

# MEDITERRANEA

## SERIE DE ESTUDIOS BIOLÓGICOS

2015 Época II Número especial



COMITÉ CIENTÍFICO:

G. U. CARAVELLO

S. G. CONARD

A. FARINA

A. FERCHICHI

A. A. RAMOS



Universitat d'Alacant  
Universidad de Alicante

Con la colaboración de:



Bernardo Basurco, Ramón Franquesa &  
José L. Sánchez Lizaso

**International Master programme on  
Sustainable Fisheries Management**

# Índice

Abstract .....	236
Résumé .....	237
Introduction.....	239
References .....	251

## **International Master programme on Sustainable Fisheries Management**

BERNARDO BASURCO<sup>1</sup>, RAMÓN FRANQUESA<sup>2</sup> &  
JOSÉ L. SÁNCHEZ LIZASO<sup>3, 4</sup>

<sup>1</sup> Mediterranean Agronomic Institute of Zaragoza, CIHEAM

<sup>2</sup> University of Barcelona

<sup>3</sup> University of Alicante

<sup>4</sup> Corresponding author: [JL.Sanchez@ua.es](mailto:JL.Sanchez@ua.es)

### **Abstract**

This article presents a review of the international master programme organized by the University of Alicante (UA), the Spanish Ministry of Agriculture, Food and Environment (MAGRAMA), through the General Secretariat of Fisheries (SGP), and the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), through the Mediterranean Agronomic Institute of Zaragoza (IAMZ). The Master was initially developed in cooperation with the University of Barcelona in

## International Master programme on Sustainable Fisheries Management

---

the period 2004-2009, and has counted on the collaboration of the Department of Fisheries and Aquaculture of the Food and Agriculture Organization of the United Nations (FAO) since the beginning.

Given the international scope of the marine environment, the need arises to establish a common method and language to be used between experts of different countries sharing fisheries. To train specialists that can facilitate cooperative measures to benefit all stakeholders is undoubtedly the great challenge, which this Master in Sustainable Fisheries Management (formerly Fisheries Economics and Management) has been addressing since 2004. In this article we describe the main topics that have been addressed, providing a short review of the training activities implemented and their impact.

**Keywords:** Training, Fisheries, Management, Master programme

### Résumé

Cet article présente une revue du programme de master international organisé par l'Université d'Alicante (UA), le Ministère Espagnol de l'Agriculture, de l'Alimentation et de l'Environnement (MAGRAMA), à travers le Secrétariat Général des Pêches (SGP), et le Centre International de Hautes Études

Agronomiques Méditerranéennes (CIHEAM), à travers l'Institut Agronomique Méditerranéen de Saragosse (IAMZ).

Le Master a été initialement développé en coopération avec l'Université de Barcelone, dans la période 2004-2009, et a bénéficié de la collaboration du Département des Pêches et de l'Aquaculture de l'Organisation des Nations Unies pour l'Alimentation et l'Agriculture (FAO) depuis le début.

Compte tenu de la portée internationale de l'environnement marin, le besoin d'établir une méthode et un langage communs pour être utilisés entre les experts des différents pays partageant la pêche s'avère nécessaire. La formation de spécialistes pouvant faciliter les mesures coopératives au profit de toutes les parties concernées est sans aucun doute le grand défi que le Master en Gestion Durable des Pêches (auparavant intitulé Économie et Gestion des Pêches) veut relever depuis 2004.

Dans cet article, nous décrivons les principaux thèmes qui ont été abordés, en fournissant une brève description des activités de formation mises en œuvre et de leur influence.

## **Introduction**

**F**ishery resources are an excellent source of food as well as a driver of job creation in the coastal areas. According to the FAO, supply of fish for food from both capture fisheries (marine and inland) and aquaculture currently provides more than 15% of the total supply of animal protein. Furthermore, international trade of seafood products has once again reached a maximum level, with an annual growth rate of 5% in the past decade. These statistics meanwhile, serve to highlight concern for the rise in fishing pressure that leads to the increasing number of overexploited and depleted stocks as well as recovering fishery resources (Hutchings, 2000; Jackson et al. 2001; Pauly et al. 2002)

Great changes have been taking place in the fishing sector in recent times, including: (i) growing demand and high fish prices that are stimulating the increase in fishing effort; (ii) global technological advances that are affecting the structure of the fleets and their fishing capacity; (iii) protection of the environment, which, as in other sectors, has become a priority; and (iv) growing importance of the international scope of fisheries.

