the recently adopted Malta MedFish4Ever Ministerial Declaration -that takes also into consideration FAO Projects- and the Mid-term GFCM Strategy for the Sustainability of Mediterranean Fisheries. She stated that CopeMed II Project had an increasing role in this aim contributing with numerous stock assessments and works on shared stocks to the SAC of GFCM. She finalized recalling the support of the Secretariat General for Fisheries to the continuity of the Project, which has demonstrated relevant results in the strengthening of capacities and better knowledge for a better management of our resources.

4. On behalf of the His Excellency Mr. Abdelkader Bouazgui, Minister Agriculture, Rural Development and Fisheries, while ensuring the attention given by His Excellency to the work of the project, Mr. Taha Hammouche, Director General of Fisheries welcomed the participants to Algeria and expressed the privilege for his country to host the 10th meeting of the Project Coordination Committee. He congratulated the Project for the amount of work done and acknowledge the increasing involvement of Algeria in the recent years. He underlined that beyond its scientific and technical objectives, the Project represented a nexus between the institutions of the region in charge of marine sciences and a meeting and sharing point of international best practices for the sustainable development of fisheries as well a means of professional and human exchange. The value of the Mediterranean from all its dimensions: ecosystems, cultural heritage, social function were acknowledged and its fragility also highlighted. The sustainability of its resources and intrinsic values call for proper management based on the best scientific knowledge and to his views, the work of CopeMed II Project was contributing to meet the challenges of the sustainability of maritime fisheries in the central and western Mediterranean Sea taking into account environmental, biological, economic and social issues and promoting scientific cooperation between coastal countries through coordinated scientific research, harmonized data collection and joint multidisciplinary approaches. He further thanked the participating countries in the commitment to the Project. He finally wished successful meeting.
5. Mr Marcelo Vasconcellos, acting coordinator of CopeMed II, welcomed participants and thanked the CNRDPA for the excellent organization of the meeting. He expressed his gratitude to the Secretaría General de Pesca of Spain and the European Commission for continuing financing the Project and thanked the participating delegates for the efforts in implementing the CopeMed activities at national level.
6. Mr Rachid Annane Director General of the *Centre National pour la Recherche et le Développement de la Pêche et l' Aquaculture* (CNRDPA) was elected chairperson of the meeting.

Report on the CopeMed Project's Progress

7. After adoption of the Agenda (Annex 2), CopeMed Fishery Expert introduced item 2 based on the document FAO-CopeMed II CC10/2017/02 (Annex 3), in which the activities carried out by CopeMed II from May 2016 to October 2017 were presented. She emphasized that all the activities carried out were in line with the Project objectives and the suggestions agreed during the 9th Meeting of the Coordination Committee (Malta, 28-29 April, 2016).
8. She informed that CopeMed II continued the cooperation with national delegates and the countries experts, concerning the capacity of the fisheries administrations and research institutes to generate statistical data of interest for fisheries assessment and management.
9. She reminded participants that within the CopeMed II framework on joint evaluation of the state of exploited stocks, two study groups were created in 2010 to facilitate the joint assessment of priority stocks in Alboran Sea (GSAs 01, 02, 03 and 04): the study groups met twice: on 17-20 October 2016 in Tangier, Morocco and on 9-11 October 2017 in Malaga. In both cases the stocks assessed jointly were hake in GSA 01 and 03 which resulted in overexploitation status the two consecutive years, and sardine in GSA 01 and 03, sustainably exploited in 2016, and close to overexploitation in 2017.

10. In the second occasion, Algerian data from the western part of the country, were combined to produce preliminary assessments of deep sea pink shrimp, hake and sardine covering a wider area of the Alboran Sea.
11. The corresponding stock assessment results were transmitted to the working groups (WGs) of the GFCM held in Rome in November 2016 and 2017 which validated the assessments and recommended an in-depth analysis on stock boundaries and to continue investigating the pertinence of joining GSAs 1 and 3 for sardine and for hake.
12. To provide feedback to these and SAC recommendations, the Project, in collaboration with the Spanish Institute of Oceanography (IEO) organized a “Technical workshop for the identification of stock units in the Alborán Sea” from 3-6 April 2017 in Alicante, Spain. Experts discussed current methodologies for the delimitation of stocks with the final aim to design a medium-term research program to identify stocks of sardine and hake and their spatial distribution in the Alborán sea (GSAs 1, 2, 3,4 and adjacent waters). Participants agreed to undertake this study of a minimum duration of two years applying a multidisciplinary approach taking advantage of the current surveys in place. The report of this workshop which includes the description of this research program, was published as Technical Document N°46 and is available to this meeting as FAO-CopeMed II CC10/2017/Inf 04. In addition, a summarised “Concept note” was also drafted to be distributed at the SAC and is available as FAO-CopeMed II CC10/2017/inf 05. The proposal was supported by the Scientific Committee (SAC) of the GFCM at the meeting held on 16-19 May in Slovenia which also requested CopeMed II to include another priority species in the sub-region (*Pagellus bogaraveo*).
13. The Working Group of *Coryphaena hippurus* met in September 2016 to assess the stock of this species in the Western-Central Mediterranean. The workshop, jointly organized by CopeMed II-MedSudMed. An invited expert from the Inter American Tropical Tuna Commission introduced the methods recently used in Eastern Pacific and trained the participants on its use. The Monthly Depletion Estimator, an adaptation of Stock Synthesis was tested for the first time in the Mediterranean. Preliminary results of assessment were presented at the GFCM Working Group on Stock Assessment, Rome, 7-12 November 2016. The report has been published as CopeMed II Technical Document 44. Further investigations are needed to confirm the suitability of CPUEs as indicator of the abundance of the species which are being carried out by members of the Working Group in 2017.
14. European Eel is also a priority species at basin level after the decline in catches in the last 20 years. A pilot study is being developed by the INSTM in Tunisian Lagoons under the support of CopeMed II since July 2017. The overall objective of this study is the collection of baseline data for a preliminary assessment of the national stock of European eel in Tunisia as contribution to the Mediterranean stock assessment and in preparation of a future Regional Management Plan.
15. CopeMed Fishery Expert described the training activities that were organized by the project during the year. A joint GFCM-INRH-CopeMed II training workshop on stock assessment methods, Tangiers, Morocco, December 2016 organized back-to-back with the meeting of the Sub-regional Committee in Western Mediterranean to train experts in the most current stock assessment methods in the Mediterranean region. Theoretical and practical sessions with national fishery data were carried out.
16. In the framework of the bilateral activities between Algeria and Tunisia and the preparation of joint stock assessments, two experts from the CNRDPA, Algeria visited the center of INSTM at La Goulette, Tunisia to be trained on laboratory techniques for otoliths age reading (daily rings) and morphometry (12-16 December 2016).

17. Training course in the collection of socio-economic data in Algiers from 9 to 23 March 2017. The course was attended by members of the national institute CNRDPA as well as of the General Direction of Fishing in the provincial offices. During the course, a template for a survey in ports was agreed and is being used to collect data in several ports of Algeria as part of the pilot study for data collection in the Eastern region.
18. Training in laboratory techniques for the study of ichthyoplankton at IEO, Gijón, Spain June 20-30. An Algerian expert made a two-weeks stay at the Spanish Institute of Oceanography in Gijón to work on ichthyoplankton identification techniques and oceanographic campaigns.
19. Summer School in Quantitative Fisheries Stock Assessment co-organised by FAO/GFCM/JRC in Mazara del Vallo, Italy. This two weeks course was attended by 30 experts from Mediterranean and Black sea countries and was delivered by lecturers from the three funding institutions. The most complete series of models run in the platform R were made available to all participants who were able to work with their own data in practical sessions guided by the trainers. This has been a collective effort and is the first of a series intended to be repeated every year.
20. Copemed staff and two INSTM experts participated in an on-the-job training mission to Annaba and El kala (Algeria) to launch a pilot action for biological sampling in ports.
21. It was noted that to ensure synergies and optimization of resources, the implementation of project's activities are tightly coordinated with other FAO regional projects in the Mediterranean, especially with MedSudMed giving the geographical coverage of the projects. Coordination with the GFCM is also continuously promoted to ensure that project activities can contribute to regional management priorities. It was also noted that appropriate communication is maintained with the Regional Office for North Africa and the Near East, RNE, in Cairo, the subregional office for North Africa, SNE in Tunis and the national offices in Algiers, Tunis and Rabat.
22. Regarding the communication, the Project's website is continually updated. News, information and technical documents are available from the CopeMed website. Further to the website, CopeMed has recently created an on-line Work Space for more direct exchange of information among the experts.
23. The Committee thanked the project for the work done and stressed the quality and the number of important results and products achieved.

Proposals on national activities in the framework of the Project.

24. National focal points were invited to comment on their proposals for priority issues in their countries needing specific support from the project.
25. Tunisian delegate thanked Algeria and CNRDPA for hosting the meeting and the project for the continuous support provided to his country. He expressed concern about the increasing presence of invasive species in Tunisian waters where more than 70 species have already been detected. It has become a widespread problem not only restricted to most Eastern countries as it was in the past. On this issue, he was favorable to initiate some activity in Western Mediterranean to monitor the presence of alien species. In addition he proposed to continue the ongoing works initiated in Tunisia in 2017 on European Eel, and on the EAF pilot study in El Bibane lagoon. In addition, they proposed to extend this experience to other fisheries, particularly, small pelagic fishery. He encouraged the WG on *C. hippurus* to continue their activities and recommended to include also the socio-economic aspects given the decrease in the catches observed in his country. *Seriola*,

dumerilii was also of interest for Tunisia. With regard the blackspot seabream, he informed that it is a species fished in the North part of Tunisia together with hake by trawlers and that the country would like to contribute to the research program for the assessment of the species. The small pelagic stocks were also a relevant subject. He informed that the R.V. Hannibal was ready to re-establish the acoustic surveys and that any support from CopeMed and MedSudMed Projects to standardize methodologies for data interpretation and processing would be most appreciated. Finally, he stressed that the work of FAO Regional Projects and the national institutions should be well coordinated and also well aligned with GFCM, and on this regard, all efforts are welcome.

26. Algerian delegate informed the Committee of the plans of CNRDPA to establish a new laboratory on sclerochronology and requested the support of the Project to develop the capacities of CNRDPA staff in the field of age reading. Surveys at sea are currently being carried out in Algeria but they need some capacity building on the interpretation and correct analysis of these data. He expressed also interest in working on European Eel and on *Pagellus bogaraveo*, given the relevance of these two species also in Algeria. He congratulated the project for the work on EAF plan in El Bibane lagoon (Tunisia) and proposed to undertake one pilot study on EAF in one of the two areas where requests were already made by fishermen to establish management and conservation measures, such as MPAs.
27. Mr Moussa Mennad did a presentation on a series of experimental fisheries that had been carried out by the CNRDPA with the support of the European Project DIVECO 2. They used FADs for dolphinfish fishery, pots for octopus, pound nets and deep bottom longlines. The objective of this experiments is to develop new fisheries that do not exist currently in Algeria (FADS for dolphinfish) but that have demonstrated potential or other that used to exist in the past but had been abandoned, in the recent years. The Committee congratulated the CNRDPA for this experience that intends to promote the use of more selective gears adapted to the small-scale fisheries and suggested that if a new fishery is going to be developed to catch *Coryphaena*, the Algerian experts should be integrated in the CORY-Working Group and start collecting the necessary data.
28. On this regard, the INSTM representative expressed their willingness to collaborate with the CNRDPA in gear technology and in biological studies and collection of fisheries data for *Coryphaena* and for octopus, given the expertise that his Institute has on these valuable species.
29. The representative of DGPA of Algeria highlighted the importance of artisanal fisheries and called for the support of the Project for a good preparatory work to participate in the upcoming activities on Small scale fisheries to be organized by GFCM next year including the High-Level Meeting on Small-Scale Fisheries to be held in Malta in September 2018.
30. Spain delegate supported the priority lines of action marked in the GFCM_SAC document, which also find parallelism in the activities of CopeMed II. In this sense, Spain is interested in deepening the assessment and sustainability conditions of the main commercial fishing species, both pelagic and demersal. In achieving this objective, he therefore suggested to put the focus on the following fundamental aspects:
 - Stock identification studies especially in areas where there are shared resources such as in the Alborán Sea. In this sense, Spain strongly supports the project proposal under CopeMed II on the identification of stocks of hake, sardine and blackspotseabream in the Alborán Sea and adjacent waters.
 - Stock assessment of blackspot seabream: In addition to the close collaboration between Morocco and Spain, he emphasized the convenience to include this work and others

related to the assessment and monitoring of this species under the umbrella of CopeMed II as it was in the past.

