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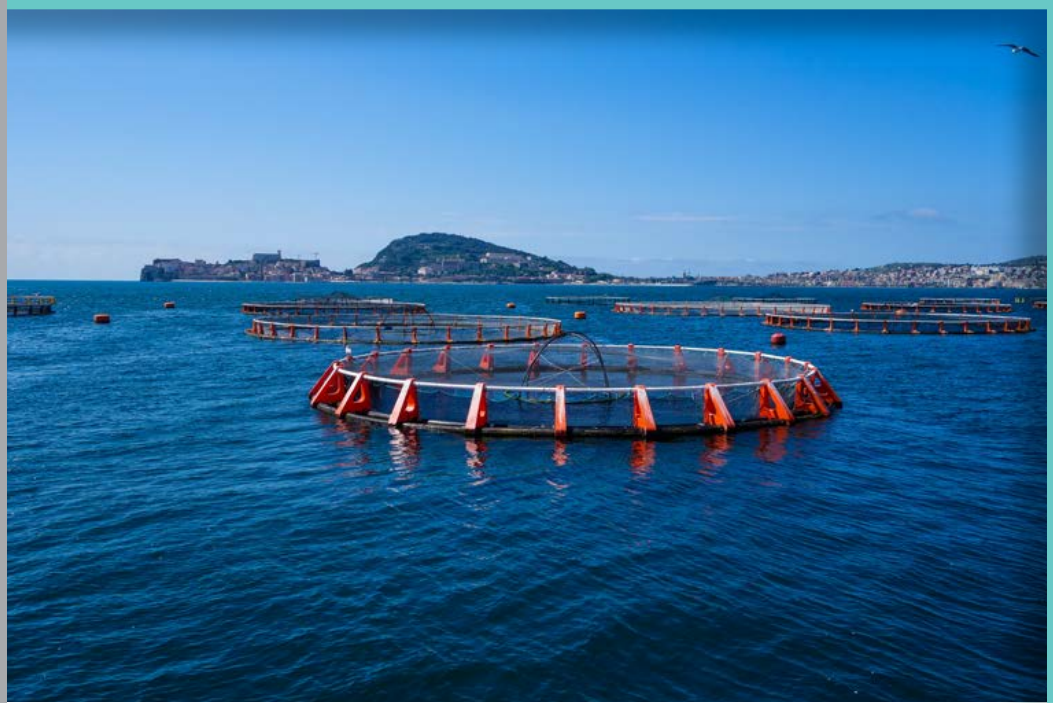
Regional Conference Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security

9–11 December 2014
Bari, Italy



General Fisheries Commission for the Mediterranean
Commission générale des pêches pour la Méditerranée

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Regional Conference
Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security

9–11 December 2014
Bari, Italy

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Preparation of this document

This document has been prepared by the Secretariat of the General Fisheries Commission for the Mediterranean (GFCM) of the Food and Agriculture Organization of the United Nations (FAO). It stems from the Regional Conference "Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security" held in Bari, Italy, from 9 to 11 December 2014. The conference was organized by the GFCM in collaboration with the Italian Presidency of the Council of the European Union, the Italian Ministry of Agriculture, Food and Forestry Policies (MiPAAF) and the European Commission, and in partnership with the International Organisation for the Development of Fisheries in Central and Eastern Europe (Eurofish) and the International Union for Conservation of Nature (IUCN).

This publication gathers the information and outcomes of the conference, the background documents presented by the partners as well as papers and abstracts, in their original language, submitted for the panel sessions and side events. It is intended as a useful collection of information on aquaculture, which should contribute to furthering the reflection on this sector and on its sustainable development within the Mediterranean and Black Sea region.

The conference report has been edited by FAO. All papers, documents and abstracts have been reproduced as submitted by the authors. All conference material is available on the following website: www.fao.org/gfcm/meetings/aquaculture2014/en/.

Abstract

The Regional Conference "Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security" was held in Bari, Italy, from 9 to 11 December 2014. It was organized by the GFCM in collaboration with the Italian Presidency of the Council of the European Union, the MiPAAF and the European Commission and in partnership with Eurofish and IUCN. The event took place at the International Centre for Advanced Mediterranean Agronomic Studies, Institute of Bari (CIHEAM Bari), Italy.

The conference was attended by more than 140 representatives of governments and international organizations, delegates, experts and practitioners from 16 Mediterranean and Black Sea riparian countries. It offered an important occasion for stakeholders to exchange their views on the most salient issues connected to sustainable aquaculture development in the region, share their experiences, examine challenges ahead and explore potential synergies and cooperation opportunities.

In light of emerging economic, social and environmental issues and taking stock of the progress made in aquaculture research and innovation, the conference acknowledged the key role to be played by the sector in achieving food security, employment and economic development in the region, under a blue growth perspective. All participating countries reached a consensus on the need to foster cooperation and implement coherent and coordinated strategies to face challenges ahead and ensure the sustainable and responsible growth in the sector in the Mediterranean and the Black Sea. This event was also marked by the adoption of conclusions and recommendations, which laid the groundwork for the establishment of a GFCM Task Force on a Strategy for the sustainable development of Mediterranean and Black Sea aquaculture.

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Acknowledgments

The organizers of this conference would like to express their sincere gratitude to the Italian Government, in particular the Italian Presidency of the Council of the European Union and the Italian Ministry of Agriculture, Food and Forestry Policies (MiPAAF) for enabling the realization of this important initiative and contributing to this publication.

Special gratitude is also extended to the International Centre for Advanced Mediterranean Agronomic Studies, Institute of Bari (CIHEAM Bari), Italy, for hosting the conference and providing valuable logistical support during the entire event.

This event was placed under the general supervision of Abdellah Srour (executive secretary, GFCM) and under the technical supervision of Fabio Massa (senior aquaculture officer, GFCM). Warm thanks are expressed to the members of the conference coordination committee, who provided continuous technical support throughout the organization of the event: François René (chairperson, GFCM Scientific Advisory Committee on Aquaculture [CAQ]), Giovanna Marino (aquaculture expert, MiPAAF), Anna Zito (aquaculture policy officer, DG MARE, European Commission), Uwe Barg (aquaculture officer, FAO), Alessandro Lovatelli (aquaculture officer, FAO) and Blaise Kuemlangan (chief, Development Law Service, FAO). The contribution of Pablo Ávila (first vice-chairperson, CAQ) and Houssam Hamza (second vice-chairperson, CAQ) in coordinating the side events is also gratefully acknowledged.

Heartfelt thanks are due to all the authors who contributed to the success of the conference bringing their knowledge and experience and presenting the documents, papers and abstracts contained in this volume. Finally, the support provided by José Luis Castilla (FAO consultant) in preparing the document page layout was greatly appreciated.

Abbreviations and acronyms

AFO	aquaculture farmers organization
AgroParisTech	Paris Institute of Technology for Life Food and Environmental Sciences
AMA	Associazione Mediterranea Acquacoltori / Mediterranean Fish Farmers Association
AMShP	Aquaculture Multi-stakeholder Platform
API	Associazione Piscicoltori Italiani / Italian Fish Farmers Association
APROMAR	Asociación Empresarial de Productores de Cultivos Marinos de España / Spanish marine aquaculture farmers association
ANDA	Agence Nationale pour le Développement de l'Aquaculture (Maroc) / National Agency for the Development of Aquaculture (Morocco)
AquaExcel	Aquaculture Infrastructures for Excellence in European Fish Research
AZA	allocated zone for aquaculture / zone affectée à l'aquaculture
CAQ	Scientific Advisory Committee on Aquaculture
CETMAR	Centro Tecnológico del Mar (España) / Technological Centre of the Sea (Spain)
CFP	Common Fisheries Policy
CGPM	Commission générale des pêches pour la Méditerranée
CIHEAM Bari	International Centre for Advanced Mediterranean Agronomic Studies, Institute of Bari
CLAMS	Co-ordinated Local Aquaculture Management Systems
CopeMed	Cooperation for fishing in the Mediterranean
DG MARE	EU Directorate General for Maritime Affairs and Fisheries
DGPA	Direction générale de la pêche et de l'aquaculture (Tunisie) / Directorate General for Fisheries and Aquaculture (Tunisia)
DHA	docosahexaenoic acid
DIMEVET	Department of Veterinary Medical Sciences (Bologna University)
EastMed	Scientific and Institutional Cooperation to Support Responsible Fisheries in the Eastern Mediterranean
EATiP	European Aquaculture Technology and Innovation Platform
EAS	European Aquaculture Society
EIA	environmental impact assessment
EIE	évaluation d'impact environnemental
EMPA	European Mollusc Producers Association
EPA	eicosapentaenoic acid
EU	European Union
Eurofish	International Organisation for the Development of Fisheries in Central and Eastern Europe
FAO	Food and Agriculture Organization of the United Nations / Organisation des Nations Unies pour l'alimentation et l'agriculture
FEAP	Federation of European Aquaculture Producers
FEPA	Féderation européenne des producteurs aquacoles

FOESA	Spanish Aquaculture Observatory Foundation / Fondation observatoire espagnol de l'aquaculture
FROM	Fondo de Regulación y Organización del Mercado de los Productos de la Pesca y Cultivos Marinos
GAFRD	General Authority for Fish Resources Development (Egypt)
GFCM	General Fisheries Commission for the Mediterranean
HUFA	highly unsaturated fatty acid
ICT	information and communication technologies
IFREMER	Institut français de recherche pour l'exploitation de la mer / French Research Institute for Exploitation of the Sea
ICZM	integrated coastal zone management
IMTA	integrated multi-trophic aquaculture
Infosamak	Centre for Marketing Information and Advisory Services for Fishery Products in the Arab Region
IUCN	International Union for Conservation of Nature
IZSVe	Istituto Zooprofilattico Sperimentale delle Venezie / Experimental Zooprophylactic Institute of Venice
LHRH	luteinizing hormone-releasing hormone
MADE project	Marine Aquaculture Development in Egypt
MedartNet	Mediterranean Platform of Artisanal Fishers
MedSudMed	Assessment and monitoring of fisheries resources and ecosystem of the Strait of Sicily
MiPAAF	Ministero delle politiche agricole alimentari e forestali (Italia) / Ministry of Agriculture, Food and Forestry Policies (Italy)
NGO	non-governmental organization
NIMBY	Not in My Back Yard
NOAA	National Oceanic and Atmospheric Administration (United States of America)
NSC	Norwegian Seafood Council
OECD	Organisation for Economic Co-operation and Development
OMC	open method of coordination
ONG	organisation non gouvernementale
PSE	programme de suivi environnemental
RDT	recherche et développement technologique
RTD	research and technological development
SHoCMed project	Developing siting and carrying capacity guidelines for Mediterranean aquaculture within aquaculture appropriate areas
SIPAM	Information System for the Promotion of Aquaculture in the Mediterranean
SPS Agreement	Agreement on the Application of Sanitary and Phytosanitary Measures
TBT Agreement	Agreement on Technical Barriers to Trade
UICN	Union internationale pour la conservation de la nature
USA	United States of America
WTO	World Trade Organization

Foreword

Aquaculture is an activity that is constantly increasing in both stature and importance. This sector plays an important role for coastal communities since it provides jobs and economic development, and contributes to food security. For this reason, it is a central component of the activities of the GFCM.

Since 1995, the FAO Code of Conduct for Responsible Fisheries has served as the reference framework for many initiatives striving to achieve sustainability both in fisheries and in aquaculture. Over the last twenty years, the very definition of the principles of sustainability has evolved and it will continue to evolve. Since the adoption of the Code of Conduct, new means have been devised, such as the ecosystem approach, marine spatial planning and the blue growth framework, and their application to aquaculture represents a key factor in taking concrete steps towards achieving a sustainable aquaculture sector in the Mediterranean and the Black Sea.

Against this backdrop, the GFCM has recognized the need to secure a clear commitment from the relevant stakeholders to supporting the sustainable development of the sector in the whole region, and the organization of a large-scale regional event to discuss challenges in this connection had been on its agenda for a long time. Given the significant advances made by the CAQ over the last few years, it seemed suitable that such tireless efforts would culminate in the delivery of an important event such as the Regional Conference "Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security" held in Bari.

The outcomes of the conference went beyond our expectations. Given its wide reach and its success in bringing high-level experts together, it can be considered as a significant milestone in the development and modernization of the CAQ and it has laid the groundwork for the establishment of a GFCM Task Force on a Strategy for the sustainable development of Mediterranean and Black Sea aquaculture. I am confident that the discussions that took place at the conference on crucial topics such as how to achieve good governance in aquaculture, how to improve market conditions for aquaculture products and how to maximize the benefits for coastal communities, will bear fruit for the regional development of the sector. The debates held highlighted plenty of necessary tasks to move the sector forward – building the economic case for aquaculture development, increasing the social acceptability of aquaculture, addressing the issue of healthy environment, to name but a few.

More generally speaking, this regional event should be regarded as a pillar of the work of the Commission in relation to sustainable aquaculture: in the same spirit in which the amendment process of the GFCM legal and institutional framework was conducted, it was based on a bottom-up participatory approach and open to all Mediterranean and Black Sea riparian countries. Breaking with past trends, many different stakeholders were involved, spanning from farmers to policy-makers, scientists and other experts in the sector.

Great opportunities come with the sustainable development of aquaculture but also many challenges, starting from the conflict between the traditional uses of the sea and the utilization of marine areas for emerging human activities. In this regard, the GFCM provides a valuable service to all Mediterranean and Black Sea riparian countries in offering them an expert forum where they can get together and address region-wide issues. It is crucial that such issues, which have an inherent public nature as they support socio-economic activities by farmers and producers while at the same time protecting biodiversity at different scales – from genetic materials to local ecosystems –,

enjoy adequate visibility. In making this possible, it is worth recalling that the GFCM considers aquaculture as a complementary activity to marine capture fisheries rather than as a competitor. Both aquaculture and fisheries depend on the sustainable use of renewable natural resources which, absent common policies and good practices, will not be available to future generations.

A special thank is due to the Italian Government, since it actively promoted and supported the organization of the conference during its Presidency of the Council of the European Union, as well as to the GFCM Secretariat for having provided expert backstopping and oversight.

We hope that the proceedings of this regional conference will provide a launchpad from which we can embark on a path towards sustainable aquaculture development within a blue growth framework.

Stefano Cataudella
Chairperson
General Fisheries Commission for the Mediterranean

Conference overview

BACKGROUND

The aquaculture sector in the Mediterranean and Black Sea region has grown significantly in recent years with certain subregions experiencing particularly notable growth. As an activity that generates both food and revenue, aquaculture offers a potentially considerable contribution towards providing a source of nutritious food products and achieving economic growth. The aquaculture sector in the Mediterranean and Black Sea region is characterized by country-specific variations in the level of development as well as by differing environmental features and characteristics. Such differences have posed sizeable challenges to the development of the sector. As a matter of fact, aquaculture development inevitably raises concerns in terms of environmental sustainability, governance and socio-economic implications. Given its present level of advancement, the sector is at a point where such concerns are no longer a matter for individual countries. Consequently, further development must be achieved through harmonious cooperation at the regional level.

In the region, there is a growing belief that concrete action at the policy level is needed on top of participatory approaches and knowledge-sharing. Such policy action would aim to secure a clear commitment to supporting the sustainable development of the sector while giving full consideration to regional and local priorities. Key actors and stakeholders within the regional aquaculture sector have been calling on governments to commit to a coordinated and sustainable approach to aquaculture development for years. For this reason, the organization of large-scale regional event had long been on the agenda of the GFCM and the time was ripe for taking action and for capitalizing on the momentum created by the Italian Presidency of the European Union in shining the spotlight on this sector.

OBJECTIVES

The conference aimed to:

i) take stock of the progress made by the aquaculture sector in the region;
ii) address the main governance, economic, social and environmental challenges facing the sector;
iii) renew political commitment among all actors concerned to work towards sustainable aquaculture development in the Mediterranean and the Black Sea;
iv) provide a forum for experts and stakeholders from different countries to share their experiences, discuss future challenges and explore potential synergies and cooperation opportunities; and
v) build consensus on a regional strategy for achieving blue growth through aquaculture.

ORGANIZATION

The conference was attended by more than 140 representatives of governments and international organizations, delegates, experts and practitioners from 16 Mediterranean and Black Sea riparian countries (see Plate 1). Discussions were structured into a two-day technical event with four panel discussions addressing the following themes: i) enabling good governance in aquaculture; ii) a healthy environment, a stronger aquaculture industry; iii) boosting markets for aquaculture and iv) advancing aquaculture innovations. Along with the technical panels, two side events were organized focusing on specific experiences and case studies related to the panel discussions. Each panel was

chaired by two chairpersons who opened the session and outlined the main objectives and targets of the panel. A keynote speaker then presented the background document and introduced the key topics to be tackled by the panel. Discussions in each panel were moderated by chairpersons, with question and answer sessions arranged as appropriate, and synthetized to distil key messages to be brought before the high-level conference. The conference coordination committee provided continuous technical support throughout the event. The high-level conference represented a forum for government delegates and authorities to learn about the findings and conclusions of the panel discussions and to express their views on the main issues raised.

PLATE 1
Regional aquaculture conference participants

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PARTNERS

General Fisheries Commission for the Mediterranean (GFCM)

General Fisheries Commission for the Mediterranean
Commission générale des pêches pour la Méditerranée

Created in 1949 under the provisions of Article XIV of the FAO Constitution, the GFCM started its activities in 1952. Amendments to its constitutive agreement were approved in 1963, 1976, 1997 and 2014. Consisting of 23 contracting parties along with the European Union (EU), and 3 cooperating non-contracting parties (Bosnia and Herzegovina, Georgia and Ukraine), the GFCM has the objective to ensure the conservation and sustainable use, at the biological, social, economic and environmental levels, of living marine resources, as well as the sustainable development of aquaculture in the Mediterranean and in the Black Sea. Membership is open to Members and Associate Members of the FAO and to such non-member nations as are Members of the United Nations, or any of its specialized agencies, that are coastal states or regional economic organizations whose vessels engage in fishing in its area of application.

Food and Agriculture Organization of the United Nations (FAO)

Food and Agriculture Organization of the United Nations

As an intergovernmental organization, FAO has 194 Member Nations, two Associate Members and one member organization, the EU. Its employees come from various cultural backgrounds and are experts in the multiple fields of activity FAO engages in. Its staff capacity allows it, *inter alia*, to support improved governance, generate, develop and adapt existing tools and guidelines and to provide targeted governance support as a resource to country- and regional- level FAO offices. Headquartered in Rome, Italy, FAO is present in over 130 countries. In support of FAO objectives, the mission of the **FAO Fisheries and Aquaculture Department** is to strengthen

global governance and the managerial and technical capacities of Members as well as to lead consensus-building towards improved conservation and utilization of aquatic resources. The Department aims to make a significant contribution to the attainment of the Millennium Development Goals and the targets set by the World Summit on Sustainable Development and the World Food Summit.

Italian Presidency of the Council of the European Union

2014
Presidenza Italiana del Consiglio dell'Unione Europea

The European Commission is the executive body of the EU. It represents the interests of the EU as a whole. Its main roles are to propose legislation which is then adopted by the co-legislators, the European Parliament and the EU Council; enforce European law; set objectives and priorities for action and work toward delivering them; manage and implement EU policies and budget; and represent the EU outside Europe. The European Commission has its headquarters in Brussels, Belgium, and some services also in Luxembourg. It has representations in all EU Member States and 139 delegations across the globe.

Ministry of Agriculture, Food and Forestry Policies (MiPAAF), Italy

mipaaf
Ministero delle politiche agricole alimentari e forestali

Established in 1946, the MiPAAF has undergone various organizational amendments, the latest occurring in 2013. The ministry is mainly in charge of elaborating and coordinating the orientations of agriculture, forestry, food and fisheries policies at the national, European and international levels. At time of writing, Maurizio Martina was the Minister since 22 February 2014.

International Centre for Advanced Mediterranean Agronomic Studies, Institute of Bari (CIHEAM Bari)

CIHEAM
Bari

Founded in 1962, CIHEAM is an intergovernmental organization with 13 Mediterranean member countries: Albania, Algeria, Egypt, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Spain, Tunisia and Turkey. Its headquarters are located in Paris. The CIHEAM Institute of Bari is a centre for post-graduate training, applied scientific research and design of in-loco partnership actions within the framework of international cooperation programmes. The organization works in four thematic areas: land and water resources management; integrated pest management of Mediterranean fruit and vegetable crops; Mediterranean organic agriculture; and sustainable agriculture, food and rural development.

International Organisation for the Development of Fisheries in Central and Eastern Europe (Eurofish)

Eurofish
INTERNATIONAL ORGANISATION

Eurofish is an international organization established to assist the development of fisheries and aquaculture in central and eastern Europe focusing on the post-harvest sector. It contributes to the development of fisheries and aquaculture by publishing marketing- and industry-related information in the Eurofish Magazine and on its website and by organizing conferences, workshops, seminars, business-to-business meetings as well as by implementing a variety of projects in the fields of trade and market, processing and fish farming. Eurofish has in-depth knowledge about the fisheries and aquaculture sector in Europe and neighbouring countries and can count on an extensive network in the region. Its key objectives are to contribute to the sustainable development of the fisheries and aquaculture sector, to promote trade of high quality, value-added fishery products, and to facilitate the transfer of information and knowledge.

International Union for Conservation of Nature (IUCN)

IUCN is a membership union uniquely composed of both government and civil society organizations. It provides public, private and non-governmental organizations (NGOs) with knowledge and tools that enable human progress, economic development and nature conservation to take place together. Created in 1948, IUCN is now the world's largest and most diverse environmental network, harnessing the knowledge, resources and reach of more than 1 300 member organizations and some 16 000 experts. It is a leading provider of conservation data, assessments and analysis. Its broad membership enables IUCN to fill the role of incubator and trusted repository of best practices, tools and international standards. IUCN provides a neutral space in which diverse stakeholders including governments, NGOs, scientists, businesses, local communities, indigenous peoples organizations and others can work together to forge and implement solutions to environmental challenges and achieve sustainable development. Working with many partners and supporters, IUCN implements a large and diverse portfolio of conservation projects worldwide. Combining the latest science with the traditional knowledge of local communities, these projects work to reverse habitat loss, restore ecosystems and improve people's well-being.

Panel 1

Enabling good governance in aquaculture

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Panel 1
Enabling good governance in aquaculture

PANEL DESCRIPTION

Sustainable aquaculture development can bring about much needed growth and jobs to local communities. To achieve this in Mediterranean and Black Sea countries, good governance and sound regulatory frameworks are essential. The establishment of allocated zones for aquaculture (AZAs) in particular could be instrumental in this respect. It is widely acknowledged that cumbersome procedures involved to obtain aquaculture licenses and farming authorizations represent one of the major obstacles to aquaculture development at the regional level. Panel 1 discussions aimed to share experiences on aquaculture governance, examine good practices and assess how these can be effectively shared among countries, as well as to identify elements for harmonized guidelines to simplify administrative processes supporting sustainable aquaculture development in the region.

DISCUSSION TOPICS

The panel explored in particular the following aspects:

- participatory approach as a driving force for good aquaculture governance;
- legal framework to prioritize and recognize aquaculture potential for blue growth;
- spatial planning and AZAs as governance tools;
- social licenses and acceptability of aquaculture: a condition for aquaculture development in coastal and maritime areas;
- ways to develop public policies based on a coherent, balanced and sustainable approach to guarantee a legal basis for aquaculture promoters;
- solutions to streamline administrative procedures in management policies and licensing procedures; and
- good practices and soft law to improve aquaculture governance.

PANEL MEMBERS*

Chairpersons

Majida Maarouf – ANDA, Morocco

Majida Maarouf is currently the director of the National Agency for the Development of Aquaculture (ANDA) in Morocco. She graduated from the Institute of Agronomy and Veterinary Hassan II, Morocco, in 1991. She started her professional career in the fish farming sector as an executive at the carp culture company Africarp SA (1993–1994) before taking the position of production manager in 1995–1996. In 1996–1997, she worked at the National Halieutic Research Institute within the international S&T cooperation project on cephalopod fishery in northwest Africa. As part of this project, she was involved in preparing a management tool for national fisheries on the basis of the ecosystem approach. Majida Maarouf then started to work in fisheries management: in 1999, she joined the Marine Fisheries Department at the Directorate for Maritime Fisheries and Aquaculture, Division for the Protection of Fishery Resources. In 2002, she was appointed as head of the Department for Planning and Management of Fishery Resources and chief of the Division for the Protection of Fishery Resources in 2008. Finally, in 2011, she was appointed as director of the ANDA.

Riccardo Rigillo – MiPAAF, Italy

Riccardo Rigillo is currently director general for Maritime Fisheries and Aquaculture at the MiPAAF of Italy and he is also part of the Italian managing authority for the European Maritime and Fisheries Fund. He graduated in economics and achieved specialized studies in administrative and constitutional law, international relations and strategic studies. As counsellor for fisheries and maritime affairs, he has coordinated the Italian position during the EU negotiations for the new Common Fishery Policy, the European Maritime and Fisheries Fund and the Integrated Maritime Policy in Brussels. He has been working in fisheries and aquaculture for more than 12 years now. He is also an expert in environmental economics and has been teaching this subject as a visiting professor at the University of Rome – Tor Vergata.

* The information is reproduced as submitted by each panel member and was up-to-date at the time of the conference.

Keynote speaker

Rosa Chapela Pérez – CETMAR, Spain

Rosa Chapela, PhD in law, is an expert in fisheries and aquaculture governance and legal framework. She is currently head of the Fisheries Socio-economic Department at the Centro Tecnológico del Mar (CETMAR) in Vigo, Spain, and a geographical expert at the Farnet support unit for Axis 4 EFF. She has experience in EU projects, project monitoring and supervision, as well as in the management of networks, policy analysis and gender equality in the fisheries sector (public hearing at the EU Parliament). She has coordinated the Spanish aquaculture strategic plan in 2008 and participated in the Mediterranean-on project "Governance indicators for aquaculture". She has collaborated with FAO (cage aquaculture licensing procedures) and contributed to the *Guide on Site Selection and Site Management for aquaculture* (IUCN, 2009). She also participated in the Spanish strategic plan for aquaculture 2014 and in a fisheries twinning project – Phare "Harmonization of Bulgarian and Romanian Fisheries Legislation" (2004 and 2007).

Panellists

Marina Petrou – Ministry of Rural Development and Food, Greece

Marina Petrou is currently acting director general for fisheries and director for aquaculture and inland waters at the Greek Ministry of Rural Development and Food. She trained as a biologist at the University of Athens and holds a master degree in oceanography from the same university. She has been working at the Ministry of Rural Development and Food since 1980 and has gained an extensive experience in most of the fisheries topics. She has served as a director in all the directorates of the General Directorate for Fisheries, namely the Directorate for Marine Fisheries, the Directorate for Trade and Development of Fisheries Products and, currently, the Directorate for Aquaculture and Inland Waters.

Rakia Trabelsi Ep Belkahia – DGPA, Tunisia

Rakia Belkahia is currently the vice-director for aquaculture at the Directorate General for Fisheries and Aquaculture (Direction générale de la pêche et de l'aquaculture, DGPA) of the Tunisian Ministry of Agriculture. She obtained her post-graduate diploma (DESS) in natural sciences from the faculty of Tunis before specializing in fisheries at the National Agronomic Institute of Tunisia. She served as senior engineer at DGPA from 1984 to 2009 and became vice-director for aquaculture in 2009.

Javier Remiro Perlado – FOESA, Spain

Javier Remiro Perlado is currently managing director of the Spanish Aquaculture Observatory Foundation (FOESA). After a bachelor's degree in marine sciences from the University of Vigo, he began his professional career in the scientific world at the University of Geneva. At his return in Spain, he completed his education with a master in integrated quality, environment and occupational risk prevention (PRL) in Madrid and started a new career as a consultant in the field of quality management, environment and PRL and, since 2006, in fisheries and aquaculture, in the public company Tragsatec. In February 2009, he was nominated managing director of FOESA. Since then, he has been promoting the consolidation of this institution as a reference entity for the Spanish aquaculture sector, expanding the lines of action and partnerships with other organizations and institutions and supporting the sustainable development of the sector.

