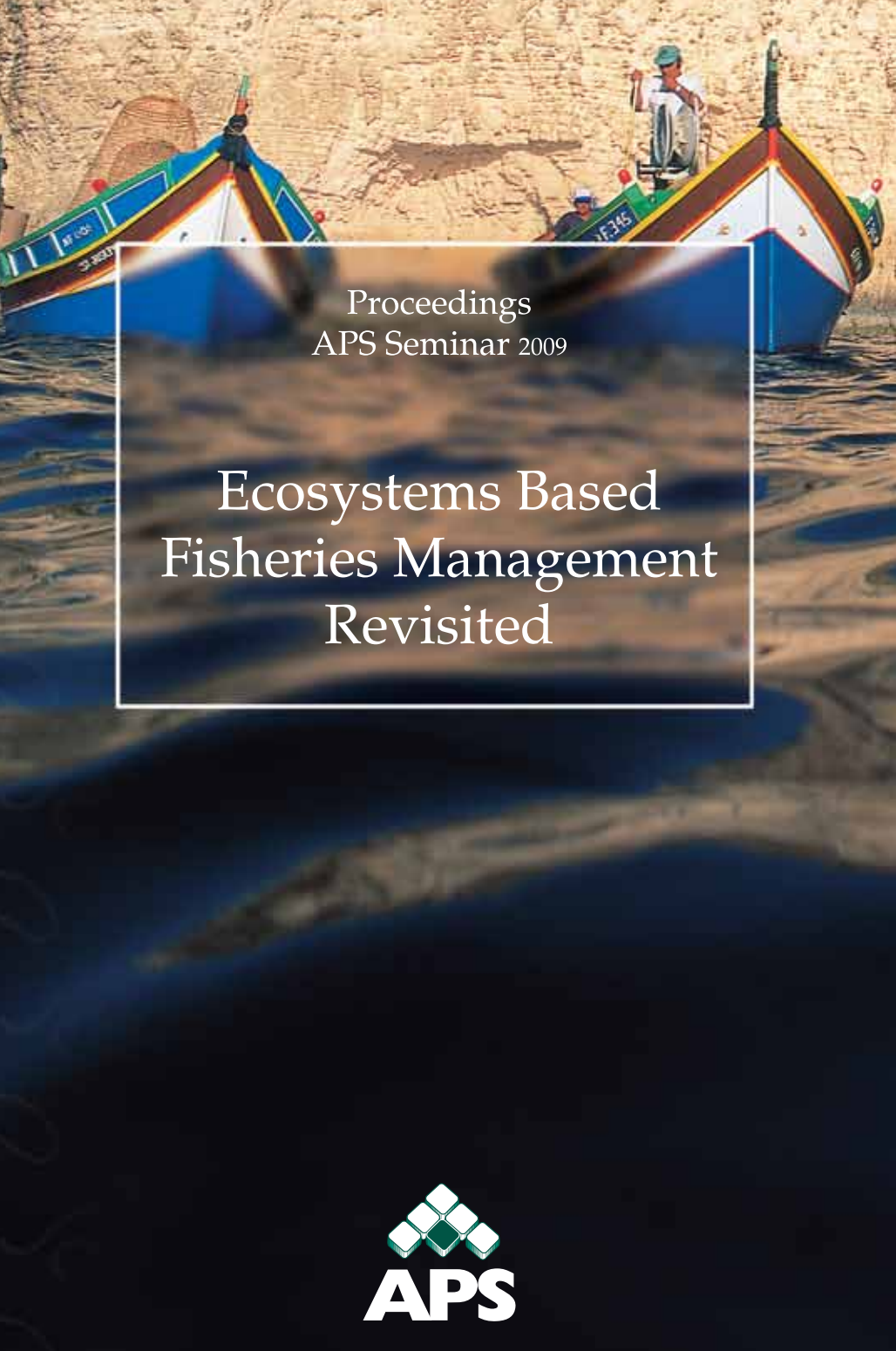

Proceedings
APS Seminar 2009

Ecosystems Based Fisheries Management Revisited

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ECOSYSTEMS BASED FISHERIES MANAGEMENT REVISITED

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FOREWORD

The purpose of the Ecosystem Approach to Fisheries is to manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by aquatic ecosystems. It is a holistic and integrated approach to fisheries management.

Cognizant of the importance of this course of action and in keeping with its commitment to promote issues in agriculture and fisheries, this year's APS Bank seminar held on 13th March 2009 addressed the topic of 'Ecosystems Based Fisheries Management – Revisited'. This was a follow-up to the 2002 and 2003 seminars and was held in collaboration with the Ministry for Resources and Rural Affairs, the Food and Agriculture Organisation of the United Nations, the DG for Maritime Affairs and Fisheries of the EU and our subsidiary APS Consult. To all we are most grateful.

The themes dealt with by the speakers included the fisheries policy in Malta and the Mediterranean, issues facing fishermen in the Mediterranean, the future for the Maltese fishermen and security in the Mediterranean. All

within the overall context of the Ecosystem Approach to Fisheries, which was specifically covered by no less than three of the presented papers.

It is now up to the stakeholders to assume their responsibilities and ensure that their actions are sustainable, in the interests of present and future generations. This publication of proceedings should assist them in their endeavours.

E. Cachia
Chief Executive Officer
APS Bank

Address of Welcome by E. P. Delia, Chairman APS Bank

ECOSYSTEM BASED FISHERIES MANAGEMENT REVISITED

Ladies and Gentlemen,

It is a pleasure welcoming you to the Tenth APS Bank Annual Seminar on the Development of Agriculture and Fisheries in the Maltese Islands. Over the years, we addressed themes that at APS Bank we considered critical for the profitable evolution and development of these two sectors. We strove to anticipate the unavoidable changes that operators had to go through if such activities were to remain worthwhile undertaking in Malta and Gozo, especially after Malta's membership of the European Union in 2004. Hence the themes chosen: the role and future of co-operatives; insurance; water supply; waste management; and fisheries management. The first four subjects have direct relevance to these Islands and to their economic and cultural survival. The fifth area, fisheries management, has a much wider connotation. It refers to the future of human kind.

This morning's convention seeks to bring together a series of issues that, altogether, bear on the future viability of the fisheries stock, primarily in the Mediterranean region. Every geographical area has its own particular fisheries characteristics, but there are several matters that

have to be attended to irrespective of the location. Such matters have to do with private and collective property rights, mentalities, codes of conduct, management structures and enforcement systems. They bring together international and national legislation, dispute of settlement structures, advancing technology, growing populations and possibly dwindling fish stocks. The limitations of jurisdictional institutions, imperfect scientific knowledge, strong vested interests that seek to reap instant financial rewards sometimes at the expense of long term viability of the activity itself, and over-stretched systems of surveillance: these factors characterise the environment that will be addressed this morning.

Our aim is to focus holistically on a subject that was addressed on two occasions in 2002 and 2003, ecosystem based fisheries management. Hence the reference to 'revisited' in the theme chosen for the seminar.* Since then, issues related to Maltese fisheries have been addressed under other headings, like the future of co-ops or insurance. But we felt that the matter deserved to be evaluated more closely in the wider global, EU, and Mediterranean dimensions.

Preserving and possibly enhancing the marine environment, with its invaluable fish stocks, is a primary challenge for all. This task is therefore of paramount importance for countries that border the Mediterranean. The Maltese Islands, lying right in the centre of this sea and on the southern perimeter of the European Union, share such responsibilities. So far, the Maltese government created a twenty five mile buffer fishing zone around the Islands, thereby earmarking a natural habitat for various species of fish. They encouraged the continuation of artisanal fishing; although this activity, with its wide ranging

socio-economic ramifications, may have suffered a set-back with the emergence of industrial cultivation of fish, especially tuna, and the use of certain areas of the sea-bed as a dumping ground. But it is in the wider, Mediterranean context, and therefore involving more players than the localised fishing communities that one tends to associate with artisanal fisheries, that we want to focus upon in today's seminar. Important issues are coming to the fore, to the extent that the European Commission has been considering declaring a temporary ban on the fishing of certain fish species.

We are fortunate to have with us a team of speakers with wide-ranging experience who can combine ideas and visions with the day-to-day operations. It is the latter set of considerations that can evoke challenging environmental scenarios, mitigate harmful effects brought about by short-sighted human actions, and come out with a range of policy options that have to be addressed in the wider legal, logistic and scientific perspectives. The issues at hand bear on international law, suitable institutional frameworks, technical equipment for monitoring and enforcement, and personnel who know clearly what they want to attain and who are determined to achieve it.

This seminar is divided into two sessions. The first session is taken up by key speakers from various units within the FAO, namely, Gabriella Bianchi, Juan Antonio Caminas, Rino Coppola, Pedro de Barrros and Matthew Camilleri. They address themes related to ecosystem based fisheries management in a global and Mediterranean context, delving on existing scientific knowledge on fish stocks and evaluations of the present management networks. Mr Coppola and Mr Camilleri are already familiar with the APS Seminars and they can

re-consider ideas they expressed some years ago. They now have the advantage of testing ideas in the context of everyday reality.

The second session raises issues in the context of the EU and the Maltese Islands. It brings together the policy makers and the policy followers, focusing in the end on Malta's place in this eventful jigsaw. The issues facing fishermen in the Mediterranean cannot be better highlighted than by the President of EUROPÊCHE, Mr Wichmann. But operators have to carry out their trade in the context of rules devised by legislators and regulators. Such conditions are described and assessed this morning by the Head of the EU Directorate General for Maritime Affairs and Fisheries, Mr Michael Roitmann. And, since the Mediterranean is a highly pliable waterway, bordering important economic and political regions, it is bound to give rise to matters related to security, a subject addressed by Captain James Grech of the Armed Forces of Malta. This is the first time that a member of the security forces will be participating in this series of seminars as a main speaker; I am sure that we will be wiser after Mr Grech's presentation. Finally, the important issue regarding the future for Maltese fishermen will be considered by Mr Busuttil who draws on the experience that follow many years of direct contact with the sea and the people whose livelihood depend on it.

The presentations will be published in the series of proceedings, so that both this morning's participants and many others can revisit the themes and continue the discussion that we hope they will generate. I thank the speakers for accepting to share their views with us and the respective organisations that made their presence possible. They give life to the issues being surveyed.

I would also wish to thank the Honourable Minister Mr George Pullicino and officials at the Ministry for Resources and Rural Affairs for their encouragement to this series of seminars. Special thanks go to Mr Jorge Csirke, Director, Fisheries and Aquaculture Management Division and to Mr Alain Bonzon, Executive Secretary, General Fisheries Commission for the Mediterranean (GFCM), both at the FAO who assisted us with ideas while structuring today's programme. We are also appreciative of the constant support given by Dr Joanna Drake, Head of Representation of the European Commission in Malta, and to officials at her office. They came to our rescue in time of need.

Finally, in the absence of Minister Pullicino, who is abroad, I now call Mr Anthony Gruppetta, Director General at MRRA, to present Malta's policy position vis-à-vis the management of fisheries in the Mediterranean.

*Vide:

The Code of Conduct for Responsible Fisheries and its Implementation in the Mediterranean – Proceedings APS Seminar 2002

Ecosystem Based Fisheries Management in the Mediterranean – Proceedings APS Seminar 2003

Anthony Gruppetta, Director General at the Ministry for Resources and Rural Affairs

ECOSYSTEM BASED FISHERIES MANAGEMENT: MALTA'S POSITION

Malta's Fisheries Policy cannot be any different from the CFP, which is the instrument for the Management of Fisheries throughout Europe.

Malta's becoming a member of the EU has taken on the CFP after its 2002 reform where Multi Annual Recovery Plans and Multi Annual Programmes were introduced. This reform aimed at progressively implementing an ecosystem based approach to fisheries management.

Prior to 2002, fishing in Malta was considered only from the point of view of production and therefore harvest and in fact was regulated by a main act, a chapter in Maltese law that was the Fishing Industry Act. In 2002, following a long debate and discussion, it was felt that the situation was changing and that a new perspective had to be adopted.

This new perspective is a completely new way of looking at fisheries and involves the understanding of the whole environment. This new act, that is in force, is the Fisheries Management and Conservation Act. The title already indicates the complete change; conservation of fisheries, hence responsible fishing to ensure sustainability. This is a totally different outlook from the simple consideration of the sector as an industry.

Membership in the EU has meant a further change in our fisheries management that is now regulated by Maltese legislation along with European Union legislation to reflect the Common Fisheries Policy of the Union. Today we have a freeze of the fishing capacity in terms of gross tonnage and power and we operate a strict entry and exit regime not to increase more pressure on fish stocks.

We also run a permanent cessation programme aimed at decreasing capacity in fishing sectors that cannot maintain the existing fishing capacity. The programmes that are being published in the coming weeks will aim to decrease the fleet capacity that targets swordfish and bluefin tuna.

This current policy, that was the result of a reform of 2002, involves the set up of multi-annual fishing programmes and recovery plans. It involves a wider respect for the environment and the habitats that form our seas. In these last years, Malta has participated in regional programmes such as Copemed and MedSudMed that have been working on these aspects and driving to install an ecosystem based approach to fisheries management. The continuous study of the situation of other seas is an important basis on which to evaluate the situation of fisheries and decide on a way forward and therefore the policy changes that would be required to save the stocks; hence the fishery and the fishermen. Most of the time, new measures lead to a reduction of the sector but this shrinkage seems to be the solution for the sustainability of fisheries. The technological improvement in the sector, that is improving the possibility of better yields in fishing, is causing the erosion of the positive conservation actions achieved by permanent cessation of vessels. This technological creep and its impact on catches increases the necessity for further reduction of fishing units. The situation is delicate and we have to be careful not to continue to apply fishing pressure indiscriminatorily to save the sector.

Currently efforts are directed at identifying more Marine Protected Areas such as Nursery Areas or Spawning Grounds to protect them and in so doing allow the stocks to replenish the adjacent areas. This will eventually increase yields but in the immediate future of the set up of areas closed to fisheries the sector will be submitted to a decreased activity.

The conservation actions and season area closures require the participation of all and therefore fora such as this meeting are required to strengthen the relationships between all the stakeholders of the Mediterranean to achieve consensus on the way forward. It will lead to the implemenation of regional plans to act responsibly in view of the fact that in the Mediterranean region, the most important stocks are either highly migratory or straddling stocks, therefore shared between most coastal states. Efforts have to be united if we wish to achieve sustainability.

In this respect, we already have the necessary regional institution in place. I refer to the General Fisheries Commission for the Mediterranean that with the move towards its management through an autonomous budget can and is continuously working towards the creation of common fisheries management measures for the Mediterranean. We all have a responsibility to fully commit ourselves to the decisions and recommendations adopted in the regional fisheries management organisations such as GFU and ICCAT. We need to continue seeking the full compliance to all the management measures that we have adopted over time. This is not always the case. Unfortunately we still meet with irresponsible operators that continue fishing with gear that has been abolished through recommendations from the highest international organisations such as the United Nations.

Dear all, the way forward for sustainable fisheries has 3 pillars to follow:

Management rules based on studies of the environment and the ecosystem, thus relating resources to capacity.

Strong commitment by all to follow recommendations adopted in regional fisheries management organisations.

Enforcement of all measures adopted in the past and in the future.

Put this way, the solution may seem simple but in fact it is difficult. The situation will be hard to change unless there is the involvement of the sector in the decision-making process. We need to achieve enforcement by persuasion and by convincing the operators themselves of the strong need of the measures we have to adopt.

In Malta we have a long experience of this as we have instituted a Fisheries Advisory Board that regularly discusses all issues related to fisheries not least management and legislation. It takes a lot of effort and time for the scientists, the technical people and the administrators to persuade the operators on the positive outcome of new regulations and conservation measures that definitely always tend to decrease their fishing operations. The sector is convinced of the good intentions and a positive outcome is simpler to achieve when the sector itself acts as the custodian of the measures adopted. This is a formula for success and therefore we can add a fourth pillar to the action plan for responsible actions to achieve sustainability in fisheries.

This fourth pillar is not new to all of us. We have been mentioning a bottom up approach and the involvement of the operators in different fora for a long time.If we wish to have success we need to seriously involve the fishermen.

Ladies and Gentlemen, we have come a long way but we need to continue to strive to save our seas.

Thank you

Gabriella Bianchi, Fisheries and Aquaculture Department, FAO

IMPLEMENTING THE ECOSYSTEM APPROACH TO FISHERIES

Introduction

The ecosystem approach to fisheries aims at incorporating the concept of sustainable development in fisheries. This approach was largely motivated by the realization that conventional fisheries management practices had been largely unsuccessful in achieving sustainability goals and that fishing were negatively affecting aquatic ecosystems in many ways that were not accounted for under conventional fisheries management. Examples are the high percentage of incidental catch in fishing operations, the impact of which is unknown as the amount and type of bycatch is largely undocumented. The use of mobile gear dragging the bottom, such as dredges and trawls, which may lead to a direct and durable impact on the bottom features and habitats such as seagrass and algal beds, corals, sponges, etc. This activity can modify the bottom structure and benthic fauna and, potentially, the benthic populations and the resource itself. Another example is related to the impacts on vulnerable species such as seabirds and sea turtles, interacting with fishing operations with resulting high mortality of these species.

The negative effects of fisheries on marine ecosystems has been debated frequently in the media during the past decade, which has led to campaigns against eating depleted species, their blacklisting on internet sites, and their banning from restaurant menus or from large fish traders supply lists.

We can expect more of this to come. Based on these developments, sustainable fisheries in the marine ecosystem may change from being an option to becoming a necessity, at least if fishery products are intended to enter international trade.

These developments have been occurring in parallel with the recognition, across all fields of natural resource management, that new attitudes and processes have to be adopted that are more prudent, transparent and democratic and that take into account more explicitly diverse societal interests in aquatic ecosystems.

The concept of an ecosystem approach to fisheries, EAF, (sometimes also referred to with other denominations such as ecosystem-based fisheries management, EBFM) has been increasingly used in policy statements by fisheries management and environmental agencies, both governmental and non-governmental, at the national and international levels. At the same time there has been widespread confusion regarding what an ecosystem approach actually entails and perceptions and use of the expression have been very different, ranging from the idea of the need to base management of human activities on a detailed understanding of ecosystems structure and functioning (often used by natural scientists to obtain funding in oceanography and marine biology or as an argument used by fisheries managers to demonstrate the impossible task of implementing it), to the perception that the use of Marine Protected Areas (MPAs) is synonymous

with EAF. Notwithstanding good progress in many localities, this confusion has significantly hindered progress in implementation of the approach.

There are various definitions in the literature of an ecosystem approach. FAO (2003) defines an ecosystem approach to fisheries (EAF) as follows:

> "An Ecosystem Approach to Fisheries strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries."

The above definition clearly addresses both human and ecological well-being and merges two paradigms, that of protecting and conserving ecosystem structure and functioning and that of fisheries management that focus on providing food, income and livelihoods for humans. Issues of sustainability are also linked to the principle of intergenerational equity, also a fundamental principle of EAF (FAO, 2003).

Concept development

Idea of sustainable development, i.e. economic growth in a way compatible with ecological sustainability, has been reflected in international instruments for the past 40-50 years, along three main (inter-related) strings of the international policy arena (Turrell, 2004). These were related to environmental, legal and fisheries management aspects, respectively. The first, the legal string, goes through the UN Law of the Sea Convention (UNCLOS,

1982), the second, the environmental string, through the UN Conference on Environment and Development (UNCED, 1992) and the WSSD (World Summit on Sustainable Development, Johannesburg, 2002); and the third, the fisheries management one guided by FAO, has the Code of Conduct for Responsible Fisheries (CCRF, FAO 1995) as a key milestone (Figure1).

Aware of the difficulties experienced in incorporating the above principles in day-to-day fisheries management, the need was felt for initiating processes and activities that would facilitate their implementation. The Reykjavik Conference for Responsible Fisheries in the Marine Ecosystem (2001) can be considered as an attempt to build a bridge between the commitments on sustainable use that countries had agreed to over the years and their actual implementation within the fisheries sector. The Reykjavik Conference resulted, among others, in a specific request for FAO to develop guidelines for implementation.

