PROJECT Nº 94/067: DESIGN OF A SYSTEM FOR THE COLLECTION AND
COMPILATION OF BASIC FISHERIES STATISTICS IN GREECE

KEY WORDS
Fisheries statistics, Greece, sample survey, database, fisheries management.

AUTHORS
N. Tsimenidis (Co-ordinator), G. Bazigos, K. Papakonstantinou, A. Economou, S. Kavadas, M. Walsh, B. Hall.

PARTICIPATING INSTITUTIONS
Marine Association Support (MARE A.S.), Greece.

OBJECTIVES
In order to accomplish the objectives of a sound fisheries management program a good
deal of current reliable multiple survey data are required on fleets, landings, fishing
effort, fishery costs and earnings and other related survey data.

The official Greek fisheries statistical system, the National Statistical Service of Greece
(NSSG), had failed to produce the required current reliable multiple fisheries survey
data. It was confined to the collection of monthly catch data by species and fishing area
(of which there are three). The existing catch databases of the three fisheries sectors of the
system have been developed independently making it difficult to match and compare the
available data sets. The quality profile of the catch statistics produced ranged from poor to
simple guesses.

Furthermore, the procedure employed in gathering the catch survey data is based on the
bulky, expensive and unreliable - due to the high non-response rates and the various
types of systematic errors - census method. An evaluation study\(^1\) of the Greek fisheries
statistical system revealed the inadequacy of the system and its many deficiencies and
limitations to provide the needed data in making decisions for the utilisation of the fishery
resources and planning of the fishing industry. The management and conservation
actions are threatened to fail if not based on appropriate reliable data on fleets and
employment, fishing effort, and fishery costs and earnings, in addition to sound biological
information on the exploited populations.

Urgent demands and requirements of the conservation policy, both at national and EU levels, of
integrated multiple reliable fisheries survey data, necessitates a shift from the present system to a
multi-year program in which integrated fisheries statistical sample surveys are conducted
continuously or at regular intervals.

The objective of this study was to design such a program.

APPROACH AND METHODOLOGY
The important sampling and other design issues that arise in planning a multi-year program of
integrated sample surveys were investigated and an efficient computerised multi-purpose Master
Sample (MS) was designed.

\(^1\) Project TR/MED92/021 (March 1993): Integrated Fisheries Information System for the Mediterranean:
Design of a Scientific and Technical Observatory in Greece.
The following four types of integrated large-scale sample surveys will be linked to the designed computerised MS:

- Catch and Effort Sample Survey (CESS).
- Fishery Costs and Earnings Sample Survey (FCESS).
- Other Fisheries Socio-economic Statistical Sample Surveys (OFSSS).
- Biological Sample Surveys at Landing Places (BSSLP).

The integration aspects of the above proposed sample surveys to be linked to MS include, integration of their conceptual aspects and coding systems, integration of sampling designs, integration of measurement designs and field operations, integration of processing procedures and creation of an Integrated Database (ID) for multiple fisheries survey data.

The designed multi-purpose MS is a system based on a stratified area sample of fishing ports and coastal municipalities, communes and localities of the country, called Survey Area Units (SAUs). From this MS, sub-samples of Survey Units (SUs) will be drawn for the variety of required sample surveys (CESS, FCESS, OFSSS, and BSSLP). This in turn means that the various types of integrated large-scale sample surveys will be conducted by using the same sample SAUs of the MS, and that the samples of SUs of the individual sample surveys are selected in the field following the listing of the SUs within the sample SAUs.

The advantages of the proposed fisheries statistical program based on a multi-purpose MS are obvious. It will minimise cost, time and other logistics in multiple fisheries survey data collection and will provide comparable and consistent data sets due to the use of the same sample SAUs by the various types of integrated large-scale sample surveys. It will make the Enumerator’s job easier and more systematic, ensuring high quality multiple fisheries data is attained which anticipate more uniform and reliable results of the required integrated sample surveys.

