



Fisheries Economics and Management

Organized by

Mediterranean Agronomic Institute of Zaragoza

Fisheries Economics and Management

Jointly organized by: **University of Barcelona (UB), CIHEAM-IAMZ and Spanish Ministry of Agriculture, Fisheries and Food (MAPA), with the collaboration of Food and Agriculture Organization of the United Nations (FAO)**

Scientific coordinator: **Dr. Ramón Franquesa**

The Master on Fisheries Economics and Management provides a two-year programme for graduates who wish to specialize in the subject and professionals interested in updating their knowledge.

In the first year participants follow the Postgraduate Specialization Course. Formal lectures are complemented by technical visits, seminars and practical work.

In the second year, students who have successfully completed the first year develop an individual work of initiation to research or to professional activity on a chosen topic of the specialization, leading to a Master of Science Degree.

The programme is held every two years. Next edition starts in October 2008.

Participants must hold a university degree in fisheries, economics, business studies, biology, marine science, agronomy, law or any related field.

The working language is Spanish, therefore participants should prove knowledge of Spanish at the start of the course. From the beginning of July to the end of September IAMZ organizes an intensive course of Spanish for those who require it. In the selection of candidates, knowledge of English and French is nevertheless valued, as part of the documentation distributed may be written in either of these languages.

This Master is also an official Master of the Spanish University system.

Objectives

The objectives of the first part of the Master programme (Postgraduate Specialisation Course) are to provide high level specialization in issues related to the economics and management of the fishing activity through: (i) 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; (ii) a multi-disciplinary vision of fisheries management from the perspective of different sciences such as biology, economics, law and sociology; and (iii) 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.

Through the work carried out in the second part of the programme (Master Thesis), participants complete their training by making a critical application of the knowledge, methods and techniques acquired during the first year of specialization and develop their competence in: (i) analysis of problems; (ii) definition of objectives; (iii) acquisition and treatment of data in compliance to a pre-established research protocol; (iv) analysis of results; and (v) elaboration of conclusions that may contribute to clarify and find a possible solution to problems.

Part 1

Postgraduate specialisation course

Training is organized in 5 sections (60 ECTS)

Section 1 APPLIED BIOLOGY IN MARINE LIVING RESOURCES

After a review of world fisheries production and trends and a discussion of present problems on fisheries management, to introduce participants to the economic nature of the use of marine living resources, the section presents the characterization of exploited marine ecosystems as well as the impact of environmental variability on them. Main taxonomic groups under exploitation are presented, as well as the typology of resources and fisheries. Thereafter, fisheries ecology and population dynamics are addressed and participants are trained on various models of population dynamics following practical case studies. The section also includes an analysis of the aquaculture sector reviewing different production systems and analysing the main economic and management issues in an aquaculture enterprise. Attention is also paid to the integration of aquaculture in global coastal management.

Section 2 FISHERIES ECONOMICS

Following an introduction to the basic and applied economic aspects related with the fishing activity, this section first reviews the main production factors to be considered in an economic analysis. The various exploitation mechanisms are then reviewed in detail, paying special attention to the fishing vessel and technology. The section then provides participants with an integrated vision of the factors shaping seafood markets, with special emphasis on Europe and the Mediterranean region. The lectures include topics from the analysis of the fish trade flows to the regulations of the markets at both international and national levels. The whole distribution channel is then addressed, through the first point of sale, wholesaling, processing, retailing and the catering market, then seeking to analyse different strategies for marketing actions, such as those adding value through various quality schemes.

Section 3 THEORY OF FISHERIES MANAGEMENT

The section starts with a review of the theoretical economic concepts affecting the management of the fishing activity. Then participants are trained on the bases and applications of bioeconomic modelling. Several simulation models are described and participants are given the opportunity to evaluate different models and to understand the potential of biomodelling as a management tool based on various case studies. The section finally deals with the definition, calculation and use of various indicators in fisheries management.

Section 4 FISHERIES MANAGEMENT TOOLS

The first part of this section introduces participants to main fisheries research objectives and programmes of the main international organizations dealing with Mediterranean fisheries, such as CIEM, GFCM, ICCAT and UE. The benefits of applying a multidisciplinary approach in Mediterranean fisheries research are then discussed in detail, and international cooperation objectives and projects in the Mediterranean are highlighted. The second part of this section deals with statistical analysis in fisheries research, the data collection process and various information management systems, which are explained through different case studies, e.g. the European data collection programme or the FAO statistical services.

