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AN ADAPTIVE APPROACH FOR THE IMPROVEMENT OF FISHERY STATISTICAL SYSTEMS IN MEDITERRANEAN COUNTRIES

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AN ADAPTIVE APPROACH FOR THE IMPROVEMENT OF FISHERY STATISTICAL SYSTEMS IN MEDITERRANEAN COUNTRIES

by

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PREPARATION OF THIS DOCUMENT

For many years, the General Fisheries Commission for the Mediterranean (GFCM) has been trying to build up a regional conscience to orchestrate a data collection and information dissemination activity. The absence of its own budget and the limited human resources available at the secretariat level confined the GFCM to being only a forum, although a highly qualified one, with very limited follow-up. Nowadays, with the establishment of the "new" GFCM with its own budget and organization the issue has been revitalized, several initiatives are under way with several national and inter-institutional applications having been developed and agreements reached on many topics.

In general, as the MedStat Statistical System is being implemented through the FAO Mediterranean projects and the GFCM, it will help countries develop their national fishery statistical systems, thus enabling them to better manage the sustainable development of their fisheries. In parallel, it will create an internationally compatible system, which will serve as a vital tool for international bodies to monitor the state of fisheries resources and the well-being of the whole ecosystem in the Mediterranean with the additional help of other resources management tools.

This document describes the whole process of the implementation of MedStat, which is a sequence of activities and tasks (consisting of a set of databases and associated statistical data collection and implementation methodologies and procedures primarily covering the fishing vessel census, the catch and effort survey, and other surveys targeting monitoring and management issues) to be carried out within a given programme of work and has been produced to inform the scientific community of the Mediterranean of this initiative and eventually benefit from it.

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ABSTRACT

The establishment of fishery statistics and information systems in many countries of the General Fishery Commission for the Mediterranean (GFCM) continues to be considered a high priority activity, and the need to monitor fishing activities and provide fishery management at all levels with accurate, reliable and timely data which can interact with stock assessment and economic and socio-economic studies for decision-making is constantly increasing.

In accordance with FAO and the GFCM mandate, the objective of MedStat is to contribute to the sustainable and responsible fisheries management of fishery resources and fish production in the Mediterranean Sea through the implementation of a long-lasting statistical and information programme which will provide a sound basis for decision-making.

The whole national statistical system developed within this activity consists of a set of databases and associated statistical data collection and implementation methodologies and procedures that primarily cover the fishing vessel census, catch and effort surveys, and other surveys targeting monitoring and management issues.

Strengthening the capability of the fisheries institutions of the Mediterranean countries in marine fishery statistics and information systems, with a view to meeting the relevant national needs and requirements for participation in, and complementing in its entirety, the Mediterranean Fishery Statistics and Information System, is also considered a priority issue of MedStat.

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1. Outline of the problem

One of the major problems in most, but not only, southern Mediterranean countries is the insufficient control over the size, structure and organization of the fishing vessel register and fishing operation pattern, especially with regard to the artisanal (small scale) component whose importance does not need to be emphasized. This, in turn, prevents national fishery administrations from understanding the fishery sector as a whole and, consequently, from monitoring and controlling it as appropriate in space and over time.

However, despite common needs and similar statistical problems, most of these countries already have a long-established statistical system with its own administrative structure, trained staff and fixed formal requirements. Restructuring such a system requires a customized approach that takes all these factors into account, i.e. comprehensive, demand-oriented and institution-centred, targeted assistance.

Over the years, most fishery administrations have either taken the initiative of introducing day-to-day measures or rely on newly-developed or “off-the-shelf “ systems, but have not undertaken a severe scrutiny beforehand to study and evaluate the main reasons for their situation. Inadequacy was found both at the headquarters (generally the fishery general directorates) and at the "periphery" where the data are actually collected. In most cases, action was taken piecemeal and achievements were not consolidated or protected from external factors. Benefits, if any, were enjoyed only by the immediate users and there was no institutional return. This was found to be mainly due to limited financial resources and lack of some specialized skills, and also because the design had not envisaged absorbing the statistical system into the administration as a consolidated task.

Of particular relevance to statistics nowadays is the incorporation of the precautionary approach contained in the UN Agreement on straddling fish stocks and highly migratory fish stocks and the FAO Code of Conduct for Responsible Fisheries which should lead to greater incentives to collect reliable fishery data.

A direct consequence of all the above is the need for a robust statistical system based on proven methodology, a powerful processing system and analytical tools, and an efficient network of statistical enumerators and institutional support through appropriate legislation and normative backstopping.

It is doubtful that this problem was given due importance in the past. However, now, we are noticing a big change: administrations are very concerned about the status of their statistical systems and it now seems plausible to hope for a planned scheme.

2. Introducing the MedStat statistical system

MedStat is a working system conceived for the establishment, improvement or consolidation of a comprehensive national statistical and information system, targeting the Mediterranean fishery. It is being implemented within the technical support of FAO to regional bodies and member countries in the field of monitoring of fishery resources. MedStat consists of a set of databases and associated statistical data collection and implementation methodologies, techniques, and procedures, including training and technical support covering the fleet census, the catch and effort survey, and other surveys targeting monitoring and management issues. It has modular and made-to-measure implementation to enable each country to progress according to its priorities and resources.

The backbone of the system is made up of the following domains:

- National management and monitoring system with I/O interfacing protocols
- Regional/national/local reference and codification system
- Fishing vessel register
- Catch and effort survey of industrial fishery based on the logbook approach

- Catch and effort survey of artisanal fishery based on the sample approach
- Web application ready to be part of an internet portal (national or regional)

All MedStat modules are fully interrelated, and are governed by the management and monitoring system, which ensures coherence and supervises all incoming/outgoing communications between the system and the external world.

MedStat has been built around a series of considerations and experience not only of a scientific nature. Considerations on national working habits and the organizational structure within a national fishery department, as well as its assigned mandate, have strongly influenced the design of the MedStat system. The regional context within which the recipient countries operate, the General Fishery Commission for the Mediterranean (GFCM), has also strongly influenced its design. Being, by definition, an "adaptive approach" each case was considered as unique with its own needs, requirements, resources allocated, working environment, peculiarities, etc.

MedStat was initially conceived, developed and applied in the implementation of fishery statistical programmes of the member countries of the three subregional projects (COPEMED, ADRIAMED and MedSudMed), and is now the basic operational instrument of the MedFisis regional project. It has been developed, among other things, to help the MedFisis project to fill the gap in the area of statistical data collection and processing for those eastern Mediterranean countries (FAO-TCP/INT 2904 Project) which did not benefit from COPEMED, ADRIAMED and MedSudMed support.

3. The fishery information issue in the GFCM

The establishment of fishery information, data and statistical systems in many GFCM countries continues to be considered a high priority activity, and the need to monitor fishing and aquaculture activities and provide fishery management at all levels with accurate, reliable and timely data for decision-making is constantly increasing. Most of the current or planned activities contain elements involving an information system for a country or a region. These elements may include databases, information systems, geographic information system (GIS) applications, networking, decision support systems, expert systems, management information systems, and so on.

It is obvious that, to be effective, management should be based on reliable data and ancillary information. The problem becomes complex when, as in fishery management, there are many interrelated principal components that need to be processed and analyzed within the same context. As a consequence, the heart of the problem is the need for a tool which enables the user, i.e. fishery and aquaculture managers in the wide sense (planners, scientists, managers, public and private), to access information from different sectors, disciplines, etc., and in different formats corresponding to different levels of expertise and application.

What is really lacking nowadays in this area is a regional central database system capable of incorporating what has been done and promote development of new applications, establish data and information standards, and build institution + user + data + information networks. The users should find an environment where an overall interfacing protocol and a front-end integrated information system are fused to enable transfer of detailed and formatted information from the bottom to a flexible decision support system according to requirements.

The following appear to be the most evident deficiencies related to regional and national responsibilities:

- No centralized harmonization and control of multidisciplinary data collection systems.
- No centralized coordination and follow-up of data processing and information systems
- Lack of or insufficient data handling resources
- Low level of staff expertise in information technology, data collection and computing techniques

- Inadequate fishery administration infrastructures to support long-term and self-sustained fishery information systems.

The GFCM has been promoting data collection and dissemination in the region for many years but without adequate human and finances resources it was limited to being only a highly qualified forum. However, with the recently established financial and organizational independence of the GFCM, this issue is being given graet attention and various applications have already been developed in the region and other initiatives are in the pipeline.

4. The database: building block of information systems and decision support systems

The database is a vital part of management information systems and the approach and technology applied for managing data is crucial. Databases are instruments to supply processed data to management information systems in a structured and normalized way to support analysts, planners, and managers in the decision-making process. It is therefore the building block of information systems (IS) and decision support systems (DSS).

Decision support systems are an extension of information systems where a progressive and interactive logic has been introduced to guide the users to reach a goal (partial or final decision) stepwise. They are especially useful where problem solving is enhanced by an interactive dialogue between the system and the user. Elementary, simple models that can easily be understood and interpreted rather than complex, integrated models, should be given preference. Different models and strategies may be used to support each of the phases of decision-making: intelligence, design, choice, testing. For testing and simulation phases, emphasis should be given to flexible access to internal and external databases that are coherent and proven to be free of macroscopic errors.

Therefore, when planning a database it is important to know the context in which the application will be used, and always plan a sort of super database "data warehousing" with corporate functions to manage the results and the interactions with other "brother" systems. This corporate database plays a basic role also as a control support system with built-in facilities to generate regular and *ad hoc* reports, and aids to forecasting and for monitoring and connecting systems.

How information is organized within the database influences the efficiency of the different functions. With the correct architecture, data validity can be greatly improved through an integrated design to eliminate redundancy and inconsistency. MedStat has been developed in modules, each with predefined characteristics and the ability to be part of a wider "Control and monitoring support system" to serve the administrations in most of their normative, statistical and informative functions.

5. MedStat programme

The whole national statistical system developed within this activity consists of a set of databases and associated statistical data collection and implementation methodologies and procedures primarily covering the fishing vessel census, the catch and effort survey, and other surveys targeting monitoring and management issues. It has a modular implementation to enable each country to progress according to its priorities and resources and, at the same time, ensure that each step is achieved and consolidated before a new step is initiated, thus avoiding jeopardizing the work already achieved.

5.1 The objective

The ultimate aim of this initiative is to assist the projects' target countries to establish, improve or consolidate, as soon as possible, a self-sustaining statistical and information system covering the principal production and associated economic components of their fisheries. This approach also makes it fundamental to disseminate information to top-level governmental officials so as to increase their awareness of needs and problems and to generate the necessary political will and action to establish and maintain the newly-established statistical system. In other words, a customized approach

that has been called the "**adaptive approach**" which should constitute the building block of a regional data management and information system aiming at support "decision" as previously introduced.

5.2 MedStat database model

The first step in designing a database is to evaluate the working environment in which the application is going to be developed. This appraisal is one of the most important steps and should not be limited to the computer processing part but should be extended to the whole "environment" and will be the tool on which to prepare the conceptual design.

The key issue is to decide, among other criteria, if a database is going to be an isolated application, a shared application, a corporate application or part of a family of databases (data warehouse system) and the level of authorization and control that the committing entity has over the whole "environment". By environment is meant the whole data processing flow, from the data collection, operation transactions, personnel mobility, language, forms, interpretation, input and output rules and criteria up to the financial aspects, and so on. Other criteria will be the amount and type of data to be managed, the response rate, the transaction rate, the access requirements, etc. By "authorization and control" by the committing entity is meant the degree of authority that this entity has over the whole environment and whether it can manage it freely.

In literature, two classical approaches are always considered and put forward: the "top-down" approach and the "bottom-up" approach. Briefly, the top-down approach is a situation where the developer conceives the system to be designed and implemented from the beginning to the end from the top, centralized decisional control. In theory, this approach seems to give a better response because all is planned according to a given project and implemented without any external interference, constraints or obstacles. Moreover, being centrally planned and implemented, it will certainly have reduced costs and quicker implementation and full functioning. Reduced costs and better performances are also expected in the management, maintenance and further improvement of the system. However, in actual fact, this is not always the case, and only a few cases can claim to have been prepared 100% top-down. The reality is that this approach is proficiently possible only when the administration has full control and "ownership" of the whole environment and can manage and take decisions without any obligations, and these situations are very limited.

On the other hand, the bottom-up approach appears to be more practical and less needing of authority (though also in this approach a certain level of authority is required). It is believed that developing one step at a time, with the consensus of the partners and users, and from a learning process, is less risky and more appropriate and acceptable. Moreover, since the application is developed in participation, many errors and wrong decisions are avoided, thus reducing cost and ensuring appreciation and support. Again, this is also a theoretical issue. If the development plan is too slow because of the participation of all parties and the constant introduction of changes and refining, with frequent major reviews, it may jeopardize the whole set-up and require a re-designing or a major update (since the original design may no longer be valid). One other major problem is in the case of non-isolated applications. The problem, sometime fatal, may occur at any time of the development process and especially when interfacing it with other systems in the same family that have (for the same reason) deviated from the original plan to better respond to other users, or new requirements that cannot be accommodated within the present vision.

For the fishery data system, which is definitely a complex system where many activities (therefore data and information) are interrelated and react within the structure, a bottom-up approach would definitely be too slow and too risky to encompass all the elements that are, step by step, brought into a common system (corporate database).

In MedStat, a mixed approach was decided on whereby the design of the whole frame followed a top-down logic and the implementation was bottom-up. In this case it was possible to develop applications in pieces, as close as possible to their natural environment, guided by national staff (the

end-users) and useful to the local administrations. The development, although adapted to the various cases, was always done within a fixed, robust framework. Moreover, in MedStat an initial country was always chosen (followed by another country with different situations) to be used as case tests to develop prototypes. The strategy was to use real life situations as pilot surveys in order to complete at the same time and, therefore, with the same resources, the development of the working prototypes and the main system.

5.3 The adaptive approach

A "customized approach" has been developed and is being implemented in some of the Mediterranean countries initially under the FAO sub-regional projects COPEMED, ADRIAMED and MedSudMed and more recently by the MedFisis project. It is flexible and adaptive because it must be made-to-measure for each situation in the countries. It addresses both the needs of:

- The national centre responsible for the statistical system (methodology, training, processing power, analytical strength, reporting)
- The periphery - the combination of field staff, their offices, tools and status (recorders, network, protocols, supervision, monitoring, mobility, etc.)
- The internal and external relationship with applied research (two-way support with national and regional scientific institutions)
- The institutional framework - how the system relates to, and is part of, a national mandate (laws, regulations, normative, staff, careers, etc.).

The most qualifying characteristic of this approach is that of tackling one major problem at a time, trying to solve it 'permanently' by intervening in all its components, incorporating in the system the normative functions normally performed by the administration vis-à-vis other institutions in the country and outside, thereby ensuring sustainability.

Its implementation requires identifying the functions required of the system and of the administration managing it and the related technical requirements (norms and standards, types of reports, periodicity, "clients", etc.), accounting for historical developments, existing capacity and tools, and identifying the major problems (data quality, timeliness, information technology).

It also requires a range of expertise that includes statistical systems design, fisheries assessment and management, fishery statistics, statistical and economic analysis; use of and training on statistical packages and data presentation, computer programming and software development, information technology and connectivity, regional legal instruments and requirements.

This initiative should be oriented firstly toward the enhancement and improvement of the existing structures, giving major emphasis to the quality of the data submitted, their affordability and their interest in the national and regional contexts.

After restructuring the statistical system, close interaction with involved national staff must be maintained to provide assistance including through remote on-line support.

The process usually includes: a computerized fishery census (and a national fishing register), automated methodology to support the management of fishing licences and related authorizations and certificates; fleet monitoring tools, routines for the production of periodic electronic or hard copy national and international reports, a catch and effort assessment survey, and a strong capacity building component.

