GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN (GFCM)
SCIENTIFIC ADVISORY COMMITTEE (SAC)

SUB-COMMITTEE ON STATISTICS AND INFORMATION (SCSI)
SUB-COMMITTEE ON ECONOMIC AND SOCIAL SCIENCES (SCESS)
SUB-COMMITTEE ON STOCK ASSESSMENT (SCSA)

WORKING GROUP ON OPERATIONAL UNITS

Rome, Italy, 8-9 April 2003

1. OPENING OF THE SESSION AND ADOPTION OF THE AGENDA

The meeting was held between 8-9 April 2003 in Rome, Italy, hosted by the FAO. The meeting was attended by approximately 20 experts from the field of economics, biology, and statistics (the list of participants is attached as Annex 1) faced with the task of forming a cohesive definition and understanding of the statistics and data management needs within the Mediterranean fisheries. The Coordinator of the Sub-Committee on Statistics and Information (SCSI) and Chairperson of the Working Group, Professor Dino Levi, opened the meeting and Cassandra De Young and Salvatore Coppola were nominated Rapporteurs.

The tentative Agenda proposed to the Working Group was adopted with a few changes, as per Annex 2.

The Chairperson then set the scene for the meeting by first making reference to several diagrams from Garcia and Staples (2000)[1] on Ecosystem Approach to Fisheries (EAF) and on reference systems and indicators. He reminded the group of the three angles from which to approach Fisheries Management: a conservation approach, a protection approach, and an economic approach. He noted that economists are prone to considering the means of production while biologists are more concerned with fishable biomass (although generally estimated through landings data). He also noted that data collection from the economic perspective are generally provided by governmental agencies and statistical offices, whereas research institutes and the like tend to collect their own data from a conservation approach. However, the Chairman felt the two approaches can work together to define one system of data collection, avoiding the "double rail" problem common in data systems through a system based on the fleet segmentation agreed upon in principle by SAC.

[1] S.M. Gargia and D.J. Staples, 2000. "Sustainability reference systems and indicators for responsible marine capture fisheries: a review of concepts and elements for a set of guidelines" Marine Freshwater Resources. Vol. 51(5) pp. 385-426.

The Chairman reminded the group that the mandate of the Working Group was essentially to update the data inventories in line with the terms of reference set out in paragraph 1.2 of Appendix H of the report of the 27th Session of GFCM, which reads:

> *1.2 To update, at sub-regional level and by geographical sub-areas, the inventory of operational units generating catches of shared stocks. To this end, SAC is also requested to monitor and fine tune, as necessary, the fleet segmentation, as adopted in principle (Appendix E of the report of the 5th Session of SAC). Whenever possible, description of Operational units should report the share, by weight and value, of priority species as well as of other important species, their fishing regime, trends in catches and landings, discard estimates.*

The Chairperson also suggested that emphasis be given to linking the 17 shared stocks comprising 14 different species (Annex 3), identified by the SCSA, with the segmentation of fleet.

2. PRESENTATION OF PILOT SURVEYS ON OPERATIONAL UNITS AND RELATED DISCUSSIONS

Salvatore Coppola, FAO Technical Secretary for Statistics and Information Systems, reported on the work carried out so far by the Working Group in connection with the Operational Units issue. He stressed the need to arrive at practical conclusions and a clear follow up. He remarked that, after an initial strong move towards a constructive start in the conceptual work to be undertaken, the same enthusiasm and participation was not noted when the working group entered the data collection and data submission phase.

Rafael Robles, FAO-COPEMED, reiterated the need to follow the well-defined mandate and to compile the available background information on operational units provided by the member countries after the first meeting of the Working Groups held in Ancona in 2001. In addition, he suggested the drawing up of a single table matching the operational units table presented at Ancona with the fleet segmentation proposed by the Sub-Committee on Economic and Social Sciences (SCESS) as fine tuned by its Working Group on socio-economic indicators in Barcelona in March 2003.

M. Malouli Idrissi, Coordinator of the SCESS, briefly reminded the Working Group of the work performed by the SCESS pertinent to the question of operational units, namely the definition of fleet segmentations and the related socio-economic data; concepts which have been presented and adopted at the Fifth Session of SAC in July 2002. Malouli also noted the need for further studies regarding Local Operational Units, the utility of which being already demonstrated through several studies realized principally under the auspices of IREPA.

Malouli then provided an overview of the problem at hand for the Working Group as one of the creation of two linked databases, one economics-based and one biological-based, without requiring a restriction to a single database.

Several concerns about the previously defined work were raised by the group, including the under-representation of the eastern Mediterranean and Black sea with regard to the list of shared stocks. The fleet segmentations, as currently defined, also raised

comprehensive discussions. The group was reminded that these definitions were defined with a compromise between the costs and benefits of more detailed definitions, knowing the limitations of such an approach, and that such definitions are subject to change over time if the need and the capability to do so were determined.

Vincenzo Placenti of IREPA presented the results of his Institute on Operational Units. This work analyzed the species captured by fleet segments for the GFCM geographical sub-areas 9-10-11 and 16-17-18-19. The results showed an homogeneity among the areas in terms of group of targeted species while identifying a certain heterogeneity among the fleet segments which tackled those species. In addition, homogeneity of the bio-socio-economic indicators within each fleet segment was worth noting, meaning that each fleet segment did represent a typology of the representative fisheries. It was acknowledged that this output clearly advocate for the use of the fleet segmentations as foundation of the operational units framework.

Placenti then provided, as an example, a method for linking these species-based and fleet segment-based data through a series of matrices (annex IV). From these matrices, one can approach the data either from a species or a fleet segment perspective. He further highlighted from these matrices the ability to draw out the information easily on the shared stocks, including which vessel categories are targeting such species. He also showed the link between species and fleet segmentation and the seasonal dimension related to the economic importance of each species. For example, although the peak season in terms of landings of a certain species falls under a three-month period, it is possible that the economic importance (i.e. revenues) of this species occurs throughout the year.