Based on the above, and in relation to the incorporation of environmental concerns in fisheries management, three main phases can be detected at the global level (Bianchi, 2008):

- the phase of raising *awareness*, with its roots in the Stockholm Conference (1972) and culminating with the Earth Summit (1992),
- *convergence* between international fisheries management objectives and international environmental concerns, with the developments of international instruments at sectoral level, such as the CCRF (1995), and
- a third phase, that of commitment to *implementation*, as stated, for fisheries, in the Reykjavik Declaration.

EAF in practice

The key features of the framework proposed in the FAO guidelines for planning and implementing under an EAF management can be summarised as follows:

- it is participatory, at all levels of the planning and implementation steps;
- it is comprehensive: it ensures that all key components of the fishery system are taken into consideration, including those related to the ecological, social-economic and governance dimensions, while also taking into account external drivers;
- it encourages use of the 'best available knowledge' in decision-making, including both scientific and traditional knowledge, while promoting risk assessment and management and the notion that decision making should take place also in cases where there is lack of detailed scientific knowledge;
- it promotes the adoption of an adaptive management system and stresses the importance of establishing mechanisms for feed-back loops at different time scales to adjust the tactical and strategic performance based on past and present observations and experiences;
- it evolves from existing fisheries management institutions and practices.

Realization of an EAF will require a sincere societal commitment to a vision that promotes conservation, sustainable use and equitable sharing of ecosystem services. Its actual application does not need to follow a single blueprint but be consistent with local context, means and culture.

One of the key reasons that have delayed the application of the EAF is its perceived complexity. Certainly as part of

this approach, much more issues have to be dealt with, some rather complex and being characterised by a high level of uncertainty. For this reason, it is important to undertake a thorough planning process, including the identification of the key problems in relation to achieving sustainability goals, and their prioritization and translate high level policy goals into operational (practical) objectives. The key steps of the planning and implementation process are presented in Figure 2. It should be noted that these steps are equivalent to those that would be undertaken under a conventional fisheries management system. However, there are some key differences that should be noted.

- Stakeholder *participation* is advocated at all phases of planning and implementation. The principle of participation is reflected in most recent international instruments, requiring that stakeholders be more closely associated to the management process. This results from the recognition that decisions will be considered as having greater legitimacy by stakeholders, but also that greater participation in decision-making will bring important additional information and insights on the fishery system, which will enhance the probability of achieving agreed objectives. However, a broader participation of stakeholders implies specific institutional arrangements, mechanisms and resources;
- Another aspect is the use of "*best available knowledge*". This concept has two implications: one is the commitment to improve scientific understanding of ecosystems in all their components, including of the human dimensions. The second aspect is related to the Precautionary Principle, according to which fisheries management is required, in conditions where there is a perceived risk in relation to achieving sustainability goals, to take decisions also in the lack of complete scientific knowledge.

- Adoption of *adaptive management* is also advocated under an EAF. The diagram shown in Figure 2 shows feed-back loops that allow to adjust short-term and long-term plans based on experiences and observations made through the management process. In fact, because of the complexity and dynamics of ecosystems and society, it is practically impossible to predict outcomes of different management measures. The emphasis, as compared to conventional practice, is on the need for mechanisms that from experience feed back into policy and management decisions.

The planning process under an EAF consists largely of examining existing or developing fisheries to identify key priority issues to be dealt with by management in order to be consistent with an ecosystem approach. There are various methods to do this but one that has proven very useful in fisheries, as well as in other fields, is based on risk assessment. The main result of this planning process is the backbone of fisheries management plans that are consistent with the key principles of sustainable development of the EAF framework.

The main steps of the planning process are presented in Figure 2, showing how high level policy goals, that are often too general to be useful in day-to-day management, can be translated into operational objectives and decision rules for actual implementation.

The entry point for implementation of EAF can range from, for example, all human sectors within a specified ecosystem to a much narrower but still useful focus on a particular fishery, or other sector, within the same ecosystem. Although this approach may seem as not consistent with the principle of an ecosystem approach implemented across all human activities, it is

a more practical transition from existing management arrangements and existing institutional arrangements and constraints. As a starting point for implementation of a multi-sectoral ecosystem approach, it is therefore commonly more tractable.

A fundamental step of this process is related to the identification of the key issues that are recognized by the various stakeholders as those requiring attention by management as a matter of priority (Figure 3). This process is carried out in a structured way, following three major categories related, respectively, to ecological and social well-being and to governance. The identification process results in a number of issues the priority of which is set through a process of qualitative (if possible also semi-quantitative or quantitative, according to data and information available) risk analysis. This process is innovative as compared to conventional fisheries management as it is holistic in considering various aspects of environmental and social sustainability. The subsequent steps in the process are related to identifying how management can actually deal with the priority issues, including identification of operational objectives (i.e. targets), the management tools that are most appropriate to achieve these, and assessing the costs and the benefits of alternative management options. The results of these steps provide the basis for the development of fisheries management plans.

Progress in implementation

The political commitment by countries to implement EAF contained in, for example, the Reykjavik Declaration and the WSSD Plan of Implementation, is undoubtedly gaining

momentum and in 2007, there was broad agreement amongst the Member countries of FAO's Committee on Fisheries "that EAF was the appropriate and necessary framework for fisheries management" (FAO, 2007a). At that meeting, many Members reported on the progress that was being made but, at the same time, many developing countries referring to the increased institutional capacity required for implementation of EAF, reporting that they needed greater support through awareness building and direct technical assistance to help build their national capacity for the task.

In 2006, two international meetings reviewed progress made in the implementation of EAF at the national, regional and international levels. The 7th meeting of UNICPOLOS (New York, 2006) concluded that while the approach had a broad acceptance, there was a wide perception that not enough knowledge was available in most cases to get started. While it was felt that the meeting had contributed to demystifying the concept, major challenges were seen to exist, particularly at the regional level, and related to fitting RFMOs into cross-sectoral approaches to management. The Bergen Conference on Implementing the Ecosystem Approach to Fisheries (Bergen, 2006) had as one of the main objectives, 'to exchange experiences made and constraints encountered' in the application of EAF. While it was recognized that many countries had already adopted measures consistent with EAF, and in this sense good progress was underway, often these were piecemeal actions, focused on addressing key ecological impacts of fishing and not the result of a more comprehensive effort towards EAF implementation (Bianchi et al, 2008).

A few countries having undertaken thorough processes towards full implementation of ecosystem-

based approaches, reported to the Bergen Conference on the progress that had and was being made. One of those, the United States has since 1996 taken steps to initiate implementation of EBFM (Ecosystem-Based Fisheries Management), with the Congress asking NOAA to establish an Ecosystem Principles Advisory Panel to inform the Secretary of Commerce and Congress on ways to incorporate ecosystem principles into fisheries conservation and management (Tromble, 2008). Since then, a number of activities, including stakeholder consultations at various levels have taken place. These have lead to implementation of a number of specific EBFM measures, including measures to quantify and minimize by-catch, definition of essential fish habitat, designation of numerous marine protected areas, including bottom trawl closures in areas off the Atlantic and Pacific coasts and in Alaska. Comprehensive Fisheries Ecosystem Plans have been developed for some regions, including Chesapeake Bay, the Western Pacific Archipelago, the Atlantic Seaboard and Gulf of Mexico, and the North Pacific. There is however the recognition that ecosystem approaches have not been more extensively implemented, because the science, data and models to effectively incorporate ecosystem effects into decision-making have not been adequate.

Australia has been one of the forerunners in the development and application of ecosystems approaches to fisheries and has been active in this field for over a decade (Fletcher et al. 2005). In the early 1990's Australia started a process of pursuit of Ecological Sustainable Development (ESD) across all areas of government, which also had implications for fisheries and other sectors exploiting aquatic resources. The main elements of the approach have consisted in defining and implementing harvest

strategies for target and bycatch species in every fishery, undertake an ecological risk assessment and ecological management response for every fishery, implement large scale spatial management (including MPAs for conservation purposes, improving data collection and communication capacity for the EBFM approach (Mc Loughlin et al., 2008). Integration of all relevant elements of the ecosystem approach for Australia's 21 Commonwealth managed fisheries started in early 2007.

Canada's approach is area-based and entails definition of broad eco-regions with ocean and costal management areas nested within these. Planning follows guidelines developed at the national level (Mageau, 2006). For each area, ecosystem objectives are set addressing ecosystem structure, function and physical-chemical properties of the system. Two approaches are being applied: a bottom-up (activity-based) involving identification of those activities that impact most and setting ecosystem objectives for these, and a 'top-down' approach that identifies key ecosystem properties or components. Both approaches make use of all available, interdisciplinary knowledge and their application is now being tested.

In Norway, in addition to piecemeal fisheries management initiatives consistent with the principles of responsible fisheries have taken place during the past decade, such as reducing bycatches in the shrimp fisheries, managing target stocks also taking into account predator-prey interactions or protecting vulnerable bottom habitats from trawling. A more holistic approach was developed for the Barents Sea, rich in natural resources both living and non-living. A cross-sectoral management plan has been developed for this region, including setting goals and targets for the region, through consultations with all the relevant stakeholders. A committee under the Ministry of

Environment has been established with representatives from all relevant government agencies, responsible for identifying appropriate management measures, and receiving advice from a 'Management forum' consisting of researchers and users.

Progress is also being made by regional fisheries bodies but, at a meeting of the Secretariats of Regional Fisheries Bodies (RFBs) at FAO in 2007, it was noted that "the issue of incorporating ecosystem considerations into RFB decision-making remains under development and is essentially work in progress." (FAO, 2007b). A common problem hindering greater progress in implementation of EAF was noted at that meeting where some RFBs reported concerns about explicitly including EAF principles in RFB Conventions or Agreements because there is a widespread perception that it is difficult to define what is really intended by EAF. Despite this, the meeting noted that in 1980 the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) had become one of the first RFBs to elaborate the Approach and that many recent regional agreements now include general references to an EAF. The misperception reported at the meeting that EAF is difficult to define is discussed later in this paper.

Within the context of regional fishery bodies, measures to implement EAF have included taking management actions to protect sharks, seabirds, turtles and dolphins, to protect vulnerable habitats by closing fishing around seamounts or in certain areas of particular concern, and to monitor lost and abandoned fishing gear. As an example, the Western and Central Pacific Fisheries Commission (WCPFC) reported that as the start of a broader process, it is reviewing an ecosystem risk assessment process while CCAMLR reported that is has a programme to monitor

selected indicator species in particular areas as a measure of ecosystem health (FAO, 2007b).

Good progress in implementation is being made by the three states comprising the Benguela Current large marine ecosystem. This example is probably unique in that the issue is being addressed in a systematic manner at both the national and regional scale and, for this reason, is presented here in greater detail than the other examples described. Much of the progress in recent years has been made within the scope of the GEF Benguela Current Large Marine Ecosystem Project (BCLME) which included, amongst other relevant projects, one entitled "Ecosystem approaches for fisheries management in the Benguela Current Large Marine Ecosystem". That project examined the progress that had been made in the region in implementation of EAF and considered the feasibility of full implementation, at least across the most important fisheries in the ecosystem. The project was a co-operative effort by BCLME, the management agencies of Angola, Namibia and South Africa, and FAO.

EAF is being introduced by FAO to a number of developing countries in Africa with core funding from the Government of Norway and in partnership with various GEF-LME regional projects, to strengthen the knowledge base for implementing EAF in developing countries. This project aims at promoting capacity building, standardized data collection and monitoring of marine fisheries and related ecosystems, while supporting policy development and management practices consistent with EAF principles.

Table 1 provides an overview of countries and regions where FAO has undertaken EAF-related activities.

Table 1. Summary of activities undertaken by FAO to introduce the EAF principles and methodologies for application.

Region	Countries	Activity
Lesser Antilles	Antigua & Barbuda, Barbados, Dominica,Grenada,, St Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad & Tobago	Introduction of EAF principles and methodologies at the regional level (in connection with Project meetings) Issue identification and risk analysis at national level
North-West Africa	Morocco, Mauritania, Senegal, The Gambia, Guinea Bissau	Introduction of EAF principles and methodologies at the regional level
Gulf of Guinea	.....	Introduction of EAF principles and methodologies at the regional level
Southern Africa	Angola, Namibia, South Africa	Introduction of EAF principles and methodologies at the regional level Issue identification and risk analysis at national level Cost-benefit analyses Development of performance reports Consideration of institutional constraints, potential incentives for EAF, methods for strengthening decision-making Consideration of the ways forward to strengthen implementation
East Africa	South Africa, Mozambique, Madagascar, Comores, Mauritius, Kenya, Tanzania, Seychelles	Introduction of EAF principles and methodologies at the regional level
Pacific Island Countries & Territories		Introduction of EAF principles and methodologies at the regional level
Mediterranean Sea		Introduction of EAF principles and methodologies to the GFCM
South and Southeast Asia		Introduction of EAF principles and methodologies at the regional level

The initial approach taken in all regions and countries is to examine existing issues, problems and needs associated with the implementation of EAF, through a the process described earlier in this chapter.

Conclusions

EAF has been recognized and adopted as the best framework for fisheries policy, planning and implementation and there has been good progress in putting it into practice in a number of parts of the world. The key message of this paper is that it is achievable, even with limited capacity and information but will require adaptation of attitudes and practices if it is to be realized on a broad, global scale. Some of the key insights and conclusions that have emerged from experiences to date are the following:

a) In the international policy arena, the ecosystem approach embodies the convergence of conservation and human development concerns and shows the way these can be dealt with. Although a common understanding of the concept is developing, and despite the good progress made in the incorporation of its principles in policies at international and national levels, there is still much to be done to make these principles operational in the practical management of fisheries.
b) There is no 'one size fits all' for EAF, and the application of the EAF needs to be tailored to the specific ecological, social and cultural conditions in each specific geographical area.
c) The broadening of fisheries management and the need to include stakeholders in the decision making process, imply the

requirement for extensive communications between different stakeholders, researchers and managers. New mechanisms of interaction need to be developed, which are truly interactive and exploratory of options for properly acknowledging the diverse need and values, for integrating knowledge, and legitimizing management actions.

d) While limited knowledge should not stop implementation of EAF, the more limited the knowledge the more conservative (precautionary) will the management measures be. Therefore, increased funding to research should also be encouraged with the view of optimizing resource utilization.

e) Application of the precautionary approach in recognition of knowledge limitations will cause substantial short and medium term social and economic problems, particularly in small-scale fisheries in developing countries where there is a high, immediate dependence on fisheries for food-security and livelihoods. In such cases, responsible means to reduce that dependence, including realisation of alternative livelihoods, will be a pre-requisite for implementation of EAF.

f) Risk assessment is a common tool in business and industry at large. A similar approach can usefully be applied within an ecosystem approach, where ecological risk assessment related to human well-being, ecosystem conservation and sustainable use should be a core tool relevant and applicable both in data-rich and data-poor situations.

g) In order to achieve the dual objectives of socio-economic benefits and environmental sustainability, it is essential to include socio-economic and institutional considerations in EA planning and implementation. Fair and equitable sharing of benefits is also a key characteristic of EAF needing serious attention.

h) EAF builds on existing fisheries management and can be implemented incrementally. However, what may be required is a radical change or revolution in our thinking and attitudes towards ecosystems, ecological relationships, stakeholder involvement, and collaborative frameworks.

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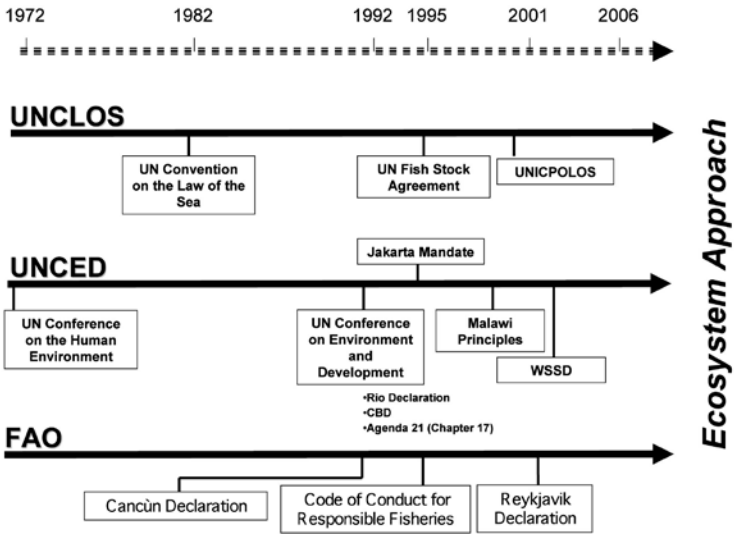


Figure 1. Main international instruments where the principles of sustainable development have been either directly or indirectly reflected.

UNCLOS: United Nations Convention on the Law of the Sea
UNICPOLOS: United Nations Informal Consultative Process on the Law of the Sea
UNCED: United Nations Conference on Environment and Development
WSSD: World Summit on Sustainable Development
CBD: Convention on Biological Diversity

Figure 2. Management cycle with feedback loops characteristic of adaptive strategies. Scoping, Setting objectives and formulation of action & rules represent the key steps for developing fisheries management plans. The following steps regard implementation. (modified from FAO, 2003)

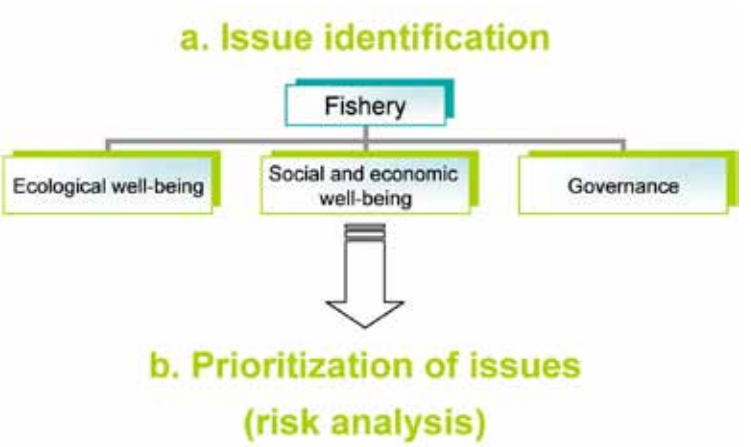


Figure 3. Two key steps of the EAF planning process. a. Issued identification: this step allows a systematic analysis of all the key issues (problems) perceived by the stakeholders as being the main hindrance to sustainability, following the main components of the fishery system, i.e. the ecological, socio-economic and governance. b. Prioritization of issues: given the number and complexity of the issues that normally result from step a., it is important that the key priorities are identified so that available human and financial resources are put where it is most needed. Both steps are carried out with full stakeholder participation.

Juan A Camiñas, FAO Project Manager, COPEMED

STATE OF THE MAIN EXPLOITED FISH STOCKS IN THE MEDITERRANEAN IN 2008

The Mediterranean Sea

The Mediterranean constitutes one of the biggest zones of reserve of the marine and coastal biodiversity, with a 28% of endemic species and a 7.5% of the fauna and an 18% of the worldwide marine flora. The Mediterranean Sea is a complex large marine ecosystem with generally narrow continental shelf and continental slope with some exceptions (Northern Spain and Gulf of Lions; North Adriatic Sea, Gulf of Gabés; North Black Sea) and considered oligotrophic waters, affecting the global production. But this low productivity contrasts with high biodiversity represented by different components according to their origin. In spite of the affinity to the Atlantic, the main components of the fauna and flora are the endemic Mediterranean species (Rodriguez, 1982). Other biological components are the species of Atlantic origin and the indo-pacific species. Another group of species, of a boreal origin, still persists since the Pleistocene and have resisted the postglacial warming in areas like the north of the Adriatic. Finally the introduced species, human-caused introductions and also the Lessepsian

migration, this last constitutes a separate episode in recent introductions produced as a consequence of the opening of the Suez Canal in 1869.

The Mediterranean, as a semi-enclosed sea, is particularly affected by human activities, but their impact depends on: the nature and amount of the direct coastal terrestrial, riverine and atmospheric inputs relative to the rate of flushing to the Atlantic Ocean; the size (and density) of the human population living along the littoral and within the basin; the level of human activities and the land-use and water-use practices; the catchment area and its rainfall relative to the area of the sea itself; the extent to which sills or basins modify the exchange of water with the Atlantic Ocean and within the Mediterranean itself; the depth, and consequently to a significant extent, the temperature stratification of the water mass (Griffits et al., 2007) .