At the design process of MS, every attempt was made to select an efficient stratified area sample of SAUs to be linked to MS by taking into account the existing statistical systems. The main steps involved were:

1. Analysis of the spatial distribution of marine fishing fleet
2. Integration of the existing geographic coding systems and creation of a computerised integrated Geographic Coding System of Greece, IGCSG.
3. By using GIS (Geographic Information System) technologies, preparation of computerised complete and accurate Enumeration Maps, providing the location, direction and distance of all the existing SAUs, the coding system of the Enumeration Maps is matched with the coding system of IGCSG.
4. By using as general source of data the results of Fishery Census - 88 and other related information, preparation of a computerised Area Sampling Frame Of Population Of Fishing Vessels, ASFFV, providing quantitative information on the size (number, GRT, hp (kW), length) and composition (types of marine fishing vessels) of the population of survey marine fishing vessels at SAU level. The coding system of ASFFV is matched with the ones of IGCSG and Enumeration Maps.

The selected stratified master area sample of SAUs, will fit the needs for the selection of efficient sub-samples of the required integrated large-scale sample surveys covering the
various topics of interest. The proposed individual sample surveys may be conducted and analysed either separately or in combination.

The important Catch and Effort Sample Survey (CESS) is the first integrated large-scale sample survey linked to MS. The other integrated large-scale sample Surveys (FCESS, OFSSS, and BSSLP) will be linked to MS after the execution of CESS. It aims to provide reliable detailed current monthly estimates, both at national and regional levels, on the amount of fishing effort generated on the survey stocks and by fishing area and the quantities of fish species removed by the operation of marine fishing vessels. Data on discards will also be collected.

An Integrated Database (ID) for multiple fisheries survey data was also designed. It will provide the raw data of the sample surveys, and the calculated sample estimates and their level of precision expressed in terms of sampling errors and relative sampling errors. In the ID will also be included, the estimated Indicators of various orders providing information on the performance of the primary phase of fishing industry over time.

The designed multi-purpose MS and CESS linked to it, should be considered as the first major development in the planning of integrated fisheries statistical programs in Greece for multiple fisheries data gathering.

With regard to area sampling, the construction of a computerised ASFFV and supporting computerised Enumeration Maps, with measures of size and stratification factors has proved a worthwhile statistical investment for designing integrated large-scale sample surveys. The use of ‘sampling in space and time’ for cost minimisation in large-scale sample surveys is also advantageous.

The designed ID for multiple fisheries survey data will provide the means for integrated presentation of survey data and sample estimates on a variety of topics, their simultaneous manipulation and analysis and the establishment of consistent and comparable time series.

**MAIN FINDINGS AND CONCLUSIONS**

The designed Master Sample of low-cost integrated sample surveys, provides the basis for the gradual approach in the development of the proposed multi-year integrated program and the establishment of the required supporting Integrated Database for multiple fisheries survey data.

The final proposals of the project were:

- **First proposal**, on the development of master samples of the individual surveys is to start modestly and expand the samples with time.

- **Second proposal**, is the urgent implementation of the designed integrated Catch and Effort Sample Survey (CESS) in order to provide the needed current complete, detailed and reliable basic fisheries statistics and the establishment of supporting database (ID-CESS). It will gradually replace the existing catch census surveys and catch statistics.

- **Third proposal**, is a thorough analysis of the results of the first 12 rounds (i.e. 12 months) of CESS. In the analysis, emphasis should be given, among other things, in using the results of CESS for quantitatively assessing the quality profile of the existing catch statistics and de-biasing available time series.

- **Fourth proposal**, is the implementation of the proposed Fishery Costs and Earnings Sample Survey (FCESS), soon after the completion of 12 months of operation of the CESS and the
establishment of the supporting database (ID-FCESS). The FCESS will run concurrently with CESS for a period of 12 consecutive months.

- Fifth, after the completion of FCESS the system will further be expanded to cover gradually the other proposed integrated sample surveys.

Finally, the designed multi-year integrated program, which is based on an integrated and co-ordinated system (MS), does not allow the design and execution of independent fisheries statistical sample surveys. In the future, the survey system of any kind of required fisheries statistical survey must be integrated with the total survey design of the designed MS.