Matthew Camilleri, from the Ministry of Agriculture and Fisheries of Malta, presented two themes to the working group: 1) an inventory of fisheries data from a 2000 fisheries census in Malta; 2) a pilot study on catch and effort in the small-scale fisheries sector in Malta.

Using available census data, it has been possible to easily classify 2000 vessels of less than 10 meters in length into 13 operating units. Although it was necessary to group related species into less detailed categories, the inherent multi-species fisheries nature of the small-scale sector and the resulting difficulties associated with matching such vessels to a single operational units was noted. However, the author felt that a good deal of operational units can be defined using existing data.

Camilleri then presented the results of a pilot study analyzing the links between catch, effort, and structural parameters of small-scale vessels. A total of 923 small-scale fishermen (using vessels of less than 10 meters in length) were interviewed over a period of 10 months in 9 major fishing ports in the Maltese Islands. Estimates on catch per unit of effort by port, vessel type and gear as well as distribution of species caught by gear were completed. Data obtained from this study were also used to carry out a preliminary analysis to identify the structural parameters of Maltese small-scale vessels that significantly affect catches and hence contribute to fishing effort (Annex V). The researchers established that vessel structural parameters could be a good indicator of effort in artisanal fisheries but that the relevant parameters depend on the gear class in use. It is clear, for example, that the length of a vessel is a limiting factor for the number and size of bulky gear. On the other hand, horse power would determine the capacity in deploying and retrieving, for example, longlines and hence the length of the gear used with a particular vessel. This preliminary study highlighted that,

even if there are many factors affecting the catch, vessel structural parameters inherently affect it.

The meeting agreed that the next step in such analysis would be to translate these data into the GFCM operational units nomenclature in order to be able to compare the results of the Maltese pilot study with data provided by IREPA.

Luca Garibaldi of the FAO/FIDI presented a review of the data and databases available within the FAO which may be of use to the Operational Units group (Annex VI). In addition, he provided a mapping of the overlaps and incongruities between the GFCM geographical sub-areas and the GFCM statistical divisions. It was however acknowledged that the matching of these two partitions of the Mediterranean and Black Sea would be an uneasy but necessary undertaking, keeping in mind the impracticability of adjusting the entire historical data series available under the GFCM statistical divisions.

The FAO FIGIS project presented the method used by its Fisheries Monitoring System (FIRMS) for the inventory of fisheries. This method takes in account the different points of view commonly used to identify fisheries: exploited stock, fishing technique, production system and management system. It was noted that the data model retained also reflects this approach and that it is compatible with the GFCM operational unit concept. The idea behind FIGIS methodology is to inventory the units as they are defined and documented by the institutions in charge. Moreover, at application level, links between related fisheries are available, even if defined through different approaches.

A preliminary inventory of the Mediterranean and Black Sea stocks was also presented. Different sources of information have been used: FAO review of the word fishery resources, GFCM/SAC Sub-Committee on Stock Assessment reports, ADRIAMED list of shared stocks and PopDyn database. This inventory was organized by GFCM geographical sub-areas and may also contribute to the identification of the species component of the operational units. It was noted however that the validation of this work would require the participation of sub-regional experts concerned. It was recommended to do it under the coordination of the FAO back-stopping officer of the SCSA. An on-line demonstration was used to support this presentation.

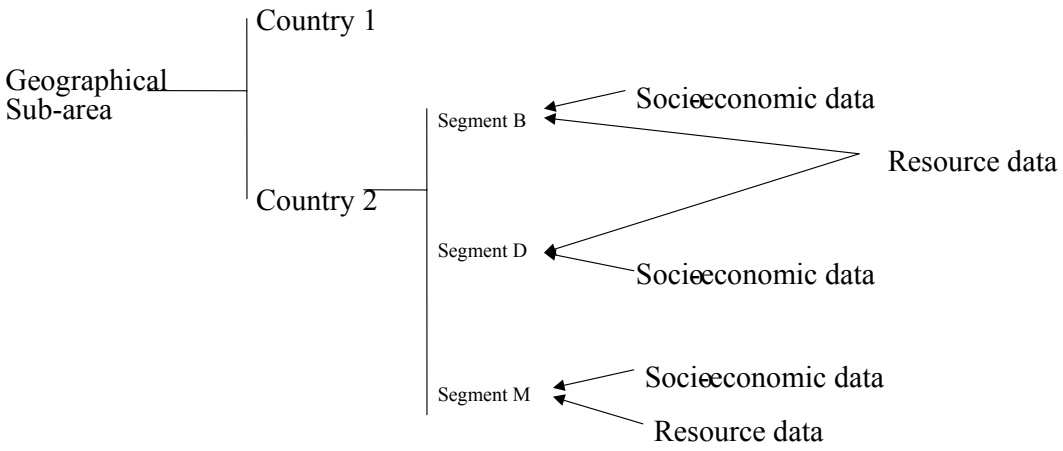
3. PROPOSED OPERATIONAL UNIT-BASED SCHEME FOR DATA COLLECTION

The meeting noted that creating a coherent, consistent, and feasible data collection structure which combines the information needs from the management, economic, and biological perspectives was a challenging task. The Working Group proposed the following scheme and recommended its review by SAC as a complete model to be implemented in the compilation of data by individual countries. It was noted that the following issues were implicit in this model:

- Much of the data are systematically collected in a proper catch assessment survey.
- The more costly data would be collected only under an ‘as needed basis’ (e.g. when a stock has been identified to be at risk of overexploitation or when fishing effort needs to be decreased) and then collected, as necessary, on a sample basis periodically.

- There is no need to combine the full data collection systems of socio-economic and of biological data as long as a proper link is built to combine the two data sets into the operational units database as defined by the GFCM.