From the human resources point of view, in the beginning, in support of this scheme, a task force within the COPEMED project was established (see para.11.2), followed by the same initiative in the ADRIAMED project (see para.11.3). In 2003, the whole activity was incorporated and formed the

backbone of the MedFisis project objectives also supported by the FAO-TCP TCP 9204 (see para.. 11.1) and Appendix 4). The task force was created through a careful and acute association of complementary expertise covering to the maximum the whole spectrum of the work to be undertaken. The task force expertise includes:

- System design and monitoring.
- Field fishery statistics.
- Advanced statistical analysis and economics
- National, regional and international harmonization, connections and normative issues.
- Training on statistical packages and data presentation.
- Computer programming/software development.
- Interaction with stock assessment and economic studies.

The team is on call to intervene, when and where necessary, to maintain close interaction among project members, and to participate in the on-line remote assistance to national staff.

An initial set of open-architecture computer applications already developed within similar projects were considered to enable a fast, stable and error-free generation of new, or derived, stand-alone applications or their incorporation into wider systems, etc. This set of tools comprises Itafish selection (about 30 databases), the inventory of the artisanal fishery community in the Mediterranean, StarFish (frame survey and catch and effort sample survey – PESTAT-originated system), and an off-the-shelf statistical package. (see Bibliography)

From the participating country perspective, full participation of national staff in these initiatives, implying firm commitments from the national authorities to provide adequate staff and guarantees to incorporate these persons into national structures, is a prerequisite of this approach.

6. The organizational strategy

The overall responsibility for this activity is with the team leader/system designer who, case by case, first carefully evaluates the situation in each of the requesting countries regarding the statistical, logistic, and resource points of view, and then draws up a detailed plan of action.

The plan of action is developed along three main lines:

6.1 Direct support to the countries/institutions

The objectives and outputs of the direct technical assistance can be summarized or anticipated in the following list of tasks that are not necessarily undertaken *in toto*, but rather according to the needs. Expertise (from the task force) will be involved, where applicable, to:

- Ascertain the accuracy, completeness, up-to-dateness and usefulness of the existing national registers for fishery, as well as their suitability for the purpose of designing national catch assessment surveys
- Design and implement a coverage frame survey for accurate *de-visu* assessment and recording of the current size, structure and localization of the fishing fleet, as well as the major land-based fishery infrastructures
- Undertake the system design and development, or revision, of a computerized fishing register of fishing vessels; this must be undertaken urgently and be completed before any of the other field work is started
- Undertake the system design and development of a computerized yearbook of the fishing industry
- Revise, if possible, the time series retrospectively by using available data and modern statistical methods

- Construct the sampling frame of fishing vessels by taking into account regional, statistical, biological and organizational criteria to be used for catch and effort assessment surveys
- Introduce a catch and effort survey that meets national and regional standards
- Undertake a critical analysis of the results
- Participate in the "on-line workgroup" to respond to ad hoc queries that will certainly arise during the field work.

6.2 National inputs

Some items/actions are considered prerequisites for implementation of the initiative. Among other things, and depending on the intervention needed, the following are mostly required:

- Assignment of the officer concerned in the statistics department as counterpart to the activity team leader for the whole duration of the activity
- Assignment of a computer programmer as counterpart to the project computer expert. If possible, he/she should be deeply involved in the analysis and development of the computerized applications for future maintenance and improvement
- Assignment of some technical staff to assist accessing all available data needed in the various offices of the national fishery department as well as in the survey area. This group should consist of at least two persons, one from the statistical unit and one from the computer unit
- Computer space and usage for the stand-alone application to be generated by the project (hardware and software to develop a database management system (DBMS) on micro-computer and peripherals)
- Mobilize national field staff to assist in the logistic and data collection aspects in order to facilitate direct interview of vessel characteristics, catch and effort data, and other infrastructure data
- Ensure continuity of the restructured system by introducing official methodology or other criteria related to vessel or fishing activity for updating
- Propose legislation and normative changes accordingly.

6.3 Outputs to the countries (results)

- A computerized fishery census, based on national methodology, national and international standards and requirements. The census, with appropriate modifications and functions, upgrading and interconnections with other institutions in the countries, normatives, etc., can function as the national fishing register
- A new computerized methodology governing applications for, and delivery of, fishing licences and authorization certificates for the applicant fishing entity, if required (individuals or vessels)
- A monitoring tool to systematically update the information on the relevant fishing-vessel characteristics and despatch the changes to other institutions involved
- A semi-computerized yearbook of the national fishing industry
- Preparation of periodic electronic or paper reports on national outputs of processed data formatted for use by national entities dealing with fisheries (e.g., ministries, co-operatives, industries, commerce) and for the regional bodies of FAO, EC, GFCM, etc.
- A catch and effort assessment survey with a methodology that conforms to national criteria and has a high degree of harmonization with the regional context and the automated production of detailed and timely catch landing estimates
- Ad hoc high-level guidance (limited to the duration of the project) through on-line internet facilities and timely visits of targeted expertise
- Formation of national staff in running and maintaining the system through the organization of systematic basic training and on-the-job training in data-collection systems, data processing and analysis, covering the whole spectrum of fishery activities

- Capacity building will be achieved by making use, as far as possible, of national experts in their respective fields of application, in their own as well as in other countries, through concerted action and also profiting from FAO's Partnership Programme and other similar initiatives.

It must be emphasised that the activities in this plan are programmed stepwise and that they are all targeted to a finite output. All countries, after this first phase, will have achieved at least one task, which could be a new census completed, a database with statistical fleet analyses, or at least a formulated plan based on a direct assessment of what should be done as soon as more resources are made available. The whole must be seen as part of a temporal process where one action systematically follows another, within the same framework, without having to always start from the beginning or disrupt what was previously achieved.

7. The working hypothesis

The following is the working approach that has been used so far in this respect.

A preliminary visit should be made by the Team leader/system designer to the country in response to the request from the authorities in charge. This first initiative is considered of paramount importance.

During this visit the programme of work will be presented, including the clear affirmation that this activity will be a joint effort between the project, FAO HQ and the national fishery department. It is essential that the approach, the tasks, and the responsibilities of all the parties involved be clearly defined. It is also advisable that where they exist, the fishery institute, the national fishery department and the national statistical office are convened together or, at least, kept fully informed on the matter. After this visit and the formal acceptance of the programme of work and its implications, the following working hypothesis can be planned.

7.1 The reconnaissance survey

A preliminary assessment is always needed, and is carried out, according to the difficulties envisaged, by one or two members of the task force. The preliminary task must, in any case, be a pure statistical validation.

One or two members of the task force (i.e., the field statistician and the statistical analyst) travel to the country concerned to undertake an in-depth analysis of the work undertaken so far, specifically to (the following should be adjusted according to the target situation, and is, in any event, a case by case decision):

- Describe the statistical environment in terms of human and non-human resources
- Summarize the statistical environment from the fishery point of view
- Validate the census of fishing villages (ports, landing places, markets, etc.)
- Validate the frame survey in terms of the :
    - Spatial coverage
    - Fishing industry breakdown
    - Vessel/gear typology
    - Format of the questionnaires used
    - Codification system (national, regional, international)
    - Contents of the questionnaires
    - Completeness of the questionnaires
    - Missing values problem
    - Data processing structure
    - Database structure
    - Database functions

- Reporting system

- Describe the administrative and statistical stratification applied
- Describe the survey system used for the catch and effort data collection through the:

  - Time/space/typology coverage
  - Format of the questionnaires used
  - Codification system (national, regional, international)
  - Contents of the questionnaires
  - Completeness of the questionnaires
  - Non-response problem
  - Data processing structure
  - Database structure
  - Database functions
  - Reporting system
  - Available documentation.

- Collate, organize and store/transfer into an electronic medium (Excel?) the collected data
- Undertake a field pilot mission to assess in real life their interview approach
- Assess and state any other relevant information that may be useful to evaluate the present status of the statistical system to enable the preparation of a strategy as close as possible to their approach and comprehensive of all the requirement that this activity envisages
- Assess the level and the requirements of the data processing and information technology present in the fishery department (or where the system is being institutionalized).

7.2 Evaluation of the assessment

The task force, as a whole, will analyse the results of the mission and a methodological programme will be designed accordingly. This is then further discussed with the project coordinator to estimate the resources needed, and the feasibility of the proposal in terms of priorities and cost-benefits.

Various scenarios could be drawn up depending on the objective analysis of the results and the availability of national resources and the project's priorities. However, since strongest emphasis is given in this approach to the active participation of national staff, the capacity building component is always given top priority. The modules listed under capacity building (Chapter 10) are the domains where technical assistance is generally directed.

7.3 Implementation of the task

Provided the appropriate staff is in place and available according to the requirements, the activity will be launched. The intervention need not necessarily be in the restricted field of fishery statistics, but could be limited to any weak part of the process. It could be, for example, only in the data processing aspect, or in the qualitative assessment of their estimates, homogenization of their results with regional/international communities, etc.

However, in general, it is possible to state that after a defined time (to be established case by case - about one to three months if the census is involved or six to twelve months if the catch and effort survey is the choice, etc.) the task force will run an evaluation exercise to appraise the work done, introduce modifications if needed and review the application.

7.4 Consolidation and hand-over to the country

After three-six months from that date, a final appraisal is expected to evaluate the system as a whole (methodology, data collection, data management, hardware, software, etc.) to introduce the final

modifications and leave the system running autonomously with the task force on call for any eventuality.

About six months later the system "package" should be ready to be handed over to the country. Each participating country will get the complete data base package consisting of:

- The whole database in running format
- The database in source code format
- System passwords and compilation protocols
- Technical software specifications
- Software user guides
- Codification and reference system
- National recorders' manual

Assistance in the normal running of the operations would be provided as necessary.

7.5 Reporting system

After the positive response to the pilot work, it was decided to introduce, whenever practical, national reporting systems in the national languages, in addition to English for the international communities (FAO-GFCM, EU, World Bank, etc.). However, it was made clear that, for technical reasons, should countries require national reporting in the national language, this could be done only with direct involvement of national counterparts or with the assistance of their own experts.

Apart from a series of working reports produced as a result of queries, tests, etc., which will be added to the database whenever needed, as starting routines the system envisages sending some official standard reports originated by the national director general to a series of recipients: a report to the office of the minister, a report to the central statistical office, a report for the public, a report for the co-operatives, etc. These reports can be either in English or in the national languages.

As far as the regional and international reports are concerned, it has already been decided that reports to the GFCM-FAO and the EC will be given priority. These reports will be in English only.

The MedStat system will also produce digital outputs to interact with other connected fishery systems and to report to the GFCM/SAC and other neighbouring systems.

In Appendix 2, a selection of sample forms and reports used by a MedStat national system is presented. It should however be remembered that reporting is a dynamic issue and that the reports can be modified at any time.

8. MedStat - the database system for the Mediterranean

The MedStat system, among other things, aims at supporting central fisheries administrations in the Mediterranean countries in their normative functions. It has been built applying a mix of top-down/bottom-up approaches, and prepared based on a detailed conceptual design and the experience gained in this field over the years.

The overall framework, the components, the relationships between elementary database applications and their basic data models, as well as the functional specifications to be performed by the system, were established beforehand. The structural positions of each database in the overall design and their input/output parameters, computer languages and options as well as constraints were also set at the beginning, as were the computing system requirements and the working platforms.

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

In MedStat the functional integration has been the most important plan at design level. Rather than separate hardware, software, and communications for each of the database components, these components are integrated into one facility. At functional level, the different software support functions for processing data and generating results are provided as a single system. For instance, producing a document and editing or completing it with word processing, storing the results on different media, and accessing external data banks can all be accomplished within MedStat.

8.1 Development environment

In developing MedStat, great attention was given to the development tools and the software used. The prospect of a recipient country hosting and continuing the implementation and further development of the software after a possible disengagement of FAO projects was also considered. Also, the project capabilities and its resources had to be taken into account. By merging these two main factors, the following development platforms were realistically chosen:

Operating system: Windows 2000/XP
Development environments:
Visual Studio 2003.net (Framework 1.1 - Programming Language: C# 2003 and MS Visual Basic .NET)
Add-ons to Visual Studio: DataDynamics Active Reports and Dundas Charts
Microsoft SQL Server - SQL programming language or Access 2002 as database engine.

Specifically, all prototypes were developed in Visual Basic with the powerful MS Access engine, which is a real relational database management system (RDBMS).

The Access XP engine provides the user with maximum data security and data consistency, through regular checks at data entry level and a powerful automatic data debugging routine. All user interfaces are designed to provide maximum user friendliness and minimum false data entry. The system makes extensive use of linkage facilities with other well known MS-Office applications such as Word, Excel, Outlook. This solution was found more versatile and suitable in all countries.

Once the whole development was completed and accepted by the parties concerned, in some cases where a country showed the ability to maintain advanced systems, the same software was redeveloped in one of the two other platforms accordingly. An attempt was also made to develop, in parallel, the prototype and the real application in Oracle (in 2003 in Croatia), but at that time this was not found practical. In general, the expectation is to have the whole system in Visual Studio.net on Access platform and, in some countries and in the GFCM HQ (rules permitting) in MS-SQL as RDBMS.

8.2 MedStat database development

Once the main skeleton of a database system is defined, it is possible to develop various databases depending on the capability and possibilities of a country, and implement them at different levels of priority and speed.

For the record, the elementary databases foreseen in the initial part of MedStat and proposed to all participating countries within COPEMED, ADRIAMED, MedSudMed and MedFisis are:

- The register of fishing vessels, no matter the size or the type
- The catch and effort survey of industrial fishery based on the logbook approach
- The catch and effort survey of artisanal fishery based on the sample approach

For clarity, the elementary database application, regardless of whether it concerns the fishing vessel register, the catch and effort survey (sample approach or logbook approach) or any other application developed within this project, is a nationally customized version of the MedStat-DB Basic.

The MedStat-DB Basic (one complete database per application) is a complex collection of programs, routines, forms, tables, and other elements, all developed around the conceptual design assumed as the starting data structure model. This application, its philosophy and initial settings have been taken from one of the Itafish domains, whereas the statistical approach and mathematical manipulations are fundamentally derived from PesStat (see reference) and its subsequent development in Windows StarFish (see reference).

The MedStat-DB Basic is constantly kept updated and progresses according to new applications and experiences. When starting, or adapting any implementation to, a new national environment "family member", this process always starts from the MedStat-DB basic system. Whatever modifications or adaptations are made or new domains or functions are introduced, attention is given such that, in any situation, the data integrity, certain outputs, the attributes, relations, etc., are guaranteed to maintain coherence and consistency among the national systems. Having parameterized the routines of the base system, national systems are "easily" developed or updated. This concerns the software, its components, as well as the national language interface and national reports. Supporting statistical and operational documentation is also developed "made to measure" for each of the applications.

The national system developed within this activity consists of a set of databases and associated statistical data collection and implementation methodologies covering the census, the catch and effort survey, and other surveys. It has a modular implementation to enable each country to progress according to its priorities and resources and, at the same time, ensure that each step is achieved and consolidated before a new step is initiated, thus avoiding jeopardizing the work already achieved.

In general, each database application is the collection of the following components:

- The live database
- The historical database
- The codification and reference database
- Transaction files and tables
- The documentation
- The data definition
- The input documents (forms and questionnaires)
- The standard national reporting system
- The standard regional reporting system
- The connections and links protocols
- The hierarchical set-up (authorities and functions).

8.3 Physical location of the MedStat modules

The physical location of the MedStat modules in general reflects the normal functions and responsibilities of the involved national staff. As a rule, the management and monitoring system should be physically located in the office of the statistical team leader (also data manager). The fishing vessel register and the associated licences monitoring and management module should be located in the immediate office of the director general with restricted use by authorized people.

The catch assessment survey by logbook approach, normally not in a local area network (LAN), could be in the office of a fishery officer responsible for collecting, validating, inputting and processing monthly logbooks.

The catch and effort assessment survey (small-scale fishery by sampling approach), normally implemented through LAN, should be accessible by statistical recorders in their area, ports or landing sites (primary sampling unit) of competence and compiled at the supervisor level.

The MedStat regional reference system is the responsibility of the regional MedStat team, and the national counterparts can update and report national references.

