GFCM:SAC8/2005/Dma.8

October 2005

E

GENERAL FISHERIES COMMISSION
FOR THE MEDITERRANEAN

COMMISSION GÉNÉRALE DES PÊCHES
POUR LA MÉDITERRANÉE

GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

SCIENTIFIC ADVISORY COMMITTEE

Eighth Session

Tirana, Albania, 25-28 October 2005

REPORT OF THE WORKING GROUP ON OPERATIONAL UNITS, INCLUDING THE WORKSHOP ON FISHING EFFORT MEASUREMENT TANGIERS, MOROCCO, 4-6 JULY 2005*

* Available only in English

GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

SCIENTIFIC ADVISORY COMMITTEE

SUB-COMMITTEE ON STATISTICS AND INFORMATION

REPORT OF THE WORKING GROUP ON OPERATIONAL UNITS, INCLUDING THE WORKSHOP ON FISHING EFFORT MEASUREMENT

Tangiers, Morocco, 4-6 July, 2005

1. Opening of the Session and Adoption of the Agenda

The meeting was held between 4-6 July 2005 in Tangiers, Morocco; hosted by the l'Institut National de Recherche Halieutique (INRH) of Morocco. The meeting was attended by 21 experts from the field of economics, biology, and statistics (Annex 1) faced with the task of establishing the "state of affaires" and the future of the Operational Units (OU) concept with regards to its application to fisheries management in the Mediterranean. The Coordinator of the Sub-Committee on Statistics and Information (SCSI), Mr Matthew Camillieri, welcomed the participants and the Chairperson of the Workshop, Mr Abdellah Srour, opened the meeting. Ms Cassandra De Young was nominated Rapporteur. The Tentative Agenda proposed for the Workshop was adopted with a few additions (Annex 2).

2. Background to the Operational Units Issue

The SCSI Coordinator then set the scene for the meeting by providing a background to the discussion concerning the OU concept, including the GFCM policy of fisheries management through effort control, the established definitions of fleet segments and OU, the multidisciplinary approach germane to the identification of OU, and the links between classical stock assessments and OU.

3. Overview of sub-regional pilot studies and other sub-regional approaches

An historical overview of the development and application of OU to the Mediterranean was provided through a suite of presentations regarding the sub-regional and regional pilot studies and projects taking place since the initial study performed under the COPEMED sub-regional project in 2000. The following list provided the chronological framework to study the history and current status of the definition and use of OU in the Mediterranean:

- The initial study – COPEMED 2000, presented by Mr Camillieri
- The Ancona meeting – ADRIAMED 2001, presented by Mr Piero Mannini
- The Madrid meeting – COPEMED 2003, presented by Mr Camillieri
- The OU in the Adriatic Sea – ADRIAMED 2004, presented by Mr Paolo Accadia
- The Coryphaena Fishery OU pilot study – COPEMED 2004/2005, presented by Mr Camillieri
- The estimation of socio-economic indicators in the COPEMED countries – COPEMED 2005, presented by Mr Ramon Franquesa.
- The current and future use of GFCM OU in the FAO Global Inventory of Fisheries – FAO-FIRM, presented by Ms Elena Balestri
- Updating of the FAO Circular 927: The Economic Status of Mediterranean Fisheries – presented by Ms Elisabetta Martone
- The typology of the Moroccan Mediterranean Trawling Fleet - 2005, presented by Mr Slimani
- The current discussions on the EU fleet segmentation matrix – presented by Mr Juan Pablo Pertierra

The first three presentations described the efforts necessary to form consensus on the definitions of OU and fleet segmentations and implementation strategies. The following three presentations provided a description of the various methodologies followed in collecting OU data for use in fisheries management in two sub-regions. The use of GFCM OU data in the FAO Global Inventory described the level of aggregation of OU data appropriate for use at the international level; the following presentation discussed the status of work reviewing the availability of socio-economic data throughout the GFCM countries; and the final presentation described the level of dissaggregation of OU data appropriate for use at the national level, in the case of Morocco. The proposal for the EU fleet segmentation matrix was discussed concerning its compatibility with the GFCM fleet segmentation matrix as the EU fleet segmentation matrix comprises a higher level of dissagregation of the fleet definition and fishing activity categories. For brief summaries of the presentations, please refer to Annex 3.

These presentations served to provide the Participants with an overview of the various approaches to defining and implementing OU in the various sub-regions. Approaches varied from the use of national census data supplemented by nationally representative surveys to the use of pilot studies at national and sub-regional levels. The Participants discussed the utility of various levels of aggregation that were used to develop OU and concurred that national-level needs differ from regional-level needs but that data collection systems must be developed such that aggregation of data to provide internationally comparable data and regional OU were possible. The group was reminded that the OU concept was defined to provide managers with the multi-disciplinary information necessary for fisheries management at both the national and regional levels. This approach would provide fisheries managers with multiple entry points to the management of their fisheries.

Concerns were raised by some Participants that, if a standardised, statistically robust system of collecting the data were not created as a starting point, the resulting information would not allow for regional comparison of such data; thereby, rending such efforts inefficacious. These concerns were acknowledge by the Group; however, it was maintained that each country would collect data relative to this country's individual needs and capabilities, keeping in mind the requirement of providing the data to the GFCM following the established fleet segmentation and OU framework.