A number of important issues are arising and confronting with the fisheries resources and their exploitation; these include tourism, shipping, coastal development, coastal and inland agriculture, pollution, and other uses of the seas as marine protected areas, aquaculture, tuna fattening. Many fisheries take place in coastal waters including lagoons and it is in these coastal areas where most of the human activities are in conflict for the space contributing to the coastal zone instability and degradation.

All the countries develop artisanal fisheries, by definition carried out near the coastline where the other human activities take place thereby increasing the conflicts and with the worst consequences for the artisanal fisher folks. Tourism and recreation are a forcing factor in coastal development and in all their forms either involved significant environmental degradation or costly

arrangements by the "tourist-importing" countries to limit such degradation; the aquatic activities inevitably prevent the pursuit of artisanal fisheries in inshore waters in many places that were once valuable fishing grounds.

During the last two decades, competition among the various types of fishery (industrial, semi-industrial and artisanal) has become more severe and industrial fishing practices have changed. New fishing technology now allows the exploitation of all the fishery resources down to a depth of at least 800 metres. As a result, there has been a very strong growth overall in the fishing effort and the GFCM limited the fishing activities to depths below 1000 m.

The experience gained from marine and fishery reserves, generally situated in areas close to the shore and of high biological value, shows that such reserves can constitute a good mechanism for resource conservation and management and represent modern tools for recovering the exploited stocks that reproduced inside the reserves.

Alien species in the Mediterranean are also an extraordinary problem whose dimensions are difficult to predict. Biological diversity faces many threats not only in the Mediterranean but also throughout the world. One of the threats for marine biodiversity, recently acknowledged by scientists and managers all over the world, are biological invasions by non-indigenous species. The impacts of alien invasive species are immense and usually irreversible. This phenomenon is considered to be one of the global change processes and is gaining increased concern around the world (CIESM, 2002).

In conclusion the governance of the Mediterranean Sea is very complex and confronts many users and stakeholders as commented in the above paragraphs. It

requests for new approaches to incorporate the many marine stakeholders in the process: the need to have appropriate tools to solve conflicts between users, the urgency in protecting the marine environment and the fisheries and other natural and cultural Mediterranean resources and the urgent international agreement for the conservation of the marine biodiversity needs of the implementation of the Ecosystem Approach to Fisheries Management.

Mediterranean fisheries

The Mediterranean Sea is a comparatively small sea bordered by a relatively high number of countries. Twenty-two coastal countries and territories share the Mediterranean Sea ecosystem's goods and services, including the rich fishery resources. Addressing future ecological issues and challenges of Mediterranean Sea region, calls for an ecosystem-oriented approach that includes cooperation among all the countries concerned (Mannini et al., 2008)

The current Mediterranean fisheries are the results of centuries of exploitation by different human groups and many cultures involve providing different fishing methods and targeting different species according to historical periods and countries. Actually many countries are exploiting juveniles and larvae and undersized target species to support the main fisheries. This exploitation model has been affecting the stocks for many decades and lead to the present stocks situation. In addition, the present Mediterranean fisheries are characterised by important impacts and effects on non-target and protected species and fragile coastal ecosystems. They are also

relevant because of their social and economic significance as a consequence of some particular characteristics: most Mediterranean countries consider marine products an important part of their nourishment but fisheries-related issues are also important in culture and traditions. The diversity of fished species is higher than in other marine regions, as a result of the high value of the fresh marine products, consumer habits of demanding fresh fish, and high fisheries products demand from tourism.

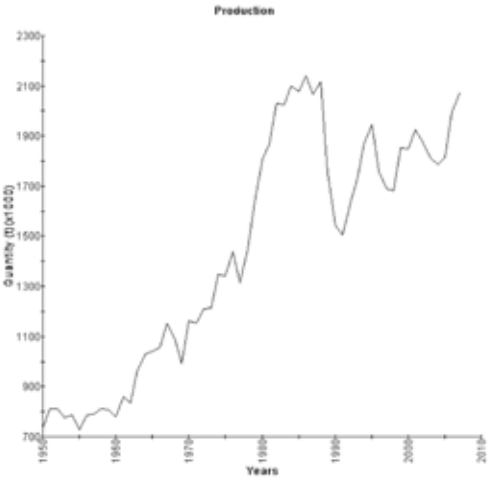
According FAO FIGIS (http://www.fao.org/fishery/statistics/global-production/en) the global production (capture and aquaculture) in the Mediterranean and Black sea reached 2,072,242 tonnes in 2007, relative to 1,689,716 tonnes to capture fisheries (mean annual landing around 1.5 tonnes during the last decades). The main exploited resources in the Mediterranean and Black sea are small and medium pelagic species reach the total landing around 800.000 tonnes and the demersal species represent more than 400.000 tonnes in landings.

The exploited resources

Small pelagic. From commercial perspective the anchovy (*Engraulis encharsicholus*) command the higher prices and have showed depletion of stocks in many Mediterranean and Black Sea areas. Anchovy is a very valuable resource and fleets from Spain (Alboran Sea and Catalonia), France (Gulf of Lions), Italy (Ligurian, Tyrrhenian, Ionian and Adriatic Seas) and Greece exploit it. With sardine (*Sardina pilchardus*), sardinella (*Sardinella aurita*) and sprat (*Spratus spratus*) they represent almost 50 % of the total landing in the Mediterranean and Black sea (Lleonart and Mainou, 2003).

Demersal. The Mediterranean demersal fishery is a multispecies fishery. Among the demersal species hake (*Merlucius merlucius*) and red mullet (*Mullus* spp) dominate the landings and have shown rises over the whole time series in most Mediterranean areas. The analysis show that the main stocks are subjected to heavy exploitation on recruits and juveniles, especially by trawler fleets, with an upward trend towards overexploitation exists everywhere.

Large pelagic. The main target species in the Mediterranean and the Black Sea are bluefin tuna (*Thunnus thynnus*), swordfish (*Xiphias gladius*) and albacore (*Thunnus alalunga*). Eastern countries with artisanal fisheries exploit other minor species as bonito (*Sarda sarda*) mainly fished by artisanal fisheries, traps, surface gears (purse seiners, long lines, hand lines), industrial purse seiners and large-scale drift nets.



Total Mediterranean and Black Sea Production 1950-2007. Source: FAO Fishery Statistical Collections.

Fisheries Management

The General Fisheries Commission for the Mediterranean (GFCM) and the International Commission for Conservation of Atlantic Tunas (ICCAT) are the existing Regional Fisheries Organisations (RFO) with competences in fisheries management in the Mediterranean Sea. To solve possible problems derived from their competences a coordination system between both RFO exists and officers from each one participate during the other RFO meeting and working groups. Moreover since 1994 joint GFCM-ICCAT Working groups on large pelagic species from the Mediterranean are carrying out studies and periodically produce scientific advice to both organisations.

GFCM is a FAO's Regional Fishery Bodies (RFB) covering the Mediterranean and the Black Sea. Every party is entitled to participate in the Commission. The Commission is the principal organ and the main decision-making body with major objectives to promote the development, conservation and management of living marine resources; and to formulate and recommend conservation measures.

Fisheries management in the Mediterranean Sea has been subjected to national measures during many decades. Actually, the fisheries management system in the Mediterranean countries is based on the individual management of each coastal state and the GFCM recommendations and its national applications. In addition, countries could implement more restrictive laws in order to preserve fisheries resources within the economic zones and wherever their national fleet are fishing. The structure, organisation and performance of the national fishery sectors around the Mediterranean Sea are significantly different as appraised within the GFCM

and its Scientific Advisory Committee (SAC) framework. At the regional scale the fishing industry reflects the regional socio-economic set up and two large groups, the European Union (EU) member countries, and the Mediterranean countries non-EU members.

The role of the GFCM is clearly defined as an organisation responsible for the management of the resources by the formulation of measures and recommendations, as well as, the application of such measures. The GFCM encourages the development, the conservation and the rational management of the living marine resources. To accomplish this principal objective, the GFCM has defined functions and responsibilities (http://www.gfcm.org) including: Examine the state of the resources; Formulate and recommend measures for the conservation and the rational management of the living marine resources, including the fishing gear regulations, the minimum fishing size, the application of closed fishing seasons and the catch regulation and distribution among its Member States; Review the economic and social aspect of the fishing industry; Put into practice the recommended measures; Encourage, promote, recommend, co-ordinate and formulate initiatives towards training, investigation and development; Publish and disseminate information on the living marine resources and its fisheries; Promote programmes for marine and brackish water aquaculture and coastal fisheries enhancement.

The usual approach to establish management decisions by the GFCM is as follows: the SAC (Scientific Advisory Committee) formulates annual recommendations based on the works carried out by its four Sub Committees and transversal Working Groups. These recommendations are reviewed during an annual meeting of the Commission and the members, normally by consensus, decide which

recommendations should be adopted and which demand more information or actions from the SAC. During the annual meeting of the Commission it is decided which of these recommendations will form part of the Resolutions approved by the GFCM, as pointed out in the Commission Rule of Procedure document.

Management decisions related with ICCAT Resolutions are not automatically adopted by the GFCM. Resolutions from ICCAT are normally distributed to the members by the GFCM Secretariat and discussed by the Commission during its ordinary meetings. To adopt an ICCAT decision or resolution by GFCM, the Commission adopts its own Resolutions.

Fisheries management in the Mediterranean Sea is a complex and difficult task. The multi-species nature of many fisheries and their great diversity, the concentration of fisheries within territorial water, the important fisheries in international waters, and the large number of countries involved all render management a difficult task. Much could be achieved in term of an ecosystem approach simply by bringing some of the fisheries under closer control (ESUG, 2004).

State of the main exploited fish stocks in 2008

The SAC Sub Committee on Stocks Assessments carries out during its annual meetings a joint evaluation of the main stocks. The presentation of the stocks assessment formed by national experts is a free decision depending of many constraints but mainly of the data obtained from the fisheries and the biological parameters calculated by the scientist. That means that not all the stocks or the Geographical Sub Areas of the GFCM region (GSAs, Resolution GFCM/31/2007/2) have been covered during

the 2001-2008 period (SAC, 2009). The whole assessment process in clearly defined by the SAC and its protocols and formularies. Examples of assessments carried out by the Sub Committee on Stock Assessment are available in the GFCM Web page for the national experts in order to check results from other assessment of the same species.

To prepare the present document the author obtained the information directly from the SAC annual report (SAC, 2008) and the information, data, analysis and the assessment results that are presented from the GFCM Web page. Nor the GFCM or the SAC are responsible of some possible error or misunderstanding introduced by the author in the following tables.

SCSA advice on Mediterranean stocks status in 2008

According the SAC 2008 report:

> "The SCSA coordinator noted that joint stock assessment of hake and associated species was performed as requested by the Commission. SCSA revised 34 assessments corresponding to 21 demersal stocks (3 shared) and 13 small pelagic stocks (5 shared), covering 12 species and 10 GSAs.
>
> Coordinator also presented a synthesis of the information related to the assessments and related management advice by stock and by GSA for the period 2001–2008. This clearly demonstrated that assessments were still to be done in several GSAs, in particular in the eastern part of the Mediterranean.
>
> The Committee noted that the stocks assessed were mostly fully exploited or overexploited, and that management measures needed to be taken urgently.
>
> The Committee endorsed the management advice on demersal and small pelagic species as suggested by the SCSA and presented in Tables below, including some adjustments. Consequently and on the basis of previous

assessments, SAC agreed to submit, for consideration by the thirty-third session of the Commission, the following management advice:

Unless proven unnecessary by sound scientific evidence, a reduction of at least 10 percent of fishing effort on demersal species shall be applied for all GFCM GSAs as a precautionary measure"

(The CGFC has now agreed on this recommendations and adopted the Resolution GFCM/33/XX).

Demersal stocks

The demersal stocks represent nearly 55% of the overall yearly landings in the area. The SAC has confirmed the diagnoses of biological full exploitation or even over-exploitation. The Committee also underlined that this situation is the result of both the conditions of the exploited populations and the exploitation patterns applied. The Committee particularly mentioned the need to establish a recovery plan for *Parapenaeus longirostris* in GSA 6. The SAC Management advises for the demersal stocks are presented in the Table 1.

Table 1 – Management advice for demersal species. (SAC, 2008)

GSA	Stock	Stock status	SAC Management Advise
01 Northern Alboran Sea	Red mullet (*Mullus barbatus*);	Moderately exploited. Y/R very close to the maximum	Not to increase the fishing effort
05 Balearic Islands	Hake (*Merluccius merluccius*)	Fully exploited. Moderate fishing mortality. ntermediate abundance	Not to increase the fishing effort Enforce the 40-mm square mesh
	Striped red mullet (*Mullus urmuletus*)	Moderate fishing mortality Intermediate abundance. Fully exploited (Y/R very close to the maximum and Bnow is about 37 percent Bvirgin)	Not to increase the fishing effort, especially in the trawl fishery
	Red mullet (*Mullus barbatus*)	Moderately exploited to fully exploited. Moderate fishing mortality Intermediate abundance. Current Y/R very close to the maximum and Bnow being 21 percent to 25 percent of Bvirgin	Not to increase the fishing effort
	Norway Lobster (*Nephrops norvegicus*)	Fully exploited. Moderate fishing mortality. Intermediate abundance	Not to increase the fishing effort Enforce at least 40-mm square mesh
	Red shrimp (*Aristeus antennatus*)	Fully exploited. Moderate fishing mortality. Intermediate abundance	Not to increase the fishing effort

06 Northern Spain	Hake (*Merluccius merluccius*)	Overexploited. High fishing mortality. Low abundance	Reduction of fishing effort of trawl Enforce at least the 40-mm square mesh size in the cod end in bottom trawl Establish temporal closures for long line and gillnet during the period of maximum spawning Protect the spawning grounds through the implementation of MPA
	Red mullet (*Mullus barbatus*)	Overexploited The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/ collapse High fishing mortality Low abundance	Reduce effective fishing effort of 20 percent by reducing time at sea from 5 to 4 days per week Enforce at least the 40-mm square mesh in the cod-end
	Deep-water rose shrimp *rapenaeus longirostris*)	Depleted. Catches are well below historical levels, irrespective of the amount of fishing effort exerted. High fishing mortality	Need for recovery plan
07 Gulf of Lions	Hake (*Merluccius merluccius*)	Overexploited. High fishing mortality. Low abundance	Reduction of 20 percent of the fishing mortality by reducing time at sea, number of fishing boats, engine power, Bollard pull and/or trawl size, etc.) Enforce at least the 40-mm square mesh size in the cod-end Closing nursery areas, at least temporally (possibly identified by trawl surveys) Protecting spawners during the period of maximum spawning (winter and spring) by closing on the continental slope the areas where the spawners live.
09 Ligurian	Hake (*Merluccius merluccius*)	Overexploited. High fishing mortality. Low abundance	Drastic reduction of the fishing mortality (40–80 percent)

15 and 16Malta and South of Sicily	Hake (*Merluccius merluccius*)	Overexploited	Reduction of the fishing effort at least 40 percent
16 South of Sicily	Deep-water rose shrimp (*Parapenaeus longirostris*)	Overexploited High fishing mortality Low abundance	Reduction of the fishing mortality by 30 percent (decreasing of fishing capacity and activity) Enforce at least the 40-mm square mesh
17Northern Adriatic Sea	Common Sole (*Solea vulgaris*)	Overexploited High fishing mortality Low abundance	Reduction of 10 percent of the fishing pressure applied by rapido trawlers (in terms of number of vessels and/or fishing time) (to reach Fmax) or of 50 percent about (to reach F0.1) A two-months closure for rapido trawling inside 6 nm offshore along the Italian coast, after the biological fishing stop (August) The safeguard of spawning areas (both in spatial and temporal terms) to prevent a possible future exploitation might be crucial for the sustainability of the Adriatic sole stock

Small pelagic stocks

The Mediterranean small pelagic resources represent about 40% of the total landings and are characterized by large fluctuations in stock size and affected by the marine environmental changes. Some anchovy stocks are subjected to an excessive exploitation. The SAC mentioned in particular the case of the sardine in GSA 17 for which an obvious state of overexploitation was observed and thus stressed the need to take drastic measures. The Committee further agreed on:

i) Reducing fishing effort without increase of capacity, and

ii) Establishing a closed season of at least 45 days.

The 2008 SAC Management advises for small pelagic are presented in the Table 2 below:

Table 2 – Management advice for small pelagic species (SAC, 2008)

GSA	Stock	Stock status	SAC Management Advise
01 Northern Alboran Sea	Sardine (*Sardina pilchardus*)	Fully exploited	Not to increase the fishing effort
	Anchovy (*Engraulis encrasicolus*)	Low biomass	Based on the 2006 assessment, unless there is an increase in recruitment evident from the 2008 autumn survey, fishing effort should be reduced
06 Northern Spain	Sardine (*Sardina pilchardus*)	Fully exploited	Not to increase the fishing effort
	Anchovy (*Engraulis encrasicolus*)	Very low biomass	Reduce the level of fishing effort
07 Gulf of Lions	Sardine (*Sardine pilchardus*)	Intermediate abundance	Not to increase the current level of fishing effort
	Anchovy (*Engraulis encrasicolus*)	Low abundance	Not to increase the current level of fishing effort. Although preliminary results show strong recruitment for the next year, the exploitation of the stock should be done with caution
16 Southern of Sicily	Sardine (*Sardina pilchardus*)	Low biomass for 2006 and 2007 Moderate exploitation rate	Given that biomass was low for two consecutive years (2006–2007) and that the exploitation rate of sardine is moderate, fishing effort should not be increased beyond the current level. However, due to the low level of the anchovy stock, measures should be taken to prevent a shift of effort from anchovy to sardine
	Anchovy (*Engraulis encrasicolus*)	Very low biomass for 2006 and 2007 High exploitation rate	Given that biomass was very low for two consecutive years (2006–2007) fishing effort should be reduced until there is evidence for a strong incoming year class
17 Northern Adriatic Sea	Sardine (*Sardina pilchardus*)	Over-exploited	Reduce the fishing effort by the way of closing season (at least 45 days/year) for sardine and anchovy, to protect the spawning of sardine, without increasing fleet capacity. The effect of this measure to be monitored by yearly evaluation
	Anchovy (*Engraulis encrasicolus*)	Fully exploited	Not to increase the fishing effort§. Fishing effort reduction on sardine should not be transferred to anchovy, when applicable

As the Committee noted in the 2008 report most of the Mediterranean demersal and small pelagic stocks

assessed were mostly fully exploited or overexploited, and management measures need to be taken URGENTLY. Several management measures suggested by the SAC as a reduction of the fishing effort (closing season) or not to increase the actual fishing effort could improve the situation of most of the stocks although some stocks need more drastic measures as the implementation of a management plan to recover the depleted stocks. The Commission during the 33rd session, held in Tunis, Tunisia, 22-27 March, after reviewing the SAC advise on the sardine stock in GSA 17, agreed that the SAC should provide further information on the basis of new analysis on the state of the stock and the fishery.

Concerning the demersal fisheries resources assessed the SAC recommends to implement the GFCM Resolution on 40 mm square mesh size in codend of trawl nets exploiting demersal resources operating outside territorial waters and that such measure needed to be urgently implemented and enforced. During the 33rd GFCM meeting several delegations, noting that "*implementation of this measure would require important technical and financial effort from the Member countries, requested support from the FAO regional projects*" to carry out the necessary research work. As an immediate answer to the GFCM request the project CopeMed II offered his support to prepare and execute a pilot action to be carried out during 2009 on the implementation of the 40 mm square mesh size and analyse its biological and socio-economic effect in Morocco with the participation (on the job training) of experts from other countries and the support of experienced SAC experts in order to prepare replications of the measure implementation in the other countries sharing the CopeMed II project with the pilot action lesson learned.

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Salvatore R. Coppola, Senior Adviser, FAO

INTEGRATING KNOWLEDGE FOR THE IMPLEMENTATION OF THE ECOSYSTEM APPROACH TO FISHERIES (EAF) IN THE MEDITERRANEAN

Mr. Chairman, distinguished guests, Ladies and Gentlemen.

First of all I should like to thank the Organisers for their invitation to address this forum and for the opportunity to make known some of the ongoing work that FAO has initiated through its Mediterranean Fishery Projects on issues related to the Ecosystem Approach to Fisheries and some of the results achieved so far.