The best configuration would be to have all the modules in a Data warehousing LAN in the fishery department that also contains a file transfer protocol (FTP) site with authorized external access through internet.

9. MedStat components overview

The system is designed and implemented using the most advanced technology in user interfacing and data base implementation. As a general rule, the user interface is designed to be as close as possible to real life operations and reproduce, to the maximum, the input documents. Generally speaking, the system provides the user with the following facilities:

- Easy and assisted data entry and modification options
- Guided safety storing and chronological history and data exchange between all MedStat components
- Fast search and filtering facilities for data elaboration, which simplify data management
- Generation of several special reports and graphical presentations of fleet statistics
- Synchronization and coherence of the data items between the national system, the monitoring system, catch and effort data and the MedStat Public (regional interface)
- Documentation, forms and questionnaires, reference manuals, etc., all available on line

Since MedStat is based on adaptive principles, it is always applied according to sustainability and resource allocation by the countries. As a matter of fact, two standard packages have been considered: MedStat full system and, MedStat basic system.

The difference lies in the functionalities of the system, the range of applications possible, available financial and skilled human resources to be dedicated to the system, and the overall research programme in the country. In other words, each country may or may not implement the whole MedStat system, but use only one database (i.e., vessel register database) as a stand-alone application. Also, as said in a previous section, the country has the choice of having the software developed in Visual Basic .NET/C# on ACCESS or MS-SQL.

MedStat is built around seven main components whose basic structure and main functions were set at design level.

The following are the seven main modules composing MedStat:

- The national management and monitoring system
- The regional/national/local reference and codification system
- The fishing vessel register
- The catch and effort survey of industrial fishery based on the logbook approach
- The catch and effort survey of artisanal fishery based on the sample approach
- The regional (GFCM) database and monitoring system
- The MedStat database supporting the web portal as part of the GFCM information system

Each module represents simultaneously, a working profile, a working process, a database, an application, a tool and other functions. Each module is the matching point between the functions and the statistical design on which the system is built.

All modules are strongly interrelated, are governed by the management and monitoring system, and checking and validation routines are performed whenever data are transferred from one system to another. In Figure 9.0 a general view is given of the national MedStat setup.

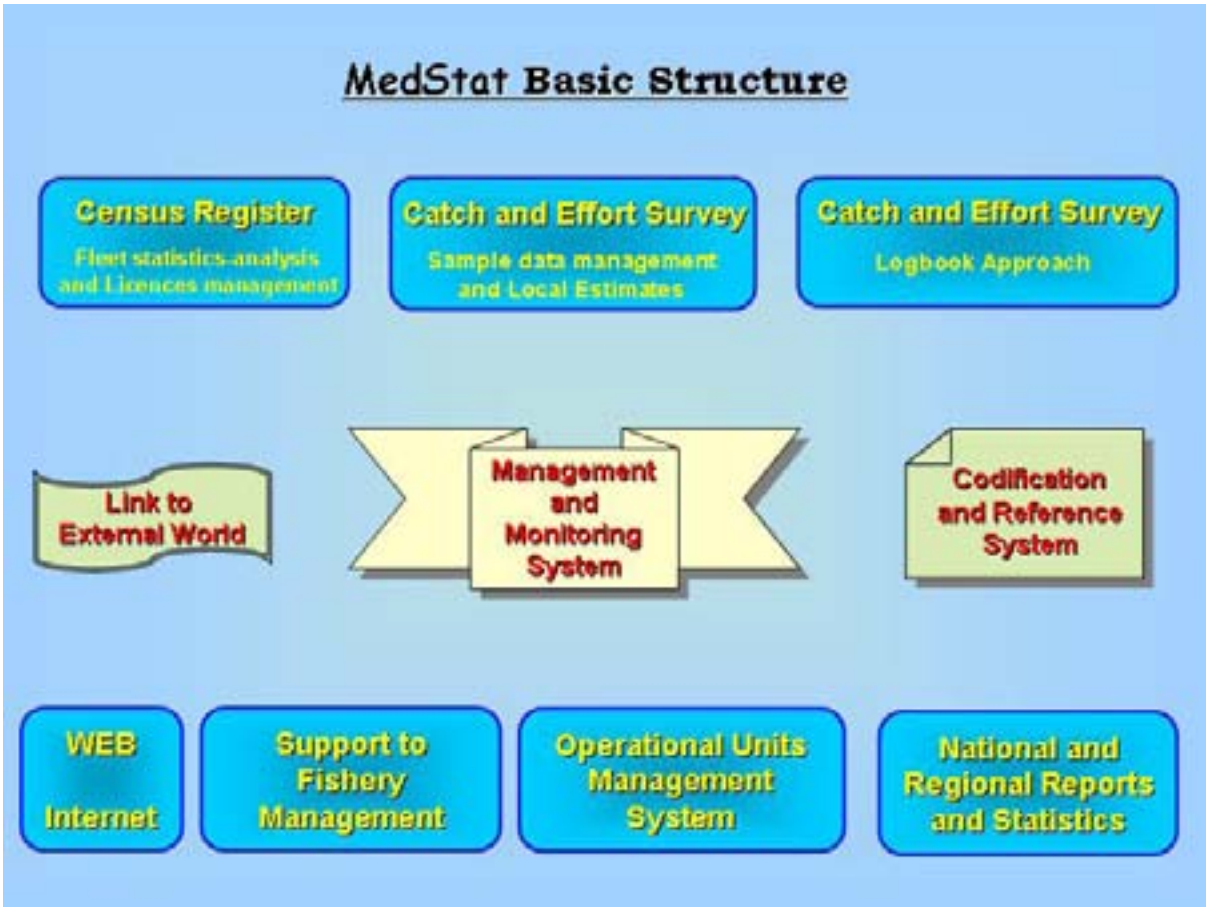

Figure 9.0 – General overview of a national MedStat setup.

9.1 The national MedStat management and monitoring system

At the national level, the management and monitoring system (MedStat M&MS) supervises all the functions that a "virtual" office of the director general of fishery is supposed to undertake. At the same time, it is the only one authorized to disseminate finite statistics, upload data to a higher system, modify codification and references (within the network), and able to aggregate and monitor the work and the results produced in the great part of the national fishery data collection system.

Having been defined "adaptive" in its development, it was crucial to create a structure where all the results from the various applications to be developed, and eventually linked, would find a domicile. It

was equally fundamental to know and decide, right from the beginning, all the communications procedures and the level of control needed to interface all the elementary data sets. The rationale of a centralized data management system and the associated functions obviously had to be established before developing elementary databases. In other words, all the planned applications had to take into consideration the structure that would have to be transferred to the central system as well as the level of accuracy and consistency, error control, etc. During the development, the interactions with the external world were progressively incorporated by defining new structures and updating the data communications protocols

The national management and monitoring database and the regional/national/local reference and codification system were the two building blocks on which MedStat was constructed.

The MedStat management and monitoring system can be nourished from two source types, depending on whether the sender system is MedStat (or MedStat family), or others. This latter case is applied when the country/institution has its own ongoing database that it intends to keep and interface with new activities.

Non MedStat-originated data sets are captured in this database whenever required, and re-organized according to its own internal structure. The "automatic data debugging system", an internal routine, checks and monitors coherence and consistency of the incoming and outgoing data as well as their integrity.

While the options and functions of elementary database applications are, to an extent, closed and not easily expandable, the MedStat M&M system is open (to qualified users) and subject to continuous development according to the needs. This module, by definition, does not have "data entry and modification" options.

In Figure 9.1 the main menu of the MedStat management and monitoring system prepared for the system in Albania is presented.

9.1.1 *The principal components of the management and monitoring system*

The MedStat management and monitoring system is made up of the following components:

- System management (internal management options)

- Vessel register: This module has the same functionalities as the vessel register database except for the data entry and modification functions. In addition it contains specific functions and tools to enable:
  - Importing regularly the latest release of the vessel register database, managed elsewhere
  - Producing analyses and reports (national and regional)
  - Officially despatching data sets electronically or on paper
  - Undertaking a comparative analysis between years and characteristics
  - Invoking the assisted search routine
  - Exploiting an advanced query system that enables the user to select, group and process any field content of the database.

- Catch and effort survey: Uploads regularly the latest assessment of the catch and effort surveys for industrial and artisanal fisheries, managed elsewhere. This module also:

  - Produces analyses, reports (national and regional)
  - Despatches data sets electronically or on paper
  - Performs comparative analyses and time series analyses

- Exploits an advanced query system that enables the preparation of datasets to be exported in Excel for further processing with a statistical package
- Using census data, defines the sampling frame for the catch assessment survey in selected areas
- Calculates the best sample size and generates the sampling scheme to be applied in the field
- Defines the listing frame for the CAS for industrial fishery (logbooks).

- Analysis: Imports results from ancillary systems (operational units, MedSudMed-Fishery and Ecosystem Information System "FEIS", socio-economic data, etc.) and processes them in isolation or with data sets extracted from statistical surveys in MedStat. It has facilities to collate data and output them for external complex analysis. This is the most variable module in this system which may require *ad hoc* updates.

- Sectoral analysis: In this module, the user establishes the extraction rules to generate data sets from the various databases that the M&MS controls. He/she also sets the format, the structure and the contents of the extractions. The produced outputs (at present limited to data sets generated from the vessel database or catch and effort surveys) will be used in the analysis module or in the data communication module where these datasets are associated with communication protocols and despatched to receivers.

- Data communication module: This module deals totally with data exchange and information dissemination. It "knows" all the distribution and communication protocols with partner institutions and foreign systems and supervises all the traffic. Such a process has been automated to ensure coherence in the system and guarantee formatted and certified data exchange between different environments. Some examples are the following:

  - Submission of annual statistics to FAO
  - Submission of data to the EC (the "snapshot")
  - Submission of data to the GFCM
  - Dataset to support socio-economic indicators database
  - Dataset to support the operational unit database
  - Dataset to support MedSudMed "FEIS" information system

- References: The management of the national reference system and interaction between the national office and the MedStat centre are all performed in assisted mode through this application.

- Documentation and library: contains all documents, user guides, PowerPoint presentations, forms, questionnaires, reporting samples, etc., that concern MedStat.

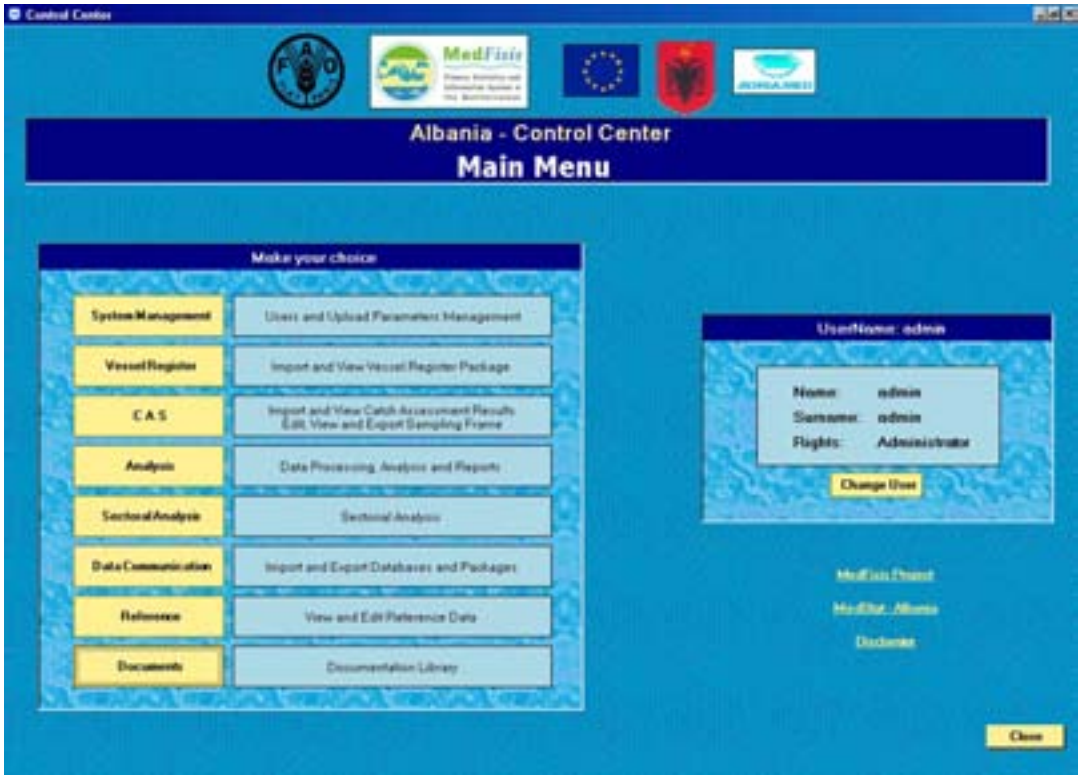

Figure 9.1 - Main menu of the MedStat management and monitoring system (Albania)

9.2 Regional/national/local reference and codification system

This was the first databank to be conceived, developed as a prototype and finally completed in full. In developing a system of databases (data warehouse), this application can be considered the most important for the coherence and consistency of the whole system. It is the repository of all the relevant codification applied by participating countries, FAO and other regional and international entities interacting with MedStat, as well as of the data dictionary, its definition and characteristics. It also contains the reference in national languages and a standard (English) in all the terms used in the system (thesaurus). This database and its functions is one of the items developed with a "top-down approach".

In order to centrally manage the regional/national codification and reference system such stand-alone database has been developed. It is divided into several "tables", one for each of the classified "items of information" (e.g., gear, species, vessel type, operational status, etc.). The data structure of this database comprises three substructures: one for the regional/national relationship, one dealing with inventory and sample data (recorder name and code, fishing activity codes, vessel characteristics, etc.), and a third covering national infrastructures only (ports, landing places, fishing zones, etc.). It responds to national and regional (international) requirements.

In the MedStat databases, when managing data on a country level, the national breakdown is applied, (different for each country, it follows the national codification and national breakdown all in the same database), whereas when international aggregation is needed, then that specific one is used (data is re-aggregated and compiled accordingly). As it stands, the system starts with the FAO-GFCM system whenever applicable.

With respect to the national codification already in use in the country, this work does not aim at imposing a new codification, but rather at facilitating the interfacing of national with regional and global terminology through a comprehensive data dictionary established and agreed to by the participants. Global references can only be modified by the MedStat system administrator; national

references are proposed by national data administrators, evaluated and, if accepted by MedStat, aligned with the existing parts and re-issued as a reviewed national codification database. Local references incorporate dynamic codes or internal codes that the system designer or the software developer have used as required by the system.

This database, which manages the whole codification and reference system of MedStat and associated applications, is mainly used when a new country (or a new software application related to MedStat) is associated to MedStat. The system requests all the information and specifications needed and generates a national codification and reference database inclusive of manuals and user guides which will be part of the national MedStat.

In Figures 9.2a and 9.2b the main menu of the codification and reference system is given. The application and its use are fully described in an appropriate document (see reference).

