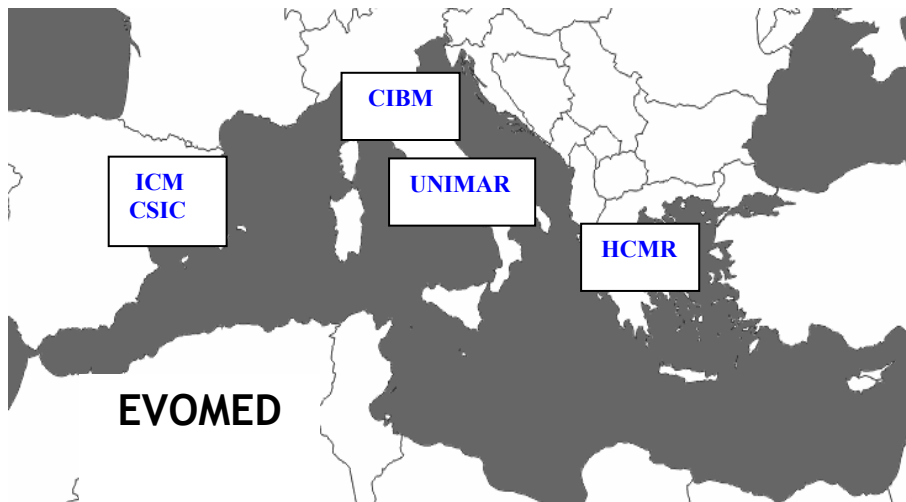


The 20th Century evolution of Mediterranean exploited demersal resources under increasing fishing disturbance and environmental change

EVOMED (EVOLution of MEDiterranean demersal fisheries)

Joint tenderers:

Participant Id	Participant name
1	CIBM, Livorno, Italy
2	ICM-CSIC, Barcelona, Spain
3	HCMR, Athens, Greece
4	UNIMAR, Rome, Italy



State of the art and objectives of the study

The Mediterranean natural resources have been subject to human exploitation since ancient times. Until the XVI century, the Mediterranean fisheries were essentially small scale and targeted mainly pelagic species. An important technological innovation occurred in the XVII century with the introduction of the first trawl nets that were towed by sailing vessels. Other technological improvement was, at the end of the XIX century, the introduction of the steam trawler; after the Second World War, practically all trawlers were equipped with motor engines. The engine power, especially for trawlers, has continuously increased to nowadays, coupled with a progressive improvement of fishing capacity, technology and catchability.

Until 1950 most of the exploitation of Mediterranean resources was limited to fishing areas shallower than 100-200 meters, after that the trawlers progressively widened their spatial range to reach, in the last forty years, fishing grounds at 600-800 meters depth.

Assessments of the resource exploitation status are available only for the last fifteen years. The Scientific Advisory Committee (SAC) of FAO GFCM reported for the period 2001-2004, assessments for 14 demersal species in small areas, most of which resulted over or fully exploited. In most cases overexploitation is attributed to growth overfishing, which makes the fisheries essentially dependent on growth and new recruits.

At community level, the less resilient or more sensitive taxa, such as the elasmobranchs seem to have suffered a decline in these last decades. Probably the excessive fishing capacity produced changes in the community structure over time, with reduction of large predators and an increase of small pelagics and small sized and fast growing species.

These pictures are based essentially on the relatively good quantitative information of the last twenty years; the knowledge on the historical evolution of the exploited populations and marine ecosystems in the last century is still scarce and limited to restricted areas.

Fisheries management can not be based only on studies on recent population sizes and it is less effective without knowledge on population and ecosystem baselines. It is difficult to generate realistic hypotheses about the dynamics of fisheries only from the understanding of the present, since all ecosystems have changed over time due to both anthropogenic and natural environmental factors.

Identifying baselines fundamental to set up correct recovery or rebuilding strategies, not only directed at biological and ecological goals but also at the preservation and, possibly, the improvement of the socio-economic benefits and ecosystem goods and services.

For the Mediterranean fisheries there is a strong need to reconstruct the trends of the demersal communities, to identify the drivers of the change and an ecological baseline for the past 100 years.

The Mediterranean countries host many research Institutions and Universities working since the late 19th century in the field of fishery sciences and marine ecology.

In this context, considerable material has been produced, in different forms: theses, scientific papers, reports and grey literature. Most of this literature contains information that has been only partially considered or exploited. In addition there is official data on fleets, landings and fishing effort produced over time by institutes of statistics, fishermen associations, fishing markets or auctions, marine military institutions, etc.

Other extremely valuable information could be extracted from the data collected through research cruises or experimental fishing surveys performed prior to 1980's.

The first need is to identify, collect and organize all the scattered information in order to demonstrate all its potential.

The available material is highly heterogeneous, as concerns type of data, time periods, sampling design (if any), sampling gears, etc. Therefore, **another important need is to standardize and check all of this information, in order to make it more reliable and robust as possible and ultimately available for further analyses.**

Analyzing historical data is a challenging task as there are multiple problems associated to the different sources of data, besides reliability. Most data are patchy and scattered in time, thus having large temporal gaps of missing data which need to be accounted for.

Another important aspect to take into account in the research of historical data is to gather information from old fishermen and fishing captains. Their historical memories on the past activity are still vivid and can yield valuable information on decades spent at sea fishing: often fishermen used to report the information on fishing activity and fishing practices on “captain-logbooks” (the so called tally books).