4. The Way Forward

Identification of multidisciplinary parameters defining OU and designing a GFCM table for providing statistical data by OU

Mr Camillieri opened the discussion concerning the future steps toward identifying the multidisciplinary parameters defining OU with a review of the first OU table templates designed in 2001 to aid in the collection of OU country-level information (Annex 4). Mr Camillieri asked the Participants to evaluate these tables with the knowledge acquired in the intervening years. Mr Camillieri suggested that, whatever information is ultimately captured by these tables, the tables should cover the following five aspects: fleet descriptions, catch information, effort identifiers, socio-economic data, and biological data.

The ADRIAMED tables previously presented (Annex 5) were revisited by the Participants as one proposal of an updated approach to collecting OU data. Unique to this approach was the use of a codification scheme to identify individual OU based on country, geographical sub area, gear type, and spatial location. Mr Accadia clarified that the Fleet Table served the purposed of identifying OU and that the remaining tables (biological, socio-economic, and effort) where directly correlated with the OU and feed directly into the Fleet Table in which the OU coding is defined. Mr Accadia also stressed the necessity of assuming that every vessel remains in its defined OU for the entire period of interest (i.e. on year). This assumption was

deemed necessary as the corresponding economic data exist only at the vessel level; therefore, could not be divided into multiple OU during any give period.

After much discussion on the limitations and qualities of such an approach, the Participants agreed to adopt the ADRIAMED templates, with some suggestions for change concerning the biological table, and codification scheme for collecting and managing OU information for application at the regional scale but acknowledge the need to clearly identify assumptions and definitions related to these tables. Issues remaining to be clarified include the following:

- the ability to addend biological information to the OU codification scheme
- the coding of polyvalent/multi-purpose vessels
- means to incorporate additional, less-aggregated information into the OU scheme
- identifying the minimal list biological parameters

Can biological sampling and assessments be carried out by OU?
The Participants agreed to postpone the discussion on this agenda item until the members of the Sub-Committee on Stock Assessment were consulted.

The use of OU in fisheries management
Participants stated that the moment to test the applicability of the OU approach toward the analysis of proposed management measures had arrived as situations in which sufficient data exist to test the OU approach have been attained. As a starting point, it was suggested that case studies be undertaken to analyse the socio-economic and biological impacts of potential effort reduction strategies in the Adriatic Sea. Other potential areas of applied studied could include the impacts of economics-driven management measures, such as cases where negative profits exist but fishing persists. Specification of such case studies would take place during the up-coming Sub-Committee meetings.

Paper on the State of Affaires of OU in the Mediterranean
Piero Mannini presented the following draft outline for a compilation paper describing the OU concept, its history, and experiences in its application:

I. The OU concept and its origin
II. The evolution of OU (history): from theory to practice
III. Results
IV. Data needs (easily available; data compilation through and based on national routine monitoring scheme)
V. Suitability to support/facilitate fishery management processes: applicability and effective utility with respect to OU concept formulation
VI. Need to test OU tool going through a complete fishery management procedure thus exploring the full multidisciplinary potential of the envisaged OU framework
VII. Main conclusions (pros & cons, open questions at the current state of the art)

The paper would serve as the basis for discussions within the Sub-Committees during the September, 2005 meetings and could form the starting point for the development of a manual on the implementation of the OU concept throughout the Mediterranean. The Table of Contents will be elaborated, the document prepared and published by a working group under the guidance of the GFCM Secretary.

5. Standardising fishing effort measurement by OU

Mr Issam Krouma introduced the subject of determining a standardised measure of effort to be applied throughout the Mediterranean by recalling the desire voiced by the SCSI to review this

issue, the work performed within the European Union, and the applicability of existing proposals to a regional level.

Experiences from around the Mediterranean
To launch the discussion concerning the measurement of effort, Mr Krouma invited the Participants to share their experiences in measuring effort either at the national or multi-national level. Experiences were shared for the European Commission, Italy, Malta, Morocco, and Spain, covering a wide variety of measures and levels of detail. In addition, explanations where provided for cases where changes in effort measurements were adopted.

Defining standard minimum effort parameters for GFCM fleet segments/OU
The Participants accepted the general definition of Effort as a function of Capacity/Engine Power and Fishing Activity. However, the exact definitions of these variables merited further discussion of three levels of parameters:

- Capacity of vessels in Gross Tonnage (GT) or Power (Kw); the formulas dependent on the vessel being shorter or longer than 15 meters.
- Fishing Activity to determine time at sea of the vessel.
- Gear-based measures of Effort

For example, the European Commission has changed its Capacity definition from Gross Registered Tonnage (GRT) to Gross Tonnage (GT) to comply with the London Convention formula. Mr Franquesa described an economic justification for the use of GT: economic agents will attempt to maximize profit given restrictions placed upon them, most importantly, the vessel size. Therefore, vessels size as measured by gross tonnage would remain the best, in terms of cost efficiency and efficacy, indicator to differentiate amongst vessels within the same OU.