As the subject of my contribution to this seminar indicates, I will focus my address on that part that goes from data collection, data processing, and the integration of the resulting information into wider and multidisciplinary information systems, to support decision making in planning action and activities to achieve the objectives. It is within this frame that I will also introduce one of the activities undertaken in the Strait of Sicily (Maltese waters included).

The purpose of an ecosystem approach to fisheries is to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by marine ecosystems.

Source: FAO: Putting into practice the ecosystem approach to fisheries, Rome, FAO, 2005

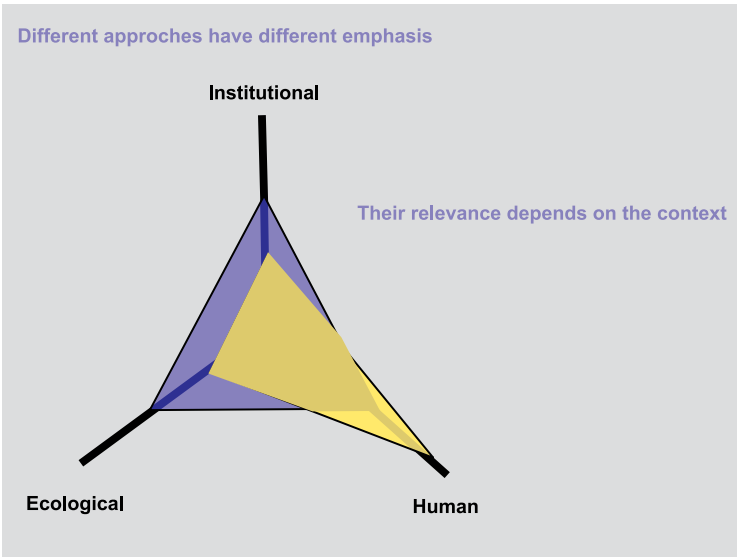
The above picture communicates perfectly the illustrative and textual definition of the main purpose of the Ecosystem Approach to Fisheries, which is *" to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardising the options for future generations to benefit from the full range of goods and services provided by marine ecosystems"*.

It is clear that, in order to make this undertaking possible, an effective mobilization of the people most concerned (decision-makers, marine environmental scientists, social scientists, coastal-zone managers, administrators, politicians, etc.) and, of course, the fishermen themselves, is not only necessary but is essential and must be continuous and timely.

These people mainly work in institutions, or are professionals, dealing with a variety of interrelated themes and issues, and since they all, directly or indirectly, become involved in decision making and activities they must have easy and timely access to good quality statistics and information (in the wide sense) in the dual aspects as information producers and users. As stakeholder specialised groups, their involvement in such a process varies from case to case and from situation to situation. And, because of their diversified specializations the team needs to put together, process and analyse information produced from different data typologies and formats.

Therefore, they also need to be able to interact strongly with data and information networks outside their specific fields and be able to learn situations and states-of-the-art from other experiences.

Moreover, after the exhaustive and forceful presentation by Dottoressa Bianchi on the theory and application strategies needed to put the approach into practice, we learn that the decision process varies case by case right from the start (the entry strategy is crucial in the Ecosystem Approach to Fisheries) and, therefore, it is plausible that a standard, traditional information model cannot be established a priori. The graphic below (FAO Fisheries and Aquaculture Report No 884. Rome, FAO, 2009. 53p)) in my opinion expresses clearly the concept behind the Ecosystem Approach to Fisheries planning process where we see that the three major contexts (Institutional, Ecological and Socio-economical) interact and, at the same time, overlap each other all contributing to the decision.



Now, if we re-consider what I have spoken about above from the data/ information viewpoint we can understand that we are talking about a very complex data management system that must have access to a variety of databases regardless of their physical locations, ownership and formats.

Databases are the instruments to supply processed data to management information systems in a structured and normalised way and they are, therefore, the building blocks of Information Systems to Support Decision Making. Furthermore, in the specific case of the Ecosystem Approach to Fisheries, we should also contemplate their exploitation in Planning Support Systems which differ from the decision making systems because they also contain facilities to test hypotheses, build models, perform planning analyses, risk analyses etc., and provide connectivity with the external world.

All the above must cover a wide spectrum of data elements and formats starting from numerical data, descriptive data, graphical data, pictorial data, maps, models, etc., encompassing data domains like ecology, economics, social science, GIS, normative, etc.

This is a large (though fascinating) task that needs to be implemented gradually and made accessible to the stakeholder specialist groups. Fortunately, nowadays, technology allows the development of genuinely integrated information systems, networked and not, based on structured and non-structured data sets from many different formats by implementing various solutions, concepts and applications.

The objective is the rationalisation of the means and the methodologies to be applied, and proper planning of data collection, processing and networking activities of all those initiatives (national, regional, international) participating in the implementation of an EAF preferably from the very beginning. From the connectivity perspectives, both the internet and web technology allow a strong interaction and link between all parties concerned (data providers and users).

It seems to me that, at this stage, we have to be pragmatic. If the EAF is the choice, then most data collection and data processing activities that directly or indirectly contribute to building up an EAF approach should follow given **top down** rules and formats. Otherwise instruments in the hands of EAF experts will always be irregular, limited and incomplete.

This is the present and the future prospect. But, we also believe that it is equally important to highlight that the implementation of an Ecosystem Approach to Fisheries needs long-term time series and therefore we need massive work in data archaeology.

Historical data are fundamental to understanding and explaining today's phenomena and to evaluating evolutionary trends, the causes and effects, and their magnitudes as well as to constructing trends and reference points.

The crucial issue is what kind of data are needed, and how to search, collect, store and manage the information produced since it was generated from diverse sources with different structures, natures and dimensions and whose data were collected (and elaborated?) within other frameworks to accomplish other objectives.

That was the question that we posed ourselves, in 2000, when formulating the MedSudMed Project, (*Assessment and Monitoring of the Fishery Resources and Ecosystems in the Straits of Sicily).* It is worth recalling that the implementation of the Ecosystem Approach to Fisheries was, at that time, practically a new item of discussion among advanced scientists and, though we were novices in this discipline, the issue was taken into consideration, and it was decided to investigate if and how a project activity could be programmed to be of some use to the implementation of an EAF in the Mediterranean taking also into account the importance we give to historical data.

As mentioned earlier, ecological and ecosystem studies of fisheries require interaction between various types of data, material, facts and figures in order to ensure a full description of the fisheries resources and the set of parameters influencing them: a complex and powerful analytical tool was, therefore, the choice. These are the justifications that fashioned the idea of developing a computerised system aiming at studying the status of the research undertaken in the past years by all the participating institutions in the region on issues related

to the Ecosystem approach rationale. The system named FEIS (Fishery and Ecosystem Information System) has been developed in its working prototype and is being used by several institutions.

As the first action, scientists from the participating countries (Malta, Sicily, Tunisia and Libya) with some direct or indirect experience in issues concerning EAF, Marine Protected Areas, Integrated Coastal Management, oceanography, and other related issues were invited to a series of technical meetings to discuss and decide on how to build such a system. We believe that this was the first time such an activity was ever undertaken in the Mediterranean at the regional and sub-regional level.

During the project life a computerised modular 'package' to enable users to search and aggregate data and information for eventual use in Geographic Information System (GIS) technology was conceived and developed. It has the capacity to store, analyse and present quickly all the basic parameters used to describe the changing status of the fish stocks, their environment and the fisheries depend upon them. The key information would concern biological aspects of the resources, environmental parameters, fishery statistics and accessory data. The primary motivation is to be able to cross reference several types of information, in order to have a synoptic vision of fishery resources and their environment.

The most important component of the package is the powerful data mining functions as well as the implementation of a GIS to monitor more efficiently the changing status of fish species within the ecosystem. This is critical to both fishery scientists and oceanographers.

One of the immediate outputs of the system is, by collecting and aggregating old data and information, to identify areas or domains where research is lacking,

where time series have been interrupted, where surveys of the same nature have been conducted with different references and therefore not immediately or directly usable for joint analyses. The system should also help in defining new standards and survey strategies, interact with present survey systems in the region and promote new initiatives to complement, extend or further explore new ways.

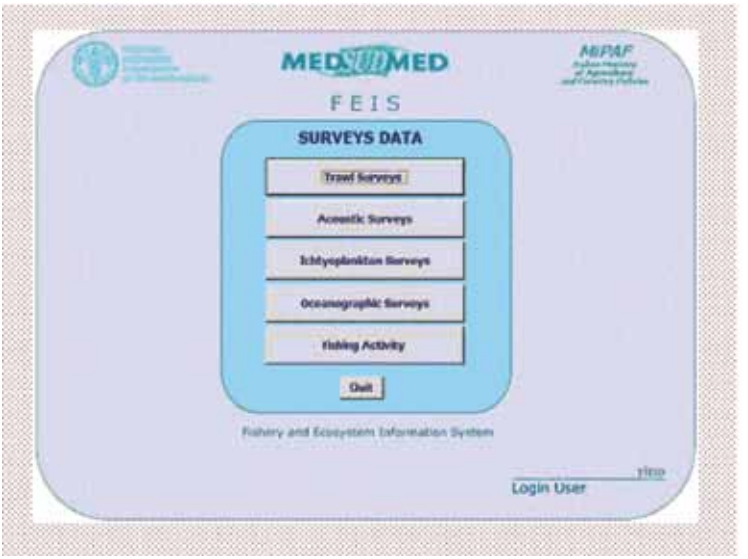
Let me briefly summarise the peculiarities of this new experiment":

The DataBase structure is constituted of i) a **corporate database** which contains public data and basic information, maps, documents and other relevant material arriving from both the participating Institutes and public sources, ii) **database applications** including, among the several modules, an intelligent data entry module to assist the user in the input or import of data into the national Database; a data management module for the management of the database; and a data analysis module including query, reporting and data uploading to the corporate system and, iii) a **web Interface** which allows visibility of and accessibility to agreed information contained in the system.

The data capture started with the systematic collection of all survey data and references of studies conducted starting from the present to the past systematically. It will encompass results from:

Pelagic Resources (Acoustic surveys)
Demersal Surveys (Trawl Survey results)
Marine Protected Areas
Fishing Effort performed by national fleets
Benthic Fauna Surveys
Sediment Surveys

The computer snapshot that follows is the opening screen enabling the users to work in the various data domains.



The user-interfaces have been rationalised to the maximum all containing the same (or very similar) look-and-feel templates as well as a complete set of functions:

- Data entry and data management
- Sectoral and Global query functions
- Standardised outputs in Text, Worksheet (Excel) and GIS

FEIS was conceived following data warehousing architecture and constructed around three data hierarchical layers

- **Survey Identification** (Figure 1a)
  Meta data on typology and characteristics of the surveys
- **Description of hauls/stations/tows per survey** (Figure 1b)

Geographical and technical data

- **Biotic and Abiotic data per haul/station/tow** (Figure 1c)
  Selection of the most representative data collected in the surveys

Users can decide on the level of completion to use the package.

In the following snapshots some examples of the internal organisation are produced.

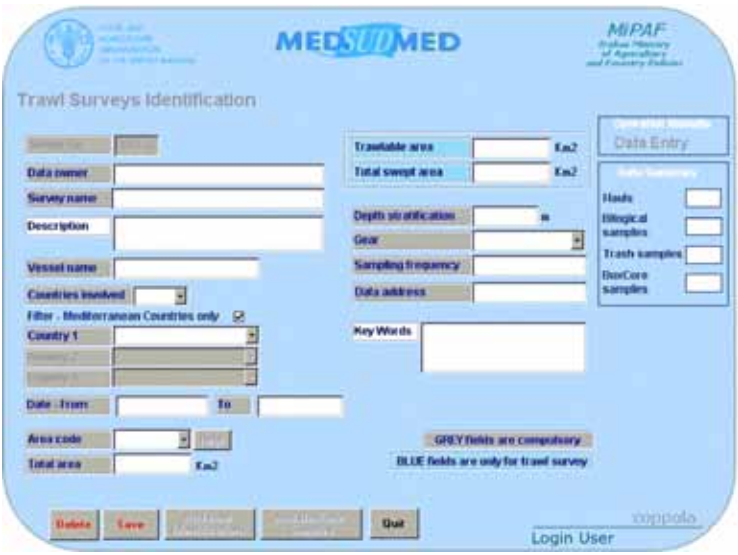


Fig. 1a - Survey Identification

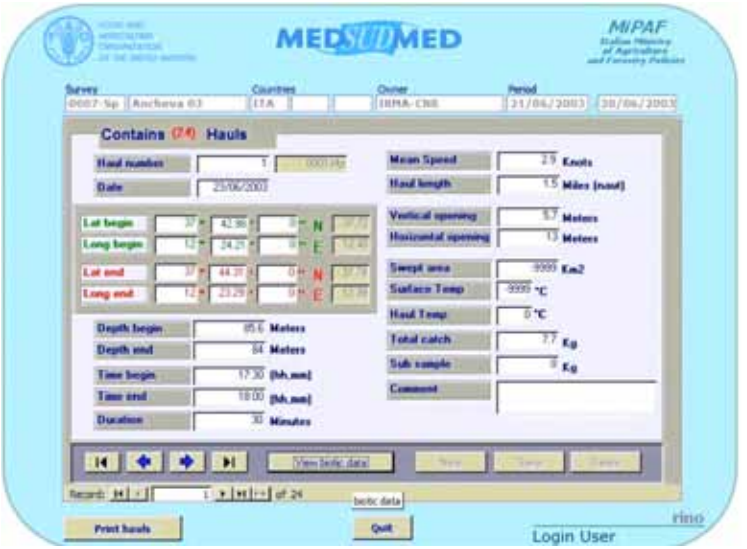


Fig. 1b - Description of hauls/stations/tows per survey

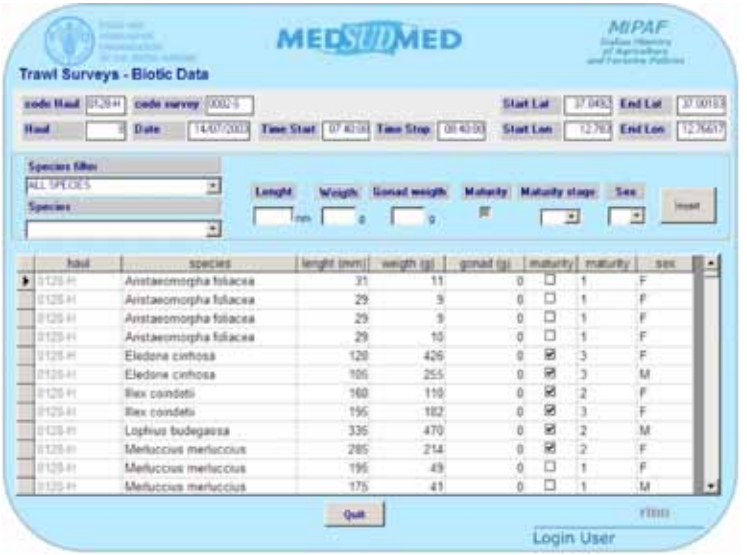
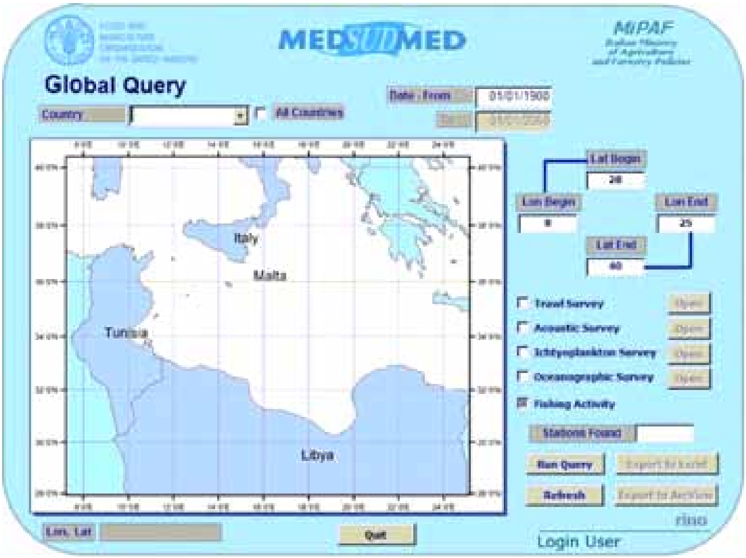


Fig. 1c - Biotic and Abiotic data per haul/station/tow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Bathymetry
GSA
Apply
Algeria
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MEDSUDMED

To conclude my intervention, Ladies and Gentlemen, allow me a few more minutes to give you some expectations for the future of FEIS.

FEIS, whose implementation has already been extended to the Adriatic Region, has recently been evaluated by the SAC (Scientific Advisory Committee) of the GFCM and it has been decided to incorporate it into the GFCM programme of work to be further exploited covering the Mediterranean region as a whole. Hopefully, FEIS can also help in harmonising standards and survey strategies, interact with the present survey systems in the region and possibly contribute to promoting the concept and implementation of the Ecosystem Approach to Fisheries throughout the Mediterranean.

To be enabled to respond to this new task, it is essential that, once handed over to the GFCM, it will be re-engineered and re-elaborated to become a web-based system to be posted on the GFCM Server and managed accordingly. In the meantime, technical feedback is expected from countries/institutions and experts to advise on its new implementation and finally open it as a social network enabling national and other individual experts to actively participate.

Pedro de Barros, Fisheries and Aquaculture Department, FAO

IMPLEMENTING ECOSYSTEM BASED FISHERIES (EAF) IN THE MEDITERREANEAN THROUGH THE NETWORK OF THE FAO REGIONAL PROJECTS

Introduction

Although EAF is now considered as the framework of choice for fisheries management across the world, it is clear that the Mediterranean in particular is a choice location for the implementation of EAF, because in this region, even more than others, it is difficult to implement the more "traditional" ways of managing fisheries that have produced important results in areas like the Northern Atlantic.

Some of the particular conditions of the Mediterranean that make it an area requiring almost absolutely the management under EAF, can be listed as follows:

a) Almost all Mediterranean fisheries are multi-species fisheries
b) There is a dominance of small-scale, multi-gear fishery, with a very large diversity of stakeholders and a large geographical dispersion that make centralized management and especially monitoring unfeasible
c) In most areas, there is not one single dominant fish stock that can be managed more or less in isolation,

but many stocks with relatively low biomass levels. The few exceptions to this rule refer mostly to small pelagic fish like the sardine;

d) The majority of the fish stocks in the area are distributed across the waters of two or more countries, making them, *de facto*, shared stocks;

e) There are no 200-mile EEZ's, and in fact only very few countries claimed Exclusive Economic Zones beyond their territorial waters, what makes most of the Mediterranean international waters, with the corresponding management difficulties;

f) Being one of the most ancient humanised seas, it is subject to multiple conflicting uses across most of the area. The main human activities disputing the area are Fisheries, Tourism, Coastal Development and Waste Disposal, plus many others, with their relative importance varying markedly among the countries bordering the Mediterranean. It is thus not possible to manage fisheries while ignoring all the other interests on the same area and resources.

The challenge that the FAO must rise to is thus to support its member countries bordering the Mediterranean Sea to achieve the sustainable management of Mediterranean taking into account its characteristics of (a) multi-dimensionality, (b) Regional dimension and (c) Multiple and conflicting uses of the Sea and coastal area

The FAO Network of Mediterranean Regional Projects

The FAO has been aware of the need to rise to this challenge for a few decades already, but its response has only started to develop and become operationalised

in the mid-1990's, when the layout of what would become FAO's programme of support to the sustainable management of Mediterranean fisheries was first made explicit. This layout is based on a network of projects, most linked to specific areas of the Mediterranean, to enhance the capacity of the countries to implement the Ecosystem Approach to Fisheries in the Mediterranean and reinforce regional cooperation at all levels. Started in 1996, with the entrance into operation of the CopeMed project (that covered the Western and Central Mediterranean), this programme has been expanding steadily with the pass of time. It was first reinforced with the AdriaMed project, covering the Adriatic Sea, in 1999, and then with the MedSudMed project, that covered the area of the Straits of Sicily, in 2001. The MedFisis project, created to assist all Mediterranean countries in improving their fisheries statistical systems, was the first of these that was thematic, rather than geographically-based. The coverage of the whole Mediterranean by the Programme was only completed in 2009, with the entry into operation of the EastMed project, covering the Eastern Mediterranean.