Section 5 FISHERIES POLICIES

This section first reviews and discusses legal, social and cultural aspects in relation with the fishing activity. It begins to explain the maritime law and the legal framework at an international level. The socio-cultural and socio-political context and perspectives of fisheries are then discussed, with special attention to fishermen's participation in management and to the characteristics of employment in the fishing sector, its evolution and management and the social services required. The second part of the section informs participants about present fisheries objectives, policies and instruments applied by the main international organizations dealing with European and Mediterranean fisheries, among them the Common Fisheries Policy (CFP) of the European Union, the General Fisheries Commission for the Mediterranean (GFCM), or the International Commission for the Conservation of Atlantic Tuna (ICCAT). Information is also provided on the function and role of the scientific committees advising the organizations. Fisheries management at national level is then analysed through the detailed description of policies, administrative organization and management instruments in two Mediterranean countries (i.e. Spain and Morocco). This section also includes technical visits organized during the course to provide participants with the opportunity of gaining first-hand knowledge of Spanish institutions involved in fisheries management or research (e.g. General Secretariat for Maritime Fishing, Social Institute of the Sea, Spanish Institute of Oceanography, Xunta de Galicia, Azti, etc.). During these visits the participants attend seminars delivered by the main representatives of the various institutions, who explain their operation and objectives. Other visits are also organized to illustrate certain contents of the whole course (e.g. sales outlets, markets, hypermarkets and fishing ports in various cities).

TRAINING SEQUENCE

Section 1

(10 ECTS)

Dates: from 6 to 31
October 2008.

APPLIED BIOLOGY IN MARINE LIVING RESOURCES

Unit 1 – The marine ecosystem and population dynamics (5 ECTS),

Unit 2 – Introduction to aquaculture and fisheries resources (5 ECTS).

Section 2

(10 ECTS)

Dates: from 3 to 7
November and from
24 November to 19
December 2008.

FISHERIES ECONOMICS

Unit 1 – Basic economics and production factors in fisheries (5 ECTS)

Unit 2 – Fish trade and processing (5 ECTS).

Section 3

(10 ECTS)

Dates: from 8
January to 4
February 2009.

THEORY OF FISHERIES MANAGEMENT

Unit 1 – Theory and models of fisheries management (5 ECTS),

Unit 2 – Applied bioeconomic models and economic and social
indicators (5 ECTS).

Section 4

(10 ECTS)

Dates: from 5
February to 4
March 2009.

FISHERIES MANAGEMENT TOOLS

Unit 1 – Institutional framework, cooperation and research (5 ECTS),

Unit 2 – Statistical analysis and database use (5 ECTS).

Section 5

(20 ECTS)

Dates: from 10 to
21 November 2008
and from 5 March to
29 April 2009.

FISHERIES POLICIES

Unit 1 – Maritime law and the socio-cultural perspective (5 ECTS),

Unit 2 – Objectives and instruments for fisheries policies (5 ECTS),

Unit 3 – Applied fisheries policies (5 ECTS),

Unit 4 – Institutional visits (5 ECTS).

Comprehensive oral or written examination

Participants take 1 written examination at the end of each Section, each unit being independently graded. In Section 5, participants also present a written report on the technical visits and prepare a written document that is presented and defended to assess the project carried out as practical work.

Participants may retake failed exams once.

Analytical syllabus

Section 1

APPLIED BIOLOGY IN MARINE LIVING RESOURCES

Unit 1 – The marine ecosystem and population dynamics

The marine and fisheries ecosystem

Introduction to the course (worldwide fishery and aquaculture production today; the economic nature of using marine living resources; the multidisciplinary approach; world trends: production, problems and management). Physical oceanography. Chemical oceanography. Marine biology. Production. Food webs. Structure and characteristics of marine ecosystems. Impact of environmental variability on marine ecosystems. Fisheries ecology: theoretical concepts. Trophic chains in fisheries ecology. The problem of interaction between commercial species. Marine biodiversity and ecosystems exploited.

Population dynamic

Theoretical concepts. Methods to estimate recruitment, growth and mortality. Selectivity. Biological functions for parameter estimation. Data sources for stock assessment. Evaluation techniques and models: global models, analytical models, Virtual Population Analysis (VPA), abundance index series, Life Cycle Analysis (LCA). Case study.