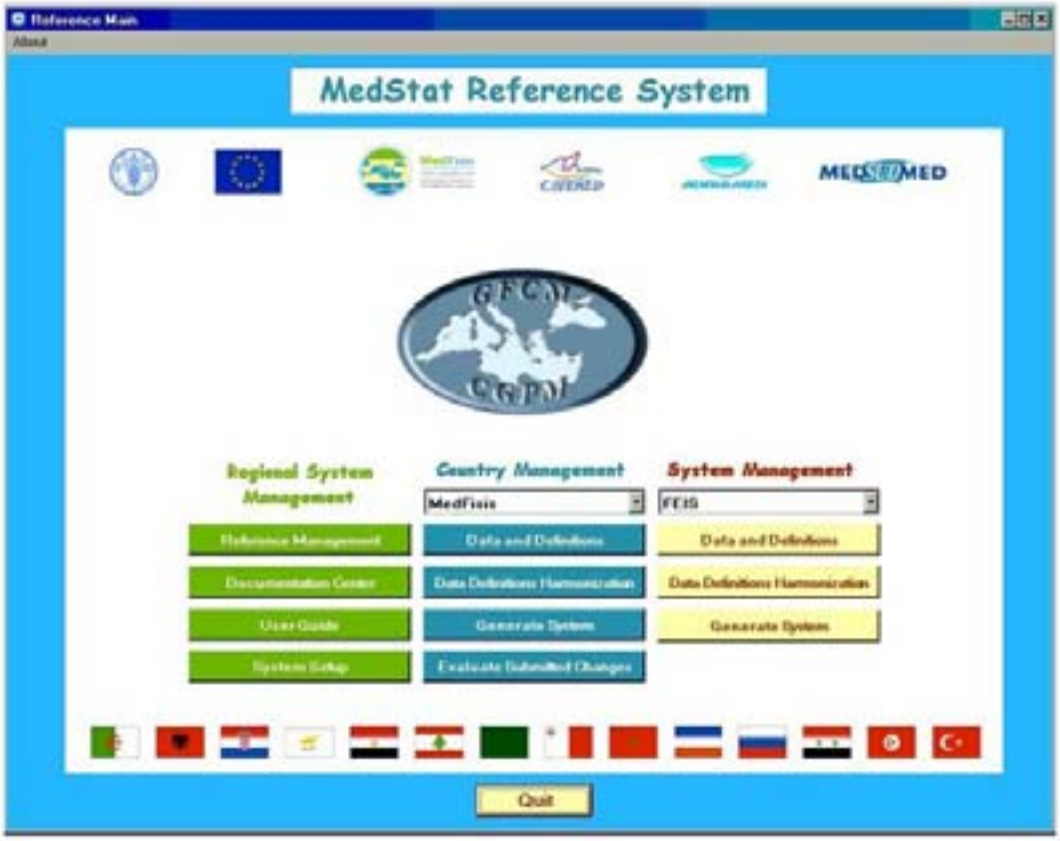

Figure 9.2a Main menu of the codification and reference system management

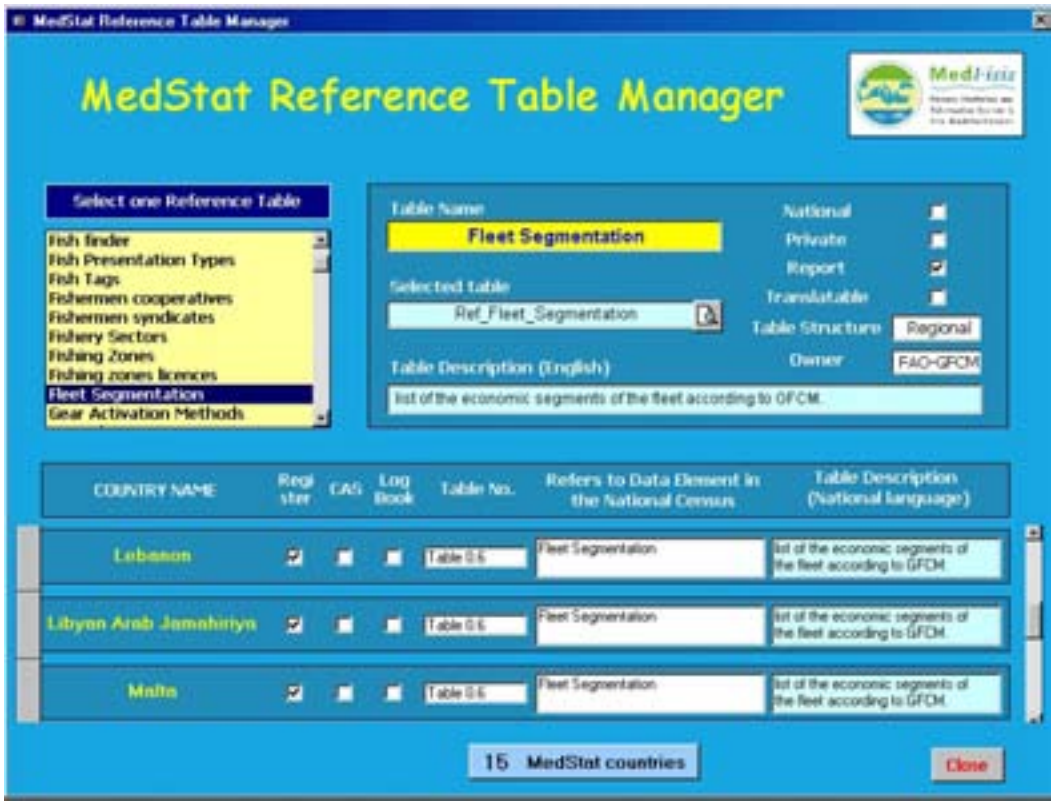

Figure 9.2b MedStat codification and references generation menu

9.3 MedStat - fishing vessel database

The census of fishing vessels and the related development of this application is considered a prerequisite to implement MedStat. The fishing vessel database handles three sets of data:

Compulsory data elements,
Common data elements, and
Complementary data elements

When a new country is associated to MedStat, the system assumes as default a MedStat common dataset. Each country, at this point, can add any other data element that it considers important, strategic or simply complementary for its own use. Some data elements within the common data set are compulsory. In other words, the system does not accept records with missing compulsory data elements. From a practical point of view, the common data elements (fields) are those most commonly and easily found and needed in the Mediterranean and are those which enable a good descriptive analysis of the fishing fleet and its operation. The compulsory data set, instead, is made up of those data elements which constitute the minimum requirements at regional level and the minimum set of variables necessary for the catch and assessment survey and for the determination of the operational unit issue. For the record, MedStat is managing a set of about 180 unique data elements over all the applications, out of which 110 are common to all countries (which does not necessarily mean that they are all collected and available) and 24 are compulsory and therefore available for certain.

Fishing Vessel Database		
Ref. No.	**Item**	**Description**
1	Registration number	The registration number assigned to the fishing vessel.
2	Registration office	Office where the vessel has been registered
3	Flag	Registration country of the vessel
4	Registration date	Registration date (dd/mm/yyyy)
5	Vessel name	Vessel name
6	Vessel type	Type of the vessel
7	Operational status	Operational status of the vessel
8	Home port	Name of the docking port
9	Fishing authorization type	Type of fishing authorization
10	Authorization document	The id number of the fishing authorization document
11	Issuing office	The office issuing the document
12	Protocol number	Registration number in the fisheries department
13	Main gear	Main gear used by the boat as registered
14	Length overall (m.)	Longitudinal dimension of the hull of the vessel. The length of the fishing vessel measured from the bow to the stern
15	GT or GRT	The gross tonnage of the vessel as registered
16	Decked	Indicates if the vessel is decked or not (Y/N)
17	Inboard/outboard	The engine position (inboard/outboard)
18	Power (kW/HP)	The engine's power either in HP or kW.
19	Method of activating the fishing gear	The method used to activate the fishing gear
20	Gear for fishing operation	The main gear which was used during the fishing operation
21	Fishing month start	The month in which the described fishing operation started
22	Fishing month end	The month in which the described fishery operation ended
23	Fishing zone	Fishing zone
24	Targeted stock/species	The target stock

Table 9.3.0 MedStat- List of compulsary data elements in the fishing vessel database

In Table 9.3.0 above, the list of compulsory data elements managed by MedFisis so far is presented for reference.

Comprehensive instructions on the installation and use of the MedStat vessel register database program are provided in the database user's guide.

The following details are presented as a broad overview of the package. The MedStat fishing vessel database is made up of the following components:

- Vessel register database. This database contains all the information regarding the vessels grouped in 13 groups of data:

    1. Vessel characteristics
    2. Fishing operations
    3. Structural characteristics
    4. Engines
    5. Electronic equipment
    6. Deck machinery
    7. Ownership

8. Crew
9. Operating ports
10. Fishing operations
11. Preservation/processing equipment
12. Other equipment
13. Safety equipment

- Chronology database**.** This is another very important part of the system which enables the user to consult the list of all the field updates and the date of the amendment. It comprises two blocks: fleet history changes and licence history changes (where applicable).

- National and regional reference system database**.** The user is able to consult the national or regional code assigned to the country, ports, fishing gears, communications apparatus, etc.

- Licence archive database. In this database are recorded all the licenses issued to the vessels. It is worth noting that this component is available only in MaltaStat.

- Documentation and help on line**.** This database includes all the documentation references. An important section of this database is the 'help on line' which provides support on how to use the system correctly.

- Reports Generation**.** By exploiting the functionality for generation of outputs, the system contains a series of pre-structured reports designed according to specific requests. The recipient institutions are thus able to specify formats for official reports, statistical reports and custom reports. All the reports can be printed or previewed in MS Word.

    - **Official reports**. This option is divided into two blocks: international and national (see Fig. 9.3.3). In the first block are collected all the report forms for international use, for FAO-UN, EC, etc. In the second, all the official report forms defined for the users' country are collected if required.

    - **Statistical reports.** From this form it is possible to output a series of all the statistical reports present in the system in order to have a statistical description of the fleet.

    - **Custom reports**. This is a useful tool with which the user is able to compose reports where the information is organized using chosen criteria. On the default form all the information is selected and all records are considered. The user may select or deselect the type of information required for the custom report by using the check boxes.

- Forms and questionnaires. The system also provides users with the possibility to print manuals and questionnaires for the data collection in the field at any time:

    - The census questionnaire,
    - The data instructions summary table,
    - The codification system, and
    - The statistical recorders' book.

From the data management point of view, the MedStat fishing vessel database is constructed around the following data processing options:

- File management. This block includes all the operations related to data file management**:**

    - Open archive
    - Store archive

- Export to control and monitoring system

- Data management. This section includes all the operations related to the data collection, and consists of three main blocks named:

  - Insert
  - Modify
  - Data debugging (missing values, code and quality errors, out of range, contradictory data). Manual validation by the users of certain data is possible

- Data browsing and query. This section includes all the operations related to data browsing and query and consists of four main blocks. Results from the browsing and search can be output according to the same functions as in report generation.

  - Select
  - Browse
  - Search
  - Selective Scan. The selective scan is a powerful and useful utility to extract data items and characteristics according to any given selection. Any field (data item) in the database can be a query field, i.e., any field can be used as a search item.

Figures 9.3.1 through 9.3.5 show some screenshots of MedStat implementation in Malta (MaltaStat).

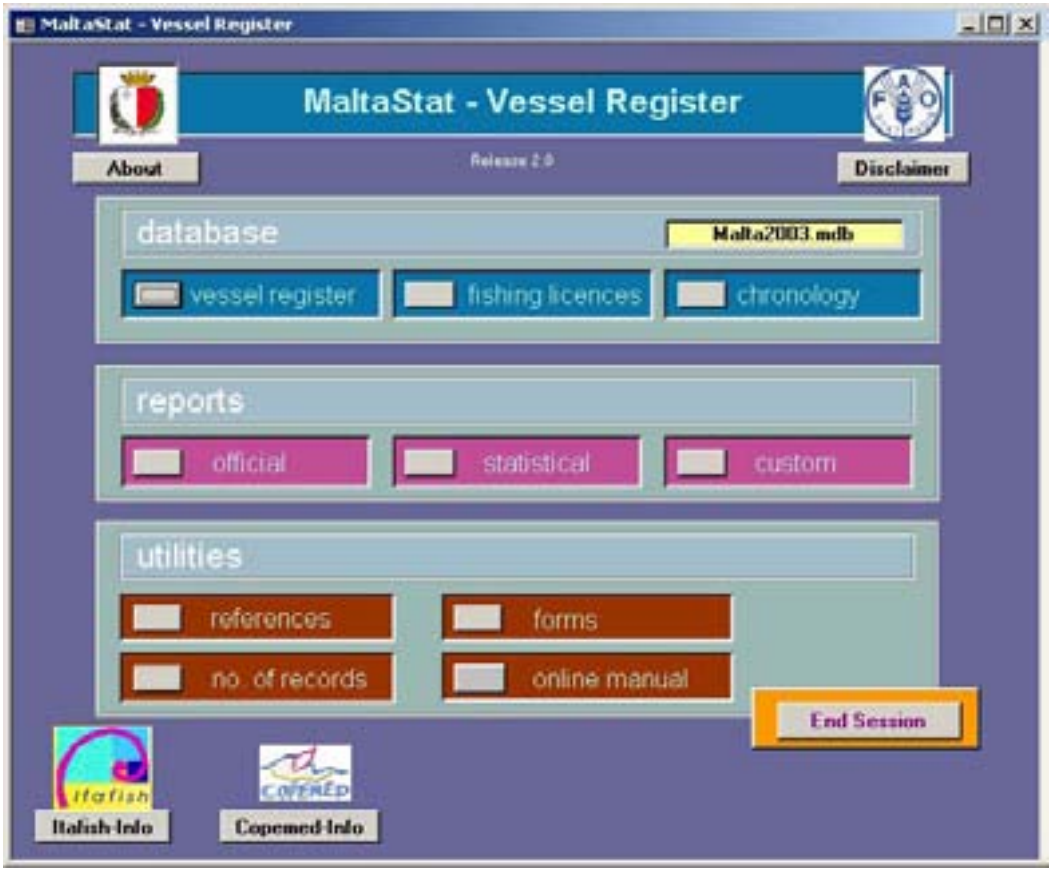

Figure 9.3.1 MaltaStat vessel register main menu

Figure 9.3.2 - MaltaStat vessel register: vessel register management menu

Figure 9.3.3 - MaltaStat- vessel database official reports available

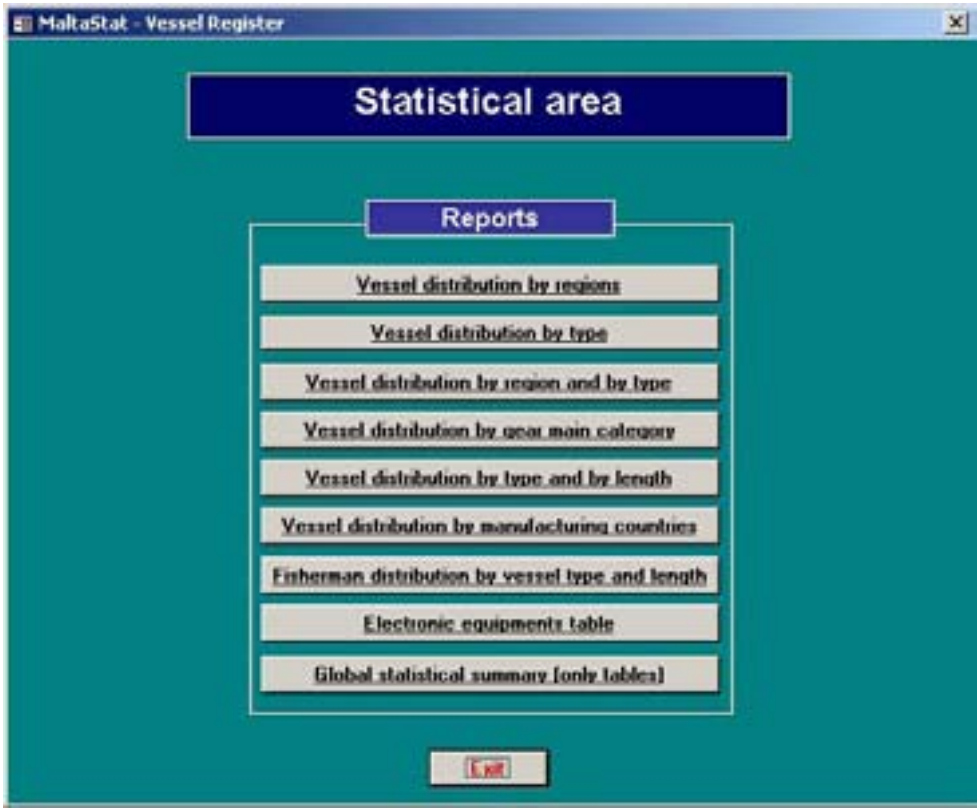

Figure 9.3.4 - MaltaStat- vessel database statistical reports available

Figure 9.3.5 -MaltaStat- vessel database customs reports available

9.4 Catch and effort survey

The catch and effort survey was designed and implemented to provide monthly catch and effort estimates by fleet typology, by gear used, by species caught and by statistical region (stratum) for the marine fisheries. The survey results should also provide qualitative indicators such as sampling errors of the estimates and/or the coefficient of variation of the mean.