- The model is based on a fleet segmentation perspective. One should note, however, that the same overall concept could be presented in many alternative manners, including one in which the biological or resource-based data collection is based on an operational unit framework, the socio-economic data on a fleet segmentation framework and the two are linked post facto. These are merely dual two concepts of the same model.



The minimum sets of resource- and socio-economic-based data necessary for this schema were identified and are provided in Annex VIII.

4. FINANCIAL RESOURCES ALLOCATION AND RESPONSIBILITIES FOR THE DEVELOPMENT OF THE OPERATIONAL UNITS SYSTEM AND ITS INTERACTION WITH THE MEDFISIS PIPELINE PROJECT

In order to test the feasibility of the proposed structure, the Working Group recommended the application of the model and its scheme to various sub-regions or fisheries. Specific case studies proposals are to be identified and proposed to the SAC for its consideration.

Among the possibilities are case studies that could be performed under the ADRIAMED and COPEMED projects and include the following:

ADRIAMED could promote and facilitate a pilot study either in GSA 17 or GSA 18 considering the national fisheries of the countries concerned, and also taking benefit of the multidisciplinary strategy (i.e. biological, economical, social, and statistical component) implemented by the Project and in line with the Operational Unit concept.

However, the countries concerned will have to be consulted about their participation in the pilot study. Therefore, a detailed workplan will have to be prepared and submitted

indicating the relevant background information as well as detailing both the necessary national expertise and financial requirements to be met by ADRIAMED.

The COPEMED plans to present the idea of implementing a pilot study on small pelagic fisheries in the Alboran Sea (Morocco, Algeria and Spain) to the next COPEMED Forum among Administrations, Industry and Research (to be held by July, 2003). The idea is to demonstrate that somebody can do it by harmonizing specific regulations and applying some joint technical measures as the ones related to the effort control. These pilots studies would also compile data on the operational units working in these areas.

5. CONCLUSIONS AND RECOMMENDATIONS

Salvatore Coppola recapitulated the conclusions of the meeting hereafter summarized. First of all, the Working Group adopted the data format for the Operational Units application. The Working Group also agreed that, until the results of a Pilot Study(ies) to be undertaken wherever possible, that the format should be considered as final.

It was further agreed that data related to Operational Units involving shared stocks or stocks of the same interest should be "shared" among the various national teams providing such data.

It was recommended that one, or preferably two, pilot studies should be carried out in two specific zones in order to establish the data model and finalize the database for the processing of operational units data. It was noted that the project coordinators of ADRIAMED and COPEMED assured their support to implement the pilot studies.

It was also recommended that all GFCM Members, as relevant, should start harmonizing their Catch and Effort Assessment Surveys to fully comply with the Operational Units model, taking note that about 80 % of the information needed for the operational units could be derived from an appropriately designed Catch Assessment Survey.

It has also been reported that the new Project "MEDFISIS", due to start soon, could help considerably in promoting the establishment of the GFCM database on Operational Units.

6. TIMETABLE FOR THE FOLLOW-UP

It was agreed that Working Group members would be informed timely on the follow up and on the detailed programme of work to be established by the Coordinator of SCSIS, the related FAO Technical Secretary and the regional project Coordinators.

7. ADOPTION OF THE REPORT

The report was adopted on Wednesday, 9 April 2003.

ANNEX 1

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ANNEX 2

AGENDA

Monday - April. 7th – Arrival and accommodation in Hotel.

1 - Report on the state of the art, and the working framework of the meeting.

2 - Report on the status of the Operational Units issue. Background Information.

SCSIS Chairman to give brief history of the situation (i.e.;Starting from Barcelona → Ancona → Rome meetings), underlying how this issue fits with EAF. Every effort should be made not to reopen the debate on definitions but to look for compatibility of various viewpoints.

3 - Reports from related sources:

a. From the Barcelona meeting on Economic indicators.

Which commercial/biological data routinely collected are of interest for Economists, what else is needed and where else can be found.

b. From the EC Countries, report on the state of the art in this issue. (Italy, France, Spain, Greece)
Follow-up of EC 1534/2001 & 1639/2001 Regulations and national set-ups: first reports ad comments.

c. Report from FIGIS/Copemed on the inventory of Stock/resources
ased on the description of the work done by Copemed/FIGIS team, agree on inventory produced and on the methods/actors to further validate and publish the inventory

d. Review of data and databases available in FAO of interest to Operational Units work.

4 - Demonstration of the prototype database on Operational Units (discussion, contents, opinions) and the ongoing "MedStat programme" statistical data collection activities in Copemed and Adriamed Areas and their relationship to Operational units application.

The database will be shown to work with the information/data from which Operational Units should be based: the demonstration deals from extractions to output example(s).

5 - Appraisal of the proposed lists and inventories, and agreement of the Sub-Committees to their use.
S*ub-committees should agree or amend lists of parameters and inventories.*

6 - Definition of a priority list from those approved for use by countries.
Priorities will of course be according to GFCM recommendations.

7 - Definition of the items (minimum requirements) to be reported to the GFCM-SAC

8 - Cross checking and review of all the parameters to be reported (BioStatistical, Economical, etc.).

Items should first be listed and then cross-checked, and elementary constituents thus identified and defined. The range: smallest detail desirable ↔ largest aggregation acceptable should be defined in space/time for different data types.

9 - Financial resources allocation and responsibilities for the development of the Operational Units System and its interaction with MEDFISIS Project.

A final statement could be produced, where conditions to be met by Countries to allow assessments on Operational Units must be clearly identified.

10 - Draft content to be reported to SAC

11 - Timetable for the follow-up.

