



MedSudMed

GCP/RER/010/ITA

Report of the Fourth Meeting of the
Coordination Committee

St. Julians, Malta 15–16 February 2006

The conclusions and recommendations given in this and in other documents in the *Assessment and Monitoring of the Fishery Resources and Ecosystems in the Straits of Sicily* 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 designations employed and the presentation of material in this publication do not imply the expression of any opinion on the part of FAO or MiPAF concerning the legal status of any country, territory, city or area, or concerning the determination of its frontiers or boundaries.

Preface

The Regional Project “Assessment and Monitoring of the Fishery Resources and the Ecosystems in the Straits of Sicily” (MedSudMed) is executed by the Food and Agriculture Organization of the United Nations (FAO) and funded by the Italian Ministry of Agriculture and Forestry Policies (MiPAF).

MedSudMed promotes scientific cooperation between research institutions of the four participating countries (Republics of Italy, Libya, Malta and Tunisia), for the continuous and dynamic assessment and monitoring of the status of the fisheries resources and the ecosystems in this area of the Mediterranean.

Research activities and training are supported to increase and use knowledge on fisheries ecology and ecosystems, and to create a regional network of expertise. Particular attention is given to the technical coordination of the research activities between the countries, which should contribute to the implementation of the Ecosystem Approach to Fisheries. Consideration is also given to the development of an appropriate tool for the management and processing of data related to fisheries and their ecosystems.

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GCP/RER/010/ITA Publications

The MedSudMed Project publications are issued as a series of Technical Documents (GCP/RER/010/ITA/MSM-TD-00) related to meetings, missions and research organized by or conducted within the framework of the Project.

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Preparation of this document

This document is the final version of the report of the Fourth Meeting of the Coordination Committee, organized by the FAO-MedSudMed Project (*Assessment and Monitoring of the Fishery Resources and the Ecosystems in the Straits of Sicily*), in St. Julians, Malta 15–16 February 2006.

Acknowledgements

The Department of Fisheries and Aquaculture of the Ministry of Agriculture and Fisheries, particularly the Director, Dr Anthony Gruppetta, as well as the Director of the Malta Centre for Fisheries Sciences, Dr Matthew Camilleri, who provided kind hospitality and assistance in the organization of the meeting, are gratefully acknowledged.

MedSudMed.

Report of the Fourth Meeting of the Coordination Committee, St. Julian, Malta, 15–16 February 2006.

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ABSTRACT

The Fourth Meeting of the MedSudMed Coordination Committee was attended by representatives of the Donor (Italy), delegations from the countries participating in the Project (Italy, Libyan Arab Jamahiriya, Malta and Tunisia), the Chair of the Scientific Advisory Committee (SAC), the Deputy Executive Secretary of the General Fisheries Commission for the Mediterranean (GFCM) as well as the FAO staff of the MedSudMed Project. A brief reminder was made on the Project objectives and activities and a presentation of the activities implemented for the four MedSudMed components during the inter-session period was made. The proposed work plan for the next period was discussed and approved. It focuses on the same priorities of standardizing approaches, increasing scientific knowledge on fishery resources and ecosystems, strengthening national expertise and regional cooperation. A positive appraisal of the MedSudMed Project for supporting all the participating countries in the assessment and monitoring of the fisheries resources and for the good job carried out since the beginning was given. The belief that continuing the Project can only bring success and be beneficial for each of the participating countries was affirmed.

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Report of the Fourth Meeting of the MedSudMed Coordination Committee

St. Julian's, Malta 15-16 February 2006

Opening of the meeting and nomination of the Chairman (Agenda Item n.1)

1. The Fourth Meeting of the Coordination Committee of the FAO MedSudMed Regional Project, "Assessment and Monitoring of the Fishery Resources and Ecosystems in the Straits of Sicily", was held in St. Julian's, Malta on 15 and 16 February 2006, hosted by the Malta Centre for Fisheries Sciences (MCFS) of the Ministry for Rural Affairs and the Environment.
2. The meeting was attended by representatives of the Donor (Italy), delegations from the countries participating in the Project (Italy, Libyan Arab Jamahiriya, Malta and Tunisia), the Chair of the Scientific Advisory Committee (SAC), the Deputy Executive Secretary of the General Fisheries Commission for the Mediterranean (GFCM) as well as the FAO staff of the MedSudMed Project.
3. On behalf of the Government of Malta, Mr. Anthony Gruppetta, Acting Director of the Department of Fisheries and Aquaculture of the Ministry of Agriculture and Fisheries, opened the meeting by welcoming all the delegates, as well as the GFCM Deputy Secretary. He thanked the Donor for making the Project possible and pointed out the importance of the MedSudMed Project and all the other Regional Projects (Copemed, AdriaMed, EastMed) for the promotion of Regional Cooperation and support of Regional Institutes. He drew the attention to the fact that MedSudMed supported multidisciplinary activities that brought together fisheries scientists and marine environment experts. At the national level, this has allowed for a major cooperation among Maltese Institutions who were given the opportunity to collaborate and achieve important work, providing a different outlook on fisheries research and ecosystems. Mr. Gruppetta underlined the achievements of the Project with respect to standardization of methodologies and National Capacity Building. He hoped that the activities for the next period would focus on the valorization of the results obtained, and considering a further extension of the Project, wished all success to the Committee for its work.
4. The FAO MedSudMed Project Coordinator, Mr. Fabio Massa, thanked the Malta Centre for Fisheries Science of the Ministry of Rural Affairs and Environment of Malta, for hosting the meeting and for the excellent organization whilst also thanking the participants for their attendance. Other meetings were organized by the Project in Malta, in particular the First Expert Consultation on "Spatial distribution of demersal resources in the project area and the influence of environmental factors and fishery characteristics", which represented the beginning of scientific cooperation within MedSudMed. Malta has actively participated in the Project since its inception, and in cooperation with the other participating countries, has contributed to the establishment of the current scientific cooperation framework.
5. It was brought to the attention of the Committee that this meeting can be set apart from the others, as it marks the closure of MedSudMed's four-year cycle since the beginning of the Project activities. Additional funds provided by the Donor allowed the extension of one more year until October 2006, enabling the implementation of

many activities related to the different components of the Project and of those that were in line with the work plan approved during the first Coordination Committee Meeting held in Rome in September 2002. The Project focused its attention on the standardization of methodologies for research activities, the increase of scientific knowledge, the support of national scientific capacity building and the strengthening of cooperation within the Project and with the GFCM and the other FAO Regional Projects.

6. The MedSudMed Project established permanent working groups and also set up the lines of applied research. In total, it organized 11 training courses, 18 technical consultations with the participation of over 328 experts and issued 12 technical publications. There has been significant cooperation with the GFCM and its SAC and Sub Committees (SC). The year 2005 saw the capitalization of the results of research activities carried out so far. The Coordination Committee was requested to discuss the Project activities and establish the work plan for the next period.
7. The Head of the MCFS of the Ministry for Rural Affairs and the Environment, acted as Chair for this Fourth MedSudMed Coordination Committee Meeting. He called the attention of the Committee on the fact that even if Malta has experience on fisheries resources, a lot of work still needs to be done. Thanks were given to the more advanced Italian and Tunisian research institutions that have helped Libya and Malta in the implementation of activities and in the standardization, allowing for their proper integration into this process.
8. The representative of Italy thanked the Maltese authorities and administration for hosting the meeting and thanked the FAO staff for the organization and the work performed so far. The hope for the continuity of those Project activities that will give technical support to the countries as well as support the research was expressed. The representative of Italy also stressed the importance that Italy attaches to the FAO Regional Projects and to MedSudMed in particular for the cooperation and the scientific results. He highlighted the results obtained by the Project, especially at present, given the growing attention and interest on ecosystems.
9. The Tunisian Delegate took the opportunity to thank the Maltese authorities for their hospitality in hosting the meeting and the Project staff for the great support carried out so far. He gave a highly positive appraisal of the MedSudMed Project for supporting all the participating countries in the assessment and monitoring of the fisheries resources and for the good job carried out since the beginning. He reaffirmed the belief that continuing the Project can only bring success and be beneficial for each of the participating countries.
10. The Libyan representative was pleased to meet again with colleagues from the Region bound by the same objectives. He thanked the Maltese authorities for hosting the meeting and wished that fruitful results would be achieved. The excellent results produced by the MedSudMed Project were underlined and the Project staff was thanked. Emphasis was put on the significant role of the Regional Projects and to the high quality of the assistance given to the countries by the MedSudMed Project in particular. Thanks to the scientific cooperation among the institutes of the area, this Project will hopefully have a positive impact on the SAC activities in the near future, while the participating countries are enabled to supply GFCM with relevant

information provided by technical meetings and research activities implemented in the different Geographical Sub Areas (GSAs). The Libyan representative expressed his conviction that the continuation of the Project can only be a success.

Adoption of the Agenda (Agenda Item n. 2)

11. The Agenda was presented to the Coordination Committee. The Chair invited the participants to make their comments. The Agenda was adopted with no changes.

Report on the Project's Progress (Agenda Item n.3)

12. The Project Fishery Monitoring Expert presented the activities carried out by the Project during the last period. Reference was made to the Report on the Project's Progress. A brief reminder was made on the Project objectives and activities. During the inter-session period, activities were implemented for the four MedSudMed components on i) Spatial distribution of demersal resources and the influence of environmental and fishery characteristics ii) Small Pelagic Fish: Stock Identification and Oceanographic Processes Influencing their Abundance and Distribution; iii) Marine Protected Areas (MPAs) and fisheries management and iv) Fishery and Ecosystem Information System (FEIS). The objectives and past achievements of each component were recalled, in particular activities dealing with the standardization of data collection protocols and training.
13. During the inter-session period, the Project component on demersal resources focused on data processing. Two working groups were organized in order to compare data sets of the different institutes, identify the most relevant parameters to be studied, including statistical data processing. The participants created a unique data set mixing information provided by the different institutes and jointly processed the data in the Geographical Information System (GIS) and statistical soft-wares. An outline of the results was presented during the meeting.
14. Regarding the fish assemblages, data collected in GSA 12 to 16 were processed, highlighting a separation between assemblages of the Tunisian and the Italian-Maltese coastal shelves. A bathymetric and a latitudinal gradient seem to condition the results obtained.
15. The meeting was also informed on the implementation of a pilot study on Spatial pattern of fisheries demersal resources, environmental factors and fishery activities conducted in GSA 15 with the objective of performing an exhaustive description of the spatial distribution of selected target species among demersal fisheries resources, *i.e.* abundance and density of different life stages, localization of spawning and nursery areas, demersal fish assemblages' characteristics. The spatial pattern of fisheries activity was also analyzed, as well as the bottom characteristics in terms of sediments. The Coordinator of the study outlined the most relevant results obtained.
16. Thanks to its multidisciplinary approach, the Pilot study on "*Spatial patterns of fisheries demersal resources, environmental factors and fisheries activities*", allowed to touch issues identified for the Project component on "Marine Protected Areas and

Fisheries management”. The description of the dynamics and status of demersal fisheries resources together with relevant environmental processes influencing the demersal fisheries resources and the critical habitats provided relevant methodological indications for the identification of sensitive areas.