The approach and philosophy of the Programme, and of the Projects it is comprised of, for supporting implementation of EAF in the Mediterranean within the larger EAF planning and implementation process, is represented in Figure 1, borrowed from the previous speaker. As Dr Bianchi has remarked, this process is marked by three main characteristics, (i) stakeholder participation, to maximise ownership and alignment of management with societal goals, (ii) the requirement for the use of "best available knowledge", ensuring that all decisions are based on the most adequate knowledge, especially scientific, where this is available (but not excluding other types of knowledge, like

traditional knowledge) and (iii), the adoption of adaptive management, recognizing the inherent uncertainty of fisheries systems and introducing feedback mechanisms for adjusting management measures based on the experience obtained by their implementation.

Activities carried out

The Mediterranean Regional Projects, until now, have concentrated their activities on the enabling part of the tasks, i.e. reinforce the capacity of the countries and the GFCM and creating the conditions for actual implementation of EAF.

Specifically, until now the projects have focused mostly on the two first aspects, stakeholder participation and consultation, and provision of best available knowledge, that are seen as creating the conditions for the actual implementation of EAF.

Because, as also mentioned by the previous speaker, EAF will evolve from existing fisheries management institutions and practices, in cooperative regional arrangements, the projects have also focused on institutional capacity building of national and regional institutions, and reinforcing regional institutional cooperation.

A more detailed account of the activities pursued by the FAO Mediterranean Fisheries Programme may be organised according to the main categories of these activities.

The first of these, training and capacity building, both in research and management, is a cross-cutting category that is embedded in almost all other activities, since it is a basic tool to achieve any of the long-term goals of the

Programme. Under this heading, the projects have carried out a large number of activities, including specialized intensive training courses, on-the-job training actions and institutional/infrastructural capacity building activities.

Since the start of the first FAO Mediterranean project, CopeMed, until the present moment, the projects have organised and supported over 60 specialized intensive training courses. Most of these targeted specialised research areas and techniques, like courses on fish stock assessment models, database management tools, or Geographical Information Systems (GIS) for fisheries. Some courses, however, targeted instead fisheries managers, like the courses organised on the sustainable management of artisanal fisheries, or on general fisheries economics and management. Although these courses were in general organised by a single project, thus more focused on a specific sub-region of the Mediterranean, efforts were always made to make them available to researchers or managers from the other sub-regions. For the FAO Mediterranean projects, these courses represented an important opportunity not only to raise the level of knowledge of Mediterranean fisheries and marine researchers and managers, but also to establish common standards and language across the region, a *sine qua non* requirement for good regional cooperation.

Despite the large number of dedicated training courses organised and delivered, by far the most important form of training used by the projects was on-the-job training. In fact, this form of training has several important advantages for the objectives of the projects, of which the most important can be listed as (a) It is easier to transfer to the actual everyday tasks of fisheries research and management, (b) does not involve removing the staff from their activities for a long, potentially disturbing

period, and thus allows training to reach the more professionally involved staff, and (c) when done in a framework where staff from different institutions are present, it is a strong bond-creating activity, functioning as a catalyst for further improved cooperation. Until now, the projects have supported over 50 on-the-job training actions, covering areas like scientific surveys at sea, port sampling, fisheries statistics, data analysis and biological analysis, among others, with an important number of trained staff.

But institutional capacity building requires also, where needed, support to reinforce the capacity of institutions to exchange information and ideas, as well as to organise and present their own information, or to access information and knowledge available. Duly concerned with these issues, the projects have supported several of their partner institutions in reinforcing their capacity on Information and Communication Technologies. This included supporting the improvement of tools for access to the internet, and communication using the Internet infrastructure, but also tools for information management, like Relational Database systems that were implemented in several countries.

For improving Best Available Knowledge, the second pillar of EAF implementation, the projects have developed activities under two main directions. On the one hand was an effort to improve the ***quality*** and ***quantity*** of existing knowledge, while a simultaneous effort was made to improve the ***availability*** of existing knowledge.

For expanding existing knowledge, the projects supported a number of research projects and activities, including joint regional scientific surveys at sea, targeting both demersal and pelagic resources, and biological research on the main features and dynamics of the

principal exploited resources. It is increasingly recognised that social elements strongly condition the effectiveness of fisheries management measures. Accordingly, an important effort has also been put into expanding existing knowledge on social factors affecting the dynamics of fisheries, through providing support for socio-economic surveys on fishers and fishery-related societal elements.

Expanding existing knowledge is not enough. Very often, even if knowledge exists, it is not available to the people (researchers, managers, other stakeholders) who need to access it. Therefore, the projects promoted a large number of dissemination activities, like workshops, seminars and specialised publications, aiming at making the "processed knowledge" available for a wider audience, and therefore usable for the process of EAF planning and implementation. Simultaneously, the projects reinforced the ease of access to more detailed scientific and technical information on the Mediterranean Fisheries, by developing and making available dedicated Information Systems for fisheries purposes. Some of these are meant to be a portal for easy access and retrieval of general information and publications, like the Fisheries Ecological Information System (FEIS) or the databases available at the Adriamed website www.faoadriamed.org, while others, like the MedStat fisheries Information System, the AdriaMed Trawl Surveys Information Systems (ATrIS), or the AdriaMed Database on Fisheries Social Survey Data (DBS), are actually data management and processing tools that provide institutions across the region with a common set of tools and concepts for storing, quality controlling, managing and processing different types of fisheries- or ecosystem-related information.

The regional, ecosystem-level management explicitly addressed by EAF requires an enhanced level of inter-

institutional and international cooperation, which the projects pursue consistently, with a number of activities that contribute to this goal.

The most evident of these is the annual Project Coordination Committee meetings, that include representatives from each of the countries covered by the projects, and which decide on the programme of work of the projects in support of the countries, focussing on joint activities. Other activities carried out and supported by the projects include Joint research activities, including international scientific surveys, Joint Fish Stock Assessment Working Groups, and activities of data standardisation and exchange. These latter activities are essential in the way towards regional coordinated fisheries management under EAF, as common or at least coordinated management requires compatible data across the whole region to be managed.

Finally, EAF requires the promotion of stakeholder consultation and participation, and the projects have supported this through a number of activities targeted specifically towards this goal. These include the Identification of Stakeholder Groups, that has been carried out in several countries of the region, and the promotion and support of Country Participatory Working Groups, an activity that has recently started.

On a more general level, the projects have been training staff of the fisheries-related institutions in the participating countries on participatory techniques, and have been developing active ties of consultation and cooperation with organisations from the civil society, including several Non-Governmental Organisations.

This is an area where important work remains to be done, as this has traditionally been given less importance

under "conventional" fisheries management, but the work done until now puts the Mediterranean in a good position to catch up in a short time, using the support from the FAO regional projects in cooperation with their partner institutions, as an essential tool to provide faster development conditions.

Main results to date

This important volume of work has already produced a good number of results directly relevant to the actual implementation of EAF in the Mediterranean.
First and foremost, the Projects have significantly contributed to the development of a strong regional cooperation framework and environment, that is the major element allowing regional-level work and cooperation, essential for effective fisheries management worldwide, but even more so in an area like the Mediterranean. Under this cooperation framework, essential activities like Joint International Research Activities (including joint research projects and even joint Scientific Shipboard Surveys) were carried out by all the Projects in operation until now (CopeMed, AdriaMed and MedSudmed). In the framework of Fisheries Management, another essential activity, the Projects have managed to hold joint Fish Stock Assessment Working Groups, where scientists from several countries sharing one or more fish stocks come together to assess the state of the stock and of the fisheries based on them, using multiple methods and data pooled across the countries. Discussions on actual management of such joint stocks were also carried out, involving several countries across the areas covered by the different Projects.

The projects have produced important work in assisting countries increase knowledge on the multiple scientific areas involved in EAF. In the earlier periods of the projects, most of the research leading to this increased knowledge was related to the Biological/Ecological dimensions of the regional seas, but recently a larger proportion of the work has been focused on increasing knowledge on the social and economic factors conditioning fisheries. This is considered essential, as until now very little is known on the social and economic factors that drive the exploitation of marine fish stocks in the Mediterranean, or on the social and economic consequences of different possible alternative management measures, and it is always more evident that explicit consideration of the social and economic drivers and constraints of fisheries management is essential to achieve effective sustainable fisheries management in a human-dominated system as the Mediterranean.

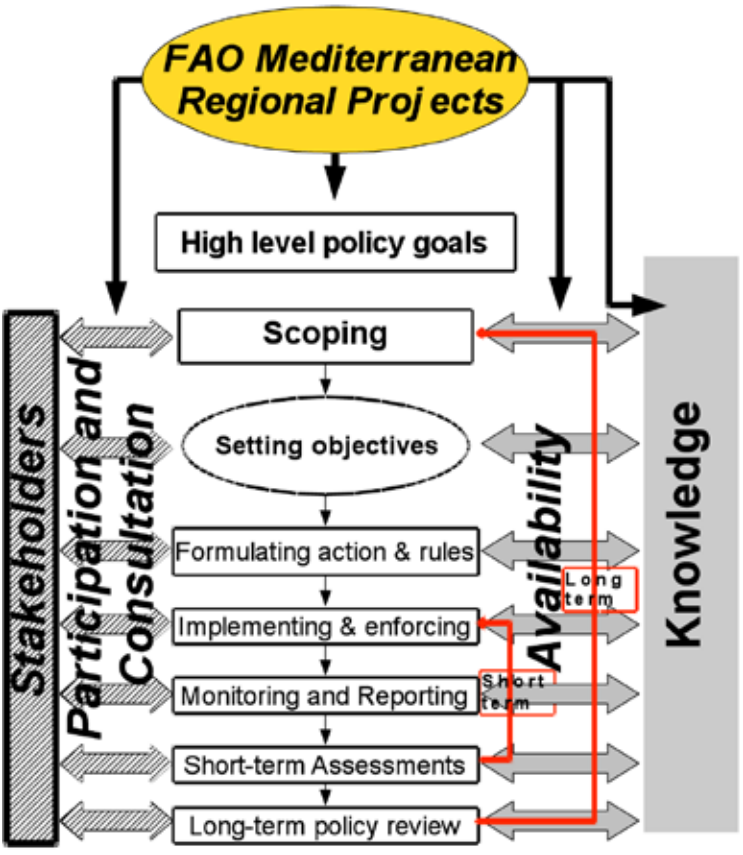
Up to now, the knowledge acquired with the support of the projects has been documented in more than 100 publications. More detailed information on the work produced under the different projects, as well as downloading of many scientific publications produced by the projects, can be found in the websites of the Projects, listed in the Annex.

Like in many other domains, in EAF the whole is more than the sum of the parts. In this case, the cumulative effect of the results obtained from each of the areas of knowledge referred is a set of improved enabling conditions for the implementation of formal EAF processes in the Mediterranean Sea region

Future work

The work of the FAO Mediterranean Regional Projects on EAF is only starting, and an important work lies ahead. This is all the more important because the increased awareness across the whole region of the need and importance of EAF puts increased pressure on countries and regional organizations to actually start implementing the necessary policies and associated measures. Therefore, the FAO Mediterranean Regional Projects are starting a new phase, in what concerns their EAF work. In this new phase, the Projects, while continuing current work targeted at reinforcing the capacity of countries' institutions to manage fisheries according to the Ecosystem Approach to Fisheries, will start supporting the countries for actually running the participatory process for actually implementing EAF in the Mediterranean. This will be made in a coordinated way across all the projects, in a close cooperation with several of FAO partner organizations, including GFCM and different NGO's working on these issues in the Mediterranean.

Figure 1. Action areas of the FAO Mediterranean Regional Projects on the EAF Management cycle. (Modified from Bianchi, this volume)



Annex: Websites of the FAO Mediterranean Regional Fisheries Projects

More detailed information about these projects and the activities of the FAO Fisheries Department in the Mediterranean can be found in the following websites:

CopeMed:	www.faocopemed.org
AdriaMed:	www.faoadriamed.org
MedSudMed:	www.faomedsudmed.org
GFCM:	www.gfcm.org
FAO Fisheries Department:	www.fao.org/fishery

Matthew Camilleri, Officer - General Fisheries Commission for the Mediterranean

THE INTEGRATION OF MULTIDISCIPLINARY INFORMATION – A PREREQUISITE FOR GFCM'S FISHERIES MANAGEMENT STRATEGY

Introduction

The particular characteristics of Mediterranean ecosystems in conjunction with multi-species and multi-gear fisheries operating in the Region present intricate scenarios which add complexity to the implementation of regional fisheries management schemes. Nonetheless, the General Fisheries Commission for the Mediterranean (GFCM)[1], a Regional Fisheries Body established in 1949 under the provisions of article XIV of the FAO constitution, has over the years developed a pragmatic approach to fisheries management which takes into consideration the four dimensions of sustainability - ecological, economic, social and institutional - identified by FAO (2001) within the framework of the Code of Conduct for Responsible Fisheries. In order to enable it to conduct responsible fisheries management at optimum levels, the GFCM has a number of scientific subsidiary bodies which monitor the fisheries resources and the fishing activities which exploit them, as well as track sustainability indicators and establish reference points in a reliable and timely manner.

1 http://www.gfcm.org

The GFCM fisheries management strategy

The GFCM fisheries management strategy is essentially based on fishing effort control systems accompanied by other technical measures, rather than a catch and quota system, whereby effort is managed by categories of vessels or Operational Units[2] (Camilleri *et al*., 2000; GFCM, 2001; Accadia and Franquesa, 2006) each of which being associated with certain fishing effort parameters which are regulated accordingly. In this respect, the GFCM strives to estimate the relative impact of Operational Units on various resources in order to draw up appropriate effort control measures for each Unit, while considering the ecological, socio-economic and governance dimensions, each having equal prominence, as much as possible, in line with the Ecosystem Approach to Fisheries (EAF). The EAF is recognised and adopted as the best framework for fisheries policy, planning and implementation by the world community (Bianchi, 2008) and the GFCM is fully committed to this more holistic approach to sustainable development in fisheries.

Data collection framework

Any fishery management system would be "blind" without a mechanism to collect reliable data on the fishery sector and resources to be analysed by scientists in order

2 "For the sake of managing fishing effort within a Management Unit, an Operational Unit is the group of fishing vessels practising the same type of fishing operation, targeting the same species or group of species and having a similar economic structure. The grouping of fishing vessels may be subject to change over time and depends on the management objectives to be reached" (GFCM glossary)

to provide a basis for decision making (Garcia *et al.*, 2003). In fact, data and information underpin all stages in the EAF management process including formulating policy, developing management plans, and evaluating progress and updating policy and plans to provide for continuous improvement (FAO, 2003). In this context, the GFCM has established a multidisciplinary regional data collection framework[3], TASK 1, through which information is compiled by Geographical Sub-Area[4], fleet segments and Operational Units. The TASK 1 regional database and information system coupled with other regional systems, dealing with the status of fisheries resources and other aspects of the fisheries ecosystem (eg. Fisheries Ecosystem Information System - FEIS), provide a complete set of information tools for both fisheries scientists and

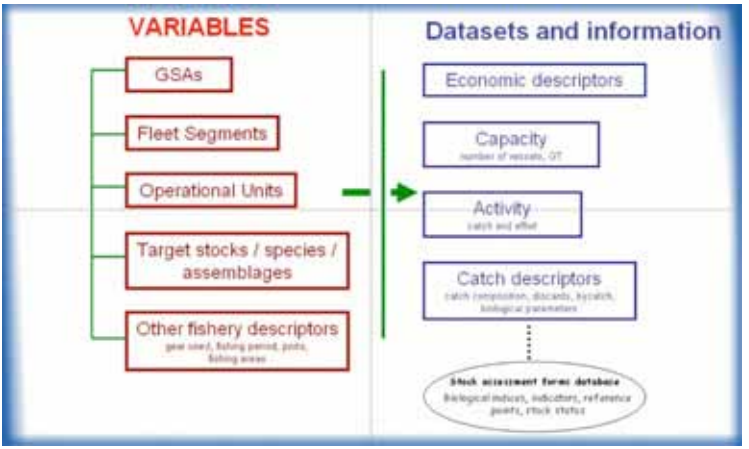


Figure 1. Variables, datasets and information available through the TASK 1 system.

3 RECOMMENDATION GFCM/33/2009/3 on the implementation of the GFCM Task 1 statistical matrix and repealing Resolution GFCM/31/2007/1

4 RESOLUTION GFCM/33/2009/2 on the establishment of Geographical Sub-Areas in the GFCM Area amending Resolution GFCM/31/2007/2

managers involved in the scientific monitoring and management decision processes respectively. Figure 1 illustrates the list of variables and corresponding datasets available through the TASK 1 system.

Naturally, the success of the system relies on the commitment and compliance of the GFCM member countries to submit data and information as well as on a harmonised reporting process. To support this, the GFCM has laid down data submission protocols and business rules and has also developed an innovative electronic data reporting tool[5] with an integrated user guide. It is, ultimately, in the interest of the twenty-four Members of the GFCM to pool the data and information which fuel the regional fisheries management advisory process upon which binding legal instruments for fisheries management are drawn up.

The fisheries management process

The fisheries management advisory process could be conceived as a container which receives and processes data and information coming from various sources and, in turn, delivers results relevant to the formulation of management decisions. The first part of this concept is illustrated as a model in figure 2 in which seven essential components for the management advisory process have been identified: (a) fleet capacity, (b) fishery activity and production, (c) fishing effort, (d) ecosystem factors and indicators, (e) fishing mortality, indices, reference points and indicators, (f) status of fisheries resources and (g) socio-economic status of the fishery. The source of

5 GFCM Task 1 – Operational Units DB application Beta

information for five of these components is evidently the TASK 1 framework[6].

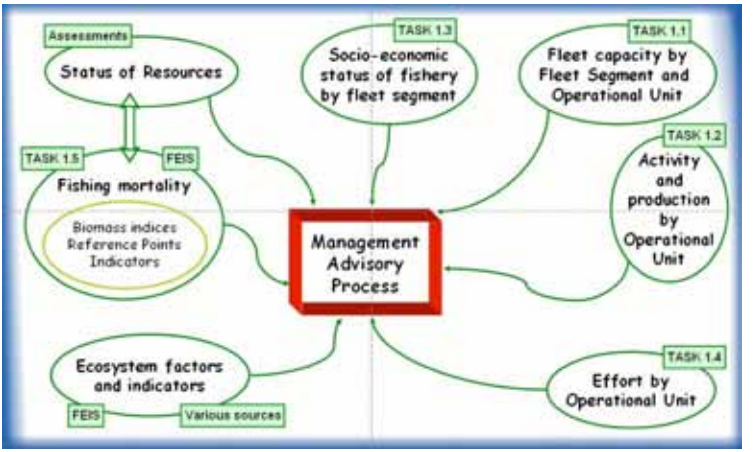


Figure 2 Components of the Management Advisory process

Keeping all sustainability dimensions in view and depending on the objectives to be reached, the management advisory process could present a number of various measures. In the GFCM context, these measures focus on the regulation of fishing operations and broadly include fleet capacity limits, closed seasons and areas, fishing gear restrictions, minimum landing sizes and effort control. It is important, however, that management measures are easily understandable to all fisheries stakeholders in order to be implemented effectively, and thus it is imperative that they are expressed quantitatively (eg. number of vessels, gear dimensions, fish sizes, area geographical coordinates, definition of fishing period, fishing effort units). In this regard, the information provided as an input to the management advisory process is re-utilised

6 TASK 1 data collection framework comprises 5 sub-tasks – 1.1, 1.2, 1.3, 1.4 and 1.5.

in the management decision phase to determine precise limitations on fishing activities and to forecast the effects of such measures on the fisheries ecosystem and fishing industry (figure 3).