Statutory deadlines would help drawing the schedule.
Person responsible: The Chairman of the SCSIS, the Segretary of GFCM, the chairman of SAC

ANNEX 3

IDENTIFICATION OF SHARED STOCKS IN EACH GFCM GEOGRAPHICAL SUB-AREA

Species	Area	Countries
1. Hake	Gulf of Lions	France and Spain
2. Hake	Adriatic	Albania, Croatia, Italy, Slovenia
3. Hake	Sicily Channel	Italy, Tunisia, Libya and Malta
4. Anchovy	Gulf of Lions	France and Spain
5. Anchovy	Adriatic	Albania, Croatia, Italy, Slovenia
6. Sardine	Adriatic	Albania, Croatia, Italy, Slovenia
7. Sprat	Adriatic	Croatia, Italy, Slovenia
8. Red mullet	Adriatic	Albania, Croatia, Italy, Slovenia
9. Blue whiting	Adriatic	Albania, Croatia, Italy
10. Bluefin tuna	All Mediterranean	All countries
11. Swordfish	All Mediterranean	All countries
12. Albacore	All Mediterranean	All countries
13. Norway lobster	Adriatic	Albania, Croatia, Italy, Slovenia
14. Dolphin fish	Western Mediterranean	Italy, Malta, Spain and Tunisia
15. *Prionace glauca*	All Mediterranean	All countries
16. *Isurus oxyrhinchus*	All Mediterranean	All countries
17. *Lamna nassus*	All Mediterranean	All countries

Source: Report of the fifth session of the Scientific Advisory Committee, GFCM. Rome, 1 - 4 July 2002. Fao Fisheries Report No. 684.

ANNEX 4

EXAMPLE OF LINKING FAO-SAC FLEET SEGMENTS DATA WITH MAIN FISHING STOCKS IN THE GFCM GEOGRAPHICAL SUB-AREA 9 (Table 1)

FAO 09

	Fleet Segments														
FAO Code	A	B	C	D	E	F	G	H	I	J	K	L	M	Scientific Name	FAO Name
ALB							X	X			X		X	Thunnus alalunga	Albacore
AMB		X	X	X	X	X							X	Seriola dumerili	Greater amberjack
ANE	X	X	X	X	X	X	X	X			X		X	Engraulis encrasicolus	European anchovy
ARA				X	X	X							X	Aristeus antennatus	Blue and red shrimp
BFT				X	X	X							X	Thunnus thynnus	Northern bluefin tuna
BOZ	X	X	X	X	X	X	X	X	X		X		X	Boops spp	Bogues nei
CGZ		X	X	X	X	X			X				X	Conger spp	Conger eel
CNZ				X	X	X							X	Crangon spp	Shrimps
CRS				X	X	X							X	Portunus spp	Swimcrabs
CRU		X	X	X	X	X							X	Crustacea	Marine crustaceans nei
CTL		X	X	X	X	X							X	Sepiidae, Sepiolidae	Cuttlefishes, bobtail squids
DGZ		X	X	X	X	X							X	Squalus spp	Dogfishes nei
DPS				X	X	X							X	Parapenaeus longirostris	Deepwater rose shrimp
FIN	X	X	X	X	X	X	X	X	X		X		X	Osteichthyes	Finfishes nei
GAR														Belone belone	Garfish
GUX		X	X	X	X	X							X	Triglidae	Gurnards, searobins nei
HKE		X	X	X	X	X							X	Merluccius merluccius	European hake
JAX		X	X	X	X	X	X	X			X		X	Trachurus spp	Jack and horse mackerels nei
LBE		X	X	X	X	X							X	Homarus gammarus	European lobster
LNZ														Molva spp	Lings nei
MAC		X	X	X	X	X	X	X			X		X	Scomber scombrus	Atlantic mackerel
MAZ		X	X	X	X	X	X	X			X		X	Scomber spp	Scomber mackerels nei
MEG				X	X	X							X	Lepidorhombus whiffiagonis	Megrim
MNZ		X	X	X	X	X							X	Lophius spp	Monkfishes nei
MOL		X	X	X	X	X	X	X			X	X	X	Mollusca	Marine molluscs nei
MTS		X	X	X	X	X							X	Squilla mantis	Mantis squillid
MUL		X	X	X	X	X	X	X			X		X	Mugilidae	Mullets nei
MUR		X	X	X	X	X							X	Mullus surmuletus	Red mullet
MUT		X	X	X	X	X							X	Mullus barbatus	Striped mullet
NEP				X	X	X							X	Nephrops norvegicus	Norway lobster
OCM		X	X	X	X	X							X	Eledone spp	Horned and musky octopuses
OCZ		X	X	X	X	X							X	Octopus spp	Octopuses
OMZ		X	X	X	X	X	X	X			X		X	Ommastrphidae	Squids
PAC		X	X	X	X	X							X	Pagellus erythrinus	Common pandora
PDZ														Pandalidae	Prawns
PIC		X	X	X	X	X							X	Spicara spp	Picarels
PIL		X	X	X	X	X	X	X			X		X	Sardina pilchardus	European pilchard
POD														Trisopterus minutus capelanus	Poor cod
SDV		X	X										X	Mustelus spp	Smoothhounds
SIL				X	X	X							X	Atherinidae	Silversides (Sand smelts)
SJA														Pecten jacobeus	Great scallop
SKX		X	X	X	X	X							X	Elasmobranchii	Sharks, rays and skates etc.
SOL		X	X	X	X	X							X	Solea vulgaris	Common sole
SPR														Sprattus sprattus	European sprat
SRX		X	X	X	X	X							X	Rajiformes	Skate and Rays, nei
SVE												X		Venus gallina	Striped venus
SWO		X	X	X	X	X	X	X	X		X		X	Xiphias gladius	Swordfish
TGS		X	X	X	X	X							X	Penaeus kerathurus	Caramote prawn
TUN		X	X	X	X	X	X	X			X		X	Thunnini	Tunas nei
WHB				X	X	X							X	Micromesistius poutassou	Blue whiting
WHG				X	X	X							X	Merlangius merlangus	Whiting