Unit 2 – Introduction to aquaculture and fisheries resources

Aquaculture

Present production and trends. Description of mollusc and finfish production systems and techniques. Aquaculture and coastal zone management. Site selection procedures. Licensing. Legal framework and administrative regulation. Aquaculture enterprises and management. Marketing of aquaculture products and enterprises strategies. Risk assessment and quality management.

Fisheries resources

Typology and distribution of fishery resources. Stocks and populations. Fishing methods. Evolution of world captures. Impact of fishing practices on the ecosystems. Biological parameters. Ecosystem approach to fisheries.

Section 2

FISHERIES ECONOMICS

Unit 1 – Basic economics and production factors in fisheries

Economic principles. Market failure. Resource rent. Profit as function objective. Supply and demand dynamics. General equilibrium. The fishing enterprise, ownership framework, accounting system and taxes. Cost structure of the fishing firm. The wages systems in fisheries. Investment, amortization and returns. Analysis of returns. The insurance system. Public subsidies. The Annual Economic Report (AER) methodology. Case study: AER application in Spain's 300 fleets. Vessel recording and control parameters. Types of hull and propelling systems. Work posts and training requirements. Types of fishing techniques and gears. Technological change and quantitative change. Evolution of the fishing effort.

Unit 2 – Fish trade and processing

The world fishing trade and institutions involved

Market globalisation and trend towards concentration. Structure of the world market: flows and trends. The problem of the subsidies in international markets. Regulation of the world market: Organisation for Economic Cooperation and Development (OECD) and World Trade Organisation (WTO). Regulations in the EU Common Market Organisation (CMO). Regulation of national markets: FROM as case study. Management and trade.

Fish marketing

Demand for fishing products: food resource and merchandise. Market process: auctions, central markets, retail. The e-market and possible changes in trade logistics. Marketing analysis. Labelling systems. The consumer safety.

Fishing processing

Definition and systems. Adding value process. The processing industry: the ownership framework and globalisation. Supply of raw material: wild fish and aquaculture fish. Development trends and perspectives.

The economic context of fishing

Interaction with other economic sectors. Added and induced value of fishery production. Calculation of the input-output tables. The case of areas highly dependent on fishing. Measuring external impacts on fishing. Case study: experience on the input-output table estimation in Galicia.

Section 3

THEORY OF FISHERIES MANAGEMENT

Unit 1 – Theory and models of fisheries management

Theoretical bases of public economy in fishing and aquaculture. Open-access and renewable natural resources. Regulation methods: agents and instruments. The concept of fishing fleets. Reactive and adaptive management. Static bioeconomic models: predictable results of management measures. Dynamic bioeconomic models: theory and results of simulations. Difficulties in modelling fisheries: the problem of interaction between fleets and multiple species. A simple simulation model: Mecon. An ecological model: Ecopath. Typology of the bioeconomic modelling. The problem of estimating effort. The estimation of economic parameters: costs, prices, etc. Definition of control variables. Mefisto/BEMMFISH, a complex model adapted to the Mediterranean. Tackling the problem: management of effort, influence of technological changes on catchability, multispecies, multifleet, etc. Obtaining data and parameters: market sampling, VIT, etc. The final model: mechanisms and operations. Results and conclusions. Models as management instruments.

Unit 2 – Applied bioeconomic models and economic and social indicators

MEFISTO1 model: mechanism and functioning. Installation, conflicts and use. Data entry and storage. Parameter manipulation. Graphic exploitation. Stochastic simulations. Problems and solutions. Relationships with other programs: VIT and SocioEconomic Study (FAO). Definition and role of indicators, selection conditions. Biological and ecological indicators. Economic indicators. Social indicators. Technical indicators. Level of calculation: geographical areas, management units, etc. Use of indicators in management.

Section 4

FISHERIES MANAGEMENT TOOLS

Unit 1 – Institutional framework, cooperation and research

History and state of the art in fisheries research. Research policies and research applied to fisheries management. Research institutions. Research institution management. The International Council for the Exploration of the Sea (ICES) framework. The European research framework. The Food and Agriculture Organisation (FAO) framework. The international cooperation: structural differences and similarities in fisheries, the cultural approach. Cooperation objectives. Cooperation management. The FAO-COPEMED experience. After COPEMED: MEDSUDMED, ADRIAMED, MEDFISIS. The new role of the European Commission. The private cooperation: joint ventures.