The discussion surrounding the definition of Fishing Activity highlighted the need to clearly and transparently define such a variable. Definitions used in the Mediterranean include number of fishing trips, fishing days, and fishing hours.

Participants tried to differentiate between a biological use and an economic use of Capacity and Fishing Activity; the former requirement more detailed information concerning 'effective' fishing enabling the calculation of fishing mortality by gear type. From an economic perspective, Fishing Activity could be less detailed but would include time spent travelling to the fishing grounds.

One Participant highlighted the need to investigate the use of extra-vessel equipment, such as fish aggregating devices (FAD) and airplanes and its effect on effort.

In order to develop simple yet flexible measures of Effort, it was agreed that the Workshop would support the use of capacity measures, GT or GRT[1], and "fishing days" for Fishing Activity. Acknowledging that these definitions leave room for interpretation, it was stressed that, as long as the method applied to each OU were homogenous, conversion factors (based on estimates of fishing mortality by gear type), normalization of variables would necessitate only mechanical transformations using these conversion factors. In addition, the Participants welcomed the provision of additional effort-related information, such as Power (Kw) and Fuel Consumption.[2]

[1] Note that, for the purpose of the GFCM Record of Vessels, member countries are required to submit GRT data for all vessels over 15 meters. GFCM Report of the 29th Session.

[2] Note: European Union member countries are required, under the EU Council Regulation 1543/2000, to collect effort data including GT, Kw, and fuel consumption

6. Recommendations

The following list of recommendations was made by the Participants to the four SAC Sub-Committees. It was cautioned that, given the small number of GFCM member countries represented and an unequal distribution among the disciplines, these recommendations do not necessarily reflect the view of the GFCM but of the experts present.

- A standard table containing fleet data required for generally defining the OU within a country/sub-area /region be adopted (AdriaMed table 1 in Annex 4)

- Standard tables related to biological, socio-economic and catch / effort data required for further defining and describing OU be adopted (AdriaMed tables 2, 3, 4 in Annex 4; table 3 needs to be expanded to describe the yearly activity of the OU)

- A codification scheme to identify OU based on country, geographical sub-area, gear type and spatial location be tentatively adopted (see AdriaMed codification system)

- In carrying out work related to OU, collaboration with projects such as FIRMS is important in order to complete the FAO / GFCM inventory of fisheries and marine resources.

- Routine fleet and catch / effort data collection schemes must be in place at national level in order to obtain the OU related data. Sampling schemes do not necessarily need to be designed according to OU stratification, as long as data compilation could be made by OU.

- Continued support from FAO sub-regional projects along with national commitments to maintain sustainable data collection schemes is essential in GFCM countries.

- As a follow up to the AdriaMed and particularly the CopeMed study, further case studies should be undertaken to analyze the socio-economic and biological impacts of potential effort reduction strategies affecting selected OU in particular sub-areas of the Mediterranean. These would help demonstrate the use of the OU approach as a tool for fisheries management.

- The SCSA should address the issue as to whether or not biological data could be compiled and assessments be carried out by OU.

- Address the relevance of incorporating ecosystem / environment considerations in the OU work (particularly for the SCMEE).

- The measurement of parameters related to fishing effort should follow a standardized scheme consisting of four levels of priority (first level is the most important) as follows:

  Level 1 – Capacity and fishing activity[3]
  - Gross Tonnage (GT) or Gross Registered Tonnage (GRT)
  - Days at sea or hours fishing

  Level 2 – Other vessel parameters

[3] This level constitutes the minimum standard measure of fishing effort i.e. the product of capacity (GT or KW) and fishing activity (days at sea or hours fishing).

- Power (KW)
- Fuel consumption

Level 3 – Gear related parameters[4]

- Number of hooks, sets of nets, number of pots, etc.
- Effective fishing time (eg. soaking time, searching time, number of hauls etc.)

Level 4 – Detailed standardisation parameters[5]

If necessary, a standardization coefficient could be applied for each OU to obtain a measure of equivalence between the fishing effort of one OU and another. For example, the fishing mortality factor of each OU (estimated by biologists) could be used to standardize the effort measured in Level 1 (e.g. 1 unit of fishing effort of a vessel in OU1 is equivalent to x units of fishing effort of a vessel in OU2 targeting the same species or group of species in a particular sub-area).

[4] An expert working group to identify the standard unit measures of each gear and to address Level 4 needs to be convened.
[5] Ibid.