It is expected that this activity, as a whole, be implemented over 12-18 months and be divided into three phases; design and pilot operation, full implementation, and consolidation (review of the old system). From the MedStat perspective, these phases are characterized by a different level of technical support: timely and frequent during the first part, monitoring and *ad hoc* intervention during the second. At the end of this exercise, an analysis and critical analysis of the whole system must be undertaken. If satisfactory, the old system (if any) could be discontinued and all the resources focussed on the new system. Consolidation of the system by assigning permanent functions to the staff will be one of the primary actions.

9.4.1 *The survey system*

In the initial phase the approach to be used country by country, and situation by situation, must be determined. MedStat takes as default the classic catch and effort survey based on a) landing interviews, or b) reported logbooks, integrated by a series of *ad hoc* sample surveys at the market place, whose results would be used as control characteristics of the estimates, and to evaluate the values of the landings, and, if this is the case, c) a catch assessment survey based on the market approach. In this case, also, *ad hoc* quality check sample surveys (QCSS) were considered to estimate regression models between the landings and the quantities actually marketed and effort data. (Reference to is made to the CAS undertaken in Malta, Albania and Morocco).

Regardless of the approach chosen, this survey is expected to provide reliable estimates of the fish catch landed and the effort exerted by the fishing industry, by sector (coastal, offshore) and by fishery.

Catch and effort estimates should be produced on a monthly basis, by area, by vessel/gear used and by species. The catch and effort sample survey should also contribute, if possible, to defining the mobility pattern of the fishing units and the pressure they exert on the fishing grounds. For reference the MedStat survey methodology is an updated revision of PeStat (see bibliography).

In MedStat, the following two main approaches are <u>generically</u> proposed and, whenever applicable, implemented in participating countries:

- Catch and effort survey – census based, with logbooks
- Catch and effort sample survey – based on direct interviews at landing places

<u>Catch and effort survey - census approach</u>.

In general, the census approach is applied to vessels longer than 12 metres which represent the commercial (or industrial) fishery. *In this survey tuna and great migratory species are not considered.*

The census approach is accomplished through the use of monthly logbooks systematically provided to fishermen and filled in by them. (For reference one logbook is a collection of several log sheets containing data related to a single fishing operation). An updated list may be available each month through the MedStat management and monitoring system. In addition to the forms, a minimum of instructions and *ad hoc* assistance must also be provided to the fishermen.

On a given day of the month fishermen are requested to submit the questionnaires duly completed in all their parts. It is strongly advisable to check the questionnaires at the moment of receipt, preferably

in the presence of the fishermen. This will greatly improve the quality and the contents and, at the same time, is a good training exercise for the fishermen that will definitely improve the reporting.

Once collected, the logbook data should be input into the system as soon as possible after receipt. Prompt data entry helps to recuperate missing values or reconstruct wrong data sets. Allowing too much time to pass may result in a lot of data being rejected when checking the data entry, because of wrong compilation or missing dynamic data. Also, the question of logbooks being filled in by third persons unfamiliar with statistics and normally with no enthusiasm must be addressed. Reporting problems, misunderstanding handwriting, and wrong coding are only some of the most common problems encountered in the case of "Posted" questionnaires (statistically, this approach is associated with mailed questionnaire management).

Every month all fishing vessels of that category must be reviewed (updated); if they have fished during the month, the catch and effort must be recorded; if they have not fished, then the reason must be recorded. If the logbook was not submitted or was empty, this must also be recorded.

In the near future, the MedStat group will also test (in Malta) some automatic data capture techniques that should definitely improve the heavy data entry work necessary for this.

MedStatCas Form 1.2 can be produced showing the dynamic situation concerning the activity status of the commercial fishing fleet by month and by port.

MedStatCas Form 1.3 is used to assess, month after month, the data collection process and the level of completeness of the survey. It will also generate the associated "automatic data debugging report".

MedStatCas DataBase will produce summary data sets for this fishery segment (commercial fishery) to be "sent" to and processed by the central system (management and monitoring system), jointly with those from other surveys, to estimate monthly catch and effort statistics and other basic statistical parameters The supervisor must certify the monthly reports before results are transferred to the management and monitoring system.

In Appendix 2, the logbook used for the CAS in Albania is given (showing their specificity).

Catch and effort survey - sampling approach.

The sampling approach is generally applied to vessels shorter than 12 metres which represent the small-scale (or artisanal) fishery.

It is based on the sampling of a certain number of ports or landing places according to the sampling design. Sample ports (primary sampling units - PSU's) are selected through the PPS (probability proportional to size) approach. The size of the sample of fishing units (secondary sampling units - SSU), i.e., the number of boats to be interviewed each sample day, is directly proportional to the number of landings per day in that port. The representative number of boats to be selected (interviewed) per day is provided to the recorders.

9.4.2 How it operates

At the beginning of each month the office team produces the sampling frame (list) for the sample ports and supplies it to the recorder team which visits the PSU port and updates the sampling frame.

Specifically, they must enquire about any changes that occurred to a vessel in that port:

- Change of gear
- Changes to structural characteristics

- Temporary modification (engine repair, boat out of order, etc.). See codification.
- Permanent modification (abandoned, change of activity, etc.). See codification.
- Any vessel that had permanently migrated from/to another port (in/out fishing units)
- Any new vessel found in the PSU port, using it temporarily as a base port (seasonal fishing)

and recalculate the number of active vessels in the reference month in a given port.

At the central office, all these modifications are input into the system and a new updated sampling frame for a given month is issued per sample port. In the presence of permanent modifications to a fishing vessel or to a PSU port the supervisor will react accordingly.

For example, if a fishing unit has changed activity permanently and has became a tourist boat, or other, and is no longer involved in fishing, its name must be dropped from the active fishing vessel register. Obviously, that boat will no longer appear in any other reports or in future MedStatCas Forms 2.1.

Equally, if a fishing unit classified as a new entry (a fishing unit found, fishing and landing, in the port as base port and not belonging earlier to that port) is already in the register (MedStat Database) such unit will be temporarily included in the sampling frame that month and not in the future list (every month this list must be updated unless a major change occurs).

Should a new fishing unit be reported (newly constructed, imported or other), and not be registered in the fishing vessel register (therefore not censuses), the supervisor must ensure that proper action is taken to have the new fishing vessel registered accordingly

During the reference month the recorder team will visit all the PSU ports according to instructions received from the supervisor. The team must be present for a certain number of days according to instructions received.

First of all, the number and gear type of fishing vessel that fished on that day (landings in the 24 hours) must be recorded on the appropriate form and, at the end of the month, all activity data sheets must be submitted complete in all parts.

Each selected boat will be interviewed and all data must be reported on an appropriate form. Once one PSU port is completed the recording team can move to another port. At the end of each month the whole set of forms must be handed to the office team for checking and data entry. The supervisor will ensure consistency between the survey units, completeness of the questionnaires, and control the contents.

The data entry can be performed either by the recorders themselves or be concentrated at the office. The way this issue is contemplated is a matter of internal organization and strategy. Both cases have pros and cons and should be solved case by case. In any case, it is of paramount importance that reporting forms are processed immediately after submission and not be left for later. The catch and effort survey is classified as a dynamic survey, in space and in time. If a problem occurs (misunderstanding, cheating, poor reporting activity, wrong samples, etc.) it may be possible to promptly correct it. If time has passed, we may not be able to reconcile the data and may lose the work done, and in many cases also jeopardize the work of other teams.

At the end of every month, once all data are entered the supervisor will firstly analyze the preliminary report automatically produced by the system which summarizes the statistical activity carried out during that month in the various PSU ports. As far as the automatic data debugging routine is concerned, it should be run after every data entry (e.g., one port) performed.

The supervisor must certify the monthly reports before results are transferred to the MedStat management and monitoring system to be processed jointly with those from other surveys, to estimate monthly catch and effort statistics and other basic statistical parameters.

Catch and Effort Data Model	
Logbook Approach	**Sampling Approach**
Log book data	**Basic data**
Recorder	Recorder
Operational port	Stratum
Reference month	Interview site name (PSU)
Reference year	Type of PSU
Recording date	Reference month
Vessel name	Year
Matriculation	
Vessel type	**Frame data (once a month)**
Vessel type code	*Total fishing units from the previous month*
Registered main gear	*Number of vessels permanently modified*
Activity	*Number of vessels temporarily modified*
Activity code [active/non-active]	*New entries (temporary immigrates from other port)*
Reasons for non activity [temporary/permanent]	*New entries(permanent immigrates or new entries in fishery)*
Number of trips in the month (log sheets)	*Number of active vessels in the reference month (calculated)*
Supervisor check	*Number of fishing days in the month*
Log sheet data	**Sample day by day data**
Number of fishing trips (sequential)	*Boat sampled no.*
Departure date	*Interview day and time*
Departure time	*Vessel name and code*
Return port	*Vessel type*
Return date	*Number of full-time fishermen*
Return time	*Number of part-time fishermen*
Landing port	*Number of trips in the day*
Fishing zone	*Fishing area (description and code)*
Stock resource	*Time spent in fishing (hrs)*
Gear used	*Species caught*
Gear size/dimension	*Number of boxes*
Species caught (code and kg/boxes)	*Box weight (kg)*
Estimated total discards	*Number of animals*
Number of fishing operations	*Average weight of animals (kg)*
Time spent in fishing (hrs)	*Total weight (kg)*
Ancillary data	*Fishing gear used*
Master name	*Number of units*
Master address	*Size, length (m) or number*
Agent name	
Agent address	*Number of boats landed in the day*
	Number of boats sampled in the day
Number of professional fishermen	
Number of part-time fishermen	
Gasoline consumption (litre)	

Table 9.4 Data elements collected through the MedStat catch and effort surveys

9.4.3 *Survey estimates*

Several “internal reports” are produced by MedStat, mainly for analytical and checking purposes. A series of “public” reports are also generated among which the following are the most representative:

- Month / Stratum
- Total catch estimate (kg)
    - Estimated standard error
    - Estimated relative standard error
- Percentage distribution of the catch on a country basis
- Total effort estimate
    - Estimated standard error
    - Estimated relative standard error
- Percentage distribution of the effort on a country basis

Catch estimates by stratum in the reference month for a selected gear class

- Month
- Species catch estimate (kg)
    - Estimated standard error
    - Estimated relative standard error
- Effort estimates
    - Estimated standard error
    - Estimated relative standard error

Catch estimates by stratum in the reference month by species for a selected gear class

- Month
- Total catch estimate (kg)
    - Estimated relative standard error
- Total effort estimate
    - Estimated relative standard error

Monthly capture and effort estimate by species and by gear class used

Monthly capture and effort estimate by gear class used and by species

The System also reports a summary of monthly vessel activity in each stratum compared to the sampling activity (as recorders activity). This is an internal report used for quality control purposes by the administration.

Monthly summary of sample activity by stratum and by gear class

For each gear class, in the reference month, it has reports:

- Primary sampling unit name (port name)
- Sampled days;
- Number of interviews;
- Number of landings;
- Daily capture by boat (kg)
- Daily effort by boat
- Fishing days in the month;
- Number of active vessels in the port;
- Number of vessels in the port;
- Number of vessels in the stratum;

9.5 The GFCM regional level

At the conceptual design level, a third component was also considered a precondition: the regional database system at the GFCM level. However, because of an unclear data dissemination agreement and consensus, as well as the limited authorization of the MedStat team on national data, this component will be developed at the end and, very likely is going to be a “hub” networking all national management and monitoring systems in the GFCM.

9.6 The MedStat database supporting the Web portal

The MedStat-Public is a database, in MS Access ®, regularly produced to be used by the ministry or other institutions to be made accessible to the ”public” in a web to be browsed or accessed. Among other applications, it is foreseen that **MedStat-Web** automatically updates the web page of the national fishery directorate. The above subset contains only non-confidential or unreserved data and is generated from the main system (see above) for other users in the department, in other ministerial offices and for the web in general.

10. National capacity building component

As mentioned earlier, training and direct support is of paramount importance to achieve the Project's aims. One of the most important, and definitely the most strategic one, components of technical assistance in constructing national statistical systems, is the national capacity building segment. It seems therefore justified that a section of this paper is dedicated to this issue.

Successfully implementing this component, in all its parts, will not only guarantee the good conduct of the statistical programme and the production of satisfactory results, but will also strengthen the system’s sustainability in the long run.

Too often national capacity building has been interpreted as, or translated into, a training course on theories not directly or immediately related to an application, as a training course limited to the application under implementation, or to a software to be applied, without taking into account the

"surroundings" (the context) in which that national programme is going to be innested and, hopefully, be continued.

If possible, when providing technical assistance all the items considered should be introduced and discussed. It will be the team leader's responsibility to understand and tailor the national capacity building programme adequately.

A series of targeted training sessions are organized for interested countries. The training courses are be of two types:

- Systematic, and
- *Ad hoc* on-the-job training.

Systematic training sessions should be given on the Statistical Package. In all the interested fishery institutions, the Project organises a one-week training course on the use of a statistical package for processing and analyzing fishery data. This activity is needed to better prepare national scientists to synthesize analyses and reports dealing with fishery statistics (census, catch and effort estimates, etc.) which seem to be generally lacking in the area. The course would focus on the theoretical and practical use of the statistical package, using national data, and would also produce "on the spot" some outputs that may be urgently needed by the institutions. The course would be attended by the staff of an institution in a member country and perhaps also of some associated units. However, for the benefit of the trainees and to maximise the investment, the number of trainees should not exceed ten persons.

Also systematic training courses should be organised on database and database management system. Training sessions on Access ™, Visual studio or SQL database use are envisaged in this context. This activity is intended firstly for national computer programmers and, as a continuation of that programme, may be extended to other staff involved (depending on the number of participants) where the MedStat-DB system will be used an example. This second level would mainly focus on data management including statistical survey data, data exchange with the statistical package, GIS packages, analytical tools, etc.

Finally, advanced training courses on fishery statistics and customizing/programming the statistical package should also be foreseen. These courses would mainly focus on the analyses and critical analyses of the results, on de-biasing procedures to improve the estimates, on optimizing sample size, data quality control, etc. They can be grouped into modules.

In Appendix 3, the basic contents of some modules are listed. They are classified as basic because, also in this case, the capacity building component must be made to measure to each case.

11. The implementation process and MedStat sustainability

The Sub-Committe for Statistics and Information Systems (SCSIS) of the Scientific Advisory Committee of the GFCM is the aknowledged authority for the statistical and information issue of the Commission. In its annual meeting held in Madrid on April 2000, it recommended the following:
"....that past failures to develop a standardised fisheries statistics system should be put aside and that the GFCM, its Sub-Committee on Statistics and Information and regional projects such as COPEMED and ADRIAMED should continue to work towards developing standardised fisheries statistics outputs based on predetermined minimum-level requirements. Each country should be free to develop its own tailor-made system, provided that they are based on these common requirements and outputs..."

At the fifth session of the Scientific Advisory Committee (SAC) of the GFCM held in Rome in July 2002, applications developed within the COPEMED and ADRIAMED areas were presented by the SCSIS Sub-Committee and endorsed for implementation in the GFCM. At that moment all applications were standardized and generalized and closed into a complete package "MedStat"

comprehensive of a national/regional reference and dictionary system, data bases, manuals and documentation, PowerPoint presentation, posters, etc., to be applied in all the other Mediterranean countries according to needs.

Since an “adaptive approach” has been adopted, by definition each case needs to be treated according to its own situation, planned targets, resources available, etc. In general, as MedStat is being implemented through the FAO Mediterranean Projects and the GFCM, it will help countries develop their national fishery statistics systems, enabling them to better manage the sustainable development of their fisheries. In parallel, it will create an internationally compatible system, which will serve as a vital tool for international bodies to monitor the state of fisheries resources and the well-being of the whole ecosystem in the Mediterranean with the additional help of other resource management tools.