The exploitation and management of fisheries has been in the hands of the fishing communities, supervised by the national administrations, until very recent times. But today, a new type

of management is necessary, flexible enough to respond to the evolution of the fishery resources, and to ensure stable and sustainable long-term exploitation. Therefore, the administration and the fishing sector must be capable of interpreting the reality of a situation, its probable evolution, and the repercussions that the implementation (or otherwise) of given measures will have in the medium term, in the biological, social and economic frameworks.

In order to obtain and interpret management-supporting data, experts that have a multidisciplinary background are needed, covering diverse perspectives such as biology, economics, sociology or law, allowing them to value and assess fishery resources and to propose management measures through different techniques, such as mathematical simulations, statistics, surveys, assessments or negotiation. Therefore, it is of maximum interest to train these experts so they may advise stakeholders in the diverse world of fisheries: different administrations (local, regional or state), fishermen (artisanal or semi-industrial), social groups (shipowners, trade unions, consumers, processors, fish farmers, etc.).

Furthermore, given the international scope of the marine environment, the need arises to establish a common method and language to be used between experts of the different coun-

## **International Master programme on Sustainable Fisheries Management**

---

tries sharing fisheries. To train specialists, that can, from their respective countries, contribute to facilitating the search for cooperative measures that may benefit all stakeholders, is, undoubtedly, the great challenge for the future.

The International Centre for Advanced Mediterranean Agronomic Studies is an intergovernmental organization created in 1962 under the auspices of the Council of Europe and the OECD. Its mission is to develop cooperation between Mediterranean countries through postgraduate training and promotion of cooperative research in the field of agriculture and natural resources. The Centre has 4 Mediterranean Agronomic Institutes situated in Bari (Italy), Chania (Greece), Montpellier (France) and Zaragoza (Spain). One of the five functional areas of Zaragoza MAI is fisheries and aquaculture. A large part of the activities are carried out in collaboration with numerous national and international institutions of the Mediterranean region. They take place both at the IAMZ and in other centres of Mediterranean countries. Of the numerous collaborations, those established with following institutions are noteworthy for their continuity and intensity: the European Commission (EC), the Food and Agriculture Organization of the United Nations (FAO), the International Center for Agricultural Research

in the Dry Areas (ICARDA) and the European Association for Animal Production (EAAP).

### ***Programme of the Master in Sustainable Fisheries Management***

CIHEAM Master programmes have a duration of two academic years (120 ECTS), aimed at young graduates and professionals who wish to specialize and update their knowledge. The Masters are structured in two parts. The first part (60 ECTS) consists of lectures, practical work, individual and group work and technical visits. In the second part (60 ECTS), individual work is carried out as an initiation to research or to professional activity for 10 months on a given topic within the speciality.

The objective of the Master in Sustainable Fisheries Management is to provide high level specialization in issues related to the economics and management of the fishing activity through an analysis of the fishing system, exploitation mechanisms, marketing and management, with special emphasis on the perspective of stock assessment and on the economic interpretation of fishing issues in the Mediterranean, an area which, due to its diversity of species and fleets and fragmented vessel ownership, requires management based on control

## **International Master programme on Sustainable Fisheries Management**

---

of the fishing effort. It offers a multi-disciplinary vision of sustainable fisheries management from the perspective of different sciences such as biology, economics, law and sociology.