17. Two workshops were organized under the framework of the Project component on small pelagic fish, in order to present and discuss detailed issues regarding the processing of acoustic data (general settings for acoustic data handling, use of day/night data, Target-Strength/Length relationships, filtering of acoustic data, influence of control catches on the biomass estimation). The agreed detailed methodology was summarized and circulated among regional scientists. Main results obtained so far were presented during the meeting for the GSAs 12, 13 and 14. A detailed work plan is under study concerning GSA 21. In the near future, the processing of the data should be completed and the results provided by all institutes should be integrated.
18. Results on spawning grounds and larvae distribution of anchovy were presented for GSAs 13, 15 and 16. A wider coverage of the Project area is necessary to draw complete hypotheses on transport patterns of eggs and larvae in the Project area.
19. Short training on acoustic data processing was organized for a scientist of the MCFS at Consiglio Nazionale delle Ricerche - Istituto per l’Ambiente Marino Costiero (CNR-IAMC), in order to process the acoustic data collected in GSA 15. Furthermore, a training course on ichthyoplankton identification was organized for scientists who had participated in surveys at sea and who were taught to identify the eggs and larvae of the main pelagic species. During the inter-session period, data collection at sea was pursued, thanks to the kind hospitality of the CNR-IAMC and Institut National des Sciences et Technologies de la Mer (INSTM) who hosted scientists from Marine Biology Research Centre (MBRC) and MCFS on board their research vessels.
20. The meeting was informed that the R/V “Nour” was recently examined by two experts (a naval engineer and an expert in acoustics), with the objective of evaluating the state of the hull and the equipment on board and of performing a noise test.
21. The chairman of the SAC expressed his satisfaction on the results obtained by the MedSudMed Project. The results show to which extent scientific knowledge on this area has increased. He expressed the wish that complete and detailed presentations would also be made at the next SAC session, since the results obtained by the Project may be of relevance for management purposes (for example, the identification of nursery areas, which are the starting point for the protection of species). In the same way, the results obtained by the pilot study seem promising for management by operational units, as all relevant information is listed. Detailed presentations at the next SAC session would allow showing examples of results that can be obtained when taking into consideration different types of data. He concluded by saying that the results achieved by the MedSudMed Project are of relevance for the GFCM purposes.
22. The representative of Tunisia acknowledged the fact that it is the first time scientists from the participating countries put data in common and analyze them jointly in order to present the results in the name of the MedSudMed Project. He assured that INSTM

would pursue its collaboration with the Project. A significant task was conducted under the frame of the component on demersal resources and the meeting was informed that INSTM has undertaken steps to perform further data analysis following the methodology that was agreed upon within the Project. He informed the meeting about the recent work at sea carried out by the institute, in particular the acoustic survey on the Skerkis Bank and the ichthyoplankton survey in the Gulfs of Tunis and Gabes.

23. The Maltese delegate mentioned that during the past period, the MedSudMed Project actively participated in several meetings organized by the GFCM SAC. During the last SAC SCs on Stock Assessment, the interest towards the MedSudMed Project was evident and highly appreciated. This should be considered as an encouragement for the continuation of the Project.
24. The Italian delegate thanked the Project staff for the presentation and the information provided and for the level of cooperation established among the Countries in the framework of MedSudMed. The technical outputs produced by the Project which regard the fisheries resources in relation with the environmental parameters, must be considered of great support for increasing the scientific knowledge necessary for the fisheries management.
25. The representative of CNR-IAMC presented the activities that his institute conducted within the cooperation with the Project. CNR-IAMC hosted several workshops and the staff actively participated in the activities organized by the Project. Work was carried out in collaboration with scientists of other participating institutes: acoustic and ichthyoplankton data processing with INSTM and MCFS; noise test performed on board the R/V Nour of the MBRC; analysis of trawl surveys data with INSTM and MBRC scientists; development of the SeaTrim software with the MCFS. CNR-IAMC collaborated with the Project staff for the development of the FEIS by providing a synthesis of the data collected during the past years by the Institute. As a general comment, the representative of CNR-IAMC expressed the wish to further develop joint efforts in the field and at laboratory to cover the remaining scientific gaps and fisheries resources in the whole Project area.
26. The Committee congratulated the MedSudMed staff for the presentation of the activities and expressed great appreciation for the quality of work carried out by the Project. The Committee acknowledged with satisfaction the overall progresses achieved by the Project, in particular for what concerns the research and training activities. The joint data analysis and the presence of mixed teams of experts coming from the different research institutes resulted in the establishment of scientific cooperation.
27. The Statistical and Information System consultant senior advisor updated the meeting on the status of the development and the implementation of FEIS. Prior to this, considering that the National version of FEIS system was completed and handed over to participating countries and institutions, and considering that the functionalities of FEIS had been already presented in different meetings, the presentation mainly focused on the environment in which FEIS was conceived and developed and on its interaction with other systems.

28. He started by stating that FEIS was developed as data management and information tool necessary to improve the performance of the national research institutions responsible for assessing/managing ecosystems and fisheries, as well as to boost sub-regional coordination. The National and Regional structure of FEIS was restated. The approach selected for FEIS was that of developing national information systems with a similar structure, which would communicate through a “corporate” regional centre.
29. He pointed out that the internal consistency and the external coherence on which FEIS is built should facilitate the interactions with other national and regional fishery information systems, developed or under development, in single countries and at the regional level. He mentioned that the FEIS reference and codification model is ensured by its link to MedStat Regional System (MedFisis)
30. The Project Coordinator informed that while establishing cooperation between institutes, difficulty of synthesizing available data and information often arises. In the case of the MedSudMed Project, the development of the FEIS provided the opportunity to identify existing data in the research institutes and organize it in a common system. Generally speaking, in all institutes around the Mediterranean, there is much information and data that may be lost due to lack of organization within a structured system.
31. The representative from Tunisia informed that the “Observatoire de la Mer”, within the INSTM, started working in 1999 with the objective of compiling all available geo-referenced data provided by surveys conducted by the Institute in the Gulfs of Gabes, Tunis and Hammamet (trawl surveys, oceanographic surveys and acoustic surveys). Different data-bases exist and are interfaced with ArcView, allowing users to produce different layers of information and manage them in the GIS. Besides, a link with the FEIS system could be useful.
32. The compatibility between FEIS and national systems was highlighted. Examples were given of the “Application Resources” currently used for the management and processing of trawl surveys data by INSTM (developed within the Copemed Project) and that could be easily linked to FEIS through ad hoc shuttles.
33. The Committee expressed great interest for the presentation and considered FEIS a relevant tool for the scientific data management both at the laboratory and at the Institution level, for gathering and storing data collected during the different surveys carried out. Particular appreciation was expressed towards that aspect of the information system which is designed to be colloquial with the other fisheries information systems present at the laboratory level.
34. The meeting also highlighted the importance of the availability of this kind of tools also for data management as a support to decision systems. Considerations were made on the lack of an accessible regional database for the management of data collected during the surveys at sea (trawl, ichthyoplankton and acoustic surveys) and on the opportunity to consider FEIS as a pilot initiative to be further developed at Mediterranean level.

Project Future implementation (Agenda Item 4)

35. The working paper “Development of the Project’s Programme: priorities identified and activities scheduled for the next period” referring to the activities proposed for the next period was introduced. The Committee was informed that this document was updated with the recent achievements of the Project for each component. The proposed work plan for the next year will focus on the same priorities of standardizing approaches, increasing scientific knowledge on fishery resources and ecosystems, strengthening national expertise and regional cooperation.
36. The list of activities concerning the four components of the Project was presented to the Committee. It was reiterated that the Project would focus on the finalization of data processing and closure of ongoing activities. Training will also be considered on the basis of the work plan that was approved, but also on the basis of specific requests that institutes may have. It was highlighted that training is of utmost importance for the sustainability of the Project, as it allows regional experts to increase their capabilities and ensure the continuation of activities initiated within the Project.
37. The SAC Chairman suggested that particular attention is paid to biological indicators and reference points defined by operational unit, as well as to ecological indicators, so as to be coherent with the Project activities dealing with ecosystems.
38. The representative of CNR-IAMC made suggestions for future activities. He stressed out the importance of continuing the joint data processing under all the Project components and expressed his agreement with the idea of duplicating the Pilot Study in other GSAs of the Project area. He suggested that results obtained by the Project are used as the basis for scientific papers that would involve all MedSudMed participating institutes. However, further standardization would be required, as discrepancies were highlighted during the data processing in the past period (handling of samples collected at sea during trawl surveys, collection of harmonized information on non-target demersal species). He mentioned gaps of information that it would be suitable to fill, in particular the absence of information on spatial distribution of fishing effort. He also recommended that sampling at sea strives to span areas that are still uncovered by the current surveys. In this perspective, he informed the meeting participants about the availability of Italian research vessels that may be destined to the MedSudMed activities: R/V Urania could be used, at no cost for the MedSudMed Project; advantage can also be taken of vessel time on board R/V Dalla Porta at a cost yet to be defined.
39. Suggestions for the upcoming period were made by the Tunisian representative who proposed i) the organization of a training/workshop on age determination for crustaceans and cephalopods, pointing out that 6 of the MedSudMed target species belong to these taxa and that difficulties are encountered to determine their age due to the absence of calcified structures; ii) to analyze the programme of the research vessels by the end of March, in view of organizing the next trawl surveys and an inter-calibration exercise. He also suggested that the inter-calibration be organized after a one-day meeting during which the precise sampling design will be examined.
40. The representative from Libya noted that most activities proposed for the next period are based on national programmes. He informed the meeting participants that MBRC

undertook initiatives to evaluate the R/V Nour and that the Institute foresees to conduct a trawl survey between Misrata and the Tunisian border, as well as an acoustic survey along the entire Libyan coast. Should the R/V Nour not be available for these surveys, all efforts will be made to study and find alternate means. Advantage could also be taken of one of the research vessels available in the Project area, provided that the MBRC is fully associated to all steps: survey planning, sampling design, data processing and results analysis. The Libyan representative explained that one of the priorities of his institute is to increase the capabilities of the staff, and he suggested the organization of i) training on age reading and determination of sexual maturity that could be hosted by MBRC; ii) training on toxic algal blooms, in view of the implementation of the national programme on algal blooms. Due to red tide phenomena that Libya had to face these last years, MBRC wishes to promote the awareness of the staff on this issue. He expressed his satisfaction seeing that activities proposed for the next period of MedSudMed match almost exactly the Libyan national requirements.

41. The representative from Malta called the attention to how the pilot study highlighted the importance of working on sediments and bottom types. One way to achieve this goal would be to perform acoustic surveys oriented towards the analysis of bottom characteristics. Moreover, there are few trawlable areas around Malta and numerous wreckages; therefore it would be of utmost relevance to identify other trawling sampling stations using acoustic techniques. The representative from Malta informed the meeting that scientists from Bangor University, UK, who are willing to collaborate with the MCFS, would be available to provide training on this topic and that the training could be extended with a field course supported by the MCFS.
42. The representative of Italy thanked the project staff for the clear presentations on the programme on the Project's future activities and expressed strong interest for the suggestions and discussions that came from the delegates. The work plan and activities defined for the next months are coherent with the work plan of the different Project components and with the expectations of the countries, in particular regarding national capacity building and interest for scientific cooperation. Furthermore, considering the time at disposal before the next Coordination Committee meeting, he suggested the conduction of an internal technical review of Project outputs that would help the Project in the preparation of a programme for a possible additional extension and that could be useful for a fine tuning of the implementation of the activities to be carried out.
43. The Committee agreed on this suggestion and proposed that the different institutions participating in MedSudMed contribute to such review, and that an extension of the Project be considered within the actual frame to avoid any critical and time gaps that could jeopardize the smooth implementation of the activities.
44. The Committee agreed on the programme and activities scheduled for the next period as presented by the Project staff (document CC4/03 refers). In particular, the Committee, on the basis of the results of the discussion on the priorities for the coming period, made the following suggestions:
 - Finalization of the programme of the research activities with particular attention to the filling of the remaining gaps (ichthyoplankton and acoustic

surveys, and inter-calibration for the trawl surveys based on the vessels availability and timetable);

- Finalization of the technical document on the Pilot Study conducted in GSA 15. This document will include methodological guidelines that should allow the duplication of the pilot study in any other GSA;
- Organization of ad hoc training programmes and advanced seminars (fisheries acoustics, age and maturity determination, coastal environmental monitoring).
- Completion of the component of the FEIS with the data input from all the participating institutes.
- Preparation of an internal technical review on the activities implemented by the Project in view of a possible extension.