The following are the expected tangible outputs:

- Establishment of the national fishing fleet register "census data" for industrial and small-scale fisheries
- Setting up a national catch and effort survey system for industrial and small-scale fisheries
- Setting up a central national control and monitoring system for fishery data
- Training and capacity building.

Once a new country requests to participate in this exercise, the first task to be undertaken is the assessment and review of the national statistical system. This task would normally produce a report, jointly written with the national staff, where the objective situation, the prospect of improving the national statistical system and the estimated cost must be clearly described. As a second step, a new “country” is added to the corporate regional reference system.

All survey items are described and translated into the national language, as also table captions and any other sentences or phrases that will be used by the statistical system in the database, user instructions or in reports. National codes and references will also be translated and regional codes assigned. This task is the prerequisite to start any further work and is performed entirely through a database assisted process.

Based on the assessment made and the preliminary work completed, the team designs and produces the census form (in English and in the national language), a methodological and instruction note, and captures the national reference system from the regional database.

Once this task has been completed, the fishing vessel register database is developed and a training course is conducted for all national staff involved in the census activity. On conclusion of the training course, a joint pilot survey is run to make all necessary amendments, if any, and the field operation kit is now completed.

Using the means and tools provided, an inventory of all fishing units in the country is undertaken. Census data are input into the database and processed accordingly. Among other functions, the register will produce the sampling frame dataset of fishing units. The sampling frame is defined as a subset of the census containing only data useful to design and implement catch assessment surveys.

11.1 FAO-MedFisis Project

The GFCM, at its twenty-sixth session (Ischia, September 2001), endorsed a project proposal to develop a Mediterranean fishery statistics and information system (MedFiSis) as presented by the SCSI, and emphasized the importance and urgency of setting-up an integrated statistical system. The three-year project MedFiSis, jointly financed by FAO, the other FAO sub-regional projects in the Mediterranean and the European Union, was mainly created to facilitate implementation of MedStat in the region and to guarantee its sustainability. Such a regional system was recognized to be

necessary to complement other fisheries management means and serve as the basic vital tool for international bodies to monitor the state of the Mediterranean fisheries and the well-being of the whole ecosystem in the basin. For the system to be of effective regional use, all countries around the Mediterranean should have a national system that collects, processes, stores and disseminates an agreed common set of data; i.e., with the same data standards and definitions (unit of measurement, frequency, classification, terminology, etc.).

Moreover, the standardized methodology of MedStat is already being introduced in countries in the western Mediterranean and on the Adriatic Sea, through the activities of two donor-supported FAO projects (COPEMED and ADRIAMED).

The MedFisis project is expected to create a Mediterranean Fishery Statistics and Information System, which will contribute to the sound management of living marine resources of the large marine ecosystem of the Mediterranean. It will be based on national fishery statistics systems, which will be enhanced and standardized within the MedStat framework in such a way as to meet obligations associated with the countries' respective governments, as well as those of international organizations and fishery bodies. This regional system will be further refined to function in a way to ensure that the information necessary for tracking sustainability indicators and establishing reference points is collected in a reliable and timely manner. As the key regional fishery body, the GFCM will be the principal user of the system in its role of monitoring the sustainable development and management of fisheries in the Mediterranean.

11.1.1 *Description of the work*

It is expected that the project will undertake a multi-disciplinary evaluation of already existing databases and statistics and information systems in the region, national statistical requirements, European Union regulations (e.g., 1543/2000) and requirements of international fishery bodies.

The project, in its implementation foresees: providing specific assistance to non-EU countries to develop their fishery statistics systems accordingly on request, whilst ensuring regional compatibility, a minimum level of data quality and coverage and the sustainability of the proposed system; assessing the national fishery register systems for reliability and efficiency, and redesigning or improving as necessary, so as to ensure their utility for catch and effort assessment surveys, and for other internal needs such as controlling and issuing fishing licenses. Also, analyzing national time series data using modern statistical methods and, where needed, designing an appropriate sampling strategy, implemented and supported to obtain reliable and timely catch, effort and biological data is planned. In view of the different political regions in the Mediterranean and the different technical capacity within each country, the proposed project will intervene at different levels in each case. It is envisaged that national and regional experts will take an active part in the project, whilst other nationals will be trained in basic statistics, data collection systems and data processing and analysis.

11.2 FAO-COPEMED Project in support of MedStat

The COPEMED Project was established in 1996 for the advice, technical support and establishment of cooperative networks to facilitate coordination and support fisheries management in the Mediterranean (western and central Mediterranean in its initial stage). Algeria, France, Italy, Libya, Malta, Morocco, Tunisia, and Spain accepted to take part in the project.

The main objective of the project was to assist participating countries in establishing a coordinated scheme for generating scientific criteria and recommendations that permit application of the most adequate strategy for the optimum management of the resources.

The COPEMED Project provided direct support to the administrations of member countries on the rehabilitation and improvement of fishery monitoring systems and, in particular, on the systematic

collection, processing and analysis of fishing fleet data, catch/effort data, infrastructures, licences, and other associated statistics.

The activity was based on the priorities indicated in the project document as well as on specific governmental requests that emerged at various committee meetings which re-emphasized the need to strengthen national fisheries departments' capabilities in the area of fisheries monitoring, management and development planning.

The ultimate aim of this initiative was to assist southern Mediterranean countries of COPEMED to establish, improve or consolidate, a self-sustaining statistical and information system covering the principal production and associated economic components of the fisheries.

Algeria, Libya, Malta, Morocco and Tunisia are included within this framework.

11.3 FAO-ADRIAMED Project in support of MedStat

The ADRIAMED Project (Scientific Cooperation to Support Responsible Fisheries in the Adriatic Sea) started in 1999 and is still ongoing. It is executed by the Food and Agriculture Organization of the United Nations (FAO) and funded by the Italian Ministry of Agriculture and Forestry Policies (MiPAF). The Adriatic countries participating in the project are Albania, Croatia, Italy, Slovenia and, more recently, Montenegro. In the ADRIAMED project, it has been sanctioned in the project document, and accepted by the member countries, that the basic support necessary for devising managerial options related to the management of the Adriatic fisheries involves a common pool of knowledge and instruments for monitoring the various components and issues being connected, integrated and standardized. The development of such a system has been identified as the first priority toward defining possible ways and approaches for assisting, at the Adriatic basin level, a smooth process of international collaboration between the coastal countries in fishery management planning and implementation.

Through the project, inter-governmental collaboration on fisheries management is facilitated by the establishment of a sub-regional computer-based communications network and fisheries-monitoring system, by helping coordinate their fishery research programmes, by the drafting of fisheries-management strategies, plans and measures, as well as by up-grading the skills of national staff in all of these disciplines, through in-service participation in courses, joint working groups, symposia, and/or through study visits and fellowships.

Such support materialized through the organization of the “fishery statistical units” in Albania, Croatia and Slovenia at the respective fishery directorates. These units aim at standardizing systems of fishery statistical data collection (in a broad sense), facilitating its diffusion and training local personnel.

As part of the ADRIAMED-MedStat programme, the census of fishing vessels was completed in Albania, Montenegro and Slovenia and was re-assessed in Croatia. In this activity is included all the work needed to establish a fishing vessel register, its maintenance and management. Activities concerning the catch and effort surveys are also ongoing.

Albania, Croatia, Montenegro and Slovenia have been assisted within this framework.

11.4 TCP INT/2904 (FAO Technical Cooperation Programme)

The countries of the eastern Mediterranean (Cyprus, Egypt, Lebanon, Syria and Turkey), which did not benefit from the assistance provided by COPEMED and ADRIAMED, participated in the TCP-project “Enabling participation in the fishery statistics and information system in the Mediterranean” (TCP/INT/2904) in order to be in a position to upgrade their national systems and enable their

affiliation in the regional network. The implementation of the project was done in accordance with FAO rules and regulations and financial procedures and according to the approved project documents.

As a main result, the national marine fisheries statistics systems will be able to meet both the national and regional statistical requirements, which would enable the Eastern Mediterranean countries' participation in the MedFiSis regional project. This would enhance the common monitoring of the Mediterranean fisheries resources and the decision-making process for the management and preservation of the Mediterranean marine ecosystem

During the short project life (18 months) the fishery statistical data collection systems of the participating countries were assessed and an immediate plan of work was prepared, giving priority to those situations that were considered more serious. Specifically, in line and following the MedStat perspective and its implementation components, in Syria and Lebanon the fishing vessel censuses (and the associated fishing vessel register) were set up and completed. In Turkey a quality check sample survey of the fishing vessel register was launched and its results were presented to the Government of Turkey which suggested a review and a reinforcement of the present system. In Egypt, an in-depth assessment of the overall data collection system in the country was conducted whose results (contrary to the situation in Turkey) suggested launching a new census of the fishing units in the country. Preparatory work was initiated with GARF to start translating MedStat interfaces in the Arabic language and adapt MedStat software to host the new system. In Cyprus a new and more dynamic approach to the data collection system was elaborated with the national experts. However, since Cyprus has become member of the EU, a new national plan for fishery data collection system was prepared by the national staff in accordance with EU regulations.

It is worth mentioning that all participating countries prepared, with the assistance of the project, a detailed report on the status of the existing fishery data collection systems. It is believed that the work started within this project will be continued and further strengthened by the EastMed project soon to be formulated.

In Appendix IV a brief note of this project and the implementation strategy applied is reported for reference.

12. The future of MedStat

A summary of action and workplans for the implementation of the review of the fishery statistical systems in the Mediterranean countries through FAO projects is given in detail in separate papers which are kept constantly updated and form part of the development plans of those projects (COPEMED, ADRIAMED, MedSudMed and EastMed).

It is expected that the GFCM will harmonize the activities and will subsequently establish a Mediterranean Fishery Statistics and Information System by creating a MedStat network of compatible national systems and by incorporating existing regional and sub-regional systems as components of this single proposed regional system, after making them compatible.

The overall work plan will be built around the following three main groups of inter-connected activities:

- Organization of a census and the fishing vessel register
- Catch and effort statistics and their integration/matching with relevant fisheries data covering various disciplines
- Consolidation of the system and establishment of regional links

The whole must be regarded as part of a progressively sequential process where one action systematically follows the other, within the same framework, and without having to always start from the beginning or disrupt what was previously achieved. It must be emphasised that the activities

should be programmed stepwise and all be targeted towards a finite output. Each participating country, after this first phase, will have achieved at least one task.

The level of assistance to countries will vary according to the status of national fishery statistical systems and resources available. Some Mediterranean EU member countries already have a direct relationship with the EU; the sub-regional FAO projects should consolidate and expand the work already initiated in their member countries, etc. Technical assistance should therefore start from the results achieved by application of the methodology introduced mainly through the COPEMED and ADRIAMED initiatives (MedStat), and expand the application of the same methods to all the other countries.

Appendix 1

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Appendix 2

Samples of forms and questionnaires used in MedStat

Republic of Albania - General Fishery Directorate - Fishing vessels census 2001

Republic of Malta – Ministry of Agriculture and Fisheries - The Monthly Sampling Frame for Catch and Effort Sample Survey.

Morocco - INRH - Système statistique national en Méditerranée marocaine - Daily catch and effort survey form.

Republic of Albania – Catch and Effort Assessment Survey. LogBook Approach. Daily Landings of Fishing Units

Republic of Malta – Fishery Department. Catch and Effort sample survey of Small-scale fishery (Vessels < 12 m). Daily Landings of Sampled Fishing Units

Database Forms for the management of Catch and Effort Sample Survey

Republic of Albania

DREJTORIA E PERGJITHSHME E PESHKIMIT

GENERAL FISHERY DIRECTORATE

Fishing vessels census 2001

Interweaver name: …….. Code:…….Date: …..……(dd/mm/yyyy)

1. KARAKTERISTIKAT IDENTIFIKUESE TE BARKES SE PESHKIMIT (KAPITENERIA)
Fishing vessel identification characteristics (Kapitaneria)

			CODE
1.1 Matriculation :	N. I Registrimit (Kapitaneria)		
1.2 Registration office:	Zyra e Regjistrimit		C
1.3 Flag:	Flamuri		C
1.4 Registration date:	Data e Regjistrimit		
1.5 Fishing vessel name:	Emri i Barkes		
1.5.1 Previous name	Emri i meparshem		
1.6 Fishing vessel type	Tipi i Barkes		C
1.7 Operational status:	Statusi I Aktivitetit		C
1.7.1 Inactivity reasons	Arsyet e mos Aktivitetit		C
1.8 Base port:	Porti Baze		C
1 Remarks:	Verejtje		

2. AUTORIZIMI (LICENSA) E PESHKIMIT Fishing authorisation

			CODE
2.1.1 Fishing authorisation type:	Tipi i Licenses se Peshkimit		C
2.1.2 Document id number:	Numri i Licenses		
2.1.3 Date of issue:	Data e Leshimit		
2.1.4 Expiry date:	Data e Skadences		
2.1.5 Issuing office:	Zyra e Licensimit		C
2.1.6 N. Fisheries Dept Register	N. registrit te peshkimit		
2.2.1 Main gear:	Pajisja Kryesore e Peshkimit		C
2.2.2 Fishing gear (2):	Pajisja e Peshkimit (2)		C
2.2.3 Fishing gear (3):	Pajisja e Peshkimit (3)		C
2.2.4 Fishing gear (4):	Pajisja e Peshkimit (4)		C
2.2.5 Other gears:	Pajisje te Tjera		C
2 Remarks:	Verejtje		

3. KARAKTERISTIKAT STRUKTURORE Structural characteristics

			CODE
3.0 Registry number (DETAR)	N. I regjistrit DETAR		
3.1 Overall length:	Gjatesia e Pergjithshme		
3.2 Width:	Gjeresia		
3.3 Height:	Zhytja		
3.4 Shipyard:	Kantieri i Ndertimit		
3.5 Country of construction:	Shteti I Ndertimit		C
3.6 Year of construction:	Viti i Ndertimit		
3.7 Hull material:	Materiali i Ndertimit		C
3.8 Year of entry on fishery:	Viti i Futjes ne Peshkim		
3.9 GRT:	NRT		
3.10 GT:	BRT		
3.11Decked:	Me kuverte		Yes/no
3 Remarks:	Verejtje		

4. MOTORI Engine

			CODE
4.1 Model or manufacturer:	Modeli ose Prodhuesi		
4.2 inboard/outboard	I Brendshem/I Jashtem		C
4.3 Power:	Fuqia		
4.4 Type of propulsion:	Tipi i Motorit		C
4.5 Country of manufacturer:	Shteti Prodhuesit		C
4.6 Year:	Viti i Prodhimit		
4.1.a Model or manufacturer:	Modeli ose Prodhuesi		
4.2.a inboard/outboard	I Brendshem/I Jashtem		C
4.3.a Power:	Fuqia		
4.4.a Type of propulsion:	Tipi i Motorit		C
4.5.a Country of manufacturer:	Shteti Prodhuesit		C
4.6.a Year:	Viti i Prodhimit		
4 Remarks:	Verejtje		

5. PAISJET ELEKTORINIKE Electronic equipment

5.1 PAISJET E LUNDRIMIT Navigation

			CODE		
5.1.1.1 Navigation equipment (1):	Aparat Lundrimi (1)		C	5.1.1.2 Year of purchase: Viti i Blerjes	
5.1.2.1 Navigation equipment (2):	Aparat Lundrimi (2)		C	5.1.2.2 Year of purchase: Viti i Blerjes	
5.1.3.1 Navigation equipment (3):	Aparat Lundrimi (3)		C	5.1.3.2 Year of purchase: Viti i Blerjes	
5.1.4.1 Navigation equipment (4):	Aparat Lundrimi (4)		C	5.1.4.2 Year of purchase: Viti i Blerjes	
5.1.5.1 Other equipment:	Aparate te Tjere		C	5.1.5.2 Year of purchase: Viti i Blerjes	
5.1 Remarks	Verejtje				

