THE NATIONAL INSTITUTE FOR MARINE RESEARCH AND DEVELOPMENT "GRIGORE ANTIPA"
LIVING MARINE RESOURCES Department

CHALLENGES AND OPPORTUNITIES IN THE MANAGEMENT OF LIVING MARINE RESOURCES

Dr. Tania ZAHARIA

The management of living marine resources has shifted, during the past decades, in two different directions:

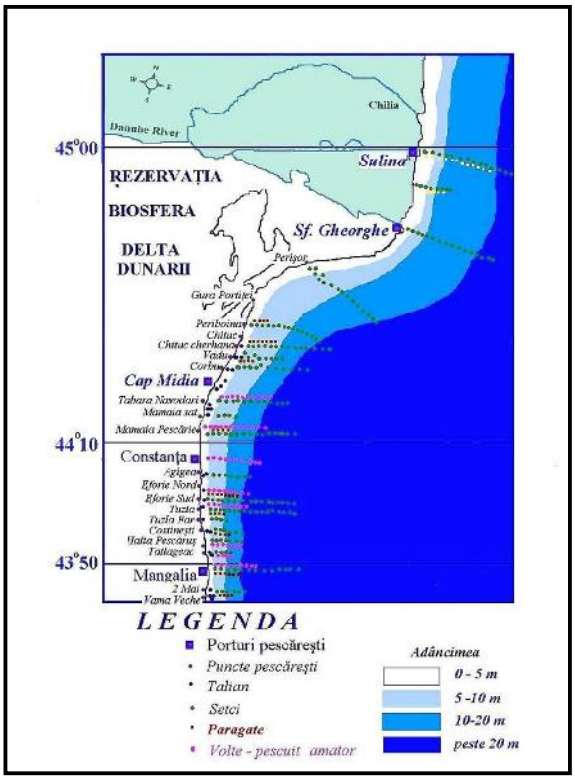
- on one hand, its "spatialization" was emphasized; despite the fact that marine protected areas are the most visible part of this tendency, the regional fishery management based on spatial rights and the spatial and temporal changes determined by climatic modifications have increased the need to spatialize and regionalize the management of living marine resources;
- on the other hand, most of our knowledge on marine ecosystems and the ecosystemic approach of fisheries has shifted towards a more integrative approach of species, the human impact and the space populated by these resources. For an efficient management, locally, as well as globally, a deeper knowledge of the habitats and the structure of the marine ecosystems, as well as of the processes that regulate them is required.

Living marine resources were, are and will inevitably be connected to the Romanian littoral, being part of the economic and cultural identity of the area. Commercial and leisure fishery, as well as the small scale fishery (sometimes for subsistence) represent sectors of interest for the Dobrogean littoral area, as showed in Picture 1.

The scientific challenges we are facing in the management of living marine resources are the same as everywhere else in the world: those of providing answers to the questions regarding applied ecology and social sciences. Some of these challenges are:

- the determination of the abundance of stocks and productivity;
- the relationship between productivity and methods of exploitation;
- the evaluation of management and benefits distribution options, aiming the sustainable development;
- the identification of habitats essential for the species targeted for management;

– the interrelationships between biological resources and the variation of the physical environment (on a spatial and temporal scale) etc.



Picture 1 - The location of the fishing points on the Romanian littoral

Research in fishery is mainly based on observation, more than experiments, as a consequence of the fact that, in most of the situation, we do not have the possibility of controlling or repeating the observations or phenomena.

As a follow up, in any programme aiming to preserve the health of the living marine resources stocks in relationship with human activities, the base is represented by the periodic supply of information regarding the abundance of the resources and the potential factors influencing it (induced by humans of natural). These observations and measurements must be precise enough and obtained at the right place at the right time and according to the biological processes observed (migration, breeding etc.).

In this respect, NIMRD "Grigore Antipa" has a long tradition in systematic observation of the living marine resources and fishery in general. This tradition was initiated by the scientist Grigore Antipa in 1932, through the establishment of the Bio-Oceanography Institute in Constanta (transformed in 1949 into the "Grigore Antipa" Marine Research and Fishery Projection Station), embedded in 1979 into the Romanian Marine Research Institute and continued through the activities carried out within NIMRD "Grigore Antipa". We may speak about a staging of the activities in the institute, according to the historic period: 1970-2002 - the stage of consolidating marine researches on the Romanian littoral, 2002-2007 - the stage of adapting to the requirements of Romania's imminent adhesion to the European Union, 2007-2010 - the stage of integrating the Romanian marine researches into the European research field.