Other matters (Agenda item n.5)

45. All the delegates and Meeting participants thanked the authorities of Malta for the kind hospitality provided.

Date and venue of the next Coordination Committee Meeting (Agenda item n.6)

46. Upon the kind invitation of the Italian delegation, the next Meeting of the MedSudMed Coordination Committee will be held in Italy around 18 September 2006. This proposal was welcomed by the Meeting participants.
47. This report was adopted on 16 February 2006.

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Agenda

1. Opening of the meeting and nomination of the Chairman
2. Adoption of the Agenda
3. Report on the Project's progress
4. Project future implementation
5. Other matters
6. Date and venue of the next Coordination Committee Meeting

List of Documents

FAO-MedSudMed: CC4/01	Provisional Agenda
FAO-MedSudMed: CC4/02	Report on Project's Progress (February 2005 - January 2006)
FAO-MedSudMed: CC4/03	Development of the Project's Programme: priorities identified and activities scheduled for the next period
FAO-MedSudMed: CC4/04	Progress report on MedSudMed Fishery and Ecosystem Information System (FEIS) and installation CD
FAO-MedSudMed: CC4/Info01	Provisional list of participants
FAO-MedSudMed: CC4/Info02	Report of the Third Meeting of the Coordination Committee GCP/RER/010/ITA/MSM-TD-10.
FAO-MedSudMed: CC4/Info03	Report of the Meeting on demersal resources mapping, identification of nursery areas and description of fish assemblages.
FAO-MedSudMed: CC4/Info04	Preliminary characterization of the main demersal assemblages in the MedSudMed Project area
FAO-MedSudMed: CC4/Info05	Spatial distribution of biomass indices, nursery and spawning areas of <i>Merluccius merluccius</i> and <i>Mullus barbatus</i> in the MedSudMed Project area - Preliminary results -
FAO-MedSudMed: CC4/Info06	Pilot study: Spatial pattern of fisheries demersal resources, environmental factors and fishery activities in GSA 15.
FAO-MedSudMed: CC4/Info07	Report of the Working Group on joint processing of acoustic data.
FAO-MedSudMed: CC4/Info08	Common methodology for acoustic data processing and regional mapping of <i>Engraulis encrasicolus</i> and <i>Sardina pilchardus</i> biomass in the MedSudMed area: outline of the results obtained so far.
FAO-MedSudMed: CC4/Info09	Mapping of spawning grounds and larvae distribution of anchovy (<i>Engraulis encrasicolus</i>) in the MedSudMed Project area. Preliminary results in East Tunisia (GSA 13), Malta Island (GSA 15) and South Sicily (GSA 16).
FAO-MedSudMed: CC4/Info10	Report of the Training course on ichthyoplankton identification
FAO-MedSudMed: CC4/Info11	List of Documents

Report on Project's Progress (February 2005 – January 2006)

Introduction

The MedSudMed Project aims at supporting the scientific community of the participating countries in the development of a monitoring system for the studies of fisheries resources and ecosystems in the Project area (General Fisheries Commission for the Mediterranean (GFCM) Geographical Sub Areas (GSAs) 12, 13, 14, 15, 16 and 21), particularly by focusing on a standardized methodology. The Project is oriented to give technical assistance to the countries in particular for what concerns the national capacity building within the Project area by ensuring that the outputs produced will be useful to each beneficiary country individually in a national context and jointly in the whole Project Area.

This paper summarizes the main activities carried out by the MedSudMed Project between February 2005 and January 2006. The activities originate from work plans presented and approved during the 1st Coordination Committee meeting (GCP/RER/010/ITA/MSM-TD-1) and the work programme approved during the successive Coordination Committee meetings. The activities detailed here represent the follow-up to the 3rd Coordination Committee meeting held in Tajura, Libya, 1-3 February 2005 (GCP/RER/010/ITA/MSM-TD-10, document CC4/Info02 refers).

During the previous Coordination Committee meetings a general outline of research, workshops and training was agreed upon and implementation of the related activities was roughly scheduled. The MedSudMed Project implements work plans related to three main components dealing with: Spatial distribution of demersal resources and the influence of environmental and fishery characteristics; Small pelagic fish: stock identification and oceanographic processes influencing their abundance and distribution; Marine Protected Areas (MPAs) and fisheries management.

Furthermore, a fourth component, transversal to the previous ones focuses on the development of the Fishery and Ecosystem Information System (FEIS), with the support of the regional experts.

In particular, during the last inter-committee period, the Project, within the components on demersal fisheries resources and small pelagic fisheries resources, undertook the following activities:

1. Cooperative research programmes and working groups
2. National capacity building
3. Regional cooperation
4. Project communication.

The outputs of these activities are hereafter summarized according to each Project component. The Project also organized further technical meetings and supported regional experts' travels.

1. Cooperative research programmes and Working Groups

In coherence with the activities and work-plan agreed upon during the previous Coordination Committee meetings, the Project implemented a series of activities dealing with field work and data processing methodology. During the inter-session period, on the basis of standardized protocols that were agreed upon previously, field work continued for each component of the Project, as well as on-the-job training. Moreover, the standardization of data processing was pursued. This was also the occasion to identify the training requirements in the Project area.

1.1. MedSudMed Component on Demersal Resources

This component profited by the cooperation that was established during the successive years of the Project, as well as the strong efforts that were made during the previous years for standardisation of protocols and training on different issues. Data collection was continued during the inter-session period, in the framework of national programmes. However, this period concentrated on the processing of a consistent data set that covers the whole Project area and on the implementation of pilot study where considered relevant. The following activities were organised:

- **Meeting on Geographical Information System (GIS) mapping procedures and on inter-calibration of fishing gears (Salammbô, Tunisia, 8-10 February 2005).** The purpose was to agree on the mapping procedures to be adopted for the study of the spatial distribution of demersal resources. Special effort was devoted to the exploration and comparison of existing data collected during the trawl surveys in the Project area in order to highlight differences, gaps and problems. The meeting focused on the comparison of geographical distribution of the hauls, period of the surveys, abundance indexes and length structures of *Merluccius merluccius* and *Mullus barbatus*. The meeting was attended by experts from Institut National des Sciences et Technologies de la Mer (INSTM) and Consiglio Nazionale delle Ricerche - Istituto per l'Ambiente Marino Costiero (CNR-IAMC) with the support of demersal fisheries biologists who provided advice on biological criteria to be applied for the mapping; the participants produced a report that was used as a basis for the joint work at regional level.
- **Meeting on demersal resources mapping, identification of nursery areas and description of fish assemblages (Mazara del Vallo, Italy, 12-14 July 2005).** The objective was to compare the results obtained since the last meeting (Salammbô, 8-10 February 2005), agree on the criteria for the identification of nurseries area and apply the available methodology for the description of fish assemblages. The experts decided to continue focusing on *Merluccius merluccius* and *Mullus barbatus* and all definitions of the parameters to be mapped were discussed and agreed upon. The criteria to be used to identify the nursery areas that were defined as those areas where the highest concentration of juveniles can be found were discussed. A unique GIS project was created with information layers from all GSAs. However, as discrepancies were still found in the sampling strategy, it was agreed that interpolation would be carried out separately for each GSA. Participants processed the data as discussions went on and produced the first maps of abundance and biomass index for the two species and for all GSAs (document CC4/Info03 refers).

- **Pilot study on “Spatial pattern of fisheries demersal resources, environmental factors and fishery activities in GSA 15”.** As mentioned during the last Coordination Committee meeting, a pilot study was implemented in GSA 15. During the working group of the Project component on demersal resources (Mazara del Vallo, Italy, December 2004), it was agreed that wherever data were available, a pilot study would be conducted in order to put together all information related to fisheries resources and their ecosystems (biotic environment, oceanography, bottom types, biocenosis). The GSA 15 appeared to be the area in which a valuable amount of data for the different components should be available in a short time. The objective of the study is to perform an exhaustive description of the spatial distribution of selected target species among demersal fisheries resources, *i.e.* abundance and density of different life stages, localization of spawning and nursery areas, fish assemblages’ characteristics. The spatial pattern of fisheries activity was also analysed, as well as the bottom characteristics in terms of sediments. In addition, the study strives to provide a picture of the abiotic factors characterizing the area of interest. A workshop was organised in Palermo, Italy on 17-18 October 2005 in order to compare the spatial patterns of the demersal resources’ distribution with those of the main abiotic relevant factors, which are expected to affect the dynamics of the resources. It is expected that the outputs of the study will contribute to enhance the understanding of the ecosystem structure and functioning. Details on the results obtained so far can be found in the document “Spatial pattern of fisheries demersal resources, environmental factors and fishery activities in GSA 15. Report of the workshop on analysis and synthesis of available outputs”. The Pilot study includes a series of topics considered relevant for the Project component on Marine Protected Areas and Fisheries Management, such as the dynamic and studies of fisheries resources, environmental processes influencing the resources, critical/key habitats and habitat identification of fisheries resources.
- **Trawl surveys.** Data collection was pursued within national programmes by the participating institutes taking into account the minimum requirements of the MedSudMed protocol that was agreed upon. However, information was collected according to the protocol that was discussed and agreed upon within the MedSudMed Project. The MEDITS survey was held from 06 July to 11 August 2005 in GSA 15 and 16 in collaboration between CNR-IAMC and Malta Centre for Fisheries Sciences (MCFS). Trawl surveys were also conducted by the INSTM in GSA 12 (21 February – 22 March 2005), GSA 13 (14 to 18 April 2005) and GSA 14 (04 to 27 May 2005) with the R/V “Hannibal”. Tentative of inter-calibration between the trawls of two vessels was made, the Project supported the execution of additional hauls in order to inter-calibrate fishing gears used in the area, however, surveys of both vessels were disturbed by the bad weather conditions and, therefore, the inter-calibration hauls could not be performed simultaneously by the two boats.