Annex 1. Participants List

Nom et Prénom	Organisme	Adresse	Téléphone	Fax	E-mail
ABID Noureddine	INRH-Tanger	N°58 Residence Lina Bd Med V-Tanger	0021239325139	0021239325139	abid.n@menara.ma
ACCADIA Paolo	IREPA Onlus	Via S.Leonardo, trav Migliaro, Salerno Itaty	0039089338978		accadia@irepa.org
BALESTRI Elena	FAO	Viale delle Terme de Caracalla, Rome, Italy 00100	00390657054739		elena.balestri@fao.org
BELCAID Sadia	INRH	BP 5268 Dradeb Tanger	0021239325139	0021239325139	s.belcaid@menara.ma
CAMILLERI Matthew	MALTA CENTRE FOR FISHERIES SCIENCES	FORT SAN LUCIAN, MARSAXLOUK, MALTA	356 21650933	356 21659380	Matthew.camilleri@gov.mt
DE YOUNG Cassandra	FAO FIPP	Viale delle Terme de Caracalla, Rome, Italy 00100	0039 0657054335		cassandra.deyoung@fao.org
ELOUAMARI Najib	INRH-Nador	BP 493 B^{d} ZERKTOUNI Nador	00212 56 60 38 28	00212 56 60 38 28	n.elouamari@inrhnador.gov.ma
FRANQUESA Ramon	GEU-Universitat Barcelona	Diagoual, 690 Fac ECOUNOMICAS	0034932178734	0034934037242	RAMON@GEMUB.com
HAMDI Habiba	INRH-Nador	BP 493 B^{d} ZERKTOUNI Nador	00212 56 60 38 28	00212 56 60 38 28	hamdihabiba@hotmail.com
KROUMA Issam	Fisheries Department Ministry of Agriculture	P.O. Box 60721 SYRIA	00963-11-5430656 /54499388	00963-11-54499389	issamkrouma@mail.sy i.krouma@scs-net.org
LAMINE Mounir	INRH-Casa	2 rue de Tiznit	00212220244		Lamine@inrh.org.ma

Nom et Prénom	Organisme	Adresse	Téléphone	Fax	E-mail
LAMTAI Aziz	INRH Tanger	CRRH-Tanger/M'diq	0021239325139	0021239325139	a.lamtai@menara.ma
LOPEZ BENITEZ Casto	CE	Rue de la loi 200 Bruxelles, Belgique	003222996077		Casto.lopez-Benitez@cec.eu.int
MALOULI Idrissi Mohammed	INRH-Tanger	BP 5268 Dradeb Tanger	0021239325139	0021239325139	malouliinrh@yahoo.fr
MANNINI Piero	FAO	Viale delle Terme de Caracalla, Rome, Italy 00100	00390657055402		PIERO.MANNINI@FAO.ORG
MARTONE Elisabetta	FAO	Viale delle Terme de Caracalla, Rome, Italy 00100	0039066522119		elisabetta.martone@fao.org
PERTIERRA,Juan-Pablo	CE	Rue de la loi 200 Bruxelles, Belgique	0032.2.296.6443		Juan-Pablo.Pertierra@cec.eu.int
SABATELLA Evelina	IREPA	via SAN LEONARDO-ITALIA	0039089338978	0039089330835	esabatella@irepa.org
SLIMANI Abdelouhab	INRH-Nador	B^{d} ZERKTOUNI BP493 Nador	00212 56331251	212 56 60 38 28	a.slimani@inrhnador.gov.ma
SPAGNOLO Massimo	IREPA	via S.leonardo Italia	0039089338978		spagnolo@irepa.org
SROUR Abdellah	INRH	BP 5268 Dradeb Tanger	00212 39325134	0021239325139	a.srour@menara.ma

Annex 2. Workshop Agenda

4th July

1. Background to the Operational Units (OUs) issue
    - GFCM policy on management of fisheries through effort control
    - The definition of an Operational Unit
    - The multidisciplinary approach to identifying OUs
    - Fleet segmentation (SCESS)
    - Stock assessment and OUs

2. Overview of sub-regional pilot studies and other sub-regional approaches
    - The initial study (COPEMED 2000)
    - The Ancona meeting (ADRIAMED 2001)
    - The Madrid meeting (COPEMED December 2003)
    - The OUs in the Adriatic Sea (ADRIAMED 2004)
    - "How GFCM OUs may feed the global inventory of fisheries" (FAO-FIDI)
    - The Coryphaena fishery OUs pilot study (COPEMED 2004-2005)
    - The EU fleet segmentation matrix
    - Discussion

5th July

3. The way forward
    - Review and listing / identification of multidisciplinary parameters defining OUs
    - Designing a GFCM table for providing statistical data by OUs
    - Can biological sampling and assessments be carried out by OUs?
    - Is the OU approach useful to assess the socio-economic implications of management measures?
    - Management advice and implementation by OUs

4. Standardising fishing effort measurement by OU
    - Overview of global approach to measuring fishing effort
    - Experiences from around the Mediterranean – artisanal and industrial fisheries
    - The importance of quantifying effort for effort control management by OUs
    - Defining standard minimum effort parameters for GFCM fleet segments / OUs

6th July

5. Conclusion
    - Overview of discussions
    - Preparation of a document on the OU “state of affairs”
    - Recommendations to SAC Sub-Committees

Annex 3. Presentation Summaries

- **The OU in the Adriatic Sea – ADRIAMED 2004, presented by Mr Paolo Accadia**

AdriaMed Working Group on Adriatic Sea Operational Units

Based on this definition of Operational Unit concept accepted by the GFCM and the work developed within the SAC Sub-Committees, AdriaMed Working Group verified the possible application of the OU concept in the Adriatic Sea, identified the OUs and collected basic sets of bio-economic data on the OUs identified.