Philippe Maraval – Ministry of Ecology, Sustainable development and Energy, France

Philippe Maraval is currently working as deputy head of the Shellfish Farming and Coastal Environment Department at the Maritime Fisheries and Aquaculture Directorate of the French Ministry of Ecology, Sustainable Development and Energy. He graduated in 2002 at the National School for Water and Environmental Engineering and was at first responsible for the interservices water mission in the Haute-Marne department in France, aiming at ensuring compliance of fish resources exploitation and industrial and urban waste with the aquatic environment regulations. He then dedicated himself to waste management, renewable energies, sustainable development strategies in the French West Indies, as well as to the setting of a marine mammals sanctuary; he established the first French Caribbean network for sea turtles. He was then appointed as French representative for the sharing of straddling fish stocks in the North Atlantic waters, in the Pacific and in the Mediterranean Sea and as head of the French delegation to the FAO and to the United Nations for negotiations on aquaculture and fishery-related resolutions.

Milena Krasić – Ministry of Agriculture and Rural Development, Montenegro

Milena Krasić is currently working as adviser for fisheries and aquaculture at the Ministry of Agriculture and Rural Development of Montenegro. She graduated in 2005 from the Department of Biology of the Faculty of Natural Sciences and Mathematics at the University of Podgorica and achieved postgraduate studies in the same faculty with a thesis on "Phytoplankton of Piva Lake" (title: Master of Biodiversity). At the Ministry of Agriculture and Rural Development, she has been involved in the negotiation process of Montenegro with the EU, under chapter 13 – fisheries. She is also an administrative representative of Montenegro in the GFCM CAQ and she actively participates in several international projects.

Mohamed Fathy Osman – Ain Shams University, Egypt

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Enabling good governance in aquaculture

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1. BACKGROUND

> Aquaculture governance is an important dimension of the industry and is likely to become even more so as the sector continues to expand.
>
> *The State of World Fisheries and Aquaculture* (FAO, 2014)

Farmed fish represents one of the fastest-growing sources of food globally. More than half of the fish consumed worldwide is produced by aquaculture and the FAO estimates that this figure will reach 62 percent by 2030 (FAO, 2014a). In light of its increasing importance, aquaculture was selected by the EU as one of only five blue growth focus areas (European Commission, 2012). Moreover, blue economy has been on the agenda of EU Member States, regions, enterprises and civil society within the framework of the Europe 2020 strategy for smart, sustainable and innovative growth.

Along this line, the FAO has launched the Blue Growth Initiative, which encompasses capture fisheries, aquaculture, ecosystem services, trade and social protection. Based on the principles enshrined in the 1995 FAO Code of Conduct for Responsible Fisheries (CCRF), the Blue Growth Initiative is a framework which focuses on promoting the sustainable use and conservation of aquatic renewable resources in an economically, socially and environmentally responsible manner with the aim of reconciling and balancing priorities between growth and conservation and between industrial and artisanal fisheries and aquaculture, and of ensuring equitable benefits for communities (FAO, 2014b).

However, as with any rapidly-growing sector, aquaculture faces many challenges, including – but not limited to – an interventionist and stringent regulatory system, long and cumbersome administrative procedures, a weak participatory approach, a lack of legal assurances for producers and limited availability of coastal areas for establishing aquaculture sites. To a large extent, many of these constraints can be addressed by formulating a sound governance strategy, combined with the creation of tools for decision-making, management, planning and monitoring. In addition to addressing management challenges, a good governance system in aquaculture can additionally create incentives to stimulate investment in this sector and promote the activity as a pathway for job creation and local development. This background document outlines the tools needed to enable good governance in the management and planning of aquaculture activities.

Unfortunately, poor governance is not a new phenomenon. The Technical Guidelines for Responsible Fisheries published by the FAO in 1997 set out a clear list of recommendations for improving the legislative and institutional framework in the aquaculture sector (FAO, 1997). Almost 20 years later, the FAO *State of World Fisheries and Aquaculture 2014* still laments the absence of a policy environment conducive to the promotion of growth in the aquaculture sector (FAO, 2014a). The SHoCMed

project[1], implemented in 2008 by CAQ, provided a first comprehensive review of the existing procedures in Mediterranean countries for site selection, licensing, regulatory schemes and environmental impact assessments (EIA).

The aquaculture strategy outlined by the EU in 2009 (European Commission, 2009) highlighted the shortfalls of the previous strategic document published in 2002 and called for "improving the sector image and governance". The measures proposed to improve governance were: better implementation of EU legislation; reducing administrative burden; ensuring proper stakeholder participation; and providing appropriate information to the public. The reformed Common Fisheries Policy (CFP) lent greater support to aquaculture by adding a dedicated pillar within the policy and by devoting a section (entitled: "A new governance to support EU aquaculture") of the report Strategic Guidelines for the sustainable development of EU aquaculture (European Commission, 2013) to improving governance.

Even on the research and development side, the European Aquaculture Technology and Innovation Platform (EATiP), together with the Aquainnova project[2], highlighted the need for improved governance. In its report, Aquainnova identified two key factors missing in aquaculture development: the need for improving aquaculture governance within the CFP and the need for accountability to society through effective governance to achieve a level playing field for aquaculture (EATiP, 2013).

The EU-funded AQUAMED project (2013)[3], throughout regional consultations with stakeholders in 12 Mediterranean countries, identified governance and policies as the most important category of constraints to aquaculture development. For both southern and northern Mediterranean countries, burdens in procedures for licensing and the lack of national policies in spatial planning are the two main constraints, among the 77 listed. Insufficient awareness of the importance of aquaculture at the decision-making level and a lack of political commitment to aquaculture development are also recognized as key constraints that need to be solved in order to achieve effective governance by 2030 at the regional level.

The definition of "governance" depends on the policy area in question. For the purpose of this panel, the following definition of aquaculture governance is proposed:

> A framework of rules, processes and policies that determine the way in which powers are exercised, decisions are taken – or not – upon a wide range of principles. These principles are accountability and transparency, participation of stakeholders in decision-making, administrative cost-efficiency, clear definition of responsibilities at international, national and local level, and predictability, taking into account regional specificities and with regard to the rule of law and equity.

In aquaculture, the presence of all those governance elements should lead to an enabling policy environment that ensures that factors such as environmental protection regulations, processes for site selection and market dynamics do not contradict the producers' interests of operating in a financially sustainable and competitive manner.

Governance should be considered as "a set of public and private interactions that are initiated to solve societal problems and create societal opportunities" (IUCN, 2009). This statement introduces two interesting insights in aquaculture governance: the interactive governance approach (i.e. the participation of the greatest possible number of stakeholders) and the element of opportunity cost (i.e. the possibility of making a choice between several exclusive alternatives given the limited or scarce resources).

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[1] EU-funded project: Developing siting and carrying capacity guidelines for Mediterranean aquaculture within aquaculture appropriate areas

[2] Supporting governance and multi-stakeholder participation in aquaculture research and innovation

[3] The future of research on aquaculture in the Mediterranean region
AQUAMED. 2013. *Collective synthesis of research needs necessary to overcome the constraints identified at Mediterranean regional level* (www.aquamedproject.net/index.php/results/deliverables-and-publications).

Wider stakeholder participation would guarantee the best choice and therefore – what is important here – increase social acceptability.

The following sections analyse the main constraints facing aquaculture governance in the Mediterranean and the Black Sea, examining examples of good practices in aquaculture governance, before ending by listing key points to stimulate discussions in an appropriate form of governance that is participative, effective, accountable and coherent, and that supports sustainable aquaculture development in this region.

2. MAIN ACTORS AND ISSUES AT STAKE

The actors in aquaculture governance are composed of any social group that has the power of action. Many stakeholders could be involved in the governance system, including producers associations, social groups, users of the publicly-owned areas, other administrative bodies, etc. Table 1 below outlines the main actors involved in aquaculture in the Mediterranean and the Black Sea with a view to achieving a participatory form of governance.

TABLE 1
Main actors involved in aquaculture in the Mediterranean and the Black Sea

International institutions	European Commission	National/regional governments	Aquaculture industry	NGOs	Related activities	Communities
• FAO • GFCM	• DG MARE • DG ENV • DG REGIO • DG INDUSTRY • GFCM	• Fisheries ministries • Environment departments • Health • Market • Administrative structures	• Producers organizations • Feed producers • Professional associations • Aquacuture Farmers Organizations (AFOs)	•Environment •Consumers	• Scientists and researchers • Platforms (AMShP, EATiP, national platforms), training centres	• Stakeholders in coastal zones: aquaculture, tourism, fisheries, etc.

Aquaculture governance needs to integrate as many stakeholders as possible. A participative form of governance in aquaculture would help introduce accountability and establish clear roles for all stakeholders involved. When responsibilities and accountability are shared by all actors, they are then able to contribute to activities such as proposing regulations and enforcing monitoring requirements. Moreover, a participatory approach would increase the stature of aquaculture, potentially allowing it to be considered at the same level of importance as other activities such as coastal tourism. It is important to note that communities play a key role in coastal zone management since they provide the social license, or acceptability, that is essential for the success of aquaculture activities (Hishamunda *et al.*, 2014).

International actors in the Mediterranean and the Black Sea would help in putting forward recommendations and harmonizing best practices and rules among the countries concerned[4]. National governments in the region would then pass regulations according to these common principles, use common benchmarks and exchange best practices both regionally and internationally.

Governance challenges and constraints

In 2008, the SHoCMed project carried out by the GFCM identified the main regulatory constraints facing the aquaculture sector in the Mediterranean and Black Sea region. As also evidenced in 2013 by the results of the AQUAMED project, which analysed the constraints through a multi-stakeholder analysis approach, this same set of constraints remains unchanged. This was further corroborated by statements made

[4] The FAO has supported Mediterranean and Black Sea countries in developping and adopting an appropriate legal framework for aquaculture through its Technical Assistance Programme.

by producers associations[5]. Therefore, there is still a need to address these constraints under the current agendas.

The major constraint facing the aquaculture sector is related to administrative issues and to the need for intervention by several different institutions. In many cases, a permit for occupying a public site or a coastal area – which is both the most important authorization and the most time-consuming process – is handled by authorities that have little to no knowledge on aquaculture. Given their minimal understanding of the activities entailed in aquaculture, they seldom consider it as a priority for coastal development. These authorities tend to lean on the side of environmental protection instead. Table 2 below lists what might arguably be considered as the main governance constraints and challenges currently facing the aquaculture sector in the Mediterranean and the Black Sea.

TABLE 2
Main governance constraints and challenges for aquaculture in the Mediterranean and the Black Sea

Governance constraints	Governance challenges and priorities
Cumbersome procedures for licensing and regulations, red tape and bureaucracy Excessive length of procedures (2 or 3 years) which hamper the business initiatives for aquaculture	Conducive policy environment for aquaculture Streamlining of cumbersome procedures, thereby providing clarity and legal security to investors
Lack of administrative coordination (too many agencies or departments involved in aquaculture licensing)	Better administrative efficiency Coordinating agency/central body for aquaculture issues
Lack of trust in policy managers Political actions in aquaculture instead of public policies, politically-based decisions instead of technically-based decisions	Information, transparency and better knowledge on aquaculture
Weak participation in decision-making	Increase the participative approach (include a wide range of stakeholders)
Competition for marine spaces and coastal areas	Site selection and site management for aquaculture (ICZM, AZAs, etc.)
Competition between countries with low costs of aquaculture or associated taxes and less rigorous legislations, and countries where the opposite is true	Harmonization of legislation in the Mediterranean and the Black Sea (EIA, etc.) Providing an economical and secure environment for aquaculture
Restrictive interpretation of rules to allow aquaculture in Natura 2000 (for EU countries)	Best practices for aquaculture activities in protected areas
Strong/severe scrutiny of marine aquaculture in public zones (coast, seas and rivers)	Legal recognition of aquaculture as a priority Efficient policy-making communities (civil service departments and relevant government ministers/ committees in order to form strong policy-making communities)

Aquaculture activities should be both financially and environmentally sustainable. They must also be socially acceptable and technically feasible. Nowadays, the only way to strike a balance between these variables is through the use of good governance tools; that is tools that are based on fair and clear regulations, and that are administered by transparent and efficient institutions following a participatory approach. Governance is, therefore, the engine that moves the entire process. It is important to remember that it is in the interest of producers to have a healthy environment.

[5] It is the case of the Spanish Association of Marine Farmers (APROMAR), which recently published a "decalogue" to promote marine aquaculture in Spain (www.apromar.es/content/apromar-promueve-un-dec%C3%A1logo-de-propuestas-para-impulsar-la-acuicultura-marina-en-espa%C3%B1a).

3. REGULATORY FRAMEWORKS

> States should establish, maintain and develop an appropriate legal and administrative framework which facilitates the development of responsible aquaculture.
>
> Article 9.1.1, *FAO Code of Conduct for Responsible Fisheries*

It should be emphasized that, although governance is a key factor for the successful development of the aquaculture sector, there are issues that cannot be addressed at a global scale. Indeed, given that one of the pillars of governance – regulations and public policies – relates to the jurisdiction of individual countries, it is beyond the mandate of bodies such as the EU and the GFCM.

Aquaculture is an economic activity developed in the public domain, using natural and public resources, and dealing with seafood products. As such, regulation of this sector involves a wide range of institutions. This multi-institutional regulatory system adds to the list of time-consuming authorization procedures, creates an additional layer of complexity for stakeholders and introduces the risk of overlapping mandates. At the same time, traditionally, only one of these institutions – either the fisheries or the aquaculture department – actively advocates on behalf of the fish farmers. The agencies most commonly involved in aquaculture-related administrative procedures include fisheries, environment, navigation, planning, public works, culture, health and industry.

Establishing a clear regulatory framework is crucial in order to successfully advance in the aquaculture sector. Unfortunately, many countries have initiated aquaculture activities and built relevant infrastructures without considering the legal or governance elements that needed to be in place in order to sustainably develop this sector. It is advisable to outline implementation plans for government action and to develop legal instruments which create long-term legal certainty in the aquaculture sector.

Although it slightly varies depending on the type of aquaculture activity in question, aquaculture legislation in Mediterranean countries is based on national regulations and on the importance of aquaculture in each country. It is of the utmost importance to consider the laws and regulations that – although not administered by the authority responsible for aquaculture – directly affect the development of this industry, e.g. the legislation on the occupation and exploitation of land (either state-owned or public coastal areas) for aquaculture that exists in most Mediterranean countries (Algeria, Egypt, France, Greece, Italy, Spain, Turkey, etc.). Such an issue introduces complexity into aquaculture legislation. An overview of the primary legal framework for aquaculture within the Mediterranean has already been provided under the SHoCMed project.

The multiannual strategic plan for Spanish aquaculture developed in Spain addresses the main constraints to achieving good governance within the aquaculture sector, establishes the strategic guidelines for aquaculture development and harmonizes the policies of different regions. This plan, which involved all stakeholders and regions in its preparation, focuses on advancing in the aquaculture sector in the coming years. The common criteria for aquaculture site selection in Spain, according to the AZA formula, are provided in the annex to the multiannual strategic plan. Although regional governments hold the jurisdiction over site selection, the national government provides common criteria to support the regional governments in the AZA process. However, it should be noted that these AZA recommendations are simply guidelines or best practices rather than mandatory regulations.

The regional Government of Galicia, Spain, has developed a governance package which includes a regional strategy for aquaculture, a management plan for coastal aquaculture, a management plan for aquaculture in marine zones (land and sea-use planning) and best practices guides (criteria for integration of aquaculture into the landscape). Additionally, Galicia is about to be the first region in Spain to adopt a law

on aquaculture. However, despite the considerable support offered by such a robust legal framework, no aquaculture licenses have been granted in Galicia since 2004.

It is worth mentioning that some countries in the southern Mediterranean are noticeably committed to furthering the development of aquaculture and are currently facing challenges related to aquaculture site allocation and licensing. At the same time, those countries are striving to put in place an enabling legal environment that would facilitate such development.

For example, in 2009, Morocco specifically established the National Agency for the Development of Aquaculture, under the national fisheries strategy Halieutis, to promote the development of national aquaculture and to address technical and legal challenges that could hinder the process of aquaculture development. Similarly, Algeria has developed an aquaculture development plan leading up to 2020 with a view to fostering the role of aquaculture as a key sector for socio-economic development. Under this plan, suitable sites for aquaculture have been identified and a series of marine aquaculture projects have been launched in 2014, alongside a number of training and expertise-transfer initiatives. In Tunisia, the 12th economic and social development plan (2010–2014) has contributed to promoting aquaculture, while in the last two decades, the Tunisian Government has carried out two strategies for aquaculture development: the master plan for aquaculture (PDA, 1996–2006) and the national strategy for aquaculture development (2007–2016). In Egypt, a policy for the development of the fisheries and aquaculture sector until 2017 was devised by the General Authority for Fish Resources Development in 2005. The major objectives of the policy are to increase the annual production of fish through environmentally compatible farming systems so as to maintain fish consumption per capita at a constant level given the growing population; to increase the quality of fish products coming from several sources to bring them in line with international requirements; and to support marine aquaculture.

In the Black Sea, Ukraine has a century-long aquaculture tradition. In 2013, a new law on aquaculture has been enacted in the country, defining the principles of state policy, the basic principles of development and operation of aquaculture and the legal basis for the executive authorities and local governments in handling aquaculture.

At the EU level, the Strategic Guidelines for the promotion of sustainable EU aquaculture (EU, 2013) emphasize the main actions needed to improve aquaculture governance: reduction of administrative burdens; coordinated spatial planning; competitiveness; and a level playing field[6]. The main aim of this initiative is "to reduce administrative burden and red tape, to simplify and streamline where possible administrative procedures and to improve governance" (European Commission, 2013).

At the international level, the FAO has developed the Code of Conduct for Responsible Fisheries, commonly referred to as a "governance tool", and the Guidelines for the Implementation of an Ecosystem Approach to Aquaculture. The FAO has also provided online access to aquaculture legislation and continues to support member countries in exchanging information on problems they face in order to find solutions, e.g. problems related to aquaculture site selection.

Open method of coordination: a good practice at the European level

To promote aquaculture activities, the reformed CFP has focused on governance issues, especially "measures concerning business security, access to Union waters and space and the simplification of licensing procedures". To promote a level playing field, the CFP regulation (art. 34) introduced the open method of coordination (OMC) as a governance tool for cooperation between EU Member States in the field of

[6] The strategy identifies the following as the main barriers that prevent aquaculture development: limited access to space and licensing; industry fragmentation; pressure from imports; long and time-consuming administrative procedures; and red tape.

aquaculture (EU, 2013). The OMC applies to issues that fall under the jurisdiction of Member States, such as employment, social protection, education or aquaculture. Through this coordinated, non-binding approach, Member States and the EU can jointly identify objectives to be achieved in aquaculture development at the EU level. This includes defining measures and instruments (e.g. guidelines, indicators, etc.) and benchmarking (i.e. exchange of best practices). The OMC has the potential to help in reaching agreements on solutions and their implementation without the need to resort to regulatory instruments[7].

In the context of the CFP, the OMC requires Member States to draw up multiannual national strategic plans that identify common objectives and indicators to measure progress towards these goals. The following measures are focused on governance issues:

- administrative simplification, in particular regarding evaluations and impact studies and licenses;
- reasonable certainty for aquaculture operators in relation to access to waters and space;
- indicators for environmental, economic and social sustainability; and
- creation of synergies between national research programmes and collaboration between the industry and the scientific community.

Other forms of soft law that could play an important role in aquaculture governance include self-regulation or best practices codes set up by producers associations, such as the Federation of European Aquaculture Producers. This European organization has published the Code of Conduct for European Aquaculture in 2000.

To summarize this chapter, Table 3 below lists some indicators that could help policy-makers and managers in monitoring the governance of aquaculture activities, either in terms of legislation or legal framework.

TABLE 3
Indicators for the monitoring of aquaculture governance

Indicator	Rationale and context	Unit (how it is measured)
Status of aquaculture regulation	It defines the position of aquaculture in the national legal framework It provides legal certainty for the development of aquaculture It establishes the degree of flexibility in aquaculture rules	Legal instruments: law, regulatory standards (legally-binding commands with a lower level in the normative system compared to a law, such as decrees, regulations, orders, etc.)
Authorities involved in the licensing process	It reflects the degree of complexity of in the licensing process	Number of public bodies/ agencies/departments
Validity of the aquaculture license	It determines the timeframe of the activity for aquaculture operators It determines the timeline for investment and returns	Years
Duration of the administrative procedure to obtain a license	It sets the period of time between the presentation of the proposal by aquaculture promoters and the granting of authorization to start building facilities and running operations	Months
Planning for aquaculture	It indicates the priority status of aquaculture in the political agenda It establishes the strategic position of aquaculture in the country's economic activities It reveals a medium- / long-term view for the development of the activity	Yes/no
Areas under public domain	It defines zones where the establishment of aquaculture activities requires specific provisions and procedures by the state, besides the general ones for private areas	Geographical areas: Maritime waters Terrestrial zone (coast) Shoreline zone

[7] http://europa.eu/legislation_summaries/glossary/open_method_coordination_en.htm.

TABLE 3 (CONTINUED)

Indicator	Rationale and context	Unit (how it is measured)
Zones reserved for aquaculture	It reserves a physical space for aquaculture facilities It simplifies the licensing process It anticipates and resolves conflicts of uses	- Yes/no
Monitoring systems	It describes the control of and follow-up on the activity It implies the measurement of the impact of aquaculture activities	- Yes/no

Source: SHoCMed project (2008).

4. GOOD PRACTICES AND LESSONS LEARNT

Best practices in the simplification of procedures and the coordination of authorities

Many countries have adopted measures in an attempt to streamline the licensing process and reduce the overlapping of jurisdictions and institutions. One such measure is the introduction of a one-stop shop which limits duplication of institutions and reduces bureaucracy. Under this approach, only one department processes permit applications. The one-stop shop approach was introduced in Norway under the Aquaculture Act (2005). This initiative reported simplified administrative procedures, shorter turnaround times for permit applications, increased efficiency and a more user-friendly system.

However this is not always an appropriate solution for this important issue. In Spain, some regional governments have implemented a one-stop aquaculture licensing office but the problem still persisted. The only way of addressing concerns related to red tape and bureaucracy would be by introducing a more efficient, effective and streamlined management system and by fast tracking the application process.

Political will is an essential component of good governance. In Norway, the first reform of the Aquaculture Act (2005) was not enough to simplify aquaculture permitting processes. However, the political will was there to revise the law again in 2013 in order to resolve the main problems facing the aquaculture industry[8].

The Norwegian legal system is a good example of how the legislative process can and should contribute to the successful development of aquaculture. Moreover, the Norwegian legal framework is an example of prioritizing aquaculture within a system of good governance. The Aquaculture Act has enhanced the legal security and competitive advantage of Norwegian aquaculture operators[9]. The new act mostly introduced simplification of licensing procedures and the administrative authorities involved. One of the best practices from Norwegian legislation is the streamlined procedure for licensing with a deadline to achieve it:

> The application for allocating a site goes through an extensive application process, with the county acting as the coordinating authority.
>
> On receiving a completed application, the county municipality forwards it to the local authorities and other relevant sector authorities for evaluation. This is done to ensure that the final decision is based on the best available knowledge. The sector authorities are the Directorate of Fisheries, the local Norwegian food safety authority, the Norwegian coastal administration, the county governor and, in some cases, the

[8] This time, the streamlining of procedures was related to improving technological issues: providing "a legal basis to exchange information with other supervisory authorities and instruct the aquaculture industry to provide information electronically".

[9] Egypt is the only Mediterranean country in the top 15 major world aquaculture producers. The only non-Asian countries in the top list are Norway, Chile and USA (6º, 8º and 15º respectively). These countries have promoted and guaranteed a good governance environment (FAO, 2014a: *The State of World Fisheries and Aquaculture* 2014, p. 22).

> Norwegian Water Resources and Energy Directorate. The county makes its final decision based on the outcome of the different authorities' assessments, decisions and the Aquaculture Act. Case handling must not take longer than 22 weeks in total[10].

It is evident that site selection and aquaculture planning can be useful governance tools for aquaculture development and that they can contribute to overcoming some of the main constraints facing the aquaculture sector. Further examples of best practices in aquaculture governance related to site selection are described below.

As mentioned above, the example of Galician marine aquaculture planning considers the selection of adequate areas for land-based marine aquaculture and the establishment of conditions conducive to development. In the Murcia region, Spain, Law 2/2007 regulates designated areas suitable for aquaculture (i.e. floating cages) within zones that are declared of interest for aquaculture by the regional government "after an assessment of their impact". In addition to the requirement for an EIA, different public administrations with unique jurisdictions provide their input. Consequently, the licensing and permitting procedure is fast-tracked.

Since 2001, the region of Andalucía, Spain, has been pioneering the site selection process and spearheading proposals for AZAs. Since then, the trend of using AZAs has rapidly increased and it is now considered as a best practice for sustainable aquaculture development. This planning tool paves the way for "marine areas where the development of aquaculture has priority over other uses and therefore will be primarily dedicated to aquaculture" (Sánchez Jerez *et al*., in press). AZAs are not only a measure to reserve spaces for aquaculture but they are also a tool to shorten the administrative procedures and grant aquaculture licenses in a relatively short time.

In Malta – a country that is very familiar with AZAs –, the system of offshore aquaculture zones managed by the Fisheries and Aquaculture Department of the Ministry for Sustainable Development, is working well and promoting the growth of the aquaculture industry.

In addition to the existence of a specific regulation defining physical, chemical and biological criteria for selecting sites for fish, shellfish and tuna farms, the Croatian Ministry of Agriculture, Fisheries and Rural Development has issued the Guidelines for Marine Aquaculture Planning, Integration and Monitoring in Croatia (Katavić *et al.*, 2005), which use a systematic approach.

In Italy, the multiannual strategic plan for aquaculture 2014–2020 includes a group of five actions for the harmonization of laws and procedures and the simplification of licensing procedures to reduce time for licensing and other authorizations necessary for starting a new aquaculture activity, including the revision of EIA in aquaculture; and establishes an observatory to facilitate and speed up the use of the European Maritime and Fisheries Fund at the central and the regional levels.

The Sub-Committee on Aquaculture of the FAO Committee on Fisheries, at its seventh session (St. Petersburg, Russian Federation, October 2013), underlined the need for spatial planning to ensure the allocation of available space to aquaculture activities. The GFCM has identified AZAs as essential to activities related to the sustainable development of aquaculture in the Mediterranean and the Black Sea, and adopted in 2012 its Resolution GFCM/36/2012/1 on AZAs guidelines[11]. This resolution acts as a basic framework to guide GFCM contracting parties in the establishment of AZAs and in the development of aquaculture at a regional level. The resolution strongly urges contracting parties to introduce a strategy for aquaculture development into their national marine spatial planning programmes, in addition to developing management schemes for the identification and allocation of specific

[10] Aquaculture Act (2005): www.fisheries.no/aquaculture/Laws-and-regulations/licence_requirement/#.VGFAQoe-uNg.

[11] Available at: www.faosipam.org/GFCMWebSite/docs/RecRes/RES-GFCM_36_2012_1.pdf

zones for aquaculture activities. As a tool that involves all stakeholders in policy and decision-making processes, an AZA has the potential to facilitate self-regulation and improve interadministrative coordination, accountability and transparency. As such, AZAs can be an effective mechanism of aquaculture governance and can considerably increase the social acceptability of aquaculture.

The integrated coastal zone management (ICZM) approach, which is closely related to AZAs, has also been used as a governance strategy in some countries. As with AZAs, the use of the ICZM approach can improve governance in aquaculture by involving as many stakeholders as possible in order to reconcile their differences over potential aquaculture sites. Wide stakeholder participation can both enhance the legitimacy of aquaculture and raise its stature as an activity that can promote job creation in coastal areas while observing care for the environment.

In 1998, the Republic of Ireland adopted the Co-ordinated Local Aquaculture Management Systems (CLAMS) as a nation-wide initiative to manage the development of aquaculture in bays and inshore waters throughout Ireland at the local level. For each individual case, CLAMS fully integrates aquaculture interests with relevant national policies[12]. In Scotland, site selection for aquaculture is also based on ICZM within an ecosystem approach[13].

To summarize, ICZM, AZAs, the ecosystem approach to aquaculture and multifunctional co-management all have the potential to contribute to good governance in aquaculture. This is due to the emphasis they place on a more holistic stakeholder participation, which reduces the likelihood of conflicts in coastal area management, and to the cost-effective approach they introduce in selecting zones to be set aside for aquaculture.

These participatory and accountability-based tools can help the aquaculture industry avoid the so-called "Not in My Back Yard" (NIMBY) effect that seems to affect both local and regional governments. This NIMBY effect has been suggested by some representatives of aquaculture producers as a potential reason for the lack of a proactive approach by regional governments in granting licenses[14]. It is the duty of governments to improve collaboration with all actors in order to promote sustainable aquaculture development.