1.2. MedSudMed Component on Small Pelagic fish

While the protocols of sampling at sea were discussed during an *ad hoc* meeting organised by the Project, several discrepancies were evidenced in the data processing methodologies. Much effort was therefore put in harmonisation of the techniques used by the different institutes. Moreover, active training was provided, both during the work at sea and in laboratory. The following events were organised or supported by the Project:

- **Meeting on common methodologies for acoustic data processing (La Goulette, Tunisia, 23-25 February 2005).** The meeting was attended by an expert from INSTM and one from CNR-IAMC. The different steps of the procedure for the estimation of small pelagic fish biomass using acoustic data were discussed. The objective was to agree on common procedures in view of the working group on joint processing of acoustic data to be held in Mazara del Vallo, Italy (8-10 March 2005). The experts also discussed the possibility of organizing an inter-calibration exercise on the Skerkis Bank. Taking into account the calendar of the acoustic surveys to be performed by the R/V Hannibal (20 July – 31 August) and the R/V Dalla Porta (24 June – 10 July), it was agreed that both vessels would prospect the area in very close periods. The results of the discussions, as well as the sampling design for the inter-calibration exercise were summarized in a report produced by the 2 experts.
- **Working Group on joint processing of acoustic data (Mazara del Vallo, Italy, 8-10 March 2005).** The objective of this working group was to perform joint data processing according to agreed methodologies on samples of data collected in the Project area. Activities of all institutes for the year 2004 were presented (number and period of surveys, sampling design, characteristics of control catches), and demonstration was made of the softwares used in the Project area (Movies⁺ and EchoView). Then, the different steps of acoustic data processing for biomass estimation were detailed and agreed upon; the topics discussed regarded: extraction of relevant parameters from the echograms in particular NASC fish (Nautical Area Scattering Coefficient: total acoustic backscattered area corresponding to fish present in the water column per each nautical mile), the calculation of surface density per species (estimated nominal weight of each species per nmile²) by taking into consideration control catches and TS-length relationships, application of interpolation methods for the estimation of the total biomass in an area. Participants underlined that more time and experience were needed to perform joint work and produce results that could cover the entire Project area. During the meeting the different levels of expertise in the Project area were highlighted. Therefore, the workshop was also meant to be the occasion of providing on-the-job training for the participants who had less experience in this field, however, due to limited time, this goal was only partially achieved and more specific training sessions were requested on data collection and processing by the participants (document CC4/Info07 refers).
- **Joint acoustic data processing (CNR-IAMC/MCFS) for biomass estimation (Mazara del Vallo, Italy, 11-12 July 2005).** A meeting was organised with one scientist from CNR-IAMC and one from MCFS in order to enter in the detail of the data processing and allow the MCFS scientists to process all data autonomously. Two days of work were dedicated to the detailed analysis of data files, break down of all calculations and interpolation of data for estimation of biomass in tons for the different species.
- **Cooperative acoustic surveys (R/V “Dalla Porta” 1-9 July and 1-15 October 2005)** were conducted in cooperation with CNR-IAMC with the scope of conducting an interdisciplinary research to estimate the spatial distribution and abundance of the pelagic organisms on the southern continental platform of Sicily, between Marsala and Capo Passero, on an area of about 2700 square kilometres. In agreement with the MCFS and with the support of the MedSudMed Project, the sampling area was extended to the Maltese territorial waters. The main activities conducted on-board were the collection of acoustic data related to small pelagic fish, the biological sampling of small pelagic fish and the measurement of physical-chemical parameters

of the water column. Training on board was provided for scientists belonging to institutes participating in the MedSudMed Project, such as the MCFS and the Marine Biology Research Centre (MBRC).

- **Cooperative Ichthyoplankton surveys (R/V “Hannibal”, 9-17 July 2005 and R/V “Urania”, 26 July-9 August 2005).** The ichthyoplankton surveys were organized respectively by the INSTM of Salammbô, Tunisia on board the R/V “Hannibal” and the CNR-IAMC of Mazara del Vallo, Italy on board the R/V “Urania”. The areas prospected include the Gulf of Hammamet, the South Sicilian coast and the Maltese territorial waters. The surveys aimed at investigating the physical factors affecting the distribution and the abundance of zooplankton and ichthyoplankton, which are believed to affect survival processes for larval and juvenile stages and ultimately determine the fluctuations in the biomass of small pelagic species. In the framework of regional cooperation with IAMC and INSTM and in order to continue the activity of on-board training initiated in 2004, the Project supported the participation of a scientist from MBRC in the survey on board the R/V “Hannibal” and of two scientists from MCFS on board the R/V “Urania”.

1.3. Information System

In the last period, the data input module was completed, as data corresponding to additional topics were included in the database (acoustic data, sediments and in-fauna data coming from box-core samples, oceanography data, accessory data representing miscellaneous types of data that may be made available on an occasional basis). Moreover, the system provides now an option for spatial data queries (full details are provided in the document CC4/04).

Advances were made on the development of the MedSudMed Fishery and Ecosystem Information System (FEIS) corporate database and a first functioning version was finalized. The data entry system of the FEIS was tested at MCFS in Malta and the data structure of biotic and abiotic parameters was finalized according to the information provided by the regional scientists. Progresses made in the data entry system allow users to input manually or automatically data related to biocenosis and abiotic environment. So far, the corporate data base contains: trawl surveys data collected during the Libfish Project (6 surveys conducted in Libyan waters between June 1993 and November 1994), trawl surveys data collected by the CNR-IAMC and MCFS (3 joint surveys conducted in 2002, 2003 and 2004), information at metadata level on acoustic surveys conducted by the CNR-IAMC (10 surveys conducted between 1994 and 2004). During the reporting period, the Project participated in the joint meeting AdriaMed-MedSudMed-MedFisis (FAO-HQ, Rome, 09 May 2005) where the developments of the information systems of AdriaMed (ATrIS) and MedSudMed (FEIS) were presented. Participants agreed that the FEIS component on demersal fish/trawl surveys and ATrIS should be harmonized for what regards the codification used and data format.

2. National Capacity building and training

As during the previous period, on-the-job training was continued during the surveys at sea, and when the case arose, during working groups. In particular the following were organised:

- **Training on acoustic data processing (Mazara del Vallo, Italy, 11-12 July 2005).** To enhance the autonomy of the different participating institutes for the processing of the data collected at sea, a meeting was organized with a scientist from the MCFS and one from the CNR-IAMC. The methodology that was agreed upon during the above

mentioned *ad hoc* MedSudMed workshop was applied to real data and all steps were followed up to the production of biomass estimates.

- **Training course on processing of ichthyoplankton samples (Mazara del Vallo, Italy, 25-27 July 2005).** The training course was organized as a follow up to the cooperative ichthyoplankton surveys that were conducted in summer 2004, in GSAs 13, 15 and 16 (17 June-06 July on board R/V “Urania” and 11-23 August on board R/V “Hannibal”) where the scientists were trained for the collection and conservation of ichthyoplankton samples and measurement of physical/chemical parameters. The course aimed at pursuing the training initiated on board and dealt with the processing of the samples in laboratory. The trainers were expected to acquire skills for the identification of the main species of interest in the Project area and preparation of required data for the study of the spatial distribution of ichthyoplankton in relation to environmental parameters (document CC4/Info10 refers).

As requested during the last Coordination Committee meeting, and in view of implementing specific research programmes in Libya, the Project drafted and submitted to MBRC two documents on “Libyan acoustic surveys Programme - Assessment of Small Pelagic Fishery Resources” and “Libyan trawl surveys Programme - Assessment of Demersal Fishery Resources”. The programmes foresee that the MBRC would receive support and expertise in view of conducting surveys at sea, and provide a programme of work for the collection and processing of the data. In particular the first step of these programmes was implemented through on-the-job training and training course and through the deep evaluation of the R/V Nour by a naval engineer and an expert in acoustics appointed by the MedSudMed Project.

Whenever necessary, the Project provided the participating institutes with some pieces of equipment (softwares, nets, books, marine scales ...) for data collection at sea, laboratory work, data processing and desk job.

Meeting	Participants	Institutions
Meeting on Geographical Information System (GIS) mapping procedures and on inter-calibration of fishing gears	3	2
Meeting on common methodologies for acoustic data processing	2	2
Working Group on joint processing of acoustic data	8	5
Joint acoustic data processing (CNR-IAMC/MCFS) for biomass estimation (Mazara del Vallo, Italy, 11-12 July 2005).	2	2
Meeting on demersal resources mapping, identification of nursery areas and description of fish assemblages	12	7
Training course on processing of ichthyoplankton samples.	8	5
Pilot study on “Spatial pattern of fisheries demersal resources, environmental factors and fishery activities in GSA 15”.	9	5
Surveys at sea	6	4

3. Regional cooperation

The reinforcement of regional cooperation was encouraged by the Project through participation of regional experts in several workshops, meetings, seminars and conferences organized in the Mediterranean area. Relations were constantly maintained with the researchers and the Institutes of the Project area for the discussion of the Project's activities, planning and organization of the working groups, and comments on the documents produced by the Project. Invitation was also made to other regional Projects to participate in meetings organized by the Project in order to promote the technical cooperation between Projects and take advantage of their experience and results already obtained. The Project participated in the GFCM Scientific Advisory Committee (SAC) Working Groups and Sub-Committees. The participation of the regional scientists at these events were supported by the Project and the results obtained under the Project components on demersal resources and small pelagic fish (adults and eggs/larvae) presented at the working groups of the Sub-Committee on Stock Assessment. In particular the Project:

- Participated in **GFCM SAC Sub-Committee on Marine Environment and Ecosystems Transversal Workshop on Ecosystem Approach to Fisheries (Salammbô, Tunisia, 7-9 September 2005)**. The Project supported the participation of regional scientists in this workshop where the latest achievements of the MedSudMed Project were presented. The meeting was informed that the Project was conducting activities in relation to fish habitats, by working on the identification of the main spawning and nursery areas of selected demersal and small pelagic species and that it is foreseen that these areas will eventually be characterized in terms of sediment structure, bottom types and oceanography wherever data are available. The meeting was also informed on the objectives and expected outputs of the pilot study operated in GSA 15 (Malta Island). The meeting highlighted that there are few studies on habitats in the Mediterranean, probably due to the high costs and the great amount of work that they require. Moreover, it was noted that poor attention is given to Essential Fish Habitat (EFH) issues in the Mediterranean, even though spatial consideration will certainly become a major issue for management. In this perspective, knowledge on habitats and on their characterisation would need to be improved and MedSudMed work in this sense was acknowledged.
- Attended the **7th meeting of the GFCM SAC Sub-Committee on Stock Assessment (Rome, Italy 26-30 September 2005)**. The Project supported the participation of scientists from the Project area and 4 presentations were given during the meeting:
 1. Preliminary results on spatial distribution of biomass indices, nursery and spawning areas of *Merluccius merluccius* and *Mullus barbatus* in the MedSudMed Project area (CC04/Info05);
 2. Preliminary characterization of the main demersal assemblages in the MedSudMed Project area (CC04/Info04);
 3. Regional mapping of anchovy and sardine biomass in the MedSudMed Project area: Update on the activities conducted so far (CC04/Info08);
 4. Mapping of spawning grounds and larvae distribution of anchovy (*Engraulis encrasicolus*) in the MedSudMed Project area. Preliminary results in East

Tunisia (GSA13), Malta Island (GSA 15) and South Sicily (GSA 16). (CC04/Info09);

The Sub-Committee acknowledged the work that was carried out and commented on the cooperation that allowed obtaining results at regional level.

- Attended the **Transversal workshop on GFCM Statistical Framework and Databases of the Sub-Committee on Statistics and Information** (Rome, 26th September 2005). One of the points of the agenda dealt with the databases developed by FAO regional projects; the structure and components of the FEIS were presented at the meeting.
- Participated in the **Subcommittee on Marine Environment and Ecosystems (SCMEE)** and informed the meeting about the results of the MedSudMed workshop on age reading of selacean fish that was held in Mazara del Vallo, Italy, 22 November – 1 December 2004.
- Was represented at the **29th and 30th Session of the General Fisheries Commission for the Mediterranean** (Rome, Italy, 21-25 February 2005 and Istanbul, Turkey, 23-28 January 2006)

4. Project Communication

4.1. Web site (<http://www.faomedsudmed.org>)

Since its publication, the Project's website has been updated. By connecting to the website, it is possible to have a general description of the MedSudMed Project, get information on the recent or forthcoming events organized by the Project, download the documents released by the Project as well as link to the Research Institutes participating in the MedSudMed Project, the Mediterranean Regional Projects or to sites regarding GIS, databanks and Research Bodies.

The connections to the web site have increased during the last year (from an average of 600 to 937 visits per month). A total of 998 documents were downloaded from the site. Visits still come mainly from North America (56.4%) and Europe (30%). Connections from Africa increased during the last year, from 1.3% to 8%.