5.2 APARATET E KOMUNIKIMIT Communication apparatus

			CODE		
5.2.1.1 Communication app. (1):	Aparat Komunikimi (1)		C	5.2.1.2 Year of purchase: Viti i Blerjes	
5.2.2.1 Communication app. (2):	Aparat Komunikimi (2)		C	5..2.2.2 Year of purchase: Viti i Blerjes	
5.2.3.1 Communication app. (3):	Aparat Komunikimi (3)		C	5.2.3.2 Year of purchase: Viti i Blerjes	
5.2.4.1 Other apparatus:	Aparate te Tjere		C	5.2.4.2 Year of purchase: Viti i Blerjes	
5.2 Remarks	Verejtje				

5.3 ZBULUESIT PESHKUT Fish finder

			CODE		
5.3.1.1 Finder app. (1):	Aparat Zbulues Peshkimi (1)		C	5.3.1.2 Year of pur chase: Viti i Blerjes	
5.3.2.1 Finder app. (2):	Aparat Zbulues Peshkimi (2)		C	5..3.2.2Year of purchase: Viti i Blerjes	
5.3.3.1 Finder app. (3):	Aparat Zbulues Peshkimi (3)		C	5.3.3.2 Year of purchase: Viti i Blerjes	
5.3.4.1 Other finder:	Aparat Zbulues Peshkimi te Tjere		C	5.3.4.2 Year of purchase: Viti i Blerjes	
5.3 Remarks					

6. MAKINERITE E KJUVERTE Deck machinery

6.1 METHOD OF ACTIVATING THE FISHING GEAR (Menyra e aktivizimit te paisjeve te peshkimit):				C
		Number	Operated by	CODE
6.2 Line winch:				C
6.3 Net winch:				C
6.4 Trammel winch:	Vinci i Trailimit			C
6.5 Power block:	Power block:			C
6.6				C
6.7				C
6 Remarks:	Verejtje			

7. PRONESIA Ownership

7.1 Type of company:	Lloji i firmes		C
7.2 Name of company or owner:	Emri i Firmes ose Pronarit		
7.3 Year company was established or owner born:	Viti i Themelimit se Firmes (sipas vendimit te gjykates)		
7.4 Address of company or owner:	Adresa		
7.5 Postal code:	Kodi Postal		
7.6 City:	Qyteti		
7.7 Region:	Qarku		
7.8 Country:	Shteti		
7.9 Capitaneria:	Kapiteneria		C
7.10 Operated by:	Menyra e Drejtimit te Barkes		C
7.11 N. of co-owner:	No i bashkepronareve		
7 Remarks:	Verejtje		

8. Crew

8.1 Maximum number:	Numri Maksimal	
8.2 Minimum number:	Numri Minimal	
8.3 Number of registered full-time fishermen:	Numri I Peshkatarevete regjistruarper gjithe vitin	
8 Remarks:	Verejtje	

9. Operative port

9.1.1 1st port Porti i 1	9.1.2 Period Periudha e Qendrimit
9.2.1 2nd port Porti i 2:	9.3.2 Period Periudha e Qendrimit
9.3.1 3rd port: Porti i 3:	9.2.2 Period Periudha e Qendrimit
9.4.1 4th port Porti i 4:	9.4.2 Period Periudha e Qendrimit
9 Remarks Verejtje:	

10. Last year fishing operations

10.1 Stock Resource (name + code)	10.2 Gear Category (name + code)	10.3 Species caught (name + code) (Fritur)	10.4 Fishing Period Periudha e Peshkimit (mm-mm) *	10.5 N. Of Outgoing No i Daljeve
			_ _-_ _	
			_ _-_ _	
			_ _-_ _	
			_ _-_ _	
			_ _-_ _	

***** periudha do te paraqitet me numrat e muajve, psh. Janar – mars, do te shenohet 01-03

Comments**:**.....

.....

.....

.....

.....

11. Equipment for preserving and transforming fish

11.1.1.1 Hold for fresh fish: stiv per mbajtjen e peshkut te fresket	11.1.1.2 Capacity (cbm):Kapacieti
11.1.2.1 Hold with refrigerating plant Dhome Frigoriferike 11.1.2.3 Refrigeration temp. (C): Temperature e Ngrirjes	11.1.2.2 Capacity (cbm): Kapacieti
11.1.3.1 Plant for refrigerated sea Pajisje per ngrirjen e ujit:	
11.1.4.1 Hold for live fish Stiv per peshq te Gjalle	11.1.4.2 Capacity (cbm): Kapacieti:
11.1.5.1 Ice plant: Pajisje Akulli 11.1.5.3 Format: Forma (name +code)	11.1.5.2 Capacity (cbm): Kapacieti
11.1.6.1 Other equipment Pajisje te Tjera	11.1.6.2 Capacity (cbm):: Kapacieti
11.2.1.1 Freeze Ngrirje	11.2.1.2 Capacity (cbm)::Kapacieti
11.2.2.1 Fish meal Ushqim per Peshqit	11.2.2.2 Capacity (cbm):: Kapacieti
11.2.3.1 Oil Vaj	11.2.3.1 Capacity oil: Kapacieti Vajit
11.2.4.1 Filleter: Prerese Filetash	11.2.4.2 N. of machine :No i Makinave
11.2.5 Other: Te Tjera	
11.1 Remarks: Verejtje	

12. Other equipment

12.1 Lift equipment	Pajisje ngarkuese		
12.2 Fish pumps	Pompa Peshkimi		
12.3 Strainer for mollusc	Setaccio		
12.4.1 Lights for fishing	Drita Peshkimi		
12.4.2 Number of lights:	No i Dritave		
12.4.3 Power of each light (candle power):	Fuqia e cdo Drite		
12.1 Remarks:	Verejtje		

13. Safety equipment

13.1.1 N. of belts:	No i Salvagente		
13.1.2 N. of lifeboats:	No I zadra		
13.1.3 N. of flares:	No i Sinjalizueseve		
13.1.4 N. of fire equipment:	No i Pajisjeve Zjarrfikese		
13.1.5 Other safety equipment:	Pajisje te Tjera Sigurie		
13.2.1 Disposal of residuals (OIL):	Menyra e Eleminimit te Mbeturinave te Makinerive		C
13.2.2 Disposal of residuals (OTHER):	Menyra e Eleminimit te Mbeturinave te Tjera		C
13.1 Remarks:	Verejtje		

14. General remarks (Verjtje te Pergjithshme)

MINISTRY OF AGRICULTURE AND FISHERIES

Department of fisheries and Aquaculture

a: Tuna and large pelagics [1] / Large vessels fishery (>12 m. L.) [2] / Small scale fishery (<12 m. L.) [3]

Monthly Sampling frame CAS 3.0

b: Interviewer's name:…………..…………………Code:……...……c: Site name:………………………Code:…...…...…

d: Ref. month:…………………….. Code:…………………... e:Date:………....……...(dd/mm/yyyy)

f: Estimated fishing days in the month:…………………..

g: Vessel identification						Registered gear			Activity status			Gear actually used			
serial number (1)	name of the boat (2)	registration number (3)	L (4)	GT (5)	HP (6)	1st (7)	2nd (8)	3rd (9)	cod (10)	perm (11)	temp (12)	1st (13)	2nd (14)	3rd (15)	new serial number (16)

TOTAL FISHING UNITS FROM THE CENSUS	+	
PERMANENT MODIFIED	-	
TEMPORARY MODIFIED	-	
NEW ENTRIES (Fishing Units)	+	
NUMBER ACTIVE VESSELS IN THE REFERENCE MONTH		

Système statistique National en Méditerranée marocaine

Sardiniers

Section 1 : Informations générales

1) Date : ……
2) 3) Port :
3) Nom de l'échantillonneur : ……

Nador	1	☐
Al Hoceima	2	☐
M'Diq	3	☐
Tanger	4	☐

Section 2 : Caractéristiques du bateau

4) Nom du bateau : …….
5) Matricule : ……
6) Puissance : …….
7) TJB :…….

Section 3 : Caractéristiques de l'opération de pêche

8) Nom de l'engin :……
9) Code de l'engin :……
10) Zone de pêche :……
11) Profondeur :……...
12) Durée de la marée :……..
13) Nombre d'opération :…….
14) Durée de l'opération : ……..

Section 4 : Captures

Espéce	Poids (Caisses)	Poids (pièces)	Poids (Kg)
Sardine			
Anchois			
Chinchard			
Allache			
Bonite			
Maquereau			
Bogue			
Melva			
Thon			
Divers			
……..			
……..			
……..			

Section 5 : Observations

_____

MedStat Albania – CATCH AND EFFORT LogBook Approach

Daily Landings of Fishing Units **Form: AlbaniaCas 1.3**

(a) Interviewer's Name: _____Code:_____(b) Port name: _____ Code:_____

(c) Interview date: __ __ / __ __ / __ __ _Time: __ __ : __ __

(d) Name of the boat: _____Code: _____(e) Vessel type: _____ Code:_____

(f) Auxiliary Boats: _____ (g) Prof. Fishermen: _____ (h) Part Time: _____

(i) Date, hour of departure: __ __ / __ __ / __ _ - __ __ : __ __ Return: __ __ / __ __ / __ __ ___ - __ __ : __ __

(j) Fishing Zones description: _____ (k) Codes: __ __ | __ __ | __ __

(l) Stock / resource: _____ Code:_____

(m) Source of catches data (Stabilimento/Port): _____

(n) Gear Name	(o) Gear Code	(p) Time spent in fishing (hrs)	(q) Number of hauls	(r) Number of Units	(s) Size, Length or Number	Total :(r*s) Trammel: [(r*s)* z]

	Species Landed Species Name / Species Code		(u) Number of Boxes (B)	(x) Box Weight (Kg)	(v) Number of Animals	(w) Total Weight (Kg)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
				Total Kg		

This form has another page ☐ This form is a continuation ☐

Malta - FISHERY DEPARTMENT – CATCH AND EFFORT SAMPLE SURVEY OF SMALL SCALE FISHERY

Vessels < 12 m

Daily Landings of Sampled Fishing Units **Form: MaltaCas 2.3**

(a)Interviewer's Name: _____Code:_____ (b)Stratum: ____ (c)Site Name: _____ Code: _____ (d)Date: ___/___/_____ Time:_____

(e)Sampled Unit: Type : _____Code:_____ (f)Registry Number:_____ (g) Auxiliary Boats:_____ (h)Prof. Fishermen:_____ (i)Part Time:_____

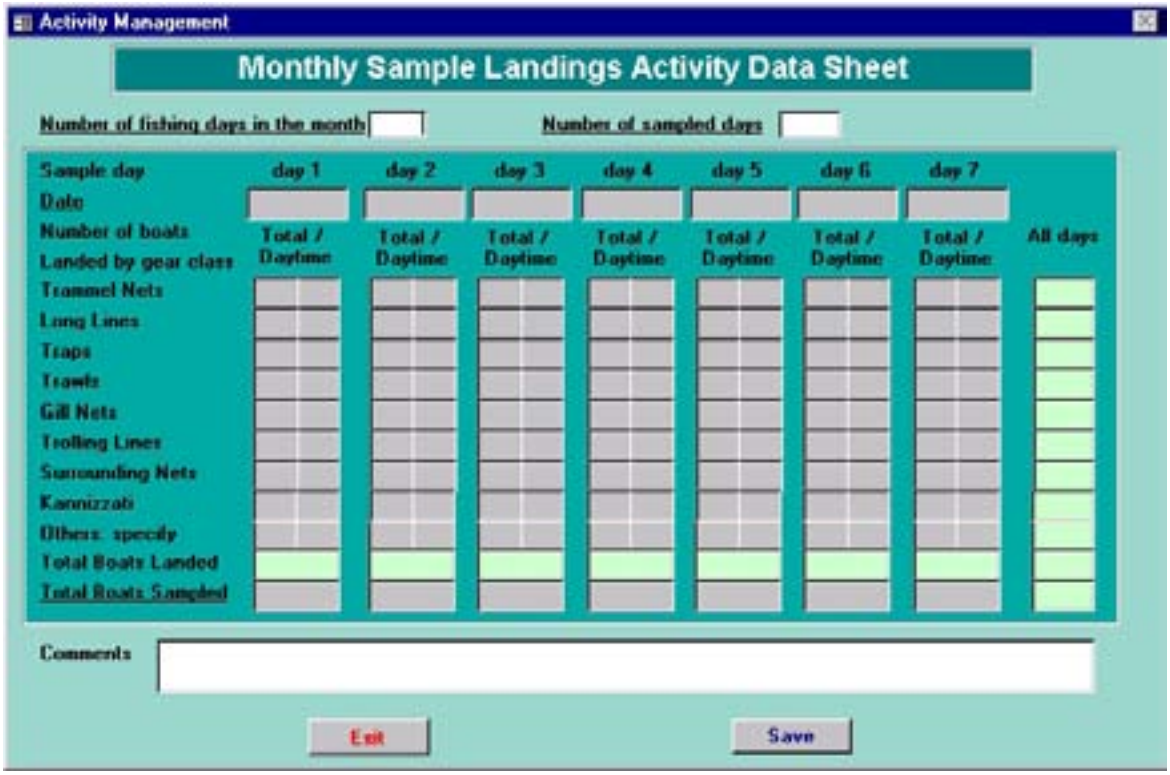
(l)Number of Trips in the Day: _____(m)Fishing Area: _____Code: _____ (n)Time Spent in Fishing: _____ (Hrs) Boat Sample N:_____

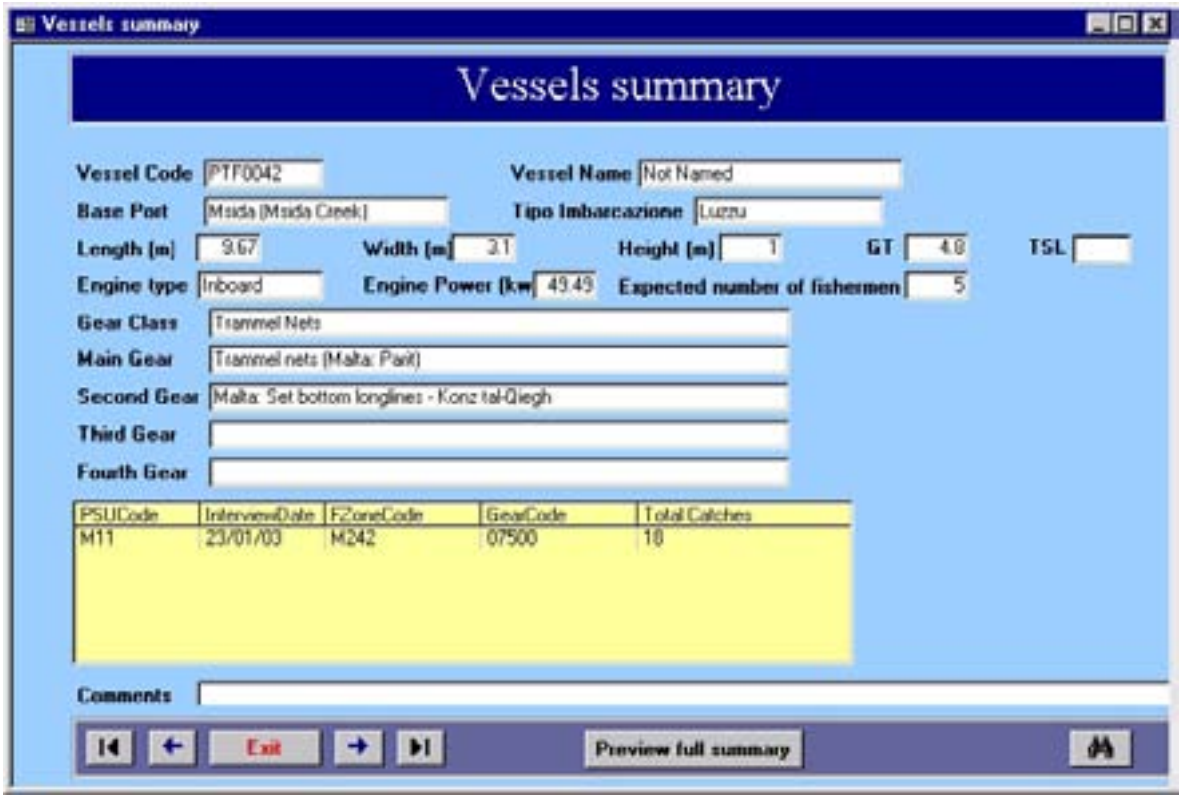
Reference Number	(o)Gear Name	(p) Gear Code	(q) Number of Units	(r)Size, length or Number	Total (q*r)* o(Trammel)	(s)Gear Reference	(t)Species Name	Species Code	(u)Number of Boxes (B) or Number of Animals (A) B/A		(v)Box Weight (Kg) or Average Weight of the Animal (Kg)	(z) Total Weight (Kg)
1	**Trammel Nets** height (m):____											
2	**Long Lines**											
3	**Traps**											
4	**Small Beam Trawls**											
5	**Gill Nets**											
6	**Trolling lines**											
7	**Surrounding Nets**											
8	**Others: Specify:**											
9												
											Total Kg	

Number of boats sampled:_____

Comment:

Database Forms for the management of Catch and Effort Sample Survey





Appendix 3

MedStat - Basic elements in the capacity building component

Module 1 - Introduction

Statistics to be collected
Integrated survey system
National / international relationships
Critical analysis of the results
System maintenance and review

Module 2 - The organisation of the Statistical Unit

Prepared ad hoc, according to the national structure and logistics.