The Master is at the present jointly organized by the University of Alicante (UA), the Spanish Ministry of Agriculture, Food and Environment (MAGRAMA), through the General Secretariat of Fisheries (SGP) and the CIHEAM through the Mediterranean Agronomic Institute of Zaragoza. It is highlighted that the Master was initially co-organized with the University of Barcelona and also counted on the collaboration with the former FAO Project CopMed II. Since 2004, when the programme started, six editions have been organized, with an average of 17 participants per edition; that is a total of 102 participants from 24 countries. Table 1 indicates the distribution of participants. It is worth to remark the very high international component of the master, with more than 60 % of students from abroad.

The Master enables participants to:

- Make an analysis of the fishing system, exploitation mechanisms, marketing, evaluation and management, with special emphasis on the economic perspective and interpretation of fishing issues in the Mediterranean, an area which,

due to its diversity of species and fleets and fragmented vessel ownership, requires management based on control of the fishing effort

- Have a multi-disciplinary vision of fisheries management from the perspective of different sciences, such as biology, economics, law and sociology
- Acquire experience in the use of new techniques and methods for the development of a more efficient fisheries management, adapted to the conditioning social and environmental factors
- Be initiated into research, making a critical application of the knowledge, skills and competence acquired in the treatment of real problems related with the economics and management of fishing activity
- Exchange experiences and points of view, enhanced through a programme developed in a highly international and interprofessional context.

The programme of the first part of the Master includes the following aspects:

## **International Master programme on Sustainable Fisheries Management**

---

- Introduction to the marine ecosystem, fishery resources and aquaculture (6 ECTS)

Structure and characteristics of marine ecosystems; Fisheries ecology and biodiversity; Fishery resources (typology and distribution of fishery resources; fishing exploitation and the ecosystem approach); Introduction to aquaculture (the aquaculture enterprise: production and management systems; aquaculture and coastal zone management); Practical work and case studies

- Statistical analysis and database use (5 ECTS)

Statistical analysis in fisheries research (statistical concepts and tools; theory and practice of sampling); Uses of databases in fisheries (statistical data and information management; application of Geographical Information Systems (GIS) to fisheries; statistical services of FAO and other institutions); Practical work: statistical analysis, use of databases and design of fisheries statistical systems

- Dynamics of exploited fish populations (5 ECTS)

Theoretical concepts; Recruitment, growth and mortality; Selectivity; Biological functions for parameter estimation; Catches and fishing effort; Standardization of fishing effort;

Catchability, vulnerability and accessibility; Data sources for population dynamics; Practical work: estimation of biological parameters

- Theory and models for stock assessment (6 ECTS)

Analytical models; Virtual Population Analysis and yield-per-recruit models; Global models; Fisheries survey: swept area and acoustic prospections; Difficulties in fisheries modelling: the problem of interactions between fleets and multiple species; An ecological model: Ecopath (Ecological Pathways Model); Obtaining data and parameters: market sampling, VIT, etc.; Results and conclusions; Models as management tools; Practical work: modelling exercises (VIT and Ecopath)

- Basic economics and production factors in fisheries (4 ECTS)

Basic economics; Fisheries business activity. The fishing vessel and fishing technology (typology, records and control parameters; jobs and training requirements; fishing techniques and gears; technological change and quantitative change); Practical work: economic projections and business management strategies

## International Master programme on Sustainable Fisheries Management

---

- Fish trade and processing (4 ECTS)

The fish trade worldwide; World trade institutions; Fish trade and marketing; The fishery production environment (fish processing; recreational activities; the economic context of fishing); Practical work: estimation of input-output tables in capture fisheries

- Theory and application of bioeconomic models and economic and social indicators (6 ECTS)

Static and dynamic bioeconomic models. Typology; Estimation of effort and of economic parameters. Definition of control parameters; Mecon, a simple simulation model; Mefisto/BEMMFISH, a complex model adapted to the Mediterranean; Application of bioeconomic models; The role of indicators and typology; Use of indicators in management; Practical work: modelling exercises (BEMMFISH) and management proposals

- Institutional framework: cooperation and research (4 ECTS)

International cooperation (objectives and cooperation management; regional, national and private cooperation projects); Fisheries research (research policies and their application to

fisheries management; research institutions and programmes; research results and uses); The multidisciplinary approach, a Mediterranean application; Practical work: design of a fisheries research campaign