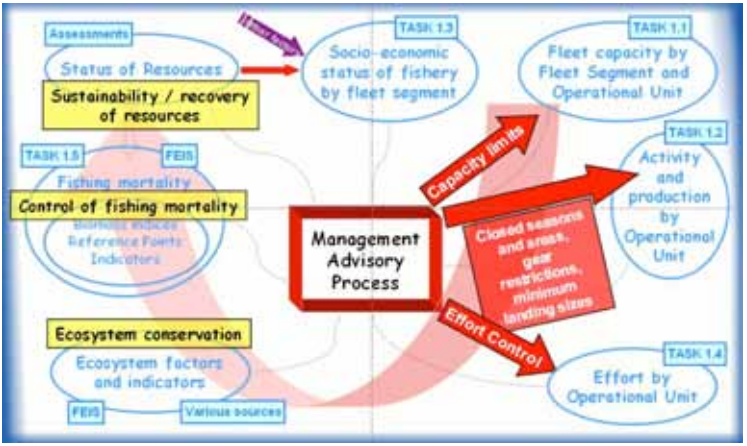


Figure 3. The outputs of the fisheries management process.

Management decisions generally aim to conserve the ecosystem and control the impact of fisheries on living resources, with the ultimate goal of ensuring sustainable exploitation of fish stocks on which the livelihood of fishers and other stakeholders depends. Nevertheless, the effective implementation of any fisheries management regime depends on sound governance at both national and international level and in this respect the GFCM is endeavouring to strengthen regional governance which considers both human and ecosystem well-being and equity, in compliance with the EAF.

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Niels Wichmann, Managing Director, Danish Fishermen's Association, and President, Europêche

ISSUES FACING THE FISHERMEN

I would like to thank the organisers for inviting me to speak at this conference.

My topic is "Issues facing the fishermen". It is a wide-ranging subject, not least because there are vast differences from area to area in the European Union and between the different types of fisheries.

I will start by covering a number of general issues which are common to all of us in the Common Fisheries Policy. Then I will comment on the issues which are specific to the Mediterranean fisheries, and take a "Country by Country" tour highlighting some of the more national questions.

General Issues

There is no doubt that the **International Financial Crisis** is the single biggest worry in the fisheries sector at the moment. On the one hand the crisis has meant a considerable drop in the fish prices across Europe, i.e. the prices paid to the fishermen. In particular the most expensive species have been hit. The prices to the

consumers have not followed the downward trend to the same extent. On the other hand, the crisis has resulted in a shortage in credit available to our sector. This means a virtual stop for the necessary investment in new vessels and in the upgrading of the organisational set up.

At the political front the big issue is the upcoming **reform of the Common Fisheries Policy – the CFP.** The CFP was agreed upon in January 1983; it has since been revised in 1993 and in 2003. A new revision or even a reform is planned for 2013. The European Commission has already presented a brief document to start the discussions going. It may seem in good time before 2013. But reaching a consensus is a long process because it is envisaged to involve the new co-decision procedure between the Council of Ministers and the European Parliament. It is the general opinion that a new piece of legislation will take on average two years to get through once the Lisbon Treaty is introduced – after Ireland's reconsideration during a second referendum on the Treaty.

The Commission has announced a no-taboo debate on the CFP. All views can be put forward for discussion. The Commission has asked the Advisory Committee for Fisheries and Aquaculture - ACFA - to give input on which items we stakeholders want treated in the reform of the CFP. A working group of ACFA gave its input in a document in mid-February which was discussed in a three-day conference in early March in Rome. Public debate will start in May after the Commission publishes a greenbook at the end of April. A greenbook is in fact a list of ideas and issues. The debate on the future CFP is of great importance for us all in the sector, since the CFP regulates our daily life and our financial situation.

Some of the elements or sub-policies of the CFP have to be amended or reformed before 2013. Among these

are the **Common Organisation of the Market – the CMO, the Technical Rules, the Control Regulation, the Governance structures.**

The CMO is the basis for the intervention system, where a fish can be taken out of the market at a so-called withdrawal price if it cannot fetch this price in the open market. It is a kind of an EU supported insurance scheme, sort of a minimum-price guarantee. The system, however, has not followed the gradual increases in market prices. Therefore a number of fishermen question their membership of the EU-approved Producer Organisations. A new Common Market Organisation must be established, but it is not at all clear how.

The technical rules are today assembled in a general regulation from 1998. It has been amended several times and is now up for a total revision. This has to do with fishing gears and their construction - Is 6 mm thread thickness acceptable or maybe 2 x 4 mm if it is double thread? These are some decisions for 27 ministers! Technical rules also deal with closed seasons, closed areas and a whole lot of other specific measures.

The Control Regulation, the basis for the EU and national fisheries control, is also under revision. The Commission is looking for an overall strengthening both of the control efficiency and of the sanctions applied in the individual countries.

Governance, the active involvement of stakeholders, was one of the key issues in the 2003 review of the CFP. Now we have the advisory body ACFA in Brussels but also a number of Regional Advisory Councils, RACs, covering the different areas of the EU. The latest is the Mediterranean RAC which will have its secretariat in Rome. The task at hand is to find out how the different structures, particularly ACFA and RACs, should be

linked in future to ensure sound advice and the least-possible overlap.

So a number of big issues are under negotiation at the moment. By having the whole CFP up for revision or reform and, at the same time, having sub-policies dealt with separately we may be running the risk – yet again – of having a CFP that lacks coherence, where the different parts of the policy will not complement one another. I think **the possibility of this continued lack of coherence is the single most important issue in the fisheries policy and, consequently, the single most important matter for the fishermen in the coming years.**

We will now turn our attention to Mediterranean Issues.

Mediterranean Issues

All the other Regional Advisory Councils – including the one which is species-specific, the Pelagic RAC – except the **Mediterranean RAC,** have been set up. It has been a difficult process here because of the very many interests and the limited number of seats on the Executive Committee. There are only 24 seats. But as I said already, it is now under way in Rome and it will be interesting to follow. We have had the North Sea RAC for four years, and the Baltic and Pelagic RAC's for three years already We also have for this area the **GFMC** (General Fisheries Commission for the Mediterranean) which is FAO-driven as other speakers have described.

The **Reform of the CFP** and the special features of the Mediterranean are naturally of utmost importance. There are huge challenges because of the involvement of many non-EU Mediterranean fisheries nations. It is crucial for

the success of whatever policy is eventually adopted how we go about dealing with three-country relationships.

I mentioned previously **Technical Measures** and the general revision. A specific set of measures has been agreed for the Mediterranean, but it has not yet been fully implemented. It has generated a lot of discussion and protests against 'over-regulation', because the number of rules, such as minimum mesh sizes, has been drastically increased. Besides, **Fisheries Management Plans** will have to be worked out.

It is necessary to build **stronger links between the fishermen and the scientists** in order to create a policy that reflects the real conditions of the sea whilst at the same time giving the fishermen space within which they can continue their work. A number of outside interests are being introduced and pressure is mounting for the creation of **Marine Protected Areas – MPA's** as well as **Natura 2000 areas.** If we do not handle these pressures carefully we will end up both with totally closed areas and areas where specific types of fisheries are wholly or partly banned.

The Control Policy will be coordinated from the new EU Control Agency in Vigo in Spain. The control agency has defined the Mediterranean as one of their priority areas so a lot of work will have to be done by all parties involved on this issue.

I already drew attention to the "country situation" in this area. A solution will have to found for third-country relations, fishing rights, fisheries policy, and general policy. Part of the international set up is **ICCAT,** the tuna commission. All countries have tuna interests so the policy of ICCAT is of immediate importance for all in the region.

Specific national issues and concerns in the Mediterranean

Now embarking on a **tour of the individual EU countries in the Mediterranean,** I will highlight some of the issues facing fishermen in the individual countries. There are many parallel problems. I will not list them under every country; I will just give examples thereby illustrating the diversity of this sector and the related issues.

Spain has a long tradition of fishing "everywhere" and is therefore confronted with rules in many places. Our Spanish colleagues would like to see **the same rules apply inside and outside the EU.** Spain has, like other countries, struggled to pull through the fuel crisis and is still affected by it. Now the openness of the market has meant that imports are flowing freely into the country at very low prices undercutting locally caught products. In Spain there is heavy resistance towards the **new technical rules which are seen as simply not understandable.**

France is very much affected by the EU **stop for Bluefin Tuna** and resists that as well as opposing the Hake-closure in the Gulf of Lion. **The lack of scientific data** is seen as a problem; it is argued that there is no justification to restrict fisheries in the absence of clear data support. **President Sarkozy had proclaimed the setting up of a Union for the Mediterranean.** The fishermen want to know what happened to it.

Italy has, like everybody else, problems with Bluefin Tuna and with the implementation of the control regime. **The Technical Measures** which will come into force on 1 May 2010 are strongly resisted and seen as misguided. Italy is looking for possible derogations for special fisheries/special species/special areas. Italy finds life difficult vis-à-vis their neighbours, especially Croatia and

Slovenia in the Adriatic. Besides they also have huge problems with the Libyan authorities.

Slovenia is engaged in a **serious struggle with Croatia over the division of their waters.** Croatian fishermen are very focused on the possibilities of pollution problems because of shipping. The **Slovenian fishing fleet is old and ill-equipped,** and it is difficult to access the necessary EFF funds for renewal.

Greek fishermen are particularly **worried about the overcapacity of the Turkish fleet** operating both in the Black Sea and in the Mediterranean. Important issues in Greece, like in other countries, include **imports, technical rules, and harmonisation vis-à-vis 3rd countries.**

In **Cyprus,** fishermen have difficulties because of the discussion with Turkey over **fishing grounds.** Furthermore, there is a debate referring to **Professional versus Leisure Fishers -** a discussion which arises in all countries.

Malta experiences the **financial crisis** on top of the **fuel crisis, fuel prices are determined in a monopolistic market set up.** There is a need for modernizing the sector. High on the list of wishes is a **new fish market, and better processing facilities. Maltese fishermen would also welcome additional funds for training. Last but not least Malta insists on keeping its derogation in the CFP with a 25 miles fishing zone.**

There is a lot to be done. But understanding the complexities and variety of issues and interests will be perhaps the most difficult part, but it will lead to a better appreciation of the matter under discussion. It also helps the formulation of workable, complementary policies that will support long-term effective fishing in the interest of the natural habitat and the fishermen.

Thank you for your attention.

Michael Roitmann, Directorate General for Maritime Affairs and Fisheries, European Commission

FISHERIES POLICY IN THE MEDITERRANEAN

As I will explain in this presentation the theme being discussed in this morning's Seminar is more than widely covered by certain EU's policies and other legal instruments administered by the Directorate General for Maritime Affairs & Fisheries. Foremost amongst these is the Common Fisheries Policy (CFP).

Basic Regulation on the conservation and sustainable exploitation of fisheries

The Basic Regulation on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy is Basic Regulation No. 2371/2002

This Regulation proposes

- A review of the CFP aimed at increasing efficiency in conserving fish stocks, protecting the marine environment, ensuring the economic viability of the European fleets and providing good quality food to consumers.
- A Green Paper to be adopted by the Commission at the end of April 2009. This together with contributions from

stakeholder organisations, the research community, other EU Institutions and Member States, the Green Paper should form the basis for a public debate of the future CFP.

- That following impact assessment and further consultations with stakeholders, The Commission will present a proposal for a new basic regulation in early 2011 to be adopted in 2012.

The reform process has already started in the field of ***fisheries control*** and the following action is already being taken:

- The current fisheries control framework from 1993 (R. 2847/93) will be replaced.
- The Commission presented its proposal on the 14th November 2008. This new Control Regulation applies to all fisheries related activities in Community waters, in Member States and outside Community waters. It is complementary to the IUU Regulation (R.1005/2008) and to the Regulation concerning authorisations for fishing activities of Community fishing vessels outside Community waters (R.1006/2008).
- The main objective of the reform is to ensure the respect of the CFP rules by building a new standard framework which will enable Member States and the Commission to fully assume their responsibilities. It establishes a global and integrated approach to control, focusing on all aspects of the CFP and covering the whole chain of catching, landing, transporting, processing and marketing – "from the net to the plate"

Structural Policy for the Fisheries Sector

Another important basic feature of the CFP in this respect is the ***Structural Policy for the fisheries sector.*** Foremost in this basic feature are

- The European Fisheries Fund under Regulation 1198/2006.
- The Operational Programme for the Maltese Fisheries Industry for the period 2007-2013 approved by the Commission in October 2008.
- A total eligible public expenditure of the programme amounts to €11.2 million, with EU assistance from the European Fisheries Fund (EFF) amounting to €8.4 million.

I feel I have to stress that the cornerstone of the CFP in the Mediterranean is Council Regulation (EC) No. 1967/2006 which concerns management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea, something closely connected with the theme of to-day's Seminar. It took the Council three years to adopt the Commission proposal which was based on the Commission action plan from 2002 for the Mediterranean and the results of the Venice Conference in 2003. The Regulation incorporates the eco-system approach to fisheries management through its emphasis on the protection of sensitive species, habitats and juveniles as well as its emphasis on management plans and fishing in protected areas.

What mostly caused the eventual inclusion of the regulation were

- High overall production and catch rates suggesting a decrease of 50%

- High levels of discards recommending a decrease
- The poor state of several stocks due to low levels of Spawning Stock Biomass (SSB).
- Inadequacy of the current exploitation caused by low selectivity and high Fishing mortality (F)
- Too wide spatial fishing grounds – brought down to 800 - 1000m
- Several fishing gears - Fishing all species and sizes without control
- Increasing level of fishing effort of non-EU countries
- Fishing impact on fish essential and sensitive marine habitats.

Objectves

As in all reasonably planned legal instruments the Regulation had specific objectives foremost amongst which the replacement of a 'Wait and See' attitude to one of 'adaptive management' in the National and Community management plans. To achieve this much desired result the Regulation proposes these measures:

- Integration of environmental protection (protected habitats, network marine protected areas, protection of littoral areas)
- The reconciliation of the exploitation rate with production potentials of resources such as Higher catch rates but Less discards
- Updating technical measures
- Retaining the social dimension of small scale fisheries.

Main Elements in Reg. 1967/2006

The Main elements in the Mediterranean Regulation No. 1967/2006 targeted Management plans on a Community and National level (art. 18 & 19) covered already by CFP Regulation 2371/2002 and changing passive management, into active and adaptive management the latter also meant to be bio-economic. The Management Plans directive also insists on the adoption of national plans for trawl nets, surrounding nets and dredges.

Another important element was that of creating Fishing Protected Areas (art.5,6 & &). A fishing protected area is a geographically – defined sea area in which all or certain fishing activities are temporarily or permanently banned or restricted in order to improve the exploitation and conservation of living aquatic resources or the protection of marine ecosystems. It includes also the protection of nursery areas, spawning grounds or marine ecosystem in national territorial waters, community or international waters.

Other objectives are:

Protected species and Habitats (art. 3 & 4):
This element is meant to extend to international waters constraints of the Habitats Directive which prohibits the use of certain fishing gears on Posidonia, Maerl, coralligenous habitats and at depth greater than 1000m.

Restrictions concerning fishing gears (art. 7 - 14):
The objective here is more extensive and it includes:

- Protection of coastal areas
- Strengthening of restrictions to use certain active fishing gears in littoral areas: towed gears 3 nautical

miles (NM) distance/50m depth; trawl nets never at less than 0.7 NM and conditions to operate between 0.7 and 1.5 NM from the coast; bivalves dredges o,3 NM

- Purse seines: 300 m distance/50m depth; depth never <70% of drop net
- Possible permanent derogations under strict conditions and at local level
- Gradual phasing-out: transitional derogations till May 2010 for traditional fisheries landed/taken on board already authorised in the past
- Prohibitions and conditions to the use of certain fishing gears and practices to protect environment, improve selectivity (less juveniles-less discards) protect social dimension in coastal areas
- Improve selectivity of bottom trawl: mesh size 40 mm square or 50 mm Diamond from 1 July 2008 - gradual phasing-in until May 2010 (no possibility of permanent derogation);
- Technical specifications for attachments and rigging of trawl nets:
- (strenghtening bag > 120mm - 30% of codend; codend single twine netting;
  Twine thickness: codend < 3mm – other gear parts <6mm; no increasing circumference of codend;
- Minimum hook size and gillnet mesh size for fisheries targeting red sea-bream
- Maximum dimension of fishing gears (annex II); drop and length, no of hooks,
- **Minimum sizes of marine organisms (art 15 – Annex III):**
- Undersize specimens shall not be caught/landed/taken on board/sold to avoid areas of seasonal aggregations of juveniles; hermaphrodite species; single market and imports from non-EU Mediterranean countries.

Possible needs to further improve selectivity to be done autonomously by the sector.

- **Leisure fisheries (art 17):** use of certain fishing gears (e.g. nets) prohibited to recreational and sportive fisheries
- **Control measures (art 20 – 24)** Catch composition, Transhipments, Designated ports, monitoring of catches (logbook 50kg to 15 kg); GFCM register of authorised vessels >15m
- **Measures for waters around Malta (art.26-27)**
- Based on the guidelines in the Treaty of Accession on the 25-mile fishery protection zone around Malta
- As a result of the enlargement negotiations the existing 25-mile zone was replaced by a non-discriminatory Community fishery protection zone limiting access to the 25-mile zone around Malta for vessels with a length of less than 12 metres, certain limited exemptions exist for larger vessels of 12-24 metres and for tuna vessels fishing in the 12-24 mile band. The fishing effort for trawlers between 12 and 24 m must not exceed the fishing effort in the period 2000-2001.

Other measures for the Mediterranean

- Bluefin tuna:

On the 26 February 2009 the Commission adopted a proposal to transpose into Community law the revised multi-annual recovery plan for Eastern bluefin tuna adopted by the International Commission for the Conservation of Atlantic Tunas (ICCAT) at its annual meeting in Marrakech, Morocco in November 2008

This proposal will be adopted well before the start of the main fishing season in mid-April and will be

accompanied by important control measures (Specific Monitoring programme of Inspection and Control and Joint Deployment Plan coordinated by the Community Fisheries Control Agency)

- Large pelagic driftnets:

Use of and carrying on board of all driftnets to catch highly migratory species is prohibited since 1 January 2002 (R. 894/1997 as amended by R. 1239/98)

The landing of all highly migratory species (tunas, swordfish, etc) which have been caught with driftnets is prohibited.

Fixing of the maximum overall length of legal driftnets (2.5 km) to catch species other than tunas and swordfish (R.809/2007 amending Art. 11 of R. 894/97)

Implementation of the Mediterranean Regulation

Unfortunately after several high level meetings and correspondence with Member States we are still encountering difficulties in the implementation of the Regulation. Foremost among the difficulties are

- Delays in the presentation by Member States of management plans and new fishing protected areas.
- STECF has evaluated the 'management plans' submitted and concluded that these cannot be considered as management plans with a sound scientific basis and in line with requirements.
- Same situation for NEW fishing protected areas. Deadlines are not respected. Information on fishing protected areas beyond national waters have not been communicated to COM
- This shows that, contrary to the intentions of the

Regulation, Member States do not take on their enhanced responsibility.
- The Commission will possibly propose Community plans on the basis of STECF reports and other scientific data

Ladies and Gentlemen, I want to end this presentation with a note on the **Mediterranean Regional Advisory Council (RAC)** which is of course of importance to you present here. The seventh and last RAC foreseen under the CFP reform in 2002 was created in Autumn 2008. The Mediterranean RAC will provide a forum for all stakeholders from Mediterranean Member States to debate fisheries management of fisheries in this area, and provide advice and recommendations on policy to the Commission and Member States. The first meeting is scheduled for April 2009.

James Grech, Captain, Armed Forces of Malta

MANAGING SECURITY IN THE MEDITERRANEAN

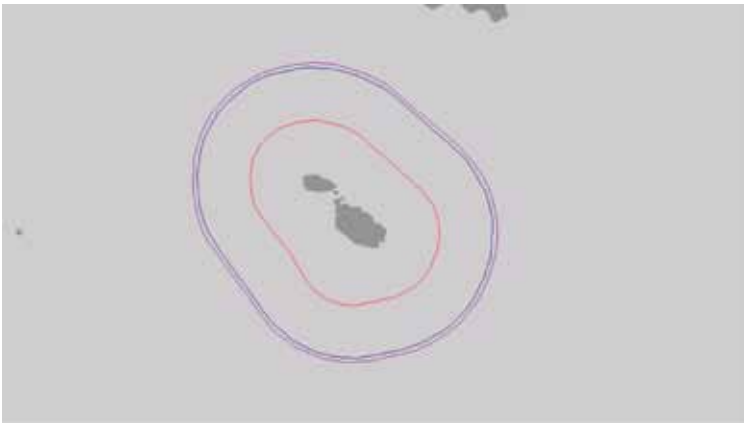
The Armed Forces of Malta (AFM) are entrusted with the security of the Maltese Islands. They exercise this task both on land and sea. They are constantly on the search to enhance their capabilities to meet effectively and efficiently the many commitments that arise from their responsibilities. This presentation highlights the range of duties and activities that are related to maritime missions.