- To improve the basic data of the fishing activities (using observers on board, landing data, effort, etc.) as well as of the biology of commercial species, offering collaboration with the countries under the umbrella of CopeMed II.
- Reinforce and support the obtaining of fishery independent information, through the coordination and standardization of research surveys. Spain supports collaboration between countries in this regard. In fact, in November 2017, there is a proposal for a survey on sardine in the Gulf of Cádiz area that will be in collaboration with Morocco. The samples collected in this survey can be used in the proposed project for stocks identification in the Alborán Sea.
- To support the specialized training in fisheries modeling and stock assessment. He stressed that the region should have the best experts in order to ensure the quality of future evaluations, creating a competent team of scientists and technical experts.
- Spain also considered of interest to share the experiences on Marine Protected Areas and Vulnerable Habitats, in relation to their definition, monitoring, and biological and socio-economical consequences of their establishment.

31. The inputs received from Italy, Malta and Morocco were presented to the Committee and are copied here below

32. Italy representative apologized for not being able to participate to the 10th Meeting of the CopeMed II Coordination Committee and on behalf of the DG Pesca of the Ministry of Agricultural, Food and Forestry Policies wishes to acknowledge the important role played by Copemed II in fostering cooperation among countries for the assessment and management of shared stocks and fisheries in the Western Mediterranean Sea. The Project provided a relevant support to the activities of the General Fisheries Commission for the Mediterranean towards the goals and targets set forth by the GFCM mid-term strategy (2017–2020). In this context, the synergies developed in these years with the MedSudMed Project appear as extremely important. In these years the Project has achieved important results in terms of assessment of the status of the stocks in the region and promoted relevant training activities at the Mediterranean scale, such as the summer school in stock assessment carried out in July 2017 in cooperation also with the Italian National Research Council (CNR). As representative of Italy I would like to stress the necessity to finalize the Project activities defined in the work plan 2017-2018 towards the vision of sub-regionalization policy adopted by the GFCM. On this regard, key aspects are those related to the standardization of methodologies in the region, with a particular attention to data collection where the Project can provide important assistance to national institutions to further develop data collection programs and fill the existing gaps. In this context, a key step is also related to the inclusion of stakeholders in the management discussions and the research work on aspects related to the identification of nursery and spawning areas in support of the decision-making process. The Italian DG-Pesca is fully available to support the project on these aspects in particular promoting the scientific collaboration of Italian fisheries scientists to the project activities. Finally, I would like to express the gratitude and appreciation of the Italian DG-Pesca to the Algerian authorities for the hospitality provided to this meeting.

33. Malta representative regretted that due to current restrictions concerning staff compliment they were not able to attend this meeting. Nevertheless, they still believe that the CopeMed is an important project which should continue to deliver the excellent results it has achieved to date. To this end Malta would like to reconfirm its interest in the work being done on the

dolphin fish and to continue building on the strong cooperation which has been established. They are also interested in participating to the genetic analysis exercise of the blackspot seabream in the Mediterranean.

34. Morocco representative also regretted not being able to attend and transmitted his words to the Committee in a written note: First of all he thanked the Copemed project and its staff for their tremendous support for fisheries research activities in Morocco and at the regional level. This support is not only limited to the financial aspects, but also to the technical aspects. The project has played a key role in promoting the communication among scientists in the region that are now better connected through collaboration networks created and strengthened by the Project. Also, the project has contributed very positively to the involvement of scientists in GFCM activities, which is very important for the sustainability of the Mediterranean's fisheries resources, our first objective to all of us. The following actions were proposed for the support of the Copemed project:

- The monitoring program for the blackspot seabream in the Strait of Gibraltar and adjacent regions is a priority. This program will include in particular the following activities: i) Biological sampling for one year, to collect the different biological parameters that will be used to determine the size of the first maturity and to perform a better quality stock assessment; ii) observation campaigns onboard artisanal and coastal fishing vessels; iii) application of genetic techniques for the identification of stocks.
- Involvement of INRH in the research project 'Transboundary population structure of sardine, hake and blackspot seabream in the Alboran Sea: a multidisciplinary approach' and improved visibility of the activities of this project.
- Continue the support of our scientists in participating in the GFCM and stock assessment related WGs and in particular in training activities on this subject promoting the participation of beginners.
- Support the participation of Moroccan experts in international surveys in the Mediterranean, such as MEDITS and others

35. CopeMed thanked the participating countries for the interventions and noted that the requests were in line with the project objectives and could contribute to an enhanced knowledge and capacity needed to support fisheries decision making in the region. Participants were reminded that the implementation of the proposed activities will depend on the availability of funds and therefore could not be asserted at the present time.

GFCM activities of relevance for CopeMed II

36. Mr Othman Jarboui, SAC Chairperson, provided an overview of the preliminary work plan of the SAC for 2017-2018, as approved at the forty first session of the Commission (Budva, Montenegro, 16-20 October 2017). He presented activities planned at the regional level, for the entire Mediterranean Sea and at the sub-regional level, specifically for the Western and Central Mediterranean sub-regions. At the regional level, foreseen activities were aligned with the implementation of the mid-term strategy (2017-2020) towards the sustainability of Mediterranean and Black Sea fisheries. Regional activities addressing Target 1 of the mid-term strategy on enhancing knowledge and strengthening advice included developing a more comprehensive framework for management strategy evaluation, implementing scientific surveys-at-sea and expanding socio-economic data collection. Regional activities addressing Target 2 on promoting sustainable small-scale and recreational fisheries included providing technical advice on SSF in advance of the high-level meeting on SSF,

testing MCS technology for SSF and compiling expert inputs on recreational fisheries. Regional activities addressing Target 3 on curbing IUU fishing included implementing the roadmap for the estimation of IUU fishing. Finally, regional activities addressing Target 4 on interactions between fisheries and the marine environment included operationalizing the discards monitoring programme, assessing impacts of climate change, compiling information on non-indigenous species, establishing a research programme on red coral, updating technical elements for VME encounter protocols and working towards a network of essential fish habitats. At the subregional level, specifically for the western Mediterranean, activities included the organization of a technical expert session on blackspot seabream, including bilateral technical preparatory work between Morocco and Spain. Specific activities in the central Mediterranean instead seek to investigate, within the context of the regional survey-at-sea, nursery areas for European hake and deep-water rose shrimp in the Strait of Sicily.

37. With regards to the planned activities in support of a regional strategy for climate change and invasive species, the Committee was informed by Mr Vasconcellos that FAO, GFCM and WWF are organizing an "Expert meeting on the implication of climate change to fisheries in the Mediterranean and Black Sea", to be held in GFCM, Rome, from 4 to 6 December 2017. The meeting will take stock of the available knowledge and design a methodology for the assessment of the vulnerability of the fisheries in the region to climate change. He informed the Committee that the application of the methodology for a regional assessment will likely involve case studies and country reviews during 2018, which could be supported by the Regional projects.
38. Participants agreed to do preparatory works to contribute to the following Working Groups: WG on VME, WG on Small Scale Fisheries and WG on Fishing Technology. In particular they agreed to prepare a background document gathering all past experiences carried out on selectivity of trawl mesh size. The necessary coordination with the GFCM on these subjects was highlighted and ensured.

Priority activities for the next period of CopeMed II

39. Mr Marcelo Vasconcellos introduced the proposed Project for the Identification of Stock Units in Alborán Sea and adjacent waters highlighting the innovative character of such a multidisciplinary approach.
40. After some questions about the operation of the Project, he informed the Committee that an inception meeting is planned to provide detailed description of the sampling protocols and treatment of samples for the respective analysis. The Proposal received the support of all the members of the Committee (Annex 6).
41. Based on the document FAO CopeMed II CC10/2017/03 and the inputs received during the meeting, CopeMed Fishery Expert presented for discussion and adoption a proposal of activities for the next annual period of the project. Some additions to the original plan as presented in document CC10/2017/03 (Annex 5) are commented here below. The adopted workplan is presented in table 1.
42. During the inter-Committee period, the project will continue working in tight coordination with the other FAO Mediterranean projects by organizing joint activities, fostering participation of experts in the training activities organized by other projects and adjusting calendars of meetings among them and the GFCM. Taking advantage of our participation in different meetings and conferences, any occasion will be used as an opportunity to have informal meeting with donors, delegates from the member countries and experts.

43. Cooperation with the GFCM secretariat and its Subsidiary Bodies will continue through coordination meetings held in Rome, back-to-back in GFCM events and through on-line communication to ensure coordination in our respective mandate's tasks and to find synergies. CopeMed will provide direct support to the activities of the GFCM by providing scientific contributions for discussion and supporting the participation of experts in annual GFCM technical and institutional meetings
44. In the framework of FAO decentralization, CopeMed will continue collaborating with the subregional (SNE) and regional (RNE) FAO offices in the North African and near East countries by supporting joint initiatives on fisheries and sharing information on the activities and results of the Project.
45. Project staff is planning to visit countries in this period to introduce the project to the fishery authorities and discuss on the way we can contribute to enhance the country skills in fisheries science taking into account other current initiatives to avoid overlapping.
46. The CC agreed that the priorities to be implemented during the next inter-committee period (2017-2018) should be those marked with 1 in the column of priority in table 1 always subject to the availability of funds. The other activities (marked with 2) should be implemented according specific requests by the countries to the project.

Adoption of the report

47. The Committee adopted the report. CopeMed will edit and finalize the appendices of this report which will be published as a new CopeMed Technical Document.

Date and place of the next coordination Committee

48. The Committee agreed to organize the eleventh Coordination Committee meeting in Spain the fourth quarter of 2018.

Closure

49. The delegates thanked the host country and the CopeMed Project for the organization and to the chairperson for his management of the meeting. Finally the Chairperson declared the meeting closed

| ACTIVITIES | Priority |
|---|----------|
| 1. First phase of the Project on Stock Boundaries in Alboran Sea and adjacent waters | 1 |
| 2. Continuation of the ongoing Pilot study on socio-economic and biological data collection in the Eastern part of Algeria | 1 |
| 3. CopeMed II-MedSudMed Study Group for data revision on hake and sardine in the Eastern part of GSA 04 and GSA 12 and joint stock assessment | 1 |
| 4. SG on stock assessment for demersal species in the Alboran sea (GSAs 01, 02, 03 and 04). | 1 |
| 5. SG on stock assessment for the small pelagic in the Alboran sea (GSAs 01, 02, 03 and 04) | 1 |
| 6. Support data collection and biological analysis of <i>Pagellus bogaraveo</i> including the WG on stock assessment | 1 |
| 7. Summer School on quantitative fisheries stock assessment, in coordination with FAO Regional Projects, GFCM and JRC | 1 |
| 8. Upon request of countries: <i>Ad hoc</i> Training course on stock assessment for data limited stocks. | 2 |
| 9. Training course on data treatment for acoustic surveys (ECHOVIEW) | 1 |
| 10. Training course on data treatment for trawl surveys (ATRIS) | 1 |
| 11. Facilitate participation of experts to training activities on methodologies on otoliths reading (including on-line exchange of images and attendance to ICES-IEO Wks) | 1 |
| 12. Facilitate participation of experts to Coordination meetings of MEDIAS and MEDITS surveys | 1 |
| 13. Upon request and in concertation with GFCM and FAO Regional Projects, assist the countries to conduct surveys at sea with standardized methodologies in areas of common fisheries | 1 |
| 14. Upon request: Assist countries on the collection and analysis of fisheries, biological and socio-economic data, in line with GFCM DCRF | 1 |
| 15. Support pilot studies for implementation of EAF management plan for selected fisheries upon request of countries | 1 |
| 16. Upon request: Training workshop for observers on board of commercial vessels to monitor discards and by-catch of unwanted species. | 1 |

| ACTIVITIES | Priority |
|---|----------|
| 17. Upon request: Country-specific case studies for the adaptation of fisheries to potential effects of Climate change. | 2 |
| 18. Facilitate attendance of national experts to the relevant meetings of GFCM and its subsidiary bodies | 1 |
| 19. Promote publications of fishery related information produced by scientist in the CopeMed sub-region, including <ul style="list-style-type: none"> - Review of biology and fisheries of <i>Coryphaena hippurus</i> in Western-Central Mediterranean - Baseline report on the small-scale fisheries on El Bibane lagoon. - Analysis of the results of selectivity surveys with different mesh sizes. | 1 |
| 20. 11 th Coordination Committee meeting | 1 |

**10th Meeting of the CopeMed II Coordination Committee
Algiers, Algeria 30-31 October 2017**

List of Participants

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10th Meeting of the CopeMed II Coordination Committee
Algiers, Algeria 30-31 October 2017

Provisional annotated Agenda

Monday 30th, 9:30-17:30

1. Opening of the meeting, Election of Chairperson and Adoption of the Agenda

2. Report of the CopeMed II Project's Progress

The main activities and the Project's outputs will be presented and reviewed. Information will be given on the activities and results of the CopeMed II Working Groups, the training and the relationship and cooperation of CopeMed II at Mediterranean level.

