



International Master in

SUSTAINABLE FISHERIES MANAGEMENT (6th edition)

Alicante (Spain), 15 October 2015 - 15 June 2016
Septiembre 2016 - June 2017

1. Introduction and objectives

Fishery 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.

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 countries 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 which this Master in Sustainable Fisheries Management (formerly Fisheries Economics and Management) has been addressing since 2004.

The objective of the Master 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 evaluation of resources 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 of the fishing effort.

- A multi-disciplinary vision of fisheries management from the perspective of different sciences such as biology, economics, law and sociology.
- Acquisition of 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.
- An initiation 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.

2. Organizing institutions

The Master is 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 International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), through the Mediterranean Agronomic Institute of Zaragoza (IAMZ), and it is an official Master of the Spanish university system within the framework of the European Space for Higher Education.

Furthermore, the Master counts on the collaboration of the Department of Fisheries and Aquaculture of the Food and Agriculture Organization of the United Nations (FAO).

3. Structure

The Master is developed over two academic years on a full-time basis [120 credits, following the European Credit Transfer System (ECTS)], and is structured in two parts.

The first part of the Master (60 ECTS) is professionally oriented and includes lectures, practicals, supervised work, seminars and technical visits. This part will be held in Alicante, in the Faculty of Science of the UA, from 15 October 2015 to 15 June 2016. The programme will be delivered by highly specialized lecturers from the organizing institutions and prestigious guest lecturers belonging to international institutions and universities, research centres, administrations and private bodies from various countries. Upon completion of the first part of the Master, participants will be awarded the Postgraduate Specialization Diploma described in the next section and have access to the doctorate studies within the postgraduate programmes that recognize the diploma.

The second part of the Master (60 ECTS) constitutes a period of initiation to research or to professional activity in which participants work on their Master of Science Thesis. This part will begin from September 2016 onwards and will last for 10 months, during which research work will be conducted, followed by the elaboration of the thesis, that must be publicly defended and approved by an examining board. The first period for the defence of the thesis will be July 2017 and the second period will be September 2017.

Those who wish to do so may complete only the first part of the Master, which constitutes a postgraduate specialization course.

4. Diplomas

The UA awards the **official Spanish University Master Degree** to those participants that accredit the accomplishment of 120 credits.

CIHEAM awards the **Postgraduate Specialization Diploma** to those participants that have obtained 60 ECTS taking the full first part of the Master.

CIHEAM awards the **Master of Science Degree** to those participants that have obtained 120 ECTS.

5. Academic organization

The first part of the Master is held in two academic semesters. This part is made up of complementary but independent units so that participants may attend, if they wish, only one or several units. Point 9 shows credits awarded to each. This part requires personal work and interaction among participants and with lecturers, its international characteristics favouring the exchange of experiences and points of view. Formal lectures are complemented by practicals, supervised work, open seminars and technical visits.

During the second part of the Master, participants complete 60 ECTS focused on the introduction to research and on the elaboration of a Thesis based on the results of an original research work, provided that the minimum qualification required in the first part of the Master has been reached, and upon presentation of a work protocol under the supervision of the thesis tutor. Only those participants that have obtained an average score of 7 over 10 or more in the first part of the Master may opt for second part scholarships awarded by IAMZ. The experimental work for the elaboration of the thesis is 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.

6. Admission

The first part of the Master is designed for participants that fulfil the following conditions:

- University degree* related with the topic of the Master; preference will be given to graduates in Marine Science, Biology, Agronomy, Fisheries, Economics, Administration, Business Management and Law. Candidates with professional experience in the specialist topics will be given preference.
- Knowledge of Spanish*, which will be the working language of the course. For admitted candidates that so require it, an intensive Spanish course will be organized in Zaragoza from July to September 2015.
- Understanding of English*, given that some lectures and part of the teaching material will be in English.

7. Registration

The deadline for the submission of **applications from non-Spanish candidates** is 4 May 2015. Applications should be addressed to:

Instituto Agronómico Mediterráneo de Zaragoza
Avenida de Montañana 1005, 50059 Zaragoza (Spain)
Tel.: +34 976 716000 - Fax: +34 976 716001
e-mail: iamz@iamz.ciheam.org, Web: www.iamz.ciheam.org

They should enclose:

- Application form
- *Curriculum vitae*, duly accredited, stating university degree, experience and professional activities
- Transcript of records (courses undertaken, with grades achieved)
- Certificates of language knowledge
- Reasons for applying to the Master

Selected candidates should formalize their pre-registration and enrolment in the UA in accordance with the established procedure, details of which will be provided when necessary.