The researches regarding fishery carried out in the institute (fishing expeditions into the World Ocean and the Black Sea, as well as aquaculture and ecological reconstruction) represented an unique sector in Romania; here, the only integrated researches in the field have been carried out, both fundamental and applicative: the design and manufacturing of marine fishing equipment, the elaboration of rearing technologies for a series of marine species of great interest for the fishery sector, the creation of a fishery database expanding for more that 60 years, due to the activity carried out by our forerunners. The only experimental research base in the country is located at the institute, specialized on marine fishery (Pictures 2-5).

Picture 2 - Exterior experimental tanks

Picture 3 - Interior experimental tanks

Now, at our anniversary, we cannot overlook the work of our forerunners, who created the bases of the present researches (the results of their work were presented extensively at the 25th anniversary of the institute). We express our deepest gratitude to all those that are no longer with us, but also to those still living and who are or are not present here with us today.

Picture 4-The “Steaua de Mare 1” research ship Picture 5 - Field autolaboratory

The small NIMRD museum stands as a proof of the effort and interest of the Romanian specialists for the fishing resources of the World Ocean, museum that shelters an impressive collection of items (mostly fish) from the seas and oceans of the world, studied by the researchers of the institute.

Picture - The museum hall - fish from the World Ocean Picture - The museum hall - fish from the Black Sea

It was inherent that our small scientific community should rally to the latest tendencies in the field. Sometimes dictated by the market, other times by financers, but most of the times by the international scientific community, the research directions of our team have tried to keep up with the latest discoveries in the domain.

Thus, the observation systems of the biological components of the marine ecosystem were expanded upon the trophic level, the aerial surveillance of dolphins, the surveillance of commercially interesting bivalve species, the observation of the dynamics of pelagic communities by the means of the hydroaccoustic probe (for the moment, with the help of the Bulgarian

colleagues) etc. The use of satellite monitoring systems (mandatory according to the Romanian and European legislation) offers new opportunities in interpreting the spatial fishery models in relationship with the distribution of marine resources and habitats. In addition, the introduction of scientific diving as a work tool in knowing the marine ecosystem leads to scientific studies carried out in loco, with observations in real time. All these studies aim the identification of the health and productivity of the marine ecosystem, able to support the rehabilitation of the living marine resources stocks.

Picture - Scientific diving - research tool

For the Black Sea ecosystem, the cooperation of all the riparian states is extremely important, with the aim of increasing the ability to evaluate the fish, invertebrates and other living resources stocks. This is the role of the Regional Activity Center of the Black Sea for the environmental aspects of the fishery and other living marine resources management (RAC FOMLRM), created in 1994 and hosted by NIMRD - to coordinate and provide the required programmatic and technical support for the functioning of the Consultative Group of the Black Sea Commission in the field of protection

Picture - Work meetings within RAC FOMLRM

and rehabilitation of the marine ecosystem in particular, for the preservation and sustainable use of the living marine resources.

Along the activity within the Center, international collaborations, the presence of specialists in various international specific commissions, committees and work groups have a very special role. An important aspect is represented by the Focal Point of ACCOBAMS (the Agreement regarding the Preservation of Cetaceans in the Black Sea and the Contiguous Atlantic Area), which contributes actively to the preservation of dolphins in the Romanian marine waters.

Picture-Accidentally captured dolphins

Picture-Surveillance of a school of dolphins

We must underline the collaboration developed during the past years with the Bulgarian colleagues, within the Fishery Data Collecting Programme, regarded also as an exercise of expanding regional abilities of supporting the living marine resources management; this collaboration may serve as an example for the entire Black Sea basin, as this way of working enhances the credibility of science.

At this level, it is also important to introduce the research process, from observation to data assimilation, into models combining biological and physical elements, through the unification of multi-institutional resources with the aim of understanding how marine biological communities work and, most important, how they face human intervention. Understanding these processes represents the greatest challenge, as well as determining the capacity of the marine ecosystem to support the rehabilitation of important resource stocks, based on understanding the food chain and how the individual components within it may be manipulated.

A new tendency is to include the issue of living marine resources management and fishery, in general, in the spatial maritime planning (concept familiar in the fishing sector in other geographic areas), extremely experienced

in sectors such as zoning or working in particular areas. Putting together as many sectors as possible, along with fishery, and their integrated approach will bring benefits by providing more management options. The fishing sector, which is often marginalized in the process of making decisions regarding the use of the sea, will benefit from the taking into consideration of the cumulative effects, the involvement of all interested factors, the minimizing of conflicts between users.