Coffee break 11:00

3. Proposals on national activities in the framework of the project

The national focal points are invited to present national priorities and to propose subregional activities of common interest.

4. GFCM activities of relevance for CopeMed II

The scientific and technical activities foreseen in the FAO GFCM work plan for 2016 - 2017 will be summarised. Discussion on how the Project can contribute in a coordinated way to these activities during 2016-2017 will be held.

Lunch time: 13:00-14:30

5. Priority activities for the next period of CopeMed II

A work plan of the Project in the cycle 2017-2018 taking into consideration, priority needs toward the national capacity building for the assessment and management of shared resources will be outlined and discussed. The Committee will be asked to provide orientation on the program presented.

Coffee break: 16:00

6. Other matters

Tuesday 31st, 11:00-13:00

7. Adoption of the report

8. Date and venue of the next Coordination Committee

**10th Meeting of the CopeMed II Coordination Committee
Algiers, Algeria 30-31 October 2017**

LIST OF DOCUMENTS FOR THE MEETING

1. Provisional Agenda. *FAO-CopeMed II CC10/2017/01*
2. Report on the intersessional activities of the Project CopeMed II during the period May 2016- September 2017. *FAO-CopeMed II CC10/2017/02*
3. Proposal of Priority Activities for the next year of CopeMed II. *FAO CopeMed II CC10/2017/03*
4. List of documents for the meeting. *FAO-CopeMed II CC10/2017/04*
5. List of participants. *FAO-CopeMed II CC10/2017/05*

LIST OF INFORMATIVE DOCUMENTS

1. Report of the ninth Coordination Committee of CopeMed II (Malta, 28-29 April 2016). Technical Document n° 43. *FAO-CopeMed II CC10/2017/Inf 01*
2. Report of CopeMed II – MedSudMed Workshop on stock assessment *Coryphaena hippurus* Fisheries in the Western-Central Mediterranean (Malaga, 13-15 September). Technical Document n° 44. *FAO-CopeMed II CC10/2017/Inf 02*
3. Report of the 5th Meeting of CopeMed II Study Group on small pelagic and demersal stocks of interest to Algeria, Morocco and Spain in the Alboran Sea (GSAs 01, 02, 03 and 04) and GFCM Training Workshop. Technical Document N°45. *FAO-CopeMed II CC10/2017/Inf 03*
4. Report of CopeMed II Workshop on methodologies for the identification of stocks units in the Alboran Sea (Alicante, Spain 3-6 April 2017). Technical Document N°46. *FAO-CopeMed II CC10/2017/Inf 04*
5. Concept Note for a CopeMed II research Project. *FAO- CopeMed II CC10/2017/Inf 05*
6. Major activities of the FAO regional projects. Document presented to the 19th SAC-GFCM Meeting (Ljubljana, Slovenia, 16-19 Mai 2017). *FAO- CopeMed II CC10/2017/Inf 06*
7. 19th Session of the Scientific Advisory Committee on Fisheries (SAC). *FAO- CopeMed II CC10/2017/Inf 07*
8. Current knowledge on Sardine and Hake exploitation and status in the Alboran Sea, and the question of stock units identification. Occasional paper 23.). *FAO- CopeMed II CC10/2017/Inf 08*

**10th Meeting of the CopeMed II Coordination Committee
Algiers, Algeria 30-31 October 2017**

Report on the intersessional activities of the Project
(May 2016 - September 2017)

Introduction

This document summarizes the activities carried out by the Project CopeMed phase II from May 2016 to September 2017, including workshops, training, research activities and the technical assistance provided to the countries, as well as the cooperation established with the donors, the GFCM and the SAC and Sub-Committees and other relevant regional institutions.

CopeMed II project, coordinated by FAO-FIAF with office in Málaga (Spain), started in February 2008 and is funded by DG Mare (UE) and the Spanish Government (Secretaría General de Pesca, Ministerio de Agricultura, Alimentación y Medio Ambiente).

The overall objective of the project is to maintain the sustainability of the marine resources in the Central and Western Mediterranean and their ecosystems, taking into account environmental, biological, economical, social and institutional issues, and promoting scientific cooperation among the regions. Countries involved are Algeria, Libya, Morocco, Tunisia, Malta, Italy, France and Spain. FAO-FI, GFCM, and the two donors are also members of the Coordination Committee guiding the project.

CopeMed II conducted activities during the period May 2016 to September 2017 following proposals from the national delegates, in close coordination with FAO-FIAF responsible and according to the guidance provided by the Coordination Committee (CC) in April 2016. The work programme and recommendations of the 9th Meeting of the CopeMed II Coordination Committee were implemented according the availability of budget. The activities carried out during the inter-committee period comply with the methodological framework of the Project and its mandate for this phase.

This report details the main outputs of the Project activities and the results achieved with direct reference to the Project Objectives:

1. Strengthening the national capacity to obtain statistical data on catch and effort, including biological and socio-economic data.
2. Strengthening the fisheries scientific research and upgrade the research activity in the national and international context.
3. Strengthening institutional capacity at national and sub-regional levels
4. Regional coordination, cooperation and synergy
5. Project communication

1. Strengthening the national capacity to obtain statistical data on catch and effort, including biological and socio-economic data.

CopeMed II continued the cooperation with national delegates and the countries experts, concerning the capacity of the fisheries administrations and research institutes to generate statistical data of interest for fisheries assessment and management. According to the proposals agreed during the meetings of the Coordination Committee, the actions summarized below were implemented.

Technical support to countries on statistics and information related issues

CopeMed continued to support national experts from research institutes and fisheries administrations to improve the collection of the biological and socio-economic data necessary for the monitoring of fisheries, in particular those of shared stocks.

Algeria is in a process of consolidating the scientific teams of the CNRDPA and have requested assistance to strengthen the capacities of scientists and administration in the domains of data collection for both biological and socio-economic analysis, stock assessment and fisheries monitoring in general. CopeMed II staff visited Algeria in January 2017 to introduce the CopeMed II Project to the new Secretary General of fisheries and to hold technical meetings with the Director and staff of the CNRDPA for better planning the activities proposed at the 9th CC. A road map was agreed upon with the Algerian authorities for the year 2017 focusing on the development of a pilot project on socio economic and biological data collection and analysis, training on surveys data analysis and on stock assessment models. Agreement was also reached with the fishery authorities to continue the assessment of priority stocks in collaboration with the neighboring countries. On this regard progress has been achieved on the preparation of data for a joint stock assessment in GSAs 4 and 12 in collaboration with MedSudMed, and on the incorporation of data from the western part of GSA 4 to the assessments in Alboran sea.

A document for a letter of agreement (LOA) was prepared and signed by the CNRDPA in July 2017, which includes a pilot study on data collection and analysis in two ports of the Eastern region: Annaba and El Kala. The pilot study once developed and tested in this area, could be extended to the rest of the Algerian coast.

The project recruited an international expert in fishery data to conduct a diagnosis of the national biological data collection system in the main ports of Morocco. This diagnostic study included the identification of possible deficiencies in the national biological data collection program and the elaboration of recommendations for their optimization. The expert visited three ports (Casablanca, Larache and Nador) to verify the sampling process on the spot. Based on these visits and the information provided by INRH, the consultant prepared a report analyzing the quality and representativeness of biological samples and assessing the suitability of spatial and temporal coverage according to the characteristics of the fleets and landings.

2. Strengthening the fisheries scientific research and upgrade the research activity in the national and international context.

The project provided support to the national fisheries research institutes and experts facilitating the preparation of documents, provision of data and joint stock assessments. Assessment forms documents were prepared by the countries in the framework of the CopeMed Study Groups on stock assessment of small pelagic and demersal stocks (Tangier, 17-20 October 2016; Malaga, 9-11 October 2017) and presented during the GFCM SAC Working groups on stock assessment of demersal species (WGSAD) and small-pelagic species (WGSASP) in Rome in November 2016. In

addition, the project supported the preparation of 2 joint assessments for hake and sardine and new assessment related works to the WGSA sessions to be held in Rome, 13-17 November 2017.

- Annual coordination meeting of the MEDIAS European campaigns held on 4-6 April 2017 in Palma de Mallorca with the aim of standardizing the methods of acoustic campaigns in the Mediterranean.

- On-line-WG on the standardization of otoliths reading of sardine organised by the ICES network of small pelagics biology. The aim of the WG was to exchange otoliths images among several institutes with a view to support the standardization of age reading;

In addition and to support the research in the field of age assignment to fish, the project purchased and shipped fungible laboratory material for the study of otoliths to the INSTM laboratory in la Goulette to overcome the difficulties in finding this type of material in Tunisia.

The project organized, co-organized, participated in, assisted and / or facilitated the assistance of experts from national institutions during this period (May 2016 to October 2017) in 22 activities reported in the table below, funding a total of 77 experts.

| Activities | Countries of experts/consultants funded | Number of experts funded |
|---|--|---------------------------------|
| Bilateral (Algeria and Tunisia) technical workshop on the fisheries of hake and sardine in GSAs 4 and 12. Tunis, Tunisia 16-18 May 2016 | Algeria | 6 |
| CopeMed II-MedSudMed Workshop on stock assessment of <i>Coryphaena hippurus</i> in the Western-Central Mediterranean., Málaga 13-15 September 2016 | Tunisia, Malta, Italy | 5 |
| Field mission in support the implementation of the Ecosystem Approach to Fisheries (EAF) at the site of the Lagoon El Bibane in Tunisia, 26-29 September 2016 | France | 1 |
| Study Groups on stock assessment of small pelagic and demersal stocks of interest to Algeria, Morocco and Spain in Alborán sea (GSAs 01, 02, 03 and 04) and GFCM training 17-20 October 2016, Tangier, Morocco. | Spain | 3 |
| GFCM-Working Groups on Stock Assessment (WGSA) of Demersal and Small Pelagic Species. 7-12 November 2016, Rome, Italy. | Algeria, Morocco | 5 |
| First consultation meeting with stakeholders for the implementation of the EAF in the El Bibane lagoon in Tunisia. 8 December 2016, Tunisia. | France | 1 |
| Training course on otoliths reading and morphometry. Tunis, Tunisia, 12-17 | Algeria | 2 |

| Activities | Countries of experts/consultants funded | Number of experts funded |
|--|---|---------------------------------|
| December 2016 | | |
| EAF-Nansen Project Forum, Abidjan, Côte d'Ivoire 17-19 October, 2016 | Tunisia | 2 |
| Training workshop on stock assessment and SAC Sub regional Committees for the Western Mediterranean (SRC-WM), 16 – 20 January, 2017, Tangier, Morocco | Algeria | 3 |
| Field mission in support of the expertise on sampling protocols in Morocco 13-20 March 2017 | France | 1 |
| Training workshop on Socio-economic surveys, Algiers, Algeria 19-23 March 2017 | France | 1 |
| Second stakeholders meeting in support the EAF Pilot study in El Bibane lagoon, Tunisia, 3-5 April 2017 | France | 1 |
| Technical workshop for the identification of stock units in the Alborán sea. 3-6 April 2017, Alicante, Spain. | Algeria, Spain, France, Italy, Morocco, Tunisia | 21 |
| Coordination meeting of EU- MEDIAS surveys. Palma de Mallorca, 4-6 April 2017 | Moroco | 1 |
| SAC GFCM, Ljubljana, Slovenia, 16-19 May 2017 | Moroco | 1 |
| Training stay in ichthyoplankton laboratory techniques, Gijón, Spain 20-30 June 2017 | Algeria | 1 |
| Summer School on stock assessment 17-28 July Capo Granitola, Italy | Algeria, Italy, Morocco, Tunisia | 10 |
| Working Group on SSF-GFCM 12-13 sept 2017 Rome | Tunisia | 1 |
| El Bibane, Tunisia, 4- 7 Sept 2017 | France | 1 |
| Third stakeholder consultation meeting of the El Biban EAF pilot study, 20-21 September, Zarzis, Tunisia | Tunisia, France | 2 |
| Study Groups on stock assessment of small pelagic and demersal stocks of interest to Algeria, Morocco and Spain in Alborán sea (GSAs 01, 02, 03 and 04) 9-11 October 2017, Malaga, Spain | Algeria, Morocco | 7 |
| 41 Session of GFCM, 16-20 October 2017, Budva, Montenegro | Argelia | 1 |

2.1 Subregional research activities related with shared stocks

Within the CopeMed II framework on joint evaluation of the state of exploited stocks, two study groups were created in 2010 to facilitate the joint assessment of priority stocks in Alboran Sea (GSAs 01, 02, 03 and 04): the study groups on demersal and small pelagic stocks. In addition, and in collaboration with MedSudMed another working group is being proposed to jointly analyse the fisheries of shared resources between Algeria and Tunisia. In this intersessional period, the three Study groups met in October 2016, in October 2017 and in July 2017 as reported in further detail here below. The three of them included training sessions on current methods thanks to the assistance of invited experts appointed by the Project and by the GFCM.

