



International Master in SUSTAINABLE FISHERIES MANAGEMENT (7th edition)

Alicante (Spain), 10 October 2017 – 15 June 2018
September 2018 – June 2019

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 about 17% of the total supply of animal protein. At the same time, international trade of fish and fishery products has expanded significantly in the last decades, with about 36% of the production being exported. These statistics however do not reveal the concern about the current situation of fishery resources. If exploitation of these resources is to be both stable and sustainable in the long term, better management is required.

In order to obtain and interpret management-supporting data, experts with a multidisciplinary background are needed, that will address the issue from diverse perspectives such as biology, economics, sociology or law. In this way, they will be able to value and assess fishery resources and 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 can advise stakeholders in the diverse world of fisheries: different administrations (local, regional, state or supranational), fishermen (artisanal, semi-industrial or 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 contribute to facilitating the search for cooperative measures from their respective countries to benefit all stakeholders is undoubtedly a great challenge that this Master addresses.

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.
- 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 competences acquired in the treatment of real problems related with the management of fishing activity.

2. Organization

The Master is jointly organized by the University of Alicante (UA), the Spanish Ministry of Agriculture and Fisheries, Food and Environment (MAPAMA), 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). Pending final confirmation, the General Fisheries Commission for the Mediterranean (GFCM) of the Food and Agriculture Organization of the United Nations (FAO) will also be part of the organization. Furthermore, the Master counts on the collaboration of the FAO Department of Fisheries and Aquaculture.

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 is held in Alicante, in the Faculty of Science of the UA, from 10 October 2017 to 15 June 2018. The programme is delivered by highly specialized lecturers from the organizing institutions and distinguished guest lecturers belonging to international institutions and universities, research centres, administrations and private bodies from various countries.

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 Final Master Project (Master thesis). This part is conducted at the University of Alicante or other collaborating institutions and will last for 10 months, starting in September 2018. The first period for the defence of the thesis will be July 2019 and the second period will be September 2019.

3. Diplomas

The UA awards the official Spanish University Master Degree to those participants that have obtained 120 ECTS.

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. This degree is recognized as equivalent to the official Master of the Spanish university system.

4. 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 8 shows credits awarded to each. This part requires personal work and interaction among participants and with lecturers. The lecturers come from different countries, thus providing participants with a wide range of experiences and points of view and enriching the training process. 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, external practicals and on the elaboration of a thesis based on the results of an original research work. The experimental work for the elaboration of the thesis is carried out under the supervision of a tutor who should be a doctor of recognized experience. The participant must reach the minimum qualification required in the first part of the Master and present a work protocol endorsed by 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 Direction of the Master undertakes to give students guidance to find contacts, seek research topics and host institutions, as well as on possible financial aid.

5. Admission

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

- a) *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 International/EU Law. Candidates with professional experience in the specialist topics will be given preference.
- b) *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 2017.
- c) *Understanding of English*, given that some lectures and part of the teaching material will be in English.

6. Registration

The deadline for the submission of applications from non-Spanish candidates is 4 May 2017. 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:

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Registration fees for each academic year of the Master amount to approximately 2800* 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 2017-18 rates for credits of Master postgraduate programmes in the Valencian Community are determined.

7. 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. Pending final confirmation, some scholarships will also be awarded to candidates from GFCM Contracting Parties and Cooperating non-Contracting Parties (Albania, Algeria, Bulgaria, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Japan, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Romania, Slovenia, Spain, Syria, Tunisia and Turkey; Bosnia and Herzegovina, Georgia and Ukraine).

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

8. Master syllabus

PART ONE (first academic year) (60 ECTS)

- 1. 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. Revision of aquaculture production systems and management
 - 1.4.2. Aquaculture and the environment
 - 1.4.3. Aquaculture and governance
 - 1.5. Practical work and case studies
- 2. 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
- 3. 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
- 4. 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. Models as management tools
 - 4.8. Practical work: application of fisheries evaluation models
- 5. 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 Europe (Spain, Iceland)
 - 11.2. Fisheries management in Mediterranean countries (Morocco, Tunisia, Turkey)
 - 11.3. Fisheries management in other countries (Peru)
 - 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
- PART TWO (second academic year) (60 ECTS):**
- 13. Introduction to research (15 ECTS)**

Basic tools to seek information and documentation and learn methods and techniques applicable to fisheries research.
 - 14. Internships (15 ECTS)**

Internships will be conducted in research departments, firms and other institutions that collaborate with the Master in order for participants to learn techniques and study methods related to the topic on which their Master thesis will be based. It will also be possible to conduct extracurricular traineeships, for example, participation in fisheries assessment campaigns on board oceanographic research vessels.
 - 15. Final Master Project (Master thesis) (30 ECTS)**

The Final Master Project (FMP) will be related to any of the topics addressed in the programme from the perspective of fisheries management or research and may be conducted in international institutions, universities, research centres, services of the public administration and private companies. In the last two editions, the Master students have carried out their FMPs at the Universities of Alicante, Barcelona, Girona, Vigo, the Polytechnic University of Catalonia, the Department of Fisheries and Aquaculture of the FAO, the General Fisheries Commission of the Mediterranean, the IEO Oceanographic Centres of Malaga, Murcia, Madrid and Tenerife, the CSIC Institutes of Marine Science of Barcelona and of Marine Research of Vigo, the WWF Bureau for the Mediterranean, and the Marine Stewardship Council (MSC).

Director of the programme

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 Ege at Izmir (Turkey), The General Secretariat for Fisheries of the Spanish Ministry of Agriculture and Fisheries, Food and Environment (SGP-MAPAMA), Fisheries Service of the Government of the Balearic Islands, Regional Government of Valencia, Social Marine Institute, Spanish Institute of Oceanography, National Research Council, Technological Institute for Environmental Control of Galicia, National Fisheries Research Institute of Morocco, Peru's Institute of the Sea, Food and Agriculture Organization of the United Nations, General Fisheries Commission for the Mediterranean, European Commission, International Commission for the Conservation of Atlantic Tuna, NAFO, WWF, MSC, Sea Around Us, Spanish Association for the Fish and Seafood Canning Industry, MERCASA, Fishermen's guilds, Shipowners Cooperative of Vigo, OPAGAC, Balfegó Group, Probitec, SIMRAD.