Maritime missions encompass several inter-related duties that have direct human and economic implications. They absorb capital and human resources and demand inter-departmental and international co-operation. Such exchanges enhance operational capabilities and contribute to a safer maritime environment for all operators who ply the busy Mediterranean.

The Maritime section is responsible for the surveillance and maintenance of security at sea; policing of areas of maritime jurisdiction; the enforcement of maritime law, that cover border control and fisheries protection; search and rescue operations and support to other government and non-government agencies and organisations.

These duties are carried out in a wide territorial area that spans over internal and territorial waters, contiguous

and fisheries conservations zones, the continental shelf and a relatively vast search and rescue areas. These zones are illustrated below.



The Maritime and Air Squadrons

The Maritime Squadron operates eight patrol craft of various types and a number of small boats. Continuous investment takes place to re-equip and upgrade these crafts, in part with the technical support from other governments, in recent years from the United States, Italy and the European Union. Substantial investment was also made on base infrastructure.

The units allow the AFM to conduct sustained operations up to two hundred nautical miles with short-term operations being possible anywhere in the Mediterranean area. Capabilities now include the availability of the first flight deck, improvements in night operations, greater interoperability with other forces and greater flexibility in small boat operations.

Land-based maritime surveillance systems are now available. These include a coastal Vessel Traffic System (VTS), which is further enhanced with the addition of an Automatic Identification System (AIS) and Vessel Monitoring System (VMS) chain as well as possible optronic elements.

The Air Squadron operates seven fixed-wing aircraft and three helicopters. Only two of the wing aircraft are suitable for overwater operations with the remainder being limited to coastal patrol. The helicopters are single-engine machines and are therefore restricted in their operability over water.

Maritime capabilities also include a small diving detachment trained in Explosive Ordinance Disposal (EOD) and Improvised Explosive Device Disposal (IEDD) techniques.

Maritime Safety Missions

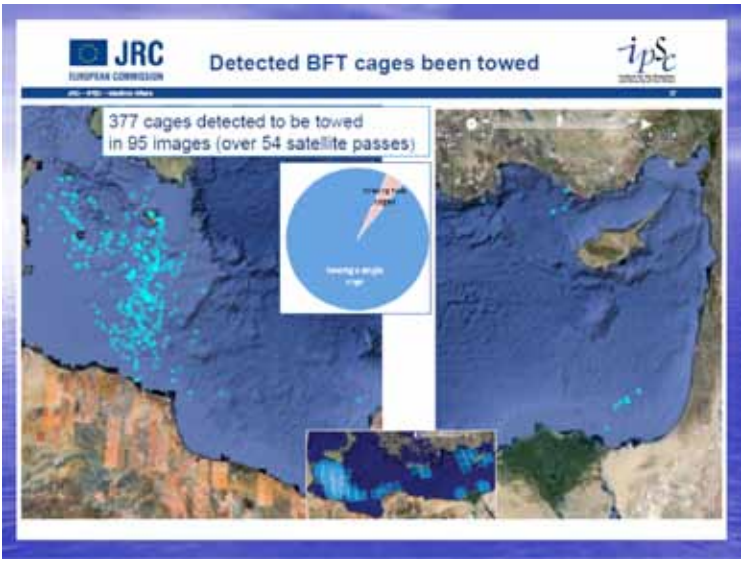
The AFM is involved in a number of maritime safety missions. The most important are the following: search and rescue (SAR); maritime traffic management and monitoring; provision of maritime safety information; and support to other government agencies in anti-pollution role. The AFM Operations Centre provides Vessel Traffic Management and Information Services (VTMIS) in compliance with EC 59/2002. These services are provided in co-operation with the Malta Maritime Authority.

The AFM is the designated competent authority for maritime search and rescue (SAR). The SAR region for which Malta is responsible covers 250,000sq km (See Figure 2 above) while the Maltese shipping registry comprises vessels that exceed a total 27 million tonnes. RCC Malta handles around 400 cases yearly. The AFM also operates a SAR Training Centre that provides training for both national and international students.

Maritime Security Missions

As the national defence force, the AFM is responsible for the maintenance of territorial integrity and surveillance of national areas including those at sea. This classical 'naval' role is only one of the many security roles that the maritime forces undertake at sea.

Maritime law-enforcement activities involve anti-smuggling operations, environmental protection, administrative law enforcement and enforcement of notices to mariners. AFM commitments to this effort include both air and surface assets. On a routine basis, the



AFM is engaged in the implementation of ISPS at both the national and technical levels. It also provides protection to visiting naval units and high-profile events such as the meeting of Commonwealth governments in 2005.

The AFM is also involved in EU co-ordinated operations with regard to fisheries protection. Joint deployment plans are implemented in support of the recovery programme for various stocks, most notably the blue fin tuna. The Armed Forces' commitment to this effort includes both air and surface assets.

When a vessel is sighted, it is contacted verbally and details are noted; these include vessel name, crew members, and fishing gear. The vessel is photographed and these images are included in the report. Documentation is handed over to the Fisheries Department. Routine inspections include the checking of documents, the logbook, the catch which is matched with information in the logbook, and the gear.

During 2008, joint EU inspections were carried out over 8 sea patrols and 18 flight patrols. There were 113 sightings which gave rise to 4 infringements being reported and 3 illegal fishing cases. The latter referred to swordfish, shrimps and blue fin tuna. The aim of these joint inspections was the sightings of IUU vessels involved in blue fin tuna activities – namely, fishing, towing, caging and farming.

During 2009, these blue fin tuna inspections will be continued to ensure the sustainability of the stock. It is envisaged to extend training of inspectors at CFCA Vigo and to carry out all year round fisheries patrols to ensure the successful implementation of the Common Fisheries Proposal. There will be increased co-operation with the Fisheries Department on controls both at sea and on land.

During these operations, the Armed Forces patrols come across small boats ferrying people from the North African coast to Europe. These travellers at times cling to tuna cages in the hope of being towed. The patrols take the apposite action in the circumstances. Surveillance of fisheries policy at times ends up in humanitarian relief operation.

National and International Co-operation

National security involves a close liaison between the Armed Forces, the Police, Customs, the Malta Maritime Authority and the Civil Protection Department. They combine forces to respond quickly and effectively to maritime challenges. In many cases this co-operation has been formalised through agreements. At a ministerial level, the line ministry responsible for the AFM (Office of

the Prime Minister) works closely with other ministries to co-ordinate activities as part of Malta's wider maritime policy

On the international front, the AFM participates in a number of multinational exercises in order to increase inter-operability and improve capabilities. A trained operating force can meet its responsibilities with confidence, charts its future and ensure the fulfilment of its obligations. In the context of today's seminar on the management of fisheries in the Mediterranean, this co-operation implies an effective monitoring of the EU's policies on fisheries and the safeguarding of the lives and equipment of those many who cross the dense Mediterranean Sea for their living.

Carmel Busuttil, Former Principal Fisheries Officer, Malta

A TRIBUTE TO FISHERMEN

When I was invited to submit a paper on Fisheries I felt that there was nothing to add to what would have been submitted by such an illustrious array of scientists. So I propose to express my views on why things almost never go the way they are intended to in Fisheries. And so here I am, exactly 100 years since the first official Regulations became law, trying to identify the factors that keep on hindering the evolution of an economic activity that also bears on the cultural and social life of the Maltese Islands.

My main intention is not to denigrate anything said or suggested by any Body or Authority but to try and highlight the plight of the most important and also the most maligned species in Fisheries – the Fisherman, who, apart from the natural hazards of his trade, has had to contend with stringent regulations which more often than not hampered him in his quest to earn a decent living. It is not that certain regulations are not necessary for the proper management of fisheries; it is just that very rarely are fishermen consulted before decisions are taken.

When I joined the Fisheries Division in 1968 I expected to be trained to become a real Fisheries Officer and to be introduced to at least the scientific basics of fisheries

management. In this way I could be of help to fishermen. Unfortunately this did not materialise; so I spent the first years sitting behind a desk doing clerical work and occasionally performing supervisory duties during sales at the fish market. During those early years the impression I was given was that fishermen were a lot of moaners hell-bent on milking the Division through persistent claims for grants. However when I started to spend more time in their company and discuss with them certain aspects of their trade, I found myself thinking otherwise.

Perhaps the most important characteristic of fishermen that I found out was that they were always ready to answer my queries and enlighten me on many aspects of fishing. I found this condition very comforting when I was given the task of writing monthly articles in the Ministry's publication, ***Biedja u Sajd.*** Besides, fishermen were also always ready to participate in the radio and television programmes which I produced years later. Fishermen have views of their own and they express them to all those who seek to learn more about this trade.

Who is a fisherman?

According to Wikipedia, a 'fisherman' or 'fisher' is someone who gathers shellfish or other animals from a body of water. This is a rather simple definition which can be expanded. I would add Hunter, Inventor and Provider.

The Hunter

A fisherman is basically a sea hunter and like his counterpart on land he uses his skill to stalk/snare and catch his prey. He is also of an independent mind and resents being forced to adhere to restrictive regulations imposed on him by people in authority who more often than not have never earned their living under the conditions prevalent in a fisherman's working life.

A fisherman's job falls into the 3D Category – Dirty, Demanding, Dangerous.

A fisherman is also very conscious of the need to protect the environment he works in, and when called upon to refrain from targeting or catching protected species he is always ready to conform. In fact Maltese fishermen do not land, say, turtles unless they are injured and need veterinarian help/medical attention. Similarly, sharks are not targeted anymore and the few that are landed each year are only by-catches.

The Inventor

Fishing as a means of providing food for the fisherman and his community started in the Middle Stone Age period, around 10,000 years ago near the time farming and domestication began.

Early man in search of food found that he could devise/invent means for catching fish, probably first by catching them with his hands, then successfully spearing them, securing them in nets woven in grass, and later hooking them with pieces of baited bone attached to strips of leather or lines woven from hair. The first tackle employing hooks and lines was discovered in prehistoric caves.

A cursory look at the number of implements invented by fishermen using every day material will give one an insight into their ingenuity. (Annex 1)

The Provider

Apart from providing food for himself and his community, a fisherman also provides employment for a large number of persons. People who earn their living through fishing include hawkers, middlemen, boat builders, suppliers of tackle, retailers of electrical (instruments) fishing aids, electricians, importers of marine engines, suppliers of mechanical fishing aids, engineers, scientists and a host of other personnel detailed to organise and supervise fishing activities.

Fishing covers a wide array of economic activities. The role of the fisherman has to be seen in this wide economic and social context and not restricted solely to catching fish.

History of fishing regulations in Malta

It is not known when fishing on a national scale started being organised, but regulations regarding the marketing of fish from a hygienic point of view were already in force at the time of the Knights. The modern era of restrictive Regulation did not begin until 1909 when a lengthy series of fishery regulations was promulgated.

The following year the same regulations were re-issued with some verbal alterations and a slight re-arrangement of some of the articles.

These regulations were made on the premise that the

industry was in complete disarray, and that stocks were being systematically put at risk by overfishing.

In 1919, G. Despott, who is regarded as one of the foremost pioneers in the scientific development of local fisheries, was requested by Government to design a scheme for the improvement of the industry.

What was submitted was an admirable piece of work, and had the scientific recommendations been carried out, they would have had most valuable results, particularly those dealing with research into the life histories of important species. Mr. Despott had remarked that: "Regulations framed without a sound scientific knowledge are sure to prove insufficient and even contrary to the ends aimed at". Quite true, but where did the experience of fishermen come in? Nowhere. In fact he proposed detailed and arbitrary restrictions at the end of his report. Unfortunately this trend in blaming fishermen for all the ills in the industry is still very much alive.

As a result of Mr. Despott's recommendations the first Fisheries Department was created to take charge of the issue of fishing licences and to carry out the scientific and educational programme envisaged by Mr. Despott who was appointed Superintendent of Fisheries.

New regulations issued in December 1920 very considerably tightened up the preceding restrictions on inshore fishing at a time when offshore fishing was inexistent except for kannizzati fisheries undertaken by just 48 boats; 31 in Malta and 17 in Gozo. But even here the floats were restricted to the deployment of just 20 floats per site and which obviously hindered the fishermen from augmenting their catches.

In the period 1921-1924 there were very large catches of most species of fish both demersal and pelagic but the period 1925-1929 showed a continuous decrease. As usual

this was attributed to excessive destruction of immature fish by the seine-net fishermen.

In 1929 fishermen suffered another blow when the use of lights was prohibited and consequently certain catches plummeted.

In 1931 the Government commissioned Mr. James Hornell F.L.S. to make a survey of the conditions of the fisheries of Malta and Gozo, which were then mainly confined to the coastline except for the kannizzati fishery which was confined to the deployment of only twenty floats.

In his opening summary Mr. Hornell wrote: "Heretofore the efforts of those in authority have been concerned almost entirely with the formulation of restrictive regulations upon certain methods of fishing which were believed to entail undue destruction among fishes in their immature condition and thereby tend to cause a decrease of catch in subsequent years".

At the end of his report Mr. Hornell recommended amongst other things a research programme into:

Spawning seasons, rate of growth, food and habits of common fishes;

Food habits and migration of pelagic fishes;

The development of offshore fisheries;

Upgrading of fishing fleet;

Upgrading of harbour facilities which was urgently needed for the fishery development;

Upgrading statistical collection;

The building of a modern fish market;

Technical education for fishermen;

Controlling imports of trawled fish which resulted in lower prices for local catches;

Setting up of an autonomous Fisheries Department;

Training of fisheries officers.

Unfortunately almost none of these recommendations were acted upon except for the building of a new Fish market, the organisation of statistical collection, while some harbour facilities were enhanced with the installation of secondhand cranes which were provided by the Services. The situation remained very much the same except for the introduction of price controls which precluded fishermen from getting adequate prices.

In 1956, Mr. T. W. Burdon was commissioned by the Government to examine the then- existing position in the industry and make recommendations for remedying the more serious defects occurring in it.

In the opening paragraph of his "Report on the Fishing Industry of Malta" Burton had this to say:

"The prices of most materials and equipment needed by the fishing industry have soared in recent years. The price of other materials has not risen so sharply, but the general increase in prices has not been accompanied by a proportionate rise in fish prices – a factor which cannot be attributed solely to price control legislation, although this was undoubtedly a contributory cause in the immediate post-war period. (A bale of cork which was indispensable for the fashioning of floats for the rigging of fishing gear and in particular for kannizzati floats, had risen by as much as 80% in ten years".

"Since catches have remained at the same level, the fishermen now receive a lower return for their efforts and this has led them to seek more remunerative employment ashore. The consequent loss of manpower has weakened the industry and constitutes a serious threat to future fish supplies".

"Furthermore, a considerable proportion of the market handlings is not landed by local fishermen. During 1953, landings from foreign vessels and imports from other

territories amounted to 16% of the market supplies by weight and 20% by value".

"The local fishermen, for whose abilities I have the highest regard, must be given immediate and substantial assistance if they are to compete on level terms with foreign fishermen whose operations are often subsidised by the governments concerned".

This meant that the lot of local fishermen, particularly through their exploitation by third parties, had remained the same for almost forty years since the First World War.

In concluding his survey Mr. Burdon highlighted the following shortcomings:

1. The limitations of existing boats in respect of range and seaworthiness;
2. The inadequate shore facilities available for the industry;
3. The high cost and relatively poor quality of the materials available for the construction of their fishing gear – a factor aggravated by the absence of an effective and durable net preservative;
4. The limited fresh market outlet for glut catches of small fish, particularly when other types of fish are available;
5. The absence of any other market outlet which might buffer the fishermen from the wide variations in prices which occurs in response to fluctuations in supply;
6. The activities of the Armed Forces in the waters surrounding Malta which hinder the inshore fishermen;
7. The lack of development of fishing harbours particularly Marsaxlokk;
8. Lack of a Loans Fund to finance the purchase of larger and more seaworthy fishing boats;

9. Lack of a fishing supply service.

Burton also made the following recommendations:

1. Improved relations with the armed forces;
2. Amendment of Fisheries Legislation to allow the use of lights;
3. Re-organisation of the Fisheries Department
4. Preliminary biological investigation;
5. The development of Marsaxlokk;
6. Transfer of fishermen to Marsaxlokk;
7. Vocational training;
8. Improved accommodation on fishing boats;
9. Improvement in statistics;
10. Cold Storage (Chilling);
11. Cold Storage (Freezing);
12. Establishment of a Fisheries library;
13. Processing: preparation of fish-oils and fish-meal from fish offal and unsaleable small fish; salting of small fish;
14. Re-equipment of the industry with larger boats through the establishment of a Loan Fund;
15. Introduction of line and pot haulers (mechanical);
16. Dredging of Marsaxlokk Bay;
17. Subsidy to local boat building industry;
18. New or improved fishing methods;
19. Improved net preservation;
20. Fishing material supply service;
21. Revision of marketing procedure;
22. Structural improvement to the Wholesale Fishmarket;
23. Removal of the control on fish prices;
24. Fish culture;
25. Shell-fish cultivation.

Most of them were almost immediately taken up and proved to be a boon to fishermen, although some other important ones were not deemed to be so urgent.

Perhaps the five most important innovations were the dredging and improvement of berthing facilities in Marsaxlokk harbour; the re-organisation of the Fisheries Department; the establishment of a Loan and Grants Fund for the upgrading and purchasing of larger boats; the launching of the Fishing Equipment Supply Service which enabled fishermen to buy gear at reduced prices and the setting up of the Fish marketing Scheme.

Marsaxlokk harbour: A most laudable project which went a long way to providing adequate berthing facilities for almost all the Maltese fishing fleet. The building of slipways also facilitated the maintenance of boats on dry land.

The re-organisation of the Fisheries Department: this included the enrolment of more Fisheries Officers, Technical Assistants and clerical staff. However the training of Fisheries Officers left much to be desired.

The establishment of a Loan and Grants Fund went a long way towards the upgrading and purchasing of larger boats. Loans were to be paid back in very soft installments, the Department deducting a small percentage from every fisherman's catch sold through the fish market.

The Fishing Equipment Supply Service enabled full-time fishermen to buy better and more durable gear at reduced prices.

The Fish marketing Scheme was also a very good step in the right direction as regards the collection of statistics. Through the Scheme fishermen were also guaranteed immediate payment for all catches sold through the fish market – this was done through the allocation of a special fund. The Department was charged with collecting the monies owed by fish-hawkers.

Other necessary installations, notably the construction facilities for chilling and freezing fish near the Wholesale Fish market, were undertaken much later but did not include ice-making machinery.

The purchase of the research and training vessel MFV Hannibal: for a number of years this vessel was used to train Fisheries Officers and prospective fishermen in navigation and fishing methods whilst undertaking scouting operations. In addition a Vocational and Training centre was set up through which young fishermen were taught English, basic mathematics and navigation.

Unfortunately in the early sixties fishing was not deemed to be as important as agriculture. Consequently the Fisheries Department was relegated to a Division of the Agriculture & Fisheries Department, and almost all fisherman-friendly initiatives were scrapped – most notably the Loans and Grants Fund, the Fishing Equipment Supply Scheme as well as the fund guaranteeing quick payment for fish landings. This means that fishermen now have to pay interest on bank loans and buy fishing gear at market prices, besides having to wait for weeks to receive the money due for their catches, since the section involved cannot issue any payments before sufficient amounts of money are collected.

The Jurong Experience

In January of 1975, the Government, with the assistance of the United Nations Development Program and the Food and Agriculture Organisation launched a project whose main objectives were the following: to reduce imports of fish by making Malta self-reliant with regards to the supply of fresh fish; develop a modern fishing industry;

demonstrate the usefulness of a trawler fleet; train Maltese fishermen and improve the handling, processing and marketing of fish.