Spanish candidates and European candidates with knowledge of Spanish should pre-register and enrol through the *Centro de Formación Continua* of the UA in the periods and in compliance with the rules defined on the website: <http://web.ua.es/es/continua/preinscripcion.html>

Applications from those candidates who cannot present their complete records when applying, or those requiring authorisation to participate in the programme, may be accepted provisionally.

For additional information about the programme, please contact the Programme Director:

José Luis Sánchez Lizaso

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Facultad de Ciencias, Universidad de Alicante
Carretera de San Vicente del Raspeig, 03080 Alicante, Spain
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Registration fees for each academic year of the Master amount to approximately 2500* euro. This sum covers tuition fees only and in no case will travel, board and lodging expenses be included, either during the programme itself or during its technical trip. For candidates wishing to attend part of the course, the fees will be proportional to the credits they register for.

It is compulsory for participants to have medical insurance valid for Spain. Proof of health insurance cover must be given at the beginning of the Master. For participants under 28 years of age, a college insurance is included in the registration fees.

(* This price is orientative and may vary when the official 2015 rates for credits of Master postgraduate programmes in the Valencian Community are determined.

8. Scholarships

Candidates from CIHEAM member countries (Albania, Algeria, Egypt, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Spain, Tunisia and Turkey) may apply for scholarships covering all or part of the registration fees, and for scholarships covering the cost of travel and accommodation. Official candidates from developing countries that have a cooperation agreement with the SGP-MAGRAMA for fisheries training actions may also apply for a scholarship.

Candidates from other countries who require financial support should apply directly to other national or international institutions.

9. Programme of the first part of the Master

- INTRODUCTION TO THE MARINE ECOSYSTEM, FISHERY RESOURCES AND AQUACULTURE (6 ECTS)**
 - 1.1. Structure and characteristics of marine ecosystems
 - 1.2. Fisheries ecology and biodiversity
 - 1.3. Fishery resources
 - 1.3.1. Typology and distribution of fishery resources
 - 1.3.2. Fishing exploitation and the ecosystem approach
 - 1.4. Introduction to aquaculture
 - 1.4.1. The aquaculture enterprise: production and management systems
 - 1.4.2. Aquaculture and coastal zone management
 - 1.5. Practical work and case studies
- STATISTICAL ANALYSIS AND DATABASE USE (5 ECTS)**
 - 2.1. Statistical analysis in fisheries research
 - 2.1.1. Statistical concepts and tools
 - 2.1.2. Theory and practice of sampling
 - 2.2. Uses of databases in fisheries
 - 2.2.1. Statistical data and information management
 - 2.2.2. Application of Geographical Information Systems (GIS) to fisheries
 - 2.2.3. Statistical services of FAO and other institutions
 - 2.3. Practical work: statistical analysis, use of databases and design of fisheries statistical systems
- DYNAMICS OF EXPLOITED FISH POPULATIONS (5 ECTS)**
 - 3.1. Theoretical concepts
 - 3.2. Recruitment, growth and mortality
 - 3.3. Selectivity
 - 3.4. Biological functions for parameter estimation
 - 3.5. Catches and fishing effort
 - 3.6. Standardization of fishing effort
 - 3.7. Catchability, vulnerability and accessibility
 - 3.8. Data sources for population dynamics
 - 3.9. Practical work: estimation of biological parameters
- THEORY AND MODELS FOR FISHERIES EVALUATION (6 ECTS)**
 - 4.1. Analytical models
 - 4.2. Virtual Population Analysis and yield-per-recruit models
 - 4.3. Global models
 - 4.4. Fisheries survey: swept area and acoustic prospections
 - 4.5. Difficulties in fisheries modelling: the problem of interactions between fleets and multiple species
 - 4.6. An ecological model: Ecopath (Ecological Pathways Model)
 - 4.7. Obtaining data and parameters: market sampling, VIT, etc.
 - 4.8. Results and conclusions
 - 4.9. Models as management tools
 - 4.10. Practical work: application of fisheries evaluation models
- BASIC ECONOMICS AND PRODUCTION FACTORS IN FISHERIES (4 ECTS)**
 - 5.1. Basic economics