The Working Group of *Coryphaena hippurus* also met in September 2016 to assess the stock of this species in the Western-Central Mediterranean. The workshop, jointly organized by CopeMed II-MedSudMed, was attended by experts from fisheries administrations and scientific institutions involved in common dolphinfish fisheries from Italy, Malta, Spain and Tunisia. An invited expert from the Inter American Tropical Tuna Commission introduced the methods recently used in Eastern Pacific and trained the participants on its use. The Monthly Depletion Estimator, an adaptation of Stock Synthesis was tested for the first time in the Mediterranean. Preliminary results of assessment were presented at the GFCM Working Group on Stock Assessment, Rome, 7-12 November 2016. The report has been published as CopeMd II Technical Document 44. Suggestions from the SAC working group on small pelagics included to continue working on the species as a GFCM Recommendation exists for this fishery and, in particular, to develop a framework for the improvement of biomass estimates. The experts of the working group on *C. hippurus* (CoryWG) are currently working on estimating CPUEs through Generalized Linear Models. In addition, a scientific paper is being drafted as an overview of the latest developments in the knowledge of this fishery in the Mediterranean.

The two Study Groups for the joint assessment of demersal and small pelagics priority stocks in Alboran Sea (GSAs 01, 02, 03 and 04) met in parallel on the 17-20 October 2016 in Tangiers, Morocco. The first day a plenary session was devoted to train participants on the use of FLR and preparation of data thanks to the collaboration with GFCM. Then the two groups worked separately to assess hake and sardine in GSAs 1 and 3 jointly (The report of this meeting was published as Technical Document N°45 and is available as *FAO-CopeMed II CC10/2017/Inf 03*). Data from GSA 4 were also provided, but because of the shortness of the time series and lack of consistency with the other two sets, they were not used in the assessment. According to the assessments hake resulted in overexploitation status, whilst sardine was considered sustainably exploited.

The group transmitted the corresponding stock assessment results to the working groups (WGs) of the GFCM held from 7-12 November 2016 which validated the two assessments but highlighted that the stock status, in the case of sardine in GSA 1 was different from the one in the joint assessment, potentially reflecting regional differences thus stressing that the issue of stock boundaries was still problematic in the Alboran Sea. The WG recommended an in-depth analysis on stock boundaries and to continue investigating the pertinence of joining GSAs 1 and 3 for sardine and for hake.

Following SAC recommendations, the Project, in collaboration with the Spanish Institute of Oceanography (IEO) organized a “*Technical workshop for the identification of stock units in the Alborán Sea*” from 3-6 April 2017 in Alicante, Spain. Experts from Algeria, Italy, Morocco Spain and Tunisia presented and discussed current methodologies for the delimitation of stocks with the final aim to design a medium-term research program to identify stocks of sardine and hake and their spatial distribution in the Alborán sea (GSAs 1, 2, 3,4 and adjacent waters). Participants agreed to undertake this study of a minimum duration of two years applying a multidisciplinary approach i.e.: hydrodynamics modelling, genetics techniques, parasites, life history traits, elemental composition,

morphometry and fishery patterns. Sampling of individuals will be designed from the beginning of the study with this purpose, taking advantage of the current surveys in place.

The report of this workshop which includes the description of this research program, was published as Technical Document N°46 and is available to this meeting as *FAO-CopeMed II CC10/2017/Inf 04*. In addition, a summarised “Concept note” was also drafted to be distributed at the SAC and is available as *FAO-CopeMed II CC10/2017/inf 05*. The proposal was supported by the Scientific Committee (SAC) of the GFCM at the meeting held on 16-19 May in Slovenia which also requested CopeMed II to include another priority species in the sub-region (*Pagellus bogaraveo*).

In October 2017, the two Study Groups for the joint assessment of demersal and small pelagics priority stocks in Alboran Sea (GSAs 01, 02, 03 and 04) met in parallel in Málaga. Scientist from Algeria, Morocco and Spain analysed sets of the most recent data to update the assessments done the last year (hake and sardine in GSAs 01 + 03). For the first time, the data of the two main Algerian ports of the Alboran Sea, (Gazahouet and Beni Saf) were made available to the group. The data from landings and effort from 2 years were tested with production models and size distribution of landings were used for a pseudo-cohort analysis for sardine, hake and deep sea pink shrimp, in GSA 01+03+04, jointly and separately. The results of the first two formal assessments resulted in overexploitation status for hake and sustainable exploitation for sardine consistent with the last year results. Nevertheless the scientists agreed to transmit a series of questions to the experts of the GFCM Working Groups regarding the suitability of XSA for this stock (*i.e.* sardine in GSAs 01 + 03), given that the status defined by the model differs from the current decline in catches.

European Eel is also a priority species at basin level after the decline in catches in the last 20 years. Mediterranean countries are called to develop management plans for the conservation of Eel and a joint effort to assess the status of the stock in the Mediterranean and Atlantic was launched by GFCM and ICES. In this regard, a pilot study is being developed by the INSTM in Tunisian Lagoons under the support of CopeMed II since July 2017. The overall objective of this study is the collection of baseline data for a preliminary assessment of the national stock of European eel in Tunisia as contribution to the Mediterranean stock assessment and in preparation of a future Regional Management Plan.

2.2 Support the standardisation of common methodologies

The project facilitated the attendance of national experts in technical meetings or training activities to standardize methodologies in fishery science as reported above in particular for acoustic surveys (coordination meeting of the MEDIAS) and sardine otoliths reading (ICES On-line-WG).

Training activities

One of the key objectives of CopeMed II is to create the optimal conditions for the cooperation among the different participating countries. With this aim, the scientific institutions have to be capable to work together and with other countries in the Mediterranean region following standard methodologies and principles.

- Joint GFCM-INRH-CopeMed II training workshop on stock assessment methods, Tangiers, Morocco, December 2016. A 3 days course was organized back-to-back with the meeting of the Subregional Committee in Western Mediterranean to train experts in the most current stock assessment methods in the Mediterranean region. Theoretical and practical sessions with national fishery data were carried out.

- In the framework of the bilateral activities between Algeria and Tunisia and the preparation of joint stock assessments, two experts from the CNRDPA, Algeria visited the center of INSTM at La Goulette, Tunisia to be trained on laboratory techniques for otoliths age reading (daily rings) and morphometry. The stay was carried out on 12-16 December 2016 and the Tunisian instructors had the opportunity to work with original material of sardines provided by the trainees as collected during the Algerian acoustic surveys.
- Training course in the collection of socio-economic data in Algiers from 9 to 23 March 2017. The course was attended by members of the national institute CNRDPA as well as of the General Direction of Fishing in the provincial offices. Theoretical lessons and on-the-job training in ports were provided by a French expert in socio-economics of fisheries. During the course, a template for a survey in ports was agreed and is being used to collect data in several ports of Algeria as part of the pilot study for data collection in the Eastern region.
- Training in laboratory techniques for the study of ichthyoplankton at IEO, Gijón, Spain June 20-30. An Algerian expert made a two-weeks stay at the Spanish Institute of Oceanography in Gijón to work on ichthyoplankton identification techniques and oceanographic campaigns aboard the research vessel Ramon Margalef belonging to the IEO.
- Summer School in Quantitative Fisheries Stock Assessment co-organised by FAO/GFCM/JRC in Mazara del Vallo, Italy. This two weeks course was attended by 30 experts from Mediterranean and Black sea countries and was delivered by lecturers from the three funding institutions. The most complete series of models run in the platform R were made available to all participants who were able to work with their own data in practical sessions guided by the trainers. This has been a collective effort and is the first of a series intended to be repeated every year.
- Copemed staff and two INSTM experts participated in an on-the-job training mission to Annaba and El kala (Algeria) to launch a pilot action for biological sampling in ports. The methodology for the selection of samples in line with the requirements of the DCRF and on the way raw data must be treated for the future assessments were taught in the field.

3. Strengthening institutional capacity at national and sub-regional levels

As part of this objective, CopeMed II continued to work in 2016-2017 with the fisheries administrations of the project's countries and the productive and research sectors, with other FAO projects in the Mediterranean, GFCM and other regional representatives in various fisheries and marine issues. CopeMed II promoted and funded the participation of 83 experts and consultants from Algeria, Morocco, Tunisia, France, Italy and Spain in 20 different scientific and training activities as reported in this document. In many of these occasions, the project has held open dialogue with the scientists and administrations representatives present at those events on topics of interest and about the implementation of project activities in their countries. In particular in the current period CopeMed II staff visited Algeria in January 2017 to introduce the Project to the new Secretary General of fisheries and to hold technical meetings with the Director and staff of the CNRDPA for better planning the activities proposed at the 9th CC.

CopeMed II maintained the fishery administrations, main fisher's organizations and other stakeholders informed by distributing information generated by the project (meeting agendas and documents, technical and occasional documents), information from others sources (courses, meeting, documents, jobs opportunities) through the web page of the project and by mail distribution lists.

In October 2017, the Project fishery expert participated in an *International Congress on small scale and low impact fisheries* organised by the fishers' guilds of Andalusia region, Spain in which she

had the opportunity to explain the cooperation role of the FAO regional Projects and to introduce the FAO Voluntary Guidelines for small scale fisheries.

During 2016, a pilot study was launched in Tunisia to implement the Ecosystem Approach to Fisheries (EAF). The aim of this case study is to develop a management plan for the artisanal fisheries of El Bibane lagoon. The study is being implemented by the Institut National des Sciences et Technologies de la Mer (INSTM) under a LoA signed with FAO and with the assistance of two consultants. In this context, the first meeting was held in September 2016 which established a road map and a project team. The study has three phases, which involve several consultation meetings with all stakeholders.

During the reporting period, the first phase was consolidated which consisted on. i) Establishment of EAF project team, meeting and roadmap elaboration ii) first stakeholder meeting (December 2016); iii) elaboration of EAF baseline report; iv) second stakeholder meeting for consolidation of the baseline report (March 2017).

In September 2017, the Second Phase was initiated. A third stakeholder meeting has been held to identify the main priority issues affecting the fishery and possible management actions. Participants agreed that the EAF team will prepare a draft management plan. This draft will be discussed first with the fisheries administration (DGPA) to evaluate the feasibility of some of the proposed measures. With the endorsement of the administration, a final draft will be prepared and presented to stakeholders during a final meeting planned for December 2017.

4. Regional coordination, cooperation and synergy

In order to strengthen international and regional cooperation, the Project operated closely with the FAO Regional Projects AdriaMed, MedSudMed and EastMed. In particular, the Project interacted closely with MedSudMed for the organisation of the Joint workshop on *Coryphaena hippurus* assessment and fisheries (September 2016). In addition, the project promoted, in collaboration with MedSudMed, Algeria and Tunisia bilateral discussions for the identification of species of joint interest for stock assessment purpose and for planning possible joint surveys at sea. In addition, several coordination meetings were also held with the other FAO Regional Projects AdriaMed, MedSudMed and EastMed throughout the year to consolidate and develop common activities.