4.2. Technical Documents

Several technical documents were prepared; they are related to the workshops and training courses organized by the Project. The MedSudMed Project Publications are issued as series of Technical Documents (GCP/RER/010/ITA/MSM-TD-00) or Occasional Papers (GCP/RER/010/ITA/MSM-OP-00) related to meetings and research organised or conducted within the framework of the Project. The MedSudMed Serial will be included in the monitoring list of AdriaMed (ASFA International Partner). Since the beginning of the Project, the following documents have been published or are being finalised:

- MedSudMed. 2003. Report of the First Meeting of the MedSudMed Coordination Committee. FAO-MiPAF Assessment and Monitoring of the Fishery Resources and Ecosystems in the Straits of Sicily. GCP/RER/010/ITA/MSM-TD-01. *MedSudMed Technical Documents*, 1: 57 pp.

- MedSudMed. 2004. Report of the MedSudMed Expert Consultation on Spatial distribution of demersal resources in the Straits of Sicily and the influence of environmental factors and fishery characteristics. GCP/RER/010/ITA/MSM-TD-02. *MedSudMed Technical Documents*, 2: 102 pp.
- MedSudMed. 2004. Report of the MedSudMed Expert Consultation on Small pelagic fish: stock identification and oceanographic processes influencing their abundance and distribution. GCP/RER/010/ITA/MSM-TD-05. *MedSudMed Technical Documents*, 5: 132 pp.
- MedSudMed. 2004. Report of the Second Meeting of the Coordination Committee. GCP/RER/010/ITA/MSM-TD-06. *MedSudMed Technical Documents*, 6: 47 pp.
- MedSudMed. 2005. Report of the Third Meeting of the Coordination Committee. FAO-MiPAF Assessment and Monitoring of the Fishery Resources and Ecosystems in the Straits of Sicily. GCP/RER/010/ITA/MSM-TD-10. *MedSudMed Technical Documents*, 10: 44 pp.
- MedSudMed. Report of the MedSudMed Expert Consultation on Marine Protected Areas and Fisheries Management. GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (draft copy)*
- MedSudMed. Report of the MedSudMed Workshop on Standardization of Trawl Surveys Protocol in the MedSudMed Project Area. GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (draft copy)*
- MedSudMed. Working Group on Basic Parameters related to Small Pelagic Fish: Length at Sexual Maturity of Anchovy and Sardine in the MedSudMed Project Area. GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (draft copy)*
- P. Rizzo, S. Gancitano, C. Badalucco, S. Enajjar, C. Mancusi, A. Mosteiro Cabanelas, B. Saidi, L. Sion. Contribution to guidelines for Chondrohichtyes fish age reading in the Mediterranean Sea (application to selected species). GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (draft copy)*
- MedSudMed. Report of the Workshop on Standardisation of Fish Age Determination Based on Otolith Samples in the MedSudMed Area. GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (draft copy)*
- MedSudMed. Workshop on the Standardization of Echo-Surveys and Ichthyoplankton Surveys Protocol in the MedSudMed Project Area. GCP/RER/010/ITA/MSM-OP. *MedSudMed Occasional Papers (draft copy)*
- De Santi, F. Fiorentino, M. Camilleri, M.L. Bianchini, S. Ragonese. SeaTrim: Software for the Exploratory Analysis of Trawl Information in the Mediterranean. GCP/RER/010/ITA/MSM-OP. *MedSudMed Occasional Papers (in preparation)*
- MedSudMed. Spatial pattern of fisheries demersal resources, environmental factors and fishery activities in GSA 15. GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (in preparation)*
- MedSudMed. Characterization of the main demersal assemblages of the MedSudMed Project area. GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (in preparation)*
- MedSudMed. Mapping of spawning grounds and larvae distribution of anchovy (*Engraulis encrasicolus*) in the MedSudMed Project area: East Tunisia (GSA13),

Malta Island (GSA 15) and South Sicily (GSA 16). GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (in preparation)*

- MedSudMed. Regional mapping of anchovy and sardine biomass in the MedSudMed area. GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (in preparation)*
- MedSudMed. Spatial distribution of biomass indices, nursery and spawning areas of *Merluccius merluccius* and *Mullus barbatus* in the MedSudMed Project area. GCP/RER/010/ITA/MSM-TD. *MedSudMed Technical Documents (in preparation)*

**Development of the Project's Programme:
priorities identified and activities scheduled for the next period
(March-September 2006)**

Introduction

The aim of this paper is to give the Coordination Committee members elements for the discussion of the MedSudMed Project work programme for the coming period. Considering the timing of the Project, the programme of work presented in this document refers to the period March-September 2006. The information presented here should put the Committee in a position to give advice to the Project on the activities to be finalised. The first Coordination Committee meeting (GCP/RER/010/ITA/MedSudMed-TD01) identified the Project components, as well as a number of medium and long terms activities to be implemented by MedSudMed. The successive Coordination Committee meetings were regularly updated on the progress made in the execution of the work-plan of the Project.

These activities were summarized in tables (Report of the Second Meeting of the Coordination Committee, GCP/RER/010/ITA/MedSudMed-TD06, Annex E refers) representing the methodological framework of the Project activities and the reference work plan of the Project since October 2002. The Project Components are unchanged and the activities for the coming period will aim mainly at finalising the activities implemented so far. Scientific cooperation among the different institutions involved in the Project as well as increasing the scientific knowledge on the fishery resources and the relations with the abiotic and biotic factors in the Project area will remain the priority of MedSudMed. For the next period the MedSudMed Project will:

- a. continue supporting the scientific standardisation of the methodologies applied in the relevant studies related to fishery resources and to the relationships between fishery resources and biotic and abiotic factors;
- b. continue increasing scientific knowledge on fishery resources and their ecosystem in the Project area through the finalisation of the programme of research activities already implemented;
- c. continue strengthening the national expertise through on-the-job training and working groups, and supporting the national research institutions in upgrading the scientists' expertise;
- d. continue strengthening and supporting scientific cooperation between the different experts and institutions involved in the Project activities, who represent the scientific network of the Project;
- e. continue strengthening cooperation at Mediterranean level, among the countries and between the MedSudMed Project, the General Fisheries Commission for the Mediterranean (GFCM) and other FAO Regional Projects.

a) Standardisation of methodology

So far, much effort was made by the Project and the research institutes to achieve standardization of sampling design and the protocol used in the different survey programmes. As a result, common protocols started to be used for field work (trawl surveys, echo-surveys) and whenever possible for the data processing methods. Thanks to the level of standardization achieved, comparable data are now available in the Project area. In the next future, work should continue on standardisation of laboratory work and processing of samples collected at sea. Where data processing is concerned (statistical analysis, mapping procedures...), previous experience show that it is a continuous process. On the basis of the network that the Project contributed to build up, exchanges between regional experts should be favoured, so that they continue interacting while processing data and producing scientific results. Whenever necessary, the Project will continue supporting the countries in acquiring the scientific softwares.

Demersal resources

Where the component on spatial distribution of demersal resources in the Strait of Sicily and the influence of environmental factors and fishery characteristics is concerned, the topics to be taken into consideration for further discussion on standardization procedures are listed below:

- Further standardisation of analysis of the data collected during the surveys. During the previous period, while processing trawl surveys data unexpected discrepancies were evidenced between data provided by different Institutes.
- Standardisation of the methodology to produce biological indicators and demographic indices. The most relevant parameters dealing with biology of target species should be listed and agreed upon, in order to synthesize the current knowledge in the Project area.
- Agreement on a common approach to study biocenosis and bottom types. In view of describing habitats, benthos and macroinvertebrate communities, regional scientists should agree on the strategy to be adopted. Some data and literature are currently available in the area; however, a comprehensive summary of the current knowledge should be made. The topics to be considered should be identified, as well as the level of detail that should be reached in the description of the bottom types/assemblages and the conventions or classifications to be used.

Small pelagic fish

Where the component on Small Pelagic fish: stock identification and oceanographic processes influencing their abundance and distribution is concerned, the topics are the following:

- Further standardisation of the scientific methodological approach and tools used for data processing. This issue was discussed during an ad hoc meeting and participants agreed on a common approach to produce estimates of spatial distribution biomass per species, however, all data sets available (Geographical Sub Areas (GSAs) 12, 13, 14, 15 and 16) were not yet processed entirely and there is a need to test the methods on real data sets and evaluate if it is appropriate and suitable to all GSAs.

- Calendar of acoustic and ichthyoplankton surveys at sea should be coordinated in order to maximise the coverage and minimize the time lag between surveys conducted by the different vessels. Wherever possible, the protocol for additional transects/samples to be performed in order to fill the remaining gaps should be discussed.
- Standardisation of age reading methodologies for small pelagic fish species: a seminar similar to the one organised for demersal species should be held on small pelagic species.
- Environmental parameters explaining the distribution and transport pattern of eggs and larvae, as well as adult fish biomass should be analysed at regional level. Data and variables to be taken into consideration should be agreed upon, in order to strive to get a circulation/hydrographic model for the whole Project area.

b) Increasing scientific knowledge

The research activities identified by the experts during the MedSudMed Expert Consultations and implemented by the Project, focusing mainly on demersal and small pelagic fishery resources. However, a pilot study on “*Spatial patterns of fisheries demersal resources, environmental factors and fisheries activities*” was carried out in GSA 15. Many of the analysis performed during the Pilot Study deal with the fundamental scientific information required for the achievements of the Project Component on marine protected areas and fisheries management.

For the coming period the Project will concentrate on supporting the Working Groups that will be established with the specific task of analysing the available information, following indications and terms of reference already provided during past periods. The cooperative research activities described are intended not only in terms of field research, but also as studies and reviews implemented by the Project.

Particular effort will be made in areas where information is still limited and where national programmes need relevant support from the Project. In particular, support will be provided by the Project for the implementation of the acoustic and trawl surveys in areas where they are not regularly executed. Field activities and working groups that are foreseen for the next period are summarized below.

Demersal fisheries resources

The Project will organise Working Groups aiming at continuing the data processing initiated during the previous periods and at finalising scientific documents. The work sessions will take place during “*ad hoc*” meetings or by email; it is foreseen that they deal with the following topics:

- Data processing should be continued and additional species should be taken into consideration. So far, spatial distribution and localization of spawning and nursery areas was studied for *Merluccius merluccius* and *Mullus barbatus*. Agreement should be sought on additional species to be studied.

- The description of fish assemblages in the GSAs included in the Project area should be finalised by processing the data collected in the GSAs for which the processing was not completed.
- A synthesis on biocenosis and on bottom types and characteristic (in terms of sediments, benthos and macroinvertebrates communities) should be made on the basis of data collected during trawl surveys and/or available scientific literature, in view of the definition of critical habitats for fisheries resources.
- Regional analysis of oceanographic parameters should be done: circulation of water masses, main currents characterising the Project area should be described at regional level.
- Review and assess the progress and results achieved during the execution of the pilot study on the “*Spatial patterns of fisheries demersal resources, environmental factors and fisheries activities*” and identify the possibility to apply a similar approach in other GSAs of the Project area on the basis of the available scientific knowledge. This could be made during a workshop during which the results and methodology applied for the pilot study will be presented.
- Description of fisheries sector. Data will be collected to analyse the fisheries sector in the different GSAs covered by the Project. Information should deal with the fleet composition, fleet activity and, whenever available, catch composition and rates.