Module 3 - The fishery statistics theory

Prepared ad hoc, according to the level of the participants.
It could be one or two sessions.

Module 4 - Fishing vessels frame survey

Planning a frame survey
The area stratification
The data structure
Coverage and non-coverage errors
The Questionnaires
Codification system
How to enumerate
The missing values problem
Processing the results of the Frame survey
Tabulation system

Module 5 - Catch and effort survey

Planning a Catch and effort assessment survey
Elements of sampling theory
Fishing areas (zones) and codes
Census (Log book) approach
Sample approach (landing approach, market approach, other approaches)
The Data structure
The Questionnaires
Codification system
How to interview or list
Response and non-response errors
The missing value-cheating problems
The estimation process
The best sample size
The tabulation system
The quality of the produced estimates

Module 6 - Data processing tools

Data base management system
Networked systems
Automatic data debugging
Basic statistical parameters
Reporting system

Module 7 - A statistical package

Descriptive statistics, breakdowns, and exploratory data analysis
Correlations
Basic statistics from Results spreadsheets (Tables)
Interactive probability calculator
T-Tests (and other tests of group differences)
Frequency tables, Cross tabulation tables
Multiple regression methods
Non-parametric statistics
ANOVA/MANOVA
Distribution fitting
Graphics tools

(According to the use, it could be one or two sessions).

Module 8 - Pilot Survey

The system design and its implementation plan
Statistical design
Field work implementation
Frame survey
Catch and effort assessment survey
Supervision and on-call support
Data processing testing
Presentation of results and information dissemination
System revision, constraints and adjustment.

Module 9 - Design and implementation of a National Fishery Information System

This module is totally based on the example of "Itafish",

The conception;
The design;
The development;
The implementation.

Appendix 4

Working strategy of the TCP Project for the implementation of a Regional Statistical and Information System in the Mediterranean Region

Background

The General Fishery Commission for the Mediterranean (GFCM), at its Twenty-sixth Session (Ischia, September 2001), endorsed a project proposal to develop a Mediterranean Fishery Statistics and Information System (MedFiSis) as presented by the Scientific Advisory Committee (SAC) Sub-Committee on Statistics and Information (SCSI), and emphasized the importance and urgency of setting-up an integrated statistical system. The three year project MedFiSis is jointly financed by FAO and the European Union. Such a regional system is recognized to be necessary to complement other fisheries management means and serve as the basic vital tool for international bodies to monitor the state of the Mediterranean fisheries and the well-being of the whole ecosystem in the basin. For the system to be of effective regional use, all countries around the Mediterranean should have a national system that collects, processes, stores and disseminates an agreed common set of data; i.e., with the same data standards and definitions (unit of measurement, frequency, classification, terminology, etc.).

Moreover, **MedStat** a standardized methodology is already being introduced in countries in the Western Mediterranean and on the Adriatic Sea, through the activities of two donor-supported FAO projects (Copemed and Adriamed).

The countries of the Eastern Mediterranean (Cyprus, Egypt, Lebanon, Syria and Turkey) , which are not benefiting from the aforementioned assistance, are participating in the TCP-project 'Enabling participation in the fishery statistics and information system in the Mediterranean' (TCP/INT/2904) in order to be in a position to upgrade their national systems and enable their affiliation in the regional network. The implementation of the project will be in accordance with FAO rules and regulations and financial procedures and according to the approved project documents.

Introduction

During the first Coordination Meeting of the project, attended by qualified national representatives, project staff and the project coordinator (Beirut, Lebanon, 19 – 24 January 2004), country representatives decided to draw up a strategic paper. This exercise was proposed to institute in this project a participatory way of working and to guide and monitor project activities to achieve results as close as possible to countries' expectations. This document is the result of a joint attempt of all participants and contains objectives, tasks, activities, input/output characteristics and assignments to each party (participating countries, FAO-TCP/INT/2904 project) to meet the projects' objectives. It is believed that this planning document could also help participating countries to prepare their national plans in order to establish, improve or consolidate a data collection programme at national level. Following the guidelines of this paper, the project management will apply a step-by-step implementation process, in order to gradually secure consolidated results according to an established plan.

As far as the spectrum of data and information to be treated are concerned, it is anticipated that the project's activities should target statistical data collection and processing issues related to all kinds of types and classes of marine fishing units (vessels, gear, fishermen) operating in the Mediterranean areas (subsistence, traditional, commercial). The oceanic fishery (distant water), sport and recreational fishing are not covered by the project.

Recalling the objectives of the project (TCP/INT/2904)

The longer-term development objective is to contribute to the maintenance of the Mediterranean Sea ecosystem, of its living marine resources and fish production, through sustainable and responsible fisheries management.

The medium-term objective is to create a sustainable basis for the operation of a Mediterranean Fishery Statistics and Information System, which will provide a sound basis and contribute to the optimum management of living marine resources of the Large Marine Ecosystem of the Mediterranean.

The immediate project objectives are:

- To promote the introduction of agreements on standardization of statistical and information parameters and of the necessary intergovernmental arrangements according to FAO and the GFCM mandatory conformity;

- To strengthen the capacity of the fisheries institutions of the Eastern Mediterranean countries in marine fishery statistics and information systems, with a view to meeting the relevant national needs and requirements for participation in and complementing in its entirety the Mediterranean Fishery Statistics and Information System - MedFisis

As a main result, the national marine fisheries statistics systems will be apt to meet both the national and regional statistical requirements, which would enable the Eastern Mediterranean countries' participation in the MedFiSis regional project. This would enhance the common monitoring of the Mediterranean fisheries resources and the decision-making process for the management and preservation of the Mediterranean marine ecosystem

Primary expectations and outputs

The project activities will be carried out in three phases. This paper refers to the first two phases. It was agreed that the third phase would be conceived after completion of the present period and taking into account results achieved and consolidated. The following are expected outputs from the project:

- **A preliminary national assessment report.** Before any intervention will take place, a detailed technical report to describe the present situation of the data collection and information system as well as the organizational structure of the fishery and the fishery institutions for each of the participating countries needs to be prepared by national staff. National human and financial resources to be assigned to the project activities should be part of the narrative as should the deficiencies and constraints that could limit the expected results. The legislative framework in each country concerning fishery and fishery regulations (including data collection, data ownership, responsibilities, dissemination and publication) should also be clearly reported.

This assessment document will form the basis for a further joint evaluation of the situation by the Project staff and the national scientist to formulate a tailored programme of work focussing feasible targets and meeting concrete needs.

In order to have an assured level of knowledge and standardization in reporting national issues, the project staff will prepare, as soon as possible, an outline of this paper, listing issues to be considered, content headings, tables and figures needed.

- **An operational National Statistical System** (tailored to national methodology and ensuring national and international standards and requirements), able to provide detailed and accurate information on the size, structure and spatial distribution of the primary fishing industry (marine capture), i.e., number of fishing vessels by type category, fishing methods

and equipment used, fishing labour force, etc., and the distribution pattern of the fishing vessels in space.

- **A computerized Fishing Vessel Register** in each participating country and fleet analysis for key fleet segments.

- Availability of **Periodic Statistical National and International Reports**.

- **A post project national assessment report**. This document should parallel the preliminary one and should be prepared at the end of the project activity. It should contain, among other

- issues, a critical analysis of the work done, describing the original plan, decisions taken, objectives accomplished, problems encountered (solved and unsolved), constraints, opportunities met, etc. If possible, the "new" "status of the national fishing industry" as a result of the project effort will be produced.

- **Increased Staff Capability** in the fisheries departments of the participating countries with considerably enhanced skills and ability in fisheries statistics and information systems and methodologies, and

- **Awareness** of the importance of data and information reliability for sound research and application of optimum fisheries management options.

It was agreed that the data collected would remain the property of the country concerned and that the level of aggregation and the exchange protocols of the data and information to be shared would be agreed upon according to the GFCM and FAO mandates.

ÉTUDES ET REVUES DE LA CGPM DÉJÀ PUBLIÉES
GFCM STUDIES AND REVIEWS ALREADY ISSUED

1 Standardisation de méthodes d'étude biométrique et d'observation de clupéidés (en particulier de *Sardina pilchardus*) utilisées en biologie des pêches. Division des pêches de la FAO. 1957

1 Standardization of biometric and observation methods for Clupeidae (especially *Sardina pilchardus*) used in fisheries biology. FAO Fisheries Division. 1957

2 Le Chalutage en Méditerranée – Observations préliminaires sur les chaluts italiens. Division des pêches de la FAO. Septembre 1957

2 Mediterranean trawling Preliminary observations in the study of Italian trawl nets. FAO Fisheries Division. September 1957

3 La pollution des eaux provoquée par les déversements des sucreries. Carlo Maldura et Paul Vivier. Avril 1958

3 Water pollution caused by wastes from sugar refineries. Carlo Maldura and Paul Vivier. April 1958

4 Filets tournants et coulissants en fibres synthétiques. Gerhard Klust. Septembre 1958

4 Ring nets made of synthetic fibres. Gerhard Klust. September 1958

5 La pisciculture dans les eaux intérieures des pays membres du CGPM. Secrétariat du CGPM. Février 1959

5 Inland water fisheries in the GFCM member countries. Secretariat of the GFCM. February 1959

6 Le chalutage en Méditerranée. Deuxième et troisième rapports. Division des pêches de la FAO. Mai 1959

6 Mediterranean trawling. Second and third reports. FAO Fisheries Division. May 1959

7 La technique des pêcheries dans les lagunes saumâtres. Ruggero de Angelis. Août 1959

7 Fishing installations in brackish lagoons. Ruggero de Angelis. August 1959

8 La situation de la pêche en Italie, en particulier dans le secteur de la distribution. Paolo Pagliazzi. Octobre 1959

8 Situation of the fishing industry in Italy, particularly regarding distribution. Paolo Pagliazzi. October 1959

9 Documentation graphique sur certains engins de pêche utilisés dans les lagunes littorales espagnoles. Fernando Lozano Cabo. Novembre 1959

9 Graphic documentation on some fishing gear used in Spanish coastal lagoons. Fernando Lozano Cabo. November 1959

10 Le chalutage en Méditerranée Quatrième rapport. J. Schärfe, Division des pêches de la FAO. Mars 1960

10 Mediterranean trawling. Fourth report. J. Schärfe, FAO Fisheries Division. March 1960

11 Le traitement du fond des étangs piscicoles et ses effets sur la productivité. La pisciculture dans divers pays européens. Alfred G. Wurtz. Juin 1960

11 Methods of treating the bottom of fish ponds and their effects on productivity. Fish culture in certain European countries. Alfred G. Wurtz. June 1960

12 Exploitation et description des lagunes saumâtres de la Méditerranée. Ruggero de Angelis. Août 1960

12 Mediterranean brackish water lagoons and their exploitation. Ruggero de Angelis. August 1960

13 Contrôle d'un chalut opérant entre deux eaux ou sur le fond et tiré par un seul bateau. J. Schärfe, Division des pêches de la FAO. Septembre 1960

13 A new method for "aimed" one-boat trawling in mid-water and on the bottom. J. Schärfe, FAO Fisheries Division. September 1960

14 Le chalutage en Méditerranée. Cinquième rapport. J. Schärfe, Division des pêches de la FAO. Mai 1961

14 Mediterranean trawling. Fifth report. J. Schärfe, FAO Fisheries Division . May 1961

15 La madrague sicilienne de course. Vito Fodera. Juillet 1961

15 The Sicilian tuna trap. Vito Fodera. July 1961

16 Influence de la température et de l'éclairement sur la distribution des crevettes des moyennes et grandes profondeurs. Walter Ghidalia et François Bourgois. August 1961

16 The influence of temperature and light on the distribution of shrimps in medium and great depths. Walter Ghidalia and François Bourgois. August 1961

17 L'amélioration des techniques de la pêche au feu. F. Bourgois et L. Farina, Experts de la FAO. Novembre 1961

17 Improvements of techniques for fishing with lights. F. Bourgois and L. Farina, FAO Experts. November 1961

18 L'élevage des huîtres en parcs flottants. M. Nikolic et I. Stojnic. Mars 1962

18 A sytem of oyster culture on floating shellfish parks. M. Nikolic and I. Stojnic. March 1962

19 Pêche au feu. Raimondo Sarà. Août 1962

19 Light fishing. Raimondo Sarà. August 1962

20 Réglementation en vigueur sur la pêche de la sardine en Méditerranée. Service d'études législatives de la FAO. Juillet 1963

20 Existing regulations for sardine fishing in the Mediterranean. FAO Legislation Research Branch. July 1963

21 Diagnoses démographiques sur les populations de poissons dans les cours d'eau à truites. R. Cuinat et R. Vibert. Octobre 1963

21 Demographic diagnosis on fish populations in trout streams. R. Cuinat and R. Vibert. October 1963

22 Dommages causés par les marsouins et autres animaux marins déprédateurs en Méditerranée. C. Ravel. Novembre 1963

22 Damage caused by porpoises and other other predatory marine animals in the Mediterranean. C. Ravel. November 1963

23 Etudes sur la sardine (*Sardina pilchardus* Walb.) et l'anchois (*Engraulis encrasicholus* L.) dans le golfe de Naples et sur leur comportement sous l'influence de la lumière artificielle. Olav Dragesund. Juin 1964

23 Studies on the sardine (*Sardina pilchardus* Walb.) and anchovy (*Engraulis encrasicholus* L.) in the Gulf of Naples and their behaviour in artificial light. Olav Dragesund. June 1964

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The establishment of fishery statistics and information systems in many countries of the General Fishery Commission for the Mediterranean (GFCM) continues to be considered a high priority activity, and the need to monitor fishing activities and provide fishery management at all levels with accurate, reliable and timely data that can interact with stock assessment and economic and socio-economic studies for decision-making is constantly increasing. In accordance with FAO and the GFCM mandate, the objective of MedStat is to contribute to the sustainable and responsible fisheries management of fishery resources and fish production in the Mediterranean Sea through the implementation of a long-lasting statistical and information programme that will provide a sound basis for decision-making. The national statistical system developed within this activity consists of a set of databases and associated statistical data collection and implementation methodologies and procedures that primarily cover the fishing vessel census, catch and effort surveys, and other surveys targeting monitoring and management issues. Strengthening the capability of the fisheries institutions of the Mediterranean countries in marine fishery statistics and information systems, with a view to meeting the relevant national needs and requirements for participation in, and complementing in its entirety, the Mediterranean Fishery Statistics and Information System, is also considered a priority issue of MedStat.

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