In the framework of FAO decentralisation, CopeMed II is reinforcing collaboration with the subregional (SNE) and regional (RNE) FAO offices in the north African and near east countries by liaising periodically, by supporting joint initiatives on fisheries and sharing information on the activities and results of the Project. In this context, CopeMed II participated in a meeting organized by the FAO office in Algiers to report on recent progress in the framework of a Letter of Agreement signed between UNDP and FAO to support the development of fisheries and aquaculture in Algeria. The objective was to improve coordination with other actors of cooperation in the agricultural and fisheries sectors in the country. Representatives of the European Project DIVECO-2 and the GFCM Secretariat were also present and it was agreed to establish a calendar of meetings to avoid duplication and improve synergies.

4.1 Cooperation and support to GFCM

Coordination and collaboration with the GFCM is established at different levels, including the participation of CopeMed II in many GFCM meetings and the participation of the GFCM Secretariat at the annual meeting of the Project Coordination Committee. Coordination is gradually strengthened to avoid duplication and increase synergies between the GFCM and the FAO-FIAF Fisheries Service and Mediterranean projects and to improve the effectiveness of support to the demands of participating countries.

In particular and as stressed by the SAC the existing synergies between the GFCM and the FAO regional projects, had been strengthened in recent years and had enabled the creation of a strong network putting Mediterranean countries in a position to address current pressing challenges towards the sustainability of fisheries. In particular, the mid-term strategy had provided an effective opportunity to reinforce existing ties and address the ambitious goals identified by the Commission.

In addition, in an attempt to be more aligned with the new GFCM calendar, the project decided to hold the 10th Coordination Committee meeting after the 41st Session of the Commission to be in the position of gathering the sub-regional needs and proposals.

CopeMed II facilitated the participation of countries in regional activities, dissemination of documents, contribution of national data, knowledge and ideas of national experts in the international sphere of the GFCM.

During the reporting period, CopeMed II participated in the following GFCM activities:

- 40th session of the General Fisheries Commission for the Mediterranean. May 30 - June 3, Malta
- GFCM training workshop on stock assessment in Tangier, Morocco, 16-19 January 2017.
- Intersessional meeting of the Commission on the mid-term strategy, including concerted actions for technical assistance. 22 - 23 September, Rome
- Working groups on stock assessment of demersal species (WGSAD) and small-pelagic species (WGSASP). 7 – 12 November, Rome.
- Meeting of the Western Mediterranean Regional Subcommittee in Tangier, Morocco, 20 January 2017.
- Red Coral Workshop, Tunis, 7-8 March 2017.
- Meeting of the Central Mediterranean Regional Subcommittee in Tunis, 9-10 March 2017.
- Coordination meeting on fisheries exploration campaigns in Mediterranean, Ljubljana, Slovenia May 15, 2017.
- 19th SAC-GFCM meeting in Ljubljana, Slovenia, 16-19 May 2017.
- Working group on small-scale and recreational fisheries (WGSSF) Rome, 12–13 September 2017
- Forty-first session of the Commission, Budva, Montenegro 16–20 October 2017

4.2 FAO internal coordination

CopeMed II is executed by FAO through the Marine and Inland Fisheries Branch (FIAF) of the Fisheries and Aquaculture Department. Technical management is carried out by and from staff of the Fisheries Service, FIAF at the Rome headquarters, and administrative support for the project is complemented by Rome and Budapest, Human Resources headquarters. Responsibility for project funds is by FAO staff at headquarters.

Coordination between the four regional FAO projects in the Mediterranean (AdriaMed, CopeMed II, MedSudMed and EastMed) is ensured through regular meetings among project's staff and by the reinforcement of communication among projects by the project Lead Technical Officer and Budget Holder.

This tight coordination and sharing of information and resources has already led to a significant increase in the number and importance of jointly-organised or shared activities, as mentioned in this report.

4.3 Coordination with the donors

CopeMed II in cooperation with FAO-FIAF service maintained the activities of coordination and contacts with the current donors of the project, the European Commission and the Spanish Government.

During the reporting period, the project has been in communication with representatives of the EU DG Mare and the Government of Spain, in particular with the Secretaría General de Pesca, Ministerio de Agricultura, Alimentación y Medio Ambiente and the Permanent Representation to FAO and the Subdelegación del Gobierno in Malaga to inform them of the current activities of the project and to request the maintenance of their support.

In January 2017, CopeMed II coordinator and expert visited the headquarters of the Spanish Agency for International Development Cooperation in Madrid to introduce themselves as the new CopeMed II team, to take stock of the Project in front of new personnel and to analyze, with the Department of Multilateral Cooperation, the possibility of recovering again part of the aid that the Agency assigned to CopeMed in the past. Conversations are still ongoing in the search of activities of common interest that can mobilize resources from their side.

The Project Coordinator also visited the EU –DG Mare in Brussels in June and October 2017 to discuss the new grant to cover the project activities from January 2017 to January 2018.

5. Project communication

CopeMed II contributed to keep experts, research institutions, fisheries administrations, main fisher's organisations and other stakeholders informed on fisheries and marine-related issues by distributing information generated by the project: meeting agendas, technical documents, meeting reports and occasional papers. Furthermore, the project publishes information from others sources (courses, meeting, documents, jobs opportunities) through the website, which is regularly updated.

To contribute to the communication of the CopeMed experts networks, further to the website, CopeMed has created an on-line Work Space for more direct exchange of information among the experts. This Work Space contains a series of portals (sharepoints) for each of the most regular permanent working groups such as the two Working Groups on Stock Assessment of Demersal and Small Pelagics species in Alborán Sea, Dolphinfish fisheries in Western Mediterranean, Ecosystem Approach to Fisheries as well as for the Coordination Committee meetings

They are based on Sharepoint technology and are hosted within the GFCM on-line environment. Privacy and limited access to these portals is granted only to members of the CopeMed working groups by login credentials assigned by the CopeMed staff upon request.

All the Technical Documents and Occasional Papers produced are published and made available on the Project web site as pdf files, www.faocopemed.org.

In the current period, **A guide to the eggs and larvae of 100 common Western Mediterranean Sea bony fish species has been published** as FAO Identification Guides series. (Currently in printing)

**10th Meeting of the CopeMed II Coordination Committee
Algiers, Algeria 30-31 October 2017**

Proposal of Priority Activities for the next year of CopeMed phase II

This document aims to provide to the Coordination Committee members elements for discussion on the Project Work Programme for the next inter-Committee period, (2017-2018).

In line with the project objectives, the proposed activities aim at: (i) strengthening the national capacity to obtain fisheries statistical data; (ii) Strengthening the fisheries scientific research; and (iii) Strengthening institutional capacity for the final aim of the sustainability of fisheries in the region in the most coordinated way with other Projects and with the GFCM. In this particular regard, the planned activities aim contribute to the goals and target set forth by the GFCM Mid-term strategy (2017–2020) towards the sustainability of Mediterranean and Black Sea fisheries.

The final annual Workplan 2017-2018 that should be adopted by the CC of CopeMed II, will take also in consideration the proposals and recommendations of the national members during the 10th Coordination Committee meeting, in accordance with the regional priorities expressed by the countries on the main components and according to budget availability.

CopeMed Phase II. 2017-2018 Workplan

In order to facilitate the presentation of the Workplan the proposed activities are organized in relation to the four main axes of the project:

1. Strengthening the national capacity to obtain statistical data on catch and effort, including biological and socio-economic data.

The Project, under request of countries will assist national institutions to put in place or further develop data collection programs to fill the existing gaps. The aim of this action is to contribute with technical and financial support to comply in time and format with the data reporting obligations set at national and regional levels and to maintain complete databases and information systems owned by the relevant national institutions. Taking into account the outcomes of technical meetings held during 2016-2017, specific activities may address the following fisheries and topics.

Hake, deep sea pink shrimp, red mullet, blackspot seabream, anchovy and sardine are among the most important species in which attention should be focused in the near future according to SAC and as agreed by experts. Based on the review of the current sampling programs done by CopeMed Working Groups in 2015, 2016 and 2017, there would be need to: i) improve the sampling frequencies (monthly); ii) increase the parameters measured (length, weight, sex) and; iii) to extend the sampling period to the whole year where this is not the case. The Project can assist technically and financially to increase the general coverage of the data collection programs for these priority species. The SAC also identified species of conservation concern such as the European eel and red coral, which are of relevance for CopeMed countries. Project support to improve the availability of data in support of the assessment and management of these species could be also prioritized.

The integration of socio-economic data is also a priority. The project can support actions aiming at enhancing national capacity for the collection and processing of this type of data. Socio-economic surveys are currently in progress in Algeria and can be launched under countries request for specific

fisheries as a pilot phase with the aim that they will be extended it to a wider area, more fleet segments and species.

2. Strengthening the fisheries scientific research and upgrade the research activity in the national and international context.

2.1. Research activities related with shared stocks

- Blackspot seabream

The project is foreseeing technical and financial support to progress with the assessment of blackspot seabream in the Alboran Sea. The project is currently discussing with Morocco the terms of the assistance for the biological sampling of the species caught by the Moroccan fleet. Further and additional support could be envisaged, considering the topics to be covered in the next session of the SAC SRC-WM. According to the ToRs defined by the SAC 19th Session, Ljubliana, 16-19 May 2017, the SRC-WM will include a session on Blackspot seabream with the following proposed terms of reference:

- Overview of the work carried out towards the standardization of biological sampling and fishing effort, including harmonized sampling plans addressing spatial and fishing activity heterogeneity.
- Overview and discussion of key parameters of the fishery, including biological parameters and sampling coverage.
- Stock identification/stock boundaries, including through genetic studies.
- Identify and discuss environmental effects on the stock/fishery.

- CopeMed SG on stocks assessment for demersal species in the Alborán sea (GSAs 01, 02, 03 and 04 West):

According to previous year's discussions and to the GFCM lists of priority species, in Western Mediterranean the three demersal species in which we are focusing our attention are: *M. merluccius*, *P. longirostris* and *P. bogaraveo*.

Regarding *M. merluccius*, CopeMed II will present the joint assessments for GSAs 01 and 03 prepared at the Study Group on Stock Assessment of demersal species recently held in Málaga (9-11 October 2017). The status is in overexploitation with a F 8.9 times higher than F_{MSY} which is worse than in the previous assessment of 2016 (8.5). The SAC recommended to continue assessing this stock jointly in these GSAs. A new session of the SG for demersal is planned for October 2018.

Parapenaeus longirostris was last assessed by CopeMed II in 2012 with a joint assessment of GSAs 01, 03 and 04W. It was validated and considered in overexploitation, this year we have done a new exploratory attempt with data from the three GSAs. Preliminary results show overexploitation status and it will be presented next month to the GFCM WGs for eventual validation and management advice.

CopeMed WG on *P. bogarveo* produced three consecutive assessments in 2010, 2012 and 2014 with similar status of overexploitation in GSAs 01 and 03. The recently adopted GFCM *Recommendations establishing a minimum conservation reference size for blackspot seabream in the Mediterranean Sea and on the management of the blackspot seabream fisheries in the Alboran Sea (GFCM-GSAs 1, 2, 3)* call for continuing our efforts on assessing this stock. Under request by the concerned countries, CopeMed II is ready to support the necessary actions to assist the SAC on

formulating the best scientific advice for the sustainability of this species and fisheries in the Strait of Gibraltar.

In addition and if endorsed by this Committee, this species will be included in the study for the identification of stock units in Alboran sea through genetic analysis and otoliths composition.

- CopeMed SG on stocks assessment for small pelagic species in the Alborán sea (GSAs 01, 02, 03 and 04 West):

After several years of confirming the decline in landings and in value of *Engraulis encrasicolus* the CopeMed working groups of stock assessment decided to focus on sardine. *Sardina pilchardus* is a species of great relevance in western Mediterranean. Despite the decline in biomass and in body condition observed in many areas of the Mediterranean, in the Alboran sea, the condition is good and the range of sizes observed in landings is quite larger than in the northern part. These facts together with the questioning about the distribution of the stock in Alboran sea (N and S) has led the working groups experts to select sardine as priority species in the near future, for assessments of the stock status and for the delimitation of stock boundaries.

A new meeting of the SG for small pelagics species in Alboran sea is foreseen for the last quarter of 2018.