This work was organised in two meetings. The first meeting was in Dürres (Albania) on 1st and 2nd of April 2004 and the second one was in Zagreb, (Croatia) on 14th and 15th of September 2004.

The work carried out by the AdriaMed WG produced the identification and description of the OUs in the Adriatic Sea. For the sake of clarity and usefulness, AdriaMed WG defined an OU alphanumeric code, composed as follow: first three characters indicate the United Nations country abbreviation. Country abbreviations are followed by a 2-digit number representing the GSA (17 or 18). Then the fishing gear is given abbreviated (two or three characters). Last 2-digit number indicates the specific Operational Unit number to be assigned when compiling the table.

The approach followed by the WG to identify and describe the OUs was based on biological, economic and social features. For this reason, four tables were compiled: Fleet and area, Main resources components, Effort, and Economic structure.

The first table, named “Fleet and area”, is to define and identify the OUs. The identification is based on geographical and structural aspects. The geographical aspects are related to the GSA, the national borders and the main fishing zone in which the OU vessels exercise their activity. The structural aspects are related to the fishing gear used by the OU vessels and the vessel length.

In the second table, named “Main resources components”, for each OU, the target species, the main associated exploited resources and the fishing period are reported. This information can be used to identify not only the species caught by the vessels of each OU, but also to highlight, for each species, how many OUs there are and which of them participate in a specific fishery.

The third table, named “Effort”, shows the effort measure commonly used in each country for each OU. It depends on the fishing gear used by the vessels considered in the specific OU. Moreover, the definition of the effort unit allows an estimation of catch per unit effort (CPUE).

The last table, named “Economic structure”, is composed of a minimum data set of microeconomic data. These data are useful to measure the economic performance for each OU and their social relevance in terms of total employment.

Based on the tables described above, AdriaMed WG identified 80 OUs, 47 for the GSA 17 and 33 for the GSA 18. The total number of vessels is 7023, 5325 for the GSA 17 and 1698 for GSA 18.

- **The Coryphaena Fishery OU pilot study – COPEMED 2004/2005, presented by Mr Camillieri**

Mr. Camilleri presented the work carried out through a collaborative study between Spain, Tunisia and Malta with the support of COPEMED. He explained that the aim of the pilot study was to use the Mediterranean *Coryphaena* fishery as an example to demonstrate how, for a shared fishery, Operational Units could be identified and how catch, effort, economic and biological data could be collected in a harmonised manner and aggregated by Operational Unit. The use and implications of this data structure in fisheries management, particularly for an effort control regime, were highlighted. Mr. Camilleri commented that the importance of MedStat in addressing the Operational Unit concept was clearly visible in this pilot study.

- **The estimation of socio-economic indicators in the COPEMED countries – COPEMED 2005, presented by Mr Ramon Franquesa.**

Mr Franquesa presented the collective study "The estimation of economic indicators in the Mediterranean fisheries" financed by COPEMED Project. The study beginnings in 1999 and it is finalised this year. The pilot study covered West Libya, Tunis, Algeria, Mediterranean Morocco and Andalusia (Spain). The study provided a first picture on the economic trends in this area, based in a common methodology. To develop this analysis the Operational Units concept based in the SAC fleet segmentation (13 groups), disaggregated geographically at level of Local Operational Units (LOU), was used. The LOU comprises the landing places and harbours of each 55 considered areas (each comprised from 15 to 50km of coast). The outcomes of the study show that the present segmentation allows cover the most part of the vessels in the area. The high level of geographical desegregation (that produces 355 LOU) is useful for management purposes, but can be excessive for the GCFM context. If exist logistic limitation the geographical division can be limited to the statistical GCFM areas. In this case OU can be defined as Fleet segment-Country-GCPM Statistical Area.

- **The current and future use of GFCM OU in the FAO Global Inventory of Fisheries – FAO-FIRM, presented by Ms Elena Balestri**

"FIRMS Adriatic fisheries inventory. First exercise of using ADRIAMED OUs in Global inventory of fisheries and marine resources"

The Adriatic fisheries inventory is part of the Global inventory of fisheries and marine resources, a project of the Fisheries Department aiming at listing and monitoring the status of fisheries and marine resources worldwide. The main source used to fill the inventory of fisheries for the Adriatic Sea has been the following one: "AdriaMed.2004 Adriatic Sea Operational Units: first identification and listing. Paper prepared in occasion of the 7th Session of the GFCM Scientific Advisory Committee (Rome 19-22 October 2004). FAO-MiPAF Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea. GCP/RER/010/ITA". The FIRMS methodology in filling inventories of fisheries has been applied referring to the first list of Operational Units available in the Mediterranean Sea (ADRIAMED), without encountering any major compatibility issue between the concept of OU and that of Fisheries. In doing so, Operational Units have been aggregated according to Geographical sub-areas (GSA), Country and Fishing gear-Target Species in order to define higher level fisheries. Link with operational units has been maintained by a column, added to the original template of the inventory, which contains the OU codes. It's important to highlight the fact that Fisheries inventory is also linked to the Shared Marine resources inventory of the Mediterranean Sea done in collaboration with

GFCM: through this artefact, a link between data related to marine resources and operational units has been established. The goal of this presentation was to obtain a validation of the Adriatic fisheries inventory and also of the methodology followed in drawing up the inventory which, if supported, will be applied to other lists of Operational Units as soon as they will be ready with the objective of extending the inventory to the whole Mediterranean Sea.