Unit 2 – Statistical analysis and database use

Main statistical concepts. Specification of functions. Statistical instruments: from regression to econometric analysis. Software resources: from Excel to SPSS. Theory and practice of sampling. The problem of data: sources, access and sampling. Data organisation. Case study: the SIRENO experience. Geographical Information Systems (GIS) applied to fisheries. Case study: the European Data Collection Programme. Case study: the statistics management in the International Commission for the Conservation of Atlantic Tunas (ICCAT). FAO statistical services (information retrieval; processing and contrasting; storage; data diffusion and access; specific database programmes).

Section 5

FISHERIES POLICIES

Unit 1 – Maritime law and the socio-cultural perspective

Legal framework in fisheries

Fishing law: legal framework and common law. The legal framework on a worldwide scale, the freedom of the seas principle. Evolution of international law process of claims and recognition. Convention of the Law of the Sea. International and regional fishery organisations. The FAO Code of Conduct for Responsible Fisheries (CCRF). Conventions of Barcelona, Bern, Bonn, FAO Compliance Agreement, ACCOBAMS. The Illegal, Unreported and Unregulated (IUU) fisheries. FAO international plans of action. The role of the EU.

The social and cultural context

The historical overview of fishing activity (from the subsistence systems to the emergence of trade; the evolution of fishing rights; from the coastal to long distance fisheries; the social dynamics). The socio-cultural perspective (fisheries as socio-cultural activity; symbolic dimension of fisheries; heritage and fishermen culture). Socio-political context (associations and representation; typology of organisations: associations, unions, cooperatives, corporations, producer organisations; participation in management: legitimacy, co-management, governability, compliance and enforcement, consultation systems; legal, illegal and non regulated fishing activity; case study: the organisation of the fishing sector in Spain – guilds, associations and producers' organisations). Types of activity from a social science perspective: subsistence, artisanal, industrial, big industrial enterprises. Social analytical issues in fisheries (petty commodity production and shared system; the role of gender and family; productive strategies: intensification and diversity).

Unit 2 – Objectives and instruments for fisheries policies

Policy objectives. Catch and landing control. Effort control (census; inspection; blue boxes; log-books; monitoring at sea). Technical measures. Harbour regulation. Health and sanitary rules. Trade regulation. Sanctions. Economic instruments: taxes and subsidies. Market regulations. Awareness as a tool and use of media to enforce the rules. The involvement of fishermen, the trade chain and consumers. Institutional coordination in national administrations. Strategic planning.

Unit 3 – Applied fisheries policies

The Common Fisheries Policy (CFP) of the European Union

The European fishing sector as a heterogeneous reality. From the Treaty of Rome to CFP. The consequences of CFP after 20 years of application. Revision of the CFP in 2002: problems, challenges and disputes. The CFP policies: resources, structures, market and international policies. The role of the Scientific, Technical and Economic Committee on Fisheries (STEF). Some new developments: Regional Councils, present enlargement, etc.

National fisheries management: the case of Spain

The Spanish fisheries: typology and importance. The history of their development: from the expansive fisheries policy to the crisis of the Exclusive Economic Zones (EEZs). Autonomous decentralisation and accession to Europe. Management instruments and effects. Distribution of responsibilities and monitoring problems. Present administrative map. The process of adaptation to the structural disruption.

National fisheries management: the case of Morocco

The Moroccan fisheries: typology and importance. The history of their development. Management instruments and effects. Distribution of responsibilities and monitoring problems. Present administrative map. The new mode of governance.

Management from Regional Fishery Organisations (RFOs)

RFOs history, structure and functioning. International Commission for the Conservation of Atlantic Tunas (ICCAT). Creation and reform of the General Fisheries Commission for the Mediterranean (GFCM). The scientific committees in the RFOs: Scientific Advisory Committee (SAC-GFCM) and Standing Committee for Research and Statistics (SCRS-ICCAT).

Specific policies

The sustainable development of fisheries (the precautionary approach; recovery plans; protected species CITES; the role of NGOs in fisheries). Recreational activities. Marine protected areas of fisheries interest. Management of employment and social services (special characteristics of maritime employment; social security at sea; employment management; social services; labour law and globalisation; the International Labour Organisation (ILO) regulations; case study: the experience of the Social Institute of the Sea).

Practical project to analyse a given problem in the fisheries sector and design an action plan to address it.