Working groups, task forces and coordination agencies to reduce and streamline administrative coordination

The Galician regional Government has created an interdepartmental commission to manage and monitor aquaculture licensing procedures on a permanent basis and to grant jurisdiction over the process to a high-level aquaculture authority. The aim of this commission is to speed up relevant procedures and grant priority status to the aquaculture industry. At the same time, the regional government set up a technical advisory committee on aquaculture – including aquaculture experts within academia and scientific research institutes – to assist aquaculture authorities in setting and implementing policy[15].

In the USA, the Aquaculture Regulatory Task Force, chaired by the National Oceanic and Atmospheric Administration (NOAA) under the interagency working group on aquaculture, was created to promote collaboration with federal agencies and

[12] Co-ordinated Local Aquaculture Management Systems (CLAMS). Explanatory handbook, available at: www.bim.ie/media/bim/content/BIM_CLAMS_Explanatory_Handbook.pdf

[13] Hishamunda, N., Ridler, N. & Martone, E. 2014. p. 34.

[14] The NIMBY effect was identified by the Spanish producers organization APROMAR as one of the main obstacles faced by aquaculture governance. Available at: www.apromar.es/content/apromar-subscribe-el-plan-estrat%C3%A9gico-de-la-acuicultura-espa%C3%B1ola-pero-desconf%C3%ADa-de-sus.

[15] This committee was created through a regulation passed by the Galician regional Government on 20 July 2012.

the National Ocean Council and to streamline and improve coordination of federal permitting for aquaculture. The stated aim of this task force is to achieve a "more coordinated and consistent federal regulatory process in order to increase efficiency, transparency and predictability in making permit decisions"[16].

How can these best practices be effectively applied and shared among countries?

One way of applying and sharing aquaculture best practices in the Mediterranean and the Black Sea could be by setting up an aquaculture regulatory task force, similar to that created by NOAA, in the Mediterranean and the Black Sea. Such a task force would include policy-makers from different countries, aquaculture experts, scientists, aquaculture farmers, as well as the representatives of AFOs, NGOs, the EU Directorate General for Maritime Affairs and Fisheries (DG MARE), the GFCM and any other relevant advisory council.

In addition, existing forums should be utilized to move towards good aquaculture governance. One example of this is the new Advisory Council of Aquaculture created under the reformed CFP. This body will feature a more balanced representation of stakeholders, including non-aquaculture interests and will both advise EU Member States on aquaculture management and propose common strategies and rules. This is in line with the aim of regionalization and more extensive stakeholder consultation. The Advisory Council on Aquaculture intends to organize a working group in the Mediterranean and the Black Sea and invite non-EU countries as observers.

Another existing forum is the Aquaculture Multi-Stakeholder Platform (AMShP) created by the GFCM in 2013 to promote the sustainable development of aquaculture in the region[17]. The AMShP is designed to support GFCM aquaculture activities by facilitating the wider involvement of aquaculture stakeholders and contributing to CAQ technical advice to the GFCM.

Finally, GFCM workshops designed to explore ways of improving aquaculture management have also encouraged wide stakeholder participation in the Mediterranean and the Black Sea. These regional meetings provide a unique opportunity to promote the implementation of new policies and strategies for better management of aquaculture in this region.

5. DISCUSSION POINTS

Openness, participation, accountability, effectiveness and coherence

The principles of openness (transparency and communication in decision-making), participation (stakeholders should participate in policy-making and implementation), accountability (each actor assumes responsibility for the role given to them), effectiveness (decisions taken at the appropriate level and time) and coherence (policies need to be pursued coherently) can contribute to the improvement of aquaculture governance. These are crucial factors in the recognition of aquaculture as a blue growth activity and as a priority activity in coastal areas. In addition, they could potentially address challenges related to the planning system.

Robust regulatory frameworks

In order to increase the stature of aquaculture as a strategic line of business, sound public policy and robust legislation is needed. It would be advisable to design legal

[16] NOAA www.nmfs.noaa.gov/aquaculture/policy/13_policy_and_reg_homepage.html. This regulatory task force has developed a shellfish permitting factsheet as a common reference for federal agency staff working on licensing aquaculture.

[17] GFCM. 2014. Conclusions of the ad hoc meeting to launch the GFCM Aquaculture Multi-stakeholder Platform (AMShP) including strategic areas for aquaculture development (Izmir, Turkey, 12–13 December 2013). Document GFCM:XXXVIII/2014/Inf.7.

tools oriented towards ensuring legal certainty in the long term. This would include aquaculture legislation that addresses the social and economic aspects of the area in which aquaculture activities take place. A lack of regulation may cause the rejection of aquaculture by society or may lead to administrative authorities prioritizing other interests.

Bolstering national-level policies

Although aquaculture traditionally falls under the jurisdiction of individual countries, aquaculture governance has now become a global issue. Consequently, international organizations are adopting a wide range of recommendations to help the endorsement of common criteria in those countries. However, some countries are facing challenges in adopting these recommendations, due to various factors, *inter alia*, funding constraints.

Multiple administrative authorities

Many Mediterranean countries have more than seven bodies/authorities that should be consulted or informed in the process of obtaining a license. It would be desirable to minimize the number of authorities involved in order to increase efficiency in public management. The one-stop aquaculture licensing office could be a potential solution to this problem.

6. KEY MESSAGES TO THE CONFERENCE

- Governments or authorities should ensure that aquaculture is regulated by a conducive policy environment; laws that put aquaculture at the same level as other economic or environmental interests in coastal and marine areas and that ensure legal security for both aquaculture operators and the activity itself.
- Instruments should be adopted to coordinate the administrative authorities and agencies involved in aquaculture licensing. It is also necessary to streamline the aquaculture licensing process with fast-track procedures and a leading agency that actively promotes aquaculture interests. User-friendly guidelines with best practices to obtain permits would be welcomed.
- Transparency and participation in decision-making should be improved.
- Good governance in aquaculture should have a global dimension, with an all-encompassing approach including FAO, GFCM, the EU, countries, regions, local areas and aquaculture companies.
- Some kind of planning or site selection process for aquaculture within the framework of ICZM or AZAs should be introduced. Site selection based on administrative, environmental and economic criteria, including a market prospects analysis, should be carried out. Aquaculture management plans should ensure that aquaculture is not exposed to environmental threats by other sectors. Aquaculture inherently requires a healthy environment to grow and, as such, this sector is interested in working towards achieving good environmental status. Good governance is the engine that should drive the process and help maintain this balance.
- To guarantee accountability among all stakeholders, stakeholder participation mechanisms in decision-making should be encouraged. This will also increase the acceptability of aquaculture among civil society. Such a participatory approach would send out a more favourable image of aquaculture and help in delivering recognition for it as a path for job creation and economic development.
- Capacity-building for civil servants involved in aquaculture should be pursued. Suitable tools should be developed for coordination among the administrations involved in aquaculture, civil service departments and relevant government ministers/committees. These would help form strong policy-making communities. Capacity-building efforts should be prioritized in those countries that are planning to decentralize control over aquaculture.

- Soft law should be adopted to develop common concepts and standards in the Mediterranean and the Black Sea. These instruments include guidelines and voluntary schemes which are flexible and adaptable to change. Such voluntary rules should be implemented according to selective incentives, either positive or negative.
- Indicators for aquaculture governance should be developed in order to monitor, measure and assess the status of aquaculture policy, and should be adapted and reformed as necessary.
- The rights for aquaculture activities to occupy the public domain during a reasonable period of time should be guaranteed in order to secure investments.
- Administrative accountability needs to be enhanced.
- In coastal and marine areas, it is important to have a leading agency with a strong policy-making role in order to reconcile the interests of different administrations and stakeholders.
- Governments or authorities in the Mediterranean and the Black Sea should put into practice the AZA approach. The implementation of AZAs would provide business opportunities and lead to the participation and accountability of relevant stakeholders.

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Panel 2

A healthy environment, a stronger aquaculture industry

Panel 2
A healthy environment, a stronger aquaculture industry

PANEL DESCRIPTION

Sustainable aquaculture development is dependent on clean, healthy and productive waters. Fostering environmental protection through responsible aquaculture practices is essential to find the most effective way to achieve food security and economic development while minimizing environmental impacts. Panel 2 discussions aimed to share knowledge on how best to manage environmental interactions of aquaculture activities and support potential mutual benefits between aquaculture development and environmental protection while ensuring human and fish healthiness.

DISCUSSION TOPICS

The panel explored in particular the following aspects:

- aquaculture–environment interactions;
- harmonized environmental monitoring programme for marine finfish cage farming in the Mediterranean and the Black Sea;
- allocated zones for aquaculture (AZAs) and allowable zone of effect;
- development and implementation of aquaculture better management practices;
- biosecurity concerns associated to aquaculture;
- aquatic animal health and disease management; and
- risk analysis and risk management in aquaculture.

PANEL MEMBERS*

Chairpersons

François Simard – IUCN

François Simard is currently deputy director and senior advisor for fisheries within the Global Marine and Polar Programme at IUCN. François Simard is a marine ecologist with more than 30 years of experience in marine conservation and sustainable use. After majoring in applied ichthyology, he has been working for several years in Japan in coastal fisheries and aquaculture management, and then at the Monaco Oceanographic Museum. He has been working with IUCN since 2003: from 2003 to 2009 as marine programme coordinator for the Mediterranean, and from 2009 as deputy director of the Global Marine and Polar Programme. During the last ten years, he has worked on the sustainable development of aquaculture, especially in the Mediterranean, in collaboration with the European aquaculture sector, in order to fully address environmental issues linked with aquaculture development. He is a member of the Board of the European Aquaculture Technology and Innovation Platform.

Giuseppe Arcangeli – IZSVe, Italy

Giuseppe Arcangeli is a veterinary with a 20-year experience in the field of seafood safety and fish, mollusc and crustacean pathology. He is the director of the National Reference Centre for Fish, Mollusc and Crustacean Diseases and the head of the Laboratory for Safety of Processed Seafood at the Experimental Zooprophylactic Institute of Venice (IZSVe), Italy. In coordination with the local veterinary services, Giuseppe Arcangeli supervises the seafood chain production and provides support to the Italian Ministry of Health, to regional authorities and to private farmers in the field of seafood safety, control and monitoring of sanitary programmes. He is involved as an expert and trainer in activities carried out in this field by the European Commission and the Italian Ministry of Health. He is the president of the Italian Society of Applied Research to Molluscs Culture.

Keynote speaker

Mohamed Salah Romdhane – National Agriculture Research Institute, Tunisia

Mohamed Salah Romdhane is a professor at the National Agriculture Research Institute of Tunis, University of Carthage, Tunisia. He holds an engineering degree in fisheries, a doctorate in marine biology and oceanography and a PhD in aquaculture. He is heading the research unit on aquatic ecosystems and resources and he is member of several scientific councils. He has headed the National Commission for Programming and Evaluating Fisheries and Aquaculture Research. He has written more than 150 national and international publications and done more than 50 assignments in Tunisia and abroad in the fields of environment, aquaculture and biodiversity.

* The information is reproduced as submitted by each panel member and was up-to-date at the time of the conference.

Panellists

Güzel Yücel Gier – University Institute of Marine Sciences and Technology, Turkey

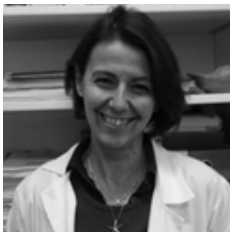
Güzel Yücel Gier is currently a researcher and educator at the Dokuz Eylül University, Institute of Marine Sciences and Technology, Turkey. She holds a bachelor's degree in nutrition from the Hacettepe University, Turkey, a master of science degree in marine aquaculture from the Institute of Biology, University of Caen, France, as well as a PhD in aquaculture from the Istanbul University, Turkey. She has contributed to many national and international projects, has published widely and has organized many conferences and workshops. She has contributed to an informative documentary film on the Izmir Bay.

Hassan Nhhala – National Halieutic Research Institute, Morocco

Hassan Nhhala is the head of the Aquaculture Centre of the National Halieutic Research Institute in M'diq, Morocco, which deals with applied marine aquaculture research. He graduated in 1985 as an agronomic engineer with a specialization in marine aquaculture from the Agronomic and Veterinary Institute Hassan II, Rabat, Morocco, and he holds a MSc (DESS) in marine aquaculture, which he obtained in 1984 at the University of Caen, France. He started working for six years in a private aquaculture farm before integrating scientific and technical applied research in marine aquaculture in 1994. He has a six-year experience in bluefin tuna aquaculture, site selection and aquaculture development planning, aquaculture projects assessment and aquaculture environmental impact study. He has been involved in many Mediterranean aquaculture cooperative projects and was a national coordinator of the Information System for the Promotion of Aquaculture in the Mediterranean (SIPAM) of the CAQ from 2011 to 2013. He is a member of the steering committee of the GFCM Aquaculture Multi-stakeholder Platform (AMShP).

Pablo Sánchez-Jerez – University of Alicante, Spain

Pablo Sánchez-Jerez has been a lecturer at the Department of Marine Science and Applied Biology of the University of Alicante since 1997. As a researcher on the sustainable management of marine resources, he has focused over the last ten years on the environmental management of coastal aquaculture and has published more than 100 papers in this field. He has participated in many national and European projects related to the monitoring of fish farming, interactions with fisheries, integrated multitrophic aquaculture, management of escapes, etc. He also remarkably collaborated with the Norwegian Institute for Nature Research and the Norwegian Institute of Food, Fishery and Aquaculture, studying the impact of salmon farming, as well as with the FAO (GFCM), participating in several projects regarding site selection and carrying capacity of marine aquaculture. He has participated in the development of national and regional programmes on sustainable aquaculture.



Marialetizia Fioravanti – University of Bologna, Italy

Marialetizia Fioravanti is currently an associate professor of animal parasitology and parasitic diseases at the Department of Veterinary Medical Sciences (DIMEVET) of the Bologna University, School of Agronomy and Veterinary Medicine, Alma Mater Studiorum, Italy. She holds a degree in veterinary medicine and a PhD in parasitology and parasitic diseases of animals. She is currently the director of the first-level vocational master course in aquaculture and fish pathology. Her main teaching and research topics are parasitic diseases of aquatic animals, fish-borne zoonosis and health management in aquaculture. Since 2001, she has been responsible for the Fish Pathology Laboratory of the DIMEVET and she has been president of the Italian Society of Fish Pathology from 2004 to 2010. Marialetizia Fioravanti is also the co-author of more than 300 scientific papers/conference abstracts on parasitology and fish diseases.

Malek Mtimet – Porto Farina, Tunisia

Malek Mtimet is currently the managing director of the Porto Farina company, Tunisia. He works in seabass and seabream aquaculture operations in offshore cages. After graduating in fisheries in 1990 at the Institut national d'agronomie of Tunis, Tunisia, he continued his studies in France in the same field. In 1991, he graduated from the École nationale supérieure agronomique of Rennes and, in 1993, he obtained a degree from the Institut supérieur de production animale. He began his career in 1993 as a researcher at the Institut national des sciences et technologies de la mer in Tunis, Tunisia. In 1996, he joined a Tunisian private group as a manager of several operating fisheries companies (tuna and lagoon operations). In 2006, he joined the first Tunisian seabass and seabream offshore cages fish farming as chief operating officer before becoming the managing director of Porto Farina in 2010.

Florent Tarbouriech – Médithau Maréee SA, France

Since Florent Tarbouriech has discovered, behind his diving mask, the wealth of submarine life, the passion for his job as a shellfish farmer has never left him. When he was 20 years old, he took back the oyster farm established by his father in 1962 and created Médithau, with the ambition to make of the Mediterranean oyster an exceptional product. Supported by a team of passionate people, Florent Tarbouriech has been involved in quality management and certification processes, following a sustainable development and innovative approach.

Giuseppe Prioli – AMA, Italy

Giuseppe Prioli is currently the president of the Associazione Mediterranea Acquacoltori (AMA), an Italian aquaculture farmers association which has among its members most of the Italian shellfish producers. Giuseppe Prioli holds a degree in biological sciences and has been working since 1986 in cooperative structures for technical assistance in the field of fisheries and aquaculture. As part of his activities, he has carried out several experiments on the rearing of bivalve molluscs, mussels and oysters, and has contributed to the implementation of statistical surveys on shellfish production. Since 1997, he has been following the activities of a mussel farmers consortium in the Emilia-Romagna region, first as a director and, since 2007, as a president. He became president of AMA in 2010.

Tatjana Boroša Pecigoš – Ministry of Agriculture, Croatia

Tatjana Boroša Pecigoš is currently working as senior expert adviser for aquaculture in the Directorate of Fisheries of the Ministry of Agriculture of Croatia. In 2000, she obtained a bachelor's degree in biology with major in ecology at the Faculty of Science of Zagreb, and she is currently following postgraduate specialist studies in fisheries at the Faculty of Agronomy in Zagreb. She has been working at the Directorate for Fisheries of the Ministry of Agriculture since 2002, dealing with different fishery-related fields and participating in several international projects. In 2008, she started working in the service for aquaculture, focusing mostly on freshwater aquaculture-related issues. She is the national coordinator (freshwater) for Croatia in the SIPAM managed by the CAQ.

Un environnement sain, une industrie aquacole plus solide

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1. CONTEXTE

L'aquaculture est une activité millénaire. Si elle était utilisée de façon récréative en Égypte pharaonienne il y a 4 000 ans, c'est aujourd'hui une industrie hautement productive et consommatrice (FAO, 2010b). La relation entre l'aquaculture et son environnement a suivi la même évolution, en se faisant de plus en plus forte. Les premières phases d'accroissement productif ont entraîné des réactions imprévisibles de l'écosystème (FAO, 2010a). La relation étroite entre environnement et aquaculture a été prise en compte par la FAO dans ses orientations stratégiques, notamment dans le cadre du Code de conduite pour une pêche responsable de 1995 (FAO, 1995).

Après avoir connu des bouleversements dans sa définition, ses objectifs et son rôle, l'aquaculture a dû revoir ses pratiques afin de se réconcilier avec son environnement grâce à l'adoption du concept de durabilité et à la consolidation de l'approche écosystémique (FAO, 2010a) dans la planification stratégique. Le choix de la durabilité a été mis en œuvre à travers plusieurs projets tels qu'InDAM[18], SHoCMed[19], Mediterranean-on, ou encore AQUAMED[20], et grâce à l'expertise d'un panel international de compétences.

Cet aspect de la durabilité n'est pas seulement théorique. En effet, la durabilité est l'aboutissement de la maîtrise des interactions entre l'aquaculture et son environnement et concilie les contraintes environnementales, sociales et économiques. Les interactions négatives entre pratiques aquacoles et environnement peuvent être réduites si l'on maîtrise bien la domestication des espèces aquacoles, l'amélioration génétique (FAO, 2009), la capture d'espèces sauvages, l'utilisation des aliments, le transfert de pathogènes ou encore l'utilisation de peintures antisalissures (FAO, 2011).

L'évolution des attentes et des pratiques de l'aquaculture traduit bien le fait que les producteurs ont conscience que le développement de l'industrie aquacole requiert une connaissance des limites de l'environnement récepteur au sens large (écosystème, acceptabilité sociale, etc.). Cet environnement récepteur dessine les limites de l'intensification des activités aquacoles et est le garant de leur durabilité (UICN, 2009). Cependant, ces limites sont souples et peuvent évoluer en fonction des modes de gestion aquacole, ce qui permet d'appréhender le concept d'un environnement sain et d'une industrie aquacole plus solide.

[18] Indicateurs du développement durable de l'aquaculture et directives pour leur utilisation en Méditerranée
[19] Élaboration de lignes directrices pour la sélection des sites et la capacité biotique de l'aquaculture méditerranéenne dans les zones adaptées à l'aquaculture
[20] Le futur de la recherche en aquaculture dans la région Méditerranéenne

Ce document s'inspire des informations et des résultats fournis par différents projets (SHoCMed, InDAM, Mediterranean-on, etc.), des résultats des réunions ad hoc de la Commission générale des pêches pour la Méditerranée (CGPM), notamment la réunion d'Izmir (décembre 2013), qui a marqué le lancement de la Plateforme aquacole multi-acteurs de la CGPM et a permis de détailler les domaines stratégiques pour assurer le développement du secteur aquacole dans le respect de l'environnement (CGPM, 2014).

2. PRINCIPAUX ACTEURS ET ENJEUX

Acteurs

En se développant, l'aquaculture s'est dotée d'outils de gestion meilleurs par rapport à ceux d'autres secteurs d'activités. En ce qui concerne l'environnement, l'aquaculture s'est appuyée sur l'approche de précaution, l'approche participative, l'approche écosystémique et l'approche d'échelle, qui ont longtemps assuré sa viabilité (UICN, 2007). Ces outils ont été développés, utilisés et partagés entre les différents acteurs de la Méditerranée et de la mer Noire.

États de la région de la Méditerranée et de la mer Noire, représentés par leurs organes administratifs et techniques

L'environnement est une responsabilité des États (Nations Unies, 1992) qui, dans leur stratégie de développement, doivent tenir compte de la durabilité. Cette responsabilité a été détaillée dans les directives européennes (Natura 2000, 2007) visant à préserver les écosystèmes et à mettre des outils à disposition des pays pour leur permettre de développer une approche durable. Les organes administratifs et techniques responsables du secteur dans chaque pays doivent permettre l'intégration durable de l'aquaculture dans son environnement au sens large, c'est-à-dire sur le plan physique, social et économique. La mise en place de zones affectées à l'aquaculture (AZAs), l'aménagement du territoire ainsi que l'adoption de normes de sélection et de gestion des sites aquacoles s'inscrivent dans le cadre d'une approche écosystémique de l'aquaculture.

Organisations nationales de producteurs

Les organisations nationales de producteurs jouent un rôle important dans la préservation de l'environnement récepteur dans la mesure où elles représentent le premier maillon de la chaîne d'activité. Les résultats du projet MedAquaMarket[21] (Barazi-Yeroulanos, 2010) démontrent que les organisations d'aquaculteurs en Méditerranée et en mer Noire doivent améliorer leur communication ainsi que le dialogue entre les différentes parties prenantes (industrie, institutions publiques, consommateurs, organisations non gouvernementales [ONG], etc.). La communication autour de l'environnement pourrait être améliorée par la mise en place de guides de bonnes pratiques élaborés par les organisations de producteurs. Le Groupe de travail sur la commercialisation des produits aquacoles de la CGPM a maintes fois pris en considération la nécessité de renforcer ces entités professionnelles.

ONG internationales

Les ONG, à l'instar de l'Union internationale pour la conservation de la nature (UICN), sont des partenaires importants pour garantir une relation pérenne entre l'activité aquacole et son environnement, d'une part, et entre les différents intervenants, d'autre part. L'UICN a produit trois ouvrages de référence depuis 2007 et a également participé au projet Mediterranean-on aux côtés de la Fondation observatoire espagnol de l'aquaculture.

[21] Élaboration d'une stratégie pour la commercialisation et la promotion des produits aquacoles méditerranéens.

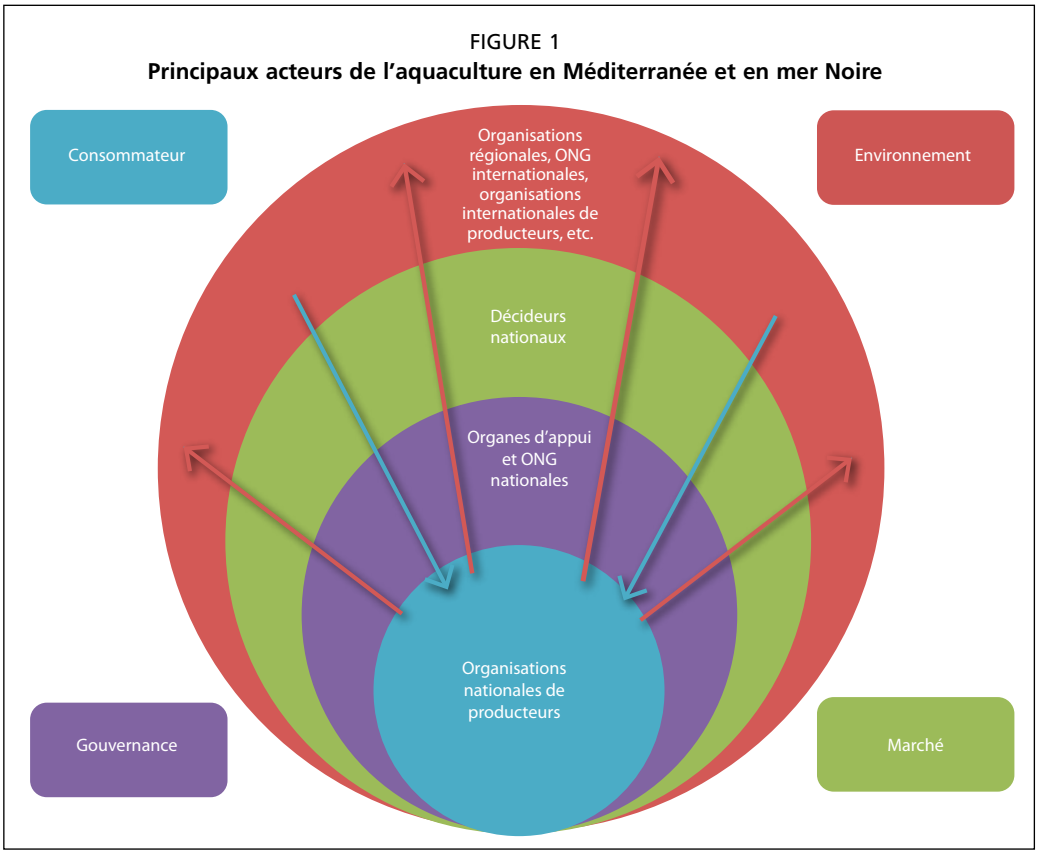
Organisations régionales

Avec ses 24 membres, dont l'Union européenne, la CGPM a pour objectif de promouvoir le développement, la conservation, la gestion rationnelle et l'utilisation optimale des ressources biologiques marines ainsi que le développement durable de l'aquaculture en Méditerranée et en mer Noire. Grâce aux activités menées ces dernières années dans le cadre de projets tels qu'InDAM et SHoCMed, la CGPM a stimulé la dynamique de concertation entre les acteurs et les intervenants. Cette dynamique s'est traduite par l'adoption de la Résolution CGPM/36/2012/1 sur les zones affectées à l'aquaculture, par le lancement d'une plateforme aquacole multi-acteurs (CGPM, 2012a) et par la définition des priorités d'intervention de la CGPM.

L'ensemble des intervenants que nous venons de citer (voir aussi la figure 1) partagent la vision commune d'une industrie aquacole respectueuse de l'environnement. La Plateforme aquacole multi-acteurs de la CGPM, lieu de rencontre entre différents intervenants, s'appuie sur une vision à long terme du développement durable de l'aquaculture. Cette plateforme devrait permettre de traiter les questions nationales en vue de fournir des solutions régionales. Les orientations de cette plateforme vont de pair avec les principes énoncés dans le Code de conduite pour une pêche responsable de la FAO, et en particulier avec les dispositions de son article 9 portant sur l'aquaculture. La plateforme est également compatible avec le programme-cadre de la CGPM, plus précisément avec son programme de travail sur la promotion du rôle de l'aquaculture pour la sécurité alimentaire et la croissance économique (WP3).

Chaque pays, chaque intervenant, mobilise ses forces pour optimiser les aspects économiques, environnementaux et sociaux qui pourraient mettre en cause la viabilité du secteur et cherche à répondre, selon sa marge de manœuvre et ses compétences, aux besoins de cette industrie en expansion. Cet effort commun permet de limiter l'instabilité cyclique de l'activité, mais ne peut en aucun cas empêcher la tendance inévitable vers une réduction des marges et une augmentation des volumes de production (Barazi-Yeroulanos, 2010).

FIGURE 1
Principaux acteurs de l'aquaculture en Méditerranée et en mer Noire



Cette situation prometteuse mais instable de l'aquaculture marine en Méditerranée et en mer Noire fait ressortir des enjeux communs en termes de durabilité, qui sont partagés par différents pays et organismes, indépendamment de l'état d'avancement de l'industrie. Ces enjeux, énumérés ci-après, sont en grande partie d'ordre environnemental.