Source: IREPA

Table 2

Groups	< 6 metres	6-12 metres	12-24 metres	More than 24 metres
1. Minor Gear without engine	A	⇐		
2. Minor Gear with engine	B	C		
3. Trawl	⇒	D	E	F
4. Purse Seine		G	H	⇐
5. Long line			I	
6. Pelagic Trawl		⇒	J	⇐
7. Tuna Seine			K	⇐
8. Dredge		⇒	L	
9. Polyvalent			M	

Segments Description

A- Minor Gear without engine. All vessels less than 6 metres in length without an engine (wind or oar propulsion). Exceptionally, vessels without engine longer than 6 metres can be included.
B- Minor Gear with engine less than 6 m. length. All vessels under 6 metres length with engine, excluding trawl vessels.
C- Minor Gear with engine between 6 to 12 metres. All vessels between 6 to 12 metres length with engine, excluded specific gears as demersal trawl, purse seine, pelagic trawl and dredge.
D- Trawlers less than 12 m. length. All demersal trawlers less than 12 metres. Exceptionally, trawl vessels under 6 metres can be included.
E- Trawlers between 12 to 24 m. Demersal trawl between 12 to 24 metres.
F- Trawlers of more than 24 m. Demersal trawl with length of more than 24 metres
G- Purse Seines between 6 to 12 m.
H- Purse Seines between 12 to 24 m. Excluded Tuna Seine. Exceptionally, Purse Seines vessels of more than 24 metres, can be included
I- Long line of more than 12 m. Long line as exclusive gear more than 12 m. Exceptionally, vessels more than 24 metres, can be included.
J- Pelagic Trawlers. All Pelagic Trawl vessels, but normally this group is between 12 to 24 metres.
K- Tuna Seine. All Tuna Seine vessels.
L- Dredge. All Dredge vessels. Normally this group is between 12 to 24 metres, but exceptionally dredges under 12 metres can be included.
M- Polyvalent (and Other) longer than 12 m**.** All vessels longer than 12 metres, that use different gears along the year or use a gear not already listed in this classification.

13 June 2003

ANNEX 5 (Corrigendum)

Preliminary analysis of the relationship between the structural characteristics of Maltese small scale fishing vessels and catches

Camilleri, M., Coppola, S.R. and Scalisi, M.

INTRODUCTION

The collection of reliable catch and effort data for various segments of a fishing fleet is essential for sound fisheries management. Data related to Maltese vessels measuring over 10m in length overall are collected through a logbook scheme whereby all fishing activities are monitored. However, over 90 percent of the vessels making up the Maltese fishing fleet are under 10m in length overall and their activities are monitored through a port sampling scheme. These small-scale vessels generally use a combination of static gears and other passive methods of fishing targeting several species. The number of active vessels varies according to season, with minor ports having practically no active vessels during the winter months and as little as 25 percent of the registered vessels in major ports land fish during this period. The proportion of vessels operating in one day seldom reaches high percentages since most of them are owned by part time fishers and it is quite common for full time fishers to own more than one vessel.

It is widely accepted that Mediterranean fisheries should be managed by an effort control regime on groups of vessels or Operational Units (Camilleri *et* al. 2000; Adriamed, 2001; SAC, 2001). Each Operational Unit would be identified by a number of specific parameters and a model for estimating fishing effort would be based on a selection of these parameters. This present study attempts to identify the structural parameters of Maltese small-scale vessels (<10m), using artisanal gears, which significantly affect catches and hence contribute to fishing effort.

MATERIALS AND METODS

Data on the activity of the Maltese small-scale fishing fleet were collected within the framework of a pilot study[1] to establish a port sampling scheme to estimate national catches and fishing effort by gear for this sector of the fleet. A total of 923 interviews were carried out over a period of 10 months in 9 major fishing ports in the Maltese Islands. Data were processed by gear class and statistics on the total catch of sampled vessels and the vessel structure parameters (length, gross tonnage and horse power) were produced. For each of the four main gear classes, as well as for all the gear classes grouped together, a multiple regression analysis was performed according to the following model:

$$\mathbf{Catch_i = b_0 + b_1 * L_i + b_2 * GT_i + b_3 * HP_i + \varepsilon_i} \qquad \mathbf{(i=1, 2, \ldots, n)}$$

where:

- n is the sample size (number of interviews per gear, during the whole 10 month period of observation)
- b_0, b_1, b_2, b_3 are the regression coefficients,
- L_i is the Length of the vessel i,
- GT_i is the Gross Tonnage of the vessel i,

[1] This pilot study and the development of the Catch Assessment Scheme have been carried out with the support of the FAO Mediterranean sub-regional project, COPEMED.

- HP_i is the Engine Power of the vessel i,
- ε_i is the random error, $\varepsilon_i \sim N(0,\sigma^2)$

The regression coefficients (b_1, b_2, b_3) describe how a unit variation in the vessel structural parameters affects the catch; the higher the coefficient is, the greater the affect on the catch would be. The following list of summary statistics for each analysis were also determined:

- N :sample size (number of interviews)
- R : goodness of fit coefficient
- F : significance of the regression model
- p : probability that the model fits the data owing to a random effect
- B : regression coefficient of variables
- t : significance of regression coefficient
- p-level : probability that the value of the regression coefficient is different from zero, owing to a random effect

RESULTS

Trammel nets

Regression summary for dependent variable (Catch)
N = 392 interviews
R = 0.245
F(3,388) = 8.2926
p< 0.00002

Variable	B	Standard error of B	T(388)	p-level
Intercept	2.326753	2.590230	0.89828	0.369593
[2]LENGTH	**2.549104**	**0.571080**	**4.46365**	**0.000011**
GT	-0.851083	0.775263	-1.09780	0.272973
HP	**-0.053140**	**0.023367**	**-2.27414**	**0.023503**

The total number of interviews for this gear class was very high (392). However, the low R value (0.245) indicated that the model did not fit the data so well in order to describe the investigated phenomenon.