FAO assigned Mr. Marcel Giudicelli to serve as captain of the project vessel ***Jurong*** and as such to be responsible for the safe navigation and efficient operations of the vessel. Besides, in co-operation with the fishing technicians and instructors embarked on the vessel, Giudicelli participated in the sea-going training of Maltese fishermen in navigation, seamanship and fishing, including the preparation, maintenance and repair of fishing gear and accessories. The team of instructors also conducted tests on modern fishing gears in order to determine the most productive fishing methods suited to the Mediterranean trawling grounds.

The project was wound up in June 1977.

Mr Giudicelli's report ***Simulated Commercial Trawling and Scouting Operations in the Central Mediterranean*** was, and still is, a mine of information regarding all aspects of trawling and especially the discovery of new large areas of pristine trouble free trawlable terrain teeming with all species of prized demersal fishes. (Annex 2)

Had the project been properly managed by the local authorities a wealth of good would have come out of it.

As it turned out, however, it became an exercise in softening the unemployment problem at the time. It did not focus on the training of youngsters, such as unemployed school-leavers who, given the right incentives, in the form of a share in eventual sales, could have been attracted into becoming full-time fishermen; they could have become even prospective owners of trawlers. As it turned out hundreds of members from the various Labour Corps were recruited, most of whom were disenchanted fishermen and ex-merchant seamen looking for a land-

based job and others who were not suited for sea-going work. Most of them did not do more than one trip. One trick crew members often used was that of feinting sea-sickness and many times the Jurong had to return to base and lose time waiting for fresh recruits.

From the marketing angle it was also a big flop, since landings were not handled by the professional middlemen, but by inexperienced personnel, and as a result the prices fetched were a mere pittance of what catches were worth. In addition, members of the crew were not allowed to consume of any of the fish caught, but were supplied with victuals which amounted to thousands of liri a week making the operation a colossal financial disaster. Incidentally, this same situation was identical also on the other six trawlers involved in the project.

Thus an unrepeatable opportunity to enhance the quality of local fisheries was wasted.

Since then a few decisions favouring fishermen were taken, but again they did not last long. Up to some time ago, all full-time fishermen could benefit from refunds from the Department of 50% of their National insurance contribution, as well as 4.4% of the total annual commission paid to middle-men operating at the Wholesale Fish market. These refunds were stopped on the promise that they would be substituted by free insurance on vessel, life and catches paid through Ministerial/Departmental Funds. The fishermen are still waiting for the implementation of this promise.

Closed seasons and Quotas

The introduction of a closed season for catching juvenile swordfish was a step in the right direction and is sure

to bear fruit. However it is a pity that it took so long to be implemented. The snag here is that unless such a closed season is endorsed by all the countries bordering the Mediterranean it may turn out to be futile and will only result in Malta losing out to countries whose maxim is "what you don't catch, we will". In fact this is what happens to the Sicilian trawling fishery during their "Fermo Biologico".

The year 1994 was the leanest year for Swordfish landings in the last 29 years. Catches amounted to just 42 m. tonnes. This occurred during a six-year period when landings did not go beyond 76 tonnes in any year.

The following year I penned an article titled "Fejn hu l-Pixxispad" (Where have the Swordfish gone?) in which I suggested that it was time to introduce a closed season for this fishery and also put a total ban on the use of the particular longline used. It would be fitting if some form of remuneration would be granted to fishermen who scrapped their gear voluntarily.

Frankly, at the time I thought that it was all due to overfishing, but years later, on examining statistics over a period of years I reconsidered this view. I now believe that it was not due to dwindling stocks, but due to a curious cycle, most probably due to the movement which occurs regularly in all species. I tend to think that the presence or otherwise of species which Swordfish feed on may have some bearing on this enigma. (Annex 3)

Total Allowable Catches

Professional resource managers often assume that the ecological knowledge obtained by professional fishermen during years of practical experience is of relatively little

use. At the same time, recent research indicates that knowledge gained on the spot, in the course of production is of fundamental importance.

If fisher's knowledge could be brought systematically into the process of resource management it will help in ensuring resilience and sustainability. After all, no land based expert can ever have the "gut feeling" fishers have regarding the fluctuation/movement of stocks and other natural conditions which are relevant for operations.

The Quota System – Divides access to the resources among those who happen to be boat owners when the system is introduced, largely on the basis of their fishing record over a number of years preceding the system. Every fishing vessel, depending on size/tonnage, is annually allotted a fixed proportion of total allowable catches.

Transferable quotas – If the quotas are transferable, one has to be very careful since this may result in the transfer of large resources into the hands of a relatively small group of people and not only does this system give permanent access to an exclusive group, but this right could be turned into a marketable commodity. Some boat owners holding more than they are capable or willing to fish, and others with more than they actually need, may temporarily rent a part or the entire annual quota.

This will create inequality due to the concentration of quotas which may lead to only a few boat owners gaining control of the entire national quota. If transferable quotas keep changing hands with full transferability and the number of boat decreases, where would all the quotas go?

This may lead to the cropping up of severe social and ethical problems, hence the need for closer collaboration between management and fishermen.

It is being earmarked that the local national quota for BFT will next year be distributed between boat owners according to the amount of catches sold through the Wholesale Fishmarket for the past 15 years. I cannot go into the merits of this decision, but I would ask for caution and further study before a final decision is taken, since here again some boat owners may be handed a raw deal and sustain considerable losses.

What if quotas start being issued for other fisheries such as Swordfish, Dolphin Fish and other most targeted species – Will it signal the end of artisanal fisheries in Malta? A browse through the internet under the title "Bridging the Gap between Science and Fishing" will give an insight into what is happening in other countries.

A Century of Commercial Fishing from a Statistical Standpoint.

Statistics are very important for fisheries management and are particularly useful for the study of trends in the availability of stocks. Unfortunately we tend to lay more emphasis on the lean years than on normal or good years. If one had to take any 10-year period for any species one would find that there exists a cycle of highs and lows which is repeated throughout the years for all species, irrespective of whether they are pelagic and highly migratory or demersal.(Annex 4)

Although commercial fishing had been recorded for centuries, it was not until 1909 that reliable statistics started being gathered and recorded.

A study of statistics throughout the years would give a fascinating insight into the world of local fishing activities and one could follow the evolution of the industry; in

particular what impact fishing has had on stocks and what variations have occurred through changing market exigencies.

Availability of Stocks

Throughout the years at least 63 various species have regularly been landed and presented for sale, but while the bulk has always been present, some fishes which in the past 50/60 years were the mainstay of the industry, are either no longer deemed marketable and consequently no longer targeted, or not found in substantial numbers, whilst some others have become the backbone of the fishermen's economy.

The most important species which were landed in large or relatively large quantities up to the 60's were: Amberjack, Picarel, Dentex and other Sparids, Gurnards, Conger/Moray eels, Perch/Wreckfish, Saddled Bream, Chub Mackerel, Dogfish/Rough Shark, Pandora, various Rays, Scad, Combers, Red Mullet, Grey Mullet, Bogue, Dolphin Fish, Pilot Fish, whilst Swordfish and Tuna were landed in relatively small quantities. Regular Shark landings were also substantial and these included Six/seven gilled, Porbeagle, Blue Shark, Thresher and Hammerhead.

From the 70's to the present the species most targeted were and still are: Coryphene, Pilot Fish, Little Tunny, Hake, Prawns, Red Mullet, Gurnards, Perch/Wreckfish, Pandora, Dogfish, Rough Shark, Bluefin Tuna, Swordfish and to a lesser degree Chub Mackerel, Bogue and Scad.

EU rules and Responsible Fishing

In general EU rules have been readily accepted by the fishing community especially those regarding safety at sea and modernization of the fleet. With regard to responsible fishing, the very nature of the way Maltese fisheries are conducted is conducive to the sustainability of stocks and respect for the ecosystem.

Can the future bring better times for Maltese fisheries? Yes.

Artisanal Fisheries

The state of artisanal fisheries in Malta has been quite stable for a long time and there is also no reason to believe that this will not continue to be so for a very long time, the main reason being the seasonality of local fisheries which contributes in no mean way towards sustainability of the stocks. Through this system both non-migratory demersal species and pelagic species are given enough time to recuperate/repopulate.

Fishing methods

The fishing methods adopted in Malta may be classified in four categories:
TRADITIONAL fishing consists mainly of:

a. inshore-longlining
b. use of trammel nets
c. use of drift nets
d. use of various traps;

MODERN fishing consists of deep-sea long-lining;

TRAWLING for Demersal species such as Prawns, Hake, Red Mullet and other related species.

LAMPARA fishing is undertaken by purse seining when strong lights are used to attract pelagic species such as Chub Mackerel, Bogue, Scad, Allice Shad and Sardines.

Fishing Seasons

The fishing seasons are determined by the particular species being targeted. Currently the most commercially viable fish are Blue Fin Tuna (May through to July); Dolphin Fish (September through to December); Stone Bass/Groupers/Snappers (January through to April); and Mackerel/Bogue/Scad/Allice Shad/Sardines (March through to July).

Swordfish is also one of the more targeted species. However since the upsurge of Tuna catches, and the tapping of the Japanese market, the peak period for swordfish landings has shifted from Spring/Summer to Autumn/early winter.

Most targeted species

Due to their commercial market value the most targeted species by Maltese fishermen are: Blue Fin Tuna, Swordfish, Dolphin Fish, Stone Bass, Groupers, Snappers, Dogfish and Rough Shark.

Trawling

Due to the complexity of the local market trawling is also seasonal, in the sense that certain species fetch better prices at particular periods of the year.

In actual fact, three different types of trawling activities are undertaken during the year: a) Deep sea trawling in 600 metres (both day and night) where the bottom is soft and yields King Prawns, along with small marketable catches of Greater Forkbeard and Common Sole; b) trawling in depths of between 150/200 metres (during the day) where the terrain is soft clay and mud, yields Shrimps, Hake, Red Mullet, Octopus, Japanese Squid, Cuttlefish, plus small quantities of Dogfish, Spotted Dogfish, Rays, Bogue and Scad; c) trawling at night in depths of 100/200 metres where the bottom is hard and rocky yields Red Mullet, Comber, Pandora, Squid, Cuttle fish, Octopus and Weavers.

Does trawling put a strain on the ecosystem?

YES – when unbridled trawling is allowed in the same areas throughout the years. The result could be catastrophic as has already happened in certain zones.

NO – if immediate action is taken to eliminate the strain on overfished areas through zonal closed seasons and by deviating operations to other trawlable grounds, of which there are quite a few in the central Mediterranean.

One way in which this can be done is by making use of the information and guidelines found in the final report on the FAO/Malta project ***Simulated commercial trawling and scouting operations in the Central Mediterranean.***

Annex 1

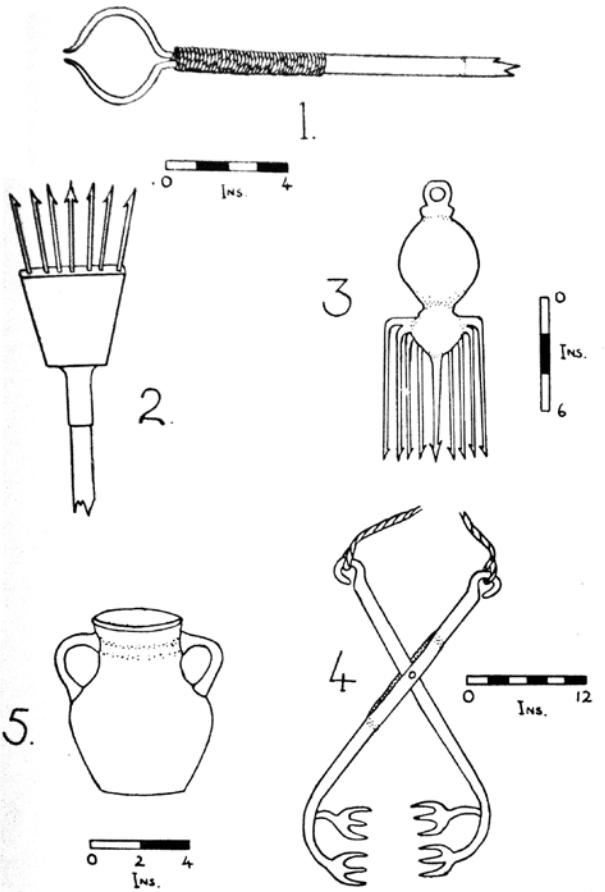
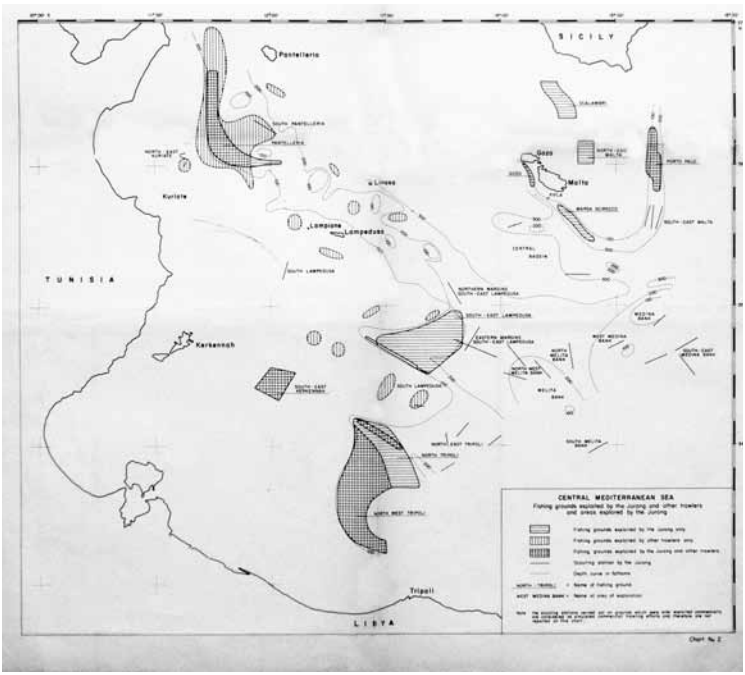


Fig. 10.

MINOR FISHING INSTRUMENTS:
1. THE GAFFA 2. THE FOXXNA 3. THE HANZIR
4. THE IMQASS 5. THE OCTOPUS-POT

Annex 2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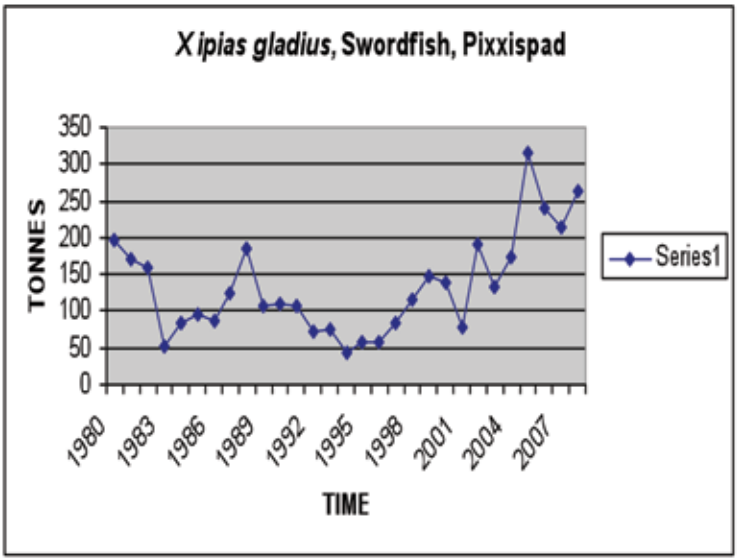
CENTRAL MEDITERRANEAN SEA

Annex 3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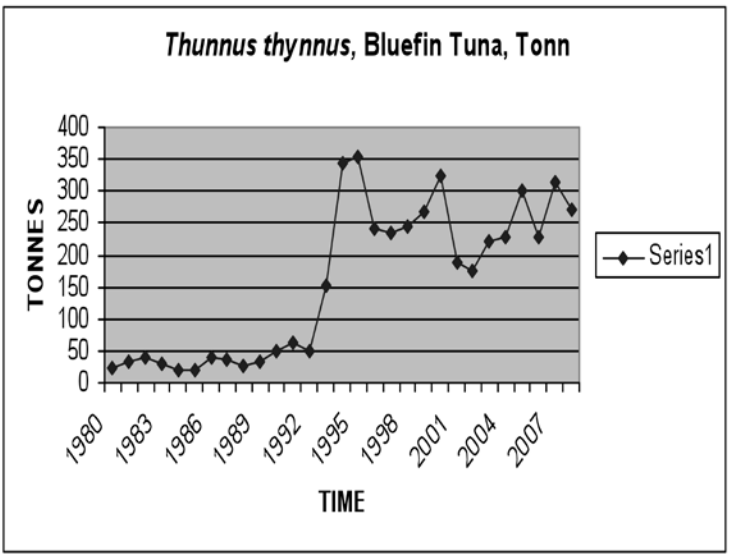
Annex 4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PROFILE OF AUTHORS

GABRIELLA BIANCHI obtained her doctorate degree in tropical fish ecology at the University of Bergen, Norway in 1992. Since 2008 she is the Senior Fishery Resources Officer in the FAO Fisheries Department. Dr Bianchi is responsible for developing and implementing programmes for the sustainable use of marine ecosystems in Asia and the Pacific regions. Dr Bianchi is a member of various international committees on marine ecosystems and is the author of numerous publications and papers on the subject.

JUAN A. CAMIÑAS is the Coordinator of the FAO Project CopeMed II (*Coordination to support fisheries management* in *the Western and Central Mediterranean*. Phase II) since February 2008. Full Member of the Malaga Academy of Sciences with more than 30 years of scientific research in ecology, marine fisheries and marine turtles, Dr Camiñas is author or co-author of 5 books and more than 100 papers published in international and national scientific journals.

SALVATORE COPPOLA is Senior Advisor at FAO's Fisheries and Aquaculture Department. During his 35 years at FAO he worked mainly in support of member countries' national institutions and fishery projects in the field of design and implementation of a Fishery Statistics and Information Systems for resource assessment and monitoring. One of his main fields of interest is the artisanal fishery sector.

PEDRO DE BARROS is currently Fisheries Resources Officer with the FAO Fisheries Management and Conservation Service (FIMF), based in Rome. He received his PhD in fisheries (fish stock assessment) from the University of Bergen, Norway, in 1995. He has worked regularly with FAO since 1992, focusing on the development, training

and application of different tools for fish stock assessment, fisheries management and fisheries statistics.

MATTHEW CAMILLERI obtained his doctorate from the University of Plymouth (UK) with his thesis entitled *Maltese fisheries and the sustainability of resources around the Maltese Islands.* He has also been awarded the status of chartered biologist by the Institute of Biology (UK). He joined FAO in February 2007 to take up the post of Fisheries Bio-statistician, which he currently occupies, within the Secretariat of the GFCM. Dr Camilleri has extensive experience in fisheries scientific monitoring, fisheries management and fisheries statistics.

NIELS WICHMANN is Managing Director of the Danish Fishermen's Association. Since 2007 he has been a member of the Board of the European Association of Producer Organisations, EAPO (EU approved Producer Organisations in the Fisheries Sector), Brussels. Mr Wichmann has served on a number of committees and boards with relation to fisheries. In 2001 he was knighted by H.M. Queen Margrethe as 'Ridder af Dannebrogsordenen'.

MICHAEL ROITMANN is Head of Section, responsible for co-ordination of enlargement questions in DG Fisheries (negotiations on the fisheries chapter and monitoring of administrative progress in candidate countries) of the EU, fisheries conservation policy in the Black Sea. Mr Roitmann has an M.Sc. in Economics (Cand.polft.).

JAMES LOUIS GRECH occupies the post of Officer Commanding of the Offshore Patrol Boat Command sub-unit at the Maritime Squadron and is also the Commanding Officer of Offshore Patrol Boat P61. He took part in several international joint exercises, conducted numerous illegal migrants rescue operations, fisheries patrols and maritime law enforcement patrols. Capt. Grech is the Fisheries Officer representing the AFM during the meetings under the framework of the CFCA.

CARMEL BUSUTTIL is a retired Principal Fisheries Officer and has acted as an advisor to Malta's Ministry of Resources since 2001. Mr Busuttil formed part of the initial negotiating team on fisheries prior to Malta's accession to the EU. For several years he was Secretary to the Board of Fisheries and took an active part in the initiation of FAO CopeMed Project. He also took part in various workshops and seminars on fisheries.

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