- **Updating of the FAO Circular 927: The Economic Status of Mediterranean Fisheries – presented by Ms Elisabetta Martone**

Ms Elisabetta Martone presented the progresses in updating the FAO Fishery Circular n. 927 «Les pêches en méditerranée: éléments d'information sur le contexte halieutique et les enjeux économiques de leur aménagement». The Circular was completed by Chistophe Breuil in 1997 to present an economic overview of the Mediterranean fishery. The current updating, an activity requested by SAC, began with the identification and organization of the publicly available information; using table templates proposed by SCESS in May, 2001 that were subsequently modified by Adriamed to include other economic and social variables (socio-economic data, other economic data, sociological data and macro variables tables). Ms Martone provided the participants with detailed lists of publicly available sources for regional and national data and highlighted the problems faced concerning availability of the data and the subsequent pooling of such data. The data availability problems concern the collection of the various items listed in the tables, the identification of updated data, and the accessing non-publicly available data sources. On the data pooling side, there are problems in gathering and assembling the fragmented data extracted from reports and papers and in comparing data collected at national level due to, for example, the use of different methodologies in creating such data. Ms. Martone requested the assistance of the participants to identify existing socio-economic data for use in this report.

- **The typology of the Moroccan Mediterranean Trawling Fleet - 2005, presented by Mr Slimani**

La présentation porte sur la classification des chalutiers opérant en Méditerranée marocaine basée sur l'analyse de leurs rendements moyens annuels par espèce. L'approche méthodologique est fondée sur l'analyse multivariée (ACP et classification hiérarchique).

Les associations des espèces et des ressemblances des bateaux ont permis de dégager deux stratégies de pêche. La comparaison des deux stratégies en terme d'espèces cibles et zones d'activité montre des chalutiers de faibles performances ciblant principalement des espèces côtières et des chalutiers de grande performance et de puissances motrices élevées ciblant des espèces du large. L'aspect géographique de la segmentation est défini en terme de bathymétrie.

L'étude montre l'importance de l'approche par l'analyse de la multivariable pour la définition de la segmentation basée sur l'activité des flottilles. Les caractéristiques techniques des bateaux ne forment pas une base fiable pour la segmentation.

- **The current discussions on the EU fleet segmentation matrix – presented by Mr Juan Pablo Pertierra**

See Annex 6.

Annex 4. AdriaMed Description of four Operational Unit tables

Table 1 - Fleet and area variable

- **GSA**: GFCM Geographical Sub-Area (e.g. 17 or 18)
- **Country**: self-explanatory (e.g.. Albania, Croatia, Italy, Serbia and Montenegro, Slovenia)
- **Operational Unit code**: alphanumeric code composed as follows:
  - First three characters indicate the United Nations country abbreviation (Albania: ALB; Croatia: HRV; Italy: ITA; Serbia and Montenegro: SCG; Slovenia: SVN).
  - Followed by two-digit number identifying the GSA (17 or 18).
  - Then the fishing gear abbreviated (two or three characters) according to the International Standard Classification of Fishing Gear (ISSCFG).
  - Last 2-digit number indicates the specific Operational Unit number.
- **Gear type**: refers to the International Standard Classification of Fishing Gear (ISSCFG).
- **Vessel segment** (LOA): length overall (e.g. < 6 meters)
- **Cross reference to SAC table**: the previous entry (Vessel segment) needs, always when possible, to be cross-referred with the standardised fleet segmentation of the SAC (e.g. fleet segment “A”, “B”, “C”).
- **Vessel Number**: Number of fishing vessels belonging to the given Operational Unit.
- **Main fishing zones**: self explanatory. In the future it might require a better definition to be agreed upon (e.g. latitude/longitude, local name for fishing area)
- **Base ports**: port/s of operation of the given Operational Unit.

Table 2 - Main resource components variables

- **Operational Unit code**: as above
- **Target species** (FAO Code): scientific name of the bio-economically most important target species (up to a maximum of five species).
- **FAO species code**: The FAO three-letter code based on the English common name as from the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP).
- **Main associated exploited resources**: the species, species group or assemblage exploited in association with the target species previously indicated.
- **Fishing period**: self-explanatory (e.g. annual, June to September)

Table 3 – Effort variables

- **Operational Unit code**: as above
- **Effort measure**: the effort measures used (e.g. trawling hours, net length, number of hooks, etc.)
- **Effort unit**: the unit in which effort measure is expressed.
- **CPUE**: Catch Per Unit of Effort (i.e. catch/effort unit)

Table 4 - Economic structure variables

- **Vessel N**.: Number of fishing vessels belonging to the given Operational Unit.
- **Gross Tonnage**: Total gross tonnage of fishing vessels belonging to the given Operational Unit.
- **Horse Power**: Total engine power of fishing vessels belonging to the given Operational Unit.