- 5.2. Fisheries business activity
- 5.3. The fishing vessel and fishing technology
 - 5.3.1. Typology, records and control parameters
 - 5.3.2. Jobs and training requirements
 - 5.3.3. Fishing techniques and gears
 - 5.3.4. Technological change and quantitative change
- 5.4. Practical work: economic projections and business management strategies
- 6. FISH TRADE AND PROCESSING (4 ECTS)
 - 6.1. The fish trade worldwide
 - 6.2. World trade institutions
 - 6.3. Fish trade and marketing
 - 6.4. The fishery production environment
 - 6.4.1. Fish processing
 - 6.4.2. Recreational activities
 - 6.4.3. The economic context of fishing
 - 6.5. Practical work: estimation of input-output tables in capture fisheries
- 7. THEORY AND APPLICATION OF BIOECONOMIC MODELS AND ECONOMIC AND SOCIAL INDICATORS (6 ECTS)
 - 7.1. Static and dynamic bioeconomic models. Typology
 - 7.2. Estimation of effort and of economic parameters. Definition of control parameters
 - 7.3. Mecon, a simple simulation model
 - 7.4. Mefisto/BEMMFISH, a complex model adapted to the Mediterranean
 - 7.5. Application of bioeconomic models
 - 7.6. The role of indicators and typology
 - 7.7. Use of indicators in management
 - 7.8. Practical work: modelling exercises (BEMMFISH) and management proposals
- 8. INSTITUTIONAL FRAMEWORK: COOPERATION AND RESEARCH (4 ECTS)
 - 8.1. International cooperation
 - 8.1.1. Objectives and cooperation management
 - 8.1.2. Regional, national and private cooperation projects
 - 8.2. Fisheries research
 - 8.2.1. Research policies and their application to fisheries management
 - 8.2.2. Research institutions and programmes
 - 8.2.3. Research results and uses
 - 8.3. The multidisciplinary approach, a Mediterranean application
 - 8.4. Practical work: design of a fisheries research campaign
- 9. MARITIME LAW AND SOCIO-CULTURAL PERSPECTIVE (5 ECTS)
 - 9.1. Maritime and fisheries law
 - 9.1.1. Worldwide legal framework
 - 9.1.2. Evolution of international law
 - 9.1.3. International agreements
 - 9.2. The historical perspective of the fishing communities
 - 9.3. The socio-cultural perspective
 - 9.4. The socio-political perspective
 - 9.4.1. Associations and representativity in the fishing sector
 - 9.4.2. Participation in management
 - 9.5. Practical work and case studies
- 10. OBJECTIVES AND INSTRUMENTS FOR FISHING POLICIES (5 ECTS)
 - 10.1. The sustainable development of fisheries
 - 10.2. Technical measures and regulation instruments
 - 10.3. Fishing control
 - 10.4. Marine protected areas of fisheries interest
 - 10.5. Regional Fishery Organisations (RFOs)
 - 10.6. The Common Fisheries Policy (CFP) of the European Union
 - 10.7. Practical work: analysis of regulation strategies
- 11. APPLIED FISHERIES POLICIES (5 ECTS)
 - 11.1. Fisheries management in Spain
 - 11.2. Fisheries management in Morocco
 - 11.3. Management of employment and social services
 - 11.4. Practical work: fishing policy planning project
- 12. INSTITUTIONAL VISITS (5 ECTS)

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

Programme director

J.L. SÁNCHEZ LIZASO, University of Alicante (Spain)

Coordinators of thematic areas

J.L. ALEGRET, University of Girona (Spain)
 J.M. BELLIDO, IEO, Oceanographic Centre of Murcia (Spain)
 A. FORCADA, University of Alicante (Spain)
 R. FRANQUESA, University of Barcelona (Spain)
 C. MONTERO, MSC Spain and Portugal Office, Madrid (Spain)

Lecturers

The programme of the first part of the Master is delivered by over 70 lecturers from international institutions, universities, research centres, administration services and private firms including the following:

University of Alicante, University of Barcelona, University of Girona, University of Vigo, University of A Coruña, University of Santiago de Compostela, University of Murcia, Polytechnic University of Catalonia, Polytechnic University of Valencia, University of Izmir, General Secretariat of Fisheries of the Ministry of Agriculture, Food and Environment, General Directorate of Fisheries and Food of the Autonomous Government of Cantabria, Social Marine Institute, Spanish Institute of Oceanography, National Research Council, Technological Institute for Environmental Control of Galicia, French Research Institute for Exploitation of the Sea, National Fisheries Research Institute of Morocco, Food and Agriculture Organization of the United Nations, General Fisheries Commission for the Mediterranean, European Commission, International Commission for the Conservation of Atlantic Tuna, International Union for Conservation of Nature, WWF, MSC, Spanish Association for the Fish and Seafood Canning Industry, MERCASA, Fishermen's guilds, Shipowners Cooperative of Vigo, CALVO Group, SIMRAD.