Another challenge is connected to the confidence in the role of marine protected areas, to the way in which living marine resources, but also the fishermen communities provide answers for them. Developing an adaptive management in this areas will ensure the survival of the entire marine ecosystem. The involvement of NIMRD in this process, by taking over the custody of the 2 Mai - Vama Veche Marine Reserve (2005-2009) represented equally an opportunity and a challenge. The concern for the future is reflected in the creation by NIMRD of the group of students of the 2 Mai elementary school - the Junior Ranger Club, dedicated to educational and awareness activities in the vicinity of the marine reserve.

Picture - Educational and awareness activities on the 2 Mai beach

Many students are guided for their graduation papers by specialists of the department. In addition, supporting summer internships for students of universities in the field from Galati, Bucharest and Cluj has become a tradition for the institute. Through this department, NIMRD is also, partner in the Erasmus Programme of the Karadeniz Technical University in Trabzon (Turkey), providing internship activities in the domain of living marine resources.

In the process of knowing the living marine resources we can firmly say that “Every fisherman is a researcher”, as the information provide by fishermen represents the basis in evaluating the fish and invertebrate stocks.


Picture - Turkish students during their internship in the Erasmus Programme

Also named “fishing dependence”, the primary data collected from fishermen represent the corner stone in the evaluation programme. Improving their quality and quantity represent a priority. This data is often collected by fishermen as records in the fishing log and the log book and, many times, their utility as a scientific instrument is limited. This system is a continuous source of disagreement between fishermen, researchers and decision factors regarding the accuracy of the data. In order to support the improvement of the professional level of fishermen and fishery workers, NIMRD created, in 2006, its own Professional Training Center in the Field of Fishery.


Picture - Collecting primary data from fishermen

For the improvement of the work tools used, new instruments to measure the abundance of living marine resources the oceanographic factors that influence their variability are required. Fish tagging is an older idea, used for the interpretation of distribution, the measurement of mortality and the determination of the stock structure. Classical technologies were based on capture and re-capture. The new intelligent tags (or data stocking tags) can be attached individually to the marine animals and can provide information

regarding migration routes, as well as simultaneous information concerning environmental data collecting (for example, depth or temperature). The information collected will help us interpret the life cycles and designate the areas where fishing is banned, areas in which the impact of human activities should be minimal.

Picture - Researchers aboard the "Steaua de mare 1" ship

An important element in the management of living marine resources is represented by the definition and protection of "essential" habitats. The potential threats to the integrity of marine habitats are generated by a great variety of human activities, which include the effects of fishing in areas with a high density and variety of marine invertebrates, activities that trigger the alteration of the sea bottom, as well as of the water column. Despite the fact that it is difficult to measure the time spent by individuals in the basic and the alternative habitats, and whether the alternative one may serve similar functions as the basic one (for example, as a breeding, feeding etc. area), an important challenge for science is to establish precisely the map of habitat types present in the coastal waters and in the Exclusive Economic Zone. Characterizing the habitats and classifying them is a basic requirement in identifying and protecting the ones considered "essential" for the life cycle of species. Applying new technologies (such as the use of the sonar) and the teledetection techniques represents a priority of future researches. Yet, they cannot replace the high quality of fishing data on the long term, which will remain the basic tools in evaluating living marine resources.

Another challenge in the management of living marine resources on the Romanian littoral is a consequence of the "aging" of the "Steaua de mare 1" research ship. The ship provides presently a research platform with the help of which numerous expeditions were carried out in Romanian waters and, now, even in Bulgarian waters. Yet, replacing it with a modern research ship is a priority, vessel necessarily equipped with an acoustic surveillance system

(aimed to improve significantly the quality of the data available for the evaluation of pelagic species), as well as with a sonar adequate for marine habitats charting.

Picture - Romanian marine habitats

One of the conclusions of the researchers is that, in general, the study of a living marine resource intensifies after its decline. If this reality continues, the support of science will always be inefficient. Science will become more systematic when needs are more stable and predictable, and this can only be realized by continuing the researches in the field.

The final challenge is a consequence of the fact that, despite the popularity of marine sciences, we are facing a deficit of specialists in the field of evaluating living marine resources, modeling resources and fishery economy. Along with the aging of the team, the need of an "injection" of qualified staff is becoming more stringent. Increasing the quality and quantity of studies in order to support the knowledge of living marine resources on the Romanian littoral is still a necessity.

As a general conclusion, we appreciate that a continuous strategic investment in technologies, institutional interrelationships and scientists who serve marine researches may improve the accuracy, relevance and opportunity of science in supporting the management of living marine resources on the Romanian littoral.