Small pelagic fishery resources

The Project will organise Working groups with the objective of processing data and produce results on the following issues:

- Data collection will be continued during acoustic and ichthyoplankton surveys. Efforts should be made to cover areas where no data is available so far.
- Joint acoustic data processing will be finalised, in particular in areas where the methodology should still be tested to calculate and describe the biomass/species distribution.
- Environmental parameters should be processed with the same methodology in order to check existing hypothesis on transport patterns of eggs and larvae.
- Species sheets for small pelagic species will be produced.
- Analysis of fisheries sector (as per Project Component on Demersal Resources);

Marine Protected Areas

Thanks to its multidisciplinary approach, the Pilot study on “*Spatial patterns of fisheries demersal resources, environmental factors and fisheries activities*”, allowed to touch issues identified for the Project component on “Marine Protected Areas and Fisheries management”. This is particularly true for what regards the description of the dynamics and status of demersal fisheries resources; relevant environmental processes influencing the demersal fisheries resources and the critical habitats. Following the results obtained, the Project will identify the possibility to apply a similar approach in other GSAs of the Project area on the basis of the available scientific knowledge and where all data required are available for a similar implementation. Therefore, the activities foreseen for the next period are:

- Production of guidelines describing the approach used for the pilot study conducted in GSA 15 and including methodological indications.

- Duplication of pilot study in other GSAs of the Project area, in view of identifying and describing critical zones that deserve particular attention when fishing is concerned.

c) Building national capacity

In the coming period, the Project will continue to strengthen the national expertise through the implementation of an *ad hoc* programme. The Project will continue to consider the full involvement of all the research institutes and scientists from the participating countries as a priority, an increase in national capacity in terms of expertise will therefore continue to be promoted through the support of specific research programmes that are coherent with the activities of the Project. Seminars and training activities will also be considered both for the implementation of research activities and in the efforts to standardise scientific methodology, as described in the tables presented in Annex 1.

In particular, activities foreseen for the next period include:

- The continuation of on-the-job training during the surveys at sea (acoustic, ichthyoplankton and trawl surveys).
- The organisation of ad hoc training programmes upon request of the participating institutes, in particular in GSAs where numerous gaps still remain.
- Basic training in fisheries acoustics, as requested by the regional scientist during previous meetings organised by the Project. A short course involving scientists from all the institutes participating in the Project will be considered.
- A seminar on selectivity in order to update regional scientists on the latest findings and techniques used to enhance the selectivity of fishing gears, as well as results available on the effect on fishing resources (field results and simulations).
- The organisation of an advanced seminar on sampling techniques and strategies for the monitoring of marine coastal environment (i.e. algal blooms, toxic phytoplankton).

The Workshops scheduled for the standardisation of methodologies will be conducted using the one already carried out on trawl survey protocols as a model. Furthermore, other *ad hoc* training courses focusing on specific requirements from the Institutes could be considered; some training could also be arranged in cooperation with the other FAO Regional Projects. The organisation of such meetings and training sessions will be considered in accordance with availability of equipment and laboratories.

Wherever possible and on the basis of budget availability, the Project will continue in providing the equipment necessary to the Institutes for the implementation of the MedSudMed activities.

d) MedSudMed Fishery and Ecosystem Information System (FEIS)

The Project component that concerns the development of a Regional Information System could continue towards:

- The completion of the data input in all the participating institutes;
- The publication of the FEIS on the web, displaying only information at metadata level;

e) Cooperation at Mediterranean level and between the MedSudMed Project, the GFCM and other FAO Regional Projects

Results of the meetings of the Project Working Groups, as well as results of the research activities as they become available would be presented at GFCM-Scientific Advisory Committee (SAC) meetings as regional contributions by the Project in the framework of its activities. Cooperation will be sought with the other FAO regional Projects (Adriamed, Copemed and MedFiSis), as well as international institutions on topics that may be of common interest with MedSudMed.

f) Project network

It is the aim of the Project to continue strengthening and supporting scientific cooperation among the experts and institutions involved in MedSudMed activities, these represent the scientific networks of the Project. These networks are well established and much of the work that concerns discussion of methodologies can now be carried out electronically, meetings will only be considered for highly specialised issues and where a technical output is required.

Annex 1: General outline of research, Workshops and training programme to be implemented by the MedSudMed Project in the coming period.

Programme	Spatial distribution of demersal resources in the Project area and the influence of environmental factors and fishery characteristics
Overall Objective	To describe the spatial distribution of demersal resources in the Project area and the factors explaining it, including biotic and abiotic environmental parameters and fisheries characteristics.
Background Rationale	Despite the management frameworks adopted, very little information is available on the distribution of demersal resources in the Project area. In this context, trawl surveys have been regularly conducted in the Project area by the different institutes since 1985, in order to enhance knowledge on the spatial distribution of demersal populations at various stages of their life cycle. However, sampling designs and protocols used to date differ and do not allow a homogeneous spatio-temporal analysis of the data, due to the absence of a coherent regional data set. As a result, experts of the region highlighted the importance of standardizing the methodologies to fill the remaining gaps in knowledge on spatio-temporal variability of fish distribution at regional level, in particular regarding fish communities, feeding grounds and habitat mapping. Besides, in the absence of seasonal data covering relevant biological periods, key knowledge on reproduction grounds of the main target species is still missing in the Project area, as well as the description of the main physical processes influencing the abundance and distribution of early life stages. Finally, for many areas a relevant gap remains on the quantification and spatial distribution of fishing effort, considering the absence of geo-referenced data on this issue. A common approach as well as standardized methodologies and protocols are needed to fill the gaps highlighted and obtain valid results and information at regional level.
Methodological approach	Combined trawl surveys with environmental measurements. Eastward extension of the on-going trawl surveys to include Libyan waters and addition of sediment sampling. Different life stages of the agreed priority species will be considered (recruits, juveniles, adults), and a component will focus on the identification of the stock units. All the relevant socio-economic information related to the fishery activities and fishing pressure in the area studied will be gathered. Whenever necessary, the organisation of working groups involving representatives of all participating institutes, to discuss, standardize, prepare activities to be implemented,
Activities	<ul style="list-style-type: none"> - Discuss, prepare and agree upon regional standardized methodologies and protocols to be used in the data inventory and collection (done) - Discuss, prepare and agree upon regional standardized methodologies and protocols to be used in the data processing (done) - Create an inventory and collect existing data and information available in the participating institutes in order to extract background information to be used as preliminary basis for further studies (in progress) - Execute joint trawl surveys in pilot areas in order to cover representative portions of the Geographical Sub Areas included in the Project Area (done) - Prepare common data sets including biological, environmental and sediment data following the standardized protocols prepared and agreed upon by all institutes involved (in progress) - Carry out data compilation and processing to produce validated results at regional level, using already existing data and data provided by standardized trawl surveys: <ul style="list-style-type: none"> o Identification and description of the spatial distribution of the target species agreed upon by the participating institutes by calculating and mapping the density index for each species (<i>Merluccius merluccius</i>, <i>Mullus barbatus</i>, <i>Mullus surmuletus</i>, <i>Trachurus trachurus</i>, <i>Pagellus erythrinus</i>, <i>Helicolenus dactylopterus</i>, <i>Parapenaeus longirostris</i>, <i>Aristaeomorpha foliacea</i>, <i>Nephrops norvegicus</i>, <i>Eledone cirrhosa</i>, <i>Sepia officinalis</i>, <i>Octopus vulgaris</i>, <i>Raja clavata</i>) (done for 2 species) o Processing of sediments and biological samples to identify and classify the main biocenosis in the Project area using the standard terminology of RAC/SPA when applicable (in progress) o Description of the fish assemblages of demersal resources according to bathymetry, biocenosis and substratum (in progress) o Analysis of the stock unit based on biological parameters and genetic markers: data elaboration in order to provide information on the genetic structure of selected populations

	<ul style="list-style-type: none"> ○ Growth and age determination of selected species based on standardized methodology using otolith reading (done) ○ Calculation of the length at sexual maturity of selected species - Analysis of the fisheries sector and of the spatial distribution of fishing effort in the Project area, where possible on the basis of the available information.
Relations with the on-going national and regional research activities	National surveys are conducted annually and geo-referenced data are processed routinely for the mapping of the resources and for age reading. Local information exists on relationships between biomass concentration and oceanographic processes, as well as on the spatial distribution of fishing effort
Expected Outputs	<ul style="list-style-type: none"> - Standardized sampling protocols to be used at regional level (done) - Standardized data processing protocols to be used at regional level (done) - Full inventory of existing data and information regarding relevant issues and mentioning the availability of the information (in progress) - Regional biomass estimation and distribution of the stocks at regional level (in progress) - Single thematic maps for each target species and relevant environmental factors (in progress) - Mapping of benthic ecosystems/habitats in the Project area (in progress) - Localization of spawning and nursery areas and relationships with physical processes (in progress) - Characteristics of the main fish assemblages and relationships with habitats and physical processes (in progress) - Definition/Calculation of standard parameters relevant for biological knowledge and for fisheries management - Delineation of the main stock units and identification of the shared stocks in the Project area
GSA Covered	As far as possible, the pilot activities mentioned above will be conducted in representative portions of the Geographical Sub Areas covered by the Project
Research Institutions involved	Institut National des Sciences et Technologies de la Mer (INSTM), Consiglio Nazionale delle Ricerche - Istituto per l'Ambiente Marino Costiero (CNR-IAMC), Marine Biology Research Centre (MBRC), Malta Centre for Fisheries Sciences (MCFS) and other relevant institutions that could be invited to give scientific support on specific matters
Required training, working groups research activities and timing	<ul style="list-style-type: none"> - Workshop on standardization of trawl survey protocols (done) - Workshop on standardisation methodologies (done) - Workshop on growth and age determination based on otolith reading (done) - Working Group on determination of length at sexual maturity for selected demersal species: definition of standard protocol for the collection of representative samples and the statistical processing of the data (TBD) - Seminar on common cartography and mapping of demersal resources density index, and description of fish assemblages (done) - Seminar on stock unit identification - Cooperative trawl surveys (done)

Programme	Small pelagic fish: stock identification and oceanographic processes influencing their abundance and distribution
Overall Objective	To estimate abundance and spatial distribution of small pelagic fish at regional level, considering also early life stages distribution pattern in relation to environmental parameters and fishery characteristics.
Background Rationale	Small pelagic fish populations are generally characterized by significant fluctuations in their abundance, and this probably affects the spatial distribution of the stocks. This variability has also an economic incidence on fisheries depending on these resources. The lack of information on regional assessment of small pelagic fish biomass was underlined on repeated occasions. Moreover, important gaps in knowledge on the possible migration of the species, stock units and relationships with environmental conditions still need to be filled. To date, several studies have been conducted on these issues in the Project area, using different sampling designs and software, and data have been collected regularly since 1998. Yet, enhancing knowledge on these issues at regional level implies the use of standardized protocols for any data collection and processing. This appears a pre-requisite for the obtaining of any useful result for management purposes. A common approach as well as standardized methodologies and protocols are needed to fill the gaps highlighted and obtain valid results and information at regional level.
Methodological approach	Joint acoustic and ichthyoplankton surveys combined with pelagic trawling. Both surveys will be combined with biotic and abiotic environmental measurements and parallel collection of remote sensing data. Organisation of working groups
Activities	<ul style="list-style-type: none"> - Discuss, prepare and agree upon regional standardized methodologies and protocols to be used in the data inventory and collection (done) - Discuss, prepare and agree upon regional standardized methodologies and protocols to be used in the data processing (done) - Create an inventory and collect existing data and information in the participating institutes in order to extract background information to be used as preliminary basis for further studies (in progress) - Prepare survey design in the Project area and standardization of sampling design, equipment and soft wares used on board, both for ichthyoplankton and echo-surveys (done) - Execute a joint echo-survey and ichthyoplankton survey extending the prospected zones to representative portions of all GSA covered by the Project (in progress) - Prepare of common data sets including biological and environmental data following the standardized protocols prepared and agreed upon by all institutes involved (in progress) - Carry out data compilation and processing to produce validated results at regional level, using already existing data and data provided by standardized sampling surveys: <ul style="list-style-type: none"> o Assessment and mapping of the small pelagic fish biomass at regional level by using direct methods (echo-integration and experimental trawling) (in progress) o Analysis of environmental factors at regional scale, in particular temperature, phytoplankton, currents (in progress) o Joint data analysis coupling eggs and larvae distribution and abundance to biotic and abiotic measurements, by using direct maps comparison and/or spatial statistics methods (in progress) o Determination of the acoustic Target Strength for sardine and anchovy, and calculation of the TS-length relationship o Analysis of the stock unit based on biological parameters and genetic markers: data elaboration in order to provide information on the genetic structure of selected populations o Growth and age determination of selected species based on standardized methodology using otolith reading o Standardisation of basic parameters (length at sexual maturity, age-length and TS-length relationship) - Analysis of the fisheries sector and of the spatial distribution of fishing effort in the