- **Employment**: Total number of people employed on fishing vessels belonging to the given Operational Unit. The number of crew members can be estimated on a full time equivalent (FTE) basis.
- **Salary Share %:** Percentage of the revenues after discounting commercial costs, daily costs and fuel costs that pertain to the crew. It will be distributed among the crew as salary.
- **Landing weight**: Total landings in weight.
- **Landing value**: The volume of landed fish valued against actual market prices. It equals to quantities landed multiplied by the landing average price.
- **Vessel value**: This is defined as total invested capital – value of hull, engine, gear and equipment. The replacement-value method can be used to estimate this parameter.
- **Fishing days/y**ear: Number of fishing days per year.
- **Fishing hours/day**: Number of fishing hours per day.
- **Cost of fishing/day**: These include daily expenses incurred in fishing activity, such as fuel, lubricants, etc. They are variable costs that depend on the time spent in fishing.
- **Yearly Fixed costs**: These comprise costs not directly connected with operational activity, such as non-routine maintenance, vessel insurance, taxes and dues, etc. The fixed costs are all the costs that are inevitable to pay yearly, independently from the time spent to fish.

Annex 5. GFCM Fleet Segmentation

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.

Annex 6. The current discussions on the EU fleet segmentation matrix – presented by Mr Juan Pablo Pertierra

Introduction

Fisheries catch-at-age data have traditionally been collected on a stock basis for the purpose of stock assessments and forecasts. Some attempts to turn to a fishery based sampling have been undertaken. These studies aimed at sampling for biological parameters like discards, length/age structure, and referred to a population of fishing trips. In such approaches, **fishing trip** is defined as the sampling unit and the population can be split into strata like quarter, gear types or more generally into strata of similar exploitation pattern. The idea behind regrouping the fishing trips according to their exploitation pattern is to improve the sampling precision by integrating the dynamics of fishing in an explicit way.

With regards to economic data, the sampling unit is the **vessel** throughout the year and the population is derived from the fleet register. A major challenge of bio-economic modelling and also of management strategies evaluations, is to be able to link input data collected under different sampling schemes and derived from different populations. The common item of both the biological and the economic sampling scheme is not the stock, but the fishing activity. The fishing activities at a yearly basis affect the economic performance and the fishing activity at the trip level defines the exploitation pattern to sample.

The "matrix" approach proposes a generic approach to split the fishing trips into groups of similar exploitation pattern, clustered in a hierarchical tree. An equivalent multi level approach is applied to the fleets for economic sampling purpose. The economic and biological information can be gathered harmoniously in a matrix where the fleets segments correspond to the lines and the fishing activities correspond to the columns.

Description of the fishing activities

By sampling or by census, the collection of data in fisheries science is often linked to a fishing trip. Catches, discards, length or age structure, effort, CPUE can be linked to variables of interest like gear used, geographical area, time of the year and species targeted. Grouping fishing trips into homogeneous strata raises three issues. The first issue is to ensure that sampling units are well identified and all parameters needed for their identification are known at the population level. The second issue is to define fishing units with similar exploitation pattern so that sampling of biological parameters achieves minimal bias and maximal precision. The third issue is to cluster the different fishing units into a hierarchical tree to enable sampling at different levels of aggregation.

Within a fishing trip, vessels will use only one gear, target one (assemblage of) species into one geographical area, but others will have a more flexible behaviour. Analysing the landings of one trip can prove difficult, when these landings result from a combination of gears and/or areas. Although, the most appropriate way to sample biological parameters is in theory to sample onboard, there are practical difficulties in implementing such a sampling procedure.

A good candidate for sampling unit would be the fishing operation, as a fishing operation is done with one gear, targeting one (assemblage of) species in one area. However, this requires data sources (e.g. log-books) documenting comprehensively total landings at the scale of the fishing operation, and these are not always available. Therefore, it is currently not possible to raise age-structured landings sampled by fishing operation to the total landings. For that reason, the sampling unit will remain the trip, and the problem of vessels using several gears during the main trip should still be addressed.

There is no theoretical limit in the number of fishing activities to be defined, as long as the fishing trips within the fishing activity strata do not overlap. When sampling is based on fishing trips, and when several fishing activities are practiced during the same trip, a rule needs to be considered to identify which one is prevalent. Another problem occurs when one species belonging to different stocks is caught during the same trip. In the ICES area, one way to deal with this problem has been to avoid sampling these problematic voyages.

Classification of fishing activities with a hierarchical model

For obvious practical reasons, it is not possible to sample the numerous fishing activities at the most disaggregated level. The main aim of a sampling plan is, (i) to estimate parameters with a given precision and, (ii) to get the best compromise between quality and cost. This search of compromise requires to sample at a more flexible level than the basic fishing activity. As an example, the vessels targeting cod with demersal trawls during one fishing trip belong to the same family of fishing activity as vessels targeting haddock and/or whiting and/or gadoid with demersal trawl if they fish in the same area. Another level is to consider all the fishing activities where vessels operate with a demersal trawl regrouping the fishing activities targeting gadoids and those targeting any other assemblage of species than gadoids. For the purpose of biological sampling, the population to sample could be the family of fishing trips were a demersal trawl has been used in a given fishing area.