Unit 4 – Institutional visits

Technical visits to Spanish National and Regional Administration bodies and to research centres: General Secretariat for Maritime Fishing, Social Institute of the Sea, General Directorate of Marine Fisheries of the regional government of Catalunya, Spanish Institute of Oceanography, Xunta de Galicia, Azti, etc. Other technical visits: fishing harbours, Nautical-fishing school Atmella de Mar, Mercabarna, Mercamadrid, processing unit of the fishing guild of Rosas, fishing museums of Palamós and Barcelona, practicals on board a coastal guard vessel.

Part 2

The Master of Science thesis

Project (10 month duration, 60 ECTS)

This part of the programme is carried out in well-recognized institutions (universities, research centres or firms), either in Spain or in the participants' country of origin, under the scientific supervision of a thesis director that must be a doctor of renowned prestige. Topics chosen by participants, which are approved by a Master Committee, should be of interest for them and for the institution or country the participant comes from. If the participant so requires, the organizing institutions advise on the choice of the most appropriate thesis director and institution to carry out the desired project, and likewise propose topics of interest previously accorded with other institutions.

As a consequence of the previous facts, there is a wide range of research topics available for Master of Science theses. Many of the theses focus on topics related with socio-economic analyses of fishing systems in various Mediterranean countries. Other theses deal with the development and application of bioeconomic modelling tools that could help to introduce analysis procedures that would, in turn, contribute to a more efficient and adaptive management.

The participant, with the support of the thesis director, should inform the organizing institutions on the development and progress of the research work. This part concludes with the writing of a thesis to be defended in public before an international examining board convened by the organizing institutions. The jury is composed of representatives of the organizing institutions and at least three external members selected in each case for their expertise and prestige in the field of the thesis.

Indicative Master theses realized within the area

Title: Socio-economic study of shrimp fisheries in the Gulf of Gabes (2006)

Author: Yassine Ben Arfa, Agronomist, Tunisia

Place of realization: Institut National des Sciences et Technologies de la Mer, La Goulette, Tunisia, and Gabinete de Economía del Mar, Facultad de Ciencias Económicas y Empresariales, Universidad de Barcelona, Spain

Thesis directors: Ramon Franquesa and Scander Ben Salem

Title: Evaluation of the socio-economic impact of the GIROPESCA project on marketing improvement of fishermen's guilds with the aim of implementing viable lines in Tunisia (2006)

Author: Abdallah Ben Hammouda, Agronomist, Tunisia

Place of realization: Grupo de Estudios Sociales de la Pesca Marítima, Universidad de Girona, Spain

Thesis director: Joan Alegret

Title: Success and failure of fisheries cooperatives: case studies from Turkey (2006)

Author: Vahdet Unal, Agronomist, Turkey

Place of realization: Department of Fish Capture and Processing Technology, Faculty of Fisheries, University of Ege, Bornova, Izmir, Turkey, and Gabinete de Economía del Mar, Facultad de Ciencias Económicas y Empresariales, Universidad de Barcelona, Spain

Thesis directors: Huseyin Ozbilgin, Gul Kitapcioglu and Ramón Franquesa

Title: Bioeconomic modelling of small pelagics from the Central Moroccan Atlantic (2006)

Author: Abdelkabar Kamili, Agronomist, Morocco

Place of realization: Centre Régional d'Agadir, Institut National de la Recherche Halieutique, Agadir, Morocco, and Instituto de Ciencias Marinas, Consejo Superior de Investigaciones Científicas, Barcelona, Spain

Thesis directors: Francesc Maynou and Hmida Otmani

Title: Bioeconomic management model applied to small pelagics in the Bou-Ismaïl Bay (2006)

Author: Essaid Zeghdoudi, Fishery engineer, Algeria

Place of realization: Centre National d'Études et de Documentation pour la Pêche et l'Aquaculture, Tipaza, Algeria, and Instituto de Ciencias Marinas, Consejo Superior de Investigaciones Científicas, Barcelona, Spain

Thesis director: Francesc Maynou

Title: Implementation of new strategies in artificial reefs: sustainable management of marine resources (2006)

Author: Abel Mourelo López, Marine biologist, Spain

Place of realization: Dirección General de Pesca y Asuntos Marítimos, Departamento de Agricultura, Generalitat de Catalunya, Barcelona, Spain