- Strengthening data collection for sardine and hake: Pilot study in the Eastern part of Algeria

As a follow up on the activities initiated in 2016 for the assessment of shared stocks in the bordering area between Algeria and Tunisia in collaboration with MedSudMed, the work will continue this year (2017-2018). The first phase of data collection (socio-economic and biological) initiated in July 2017, should run for a whole year cycle. Several follow up workshops are foreseen that will help on knowledge sharing between experts from Tunisia and Algeria and to the standardization and strengthening of biological sampling in Algeria. Should the sampling be completed in Algeria during 2017, new stock assessment exercises could be attempted taking advantage of the forthcoming sessions of the Working Groups or Study Groups on stock assessment of the two projects (CopeMed II and MedSudMed) in the third quarter of 2018. The assessments will cover GSA 12 and GSA 04E.

The Socio-economic component of this pilot study will include a training component as in the case of the biological sampling, the data collection in the field through an agreed survey template and the estimation of selected indicators to describe the main socio-economic features for the selected fisheries. The integration of these data together with the biological information will provide a whole picture of the fisheries and elements for planning possible actions under different management scenarios.

- Follow up on *Coryphaena hippurus*:

The workshop held in Malaga on 13-15 September 2016 to assess *Coryphaena hippurus* in the Western-Central Mediterranean, jointly organized by CopeMed II-MedSudMed, tested for the first time in the Mediterranean, the Monthly Depletion Estimator, an adaptation of Stock Synthesis used in the Pacific Ocean by the IATTC. Preliminary results were presented at the GFCM Working Group on Stock Assessment, Rome, 7-12 November 2016. Suggestions from the SAC working group on small pelagics included to continue working on the species and, in particular, to develop a framework for the improvement of biomass estimates.

The experts of the working group on *C. hippurus* (CoryWG) are currently working on estimating CPUEs through Generalized Linear Models. Until now, the preliminary results are not very promising and the expected correlation between FADs catches and longline bycatches has not been found. Therefore, and provided that analytical models are not valid for a species which is caught

during its first year of life the plan for the next year will be to continue exploring best indices of biomass. The way of measuring the effort can also improve the estimation of CPUE and to this end a pilot experience is going to be held in the Mallorca FADs fishery. The numbers of settings will be considered instead the number of fishing trips and then the resulting CPUE values will be compared with the previous ones. In addition, a scientific paper is being drafted as an overview of the latest developments in the knowledge of this fishery in the Mediterranean and the plan is to publish it in an international journal.

- Follow up on European Eel

The study initiated in 2017 will continue in support of data collection for a preliminary assessment of the national stock of European eel in several lagoons in Tunisia as a contribution to the Mediterranean stock assessment and in preparation of a future Regional Management Plan.

- Progress on the identification of stock boundaries:

During the workshop for the identification of stock units held from 3-6 April 2017 in Alicante, Spain, participants agreed to undertake a study of two years (minimum) applying a multidisciplinary approach to identify stock boundaries for hake and sardine. The whole report of the mentioned workshop been published as CopeMed Technical Document 46 in the web page of CopeMed and is available as *FAO-CopeMed II CC10/2017/inf 04*. A summary concept note of this research project has also been developed to be distributed at the SAC and is available as *FAO-CopeMed II CC10/2017/inf 05*. The SAC during its 19th session held in May in Ljubljana formulated a request to CopeMed II for the inclusion of *P.bogaraveo* in this study. This question was discussed with the experts in the relevant working groups held by CopeMed II since then who finally agreed to include this third species in the study but applying only two techniques: genetics and isotopes composition in otoliths. These are considered the most discriminating techniques and the increase of cost will be minimal.

The idea is to sample fish in selected stations of Alborán sea and adjacent waters during the current surveys in place and to use the same individuals for a series of multidisciplinary analysis. The techniques involved are: genetics analysis, parasites, life history traits, elemental composition, morphometry and meristics, fishery patterns and hydrodynamic connectivity. Sampling of individuals and detailed preservation and transportation protocols will be designed from the beginning of the study. Specimens will be preserved, analysed and circulated among the different laboratories in charge of each technique to work on the same animals. This would eliminate any possible bias introduced by the variability of individuals within the same species.

Should the proposal for this project be endorsed by this Committee, the first inception meeting for the design of detailed sampling protocols is planned before the end of 2017 in order to start the collection of samples as soon as possible at the beginning of 2018. This first year will cover the first phase of the study consisting of:

- Inception meeting to be attended only by the coordinators of the main techniques to define sampling periods, sites and procedures.
- One year of sampling and analysis in the selected stations.
- Hydrodynamic modelling.
- Workshop for fisheries data analysis.

2.2 Support the standardization of common methodologies

The project will facilitate the attendance of national experts to technical meetings or training activities to standardize methodologies in fishery such as the annual coordination meetings of the acoustic (MEDIAS) and trawl (MEDITS) surveys.

Furthermore, the Project can support the participation of experts in the surveys of the other countries upon request and in coordination with the other Regional Projects, in particular with MedSudMed in the framework of the bilateral actions between Algeria and Tunisia.

In view of the conclusions of the *GFCM coordination meeting on the implementation of scientific surveys in the Mediterranean* held in Ljubljana, Slovenia in May 2017, CopeMed II is ready to support under request of the countries, any complementary action to standardize the surveys currently in place in Algeria, Morocco and Tunisia, as these are the selected countries for the first pilot surveys of GFCM in 2018.

3. Strengthening institutional capacity at national and sub-regional levels

The Project will continue to support the strengthening of national expertise through the implementation of specific training with the aim to build a common ground for fisheries science. Training workshops and on-the-job training activities will be organized in different topics according to the needs expressed by this Committee and trying to cover all steps in the fishery science, from sampling and processing of data to stock assessment and management options.

In particular, activities foreseen for the coming period include:

- **Treatment of data from acoustic surveys:** a training course is foreseen for the treatment of acoustic data, dealing with all the phases, from the transponder signal to the elaboration of reports. The course will be held in Palma de Mallorca under request of the CNRDPA with the collaboration of prof. Joan Miquel from IEO Balearic Islands.
- **Treatment of data from trawl surveys, the use of ATRIS.** A course to be trained in the use of the software ATRIS for the processing of georeferenced information coming from the trawl surveys is foreseen to be held in Algeria in the second quarter of 2018.
- **Elaboration of Socioeconomic indicators.** One or two workshops are foreseen during and after the one year cycle of socio-economic surveys carried out by the pilot study in the Eastern part of Algeria in coordination with MedSudMed activities of the same subject in Tunisia. The estimation of socio-economic indicators with the same methodology, following standards of GFCM and guidance of the FAO Handbook for fisheries socio-economic sample survey will contribute to the further testing of management scenarios.
- **Second Edition of the “Summer School in quantitative fisheries stock assessment”.** In July 2018 and kindly hosted by Malta. In collaboration with AdriaMed, MedSudMed and Eastmed , GFCM and the EU-JRC. The summer school is planned to run every year for two weeks during the summer months. It will combine theoretical lectures with practical, hands-on sessions. The courses will be based on the R language for statistical computing and graphics.
- **Ad-hoc trainings on methodologies for stock assessment** will be organized, tailored to the needs of the participating countries. Training activities, when possible, will be coordinated with

the other FAO Regional Projects, in order to avoid duplication or overlapping of activities.

- **Ecosystem Approach to Fisheries**, as a follow-up to the EAF training workshop (Tunis, April 2016). Potential case studies were proposed for the application of EAF in the development of national fisheries management plans. In Tunisia: artisanal fisheries in the lagoon of El Bibane are already ongoing. CopeMed II is ready to support any new case study under request of the countries including the corresponding training workshops and coordination meetings.
- **Training on onboard sampling for discards and by-catches**. Under request of the countries the Project can support pilot actions for observers on board of commercial vessels to monitor discards and incidental catch of unwanted species. The first step would be a training course for onboard observers where participants will learn the methodology to collect this data including identification of species and practical sessions to simulate the on-board processing of samples coming from a haul. This will help the country to contribute to *Target 4 of the Mid-Term Strategy of the GFCM*, namely: “Minimize and mitigate unwanted interactions between fisheries and marine ecosystems and environment. catches, discards and bycatches”. A second phase of these pilot actions would be, the implementation of sampling programs for observers on-board with the support of CopeMed II
- **Assessment of the vulnerability of fisheries to climate change**. With a view to contribute to a regional adaptation strategy to cope with the potential effects of climate change in the Mediterranean and Black Sea, foreseen in Target 4 of the GFCM Mid-Term Strategy, an expert meeting will be held in Rome in December 2017 to design a methodology for the assessment of the vulnerability of the fishery sector to the observed and projected environmental changes. The application of the methodology will probably require country-specific case studies and expertise, which the project could support during 2018.

4. Regional coordination, cooperation and synergy

During the inter-Committee al period, the project will continue working in tight coordination with the other FAO Mediterranean projects by organizing joint activities, fostering participation of experts in the training activities organized by other projects and adjusting calendars of meetings among them and the GFCM. In coordination with the other FAO projects, CopeMed will prepare the annual Report of activities and main achievements for the SAC and the GFCM.

The communication with the scientists of the national institutes is permanent and fluid for planning and organization of the working groups, to discuss of the Project’s activities, their current research projects and to find synergies and benefits to all members.

In the framework of FAO decentralisation, CopeMed will continue collaborating with the subregional (SNE) and regional (RNE) FAO offices in the North African countries by supporting joint initiatives on fisheries and sharing information on the activities and results of the Project.

Taking advantage of our participation in different meetings and conferences, any occasion will be used as an opportunity to have informal meeting with donors, delegates from the member countries and experts.

Meetings with the donors, Secretaría General de Pesca of Spain and the representative of EU-DGMare will be held during this inter-Committee period.

Cooperation with the GFCM secretariat and its Subsidiary Bodies will continue through coordination meetings held in Rome, back-to-back in GFCM events and through on-line communication to ensure coordination in our respective mandate's tasks and to find synergies.

CopeMed will provide direct support to the activities of the GFCM by providing scientific contributions for discussion and supporting the participation of experts in annual GFCM technical and institutional meetings. Moreover the Project will act in synergy with the proposed work plan for the SAC and the Sub Regional Committees for the Western and Central Mediterranean (SRC-CM and SRC-WM) as well as in support of the Mid-term Strategy 2017-2020.

5. Project communication

In order to keep experts, research institutions, fisheries administrations, main fisher's organisations and other stakeholders informed on fisheries and marine-related issues, the website of the project will be continuously updated with the different events, documents and news.

The Project also foresees participation in external meetings, conferences and seminars to disseminate our products and search for synergies with other projects and institutions working for the fisheries in the Region. Printed material is being reduced in line with the FAO policy of environmental respect, but still some relevant technical documents can be printed and distributed upon request.

Communication of the CopeMed experts' networks on specific topics will be reinforced thanks to the on-line Work Space based on SharePoint.

The Project will continue promoting publication of scientific papers produced by scientist in the CopeMed sub-region on shared stocks, assessment methodologies marine species and its ecosystems. In particular two publications are planned for the next inter-Committee period

- **Dolphinfish (*Coryphaena hippurus*) biology and fisheries in the Mediterranean Sea.** Current knowledge on this species in the Mediterranean mainly as result of the workshops organized by the regional projects CopeMed and MedSudMed.
- **Analysis of the results of selectivity surveys with 40 mm square mesh size.**

All the Technical Documents and Occasional Papers produced will be made available on the Project web site as pdf files, www.faocopemed.org.

CONCEPT NOTE FOR A COPEMED II-RESEARCH PROJECT

Transboundary population structure of Sardine and European hake in the Alboran Sea: a multidisciplinary approach

INTRODUCTION

Recent research on fish stock identification methods have revealed inconsistencies between the spatial structure of biological populations and the definition of stock units used in assessment and management. There is common agreement that this mismatch emerges from a lack of acknowledgement of the population spatial structure of harvested species. Indeed, it is now clear that the population structure of marine species falls along a continuum from panmictic to numerous distinct populations, with the majority of species exhibiting complex structure within this range.

Historically, stock delimitation has followed a top-down approach, in which management stewardships decide the stock boundaries attending mainly to political reasons and, consequently, fisheries and assessment modelers adapt their work to these boundaries. However, there are currently vast research evidences showing that stock delimitation should follow a bottom-up approach in which the stock delimitations should be based in scientific evidences. This inherently requires multidisciplinary and holistic approach.

Although in the last years some studies were published overall specific studies on modelling eggs and larval drift from spawning to nursery areas were still lacking in the Mediterranean. These studies are considered essential to investigate connectivity within and among stock units in a modern meta-population paradigm.