The regression coefficient of the length variable was significantly different from zero. This means that the length variable affected the catch; moreover, the probability that this relationship was due to a random effect was less than 0.01%.

The HP regression coefficient was also significantly different from zero. However, the probability that the relationship between HP and the catch could be due to a random effect (2.3%) was higher than in the case of the length variable.

The analysis showed that there was no significant relationship between catch and GT for this gear class.

[2] Significant values are represented in bold

Longlines

Regression summary for dependent variable (Catch)
N = 143 interviews
R = 0.512
F(3,139) = 16.438
p< 0.00000

Variable	B	Standard error of B	T(139)	p-level
Intercept	-3.67604	3.926474	-0.936220	0.350784
LENGTH	1.37080	0.902753	1.518467	0.131168
GT	-0.27945	1.301203	-0.214762	0.830268
HP	**0.10765**	**0.028574**	**3.767579**	**0.000243**

The number of interviews was quite high (143) and the model fitted the data quite well (R = 0.512).

The regression coefficient of the HP variable was significantly different from zero. This means that the variable HP affected the catch, with the probability that this relationship was due to a random effect being less than 0.01%.

The analysis showed that there was no significant relationship between catch and both GT and length for this gear class.

Traps

Regression summary for dependent variable (Catch)
N = 176 interviews
R = 0.525
F(3,172) = 21.819
p< 0.00000

Variable	B	Standard error of B	T(172)	p-level
Intercept	0.838436	7.194008	0.116546	0.907355
LENGTH	-0.925000	1.511910	-0.611809	0.541472
GT	**6.208077**	**1.781783**	**3.484194**	**0.000626**
HP	**0.120904**	**0.056540**	**2.138367**	**0.033898**

A good number of interviews were obtained (176) and the data collected fitted the model quite well (R = 0.525).

The regression coefficient of the GT variable was significantly different from zero. This means that the variable GT affected the catch, with the probability of less than 0.01% that this relationship was due to a random effect.

The HP regression coefficient was also significantly different from zero. However, the probability that the relationship between HP and the catch could be due to a random effect (3.4%) was higher than in the case of GT.

The analysis showed that there was no significant relationship between catch and length for this gear class.

Trolling lines

Regression summary for dependent variable (Catch)
N = 176 INTERVIEWS
R = 0.202
F(3,172) = 2.4334
p< 0.06666

Variable	B	Standard error of B	T(172)	p-level
Intercept	0.04895	1.906715	0.02567	0.979550
LENGTH	**1.23423**	**0.471985**	**2.61497**	**0.009716**
GT	-1.25745	0.780149	-1.61181	0.108837
HP	-0.00395	0.016856	-0.23413	0.815163

The model did not fit the data obtained from the interviews (176) for this gear class (R = 0.20).

The regression coefficient of the length variable was significantly different from zero, indicating that this variable affected the catch. The probability that this relationship was due to a random effect was less than 0.9%.

The analysis showed that there was no significant relationship between catch and both GT and HP for this gear class.

All gears

Regression summary for dependent variable (Catch)
N = 923 interviews
R = 0.367
F(3,919) = 47.642
p< 0.00000

Variable	B	Standard error of B	T(919)	p-level
Intercept	-0.150051	2.697922	-0.055617	0.955659
LENGTH	0.514532	0.589067	0.873469	0.382636
GT	**5.342294**	**0.752216**	**7.102073**	**0.000000**
HP	-0.011426	0.022099	-0.517042	0.605251

The total number of interviews was very high (923), but the model did not fit data very well (R = 0.37). The regression coefficient of the variable GT was significantly different from zero indicating this variable affected the catch with practically no probability that it could be due to a random effect.

The analysis showed that there was no significant relationship between catch and both length and HP when all the gears were considered together.

DISCUSSION

The use of vessel structural parameters could be a good indicator of effort in artisanal fisheries. The relevant parameters, however, would depend on the gear class being used. It is clear, for example, that the size (length) of a vessel is a limiting factor for the number and size of bulky gear, such as trammel nets, which could be kept on board. On the other hand, horse power would determine the capacity (speed) in deploying and retrieving longlines and hence the length of the gear used with a particular vessel.

The generally low R values obtained in the analyses are probably not related to errors associated with the actual investigation (samples, analysis, etc.) but are a result of the deficiency of the structured regression model used in this study to explain catches. Since catches are highly variable and are a function of several factors, they cannot be explained by a model involving only structural parameters. Nevertheless, this preliminary study highlighted that, even if there are many factors affecting the catch, vessel structural parameters inherently affect it.

REFERENCES

Adriamed (2001). A preliminary contribution to the Mediterranean Operational Units. Paper presented at the GFCM-SAC Working Group on Operational Units (Ancona, 18th-19 th March 2001). FAO-MiPAF Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea.

Camilleri, M., Coppola, S.R. and De Leiva Moreno, I. (2000). Operational Units; a preliminary study. Sub-Committee on Statistics and Information, Scientific Advisory Committee, General Fisheries Commission for the Mediterranean, FAO (April, 2000).

SAC (2001). Report of the fourth session of the Scientific Advisory Committee (GFCM). Athens, Greece, 4-7 June 2001.