Thesis director: Jaume García

REFERENCES OF THE MAIN ACADEMIC STAFF TEACHING WITHIN THE M.SC. PROGRAMME

More than 70 lecturers participate in each edition of the M.Sc. programme. Some of them belong to the organizing institutions and many others are guest lecturers from various institutions in Spain and in other countries. 35% come from Administration Services, 26% from Higher Education Institutions, 23% from Research Centres, 13% from International Organizations and 3% from Private Companies. Considering their implication in the programme, the following academic staff is taken as reference:

- Ramón **FRANQUESA**, Scientific coordinator, Univ. Barcelona, Facultat de Ciències Econòmiques i Empresariales, Gabinet de Economia del Mar, Barcelona (Spain)
- Juan Lluís **ALEGRET**, Univ. Girona, Grup d'Estudis Socials de la Pesca Marítima, Girona (Spain)
- Antonio **DI NATALE**, AQUASTUDIO, Messina (Italy)
- Antonio **FERNANDEZ**, Xunta de Galicia, Santiago de Compostela (Spain)
- Natalia **FRERS**, Univ. Barcelona, Facultat de Dret, Barcelona (Spain)
- María Carmen **GARCÍA DO NEGRO**, Univ. Santiago de Compostela, Depto. Economía Aplicada, Santiago de Compostela (Spain)
- Luca **GARIBALDI**, Food and Agriculture Organization of the United Nations (FAO), Roma (Italy)
- Ana **GORDOA**, Consejo Superior de Investigaciones Científicas (CSIC), Centro de Estudios Avanzados de Blanes (CEAB), Blanes (Spain)
- Angel **GUERRA SIERRA**, Consejo Superior de Investigaciones Científicas (CSIC), Instituto de Investigaciones Marinas (IIM), Vigo (Spain)
- Mario **LOPES DOS SANTOS**, European Commission, DG Fisheries and Maritime Affairs, Brussels (Belgium)
- Rafael **LOSTADO**, Univ. Valencia, Depto. Estructura Económica, Valencia (Spain)
- Ladislao **LUNA SOTORRÍO**, Univ. Cantabria, Dpto. Organización de Empresas, Santander (Spain)
- Juan Carlos **MARTIN FRAGUEIRO**, Ministerio de Agricultura, Pesca y Alimentación (MAPA), Secretaría General de Pesca Marítima, Madrid (Spain)
- Francesc **MAYNOU**, Consejo Superior de Investigaciones Científicas (CSIC), Instituto de Ciencias del Mar (ICM), Barcelona (Spain)
- Aranza **MURILLOS**, AZTI Tecnalia, Sukarrieta (Spain)
- José **NAVARRO GARCIA**, Ministerio de Agricultura, Pesca y Alimentación (MAPA), Secretaría General de Pesca Marítima, Madrid (Spain)
- Pere **OLIVER**, Instituto Español de Oceanografía (IEO), Madrid (Spain)
- Benito **PELETEIRO**, Instituto Español de Oceanografía (IEO), Centro Oceanográfico de Vigo (Spain)
- Ernest **PONS**, Univ. Barcelona, Facultat de Ciències Econòmiques i Empresariales, Barcelona (Spain)
- Victor **RESTREPO**, International Commission for the Conservation of Atlantic Tunas (ICCAT), Madrid (Spain)
- Rafael **ROBLES**, Consultant, Madrid (Spain)
- Joan Doménech **ROS**, Univ. Barcelona, Facultat de Biologia, Barcelona (Spain)
- Carlos **RUIZ BLANCO**, Asociación Nacional de Fabricantes de Conservas de Pescados y Mariscos (ANFACO), Vigo (Spain)
- Juan José **RUIZ CARRION**, Instituto Social de la Marina, Madrid (Spain)
- Covadonga **SALGADO**, Centro de Control da Calidade do Medio Mariño (CCMM), Vilanova de Arousa (Spain)

- José Luis **SANCHEZ LIZASO**, Univ. Alicante, Facultad de Ciencias, Alicante (Spain)
- Carl **SCHMIDT**, Organisation for Economic Co-operation and Development (OECD), Paris (France)
- Javier **TOMAS**, Consejo Superior de Investigaciones Científicas (CSIC), Institut Mediterrani d'Estudis Avançats, Esporles (Spain)
- Manuel **VARELA**, Univ. Vigo, Depto. Economía Aplicada, Vigo (Spain)