One way to build the hierarchical model is to have a top-down approach. For a given year, one vessel may have, (i) fished, (ii) been employed for the purpose of another activity than fishing and, (iii) stopped any activity. This split into three categories is referred to as the "Activity" level, or **level 1**.

Switching between gear classes reflects the opportunistic behaviour of fishermen. The exhaustive list of classes of gears available for practising a fishing activity is given on the "Classes of gears" level, or **level 2**. These classes of gears are then split into more precise categories, gears groups (**level 3**) and gears defined at the EU/Data Collection Regulation level (**level 4**). The gears catalogue and coding corresponding to level 4 should be to a large extent consistent with the international gear classification used by the EC(2004) and FAO (Anon. 1994, Le Gall, 2004).

With a specific gear (level 4), a vessel may target different species, depending on the fisher's choice regarding fishing grounds, fishing season and gear attributes. The exploitation pattern is strongly related to the gear used and the gears have many variants related to the rigging or the mesh size. To express similarities of exploitation pattern, the group has considered as a good approach to discriminate the use of a gear with the targeted (assemblage of) species at a Regional co-ordinated level (**level 5**). In the purpose of sampling for biological parameters, it is impractical to split level 4 on the basis of all possible targeted species. For the sake of simplicity, targeted species are gathered into large groups like crustaceans, molluscs, benthic, demersal and pelagic fish.

Countries are free to build more precise levels respectful of the general concept that is the search of being exhaustive and the ability to get the appropriate information for all fishing trips. For example, it can be of interest to split the catch of sole depending on specific mesh size of the trawls. In this case, we could imagine a sub stratification of the strata of vessels operating with a bottom trawl and targeting benthic fish into three sub-strata like <80 mm, 80 – 90 mm and > 90 mm.

Linkage between fleet and fishing activities

During the year, one vessel can practice several fishing activities. The economic performance of a fleet will be dependent on the diversity of activities and this diversity is described by parameters of effort and production related to the exhaustive fishing activities performed by the fleet on a Regional scale. On the other hand, the exploitation pattern is reflected through fishing activities in the

purpose of biological sampling. Biological samples taken for a fishing activity will apply identically for the relevant fleets according to specification agreed at the Regional scale. As an example, sampling for length structure of the landings may be relevant to gather for otter trawler targeting demersal fish with vessel <24 m. as well as vessels >= 24 m. If all the data collected are split in the cells of the fleet/fishing activity matrix, the full linkage between biological and economic data is achieved.

Table 1. Suggested gear- and length-based disaggregation of economic fleets in the Mediterranean Sea.

FLEET-EU/DCR level)	*Fleet (Regional level)*	*length size (m)*
Exclusive trawler	Bottom trawl	< 12 m.
		12-18m
		18-24 m
		>24 m
	Pelagic trawl	<24 m
		>24 m
	Mixed bottom and pelagic	<24 m
		>24 m
Non exclusive trawler		< 12 m.
		[12-24[m.
		>= 24m.
Seiner	Exclusive seiner	< 12 m.
		[12-24[m.
		[24-40[m.
		>= 40m.
	Non exclusive seiner	<12 m
		>12 m
Other towed gear		< 12 m.
		>= 12 m.
Exclusive netter		< 12 m.
		>12 m
Other fixed gear		< 12 m.
		12-24 m
		>24 m
Inactive		All

Table 2. Suggested classification of fishing activities in the Mediterranean.

Fishing activity (EU/DCR level)	*Fishing activity (Regional level)**
Boat Dredge [DRB]	Boat Dredge [DRB
Bottom otter trawl [OTB]	OTB Crustaceans

	OTB Demersal species
Multi Rig Bottom Trawl [OTT]	
Bottom Pair Trawl [PTB]	Bottom Pair Trawl [PTB]
Beam Trawl [TTB]	TTB Benthic and demersal species
Midwater Otter Trawl [OTM]	Midwater Otter Trawl [OTM]
Pelagic Pair Trawl [PTM]	OTM small pelagics
Hand and pole lines [LH]	LH Demersal
	LH Pelagic fish
Troll lines [LTL]	LTL Pelagic fish
Drifting Longlines [LLD]	LLD Pelagic fish
Set Longlines [LLS]	Set Longlines [LLS]
Pots [FPO]	Pots [FPO]
Tangle net	
Trammel net	
Set Gillnet	GNS Large Mesh
	GNS Medium Mesh
	GNS Small Mesh
Driftnet	GND Large Mesh
	GND Medium Mesh
	GND Small Mesh
Purse Seine [PS]	PS with purse lines
Lampara nets [LA]	PS without purse lines
Boat seine [SV]	SV Boat seines
Other fishing activities (to be specified)	SV Beach seines
	Other gears
Other activity than fishing	

* to be further discussed in the Regional meeting

References

Anonymous 1994. Bulletin of fishery statistics.. N°34. Rome, FAO. 1994. 448 pp.

EC 2004. Commission Regulation (EC) No 26/2004 of 30 December 2003 on the Community fishing fleet register.

Le Gall, J.Y. 2004. Engins, techniques et méthodes des pêches maritimes. Editions TEC & DOC ed. 2004. 367p.