Enjeux

Simplification des procédures administratives

La simplification des procédures en aquaculture doit passer par l'adoption d'une loi-cadre définissant l'aquaculture et ses produits comme des entités à part entière. Les procédures d'octroi de licences ainsi que le coût et la durée d'attribution gagneraient à être conceptualisés afin d'améliorer la compétitivité de l'activité.

Cependant, la simplification des procédures n'est pas seulement liée à l'octroi des licences. Elle dépend aussi de la gestion et du suivi de l'activité. L'élaboration de directives pour l'évaluation d'impact environnemental (EIE), de points de référence et de méthodologies pour les programmes de suivi environnemental (PSE) sont également à prendre en considération dans la formulation des textes réglementaires.

Le développement de l'aquaculture est lié à la nécessité de trouver un équilibre entre la réduction des impacts sur l'environnement et la poursuite de la croissance productive. Pour ce faire, il convient de mettre en place de meilleurs cadres réglementaires en matière de surveillance, notamment pour ce qui est de l'EIE et des procédures de sélection des sites, et de les harmoniser, ce qui favoriserait le développement du zonage de l'aquaculture dans une perspective écosystémique.

Interactions entre pêche et aquaculture

Pêche et aquaculture ont longtemps cohabité sans conflits apparents. Ce n'est qu'avec le développement rapide et parfois mal orienté de l'aquaculture marine en cage que les interactions négatives entre ces deux activités se sont accentuées.

En Tunisie, une étude récente (Piccolotti, 2013) a montré que ces interactions négatives peuvent être considérablement réduites grâce à l'adoption d'une approche participative et écosystémique impliquant différents intervenants et grâce à la mise en place d'un plan de communication.

L'étude des interactions entre les pêches de capture et l'aquaculture est récente. À l'heure actuelle, la plupart de ces interactions se produisent dans les écosystèmes marins et côtiers. De nombreux exemples montrent que les interactions potentielles dans les écosystèmes continentaux ont pu être abordées grâce à un rapprochement entre pêches de capture et aquaculture (De Silva, 2003).

Le Code de conduite pour une pêche responsable propose un cadre où les pêches de capture et l'aquaculture font partie du même système productif. Cette vision intégrée permet de limiter les interactions liées à l'introduction d'espèces exotiques, la nécessité de programmes de stockage, l'utilisation d'alevins et de naissains sauvages pour l'aquaculture ainsi que l'utilisation des produits de la pêche pour approvisionner l'industrie de l'alimentation aquacole. Il convient donc de minimiser les interactions négatives entre pêche et aquaculture en ce qui concerne par exemple les modèles de stockage et de repeuplement, l'origine génétique des organismes cultivés, la conservation et la valeur de la biodiversité, le développement de l'aquaculture dans les environnements sensibles et l'impact direct des produits d'élevage sur les marchés et les prix.

Prévention et suivi des maladies

L'intensification de l'aquaculture a augmenté les risques de pathologies. Si elles ne sont pas maîtrisées, les pathologies peuvent affecter la durabilité de l'industrie et l'écosystème environnant.

La prévention s'appuie sur une approche de précaution. Le recours aux antibiotiques et autres traitements chimiques doit être limité et basé sur une évaluation des risques, outil de gestion des maladies. La longévité de l'industrie doit être assurée par un environnement sain, un stock de poissons sainement nourris et une gestion piscicole qui adopte de bonnes pratiques. En revanche, des pratiques aquacoles mal adaptées, un environnement fragilisé, une utilisation massive de substances chimiques conduisent à une résistance aux traitements, à une contamination du milieu récepteur ainsi qu'à une variabilité des résultats zootechniques. La prévention, le suivi des maladies et la bonne gestion du stock maintiennent les poissons en bonne santé et assurent le bien-être animal.

Les préoccupations relatives à la biosécurité sont nombreuses. Les risques concernent aussi bien l'environnement aquatique que la santé humaine. La biosécurité doit permettre d'appliquer des mesures appropriées pour éviter la propagation d'un organisme ou d'un agent biologique à l'échelle d'un individu, d'une population ou d'un écosystème.

En effet, quand une pathologie se propage dans un secteur de l'aquaculture, elle constitue souvent une situation d'urgence à tous les niveaux: ferme, localité, région ou pays. La planification préalable et une préparation adéquate (NACA/FAO, 2000) sont nécessaires pour éviter ces situations d'urgence. L'analyse des risques des agents pathogènes (OIE, 2007) est un processus structuré visant à évaluer les risques de maladie associés aux mouvements d'animaux aquatiques vivants à l'échelle nationale et internationale.

D'une manière générale, l'analyse des risques s'applique aussi à la sécurité alimentaire, aux risques de santé publique associés aux produits de l'aquaculture, aux ressources génétiques, aux risques écologiques et à la gestion des organismes exotiques (FAO, 2007).

Interactions avec l'environnement et les autres utilisateurs de l'espace

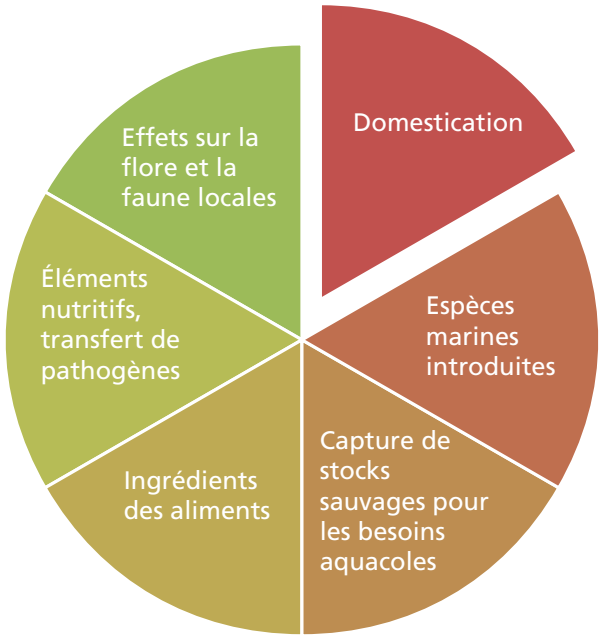
Les interactions de l'aquaculture avec différentes activités comme la pêche, le tourisme ou encore la navigation peuvent entraîner une concurrence en matière d'occupation de l'espace. La gestion intégrée des zones côtières peut être un outil pour la sélection des sites aquacoles et la délimitation des AZAs. À cet outil performant s'ajoutent la capacité de charge, l'EIE et les PSE qui minimisent les interactions négatives avec le milieu récepteur.

Selon la CGPM, il est primordial de réfléchir à une stratégie régionale pour mettre en place des AZAs afin de permettre le développement et la gestion d'activités aquacoles responsables en Méditerranée et en mer Noire.

Les pays membres de la CGPM ont affirmé que la création d'AZAs faciliterait l'intégration des activités aquacoles dans les zones côtières utilisées pour d'autres activités et contribuerait à une meilleure communication entre les différents organismes publics impliqués dans les processus d'autorisation et de surveillance de l'aquaculture. Le Comité scientifique consultatif de l'aquaculture de la CGPM a notamment souligné l'importance de l'environnement récepteur et a recommandé qu'un programme de surveillance environnementale de l'aquaculture soit mis en œuvre dans les zones entourant les fermes aquacoles en cage, connus sous le nom de «zone d'effets admissibles». Depuis 2012, le projet SHoCMed a défini des lignes directrices pour des programmes de surveillance environnementale afin d'assurer la protection des ressources biologiques marines, le développement durable de l'aquaculture et la protection des habitats sensibles. À l'échelon national, l'objectif principal est de réglementer et d'harmoniser l'activité afin de conserver la bonne qualité de l'eau à proximité des fermes aquacoles.

La qualité de l'eau peut être préservée grâce à des programmes de surveillance environnementale adaptés et maîtrisés. Cependant, d'autres défis sont à prendre

FIGURE 2
Principales interactions avec l'environnement



en considération, comme par exemple l'échappement des poissons des cages d'élevage. Ce phénomène doit encore être étudié et il convient de rechercher des solutions pour référencier les performances des équipements d'élevage et pour améliorer les normes nationales et internationales en matière de conception, de construction et d'utilisation des équipements aquacoles (Jensen, 2010).

Les interactions avec l'environnement récepteur ont été répertoriées et évaluées (UICN, 2007) afin de mesurer l'ampleur de ces dynamiques et de proposer des actions d'atténuation. Les principales interactions sont résumées dans la figure 2.

Changements climatiques

L'industrie aquacole doit s'adapter aux changements climatiques. En effet, les variations des paramètres physiques influencent directement les performances zootechniques des poissons d'élevage et, par conséquent, la pérennité économique des entreprises. L'environnement peut répondre de manière imprévisible et parfois spectaculaire aux changements climatiques (prolifération de méduses ou de phytoplanctons, impact sur la conchyliculture, etc.).

Des mécanismes de veille et de prévention doivent être mis en place pour minimiser l'impact de ces changements climatiques sur l'industrie aquacole. Le projet Med-Jellyrisk[22], financé par l'Union européenne (Instrument Européen de Voisinage et de Partenariat-Coopération Transfrontalière), est une illustration de l'adaptation et de la prévention associées aux changements climatiques.

3. CADRE RÉGLEMENTAIRE

Il existe en Méditerranée et en mer Noire un nombre important de législations et d'autorités compétentes qui interviennent à différents niveaux de prise de décision. Dans la zone d'application de la CGPM, la plupart des pays prennent en considération l'aquaculture. Si quelques pays, comme l'Algérie ou l'Espagne, disposent de lois spécifiques, les autres rapprochent l'aquaculture des lois sur la pêche (Grèce, Maroc, Tunisie, etc.).

En plus de la réglementation sur l'octroi des licences, d'autres réglementations importantes portent sur l'impact sur l'environnement et les modes de gestion sanitaire de l'activité.

Dans la plupart des pays de la Méditerranée, une EIE est réalisée avant l'installation ou l'expansion d'une exploitation aquacole. Toutefois, le type et le niveau d'exigences varient d'un pays à l'autre. En effet, bien que l'EIE soit prise en compte dans tous les pays de la Méditerranée et de la mer Noire, elle n'est pas obligatoire et dépend parfois de la taille des fermes. L'EIE n'est pas obligatoire pour tous les projets et n'est pas toujours intégrée à la législation. Les autorités chargées de la prise de décision en matière d'EIE ne sont pas toujours suffisamment outillées juridiquement pour suivre d'une manière indépendante la mise en œuvre de ces programmes lourds.

[22] Améliorer l'approche de gestion et les mesures d'atténuation des impacts de prolifération de méduses.

On constate cependant de grandes différences entre les pays pour ce qui est des paramètres, des procédures et des autorités responsables. En Tunisie et à Malte, par exemple, les EIE sont obligatoires et sont effectuées par des cabinets de consultants indépendants privés et engagés par le promoteur, sous réserve d'approbation des autorités compétentes. En revanche, en France et en Espagne, chaque ferme doit présenter une EIE et appliquer un PSE. Chypre, par exemple, a entrepris une mise à niveau réglementaire depuis son entrée dans l'Union européenne et l'EIE a été considérablement améliorée.

Il serait donc bénéfique d'harmoniser ces méthodologies, paramètres et niveaux de maîtrise des outils de contrôle entre les pays, voire au sein de chaque pays (comme dans le cas de l'Espagne). En effet, bien qu'il existe dans la plupart des pays un cadre réglementaire définissant les EIE et les PSE, certains ne l'appliquent pas ou ne l'appliquent que partiellement pour leurs fermes. Dans la plupart des cas, le PSE se limite à une série de mesures physico-chimiques et biologiques et ne couvre pas les aspects socioéconomiques.

En ce qui concerne les conventions internationales, les problèmes environnementaux exigent la mise en place de stratégies capables d'identifier les liens et les interactions profondes entre les diverses conventions. Les gouvernements, les institutions, les organismes scientifiques, les communautés locales et les ONG doivent collaborer pour établir des programmes communs visant à harmoniser les politiques en matière de gestion des ressources naturelles et de l'environnement.

La Convention-cadre des Nations Unies sur les changements climatiques et la Convention sur la diversité biologique visent à conserver la diversité biologique. Leurs recommandations mettent l'accent sur le développement et le renforcement des liens de coordination, et ont pour objectif la conception d'une stratégie de mise en œuvre reposant sur les principes directeurs du développement durable.

Le projet InDAM de la CGPM, grâce à une approche participative visant à identifier des indicateurs de développement durable de l'aquaculture, a posé les jalons d'une démarche solide vers la durabilité du secteur. Suivant une méthodologie principes-critères-indicateurs, les objectifs stratégiques de la dimension environnementale sont traduits en critères et indicateurs standardisés. Les principes sont formulés sous la forme de verbes d'action tels que «contribuer», «assurer», «adapter», «renforcer», «minimiser», etc. (par exemple, «minimiser l'impact de l'aquaculture sur l'environnement»). Les indicateurs, quant à eux, représentent des outils de suivi, d'évaluation, de prévision et d'aide à la décision. Ils sont définis en fonction d'objectifs convenus. La confrontation d'un indicateur avec l'objectif correspondant permet de juger de l'efficacité d'une action. Les indicateurs sont également des outils de communication qui sont utilisés pour quantifier et simplifier l'information afin de la rendre compréhensible pour un public cible.

4. MEILLEURES PRATIQUES ET ENSEIGNEMENTS TIRÉS

Au cours de son évolution dans la région, l'aquaculture a rencontré un grand nombre de contraintes d'ordre technique, sanitaire, environnemental et économique. Le défi ne consistait plus à produire mais à faire en sorte que cette production soit faite d'une manière durable tout en respectant le bien-être animal et en garantissant la sécurité du consommateur.

L'industrie aquacole, consciente de ces nouvelles orientations, a mis en place une série de bonnes pratiques concernant les dimensions environnementale, sociale et économique. Le Code de conduite pour l'aquaculture européenne (FEPA, 2006), développé par la Fédération européenne des producteurs aquacoles (FEPA) en 2006, est une illustration de la volonté des producteurs d'améliorer leur processus de production. Ce guide pratique détaillé vise à aider les producteurs à adopter des pratiques de gestion appropriées.

Le Code de conduite pour une pêche responsable de la FAO est précurseur en matière de bonnes pratiques responsables et aborde l'aquaculture dans son article 9. Le guide de la FAO est plus théorique que celui de la FEPA, mais tous deux ont le même objectif: la gestion durable de l'industrie.

Le guide de la FEPA, tout comme d'autres codes de bonnes pratiques tel que le Code de bonnes pratiques pour l'aquaculture écossaise de poissons à nageoires, sont écrits par des professionnels et sont donc plus facilement acceptés par les aquaculteurs.

Ces codes, pour la plupart d'envergure mondiale, sont complétés par des ensembles de bonnes pratiques qui portent notamment sur la biosécurité, le régime alimentaire et la lutte contre les maladies.

L'aquaculture se doit de préserver l'état naturel, la viabilité des populations sauvages, leurs écosystèmes ainsi que la biodiversité. Cela est possible à travers la réduction du transfert et de l'expansion de pathogènes entre organismes cultivés et populations sauvages, l'utilisation d'intrants contrôlés et non nuisibles à l'environnement et aux stocks de poissons élevés, ou encore l'adoption d'EIE et de PSE harmonisés avec des points de référence communs et des paramètres maîtrisés et peu coûteux.

5. POINTS DE DISCUSSION

Les principales préoccupations des intervenants s'articulent notamment autour des axes suivants:

La variabilité des systèmes et des niveaux de production entre les différents pays de la région

Cette variabilité doit être mise en valeur et vue comme un atout du fait de la complémentarité des différents systèmes et de la diversité des expériences. Il s'agit de proposer des outils permettant une industrie durable, notamment en ce qui concerne les interactions avec l'environnement.

La variabilité des modes de gestion environnementale et sanitaire

Les PSE et les méthodes de gestion sanitaire sont également variables d'un pays à l'autre, au même titre que leur application et leur contrôle. Un point de vue partagé et concerté devrait aboutir à une approche commune.

Les bonnes pratiques, outils de durabilité et de communication

Comme expliqué ci-dessus, les bonnes pratiques sont une assurance pour l'aquaculteur, le décideur et le consommateur. Leur mise en place et leur diffusion parmi tous les acteurs est donc à encourager.

La recherche scientifique et l'innovation, outils d'amélioration et d'optimisation aquacoles

La recherche scientifique et l'innovation sont deux piliers du développement durable de l'aquaculture et passent par la maîtrise des techniques (réduction des échappements, vaccination, etc.), des espèces et des intrants (aliment, alevins, etc.). Ces piliers permettent aussi de fournir aux décideurs, aux professionnels et aux consommateurs des indicateurs et des points de référence pour quantifier, qualifier et atténuer les relations aquaculture-environnement.

6. PRINCIPAUX MESSAGES POUR LA CONFÉRENCE

Pour réfléchir à la question «un environnement sain, une industrie aquacole plus solide», il convient d'examiner des lignes de conduite et des recommandations dans le but d'orienter l'aquaculture vers la durabilité. En effet, les défis évoqués précédemment doivent être associés à des actions et à des mesures adaptées selon le domaine de compétence de chaque pays.

- **Une harmonisation des législations relatives à l'aquaculture** – Il est nécessaire d'identifier, d'éclaircir et de simplifier les textes spécifiques à l'aquaculture, notamment pour ce qui est des EIE et des PSE, qui doivent avoir pour base commune un ensemble minimal de paramètres, de méthodes scientifiques et de points de référence. Ce type d'approche est essentiel si l'on considère que l'environnement, et en général l'écosystème aquatique, sont des biens collectifs partagés par plusieurs pays. La législation doit aussi faciliter la mise en œuvre de mesures d'appui et de contrôle et promouvoir les bonnes pratiques chez les professionnels.
- **L'adoption de bonnes pratiques** – Que ce soit à travers des codes de conduite ou des guides de bonnes pratiques, l'aquaculture doit, dans chaque pays, améliorer les procédés de gestion zootechnique, de commercialisation, de protection de l'environnement, de sécurité alimentaire, etc. Ces bonnes pratiques doivent être formulées par des professionnels du secteur et partagées avec les autres acteurs.
- **L'adoption d'une approche participative** – Tous les acteurs doivent s'impliquer dans la mise en place d'une aquaculture durable, comme par exemple les ONG qui traitent les aspects environnementaux ou les autorités responsables. Cette approche participative pourrait être améliorée par la mise en place de plateformes aquacoles multi-acteurs à l'échelon régional et national.
- **La mise en place d'AZAs** – Un grand nombre de pays ne parviennent pas, même s'ils en ont la volonté, à mettre en place des AZAs dans leur zone côtière car ils manquent d'outils et de savoir-faire. Il serait intéressant de soutenir ces initiatives pour harmoniser le niveau de développement du dispositif d'affectation des espaces marins à l'aquaculture.
- **La mise en place de mécanismes de veille pour les changements climatiques** – Les changements climatiques requièrent une attention particulière en raison de l'impact direct qu'ils ont sur l'activité aquacole. Il est donc essentiel de mettre en place des mécanismes de veille pour les changements climatiques à l'échelon régional et national, en particulier pour les segments les plus vulnérables de la production aquacole.
- **La mise en place d'une stratégie nationale et régionale de communication** – L'aquaculture a connu une croissance très rapide mais a suscité aussi beaucoup de controverses. Pour garantir la durabilité d'une croissance aussi rapide, il est nécessaire de développer la communication entre les différents intervenants et avec les consommateurs. Les stratégies de communication doivent mettre en valeur les atouts du produit: valeur nutritionnelle, respect de l'environnement, sécurité alimentaire, etc. Montrer que l'aquaculture n'est pas une activité nuisible à l'environnement ne peut qu'améliorer son image et sa durabilité. Dans ce cadre, il serait intéressant de promouvoir une plateforme multi-acteurs au niveau national et/ou régional.
- **La mise en place d'un mécanisme de pratiques responsables et de certification commune** – La certification, au même titre que les codes de bonne conduite, permet à l'industrie aquacole de garantir sa durabilité. Il serait intéressant de mettre en place des normes relatives aux modèles de certification de la durabilité prenant en considération les particularités régionales et culturelles car l'environnement de la région et ses spécificités appellent des normes spécifiques (FAO, 2011).

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Panel 3

Boosting markets for aquaculture

Panel 3
Boosting markets for aquaculture

PANEL DESCRIPTION

In the Mediterranean and the Black Sea, sound market competitiveness for aquaculture products (fish and shellfish) requires moving away from a production-oriented approach to a market-oriented production strategy, and addressing issues such as product quality and safety, economic efficiency, market promotion and image as well as the contribution of aquaculture farmers organizations (AFOs). A market-oriented aquaculture is based on the knowledge of customers, competitors and markets. Panel 3 discussions aimed to address the main aspects related to market and high-value products based on health standards and traceability as well as to examine how to further develop domestic and international markets and improve the public image and perception of aquaculture.

DISCUSSION TOPICS

The panel explored in particular the following aspects:

- a move from a production-oriented growth to a market-oriented approach;
- elements for market-oriented data collection and dissemination schemes;
- addressing consumers concerns about fish and seafood safety/quality, animal welfare and sustainability aspects;
- ways to improve the public perception of aquaculture and image building;
- policies to promote domestic consumption in order to boost demand and markets;
- empowering AFOs for collective arrangements/actions and sustainable aquaculture development, with particular regard to markets and marketing aspects;
- opportunities and constraints in aquaculture value chains, retail sector and distribution channels;
- strategies to use information and communication technologies for image building, market promotion, marketing and data/information collection; and
- shellfish culture and possible strategies for its promotion.

PANEL MEMBERS*

Chairpersons

Aina Afanasjeva – Eurofish

Aina Afanasjeva has been director of Eurofish since May 2009. She has over 30 years of experience in the fisheries sector, at both commercial and administrative (national, EU and international) levels. Aina Afanasjeva has a wide range of knowledge and expertise from her past jobs. Before joining Eurofish, she worked at the European Commission, DG MARE, where she was managing the implementation of EU structural funds programmes in the fisheries sector in different Member States including Latvia, Denmark and the Netherlands. During her posting as deputy director at the Latvian fisheries administration, from 1996 until 2005, negotiations on trade in fisheries products (bilateral, European Free Trade Association, World Trade and the EU), preparation of Latvia's accession to the EU (including common market organization of fish products and data collection) and representation of national interests in various EU institutions were among her major tasks.

Ferit Rad – Mersin University, Turkey

Ferit Rad is currently professor at the Department of Aquaculture of the Faculty of Fisheries at the University of Mersin, Turkey. He graduated in 1999 from the University of Ankara, Turkey, and obtained a PhD from the Department of Fisheries and Aquaculture. He is currently working in aquaculture planning, development and management. Since 2006, he has been working as the coordinator of the Working Group on Marketing of Aquaculture Products, a subsidiary body of the GFCM CAQ. He also works in close collaboration with FAO-Globefish preparing national market reports on the Turkish seabass and seabream sector.

Keynote speaker

Katia Tribilustova – Eurofish

Katia Tribilustova is currently holding the position of market specialist at Eurofish. Her experience combines the evaluation of international markets for selected fisheries and aquaculture products, the training of stakeholders on marketing of fish and seafood, the assessment of market potential for exports to selected countries and other researches as well as the organization of conferences, workshops and business-to-business meetings. Her educational background in international marketing and project administration in the Russian Federation, Norway and Italy complements her professional experience, which includes more than ten years working with Eurofish, FAO, the Norwegian Seafood Council and other partners implementing projects in more than 13 countries.

* The information is reproduced as submitted by each panel member and was up-to-date at the time of the conference.

Panellists

Javier Remiro Perlado – FOESA, Spain

Javier Remiro Perlado is currently managing director of the Spanish Aquaculture Observatory Foundation (FOESA). After a bachelor's degree in marine sciences from the University of Vigo, he began his professional career in the scientific world at the University of Geneva. At his return in Spain, he completed his education with a master in integrated quality, environment and occupational risk prevention (PRL) in Madrid and started a new career as a consultant in the field of quality management, environment and PRL and, since 2006, in fisheries and aquaculture, in the public company Tragsatec. In February 2009, he was nominated managing director of FOESA. Since then, he has been promoting the consolidation of this institution as a reference entity for the Spanish aquaculture sector, expanding the lines of action and partnerships with other organizations and institutions and supporting the sustainable development of the sector.

Nada Bougouss – Infosamak

Nada Bougouss is a quality and marketing specialist at the Centre for Marketing Information and Advisory Services for Fishery Products in the Arab Region (Infosamak). She graduated with an engineering degree in food science from the Hassan II Institute of Agronomy and Veterinary Medicine, Morocco. Besides, she undertook advanced courses at the Mediterranean Agronomic Institute of Zaragoza and at the Wageningen Centre for Development Innovation, Wageningen University & Research, Netherlands. In 2008, she joined Infosamak where she concentrated on information and advisory services. She has been working on many fisheries and aquaculture projects in the Arab region. Within the framework of an agreement between Infosamak and an international ecolabelling organization, Nada Bougouss was assigned as on-site monitoring director for Africa. She performed traceability and verification audits. She has also been a consultant for FAO on certification and ecolabelling, traceability and quality assurance in the fisheries sector.

Catherine Mariojouls – AgroParisTech, France

Catherine Mariojouls is currently professor at the Paris Institute of technology for life food and environmental sciences (AgroParisTech). She has graduated as an agronomist engineer and holds a PhD in agronomic sciences. Before joining AgroParisTech, she worked as a consultant at the French Study and research centre on economy and organization of animal production (Cereopa) and as an academic at the Institut National Agronomique Paris-Grignon. Her research focusses on the aquaculture sector, mainly on approaches linking technical and socio-economic aspects: value chain analysis, aquaculture sector development, market studies and consumer preferences, quality schemes and certification related to farming practices.

Salah Taher – USSEC, Egypt

Salah Taher is currently working at the United States Soybean Export Council (USSEC) as a commercial specialist on poultry/aquaculture in Egypt. He holds a degree in biology from the American University in Cairo and a master of business administration from the Maastricht School of Management. He is also a certified banking credit analyst from the American University in Cairo (Institute of Banking and Finance). He has 17 years of experience in the field of aquaculture, agribusiness development and finance. His experience includes structuring and managing fish farming companies for freshwater and marine species. He has also worked in the banking and finance sector to develop programmes for ecoinvestments and the agriculture sector. In his capacity of expert, he has worked with donor-funded projects including projects funded by the United States Agency for International Development, the EU, the United Nations Development Programme, etc.

Marco Gilmozzi – COSA farm, Italy

Marco Gilmozzi is currently president and general manager of the aquaculture farm COSA srl. He holds a master of sciences degree in marine biology and aquaculture from the University of La Sapienza, Rome, Italy. He started his professional carrier as a member of the board of directors of the Gruppi di Azione Costiera. He has been the vice-president of the Italian Fish Farmers Association (Associazione Piscicoltori Italiani, API) for nine years now, the vice-president of the European Federation of Aquaculture Producers for four years, and the vice-president of COOPAM scrl, a regional aquaculture fish farmers cooperative group, for 16 years.

Florent Tarbouriech – Médithau Marée SA, France

Since Florent Tarbouriech has discovered, behind his diving mask, the wealth of submarine life, the passion for his job as a shellfish farmer has never left him. When he was 20 years old, he took back the oyster farm established by his father in 1962 and created Médithau, with the ambition to make of the Mediterranean oyster an exceptional product. Supported by a team of passionate people, Florent Tarbouriech has been involved in quality management and certification processes, following a sustainable development and innovative approach.

Patrizio Piozzi – Ismea, Italy

Patrizio Piozzi is an agronomist who joined the Italian Institute of services for the agricultural and food market (Istituto di servizi per il mercato agricolo alimentare, Ismea) in 1996. At Ismea, he is the coordinator of market information services and head of the data and information collection unit, in charge of price and information collection for agriculture, fisheries and agrifood markets. This unit is also responsible for the observatory on organic products and of the observatory on protected designation of origin and protected geographical indication, and it carries out quarterly surveys on farms, food processing industries and household purchase. Patrizio Piozzi is responsible for weekly market reports on agriculture and fisheries chains and manages the quality system for the price data collection system of Ismea, which is certified according to UNI EN ISO 9001:2008 standards. He has also managed the first certification of the institute in 2002.