- Maritime law and socio-cultural perspective (5 ECTS)

Maritime and fisheries law (worldwide legal framework; evolution of international law; international agreements). The historical perspective of the fishing communities. The socio-cultural perspective; The socio-political perspective (associations and representatives in the fishing sector; participation in management); Practical work and case studies

- Objectives and instruments for fishing policies (5 ECTS)

The sustainable development of fisheries; Technical measures and regulation instruments; Fishing control; Marine protected areas of fisheries interest; Regional Fishery Organizations (RFOs); The Common Fisheries Policy (CFP) of the European Union; Practical work: analysis of regulation strategies

## International Master programme on Sustainable Fisheries Management

---

- Applied fisheries policies (5 ECTS)

Fisheries management in Spain; Fisheries management in Morocco; Management of employment and social services; Practical work: fishing policy planning project

- Institutional visits (5 ECTS)

Technical visits and seminars in government institutions, research centres, fishing organizations, processing industries and markets

Lecturers in the first part of the Master

More than 67 lecturers from, among others, the Universities of: Alicante, A Coruña, Barcelona, Ege (Turkey), Girona, Murcia, Politècnica de Catalunya, Politècnica de Valencia, Santiago de Compostela, Vigo; Research centres: CSIC, IEO, IFREMER-France, INRH-Morocco, IMARPE Peru; Public administrations in Spain: Centro Nacional de Formación Marítima de Bamio, DG Pesca y Alimentación Gobierno de Cantabria, Intecmar, ISM, SGP-MAGRAMA; International organizations: CIHEAM-IAMZ, FAO, GFCM, ICCAT, NAFO,; NGOs, firms and other private bodies: ANFACO, Fishermen's guilds, Grupo Calvo, Mercasa, MSC, Oceana, Probitec, Simrad, WWF-MedPO.

## Second part of the Master

During the second part of the Master, participants prepare the Thesis required for being awarded the Master of Science Degree in a second academic year, upon submission of a work protocol presented under the supervision of the thesis tutor. The experimental work for the elaboration of the thesis will be carried out in the organizing institutions or in collaborating institutions, for a period of 10 months, under the direction of a tutor who should be a doctor of renowned experience.

Results of the master programme indicates that more than 85 % of the student are working in subjects related with fisheries management at Ministries (33%), Universities and Research Institutions (42 %), NGOs (7%) or the private sector (7%).

## International Master programme on Sustainable Fisheries Management

---

### References

- HUTCHINGS, J.A. (2000) Collapse and recovery of marine fishes. *Nature* 406, 882-885
- JACKSON, J.B.C., Michael X. KIRBY, Wolfgang H. BERGER, Karen A. BJORNDAL, Louis W. BOTSFORD, Bruce J. BOURQUE, Roger H. BRADBURY, Richard COOKE, Jon ERLANDSON, James A. ESTES, Terence P. HUGHES, Susan KIDWELL, Carina B. LANGE, Hunter S. LENIHAN, John M. PANDOLFI, Charles H. PETERSON, Robert S. STENECK, Mia J. TEGNER, Robert R. WARNER (2001) Historical overfishing and the recent collapse of coastal ecosystems. *Science* 293, 629-638
- PAULY, D., Villy CHRISTENSEN, Sylvie GUÉNETTE, Tony J. PITCHER, U. Rashid SUMAILA, Carl J. WALTERS, R. WATSON, Dirk ZELLER (2002) Towards sustainability in world fisheries. *Nature* 418, 689-695.

Table 1: Distribution of participants per country

Germany	1
Algeria	8
Argentina	1
Brazil	1
Colombia	3
Ecuador	2
Egypt	5
The Savior	1
Spain	38
France	1
Guinea	1
Guinea-Bissau	1
Italy	4
Morocco	9
Mauritania	3
Mexico	1
Mozambique	1
Panama	2
Peru	2
Senegal	1
Seychelles	1
Tunisia	7
Turkey	5
Venezuela	3
<b>Total</b>	<b>102</b>