	Project area and when possible on the basis of available information.
Relation with on-going national and regional research activities	Annual/seasonal surveys are presently organized in the area, by INSTM (Tunisia), and CNR-IAMC (Italy), for the assessment of the biomass and the coupling of biological data to oceanographic variables. The spatial distribution of several species is drawn up, as well as the bathymetric distribution of the different age and size classes. Eggs and larvae samples are also collected on a regular basis.
Expected Outputs	<ul style="list-style-type: none"> - Regional estimate of the small pelagic fish biomass (in progress) - Spatial distribution of small pelagic fish biomass and relative abundance pattern in the Project area, in relation with environmental factors and fishing activities (in progress) - Eggs and larvae distribution and relative abundance pattern (in progress) - Regional map of the main spawning areas of small pelagic fish species (in progress) - Identification of the main environmental factors explaining the distribution and transport pattern of eggs and larvae (in progress) - Validated Target Strength-length relationship at regional level for sardine and anchovy (to be reconsidered) - Improved knowledge of stock unit of selected species through the analysis of genetic structure of the studied populations
GSA Covered	Studies will be conducted in representative portions of the Project area
Research Institutions involved	INSTM, CNR-IAMC, MBRC, MCFS and other relevant institutions that could be invited to give scientific support on specific matters
Required training, working groups research activities and timing	<ul style="list-style-type: none"> - Preparation of surveys at sea and standardisation of working methodologies (sampling period and sampling design, type of data, software, storage of data) (done) - Working group on Target Strength calculation based on historical data - Joint echo-surveys (in progress) - Presentation of the sampling surveys results (in progress)

Programme	Assessment of Marine Protected Areas as a tool for Fisheries management
Overall Objective	To assess the feasibility of MPA implementation for fisheries management purposes, and to produce guidelines on the use of MPAs as a tool for fisheries management specific to Mediterranean areas. The overall objective is to provide proposals on the design, localization and use of such tools and/or further studies, taking into account the existing experience and peculiarities of Mediterranean fisheries.
Background Rationale	During the Project's Expert Consultation organized on this issue, the role of MPAs in the reduction of the fishing mortality, protection of key portions of the stocks and of fish feeding grounds was highlighted. Critical points were indicated as: (i) the dimension of the area to be protected; (ii) legal aspects of the access of the different users to the protected areas; (iii) the assessment of the socio-economic benefits of the implementation of MPAs; (iv) monitoring, control and surveillance to be implemented with particular attention to fishing exploitation. The experts highlighted the existing experience and scientific expertise on these issues in the Project area. However, they underlined the lack of guidelines providing methodological framework and strategic criteria for the implementation of MPAs in a management perspective and taking into account the characteristics of the Mediterranean. Moreover, the experts underlined the relevance of finding common ground between usual considerations on MPAs for biodiversity conservation and fisheries management, for instance in the use of homogeneous terminology. The preparation of specific guidelines on the use of MPAs as a tool for fisheries management in the Mediterranean could also help with this aspect
Methodological approach	<p>1) Establish the spatio-temporal dynamic and status of the fisheries resources inside and outside the identified area using mapping tools (Geographical Information System), particular attention must also be given to the issues dealing with the abiotic environment as well as biodiversity including knowledge of biocenosis present in the area. This assessment should be based on background information touching biological, ecological and socio-economical issues.</p> <p>2) description of the fishing effort and pressure exerted inside and outside the area (in space and time)</p> <p>3) on the basis of the above, identify clear objectives of fisheries management, technical measures to be adopted and the monitoring programme including biological, environmental and socio-economic aspects</p>
Activities	<ul style="list-style-type: none"> - Collection and compilation of relevant data on fisheries resources and their ecosystems (habitat, environment, fisheries activity, socio-economy, fishing effort) related to the definition of pilot study zones (in progress) - Definition of pilot study zones (in progress) - Definition of a monitoring programme to assess the effect of fishing closure
Relation with the on-going national and regional research activities	Activities implemented in the framework of this programme will take advantage of on-going research dealing with demersal resources, habitat identification and mapping, assessment of fishing effort. The activities will be conducted in close collaboration with the programme identified by the Consultation on demersal resources, due to the overlap of several topics.
Expected Outputs	<ul style="list-style-type: none"> - In the Pilot study zones, description of: <ul style="list-style-type: none"> - dynamics and status of fisheries resources (in progress) - relevant environmental processes influencing the resources (in progress) - critical/key habitats (in progress) - fisheries activity depending on the key resources (fishing effort inside and outside the zone) (in progress) - relevant socio-economic aspects - Assessment of the effect of fishing closure on biomass, mean size of fish, spillover and socio-economic relationships - Guidelines for the implementation and assessment of MPAs for management purposes adapted to Mediterranean case studies (in progress)
GSA Covered	Pilot study zones will be either included or straddling the GSA included in the Project area
Research Institutions involved	INSTM, CNR-IAMC, MBRC, MCFS and other relevant institutions that could be invited to give scientific support on specific matters
Required training, working groups research activities and timing	<p>Working group on data collection and data processing (in progress)</p> <p>An <i>ad hoc</i> Working Group will be organised for the implementation of pilot studies. The Working Group will focus on the preparation of the scientific protocol including data collection and processing (in progress)</p>

MedSudMed Fishery and Ecosystem Information System Progress report on Database and Applications Components

Abstract

The MedSudMed Fishery and Ecosystem Information System (FEIS) is the information component of the FAO regional Project MedSudMed. It was designed to store and analyze standardized data and information, in support of the research activities that are conducted in cooperation with the four participating countries (Italy, Libya, Malta and Tunisia). The FEIS provides an overview of the available data and information in the Project area; it offers the possibility of exchanging and sharing data and it includes data query tools, as well as data visualisation and analysis tools. The FEIS was developed in two versions: national and regional. The national version was designed for the manual or automatic input of data related to different topics such as demersal fishery resources, small pelagic fishery resources, ichthyoplankton, oceanography, and operational units. It is destined for the input and management of data collected by the national institutions. The regional version provides information at metadata level on the content of the national versions and includes a global data query that can provide summary information of data available in the Project area. Further development of the FEIS foresees a web interface as well as the on-line publication of the system.

1. Background information

The FEIS is the information component of the FAO regional Project MedSudMed which operates in Geographical Sub Areas (GSAs) 12, 13, 14, 15, 16 and 21 and undertakes research activities in cooperation with four participating countries (Italy, Libya, Malta and Tunisia). The FEIS is designed to support scientific communities and country administrations in the development of a system for monitoring fisheries resources and ecosystems through the organization and standardization of present and past data generated by institutions. The key information concerns biological aspects of the resources, environmental parameters and fishery statistics (thematic data) in the Project area.

The thematic base of data is complemented by accessory data and information obtainable from the Internet or other networks and duly structured to enable its access for pooled processing (immediate and/or further). Scientifically, the aim of this system is to act as an analytical support tool to study marine ecosystems, natural phenomena and fisheries, by providing a framework within which the project participants can share information and data.

Following the agreements reached at the 1st, 2nd and 3rd Coordination Committee meetings, FEIS was designed to provide a framework within which the MedSudMed Project participants could share and transfer knowledge, information and data. Particular focus is given to knowledge management, Geographical Information System (GIS) and communication facilities between the national partners. To this end, regional experts were involved in the development of FEIS by making them fully participative throughout the entire

technical development of the system, as well as by incorporating, whenever needed, their comments and suggestions.

On release of the final product, it is foreseen that the package will be installed and made operational in all MedSudMed participating institutions, so that each will have an independent module covering the information related to its own national zones. National modules are foreseen to be compatible and to include part of a common international module referring to shared ecosystems and resources data. Therefore, each Institute received the prototype of the FEIS in its current state for testing and reviewing for specific adaptation to national exigencies. Once implemented, it is expected that it will also enable the creation of applications to support the management, analysis and representation of data relative to fishery resources and their environment.

This document, as for the previous Coordination Committee meetings, is an update of the current status of the FEIS development focussing on changes and events that have occurred since the last meeting.

2. Objectives of the FEIS

The primary motivation of the FEIS is to standardize, aggregate and integrate the data, and enable them to be exported on analytical and other tools such as GIS. The primary users and beneficiaries would be the partner countries of MedSudMed, as well as the scientific institutions of the General Fisheries Commission for the Mediterranean (GFCM) and FAO. The further use through the WEB will also be open to the external world with limitations on some data source for which authorization might be necessary.

In addition to the primary objective, some other motivations should be highlighted which will certainly contribute to facilitating the implementation of FEIS on a larger scale. From these perspectives, worth mentioning are the Clearing House Functions through which institutes, departments and even projects can use FEIS as the repository of all data compiled during various surveys in a structured way; the Data Mining Functions that will enable researchers (at any level) to find, access and extract summary data concerning common issues or topics throughout the whole FEIS database and acquire knowledge of the work done, data availability and ways and means to consult them; and, finally, the Gaps Finding Aid that should help (as opposed to the Data Mining Functions) researches to individuate areas and domains where data are lacking.

3. Conceptual reminders

The key element in designing FEIS was that the System Database would not be a shared application but rather a corporate application interacting and aggregating a family of databases (Database System of national ownership and use) whose authorization and control belong totally to the partner Institutions. The entire contents were thus jointly established by regional experts participating in the various Project components. In such an environment, the corollary was that the whole data processing flow, from data collection, operation transactions, forms, interpretation, input and output rules and criteria, creates a “corporate” logic.

The implementation process, the level of detail, the amount of data processed and the level of interaction with national counterparts as well as national specifications were developed stepwise. National requirements were included in the system development without upsetting the overall plan. Also, development priorities were adjusted on a case-by-case basis, but always respecting the specifications set out in the general framework. This approach was, in a way, dictated by the situation. Some participating institutes had different priorities and different preparation and resources to follow the same development plan.

In FEIS the functional integration has been the most important plan at design level. At functional level, the different software support functions for processing data and generating results are provided as a single system (Database, GIS, Excel Worksheets, Word, etc.). The package software has the built-in communications features required to accomplish integration between sub-systems.