Boosting markets for aquaculture

Katia Tribilustova
Market specialist
International Organisation for the Development of Fisheries in Central and Eastern Europe (Eurofish)

1. BACKGROUND

Aquaculture in the Mediterranean and the Black Sea countries is a large and dynamic industry, which has grown substantially in past decades. In so doing it has helped meet the rising worldwide demand for fish and fishery products. The varied character of the sector has been shaped by diversity in geographical features (e.g. coastal lagoons, islands, etc.) and by a range of historical and socio-economic factors. Growth in the industry can be attributed to favourable farming conditions (e.g. temperature, water quality) as well as to the application of new technologies, increased trade, and proximity to markets.

Today, the market for aquaculture in the region is significantly impacted by global demand as well as by consumers at the local level. An analysis of current production priorities, challenges, trade, and marketing strategies can provide an insight into trends in the aquaculture marketplace. A comprehensive look at current regulatory frameworks can help industry members engage in marketing and promotional activities to enhance products visibility and image. While these factors have helped production expand, more needs to be done to increase the consumption of fish and fishery products across the region. In this regard, one of the first steps to be taken is to improve data collection and analysis at each stage of the value chain. This information will help better understand consumers' perceptions and the image of aquaculture products; this can be used, in turn, to underpin marketing and promotional activities aimed at enhancing the visibility and image of fish and fishery products. Successful marketing activities will first need to identify the communication channels best suited to the message and the relevant audience. Increasing consumption also depends on the collaboration between the different stakeholders in the aquaculture sector at the local, national and international levels, which can therefore contribute to the growth of aquaculture markets in the region.

This background paper analyses the aquaculture sector in the Mediterranean and the Black Sea region as it exists today and suggests how sustainable growth in the sector can be maintained and even accelerated thereby enhancing its socio-economic status and the importance of its contribution to global food security.

2. MAIN PRIORITIES AND CHALLENGES FOR THE SECTOR

The technical meeting on marketing held in October 2009 (Tangier, Morocco) by the CAQ Working Group on Marketing of Aquaculture Products identified the main objectives for the sector as follows: transition the aquaculture industry to be more market-oriented; strengthen producers organizations; and reinforce the principal bodies in further developing the industry. Several challenges were identified through national country reports and stakeholders dialogue as part of the MedAquaMarket project "Development of a strategy for the marketing and promotion of Mediterranean aquaculture" (Barazi-Yeroulanos, 2010). Most participating countries criticized the absence of a marketing strategy for the sector and the fact that the goals of price

stability, exploitation of emerging and niche markets and improvement of the sector's public image had not been achieved yet (Barazi-Yeroulanos, 2010). The lack of reliable collection and dissemination systems for data on production volumes, consumption, distribution channels, market trends and trade, was also identified as a factor hindering the development of the sector.

The MedAquaMarket project identified the following challenges facing Mediterranean and Black Sea aquaculture:

- unregulated supply and demand in the industry;
- inefficient mechanisms to control product supply and price reductions;
- low level of collective action;
- lack of cooperation among producers for promotional activities;
- lack of market data and information, and inefficient marketing;
- lack of communication and dialogue between stakeholders, industry and public institutions;
- lack of farmer participation in policy- and decision-making processes, including legislative aspects;
- decreasing bargaining power of farmers in the supply chain; and
- negative perception of aquaculture products.

The regional FAO/Eurofish/GFCM Workshop on predicting the market for seabass and seabream (November 2014, Turkey) concluded that several of the above-mentioned challenges were still hampering the sustainable development of Mediterranean and Black Sea aquaculture.

Data are oriented towards production rather than towards trade and markets and can be used to assess past trends without making the predictions that both the industry and governments need. Timely data and market analysis are essential to better understand developments in markets and value chains. However, for this purpose, it is essential that data are both reliable and transparent. It is also necessary to have data in a less aggregated form, even though this could raise confidentiality issues since economic data cannot be made public for segments for which there is an insufficient number of companies.

Producers need to adopt a market-oriented approach rather than a production-oriented one and should have a better understanding of markets and consumer preferences to respond to these quickly. It is important to increase fish consumption in domestic markets, reduce dependence on fish imports, as well as to develop and implement coordinated marketing strategies and promotional activities at the local, national and regional levels. Coordinated marketing efforts should place greater emphasis on non-price attributes of farmed products, increase awareness of the benefits compared with non-seafood products, and combat negative perceptions of aquaculture products. Product development and diversification can lead to expanding domestic markets and can increase visibility. Establishing a pan-Mediterranean and Black Sea organization to disseminate market information and coordinate promotional efforts will aid in marketing farmed fish to consumers around the region.

3. MAIN ACTORS AND ISSUES AT STAKE

Aquaculture production in the Mediterranean and the Black Sea

In the past decade, growth in the regional production has been led by Nile tilapia and high-value species such as the European seabass and gilthead seabream. Total aquaculture production for direct food consumption in the region has grown by more than 50 percent, from about 1.3 million tonnes in 2002 to more than 2 million tonnes in 2012. Approximately 70 different species of fish, molluscs and crustaceans are currently farmed in freshwater, marine and brackish water environments. However, just a few resources (Nile tilapia, mullets, common carp, rainbow trout, mussels, oysters, European seabass and gilthead seabream) accounted for 90 percent of production in 2012.

The aquaculture sector in Mediterranean and Black Sea countries is characterized by different levels and stages of development. Egypt, Italy, France, Spain, Greece and Turkey are among the largest producing countries in the region. Nile tilapia and mullets account for more than 35 percent of aquaculture production in the region. Egypt is responsible for almost all the production of these fish and nearly all of Egypt's farmed fish are consumed domestically.

Mussel production has decreased slightly between 2002 and 2012, falling from 484 000 tonnes to 321 000 tonnes. Currently, mussel farming accounts for 15 percent of all aquaculture production by volume in the region. Spain, Italy, France and Greece are the largest producers of mussels.

European seabass and gilthead seabream are farmed in several countries, of which Greece, Turkey and Spain are the highest producers. European seabass production has grown significantly between 2002 and 2012 reaching 151 000 tonnes (which represents an increase of 160 percent since 2002). This was mainly due to increased production in Turkey. Gilthead seabream production has increased by 90 percent over the period 2002–2012 up to 156 000 tonnes representing 8 percent of the total production in the region in 2012; it is the main marine finfish species farmed in the Mediterranean and the Black Sea.

Carp production amounted to 233 000 tonnes in 2012, Egypt being responsible for 88 percent of this production. Rainbow trout production made up to 10 percent of the total aquaculture production in the region. While most countries have experienced steady growth in trout production, Turkish production surged by 180 percent over the past decade, surpassing (since 2003) production in France, Italy and Spain. In November 2014, the EU imposed a provisional countervailing duty on Turkish exports of trout to the EU (Turkey's largest export market for trout) following an anti-subsidy investigation.

Aquaculture trade

Growing consumer demand, increased production, economic growth and the liberalization of markets are the driving forces behind the rapid development of the trade in aquaculture products in Mediterranean and Black Sea countries. Due to their high consumption levels, many countries with substantial production continue to import farmed fish to satisfy growing domestic demand. Almost all farmed species in the Mediterranean are subject to high demand in domestic markets. In addition, there is also regional and international demand for some high-value species.

Bivalves are traded in large volumes in the Mediterranean and the Black Sea countries. Between 2002 and 2012, mussel import value increased by 60 percent – reaching US$222 million – while export value increased by 42 percent to US$100 million. Spain was the largest exporting country, followed by Italy, France and Greece, while the main importing countries were France, Spain and Italy. Although the production of mussels has slowed over the past decade, both the import and export markets for mussel seem to have remained stable. The oyster trade in the region has remained limited. Though the export value of oyster in the region has increased from US$20 million in 2002 to US$71 million in 2012, it accounted for only a small share of the exported species in the region. France is by far the main oyster-exporting country, followed by Italy and Spain. Italy and France are also the main importing countries, followed by Spain.

Farmed finfish species are currently among the most traded in the region and are mostly exported by countries with large production. Demand for high-value finfish species such as European seabass and gilthead seabream has increased in many Mediterranean and Black Sea countries as well as other markets around the world. The export value of European seabass and gilthead seabream has grown from US$226 million in 2002 to US$871 million in 2012, accounting for a large proportion of regional exports of aquaculture products. Greece was the largest exporter of European

seabass and gilthead seabream with an export value of US$539 million in 2012, followed by Turkey, Spain, France and Italy. The import value of European seabass and gilthead seabream grew from US$238 million to US$595 million correspondingly. The main importing countries were Italy, Spain and France, which are the largest traditional markets for those species. However, in recent years, the growth in demand from consumers in emerging markets both in the EU (United Kingdom and Germany) and non-EU (Russian Federation, United States of America and Middle East) countries has been significant, thereby accelerating the development of the industry.

Although most of the carp produced in the Mediterranean and the Black Sea countries is consumed domestically, trade is significant for carp-producing countries. The export value of carp species increased by US$7.4 million over this period, representing a small share of the region's total exports. While Egypt is the main market for carp consumption, Turkey, Croatia and France are the main carp-exporting countries. Due to a significant increase in Turkish carp production and exports, regional exports of carp surpassed imports in 2010. France and Italy are the largest carp-importing countries, followed by Croatia.

The trade in trout also represents a large proportion of the farmed species traded in the region. Exports of trout increased rapidly from US$55 million in 2002 to US$179 million in 2012 and imports increased from US$17 million to US$64 million over the same time period. Turkey is the leading trout-exporting country, followed by Italy, Spain and France, which also hold most of the import market.

In terms of apparent consumption, Italy, France, Spain and Turkey are generally the main markets for Mediterranean and Black Sea aquaculture products. For mussels, Spain is the largest market with an average apparent consumption of 3.7 kg per capita followed by Italy with 1.9 kg per capita in 2012. Oyster consumption is by far the largest in France, with nearly 2 kg of apparent consumption per capita. Greece (2.9 kg per capita), Turkey (1 kg per capita), Italy (almost 1 kg per capita) and Spain (0.7 kg per capita) are very important domestic markets for the apparent consumption of European seabass and gilthead seabream. Egypt is the main market for carp in the region with an apparent consumption of 2.5 kg per capita while Turkey is the largest market for trout with apparent consumption of 1.3 kg per capita, followed by Italy (0.5 kg per capita) and France (0.4 kg per capita).

4. VALUE CHAIN

Aquaculture products are traded in local, regional and international markets, and trade growth has been influenced by changes in the supply chain in globalized markets. Such changes are driven by economic growth, rapid urbanization, rising consumer demand, policy reforms and evolving consumer preferences.

A typical supply chain consists of three key parts: supplying raw materials to manufacturing units, converting raw materials into semi-finished or finished products and distribution to ensure products reach consumers (De Silva, 2011). There are a number of links between the fish farmer and the final consumer and a network of suppliers, logistics companies, distributors and retailers participate in the production, delivery and sale of products to consumers. A relatively new feature of the global supply chain is the emergence of a third country processor – a country to which nations export unprocessed products to be processed and re-exported (Roheim, 2008). Production and processing are outsourced to East Asia, central and eastern Europe, North Africa and, to a lesser degree, Central America. Outsourcing takes place both at the regional and global levels, depending on the product form, labour costs and transportation time.

The spread of supermarkets has brought changes to the traditional supply chain, introducing new technologies, a more integrated structure and stronger links to international suppliers. However, depending on the country, consumers can still

access fishery and aquaculture products through traditional retail (e.g. open markets, fishmongers).

As with supply chains, the main objective of value chains is to maximise net revenue. However, in contrast with supply chains, value chains add incremental value to the product at the various joints of the chain, either through value creation or value addition. This results in higher prices, as well as in the development of new markets or in the expansion of existing markets. Many fish suppliers in developing countries act as raw material suppliers to developed countries and earn only limited profits from their valuable natural resources. Processors and retail markets receive more of the value chain benefits because of their more concentrated structure and stronger bargaining power as compared with primary producers (Lem, Bjorndal and Lappo, 2014).

The value chain helps maximize profits and serves to identify activities that are unprofitable. The emphasis is on the need for good quality products, which in turn justifies a higher price on the market. Quality assurance is therefore of paramount importance: it starts at the moment the fish is farmed and lasts until it reaches the consumer. The need for market information and market research are both also very important.

Small-scale producers are characteristic of Mediterranean and Black Sea countries. The fragmentation of primary production has traditionally weakened the commercial bargaining power of producers. As a response, small-scale producers have established cooperatives, AFOs, etc. This has enabled access to cheaper and better services (e.g. maintenance, feed supply, legal advice) as well as transfer of know-how and access to markets.

However, aquaculture in the region remains a highly fragmented sector; producers still lack the ability to proactively respond to emerging market issues and challenges as well as to government regulatory initiatives. One issue that is widely debated, especially among producers, is the role of the retail sector, which seems to take a disproportionate share of the value created.

The value chain approach can apply to whole supply chains and distribution networks. This could include diversifying the fish species farmed, promoting value-added products (e.g. smoked, filleted, prepared, etc.), challenging the competition, improving management capabilities including developing marketing strategies, carrying out price formation and overcoming recessionary impacts. Linkages and synergies with other sectors that can add value – such as tourism and hospitality or recreational fisheries – represent another area that could be explored. Increasingly today, sustainability and the certification to prove it, are also a form of value addition.

5. REGULATORY FRAMEWORKS

The growing global demand for fishery and aquaculture products has increased international fish trade, leading to the development of a range of national and international regulatory frameworks. International fish trade is governed by the rules of the World Trade Organization (WTO) and, currently, all major fish-producing, importing and exporting countries are WTO members. In addition to securing improved market access for exports and more transparent trade rules, membership also gives access to the WTO dispute settlement mechanism which has increasingly been used to solve disputes.

Import duties on fish raw materials are lower than on processed products. With low import duties on the main international markets, the major issue of market access is related to quality and safety requirements. Adhering to these requirements has therefore become a prerequisite for entering international markets. In this respect, international standard-setting bodies such as Codex Alimentarius – established by FAO and WTO – play a vital role, as do the rules and agreements of the WTO, in particular the Agreement on Technical Barriers to Trade (TBT Agreement) and the Agreement

on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). Indeed, Codex Alimentarius standards, unless adopted and integrated into national legislation, remain voluntary.

In addition to public sector regulatory frameworks for food safety and quality, there is a multitude of private standards, technical regulations and certification schemes which are considered as a means to reassure buyers on product safety and quality and on production and processing methods conformance. Standards and technical regulations can relate to the products themselves (defining specifications or criteria for product attributes) or to processes (outlining criteria and practices for the way products are made).

Standards, technical regulations and certification schemes are developed by:

- government institutions which enact regulations with the aim of protecting consumers and/or the environment and promoting fair trade practices;
- buyers (retailers, processors, food service operators, etc.) who traditionally have internal standards within their company which might simply reflect the product and process specifications required for suppliers and/or the requirements for certification by a third party to an independent standard;
- groups of producers/industry bodies that have regulations usually designed to promote good practices within an industry and are often referred to as "codes of conduct" or "codes of practice";
- coalitions of retail firms (e.g. the Global Food Safety Initiative); and
- independent NGOs, such as the World Wide Fund for Nature.

These standards and their related certification schemes have a range of objectives, including the sustainability of fish stocks, environmental protection, food safety and quality, animal health and welfare and socio-economic considerations. They are also increasingly linked to corporate social responsibility and are becoming significant features of international trade and marketing. In general, standards developed by retailers or groups of retailers primarily focus on quality and safety; those developed by aquaculture producers concentrate on good practices and those developed by NGOs are more directed at the environmental implications of aquaculture.

Many industry organizations have embarked on the development of their own standards and certification schemes. This includes the creation of a label to be used for business-to-business labelling. Some of these standards are developed by government institutions, others by industry associations and yet others by a collaboration of both. For example, products labelled "Galician mussels" and "Trout of Trentino" illustrate the link to the geographical origin of the product. "Label Rouge" is another example of differentiation of the industry by the national quality assurance brand certifying products of superior level to other similar products.

6. REVITALISING MARKETS FOR AQUACULTURE PRODUCTS

The lack of coordinated marketing strategies and promotional activities at the local, national and regional levels for regional aquaculture products has been acknowledged by stakeholders and public administrations in the Mediterranean and Black Sea region. However, the implementation of such activities has not been completed yet. In order to take full advantage of available market information and successfully promote products to consumers, there is a need for regional collaboration. Monitoring current market dynamics can help industry stakeholders understand how to promote and develop the market for farmed fish and fishery products and tout the natural benefits of fish consumption in promotional activities.

Understanding market and consumer behaviour

Boosting the market for aquaculture products has two main pillars:

- understanding consumers' perceived image of aquaculture products; and
- identifying and implementing communication channels to improve the perceived image of aquaculture products.

Despite official recognition of the Mediterranean diet, which includes the consumption of fish and its associated benefits, producers face difficulties in growing and adapting to market challenges, including understanding and/or altering consumer preferences, responding to price increases, adopting labelling and certification schemes, dealing with the dominance of retail chains and handling competition both from imported aquaculture products and from other food products (e.g. chicken and pork). Competition from farmed fish and seafood from other parts of the world, such as Atlantic salmon, pangasius, shrimps and others, is also a challenge for Mediterranean and Black Sea aquaculture products.

To fully understand consumer habits and preferences in the Mediterranean and Black Sea region, the following aspects should be assessed:

- frequency of buying fish products (e.g. higher in the countries with higher per capita consumption);
- consumption patterns according to the levels of processing (e.g. the preference of consuming fresh versus frozen products);
- consumption habits according to the species (e.g. finfish versus shellfish);
- consumption patterns according to the production method (farmed versus captured);
- place of purchase (e.g. supermarket chain versus traditional retail);
- barriers to consumption of aquaculture products (e.g. price, safety concerns); and
- consumption trends and future opportunities (e.g. household versus "out of home").

Communicating knowledge is as important as acquiring it. Understanding the consumer leads to identifying the "what" (information content), "to whom" (targeted consumer categories) and "how" (improved communication channels, not only promotion) of a communication strategy. Communication needs to capitalize on the high quality and healthy characteristics of aquaculture products emphasizing their freshness (through their local/regional origin), nutritional characteristics, traceability along the value chain as well as their round-the-year availability (in both modern and traditional retail) at affordable prices. In addition, environmental protection, sustainability of feed, production ethics and animal welfare should also be referenced.

Improving the perceived image of aquaculture products

The sustainable growth of the region's aquaculture sector can be secured by continuously projecting a positive image of Mediterranean and Black Sea aquaculture products. The image of aquaculture products in the region is crucial for guaranteeing the viability and sustainability of Mediterranean and Black Sea aquaculture. In many countries, aquaculture products have negative connotations and are for example associated to environmental pollution, the use of antibiotics or habitat degradation.

However, not all the countries in the region suffer from this negative perception of aquaculture products. Within the northern region of the Mediterranean, the image of aquaculture has been changing from neutral or negative to mostly positive, especially in Spain, France, Italy and Croatia. Over the last decade, important efforts have been carried out in the Mediterranean and Black Sea region to educate consumers and enact new legislation, both of which have improved public opinion on aquaculture products (Barazi-Yeroulanos, 2010).

The unique features of the Mediterranean and Black Sea region lie in their aesthetically-pleasing waters, unspoilt nature, diversified food culture and associated

relaxation and holiday-inspired images. By capitalizing on these positive perceptions of the region, one can target a wide group of potential consumers rather than only concentrating on marketing to existing consumers. The perception of farmed products could also be improved by promoting certain species in countries where knowledge of these species is limited (e.g. marketing oyster in countries which do not have a tradition for consuming shellfish) or by focusing on their freshness, nutritional qualities and "exotic" attributes, for example.

To be effective, communication needs to be simple, straightforward and articulated in plain language in a way that encourages consumers to purchase farmed products. It should build upon, and reinforce, the regional and unique characteristics of the Mediterranean and the Black Sea.

Possible marketing strategies and activities for the Mediterranean and Black Sea aquaculture

In an increasingly competitive global marketplace, marketing strategies for the promotion of Mediterranean and Black Sea aquaculture products should be supported at the national and regional levels in order to benefit the industry in the entire region. Although every market is different, coordinated marketing efforts will increase consumer knowledge and improve the image of these farmed products, thus ensuring an increase in consumer demand. Increasing the consumption of Mediterranean and Black Sea farmed fish and fishery products achieves multiple objectives: it gives the industry a boost, paves the way for its further development and provides health benefits to consumers associated with these products.

Possible marketing strategies for the Mediterranean and Black Sea aquaculture industry can be summarized as follows:

- coordinated marketing strategies focused on collaboration within the business-to-business segment (producers, traders, retailers, organizations and media) through cooperation with industry stakeholders and the largest retailers for joint marketing actions;
- public relations and promotional activities that target final consumers and choose a narrow target group of decision-makers; this would focus on quality and product origin and would provide the target group with modern and attractive products as well as service solutions; and
- joint communication concept has to be transferred through all value chain nodes in the industry stressing high quality, attractive image and safety of Mediterranean and Black Sea aquaculture products.

Possible marketing activities within the framework of marketing strategies could include:

- joint promotional campaigns in collaboration with the largest producers and retailers such as in-store demonstrations and tastings, placement of products outside of the traditional shelf space, distribution of information materials, advertising and participation in exhibitions;
- projecting an attractive image of Mediterranean and Black Sea aquaculture products in the activities organized by the largest production and trading companies, such as competition events and festivals that involve a network of public administration;
- creation of an arena for business-to-business communication in the form of various master classes, industry, retail and Horeca meetings, seminars and teaching programmes;
- training of stakeholders in trade and business-to-business, including the retail sector, training of staff in the Horeca sector, identification and collaboration with restaurant chefs for public relation activities, training of consumer segments such as educational programmes for younger consumers and potential consumers (schools and kindergartens) using mass media;

– high focus on media communication and cooperation with the leading mass media and business-to-business communication in the industry, supporting a close dialogue with the press to communicate all activities carried out for the promotion of Mediterranean and Black Sea aquaculture products; and
– providing attractive contents and modern information platforms for consumers and business-to-business stakeholders to gain knowledge about Mediterranean and Black Sea aquaculture products and ensure systematic promotion directed at final consumers by participating in various programmes, distribution of printed materials and web-based materials, relevant public relation activities and tasting events.

7. GOOD PRACTICES AND LESSONS LEARNT

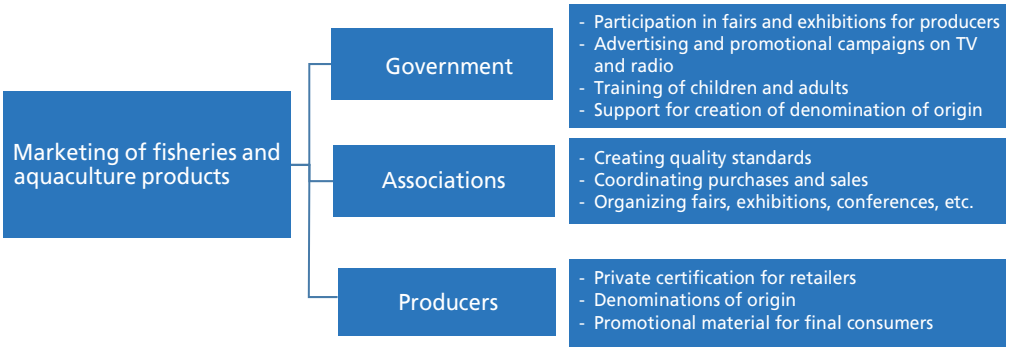
Several Mediterranean and Black Sea countries have implemented various national marketing strategies aimed at increasing popularity and consumption of aquaculture products from the region. Various marketing campaigns were designed at the national level by national governments, public administration and producers associations. This section gives some examples of good practices in the marketing and promotion of aquaculture products in Spain, which is the leading aquaculture-producing country in the region (see also Figure 1), and in Norway, the world's second largest seafood exporter.

Spain

Spain is the largest aquaculture producer in Europe; it produces approximately 250 000 tonnes of farmed fish and fishery products and mostly focuses on mussels, gilthead seabream and European seabass. It has successfully applied various marketing promotion tools to boost consumption of aquaculture products. As part of the associations, aquaculture producers are also responsible for developing private certification schemes for retailers and denominations of origin and for preparing promotional material for the final consumers.

The main activities that have been carried out by governmental agencies for the promotion of Spanish fisheries and aquaculture products are: i) support for participation of companies in fairs and exhibitions worldwide; ii) encouragement and promotion of consumption of fishery and aquaculture products through advertising and promotional campaigns on television, radio and markets; iii) education and awareness-raising for consumers and iv) promotion through governmental bodies, the Asociación Empresarial de Productores de Cultivos Marinos de España (APROMAR) – the Spanish association of marine aquaculture producers –, several inland aquaculture

FIGURE 1
Organizational structure of the marketing activities of fisheries and aquaculture products in Spain



Source: Garrido Gamaro, 2013.

associations and regional organizations of producers supporting the creation of denomination of origin for aquaculture products.

In addition to the general promotion of fish through educational workshops and the creation of marketing materials, several promotional campaigns were targeting selected aquaculture species like gilthead seabream, European seabass and turbot. Promotional activities organized by FOESA within the Ministry of Agriculture, Food and Environment included a travelling fish and seafood exhibition and an aquaculture education day. Informative actions included brochures with information about the nutritional value of aquaculture products, the importance of fish in the Mediterranean diet and the importance of aquaculture in achieving environmental sustainability and protecting biodiversity.

A wide range of promotional activities were implemented by several national associations in the marine and inland aquaculture industry such as APROMAR, the Organización de Productores de Mexillón de Galicia (OPMEGA), which is the organization of producers of Galician mussels, the Organización de Productores de Acuicultura Continental (OPAC), the Organización de Productores Piscicultores (OPP-22), FOESA and others.

For example, OPMEGA highlights the denomination of origin for products in order to promote and enhance the quality of Galician mussels. APROMAR represents the business sector of marine aquaculture in Spain. It provides services that help improve the competitiveness of its members, encourages socially responsible behaviour for sustainable aquaculture and coordinates marketing, promotional and educational events for aquaculture products. The scheme "Crianza del Mar" (see Figure 2), owned by APROMAR, was created with the support of the Fondo de Regulación y Organización del Mercado de los Productos de la Pesca y Cultivos Marinos (FROM) and of the General Secretariat of Marine Fisheries to endorse the quality of Spanish marine aquaculture.

The OPAC and FOESA promote the inland aquaculture sector focusing on farmed rainbow trout. Promotional campaigns have included a series of cooking shows on public television. In order to reach consumers, the flavour, nutritional value, freshness and competitive price of trout were highlighted. The promotion on television led to increased sales and retailers communicated the results to producers that trout went up from a top-25 product to a top-10 product.

FIGURE 2
Crianza del Mar scheme established by APROMAR

OPP-22, the major inland aquaculture organization in the Spanish sector, has also launched a website, the PISCIS Platform. Through this platform, the organization aims to achieve improved functionality through enhanced communication and presentation based on online resources. The Spanish associations in the fisheries and aquaculture industry also support the organization of fairs, exhibitions, conferences and seminars for the industry and related fields. They also coordinate purchases and sales as well as the creation of quality standards.

Norway

The Norwegian experience in the unifying market information and implementing marketing strategies and different communication activities for the domestic and international seafood industry can be seen as a good example for the Mediterranean and Black Sea aquaculture industry. Norway, the world leading producer of Atlantic salmon and the second largest seafood exporter in the world, has channelled all marketing and promotional activities for Norwegian fisheries and aquaculture to the

Norwegian Seafood Council (NSC), a public company established in 1991 and owned by the Ministry of Trade, Industry and Fisheries. Each year, the NSC implements some 500 marketing projects in 25 different countries, all aimed at increasing demand and consumption of seafood from Norway. The difference from other countries is that responsibilities related to national marketing strategies, plans, actions, consumer analysis, market information, data and communication strategies regarding the promotion of Norwegian seafood have all been united within the same body. Joint marketing, market information and communication and reputational risk management form a three-pronged approach to promotion.

Joint marketing is carried out with domestic and international industry stakeholders to increase the impact of marketing investments and to achieve the common goal of raising awareness for seafood from Norway worldwide. The NSC now conducts marketing activities throughout the value chain, such as marketing towards businesses, promotional activities in the retail sector, public relation activities and investments in various media channels such as TV and magazines. Regarding market information, the NSC is the main source of statistics, trade information, trends, developments, updated information on import quotas, tariff rates and trade conditions in various markets. This market information is shared with the Norwegian seafood industry, the Norwegian authorities and within the NSC to provide a reliable decision-making basis. The NSC has 17 consumer websites, all in different languages, which are an integral part of its marketing strategy.