This cultural and anthropological information could substantially contribute to improve the historical picture of the fisheries and associated fish communities. Even though some discrepancies due to emotionality of the past memories can affect the collected information, their added value is indubitable. Disqualifying as “anecdotal” this data dismisses important first-hand information.

Objectives of EVOMED

- **The main objective is to provide information on the evolution, over the past 100 years, of the Mediterranean demersal fisheries and marine exploited populations and to assess the effect of fishing and environmental drivers.**

Other specific objectives are the following:

- **To identify and organize all the available information produced in the last century, especially that prior to 1980, on Mediterranean trawl fisheries and demersal resources.**
- **To collect information from old fishermen on fishing regime and fishing patterns, as well as yields and discards and to evaluate its reliability.**
- **To standardize and inter-calibrate the different data and information collected, to develop and validate a common methodology of analysis.**
- **To characterize the historical evolution of the demersal fishing fleets, concerning their consistence and characteristics, as well as fishing effort and fishing regime.**
- **To estimate trends in relative abundance indices, such as standardized CPUEs, over time for important commercial and non commercial species.**
- **To describe temporal evolution of species diversity and species assemblages; to identify, if any, loss of keystone demersal species in the past 100 years.**
- **To formulate hypothesis about the role of potential drivers of changes (e.g. fishing pressure, environmental changes) in the species abundance and community structure.**

Outline of the project

EVOMED involves Partners belonging to Institutions of different countries (Italy, Spain, Greece), working in fishery biology. Many of them are involved in the EU Data Collection programmes.

The project is coordinated by the Centro Interuniversitario di Biologia Marina ed Ecologia Applicata “G.Bacci” di Livorno, Italy. The duration is twelve (12) months from the signature of the contract, August 7th, 2009.

Most of the activities of EVOMED will be carried out according to case studies.

- 1) Spanish Mediterranean
- 2) Tyrrhenian Sea
- 3) Eastern Mediterranean (Central Aegean Sea)
- 4) Adriatic Sea
- 5) French historical data

The project includes the following five workpackages:

WP1 - Project management and coordination - Leader Paolo Sartor (CIBM)

Objective

To co-ordinate and manage all the technical and contractual aspects of the project, including ethical, financial and administrative parts.

Description of work

Task 1.1 - Project management.

Task 1.2 - Project coordination and communication among participants.

Task 1.3 - Organisations of meetings.

Task 1.4 - Ultimate characterisation of the case studies.

Task 1.5 - Preparation of the interim and the draft final reports.

WP 2 - Available historical information - Leader Christos Maravelias (HCMR)

Objective

To do a critically reviewed inventory of the available historical information concerning Mediterranean demersal fisheries, in terms of characteristics of fleets, fishing effort, catches, landings and some relevant environmental indicators.

Description of work

Task 2.1 - Bibliographic research.

Task 2.2 - Assessment of availability of information.

Task 2.3 - Revision and classification of the literature (metadata database).

Task 2.4 - Production of standard datasets for the selected case studies.

WP3 - Historical fishermen knowledge - Leader Mario Sbrana (CIBM)

Objectives

To extract information from the historic fishermen knowledge. Other objectives are:

- to obtain quali-quantitative estimations of landings and species composition of catches;
- to contrast the picture of the evolution of Mediterranean fisheries in the 20th c. obtained from scientific data collection with the fishermen's perceptions.

Description of the work

Task 3.1 - Data collection methodology.

Task 3.2 - Interviews and tally books consultation.

Task 3.3 - Data entry in standard formats; revision and analysis of collected information.

WP4 - Evolution of the fleets - Leader Francesc Maynou (ICM-CSIC)

Objective

To describe the evolution of the fleets in the last century in terms of number of vessels, fishing capacity, fishing effort, fishing gears, fishing grounds and fishing practices.

Description of work

Task 4.1 - Descriptive analyses.

Task 4.2 - Data standardisation and inter-calibration.

Task 4.3 - Quantitative analyses.

WP5 - Changes in resource abundance and community structure - Leader Chato Osio (CIBM)

Objectives

- to document changes in species diversity and disappearance of key demersal species;
- to estimate changes in commercial yields, species abundance and catch composition;
- to find possible explaining factors related to anthropogenic causes (such as fishing effort) and environmental factors.

Description of work

Task 5.1 - Qualitative analysis.

Task 5.2 - Data standardisation and inter-calibration.

Task 5.3 - Quantitative and trend analyses.

Timing of WPs and their components

Months	1	2	3	4	5	6	7	8	9	10	11	12
WP1: Project management and coordination	☒				☒						☒	
						📄						📄
	M				M	M					M	M
WP 2: Available historical information	📖	📖	📖	📖	📖	📖						
				💾	💾	💾	💾					
						M	M					
WP 3: Historical fishermen knowledge		🗣️	🗣️	🗣️	🗣️							
			💾	💾	💾	💾						
	📄				📄	📄	📄	📄				
	M			M		M		M				
WP 4: Evolution of the fleets					💾	💾	💾	💾				
								📄	📄	📄	📄	
								M		M	M	
WP 5: Changes in resources abundance and community structure					💾	💾	💾	💾	💾			
								📄	📄	📄	📄	📄
									M	M		M

☒: Coordination meetings.

📖: Bibliographic data collection.

🗣️: Data collection through fishermen interviews.

💾: Data entry, data standardisation and inter-calibration.

📄: Data analysis and synthesis.

📄: Reports.

M: Milestones.