Based on all these previous studies, and at the request of Scientific Advisory Committee of the GFCM to deepen in the structure of fish populations, the FAO Regional Project CopeMed II, organized a workshop to propose a specific research program to identify the stock structure and boundaries of Sardine and European hake inhabiting the Alboran sea and the adjacent waters. The workshop was held from 3-6 of April 2017 in Alicante and the group of experts discussed the existing data and methodologies and agreed to undertake a study of two years (extendable according to the availability of funds) using different techniques following a holistic approach.

The proposal of this new project with details of the methodology by the different project components are reported hereunder.

The proposed project aims:

- To investigate the spatial population structure and to identify the most plausible stock units of Sardine and European Hake in the Alboran Sea according a multidisciplinary approach. The project output will reveal whether the current GSA boundaries are the appropriate spatial scale of assessment and management for Sardine and Hake.;

The methodology will follow these steps, (not necessarily in chronological order):

- to examine existing information on the stock structure of Sardine and Hake in the Alboran Sea and adjacent areas, including upstream the Atlantic Ocean close to the Gibraltar Strait and downstream the portion of the Western Mediterranean more directly affected by the current entering from the Strait of Gibraltar.
- to propose an *ad hoc* sampling program for a minimum of two years in which the same individuals will serve to different type of analysis (*i.e.*: genetics, parasites, morphometry, isotopes).

- to model the movements of the different life stages of fish coupled with the hydrodynamics of water masses in Alboran area, and compare the outputs with observations of the two species (i.e. surveys, cpue , assessment indicators).
- to analyze the information produced with a multidisciplinary and holistic approach.

One of the main themes in the identification of stock structure and boundaries is the strength of interdisciplinary analyses when they are developed across national boundaries. In the last decades, a lot of methods have been developed and proposed as proper ways to deal with stock identification. However, applying different approaches may lead sometimes to competing hypotheses because different methods are sensitive to show differences at contrasting spatial (from local to regional) and temporal scales (from daily to evolutionary scales). However a general agreement exists on the need to adopt a holistic approach with multiple perspectives to improve information on stock structure for resource management that capture different ecological and structuring processes acting at contrasting scales.

According to Cadrin et al. (2014) the process for multidisciplinary identification of the most likely population structure and recommendations for the most appropriate management units requires a review of available information, synthetic conclusions, and practical considerations for management. Moreover, the whole process must adhere to principles of best scientific information available, which should be relevant, inclusive, objective, transparent, timely, verified, validated and peer-reviewed (Cadrin *et al.*, 2014). However, from a practical perspective, the final management approach used to address misalignments also depends on the complexity of the implementation procedures, which are constrained by available knowledge of the population structure of the species (Kerr et al. 2017, Hidalgo et al. 2017).

Following Cadrin et al. (2014), the stock identification process can be summarized in 6 steps

1. A clear definition of the current spatial management units.
2. The identification of all *a priori* hypotheses and paradigms about the population structure, and their internal consistency.
3. Comprehensive information of the specific fishery resource, with emphasis on data and results arising from research explicitly intended for stock assessment.
4. An interdisciplinary evaluation, whose goal is an integrated and holistic knowledge of the life history of the stock.
5. A statistical revision, selecting and using all the information useful for rigorous testing, followed by simulations inside the area and in view of its neighboring connectivity (Kerr and Goethel, 2014).
6. All the necessary recommendations for practical units which reflect not only the stock biology but also other aspects of managing and monitoring its fishery. This includes adopting a different spatial scale for assessment and for management; for instance, a whole region conducting a unique assessment while small management areas apply context- dependent management measures.

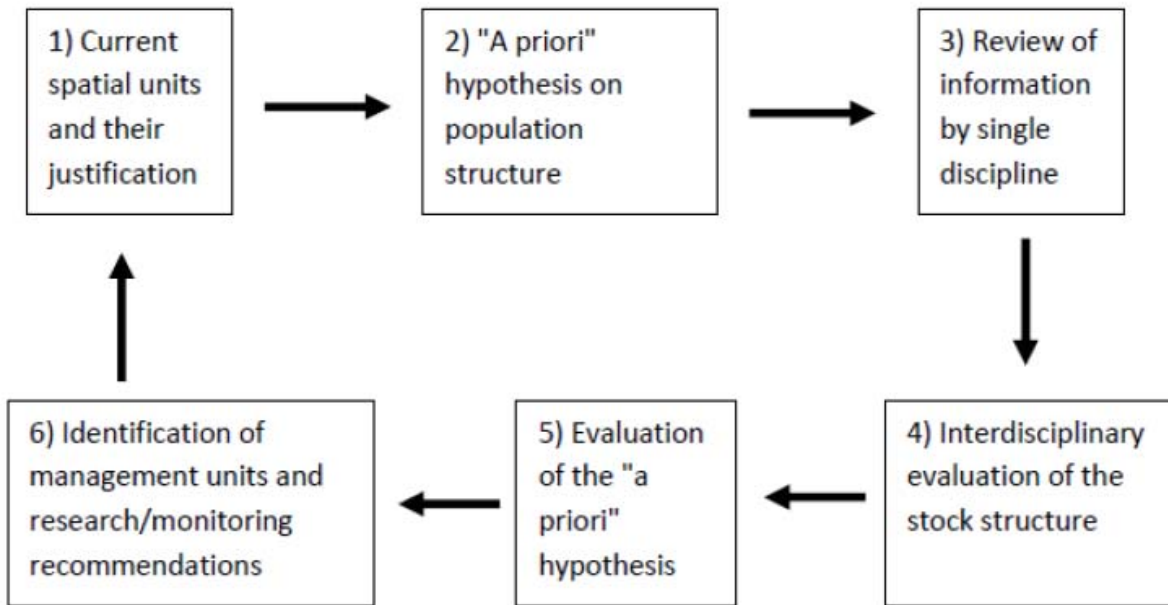


Figure 1 - The logical framework in stock identification followed by SIMWG of ICES. (drawn from Cadrin *et al.*, 2014).

The 3 existing GSAs in the Alboran Sea (1,3 and 4) will represent the “*a priori*” stock hypothesis to be tested. Information coming from single disciplines will be collected and scrutinized with the objective to be analysed by a holistic approach similar to the framework proposed by the STOCKMED project. Differently from the STOCKMED project that was based only on existing data, and similarly to HOMSIR project an *ad hoc* sampling scheme will be designed to collect new data and samples. Sampling will be designed by the experts on an initial phase with the purpose to cover the spatial and temporal scales of the life cycle of the two-species concerned. The same individuals will provide biological material for the different analysis. The disciplines involved are: hydrodynamic connectivity, genetic markers, parasites as markers, otolith shape and elemental composition, body morphometry and meristics, analyses of fishery patterns, demographics indices and life history traits, and isotopes analyses.

The main phases of the project are outlined in the section below. The last section of this document: Project Components includes technical sheets produced by different groups of experts in the different disciplines during the CopeMed II workshop and represent the preliminary description of methods, resources and costs in a more detailed way.

The theoretical spatial concept of the project can be represented in figure 2.

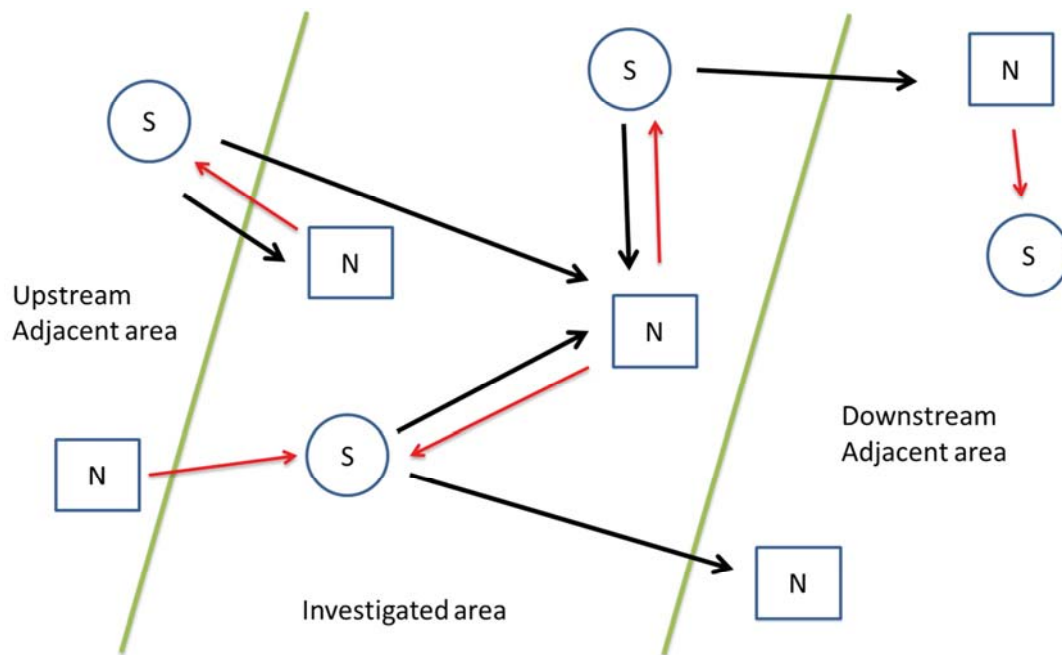


Figure 2: the source-sink dynamics of a species during its life cycle in an area and its adjacent upstream and downstream vicinities. **S**: spawning area; **N**: nursery area; **red arrows**: adults displacements; **black arrows**: larvae displacement towards the nursery areas. (from Fiorentino *et al.*, 2017)

PHASES OF THE PROJECT:

Modelling

A hydrodynamical-biological model describing the movements of simulated particles in the Alboran sea will be used to simulate the dispersal and/or retention of eggs and larvae and examine both potential and effective connectivity between the northern and southern continental shelves of the Alboran basin and the vicinities.

Metrics of connectivity will be calculated for defined areas and periods that reproduce the spawning to the recruitment of each species and the outputs will be compared with observations from surveys and landings. A series of years of data will be selected per specie including contrasting years of high and low abundance as well as contrasting oceanographic conditions to test the model outputs.

Sampling

Experts from different disciplines will work jointly according to a determined sampling strategy that will cover the different spatial and temporal scales needed for each analysis.

The necessary number of fish will be collected during the regular sampling programs (surveys and landings) in the four countries: Algeria, Morocco, Spain and North Tunisia. The biological material will be processed and analysed, or sent to the laboratories responsible for the different analysis: genetic markers, parasites, otoliths shape and elemental composition, stable isotopes, body shape and meristics of hard structures.

Information Processing

- Spatial analysis

The information produced in the steps above together with all data compiled referred to the fisheries indicators, biological parameters and demographic and spatial metrics will be collated and processed with integrative statistical tools.

- Multivariate statistics:

Multivariate statistical techniques as the Multi Criteria Decision Analysis (MCDA) will be used at a later extent. These techniques include: selection of best descriptors, assignation of weights by Non-Structural Fuzzy Decision Support System - NSFDDSS, perform integration of multiple thematic descriptors by the Cohen's Kappa coefficient of agreement, perform sensitivity analysis by the Stochastic Multi-criteria Acceptability Analysis -SMAA-. This exercise of synthesis will help in the elaboration of alternative hypothesis of stock boundaries.

Proposal of stock units

The final proposal of new possible configurations of stock units will be integrated with maps of distribution of fishing effort (by fleet segment). The areas where new stock units have been identified will be compared with the current configuration of GFCM GSAs.

The final aim is to describe the spatial distribution of the resources in the most precise way to be applied in the regular assessments and to inform the management advice for sardine and hake in Western Mediterranean.

The Project Components

The study area will cover the Alboran sea and adjacent waters including the Atlantic Ocean and southern Mediterranean coast up to northern Tunisia trying to cover the whole distribution area of the two species selected (sardine and hake) with the aim to better understand the movements of fish during all their life cycle. Samples will be taken from a set of locations well distributed along the whole study area in periods that cover the different life stages. The same specimens will serve to take different measures, otoliths and tissue samples for different analysis: genetic, elemental composition, isotopes and parasites. In addition, time series from fishery and surveys data will be incorporated.

Scientific teams have been created to oversee each one of the project components (or research lines) established. The outlines of these research lines and resources existing and needed are summarised below:

1. HYDRODYNAMIC CONNECTIVITY

This task will focus on the description of the hydrodynamics features that shape the connectivity between spawning and nursery areas in Alborán and its source and sink outer areas. The hypothesis generated by this model will be validated by other methods.