In the field of communication and reputational risk management, the NSC contributes towards strengthening the reputation of seafood from Norway with active information. Corporate communication, press grants, press travel and public relation activities are all aimed at increasing market awareness of Norwegian seafood, highlighting the importance of Norwegian seafood exports and improving stakeholder knowledge of seafood from Norway. Reputational risk management is important to safeguard and strengthen the image of seafood from Norway; the NSC contributes to the social debate by providing accurate, up-to-date information about seafood products and the Norwegian seafood industry.

8. DISCUSSION POINTS

A shift from production-oriented growth to market-oriented approach

It is widely acknowledged that producers would benefit by shifting from a production-oriented approach to a market-oriented approach. This requires better understanding markets and consumer preferences, better exploitation of external linkages with customers and value chain partners, tailored offering of products and services to those needs and accumulation and deployment of consumer data. The Mediterranean and Black Sea aquaculture sector needs to make this shift to a market-oriented approach.

Data/information collection and dissemination schemes

Comprehensive, accurate and timely flow of information on markets, consumer needs and trends is crucial for a balance between production and demand and for the overall sustainable development of the sector. At present, there are a number of regional or global aquaculture data collection and dissemination systems; however, there is a gap between the needs of the sector and available statistical data, which are more production-focused rather than trade- and market-oriented.

Consumer concerns, negative perceptions and image building, public communication and responsible aquaculture practices

Consumers can be increasingly influenced by the negative perception given by the media and some NGOs on the aquaculture sector. Negative perception can be counteracted by actively providing accurate information and promoting the participation of authorities

and industry stakeholders in social debates in order to buttress a positive image of the Mediterranean and Black Sea aquaculture products.

Promoting domestic consumption to boost demand and markets

Domestic markets often represent the closest and easiest markets with the most potential for boosting consumption of aquaculture products. A set of coordinated marketing strategies should be developed at the national level taking into consideration the different characteristics of domestic markets.

Collective arrangement/actions and role of AFOs in sustainable aquaculture development – markets and marketing aspects

Collective actions are very important for the implementation of common strategies on aspects related to production and marketing; however, many countries in the region face difficulties due to the fragmented structure of the sector and to the lack of collective actions. In this regard, the creation and role of AFOs should be further promoted at the national and regional levels.

Value chain, retail sector, distribution channels: opportunities and constraints

Both organizational and adaptive responses are needed to answer to market changes since producers are losing bargaining power with different distribution channels; in particular, due to the structure and requirements of the modern retail sector that is gradually replacing traditional wholesalers and fishmongers.

Use of information and communication and technologies for image building, market promotion, marketing and data/information collection

Market intelligence can be improved for the benefit of the Mediterranean and Black Sea aquaculture sector by using accessible information and communication technologies to facilitate marketing, promotion and image-building.

9. KEY MESSAGES TO THE CONFERENCE

- Authorities in the Mediterranean and Black Sea region should ensure increased availability of trade and market data, and should efficiently disseminate information to all stakeholders in the value chain to promote sustainable growth and production.
- The role of both industry and national authorities in data collection and transmission needs to be reinforced. AFOs should also facilitate data collection and dissemination.
- Producers need to adopt a market- rather than production-oriented approach, using better understanding of markets and consumer preferences to respond to them quickly.
- Mediterranean and Black Sea producers should ensure that responsible aquaculture practices are encouraged through better management practices, food safety assurance, animal welfare, traceability and transparency – actions that will provide a positive image of the industry and its products.
- Authorities, sectoral associations and other stakeholders should ensure coordinated marketing strategies for Mediterranean and Black Sea aquaculture products that target national, regional and international markets, thereby enhancing product visibility and awareness.
- Collaboration and capacity-building of all stakeholders should be improved to overcome obstacles and encourage market-driven growth in the sector.
- Sectoral associations and other stakeholders should decisively counteract negative information about aquaculture products in the media and from some NGOs by

providing timely, accurate and up-to-date information that reinforces the positive image of the Mediterranean and Black Sea aquaculture sector and its products.
- Authorities and stakeholders should facilitate the establishment of producer organizations and strengthen their role where they already exist in order to establish them as the principal bodies for driving the further development of the aquaculture sector.
- Authorities and stakeholders should facilitate the establishment of a new structure of a pan-Mediterranean and Black Sea organization for sharing production and market data, conducting market analysis and initiating the establishment of market intelligence tools.

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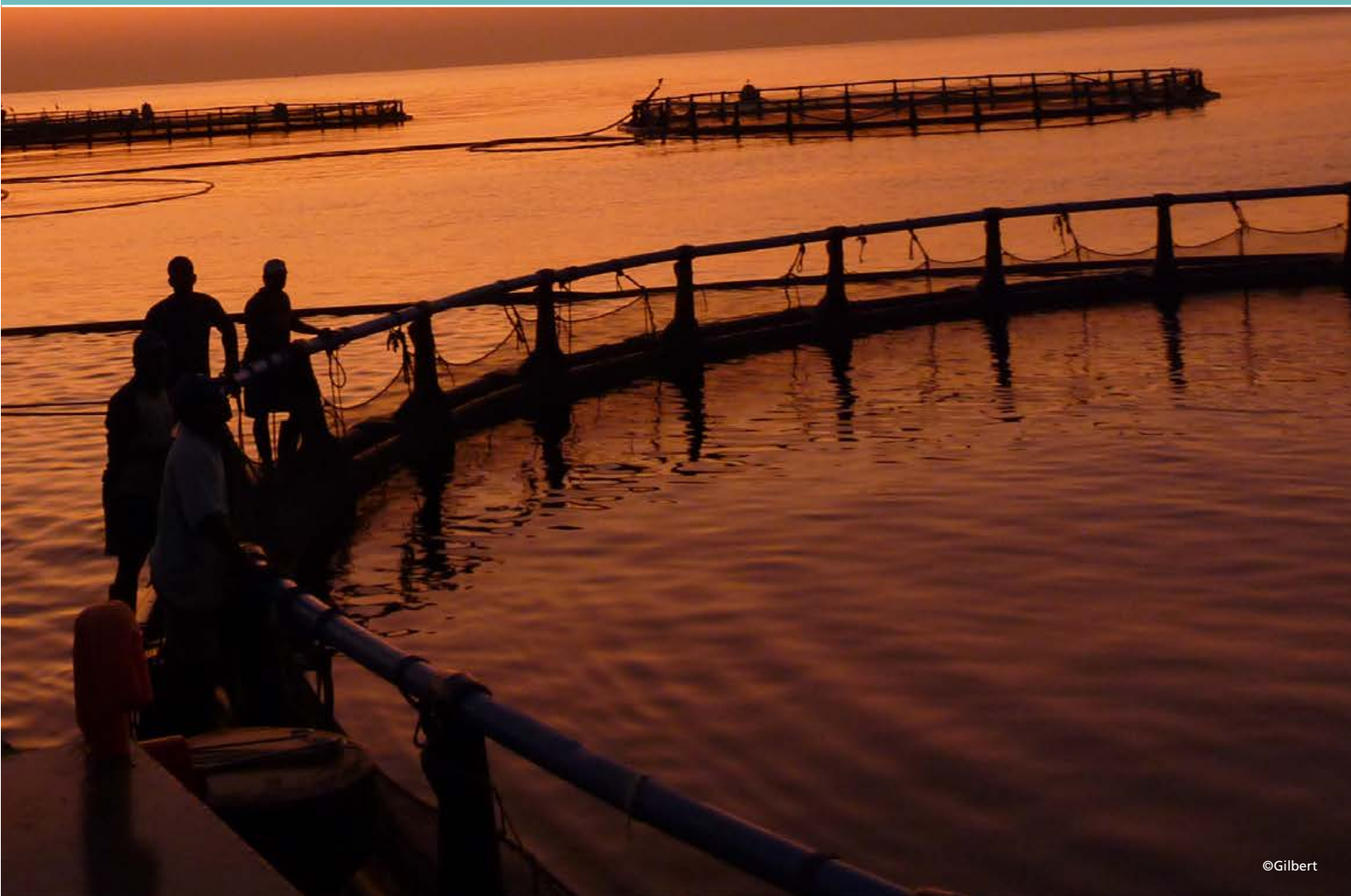
Panel 4

Advancing aquaculture innovations



Panel 4
Advancing aquaculture innovations

PANEL DESCRIPTION

Investments in aquaculture research and development foster technology innovation and the improvement of production systems. This results in increased production efficiency and performance, higher product quality and safety for consumers, as well as a more sustainable industry. Panel 4 discussions aimed to address and reflect upon innovative approaches and solutions as well as to consider emerging technologies that could potentially contribute to sustainable aquaculture development.

DISCUSSION TOPICS

The panel explored in particular the following aspects:

- state of the art of major aquaculture research and technological developments (RTD) and innovations in the Mediterranean and the Black Sea;
- RTD and innovation needs: assessment, research implementation and funding, and transfer of results to stakeholders;
- geographical scope for tailored strategies and solutions;
- transnational approaches and north–south cooperation to address RTD and innovation needs in the region;
- effective dissemination of RTD results to create innovation;
- dissemination strategies: capacity-building requirements and knowledge tools to strengthen communication; and
- ways to establish and foster networks among researchers, policy-makers, industry and society stakeholders.

PANEL MEMBERS*

Chairpersons

Alistair Lane – EAS

Alistair Lane has been the executive director of the European Aquaculture Society (EAS) since 2000, managing this international non-profit association of more than 500 members in over 40 countries. After graduating with a master of sciences in marine biology, he has worked in the aquaculture feeds business for ten years in the United Kingdom, France and Spain, with responsibilities in distribution, marketing and general management. He has a special interest in aquaculture networks and has been involved in several European initiatives related to sustainable aquaculture development. He also provides research compilations and other aquaculture information to European consumer organizations. He has presented aquaculture issues to European policy-makers (EU Parliament and Commission) and is an expert for the evaluation of European Commission RTD projects – notably concerned with networks and with small and medium enterprises measures – and for the Research Council of Norway.

Jean-Paul Blancheton – Ifremer, France

Jean Paul Blancheton is a senior scientist who is currently working in the research team of the Laboratoire d'aquaculture du Languedoc Roussillon of the French Research Institute for Exploitation of the Sea (Ifremer), at the aquaculture research station of Palavas les Flots, France. This laboratory is devoted to two main research activities: fish reproduction and genetic, and aquaculture production systems (fish, molluscs and algae). Jean-Paul Blancheton is a member of a large university research team called "Unité mixte de recherche UMR 5119 (ECOSYM)" and of several national and international research groups. His research is focused on aquaculture production systems, with a special focus on recirculation systems and aquaculture sustainability. He is currently involved in several projects dealing with aquaculture sustainability and ecological intensification of production systems – recirculation systems and waste treatment, leading to integrated multitrophic aquaculture – and Mediterranean aquaculture research networking. He is also contributing to education and training at the national and international levels.

Keynote speaker

Javier Ojeda – APROMAR, Spain

Javier Ojeda is currently the general secretary of the Asociación Empresarial de Productores de Cultivos Marinos de España (APROMAR) – the Spanish association of marine aquaculture producers. He holds a bachelor of science in general biology from the University of Madrid, Spain, and a master of science in oceanography from the University of South Carolina, United States of America (USA). He has been involved in aquaculture production since 1989. In 2003, he was appointed as general secretary of APROMAR serving not only at the national level but also participating in international activities with the European Commission, the European Parliament, the Federation of European Aquaculture Producers (FEAP), FAO, IUCN and other relevant organizations.

* The information is reproduced as submitted by each panel member and was up-to-date at the time of the conference.

Panellists

Malek Mtimet – Porto Farina, Tunisia

Malek Mtimet is currently the managing director of the Porto Farina company, Tunisia. He works in seabass and seabream aquaculture operations in offshore cages. After graduating in fisheries in 1990 at the Institut national d'agronomie of Tunis, Tunisia, he continued his studies in France in the same field. In 1991, he graduated from the École nationale supérieure agronomique of Rennes and, in 1993, he obtained a degree from the Institut supérieur de production animale. He began his career in 1993 as a researcher at the Institut national des sciences et technologies de la mer in Tunis, Tunisia. In 1996, he joined a Tunisian private group as a manager of several operating fisheries companies (tuna and lagoon operations). In 2006, he joined the first Tunisian seabass and seabream offshore cages fish farming as chief operating officer before becoming the managing director of Porto Farina in 2010.

Courtney Hough – FEAP, EATiP

Courtney Hough is currently the general secretary of the FEAP, which gathers 26 national European aquaculture associations, representing the federation in different European advisory committees and development actions. He has been closely involved in the creation of the European Aquaculture Technology and Innovation Platform (EATiP) and became its secretary in 2008. Courtney Hough has received his scientific education in the United Kingdom and, after developing a pilot fish farm, he has been involved in project development and consultancy, overseeing technical and marketing services for work in Europe, Latin America and Africa. Courtney Hough has also cooperated with international organizations on aquaculture issues, notably the FAO, the Organisation for Economic Co-operation and Development (OECD) and IUCN, with a focus on governance, environmental and development issues. He is also a member of the Bioeconomy Panel of the Directorate-General for Research and Innovation of the European Commission.

Claire Caralp – Aquimer, France

Claire Caralp is project manager at the pole of competitiveness Aquimer in France. She supports research and development projects, an activity which ranges from partnerships prospection to the presentation of results via research funding. She continuously monitors projects in order to promote innovation in business while meeting requirements for sustainability. At the cluster, she is mainly in charge of aquaculture-related research and development projects. Before joining Aquimer in 2013, she took part in many research and development projects, especially at France Haliotis, on the development of algae in abalone feed. Claire Caralp graduated with master of science in aquaculture and marine resource management from the Wageningen University, the Netherlands.

David Murphy – AquaTT, Ireland

David Murphy has been the general manager of AquaTT for the past 15 years. AquaTT is a leader in scientific knowledge management for the marine sector and a specialist in ensuring that the new knowledge generated by European-funded scientific projects is effectively transferred to create maximum positive impact. David Murphy holds a bachelor of science in marine biology and oceanography from the Bangor University, United Kingdom. He has extensive experience of EU projects in education, training and RTD, having coordinated eight projects and participated in more than twenty-five others. In the past, he has been facilitator of the knowledge management thematic area of EATiP, bringing together private and public stakeholders to promote and coordinate research and development to improve competitiveness in the European aquaculture industry.

Giuseppe Prioli – AMA, Italy

Giuseppe Prioli is currently the president of the Associazione Mediterranea Acquacoltori (AMA), an Italian aquaculture farmers association which has among its members most of the Italian shellfish producers. Giuseppe Prioli holds a degree in biological sciences and has been working since 1986 in cooperative structures for technical assistance in the field of fisheries and aquaculture. As part of his activities, he has carried out several experiments on the rearing of bivalve molluscs, mussels and oysters, and has contributed to the implementation of statistical surveys on the shellfish production. Since 1997, he has been following the activities of a mussel farmers consortium in the Emilia-Romagna region, first as a director and, since 2007, as a president. He became president of AMA in 2010.

Pier Antonio Salvador – API, Italy

Pier Antonio Salvador is currently the president of the Associazione Piscicoltori (API), an Italian fish farmers association. He holds a bachelor degree in marketing and finance from the International University of Miami, USA and has been active in farm associations since the 1970s. He has been the vice-president of the national young farmers association and a council member of API since the second half of the 1980s, before becoming its vice-president (1994–2000) and its president (since 2000). From 2005 to 2012, he has been a member of the Advisory Commission for Fishing and Aquaculture at the MiPAAF. He represents API in the FEAP, where he holds the position of chairman of the Fish Health Commission. He is the chairman of the Aquaculture Working Group and the vice-chairman of the Fish Party in the Committee of Professional Agricultural Organisations and General Committee for Agricultural Cooperation in the European Union. From 2009 to 2010, he has been a counsellor for the aquaculture sector at MiPAAF. From 2003 to 2012, he has been a member of the Advisory committee on fisheries and aquaculture, established by the European Commission.

Shérif Sadek – ACO, Egypt

Shérif Sadek is currently the general manager of the Aquaculture Consultant Office (ACO). In 1986–1987, he obtained a research grant on crustacean aquaculture from the Auburn University, USA, at the Department of Fisheries and Allied Aquaculture. In 1998, he obtained a doctorate degree from the Institut national polytechnique in Toulouse, France. Since 1991, he has been the general manager of ACO, which he has established. Shérif Sadek has been nominated as a consultant for different projects in North Africa and in the Arab countries. Since 2010, he has been a partner and the general manager of the Franco-Egyptian mariculture company Egymarine Co., in the Manzala lake, Egypt. He has published around 30 complete scientific papers in different international journals and presented 35 short papers in different international aquaculture conferences. In addition, Shérif Sadek has been nominated as vice-president of two Egyptian NGOs: the Egyptian Aquaculture Society and the West Port-Said Aquaculture Cooperative.

Michela Cariglia – Tortuga srl and Consorzio Gargano Pesca, Italy

Michela Cariglia has been a fish farmer since 1997 and she is the chief executive officer of Tortuga srl and Consorzio Gargano Pesca. She has experience in research and development and she has carried out research on the reproduction on sea urchins and oysters. She has also created a fashion line with seabass and seabream fish skin. In 2008, she won the prize "Young ideas changing Italy" issued by the Italian Department for Youth Policies. She is also a shareholder in the aquaculture company Panittica Italia.

Ílhan Aydin – Central Fisheries Research Institute, Turkey

Ílhan Aydin is currently director of the Central Fisheries Research Institute of the General Directorate of Agricultural, Research and Policy at the Ministry of Food, Agriculture and Livestock of Turkey. After having studied at the Faculty of Agriculture of the Atatürk University, he obtained, in 2008, a master degree from the Rize University, Institute of Science, Department of Aquaculture. In 2011, he obtained a PhD at the Karadeniz Technical University, Department of Fisheries Technology and Engineering and became, in 2013, an associate professor at the Üniversitelerarası Kurul Başkanlığı. He has published many papers and collaborated in several projects.

Advancing aquaculture innovations

Javier Ojeda
General secretary
Asociación Empresarial de Productores de Cultivos Marinos (APROMAR)
Spain

1. BACKGROUND

In terms of its development, aquaculture in the Mediterranean and Black Sea region is a relatively nascent activity. Although the industry is at varying stages of advancement throughout the region, the improvement of production technologies and systems is still a priority today for both the traditional and the most modern types of aquaculture. Furthermore, there is a need to make farming practices more efficient, to adapt to new societal demands in connection with environmental protection, quality and food safety issues and, more generally, to face the challenges of developing a sustainable sector.

In spite of their apparent simplicity, finfish and shellfish aquaculture are complex activities. To begin with, both of these types of aquaculture are developed in water, an environment which is hostile to humans and aggressive on equipment. Furthermore, the biology of aquatic species is far more complex than that of terrestrial animals. All these circumstances make aquaculture development a special challenge that requires sound and science-based knowledge that is acquired through RTD.

From an economic perspective, innovation is a critical aspect of competitiveness and this applies both to individual farmers and to the industry as a whole. Moreover, innovation is necessary to enhance the position of aquaculture with regards to other users of the same spaces and to comply with increasingly stringent legal and regulatory frameworks. Innovation in aquaculture tends to revolve around equipment, systems, feeds, veterinary treatments and product quality. However, other less obvious fields should also be given consideration, such as environmental interactions, management, marketing, socio-economics, governance, knowledge management and social responsibility; fields that were identified by the GFCM in the creation of the Aquaculture Multi-Stakeholder Platform (AMShP; GFCM, 2014) and that were previously flagged by both the AQUAMED project[23] (AQUAMED, 2013) and EATiP (EATiP, 2012). The focus of innovation is varied and in line with the different farmed species and the aquaculture sector level of maturity and structure in the country in question. The specificities of each aquaculture subgroups are also to be taken into consideration. For example, in order to meet the criteria for high water quality, shellfish production requires either governance-related planning innovations (European Parliament, 2014) or innovative integrated multitrophic aquaculture systems.

This document describes the state of aquaculture in the Mediterranean and the Black Sea with respect to innovation in farming technologies, market-driven research and production efficiency. It offers insight into various approaches to knowledge management, knowledge transfer, research priorities, regional cooperation, extension and education. This paper is not intended to serve as an exhaustive review of the issues in question, rather it offers a high-level glimpse.

[23] AQUAMED (The future of research on aquaculture in the Mediterranean region) is an aquaculture project with 18 partners and associated partners from 16 European and non-European countries from the Mediterranean region. It is funded under the Seventh Framework Programme of the European Commission.

2. MAIN ACTORS AND ISSUES AT STAKE

At present, 115 scientific institutions are actively involved in aquaculture throughout the Mediterranean region. Between 2005 and 2010, 547 research projects were carried out in the Mediterranean, the majority of which took place in France, Italy and Spain and had only a national focus. The number of research projects developed over that period is reported to have exhibited an overall downward trend (AQUAMED, 2013).

However, it is important to highlight that a significant part of aquaculture RTD that is carried out in the Mediterranean region is driven directly by aquaculture producers or their suppliers. Within the EU, structural funds schemes for fisheries such as the Financial instrument for fisheries guidance or the European Maritime and Fisheries Fund have contributed to financing these innovation ventures. The results of this industry-led RTD efforts tend to be effective and focused, but its available human and economic resources are limited. A typical marine fish hatchery in the Mediterranean spends about 5 percent of its revenues in RTD for innovation and on-growing fish farms can spend an average of 1 percent for this purpose. Nevertheless, the main private stakeholders investing in RTD are feed manufacturing companies. By striving to improve the use of raw materials and to discover suitable alternatives to the utilization of marine resources, these companies address some of the main challenges facing sustainable aquaculture.

Cooperation on RTD between research institutes and aquaculture companies is frequent but considered insufficient. Effective paths for the transfer of new knowledge between these sectors is an issue, but the influence that the industry wields on the selection of research topics by these institutes is of even more concern.

The above-mentioned AQUAMED project is the most recent example of scientific cooperation on aquaculture research in the Mediterranean and the Black Sea. This initiative has enabled southern and eastern Mediterranean countries to collaborate with their EU counterparts in order to reach consensus on research needs and priorities. This has led to the preparation of a plan of action for the Mediterranean aquaculture, validated by stakeholders, and has served to better coordinate research activities, identify synergies between stakeholders, establish a network of partners and prepare the ground for transnational joint activities in Mediterranean aquaculture through a multi-stakeholder platform (AQUAMED, 2013).

EATiP is another example of cooperation between a wide range of aquaculture producers, scientists, civil society organizations and other stakeholders (EATiP, 2012). The European aquaculture industry, which is the driver of this initiative, has also defined research priorities for the growth, competitiveness and sustainability of both finfish and shellfish farming. EATiP has produced a vision document and a strategic agenda with the objective that the European aquaculture sector will be sustainable and globally competitive by 2030.

Other actors influencing aquaculture RTD in the Mediterranean region are the FEAP, the EAS and the European Mollusc Producers Association (EMPA). The FEAP represents the European aquaculture industry and has 26 members from 22 European states; the EAS brings together individuals and companies to build a network of contacts, share and disseminate information and promote multidisciplinary research; and the EMPA represents the interests of the EU shellfish aquaculture producers.

Existing geopolitical differences between the northern, southern and eastern countries that border the Mediterranean and the Black Sea – combined with the lack of funds for cooperative and transnational research in the region – have resulted in the establishment of very few international frameworks for RTD in aquaculture. One of these exceptions is the CIHEAM, which was founded in 1962 as a joint initiative of the OECD and the Council of Europe. The mission of CIHEAM is two-fold: providing supplementary education, on the one hand, and developing a spirit of international

cooperation between Mediterranean agricultural practitioners (including aquaculture), on the other.

The GFCM should also be considered within this context given that it was established as a regional fisheries management organization under the provisions of Article XIV of the FAO and it is therefore the only de jure legal framework for fisheries and aquaculture cooperation in the Mediterranean and the Black Sea. The purpose of the GFCM is to "promote the development, conservation, rational management and best utilization of living marine resources in the region, as well as the sustainable development of aquaculture". Its activities also include encouraging, coordinating and undertaking research and development activities, including cooperative projects, as well as training and extension activities. Within the GFCM, there is a specific subsidiary body dedicated to aquaculture called the Scientific Advisory Committee on Aquaculture (CAQ). The CAQ was established in 1995 to promote the sustainable development and responsible management of marine and brackish water aquaculture in the Mediterranean and the Black Sea and to provide technical advice to the GFCM on aquaculture common standards, norms, guidelines and decisions. In 2007, the CAQ regrouped its subsidiary bodies to work more efficiently towards addressing aquaculture sustainability in all its dimensions (environmental, economic, social and governance).

Throughout 2014, the CAQ has been instrumental in fostering regional cooperation and establishing research networks through, *inter alia*, the activities of ad hoc thematic working groups and the implementation of regional projects. Its cooperation with IUCN has also been instrumental in creating solid aquaculture networks. After the AQUAMED project, the GFCM has worked on designing and launching the AMShP. The objective of the AMShP is to support the activities undertaken by the GFCM in the field of aquaculture in order to facilitate a wider involvement of aquaculture stakeholders and to contribute to the technical advice provided by the CAQ to the GFCM on promoting sustainable aquaculture development in the Mediterranean and the Black Sea (GFCM, 2014). This platform will play a vital role in knowledge sharing, mobilizing human and financial resources, providing guidelines for supporting decision-making processes in aquaculture, facilitating research cooperation, advancing efforts to coordinate research and development initiatives and promoting the creation of projects for overcoming bottlenecks in aquaculture development. The AMShP builds upon the major outputs and results achieved by the aforementioned AQUAMED project and other GFCM projects on aquaculture, such as InDAM[24], SHoCMed[25], LaMed[26], MedAquaMarket[27] and SIPAM[28].

3. PREVIOUS EXPERIENCES

Apart from RTD carried out directly by the aquaculture industry, including its suppliers, the majority of aquaculture-related RTD in the Mediterranean and the Black Sea area is done by universities and institutes that also offer training and advice. Almost all of them have a national focus and only a few are international in nature (AQUAMED, 2013). At the Mediterranean and Black Sea level, the EU provides the best examples of frameworks and instruments for transboundary cooperation on RTD and innovation. The Framework Programmes for Research and Technological Development, also called Framework Programmes or abbreviated FP1 to FP7, are

[24] Indicators for Sustainable Development of Aquaculture and Guidelines for their use in the Mediterranean

[25] Developing siting and carrying capacity guidelines for Mediterranean aquaculture within aquaculture appropriate areas.

[26] Strengthening cooperation on fisheries and aquaculture management in the Mediterranean and the Black Sea (component 1: Fisheries laws and regulations in the Mediterranean and the Black Sea; component 2: Mediterranean coastal lagoons management: interactions between aquaculture and capture fisheries.

[27] Development of a strategy for the marketing and promotion of Mediterranean aquaculture.

[28] Information System for the Promotion of Aquaculture in the Mediterranean.

funding programmes created by the European Commission to support and foster research. The specific objectives and actions vary between funding periods. In FP6 and FP7, the focus was on technological research, while in the new Horizon 2020 initiative, the focus is on innovation, delivering more rapid economic growth and providing solutions to end users.

Under the FP7, special reference should be made to the project Aquaculture infrastructures for excellence in European fish research (AquaExcel). Although not specifically focusing on the Mediterranean, this project is related to aquaculture RTD. The aim of this project is to integrate key aquaculture research infrastructures across Europe in order to promote their coordinated use. AquaExcel has also been credited with pioneering new technical training courses that focus on different aspects of aquaculture experimentation, putting emerging aquaculture infrastructure centres of excellence at the forefront.

In recent years, the GFCM has carried out a number of projects funded by the Governments of Spain and Italy as well as by the EU. Such projects include namely:

- MedAquaMarket – focusing on better understanding the market trends in the aquaculture sector and investigating strategic issues related to aquaculture for the main finfish marine species farmed in the Mediterranean;
- InDAM – developing a methodology and a minimum set of regional and specific national indicators for monitoring the development of aquaculture and improving communications among stakeholders; and
- LaMed – advancing the conservation of traditional aquaculture and artisanal capture fisheries, the prevention of any further degradation of coastal lagoons and the restoration of the environment.

The implementation and outcomes of these activities and projects have created a unique opportunity to improve knowledge sharing in the region, in particular in the south of the Mediterranean region. One notable by-product of this was the possibility to establish multidisciplinary networks of experts (economic, environmental and social) featuring the involvement at different levels of stakeholders from administrations, research institutions and farms.