Hereafter are listed the seven main database models interacting with the FEIS Corporate System:

- ***Regional/National/Local Reference and Codification System*** (MedStat origin)
- ***Environmental Parameters*** (available data bases with free access on the internet)
- ***Small Pelagic Fisheries Resources*** (data from acoustics surveys and from ichthyoplankton surveys)
- ***Demersal Fisheries Resources and associated Benthic Fauna and Sediment*** (data from trawl surveys)
- ***Oceanography data***
- ***Operational Units*** Performances by national fleets (MedStat origin)

Each application contains several modules, the most important of which are:

- **Data entry module:** allows the manual input or automatic import of data related to the above-mentioned topics.
- **Query data, processing and reporting:** The databases are equipped with a detailed and itemised query system to select and group records according to one or several options. Resulting datasets are processed locally or exported for further analyses. All results, processed or only tabulated, are reported according to various reporting standards.
- **Data query and export module:** A tool to select data from the different surveys and extract them in an Excel table or view them in a GIS map in ArcView¹ was developed. Moreover, it is possible to view the distribution of a species per weight or make a diagram, etc.
- **Global query module:** A tool to select data from all surveys by geographic query was developed (Fig. 2). Query results can be sent for pre-formatted printing, or exported in Excel table or viewed in a GIS map in ArcView.

¹ It is worth mentioning here that the FAO Fishery Department provided free copies of ArcView to all the participating institutes.

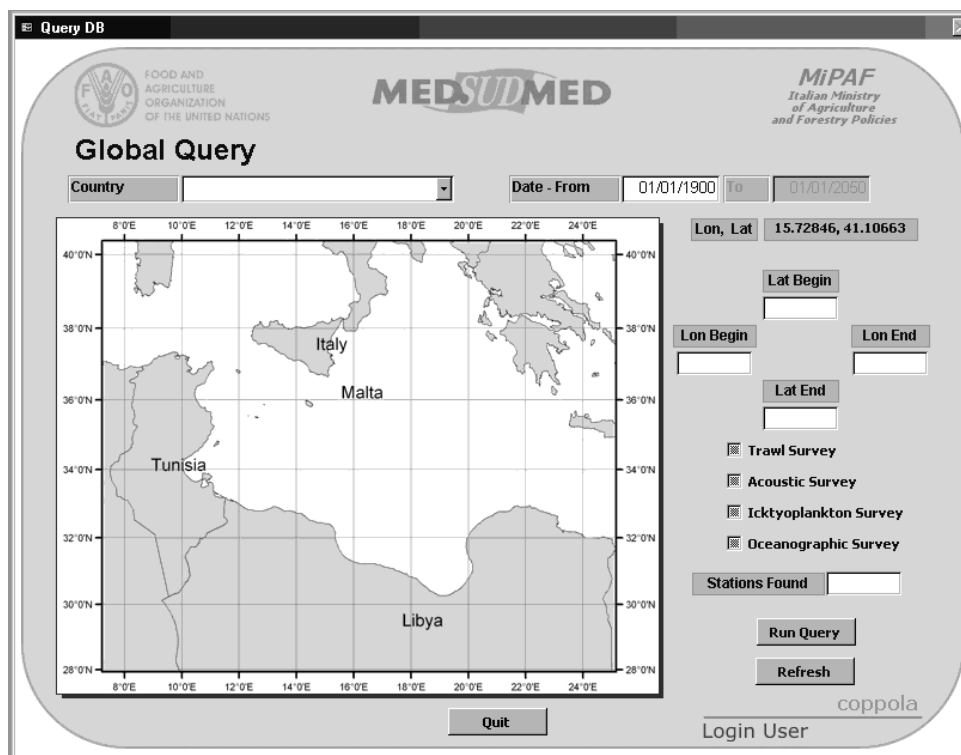


Figure 1. The Global Query Interface

4. Recent technical developments

All parts of the national system were completed. Each participating Institution will have a copy of the data-base with all the necessary tools to fully implement it. National databases differ from the regional corporate system in that the regional system has no data entry functions for the thematic databases. Therefore the data entry is the responsibility of each participating Institution. The nature of the data contained in each database is purely scientific and, in most cases, extracted from other systems. In order to facilitate the data entry, increase productivity and reduce redundant workload and source of errors, a series of “Shuttles” have been developed. These are routines to enable automatic uploading of data from other systems using agreed protocols and procedures. Each of the FEIS databases have been provided with incoming/outgoing Shuttles aiming at receiving or distributing data or results in a systematic and agreed format.

The main developments achieved during the intersession period are summarized in the following paragraphs.

4.1. Corporate Database - Development phases

During the inter-session period, the structure of the corporate database was amplified, in particular new tables on Trawl surveys and Acoustic surveys were produced, and two new parts regarding Environmental data and Accessory data (data files containing output results from raw data) were implemented. On the basis of suggestions from regional experts, new tables were added in the structure of the database in order to include missing fields. The corresponding forms were updated in order to allow the user to insert and visualize the relative data.

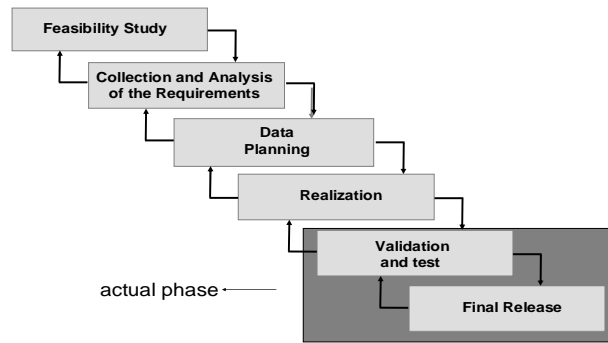


Figure 2. Phases of development of the corporate data base

4.2 Corporate Database data model

The data model can be considered as finalised, even though the update of the data model is a dynamic process and can be modified in the next versions of the FEIS according to the needs of the users. The data structure includes fields that are identical for all types of surveys. These common fields include information such as the data owner, the name of the survey, the country/ies involved, the period of sampling, GSA covered, as well as the spatial-temporal coordinates of the samples collected during the survey (latitude, longitude, time, bottom depth...). More specific fields vary from one type of survey to the other. On request, the MedSudMed Project can supply the whole structure of the data-bases. In any case, they will be presented in the FEIS technical documentation.

4.2.1. Demersal Fisheries Resources and associated Benthic Fauna and Sediment (data from trawl surveys)

The structure of the data collected during the trawl includes two new tables related to:

- Identification of the “boxcore samples” where mention is made of the coordinates, the depth, date, time, as well as the species identified at laboratory, and sediment characteristics;
- Identification of trash collected during trawl surveys, the parameters recorded are: species, individual number, total weight.

4.2.2. Small Pelagic Fisheries Resources (data from Acoustic Surveys)

Due to the significant volume of raw data recorded during each acoustic survey, a standard format was agreed upon to store pre-processed data. Prior to inputting data in the FEIS, data owners should filter the raw data and keep only the NASC (Nautical Area Scattering Coefficient) values corresponding to fish ($NASC_{fish}$) (values of acoustic scattering per nautical mile cleaned from the acoustic noise scattered from other organisms than fish). Moreover, raw biological data provided by the experimental control catches performed during the acoustic surveys may be input in the FEIS.

In view of undertaking data processing for biomass estimation, applications were developed to automate the calculations. In particular, the NCC tool (NASC Catch Coupling), application that can be executed within the FEIS, was created to associate each $NASC_{fish}$ to the corresponding catch on the basis of a criterion based on the distance between acoustic and biological samples.

4.2.3. Oceanography data

With regard to information on Oceanography, the data structure allows the storing of data of surveys on the single stations and on all parameters in the station.

- Identification of the survey, general information as for the other survey, name of survey, period, geographic area ...
- Related stations: coordinates, data, time...
- Related parameters.

4.2.4. Accessory data

The Accessory data is a new component of the database system that allows storing data files that not are included in the other databases and, in particular, generic data files such as maps, graphs, images, tables, documents, texts, etc.

- Identification and general information of the file and its content, physical location of the file on the computer/network, type of file.
- When applicable, relationship to a survey already stored in the FEIS.

4.3 Status of data currently stored in the Regional Corporate Data Base

At the MedSudMed Project's request, participating institutes input data into the FEIS prototype. A summary of the data currently stored in the FEIS and available for data processing is shown in Table 1.

Table 1. Summary of data that were provided by the MedSudMed participating institutes and stored in the FEIS.

Type	Name	Year	Owner	Covered GSA
Trawl Surveys	Trawl survey in GSA 21*	1993	MBRC ¹	21
	Trawl survey in GSA 21*	1994 (5 surveys)	MBRC	21
	MEDITS 02	2002	CNR-IAMC ²	16
	MEDITS 03	2003	CNR-IAMC and MCFS ³	15 and 16
	MEDITS 04	2004		
Acoustic Surveys	SERENA I SERENA II SERENA III Echo MAGO 98 JUVENILE 99 JUVENILE 00 ANCHEVA 00 JUVENILE 01 ANCHEVA 02 ANCHEVA 03 JUVENILE 04	April 1994 December 1995 June 1996 June 1998 October 1999 September 2000 July 2000 October 2001 August 2002 June 2003 October 2004	CNR- IAMC	15
Oceanographic Survey	-	2003	University of Malta	15
Frame surveys	-	2004	MCFS	15

* Operated in the framework of the FAO-LibFish Project

¹ Marine Biology Research Centre, Tajura, Libya

² Consiglio Nazionale delle Ricerche - Istituto per l'Ambiente Marino Costiero, Mazara del vallo, Italy

³ Malta Centre for Fisheries Sciences, Malta

5. General comments on the development status

One of the main activities envisaged in the near future is related to the Clearing-house potentiality of FEIS. This complementary side of the system was not fully foreseen at the beginning. In fact, the interest generated for it to also be used as a repository system of all surveys conducted by participating institutes was reported on various occasions. It seems that in the Project area surveys are conducted and results stored in unstructured and unsystematic ways, and often no record of the data sources is kept.

As far as the national-regional data communication is concerned, a few points must also be put forward:

- a) the full interaction that FEIS has reached with the “Sea Trim” Data Base (limited to trawl surveys recording and processing) developed by the Consiglio Nazionale delle Ricerche - Istituto per l’Ambiente Marino Costiero (CNR-IAMC) in collaboration with the Malta Centre for Fisheries Sciences (MCFS). The SeaTrim is used for national data management and is fully compatible with FEIS at Corporate level. The interaction with FEIS operates through the data communication protocol developed jointly by SeaTrim and FEIS developers: an option allowing the export of data from SeaTrim to the corporate database of the FEIS was added. This option creates an Excel file which can be easily imported in the FEIS. This communication protocol could be easily adapted to any other national system existing in the Project area.
- b) FEIS has been developed following two main production lines, one as a corporate database and a second as a national database (100% compatibility with the Corporate Database), where all the data management functions are available.

6. Future developments and publication

Future developments include transfer of the corporate database to a more powerful and flexible platform (e.g., Microsoft SQL) allowing easier interfacing, both in LAN (Local Area Network) and WAN (Wide Area Network) (Internet). This step was foreseen and motivated by the ever-increasing amount of data and records that have to be managed. Microsoft Access used in the current version of FEIS will be used in countries with hardware infrastructure problems (LAN and Internet connections), since all the systems interface perfectly, given that the structure has been completed.

In order to facilitate the implementation of FEIS, the development team will be available on-line to assist participating countries and institutions in developing interfaces (shuttles) for downloading data sets from national or institutes’ data-bases into FEIS

Another major area of development will be the finalization of the Web Interface that remains, in any case, a function of the previous task. This will be finalized on the new platform which is better suited to the publication of data on the web and to the management of access authorization. The system will be posted on the web to be commented and critically reviewed

The finalization and publication of the documentation is the last development issue.

It is also worth mentioning that the Project presented an advanced release at the 2005 Scientific Advisory Committee (SAC) session, receiving encouraging and positive comments.