The study will be based on a hydrodynamical-biological coupled model (ocean physics plus lower trophic ecosystem component) that will cover both Gulf of Cadiz and Alboran Sea (until the Gulf of Vera in the north and 1° East in the south) (Figure 1). At temporal scale, the model will solve from tidal to inter-annual scales. This work is already well advanced by the Physical Oceanography group of the University of Málaga can simulate the drifting of fish larvae in both space and time through Lagrangian drifter experiments. The experiments will be conducted during the spawning season of each species. Phytoplankton, zooplankton and sea water temperatures, which are too variables provided by the model, will be used to further assess the probability of larvae survival along their drift (e.g. starvation mortality). The model has a mean spatial resolution of 1.5 km in the Alboran Sea, which enables for analysis of sets of cells up to the 30'x30' statistical grid.

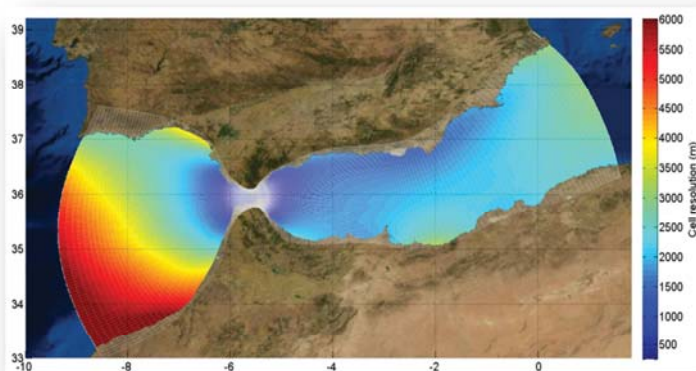


Figure 1. Geographic domain of the hydrodynamical-biological coupled model.

Demographic and size information from acoustic (sardine) and trawling (hake) surveys and landings will be collected for as many years as available in the most recent period. Connectivity and self-recruitment estimates derived from the hydrodynamical-biological coupled model will be obtained based on tools proposed by Dubois et al (2016) and Hidalgo et al (in review), and statistically compared with demographic information obtained from scientific surveys and landings.

Samples of larvae and adults (for sardine) and recruits (for hake) will be collected for two consecutive years (2018 and 2019) and analysed with stable isotopes techniques to validate and adjust the hydrodynamical-biological coupled model.

Existing resources

The University of Malaga (UMA) will use its supercomputing resources for the model simulations, other instruments for physical measurements could be used if required.

IEO will collect samples from the different sampling sites during its current surveys and will perform isotope analyses of organic tissues and otoliths.

Methods and needs

The bio-physical modeling will have two steps:

1. Selection of four years per species with enough contrast of high and low abundance, but also contrasting in terms of the general oceanographic scenario.
2. Estimation of connectivity metrics for defined areas and periods that simulates the spawning to the recruitment tracks of each species. The outputs will be compared with observations from surveys and landings.

In addition, analyses of two stable isotopes: bulk-SIA and CSIA will be combined to estimate the ecological segregation in diet and spatial distribution. *S. pilcardus* early life stages (post-larvae) will be collected in the nursery areas from the Gulf of Cadiz and North and South of Alboran Sea. Isotopic values of sardine post-larvae will be related to their respective baseline isoscape signatures (two zooplankton size fractions as putative food sources). Juveniles and/or adults sardines coming from the whole study area will be sampled for otolith SIA and CSIA analyses for retrospective studies of diet and movement across isoscapes. For *M. merluccius*, bulk-SIA and CSIA from tissue and otoliths will be combined in juveniles and adults coming from the whole study area. These outputs together with demographic information from surveys and assessment outputs will contribute to validate the bio-physical model outputs.

Participants Institutions and coordinator(s)

IEO Málaga, Balears and University of Málaga (UMA) from Spain; INRH (Morocco); CNRDPA (Algeria), INSTM (Tunisa) and collaboration of scientists from CNR-IAMC (Italy)

Coordinator of Modeling of larvae dispersal and survival: Manuel Hidalgo IEO Málaga

Coordinator of Isotope analysis: Raul Laiz IEO Málaga

Oceanographic modeller and laboratory assistant are needed.

2. GENETIC MARKERS

Fish will be collected at specific sites from the Alboran Sea, as well as from neighbouring Atlantic Ocean (Spain and Morocco) and neighbouring Mediterranean Sea up to the Northern coast of Tunisia. Specimens must be both, spawners from adult high concentration areas and early life specimens to investigate overlap with boundaries defined by adults, and connectivity with spawning and nursery grounds (source-sink concept from spawning to nursery areas).

Specimens collected by the different teams (minimum of 40 individuals per sampling site) should be stored in non-denatured ethanol (96%) and transmitted to the laboratories in charge of the genetic analysis.

Approximately 33 samples have been taken into account to estimate the cost of the activities; however the sampling strategy should be designed by experts according to currently undergoing surveys and data collection programs.

Existing resources

INRH: Molecular biology laboratory

University of Bologna (UniBo): Molecular biology laboratory.

IEO: Molecular biology laboratory at Aquaculture facilities in Vigo and in Málaga

The microsatellite laboratory experiments on *M. merluccius* are already underway at INRH (including samples from the Alboran and the Atlantic Ocean). All the information related to *M. merluccius* SNPs are legacy of FishPopTrace Project and can be transferred to any laboratory. *M. merluccius* microsatellite genotyping is ongoing at IEO, Vigo, for aquaculture applications.

S. pilchardus microsatellite genotyping was carried out in UniBo in the past years.

Method and needs.

M. merluccius:

Neutral microsatellite loci (from bibliography and EST-derived possibly non-neutral) (15 loci)

Non-neutral (outlier) SNPs (48 loci)

S. pilchardus

Neutral microsatellite loci (15 loci)

SNPs development for *Sardina pilchardus* is ongoing

Participants Institutions and coordinator(s)

Participants Institutions: IEO Málaga, Vigo (Spain); INRH Nador, Casablanca (Morocco); CNRDPA (Algeria); INSTM (Tunisa); University of Bologna (Italy) and University of Vigo (Spain).

Coordinators of analysis: IEO: C. Johnstone, INRH: K. Mokhtar-Jamaï and UniBo: A. Cariani
Laboratory assistants are needed.

3. PARASITES AS MARKERS

The parasite based methodology (including parasite community structure of the fish species along its geographical distribution, parasitic infection levels and genetic/molecular characterization of parasite species) represents an important approach in defining a fish stock. Indeed a parasite can be used as a suitable biological tag for fish stock identification when its geographical distribution and life cycle are known, and when the parasite's residence time in the host is long enough, compared with the lifespan of the fish host.

Sampling sites (a minimum of 8) will be selected in agreement with the other groups to make sure that the totality of the study area will be covered. Samples must be obtained during the peak of spawning season which for sardine is in winter and for hake is in Spring.

Samples must contain adults. Preferred larger sizes of both species. Estimated numbers of individuals are 50 specimens per sampling site and year of sardine and 35 specimens of hake per sampling site and year.

Existing resources

La Sapienza University can provide infrastructure for genetics of parasites. The samples will be provided by the other institutions following a protocol well established for the preservation of the material. Previous experience in hake and sardine will be included as a comparative analysis. There are research surveys through the study area that can be used to obtain the samples.

Method and needs.

Traditional parasitological analysis including UV-press system; traditional morphological analysis of some parasite species; genetic / molecular identification of anisakids and other nematodes; population genetic analysis of some parasitic species. Statistical analysis of the genetic data and epidemiological parameters including simple and multivariate methods. Comparison with the results from other methods.

Participants Institutions and coordinator(s)

IEO (Spain); INRH (Morocco); CNRDPA (Algeria), INSTM (Tunisa), La Sapienza-University of Rome, Italy and Faculty of Sciences Sfax University of Tunisia.

Coordinator of parasites identification: Simonetta Mattiucci from La Sapienza University (Italy)

Coordinator of sampling and analysis of data: Pablo Abaunza from IEO , Madrid (Spain)

Laboratory assistants are needed

Experts from the Faculty of Science (Tunisia) will be in close contact, including short-term visits for the molecular identification, with the University La Sapienza (Italy).

4. OTOLITH SHAPE AND ELEMENTAL COMPOSITION

Otolith shape and microchemistry analyses are useful techniques for discrimination of populations. The chemical composition of whole otoliths is analyzed using solution-based inductively coupled plasma mass spectrometry (ICPMS). In addition, the otoliths shape is analyzed using Fourier analysis.

A minimum of 8 sampling sites will be selected in agreement with the other groups to make sure that the totality of the study area will be covered. For each species 120 specimens are needed (length range: 11 to 16 cm for sardine; 25 to 35 cm for hake): 100 for shape analysis and 20 for microchemistry.

Existing resources:

All the equipment for image acquisition of otoliths is available at the IEO, INRH and CNRDPA furthermore, the software needed for the otoliths shape analysis is available at the INSTM.

Method and needs.

Otolith Shape: High-contrast images of complete otoliths will be acquired using reflected light on a black background. A camera linked to a computer will be used to acquire digital images. The shape of each otolith will be assessed with the elliptic Fourier analysis.

Otolith microchemistry: Upon extraction, sagittal otoliths are cleaned in a laminar flow hood. Whole otolith analysis is done by solution-based inductively coupled plasma mass spectrometry (ICP-MS) to permit simultaneous measurement of the concentrations of many elements that are useful for stock identification. Once the otoliths are cleaned and preserved, will be sent to an external laboratory for the ICP-MS.

Participants Institutions and coordinator(s)

IEO (Spain), INRH (Morocco), CNRDPA (Algeria) and INSTM (Tunisia)

Coordinator for otoliths shape and analysis: S. Khemiri from INSTM

5. BODY MORPHOMETRY AND MERISTICS

Morphometric and meristic characters will be used to investigate fish populations.

A minimum of 8 sampling sites will be selected in agreement with the other groups to make sure that the totality of the study area will be covered. Samples will be taken from Alboran Sea and adjacent areas: Spain, Morocco, Tunisia and Algeria, from survey and landings, with a frequency of twice a year and out of the reproduction period (between April and September for all countries). Sample size will be up to 50 specimens per station.

Existing resources

Basic equipment and expertise exist in the four centres. Complementary basic equipment and technical assistance for the analysis of data can be needed.

Method and needs.

Morphometry of body including measurements of some body dimensions will be done with a calliper and through image analysis from pictures. Meristic characters such as the number of vertebrae and branchispines in dry material will be used to investigate fish populations variability.

Participants Institutions and coordinator(s)

A coordinator will be nominated in each country for the morphometry analysis IEO (Spain), INRH (Morocco), CNRDPA (Algeria) and INSTM (Tunisia)

Coordinator for meristics: T. Filali, CNRDPA (Algeria)

Assistance of expert in data analysis is needed.

6. ANALYSES FISHERY PATTERNS, DEMOGRAPHICS INDICES AND LIFE HISTORY TRAITS.

Existing data and published Information on the biology and fisheries of the two species in the region will be compiled and analysed. The progress on this type of analysis currently done at the Working Groups of stock assessment of the CopeMed II Project will be taken as a basis. Update will be ensured by the partners' laboratories, which will provide the annual data from surveys and commercial fisheries.

Existing resources: (equipment, software, human resources, current surveys, sampling programs, suitable to include program activities in the different institutions)

Information and expertise exist in the four centres. Complementary technical assistance for some specific analysis can be needed.

Method and needs.

Pattern of biomass in space and time, Identification of Essential Fish Habitats of the two target species, Analysis of life traits variability in time and space; Pattern of fishing effort in space and time, Statistical framework for identification of stock units and their boundaries by a multi-dimensional approach.

Scientists from the various national institutions will be in close contact to exchange data sets including one or two working groups to process the data.

Participants Institutions and coordinator(s)

IEO (Spain); INRH (Morocco); CNRDPA (Algeria), INSTM (Tunisa) and collaboration of scientists from CNR-IAMC (Italy)

Coordinators for the compilation of information: A. Giráldez (IEO), MH. Idrissi (INRH)

7. POPULATION DYNAMICS SIMULATIONS

Under the different scenarios of stock discrimination obtained and before formulating any type of recommendation, population dynamics simulations will be carried out to evaluate the consequences of the different assumptions about stock boundaries to the assessment of the resource status and the outcomes of management strategies. This component will be further developed based on the outcomes of the previous components. It is envisaged the use of methodologies for management strategy evaluation.

Coordinator: M. Hidalgo (IEO), Spain

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