4. GOOD PRACTICES AND LESSONS LEARNT

There are four examples of innovation breakthroughs in the history of Mediterranean aquaculture that deserve to be recognized as landmarks for the development of this industry. Three of them featured positive results and one less so; however, all of them offer lessons to be learned.

1) The two main aquaculture fish species produced in the Mediterranean and the Black Sea are the European seabass (*Dicentrarchus labrax*) and the gilthead seabream (*Sparus aurata*). The first bottleneck faced was learning to feed the early life stages of both fish with appropriately-sized preys. The challenge was solved through the use of live rotifers (even though rotifers were never a prey for wild seabass and seabream larvae).
2) Mass production of seabass and seabream larvae was fuelling the farming of these two species. However, not all juvenile fish were at the expected level of quality, due to a skeletal deformity mainly related to the absence of a functional swimming bladder. Intense research determined that the non-functionality of the swimming bladder had to do with the presence of a very thin layer of oil on the surface of the water that impeded the larvae from gulping a first bubble of air. A very simple technology was then smartly developed to clean the water surface with a basic air-driven skimmer. This second innovation was the definitive leap forward for mass production of seabass and seabream juveniles throughout the Mediterranean region.

3) A third innovation had to do with offshore technology for growing out seabass, seabream and other species like meagre (*Argyrosomus regius*) up to the market size. As a result of its rapid growth, the Greek aquaculture industry required more sites. At the same time, in Turkey, new environmental regulations obliged the movement of cages further offshore. In countries like Italy, Spain, Tunisia and France, coupled with the inexistence of sheltered coastal areas, there was a pressing need to engineer innovative solutions for offshore cages. After several unsuccessful attempts, the system of cages – a mooring, a structure grid and anti-current rings – was devised and is still in use today. These structures are able to withstand storms, winds, waves and currents; they are relatively easy to manage and are affordable. This system is today perfectly adapted to Mediterranean environmental conditions. More sophisticated cage systems are available but they come at a higher price and are more complicated to manage.
4) This is the example, as mentioned above, of a relevant RTD effort that has led to little practical results. The issue of diversification of species in aquaculture is important and is permanently on the research agenda. In the Mediterranean, plans have been proposed to diversify the seabass and seabream industry with species such as white seabream (*Diplodus sargus*), red porgy (*Pagrus pagrus*) and some other similar fish. Well-driven research resolved the biological challenges that their production required, but their production has remained marginal. However, all these species shared similar marketing characteristics with seabass and seabream, such as their size and shape, and were therefore almost perfect substitute species for the same target markets. Since then, farmers have preferred not to outcompete themselves and opted to continue producing the species they master and benefit from economies of scale. Although diversification is still necessary, a more careful selection of new candidate species has to be performed (Diversify, 2014).

Besides these four examples of innovation, aquaculture development in the Mediterranean and the Black Sea has also been made possible by resolving multiple other issues. This has led to the present development of intensive marine aquaculture, a development which is supported by an improved understanding of the species biology, technology, improved feeds and better husbandry practices. In some coastal areas, extensive farming of finfish and shellfish are carried out in parallel. These producers combine traditional knowledge with modern practices that assure exploitation in an environmentally-responsible manner and represent a vital element of local economic communities; this is the case in some lagoons and estuarine areas, where extensive fish farming and mollusc culture are traditional activities.

Sharing knowledge and production good practices in Mediterranean and Black Sea countries is essential for the sustainable development of this industry. The underlying principle here is that what is done in an aquaculture sector in one country affects the aquaculture industry in other countries. This is true for issues such as species health, environmental impacts or markets. Mediterranean experiences that cover the whole Mediterranean are rare. From 2005 to 2008, an interesting initiative, driven by IUCN and coordinated by the Observatorio Español de Acuicultura, with the financial support of the General Secretariat of Marine Fisheries of the Spanish Ministry of Agriculture, Fisheries and Food, involved experts from almost all the Mediterranean countries and provided an excellent example of cooperation in aquaculture best practices. The outcome of this initiative was a set of guiding documents on interactions between: aquaculture and the environment; site selection and site management; and responsible practices and certification. These guides are recognized today as reference documents (IUCN, 2007).

It is important to regularly revise the work carried out by AQUAMED on the basis of a collective synthesis (i.e. research, industry and public administration) of the

research needs that are necessary to meet in order to overcome the regional constraints identified. This can be achieved through a constant dialogue among stakeholders. The AMShP could be the forum for this regional dialogue.

5. DISCUSSION POINTS

Refining RTD needs and identifying their geographical scope

Building on the available results of AQUAMED and of other GFCM and EATiP projects on aquaculture, the ultimate bottlenecks in Mediterranean and Black Sea aquaculture need to be precisely outlined in order to improve its efficiency and unlock its potential. Additionally, the geographical scope of each bottleneck needs to be identified (farm, national or regional level) in order to appropriately search for solutions. Identification of the geographical level is also essential in promoting stakeholder cooperation. Although certain challenges transect the entire industry (e.g. fish health, vaccines, environmental mitigation, biomass counters, etc.), neighbouring farmers and countries compete with each other. Mediterranean aquaculture cannot be realistically expected to address global aquaculture challenges, such as finding suitable alternatives in fish feeds to fish meal and fish oil, on its own.

Some challenges are easy to spot, but the identification of production bottlenecks is typically hard given the lack of appropriate production benchmarking between farms. Due to the very limited nature of communications between aquaculture companies, individual farm managers are unable to know whether or not a problem they are experiencing is unique to their facility. Scientific and industry-wide benchmarking is essential for innovation, as recently acknowledged in a workshop entitled "Performance of the seabass and seabream sector" of the Aquaculture Europe 2014 Conference (San Sebastian, Spain, October 2014). The recognition of the insufficient improvement of the biological performance of the seabass and seabream sector (in food conversion ratios, in survival rates and in growth rates) is an example of a pan-Mediterranean key issue that has remained unnoticed for many years (EAS, 2014).

Prioritization of RTD challenges should consider the needs of the industry, public administrations and especially society. Specific topics to consider include environmental externalities, food security, animal welfare and worker safety.

Encouraging farmers and researchers to work together

Getting researchers and the industry to work together on RTD is a challenge in most fields. In general, the working frame of scientists, researchers and academics differs in both timelines and professional incentives. Furthermore, both have different expectations with regards to the confidentiality of RTD outcomes. Although there are exceptions, this mismatching occurs in most Mediterranean and Black Sea countries. The solution to this scenario is complex but needs to be approached.

A transboundary approach is necessary to overcome most bottlenecks in regional aquaculture RTD activities. At present, there are no clear north–south cooperation research programmes. At the national level, there is a need to promote synergies between research programmes, to promote the participation of the industry in them and to encourage information sharing.

Financing RTD and innovation

Financing RTD programmes is a key component in the promotion of innovation, especially when dealing with transboundary or Mediterranean-wide problems.

There are currently very few RTD schemes that allow for pan-Mediterranean cooperation. Nevertheless, it is generally accepted that most aquaculture challenges in the Mediterranean and the Black Sea have a regional extension.

Efforts should be made to ensure that research initiatives are not duplicated or fragmented. In line with this, there is a need to complete and maintain an updated

inventory of research facilities across the countries and to identify the key facilities of excellence in different fields of aquaculture research at the regional level. As identified by AQUAMED, key projects for research centres also require continuous updating.

Communication of RTD outcomes

RTD processes are only fruitful if their outcomes can be effectively transferred and disseminated for innovation. For this, efficient networks need to be established and maintained in order to strengthen the dialogue between research, policy-makers, industry and society.

Aquaculture workers should receive appropriate training and lifelong education in order to increase their talent and working qualifications.

Farmer organizations can play a crucial role in transferring technology and development across the industry and bridging the gap between farmers and researchers.

The recently-completed Euroshell project (FP7) identified strategies and best practices examples for a pan-European shellfish extension network as well as national and local requirements.

6. KEY MESSAGES TO THE CONFERENCE

- **Identification of specific RTD needs** – Several initiatives such as the AMShP, AQUAMED and EATiP have identified the main strategic research and innovation areas for aquaculture in general. Nevertheless, specific RTD topics for the Mediterranean and Black Sea aquaculture remain to be refined and linked to the most appropriate geographical scope in order to facilitate the effective collaboration of stakeholders through a common research strategy.
- **Fostering cooperation between researchers and the industry** – Appropriate Mediterranean- and Black Sea-wide RTD schemes are to be designed and established, with a particular emphasis on strengthening north-south collaboration. The AMShP could serve as the appropriate forum for coordinating this effort and offering space for networking and strengthening the dialogue between researchers, the industry and policy-makers. Preference should be given to multiannual schemes.
- **Financing RTD and innovation** – The limited availability of public funds for RTD requires an effective process for prioritizing research needs and ensuring social accountability of their results. National authorities should also encourage farm-level RTD activities, for example by offering incentives to companies that can certify in-house RTD expenses and by facilitating collaboration between scientists and farmers. The latter approach could be taken into consideration particularly when research innovations are planned in support of a green economy.
- **Communicating RTD outcomes** – Effective dissemination of research outcomes is required for their optimal application. A common strategy on specific dissemination programmes through cooperation and networking in the Mediterranean and Black Sea region should be established.

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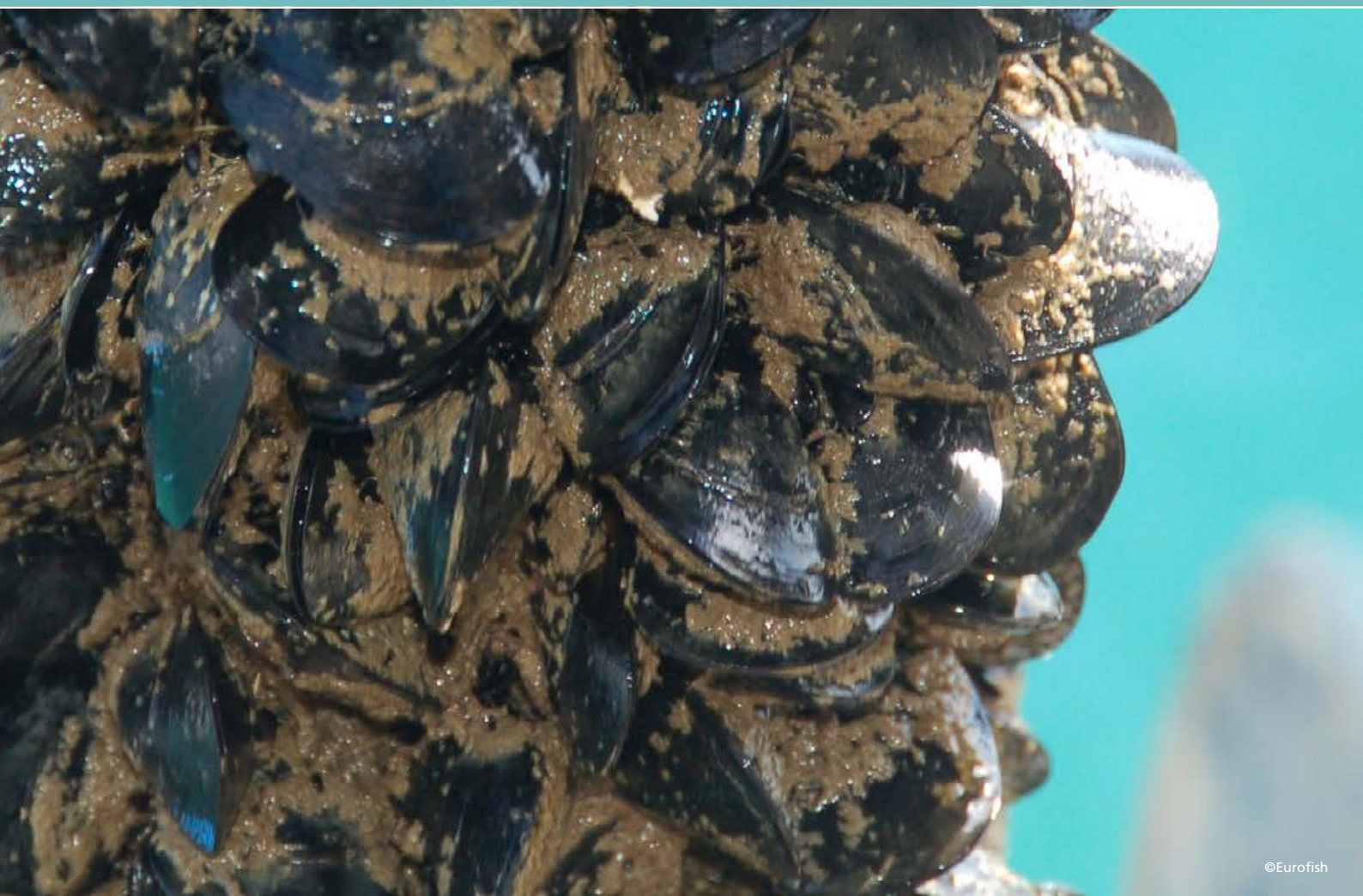
Conclusions



Conclusions
Regional Conference "Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security"

Aquaculture is a key component of the Blue Growth Initiative of the Food and Agriculture Organization of the United Nations (FAO), due to its potential for sustainable socio-economic growth, food security and employment.

Relevant international and regional instruments calling for the sustainable development of aquaculture include: the 1992 Rio Declaration on Environment and Development and Agenda 21; the 1995 FAO Code of Conduct for Responsible Fisheries; the 2000 Bangkok Declaration and Strategy for Aquaculture Development Beyond 2000; the 2009 FAO Declaration of the World Summit on Food Security; the 2010 Phuket Consensus: a re-affirmation of commitment to the Bangkok Declaration; and the 2012 United Nations Conference on Sustainable Development as well as its outcome document "The Future We Want".

The thirty-first session of the Sub-Committee on Aquaculture of the FAO Committee on Fisheries (St. Petersburg, Russian Federation, 2013) outlined priorities including the need for bilateral, multilateral and regional cooperation to support the global advancement of aquaculture and the implementation of an ecosystem approach to aquaculture.

The preparatory activities carried out at the regional level in 2012–2013, the outcomes of projects, regional expert consultations and meetings and the Aquaculture Reflection Day organized by the General Fisheries Commission for the Mediterranean (GFCM) in Tunis, Tunisia, in 2013 have laid the foundations for establishing the GFCM Aquaculture Multi-stakeholder Platform (AMShP). At its thirty-eighth session (FAO headquarters, May 2014), the GFCM welcomed the AMShP as an instrument to enhance dialogue and facilitate the visioning, priority-setting and consultation processes in the Mediterranean and Black Sea region.

Within this framework, the Italian Presidency of the Council of the European Union, together with the GFCM of the FAO and the European Commission, organized a regional conference entitled "Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security" in Bari, Italy, on 9–11 December 2014. The aim of this conference was to reaffirm the importance of aquaculture into achieving food security and promoting sustainable development. The conference participants discussed strategies for sustainable aquaculture development at the regional level in light of emerging economic, social and environmental issues, and taking into account advances in aquaculture innovation.

GENERAL CONCLUSIONS

The conference recognized the following:

- Aquaculture offers great potential of providing sustainable sources of seafood products. As such, it plays a major role in achieving food security, employment and economic development at the global level. It constitutes therefore a strategic sector for future development, in particular from the perspective of blue growth.
- The unique aquatic ecosystems of the Mediterranean and the Black Sea are confined within a semi-enclosed area, where highly diversified human activities, which are driven by market demand, take place.
- The complexity and specificities of aquaculture across the Mediterranean and the Black Sea, which consists of various culture systems at varying stages of development, require differentiated strategies for growth.
- A high level of integration of aquaculture with the environment should be pursued to the greatest possible extent since a healthy environment is necessary for this activity.
- The complex and overlapping regulatory frameworks for the allocation of zones for aquaculture and the involvement of different national authorities for licensing purposes often result in interactions and conflicts over use with other coastal activities.
- An effective collection of market data, including on consumption patterns and distribution channels, is essential in order to support a market-oriented approach in production and marketing planning and to target aquaculture product diversification and consumer preferences.
- The existence of sustainable interactions between aquaculture and capture fisheries, particularly those pertaining to small-scale fisheries and coastal communities, is an important factor that should be properly considered.
- Effective and timely data collection as well as statistical reporting on aquaculture performed by competent national authorities are pivotal to increase institutional capacity; processes for data sharing and information exchange need to be harmonized to support aquaculture development at the regional level.
- A sustainable industry means ensuring that aquaculture is not only economically and environmentally sustainable but also that aquaculture farms operate in a socially and culturally responsible manner.
- Decision-making must engage a broad array of stakeholders through a participatory process able to facilitate the identification of different issues raised and of possible solutions at the national, regional and interregional level.
- Since aquaculture farmers are the key driving force in aquaculture development, their participation in all relevant fora should be promoted.
- The private sector is a key driving force for the development of aquaculture, and particular attention should be paid to support its participation, including but not limited to public-private partnership initiatives.
- Aquaculture is a bioeconomic activity based on knowledge; research and technology development, together with capacity-building in research and effective knowledge transfer, are therefore essential to progress towards a thriving aquaculture industry.
- National and transnational cooperation, at every level, is a powerful asset and should be further nurtured in order to promote sound aquaculture growth in the Mediterranean and Black Sea region.
- In light of the need to drive forward the process of aquaculture development, FAO and other relevant intergovernmental organizations at the regional level should provide for generally agreed policy directions and technical guidelines while ensuring enhanced transparency and participation.

SPECIFIC CONCLUSIONS RELATED TO THE EXPERT PANELS

Participants in the conference took note of the main conclusions and recommendations of the expert panel discussions.

Panel 1 – Enabling good governance in aquaculture

Conclusions

Following the discussions held within Panel 1, participants drew the following conclusions:

- Enabling good governance in aquaculture is fundamental in achieving sustainable aquaculture development. Good governance principles in aquaculture include participation, accountability, effectiveness, the rule of law, transparency and coherence.
- In many countries, management, planning and licensing fall within the field of competence of numerous administrations, involved both at the national and local level. Coordination to streamline authorization processes (licenses, permits, concessions or leases, etc.) is essential to facilitate aquaculture development.
- There are significant regulatory constraints facing the aquaculture sector. In maritime or inland zones, weaknesses in spatial planning for aquaculture are among the major constraints for aquaculture development in the region. Introducing planning and site selection processes, according to the principles of allocated zones for aquaculture defined by the GFCM, is crucial for aquaculture growth.
- Participatory approach and regional cooperation frameworks are essential for the development of the regional aquaculture sector. Such an approach complies with good governance principles, facilitates stakeholder participation, reduces possible conflicts in coastal area management and promotes a cost-effective approach to site selection.
- Soft law instruments are recognized as useful tools to strengthen aquaculture governance in the region.
- Good labour conditions are recognized as a priority in aquaculture to guarantee decent employment of aquaculture farm workers in the whole region.

Recommendations

In light of Panel 1 discussions and conclusions, participants put forward the following recommendations:

- The regional aquaculture industry should be developed taking due consideration of sustainability and with a view to reconciling economic, environmental and social issues of concern.
- Conducive legal and administrative frameworks should facilitate aquaculture development. These should cover in particular: principles, property rights over production sites, licensing processes, guarantees for concessions or permits, etc.
- Better coordination should be ensured among relevant administrations to develop effective and efficient authorization processes. In this respect, removing existing legal and bureaucratic obstacles while increasing the cost-effectiveness of aquaculture activities is necessary.
- Good governance should rely on soft law tools such as self-regulation and general user-friendly guidelines based on common criteria for site selection, environmental management or common requirements for allocated zones for aquaculture.
- A participatory approach is recommended to ensure representation and consultation in the decision-making process. This approach should include,

inter alia, clear access to information, discussion fora and appropriate channels to foster participation.
- Increased coordination among countries in the region and the direct involvement of all relevant actors, including the private sector and civil society organizations, through institutional and technical capacity development, are essential.
- The governance framework for the management and development of aquaculture should ensure that environmental impacts are minimized, by incorporating procedures to undertake environmental impact assessment prior to the establishment of aquaculture facilities and guaranteeing a monitoring on effluents, the use of drugs and chemicals as well as on other related activities that might adversely affect the surrounding land or water.
- Based on the ILO Declaration on Fundamental Principles and Rights at Work and its Follow-up, coherence should be promoted in policies for sustainable aquaculture development, with particular reference to the implementation and enforcement of internationally recognized labour standards.
- Clear and simplified authorization and licensing procedures should be considered for small-scale and medium enterprises. In this respect, the creation of a one-stop shop and fast-tracking procedures could represent a valid solution. The GFCM is invited to lead a wide consultative process on developing regional guidelines for the simplification of administrative procedures.

Panel 2 – A healthy environment, a stronger aquaculture industry

Conclusions

Following the discussions held within Panel 2, participants drew the following conclusions:
- The unique aquatic ecosystems of the Mediterranean and the Black Sea are confined within a semi-enclosed area where highly diversified human activities take place. The interactions between aquaculture and the environment are complex, with positive aspects as well as negative impacts.
- Aquaculture–environment interactions occurring at the local level have consequences at a local, national, regional and global scale due to the physically continuous nature of aquatic ecosystems. This calls for a regional approach in addressing and monitoring aquaculture effects on biodiversity and ecosystems.
- Sustainable aquaculture development requires a sound site selection process; this includes the use of allocated zones for aquaculture, site carrying capacity and vulnerability assessments. These processes should involve all stakeholders, in particular local communities, in order to increase social acceptability.
- Sustainable aquaculture should duly consider the challenges posed by climate change and associated phenomena such as ocean acidification, which will have increasing impacts on the sector.
- Key aspects concerning aquaculture–environment interactions also embrace responsible feed production and management, aquaculture relationships with marine protected areas, disease and escapee effects on wild populations as well as the "sentinel" role of aquaculture, all of which deserve further attention and research.
- Strategically combining the farming of shellfish and fish in a given area would contribute to maintain an environmental balance.
- Aquaculture in the region can be an integral part of local ecosystems; it may carry a number of biosecurity and health concerns that can pose risks and hazards to its own development and management as well as to the aquatic environment and the society.

- Diseases can cause heavy economic losses in farmed fish, molluscs and crustaceans and may affect the growth, competitiveness and sustainability of the aquaculture sector. The lack of available treatments and vaccines for aquatic diseases might further increase the risk of disease spread, environmental impact and economic losses.
- Effective fish health management measures to prevent and control diseases at the regional level are based on sound epidemiological knowledge of pathogenic agents in farmed and wild fish populations; this requires cooperation in sharing information among countries.
- Aquaculture biosecurity consists of practices, procedures and policies to prevent the introduction and spread of infectious and parasitic diseases in aquatic species.

Recommendations

In light of Panel 2 discussions and conclusions, participants put forward the following recommendations:

- National institutions should be strengthened and their involvement should be solicited to ensure that they play a more active role in addressing aquaculture aspects related to environment, climate change, responsible fish feed production and management, human and aquatic animal health, biosecurity, labour and industry.
- Harmonized environmental regulatory and monitoring frameworks, including environmental impact assessment and environmental monitoring programmes, should be implemented together with specific indicators within an ecosystem-based management approach to aquaculture.
- Aquaculture better management practices should be developed, widely disseminated and implemented at the local and regional levels.
- The use of risk analysis in aquaculture – including risk assessment, management and communication to assess aquaculture–environment interactions as well as the vulnerability of ecosystems and of the ecological services they provide – should be embraced and implemented with equally shared responsibility by both the public and private sectors.
- An assessment of the carrying capacity of potential aquaculture sites should be carried out systematically; this should also consider the cumulative effects from all activities.
- A particular focus on interactions between capture fisheries and aquaculture is necessary at all levels addressing, among other things, natural resources, fish stocks and socio-economic aspects.
- A harmonized and common approach to strengthen the surveillance system should be implemented at the regional level, taking into account the standards set by the World Organisation for Animal Health.
- Record-keeping and information sharing through the creation of a database system to monitor the health status of farmed stock may help farmers to prevent and control diseases.
- The implementation of effective biosecurity measures at the farm level should be based on education, extension and continuous training of aquaculture operators.

Panel 3 – Boosting markets for aquaculture

Conclusions

Aquaculture in the Mediterranean and the Black sea contributes to food security, employment and trade in the region. To further enhance such contribution, aquaculture should be market-driven, consumer-responsive and should address challenges such as: increasing consumer awareness of quality, seafood safety, freshness, traceability, animal welfare and sustainability.

Against this backdrop, aquaculture market/marketing, data/information collection and dissemination schemes, image-building, local consumption promotion, value chains, use of information and communication technologies, the role of retailing sector and aquaculture farmers organizations, were among the key issues addressed and discussed within Panel 3.

Following the discussions held within Panel 3, participants drew the following conclusions:

- A shift from a production-oriented growth to a market-oriented and consumer-responsive approach can contribute to job creation, improved seafood trade and aquaculture development in the Mediterranean and the Black Sea.
- Common standards (e.g. codes of conduct/good practices) or harmonized standards at the regional level could be beneficial in promoting responsible aquaculture practices in the region.
- Aquaculture farmers organizations play a crucial role in sustainable aquaculture development in the region.
- The image of Mediterranean and Black Sea aquaculture could be further enhanced.
- Shellfish farming is an integral part of aquaculture in the region; it bears great socio-economic benefits and environmental services.
- Promoting domestic consumption can boost markets for Mediterranean and Black Sea aquaculture products.

Recommendations

In light of Panel 3 discussions and conclusions, participants put forward the following recommendations:

- The collection and dissemination of market/trade data and qualitative information on consumer preferences and behaviours should be ensured in order to facilitate market-oriented aquaculture development in the region.
- Responsible aquaculture practices (e.g. codes of conduct or good practices) based on common minimum standards at the regional level should be promoted in order to respond to societal consumer concerns and enhance aquaculture's image, among other things.
- The role of aquaculture farmers organizations should be enhanced to facilitate collective and proactive actions through harmonized legislation and stronger political will.
- Domestic consumption of aquaculture products should be promoted by public administrations and by the industry through effective and coordinated communication campaigns, highlighting the non-price attributes of aquaculture products (e.g. freshness) and the Mediterranean diet.
- The market for shellfish products should be boosted by promoting their nutritional aspects and added value; this would increase profit margins and ensure the financial sustainability of the industry.
- The GFCM is invited to gather success stories aimed at improving the image and acceptability of aquaculture products, to set up a mechanism for real time monitoring of market conditions and to strengthen regional databases on aquaculture.

Panel 4 – Advancing aquaculture innovations

Conclusions

Following the discussions held within Panel 4, participants drew the following conclusions:

- Research and technological development (RTD) is fundamental for the sustainable development of aquaculture. Innovation is a critical aspect for competitiveness; however, it can be multifaceted according to the different species farmed, the level of maturity and the structure of the sector in each country.

- Aquaculture production (e.g. fish growth and mortality, feed efficiency, etc.) is strongly linked to the technologies in place and to their performance.
- Investments in aquaculture research and development to foster technology innovation and the improvement of production systems in the region are essential.
- It is essential to align industry objectives with RTD capacity, policy support and administration mechanisms that can clearly demonstrate the impacts of innovation.
- Although innovation challenges are a cross-cutting feature of the whole industry in the region, there is a need to identify more precisely the main bottlenecks in Mediterranean and Black Sea aquaculture in order to improve its efficiency and unlock its potential. In this respect, the geographical scope of each bottleneck should be determined (i.e. individual farming company level, national level or regional level) so that appropriate solutions can be identified.
- To prioritize RTD challenges, it is essential to take into account the actual needs of the industry, public administrations and stakeholders. This prioritization process should also take into consideration, *inter alia*, the benchmarking of production performance.
- One of the main challenges for RTD in the region is cooperation and exchange between research and industry. Scientists, researchers and academics generally work with different timings and professional incentives compared to those that prevail in the industry.
- There are different expectations with regard to RTD outputs and the objectives of applied research sometimes do not match producers' needs and expectations. Clear definitions of success criteria are therefore essential. Innovation in the Mediterranean and the Black Sea may also require new approaches and the commitment of the actors in the sector, at various levels.
- At the regional level, north–south cooperation in research programmes is based on the acceptance of problems and issues that can be resolved by better aligning sectoral needs with research infrastructure, competences and capacity-building in research.
- National and mirror platforms of aquaculture stakeholders are useful instruments to facilitate the sharing of scientific data, information and know-how. Regional, national and local platforms need to identify the most appropriate resources and strategies to fill the gap between RTD providers and the sector.