Description of the data related to the Mediterranean and Black Sea area available in the FAO fishery statistics databases managed by FIDI

Title of the database:	*GFCM capture production*
Period of coverage:	1970-2000 (2001 data available at about May-June 2003)
Area of coverage:	GFCM area (Mediterranean and Black Sea) subdivided into 10 divisions
Main attributes:	country, species item, division, catch in volume
Frequency of data:	annual
Units:	tonnes
Main sources:	national correspondents; FAO estimates of missing data marked by a 'F'
Method of data collection:	STATLANT 37A questionnaire
No. of Mediterranean countries represented:	26
No. of Distant Water Fishing Nations represented:	6
No. of records related to Mediterranean countries:	1,751
Dissemination:	FISHSTAT+ software

Title of the database:	*Capture production*
Period of coverage:	1950-2001
Area of coverage:	global, including Mediterranean and Black Sea FAO fishing area
Main attributes:	country, species item, FAO fishing area, catch in volume
Frequency of data:	annual
Units:	tonnes
Main sources:	national correspondents; FAO estimates of missing data marked by a 'F'
Method of data collection:	National Summary (NS1) and STATLANT 37A questionnaires
No. of Mediterranean countries represented:	26
No. of Distant Water Fishing Nations represented:	6
No. of records related to Mediterranean countries:	1,260
Dissemination:	FAO Yearbook – Capture production; FISHSTAT+ software; FIGIS

Title of the database:	*Aquaculture production*
Period of coverage:	1950-2001
Area of coverage:	global, including Mediterranean and Black Sea FAO fishing area
Main attributes:	country, species item, FAO fishing area, environment, aquaculture production in volume
Frequency of data:	annual
Units:	tonnes
Main sources:	national correspondents; FAO estimates of missing data marked by a 'F'
Method of data collection:	AQ questionnaire
No. of Mediterranean countries represented:	19*
No. of records related to Mediterranean countries:	153*
Dissemination:	FAO Yearbook – Aquaculture production; FISHSTAT+ software; FIGIS
Notes:	*Only records of mariculture reported as taking place in area 37 (Mediterranean and Black Sea) have been considered.

Title of the database:	*Aquaculture production values*
Period of coverage:	1984-2001
Area of coverage:	global, including Mediterranean and Black Sea FAO fishing area
Main attributes:	country, species item, FAO fishing area, environment, aquaculture production in value
Frequency of data:	annual
Units:	US$ 1,000
Main sources:	national correspondents; FAO estimates of missing data marked by a 'F'
Method of data collection:	AQ questionnaire
No. of Mediterranean countries represented:	19*
No. of records related to Mediterranean countries:	153*
Dissemination:	FAO Yearbook – Aquaculture production; FISHSTAT+ software; FIGIS
Notes:	*Only records of mariculture reported as taking place in area 37 (Mediterranean and Black Sea) have been considered.

Title of the database:	*Total fishery production*
Period of coverage:	1950-2001
Area of coverage:	global, including Mediterranean and Black Sea FAO fishing area
Main attributes:	country, species item, FAO fishing area, fishery production in volume
Frequency of data:	annual
Units:	tonnes
Main sources:	the total fishery production is obtained by the sum of capture and aquaculture productions; FAO estimates of missing data marked by a 'F'
Method of data collection:	no specific data collection
No. of Mediterranean countries represented:	26
No. of Distant Water Fishing Nations represented:	6
No. of records related to Mediterranean countries:	1,318
Dissemination:	FISHSTAT+ software; FIGIS; FAOSTAT

Title of the database:	*Fisheries commodities, production and trade*
Period of coverage:	1976-2001 (updated FISHSTAT+ release in April 2003)
Area of coverage:	global
Main attributes:	country, commodity, import quantity, export quantity, re-export quantity, import value, export value, re-export value, production quantity
Frequency of data:	annual
Units:	tonnes and US$ 1,000
Main sources:	national correspondents, national electronic files and agricultural trade questionnaires provided by FAO-ESS, other published and Internet released information, UN COMTRADE database; FAO estimates of missing data marked by a 'F'
Method of data collection:	FC1, FTR and DNC questionnaires
No. of Mediterranean countries represented:	25
No. of records related to Mediterranean countries:	14,178*
Dissemination:	FAO Yearbook – Fishery commodities; FISHSTAT+ software; FIGIS
Notes:	*Trade statistics do not permit to identify area of capture, records for some countries may also refer to trade of species caught outside the Mediterranean

Title of the database:	*Food Balance Sheets (fish and fishery products)*

Period of coverage:	1961-1999 (provisional data for 2000 and 2001)
Area of coverage:	global
Main attributes:	country, commodities, commodity groups, elements of the Supply Utilization Accounts, nutritional factors
Frequency of data:	annual
Units:	tonnes, 1,000 (population), kilograms (per caput supply), grams per caput per day (proteins and fats), number per caput per day (calories)
Main sources:	elaboration of data included in the FAO-FIDI and FAO-ESS databases on the basis of established methodology for Food Balance Sheets
Method of data collection:	no specific data collection
No. of Mediterranean countries represented:	27
No. of records related to Mediterranean countries:	˜10,900
Dissemination:	FAO Fisheries Circular No. 821, Rev. 6 (latest issue published in 2002) "1961-1999 fish and fishery products: world apparent consumption statistics based on Food Balance Sheets"; FAOSTAT
Notes:	data provide indicators on the role of fish in national diet

Title of the database:	*Number of fishers*
Period of coverage:	1970-2001
Area of coverage:	global
Main attributes:	country, number of fishers, working time, aquatic environment, gender
Frequency of data:	annual
Units:	numbers
Main sources:	national correspondents
Method of data collection:	FM questionnaire
No. of Mediterranean countries represented:	25
No. of records related to Mediterranean countries:	
Dissemination:	FAO Fisheries Circular No. 929, Rev. 2 (latest issue published in 1999)
Notes:	The database includes only data made available to FAO

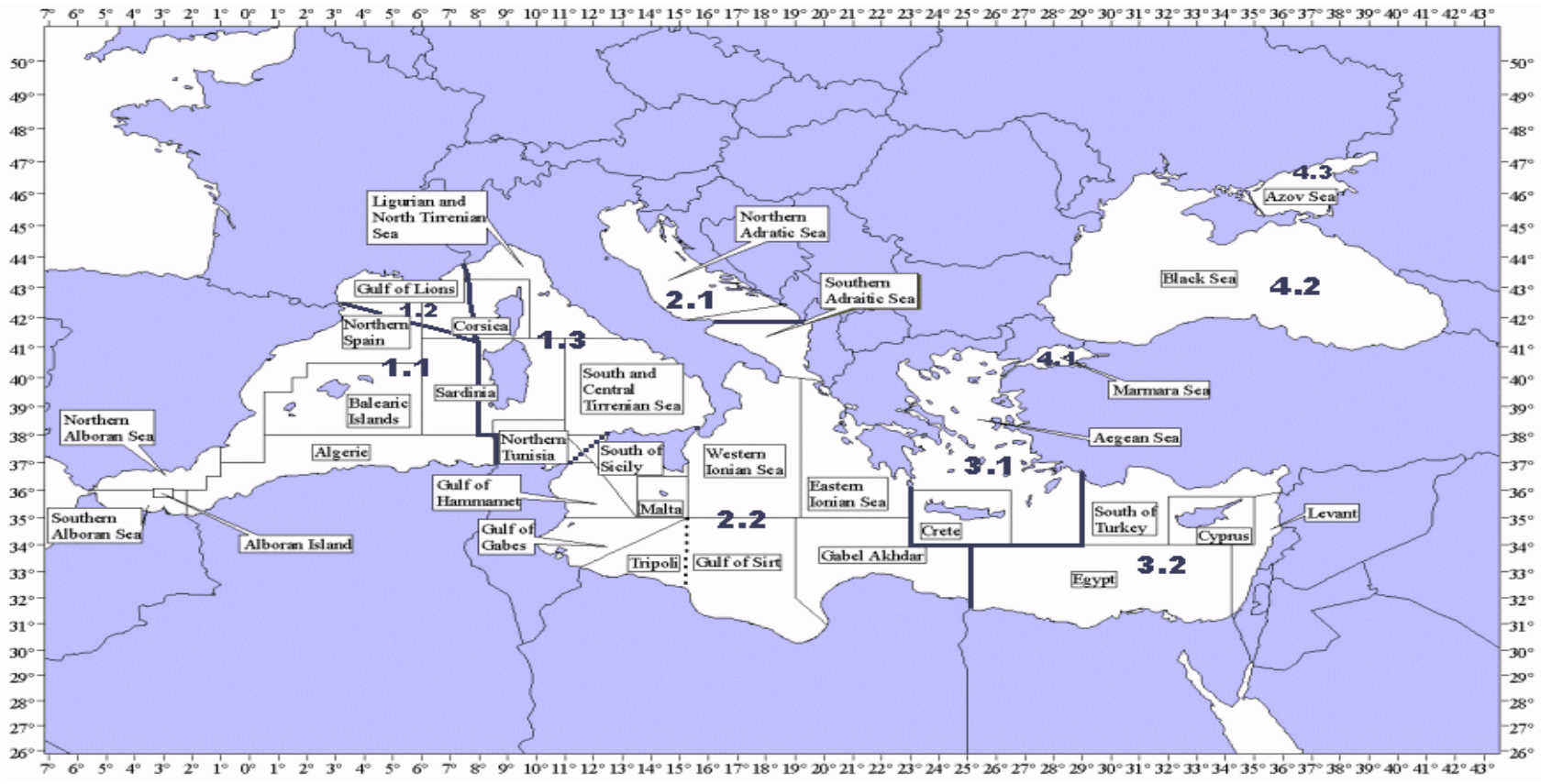
Title of the database:	*Fishery fleet*
Period of coverage:	1970-1998
Area of coverage:	global
Main attributes:	country, fishing vessel type, decked/undecked, length class, number of vessel by category, capacity indicators
Frequency of data:	annual
Units:	numbers, HP, kW, GT, GRT
Main sources:	national correspondents
Method of data collection:	FF1 and FF2 questionnaires
No. of Mediterranean countries represented:	18
No. of records related to Mediterranean countries:	
Dissemination:	FAO Bulletin of fishery fleet statistics (latest issue published in 1998, a new issue is in preparation); FIGIS
Notes:	Since 1996 fleet statistics formerly reported in GRT (or GT) classes, are reported in vessel length overall (LOA) classes. The international classification used as a basis for the inquiry was revised; these changes will be reflected in the upcoming release of the database including data up to 1998.

Internet addresses to access or download the databases:

FISHSTAT+: http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp
FIGIS:http://www.fao.org/figis/servlet/FiRefServlet?ds=staticXML&xml=webapps/figis/wwwroot/fi/figis/tseries/index.xml&xsl=webapps/figis/staticXML/format/webpage.xsl
FAOSTAT Fisheries data: http://apps.fao.org/page/collections?subset=fisheries
FAOSTAT Food Balance Sheets: http://apps.fao.org/page/collections?subset=agriculture

ANNEX 6

MAPPING OF THE OVERLAPS AND INCONGRUITIES BETWEEN THE GFCM GEOGRAPHICAL SUB-AREAS AND THE GFCM STATISTICAL DIVISIONS



ANNEX 7

LISTS OF MINIMUM DATA REQUIREMENTS

Socio-economic data recommended by the Sub-Committee on economic and social sciences and accepted by the SAC, 2002:

Macro-level Data:	**Micro-level (vessel) Data:**
Import/export weight and value	Number of vessels
Annual interest rate	Gross tonnage
Population	Horse power
Working population	Employment
Gross National Product	Salary Share %
Aquaculture production weight and value	Landings weight
	Landings value
	vessel value
	number of days fishing /year
	number of fishing hours/day
	cost of fishing/day
	yearly fixed costs

Although still in the early stages of development, the SCESS proposed to the SAC the following list of sociological data to be gathered for each vessel:

Age of each crew member
Number of years of active fishing for each crew member
Capital ownership of each crew member
Educational attainment of each crew member
Household structure of each crew member
Social background
Professional experience

Resource-based data recommended by the Sub-Committee on Statistics and Information:

As far as the resource-base data set is concerned, this should contain seasonal Catch and Effort estimates by target and associated species in each sub-regional area, by operational port and by fleet (vessel/gear) grouping.