Recommendations

In light of Panel 4 discussions and conclusions, participants put forward the following recommendations:

- Specific RTD topics for Mediterranean and Black Sea aquaculture should be refined and linked to an adequate geographical scope in order to ensure effective coordination between stakeholders and the development of common research strategies. Each topic requires an action plan that ensures timing, duration, financing and outputs.
- Appropriate Mediterranean and Black Sea-wide RTD schemes should be established and north–south collaboration should be strengthened. In this respect, the AMShP can provide an appropriate framework for coordinating efforts and offer room for networking and strengthening dialogue between researchers, industry actors and policy-makers. The role of platforms and structures at all levels is essential to identify needs, address challenges and transfer knowledge; this can lead to a level playing field throughout the region.
- The role of farmers associations across the region should be strengthened and synergies should be promoted between research programmes at the national level. In this respect, the GFCM should play a facilitating role in consolidating this approach while leaving space for stakeholders. For example, this could take

the form of public–private partnerships and groups of economic interest based on clearly defined terms of reference.

- The use of public funds for RTD requires an effective process to prioritize research needs as well as a social accountability for their results. RTD activities should also be encouraged by national authorities at the farm level, providing for instance incentives to companies that able to certify in-house RTD expenses and facilitating collaboration between scientists and farmers. This latter approach could be taken into consideration in particular when research innovations are planned in support of green economy.
- The dissemination of research results is required to ensure their optimal application. A common strategy on specific dissemination programmes based on cooperation and networking in the Mediterranean and the Black Sea region should be set up.
- The GFCM is invited to coordinate efforts towards a regional programme for capacity-building and training for small-scale aquaculture farmers and workers; this should include the launch of pilot studies on relevant RTD issues (e.g. feed, cost-efficiency, valorization, etc.).

Conclusions
Conférence régionale «La croissance bleue en Méditerranée et en mer Noire: développer une aquaculture durable à l'appui de la sécurité alimentaire»

L'aquaculture est une composante essentielle de l'Initiative en faveur de la croissance bleue menée par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), compte tenu du potentiel qu'elle représente pour la croissance socioéconomique durable, la sécurité alimentaire et l'emploi.

Les instruments régionaux et internationaux appelant au développement durable de l'aquaculture comprennent notamment la Déclaration de Rio sur l'environnement et le développement et l'Action 21 de 1992, le Code de conduite pour une pêche responsable de la FAO de 1995, la Déclaration de Bangkok et la Stratégie de développement de l'aquaculture au-delà de l'année 2000, la Déclaration du Sommet mondial sur la sécurité alimentaire promulguée en 2009 par la FAO, le Consensus de Phuket de 2010 réaffirmant l'engagement à suivre la Déclaration de Bangkok ainsi que la Conférence des Nations Unies sur le développement durable de 2012 et son document final «L'avenir que nous voulons».

La trente-et-unième session du Sous-Comité de l'aquaculture du Comité des pêches de la FAO (Saint-Pétersbourg, Fédération de Russie, 2013) a fixé parmi ses priorités la nécessité de mettre en place une coopération bilatérale, multilatérale et régionale afin de favoriser la progression de l'aquaculture au niveau mondial et la mise en œuvre d'une approche écosystémique de l'aquaculture.

Les activités préparatoires menées à l'échelon régional tout au long de la période 2012-2013, les résultats des projets, des réunions et des consultations avec les experts régionaux ainsi que la Journée de réflexion sur l'aquaculture organisée par la Commission générale des pêches pour la Méditerranée (CGPM) à Tunis, Tunisie, en 2013, ont jeté les bases nécessaires à la mise en place de la Plateforme aquacole multi-acteurs de la CGPM. À sa trente-huitième session (siège de la FAO, mai 2014), la CGPM a favorablement accueilli cet instrument destiné à renforcer le dialogue et à faciliter les processus de conceptualisation, d'établissement des priorités et de consultation dans la région de la Méditerranée et de la mer Noire.

Dans ce contexte, la Présidence italienne du Conseil de l'Union européenne, la CGPM de la FAO et la Commission européenne ont organisé, du 9 au 11 décembre 2014 à Bari, Italie, une conférence régionale intitulée «La croissance bleue en Méditerranée et en mer Noire: développer une aquaculture durable à l'appui de la sécurité alimentaire». L'objectif de cette conférence était de réaffirmer le rôle prépondérant de l'aquaculture en matière de sécurité alimentaire et de développement durable. Les participants à la conférence ont débattu des stratégies de développement d'une aquaculture durable au niveau régional à la lumière des problématiques économiques, sociales et environnementales émergentes ainsi que des progrès de l'innovation aquacole.

CONCLUSIONS GÉNÉRALES

La conférence a reconnu les points suivants:

- L'aquaculture offre un potentiel considérable compte tenu de sa capacité à fournir des sources durables de poisson et de produits de la mer, si bien qu'elle joue un rôle majeur dans la sécurité alimentaire, l'emploi et le développement économique au niveau mondial. Elle constitue par conséquent un secteur stratégique pour l'avenir, notamment dans la perspective de la croissance bleue.
- Les écosystèmes aquatiques uniques de la Méditerranée et de la mer Noire sont confinés dans une zone semi-fermée qui accueille une grande diversité d'activités humaines régies par la demande du marché.
- La complexité et les spécificités de l'aquaculture en Méditerranée et en mer Noire, qui comprend divers systèmes de culture ayant atteint des stades de développement variables, requièrent la mise en œuvre de stratégies de croissance différenciées.
- Il convient de rechercher, autant que possible, un degré élevé d'intégration de l'aquaculture avec l'environnement car cette activité a besoin d'un environnement sain.
- La complexité et le chevauchement des cadres réglementaires qui régissent l'affectation des zones à l'aquaculture et la diversité des autorités nationales intervenant dans l'octroi des licences aboutissent souvent à des interactions et à des conflits d'utilisation avec d'autres activités côtières.
- Une collecte efficace de données sur le marché, y compris celles concernant les habitudes de consommation et les circuits de distribution, est essentielle pour soutenir une démarche de planification de la production et de la commercialisation axée sur le marché ainsi que pour cibler la diversification des produits aquacoles et les préférences des consommateurs.
- L'existence d'interactions durables entre l'aquaculture et la pêche de capture, en particulier en ce qui concerne la pêche artisanale et les communautés côtières, est un facteur important qui doit être dûment pris en compte.
- Une collecte des données efficace et assurée en temps opportun ainsi que des rapports statistiques sur l'aquaculture élaborés par les autorités nationales compétentes sont déterminants pour renforcer les capacités institutionnelles; il convient d'harmoniser les procédures de partage des données et d'échange d'informations afin de soutenir le développement de l'aquaculture au niveau régional.
- Pour faire de l'aquaculture une industrie viable, il convient de veiller à ce qu'elle soit durable du point de vue économique et environnemental, mais aussi à ce que les fermes aquacoles soient exploitées de manière socialement et culturellement responsable.
- La prise de décision doit associer un large éventail de parties prenantes au travers d'un processus participatif permettant de faciliter l'identification des différentes problématiques qui se posent et des solutions envisageables au niveau national, régional et interrégional.
- Les exploitants aquacoles sont le principal moteur du développement de l'aquaculture, c'est pourquoi il convient de promouvoir leur participation à toutes les instances de discussion concernées.
- Le secteur privé est un moteur essentiel du développement de l'aquaculture et il convient donc de veiller tout particulièrement à encourager sa participation, y compris, mais non exclusivement, au travers d'initiatives de partenariat public–privé.
- L'aquaculture est une activité bioéconomique qui exige des connaissances; c'est pourquoi les activités de recherche et développement technologique ainsi que le renforcement des capacités de recherche et le transfert efficace des connaissances sont indispensables pour évoluer vers une industrie aquacole prospère.

– La coopération nationale et transnationale, à tous les niveaux, constitue un atout puissant et doit être encouragée plus fortement afin de promouvoir une croissance solide de l'aquaculture dans la région de la Méditerranée et de la mer Noire.
– Compte tenu de la nécessité de faire avancer le processus de développement de l'aquaculture, la FAO et d'autres organisations intergouvernementales concernées au niveau régional doivent proposer des orientations politiques et des directives techniques faisant consensus tout en veillant à une plus grande transparence et à une participation plus large.

CONCLUSIONS SPÉCIFIQUES DES QUATRE PANELS D'EXPERTS

Les participants de la conférence ont pris note des principales conclusions et recommandations issues des débats des panels d'experts.

Panel 1 – Permettre une bonne gouvernance de l'aquaculture

Conclusions

À l'issue des discussions du Panel 1, les participants ont formulé les conclusions suivantes:

– Permettre une bonne gouvernance de l'aquaculture est un enjeu fondamental pour assurer le développement durable de ce secteur. Les principes de bonne gouvernance de l'aquaculture comprennent la participation, la gestion responsable, l'efficacité, la primauté du droit, la transparence et la cohérence.
– Dans nombre de pays, la gestion, la planification et l'octroi des licences relèvent du domaine de compétence de nombreuses administrations intervenant à la fois au niveau national et local. Une coordination permettant de simplifier les procédures d'autorisation (licences, permis, concessions ou locations, etc.) est indispensable en vue de faciliter le développement de l'aquaculture.
– Le secteur aquacole est confronté à de fortes contraintes réglementaires. Les faiblesses en matière de planification de l'espace aquacole dans les zones marines ou intérieures sont l'une des grandes contraintes qui pèsent sur le développement de l'aquaculture dans la région. L'intégration de processus de planification et de sélection des sites respectant les principes des zones affectées à l'aquaculture définis par la CGPM est cruciale pour la croissance de l'aquaculture.
– L'adoption d'une approche participative et de cadres de coopération régionaux est un facteur clé du développement du secteur aquacole régional. Ce type d'approche est conforme aux principes de bonne gouvernance, facilite la participation des parties prenantes, réduit les risques de conflits dans la gestion des zones côtières et favorise une démarche performante de sélection des sites.
– Les instruments juridiques non contraignants sont reconnus comme des outils utiles permettant de renforcer la gouvernance de l'aquaculture dans la région.
– L'existence de bonnes conditions de travail est une priorité reconnue dans le secteur aquacole pour garantir un travail décent aux travailleurs aquacoles dans l'ensemble de la région.

Recommandations

À la lumière des débats et des conclusions du Panel 1, les participants ont formulé les recommandations suivantes:

– L'industrie aquacole régionale doit se développer en tenant dûment compte des questions de durabilité, afin de concilier les enjeux économiques, environnementaux et sociaux.
– Des cadres juridiques et administratifs favorables devraient faciliter le développement de l'aquaculture. Ceux-ci doivent couvrir notamment les éléments suivants: principes, droits de propriété sur les sites de production, procédures d'octroi des licences, garanties associées aux concessions ou permis, etc.

- Une meilleure coordination doit être assurée entre les administrations compétentes afin d'élaborer des procédures d'autorisation rationnelles et efficaces. À cet égard, il est nécessaire d'éliminer les obstacles juridiques et bureaucratiques existants tout en améliorant la rentabilité des activités aquacoles.
- Une bonne gouvernance doit s'appuyer sur des outils juridiques non contraignants tels que l'autorégulation et des lignes directrices générales aisément compréhensibles fondées sur des critères communs en matière de sélection des sites, de gestion de l'environnement ou d'exigences communes pour les zones affectées à l'aquaculture.
- Il est recommandé d'adopter une approche participative afin de garantir la représentation et la consultation des parties concernées lors du processus décisionnel. Cette approche doit prévoir notamment un accès aisé à l'information, des forums de discussion ainsi que des canaux adaptés afin d'encourager la participation.
- Une coordination renforcée entre les pays de la région ainsi que l'implication directe de tous les acteurs concernés, y compris ceux du secteur privé et les organisations de la société civile, au travers d'un renforcement des capacités institutionnelles et techniques, sont essentielles.
- Le cadre de gouvernance régissant la gestion et le développement de l'aquaculture doit veiller à minimiser les impacts environnementaux en intégrant des procédures permettant d'évaluer les impacts environnementaux préalablement à la mise en place des installations aquacoles et de garantir la surveillance des effluents, de l'usage des médicaments et produits chimiques et des autres activités associées susceptibles d'avoir des effets indésirables sur les terres ou les eaux environnantes.
- À partir de la Déclaration de l'OIT relative aux principes et droits fondamentaux au travail et son suivi, il convient de promouvoir la cohérence dans les politiques en faveur du développement d'une aquaculture durable, en insistant en particulier sur la mise en place et l'application de normes du travail reconnues au niveau international.
- Des procédures d'autorisation et d'octroi de licences claires et simplifiées doivent être envisagées pour les petites et moyennes entreprises. À cet égard, la création d'un guichet unique et la mise ne place de procédures accélérées pourraient constituer une solution valable. La CGPM est invitée à mener un large processus consultatif afin d'élaborer des directives régionales pour la simplification des procédures administratives.

Panel 2 – Un environnement sain, une industrie aquacole plus solide

Conclusions

À l'issue des discussions du Panel 2, les participants ont formulé les conclusions suivantes:

- Les écosystèmes aquatiques uniques de la Méditerranée et la mer Noire sont confinés dans une zone semi-fermée qui accueille une grande diversité d'activités humaines. Les interactions entre l'aquaculture et l'environnement sont complexes et comportent tant des aspects positifs que des impacts négatifs.
- Les interactions entre l'aquaculture et l'environnement au niveau local ont des conséquences à l'échelle locale, nationale, régionale et mondiale en raison de la continuité physique des écosystèmes aquatiques. Il est donc nécessaire d'adopter une approche régionale pour appréhender et surveiller les effets de l'aquaculture sur la biodiversité et les écosystèmes.
- L'aquaculture durable requiert un processus solide de sélection des sites, englobant notamment le recours aux zones affectées à l'aquaculture ainsi que l'évaluation de

la capacité de charge et de la vulnérabilité des sites. Toutes les parties prenantes, en particulier les communautés locales, devraient prendre part à ce processus afin de renforcer l'acceptabilité sociale.
- Une aquaculture durable doit pleinement prendre en compte les défis posés par les changements climatiques et les phénomènes qui y sont associés, tels que l'acidification des océans, dont l'impact sur le secteur sera croissant.
- Les aspects cruciaux relevant des interactions entre l'aquaculture et l'environnement devraient également porter sur la production et la gestion responsables des aliments, les relations entre l'aquaculture et les aires marines protégées, les effets provoqués par les maladies et les fugitifs sur les populations sauvages, ainsi que le rôle de «sentinelle» joué par l'aquaculture. Tous ces aspects méritent que l'on y consacre une attention accrue et des efforts de recherche.
- La combinaison stratégique de la conchyliculture et de la pisciculture dans une zone donnée est à même de contribuer au maintien d'un équilibre environnemental.
- Dans la région, l'aquaculture peut faire partie intégrante des écosystèmes locaux; elle peut présenter un certain nombre de préoccupations en matière de biosécurité et de santé susceptibles de comporter des risques et des dangers, tant pour son propre développement et sa gestion que pour l'environnement aquatique et la société.
- Les maladies des poissons d'élevage, des mollusques et des crustacés peuvent engendrer de lourdes pertes financières et peser sur la croissance, la compétitivité et la durabilité du secteur aquacole. Le manque de traitements et de vaccins pour les maladies aquatiques est susceptible d'accroître les risques de propagation des maladies, d'impact sur l'environnement et de pertes économiques.
- Des mesures de gestion de la santé du poisson efficaces permettant de prévenir et de contrôler les maladies au niveau régional exigent une bonne connaissance épidémiologique des agents pathogènes des populations de poissons élevées et à l'état sauvage; cela requiert une coopération et un partage des informations entre les pays.
- La biosécurité en aquaculture consiste en un certain nombre de pratiques, de procédures et de stratégies visant à prévenir l'introduction et la propagation de maladies contagieuses et parasitaires parmi les espèces aquatiques.

Recommandations

À la lumière des débats et des conclusions du Panel 2, les participants ont formulé les recommandations suivantes:
- Il est nécessaire de renforcer les institutions nationales et de les impliquer afin qu'elles jouent un rôle plus actif dans la gestion des aspects de l'aquaculture liés à l'environnement, aux changements climatiques, à la production et à la gestion responsables des aliments pour poissons, à la santé humaine et des animaux aquatiques, à la biosécurité, au travail et à l'industrie.
- Des cadres de réglementation et de surveillance environnementale harmonisés intégrant une évaluation des impacts environnementaux et des programmes de surveillance de l'environnement, ainsi que des indicateurs spécifiques, doivent être mis en place au sein d'une démarche de gestion écosystémique de l'aquaculture.
- De meilleures pratiques de gestion de l'aquaculture doivent être développées, largement diffusées et mises en œuvre au niveau local et régional.
- Le recours à l'analyse des risques dans l'aquaculture – notamment l'évaluation, la gestion des risques et la communication afin d'évaluer les interactions entre l'aquaculture et l'environnement ainsi que la vulnérabilité des écosystèmes et des services écologiques qu'ils fournissent – doit être encouragé et mis en œuvre en assurant un partage équitable des responsabilités par le secteur public et privé.

- La capacité de charge des sites aquacoles potentiels doit être évaluée de manière systématique, en tenant aussi compte des effets cumulés de toutes les activités.
- Les interactions entre la pêche de capture et l'aquaculture doivent faire l'objet d'une attention particulière à tous les niveaux en notamment en ce qui concerne les ressources naturelles, les stocks halieutiques et les aspects socioéconomiques.
- Une approche commune harmonisée visant à renforcer le système de surveillance doit être mise en œuvre au niveau régional, en tenant compte des normes fixées par l'Organisation mondiale de la santé animale.
- La tenue de registres et le partage d'informations au travers de la création d'une base de données permettant de surveiller l'état de santé des stocks d'élevage pourrait aider les exploitants à prévenir et contrôler les maladies.
- La mise en œuvre de mesures de biosécurité efficaces au niveau des fermes devrait être étayée par l'éducation, la vulgarisation et la formation continue des exploitants aquacoles.

Panel 3 – Dynamiser les marchés de l'aquaculture

Conclusions

L'aquaculture en Méditerranée et en mer Noire contribue à la sécurité alimentaire, à l'emploi et aux échanges commerciaux dans la région. Pour renforcer cette contribution, l'aquaculture doit être axée sur le marché, à l'écoute du consommateur et relever des défis tels que la sensibilisation des consommateurs à la qualité, la sécurité, la fraîcheur et la traçabilité des produits de la mer, le bien-être des animaux et le développement durable.

Dans ce contexte, des aspects fondamentaux de l'aquaculture tels que le marché/marketing, les systèmes de collecte et de diffusion des données/informations, la création d'une bonne image de marque, la promotion de la consommation locale, les chaînes de valeur, le recours aux technologies de l'information et de la communication, le rôle du secteur du détail et les organisations d'exploitants aquacoles ont été abordés et débattus dans le cadre du Panel 3.

À l'issue des discussions du Panel 3, les participants ont formulé les conclusions suivantes:

- Le passage d'une croissance centrée sur la production à une approche tournée vers le marché et l'écoute du consommateur peut contribuer à la création d'emplois, au commerce des produits de la mer et au développement de l'aquaculture en Méditerranée et en mer Noire.
- Des normes communes (par exemple des codes de conduite/bonnes pratiques) ou des normes harmonisées au niveau régional pourraient être utiles pour promouvoir des pratiques aquacoles responsables dans la région.
- Les organisations d'exploitants aquacoles jouent un rôle crucial dans le développement durable de l'aquaculture dans la région.
- L'image de l'aquaculture en Méditerranée et en mer Noire pourrait être encore améliorée.
- La conchyliculture fait partie intégrante de l'aquaculture régionale ; elle est porteuse de bénéfices socioéconomiques et de services environnementaux majeurs.
- Le fait d'encourager la consommation nationale peut dynamiser les marchés de produits aquacoles en Méditerranée et en mer Noire.

Recommandations

À la lumière des débats et des conclusions du Panel 3, les participants ont formulé les recommandations suivantes:

- Il est nécessaire de recueillir et de diffuser des données de marché/commerciales ainsi que des informations qualitatives sur les préférences et les comportements

des consommateurs afin de faciliter le développement d'une aquaculture régionale tournée vers le marché.
- Il convient de promouvoir des pratiques aquacoles responsables (par exemple des codes de conduite ou bonnes pratiques) fondées sur des normes communes minimales au niveau régional, afin, entre autres, de répondre aux préoccupations sociétales des consommateurs et d'améliorer l'image du secteur.
- Le rôle des organisations d'exploitants aquacoles doit être renforcé afin de faciliter les actions collectives et volontaristes en s'appuyant sur une législation harmonisée et une volonté politique renforcée.
- Les administrations publiques et l'industrie doivent promouvoir la consommation nationale de produits aquacoles grâce à des campagnes de communication efficaces et coordonnées mettant en avant des qualités des produits aquacoles autres que leur prix (la fraîcheur, par exemple) et le régime méditerranéen.
- Il convient de dynamiser le marché des produits de la conchyliculture en mettant l'accent sur leurs qualités nutritionnelles et leur valeur ajoutée; cela permet d'améliorer les marges bénéficiaires et d'assurer la viabilité économique du secteur.
- La CGPM a été invitée à recueillir des exemples de réussites visant à améliorer l'image et l'acceptabilité des produits aquacoles, à mettre en place un mécanisme de surveillance en temps réel des conditions du marché et à renforcer les bases de données régionales sur l'aquaculture.

Panel 4 – Faire progresser l'innovation aquacole

Conclusions

À l'issue des discussions du Panel 4, les participants ont formulé les conclusions suivantes:
- Les activités de recherche et développement technologique (RDT) sont indispensables au développement durable de l'aquaculture. L'innovation est un élément clé de la compétitivité, mais elle peut présenter de multiples facettes en fonction des espèces élevées, du degré de maturité et de la structure du secteur dans chaque pays.
- La production aquacole (par exemple la croissance et mortalité des poissons, l'efficacité des aliments, etc.) est étroitement liée aux technologies en place et à leur efficacité.
- Les investissements dans la recherche et le développement aquacoles visant à encourager l'innovation technologique et l'amélioration des systèmes de production régionaux sont essentiels.
- Il est fondamental d'aligner les objectifs de l'industrie avec les capacités en matière de RDT, un appui politique et des mécanismes administratifs permettant de démontrer clairement les effets de l'innovation.
- Bien que les défis liés à l'innovation soient une caractéristique commune à l'ensemble du secteur dans la région, il est nécessaire d'identifier plus précisément les principaux obstacles auxquels est confrontée l'aquaculture en Méditerranée et en mer Noire afin d'améliorer son efficacité et d'exploiter son potentiel. Pour cela, il convient de définir la portée géographique de chaque obstacle (entreprise aquacole individuelle, échelon national ou régional) de manière à pouvoir déterminer des solutions adaptées.
- Il est essentiel de prendre en compte les besoins réels de l'industrie, des administrations publiques et des parties prenantes afin de hiérarchiser les défis en matière de RDT. Ce processus d'établissement des priorités devrait également tenir compte, entre autres, de la référenciation des performances de production.
- La coopération et les échanges entre la recherche et l'industrie constituent l'un des principaux défis en matière de RDT dans la région. Les travaux des

scientifiques, des chercheurs et des universitaires sont régis par des calendriers et des motivations professionnelles qui diffèrent de ceux qui prédominent dans l'industrie.
- Les attentes vis-à-vis des résultats de la RDT sont différentes et les objectifs de la recherche appliquée ne correspondent pas toujours aux besoins et attentes des producteurs. Il est par conséquent essentiel de définir clairement les critères de succès. L'innovation en Méditerranée et en mer Noire peut également exiger de nouvelles approches et un engagement des acteurs du secteur à différents niveaux.
- Au niveau régional, la coopération nord–sud dans les programmes de recherche repose sur une reconnaissance des problèmes et des enjeux pouvant être résolus par une meilleure adéquation entre, d'une part, les besoins des secteurs concernés et, d'autre part, les infrastructures et compétences de recherche ainsi que le renforcement des capacités dans la recherche.
- Les plateformes nationales et miroirs des parties prenantes du secteur aquacole sont des instruments utiles pour faciliter le partage des données, des informations et du savoir-faire scientifiques. Les plateformes régionales, nationales et locales doivent pouvoir identifier les ressources ainsi que les stratégies appropriées pour combler l'écart qui sépare les prestataires de RDT et le secteur.

Recommandations

À la lumière des débats et des conclusions du Panel 4, les participants ont formulé les recommandations suivantes:
- Les thématiques de RDT propres à l'aquaculture en Méditerranée et en mer Noire doivent être affinées et associées à un champ géographique approprié afin de permettre une coordination efficace entre les parties prenantes et l'élaboration de stratégies de recherche communes. Chaque thématique requiert un plan d'action afin de fixer les échéances, la durée, le financement et les résultats.
- Il convient de définir des systèmes de RDT adaptés à l'ensemble de la région de la Méditerranée et de la mer Noire et de renforcer la collaboration nord–sud. À cet égard, la Plateforme aquacole multi-acteurs de la CGPM peut offrir un cadre approprié pour coordonner les efforts et fournir un espace pour travailler en réseau et renforcer le dialogue entre les chercheurs, les acteurs de l'industrie et les décideurs politiques. Les plateformes et structures, à tous les niveaux, jouent un rôle essentiel dans l'identification des besoins, la résolution des défis et le transfert des connaissances; cela peut contribuer à la mise en place de règles du jeu équitables dans l'ensemble de la région.
- Le rôle des associations d'exploitants dans l'ensemble de la région doit être renforcé et les synergies entre les programmes de recherche doivent être facilitées au niveau national. À ce titre, la CGPM doit jouer un rôle de modérateur afin de consolider cette approche tout en laissant de l'espace aux parties prenantes. Par exemple, ceci pourrait prendre la forme de partenariats public–privé et de groupements d'intérêt économique dont le mandat serait clairement défini.
- L'utilisation de fonds publics pour la RDT requiert la mise en place d'une procédure efficace en vue de hiérarchiser les besoins de recherche et la responsabilité sociale des résultats. Les autorités nationales doivent aussi encourager les activités de RDT au niveau des exploitations, par exemple en octroyant des incitations financières aux entreprises capables de certifier leurs dépenses de RDT internes et en facilitant la collaboration entre les scientifiques et les exploitants. Cette approche pourrait notamment être envisagée lorsque des recherches d'innovation sont prévues pour favoriser l'économie verte.
- Les résultats de la recherche doivent être diffusés afin d'en favoriser l'application optimale. Une stratégie commune pour des programmes de diffusion spécifiques

doit être définie en s'appuyant sur la coopération et le travail en réseau dans la région de la Méditerranée et de la mer Noire.

– La CGPM est invitée à coordonner les actions en faveur d'un programme régional de renforcement des capacités et de formation des artisans exploitants et des travailleurs aquacoles; celui-ci devrait comprendre notamment le lancement d'études pilotes sur des thématiques pertinentes de RDT (aliments, rentabilité, valorisation, etc.).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Side events


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Side event 1
Enabling good governance in aquaculture / A healthy environment, a stronger aquaculture industry

MARINE AQUACULTURE SECTOR STRATEGY AND BEST MANAGEMENT PRACTICES IN EGYPT

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BOX 1

Aquaculture and marine aquaculture development in Egypt

Egypt is among the top ten countries in the world, and the first in Africa, for aquaculture production. Aquaculture production in Egypt is mainly composed of freshwater products, such as tilapia. From 139 000 tonnes in 1998, the total production has increased to 635 000 tonnes in 2007 and reached approximately 986 820 tonnes in 2011 (FAO data), while per capita consumption (internal demand) corresponds to about 19.09 kg per year. Against this backdrop, it is important to highlight that, currently, Egypt is not self-sufficient in terms of food consumption (including fish) and its dependence on imported products makes the domestic market vulnerable to external factors such as changes in supply and currency fluctuations. For these reasons, the Egyptian agriculture strategy (sustainable agricultural development strategy towards 2030) aims to both improve food security and increase competitiveness in international markets, while the national plan aims to increase total production to somewhere between 1 840 000 and 1 950 000 tonnes in order to face at least the demand linked to a fast-growing population (population growth rate of 1.73 percent; 2011 data; World Bank, 2012).

In Egypt, the fisheries and aquaculture sectors show multiple signs that growth and production models need adaptive strategies and responses in order to adequately address a number of key issues such as natural resources and production, new technologies, professional capacities and human resources. Freshwater aquaculture in Egypt currently faces environmental and marketing constraints, particularly for tilapia, which is the main reared species. Marine capture fisheries appear to have reached their maximum level of exploitation, which necessitates a shift to marine aquaculture. If such ventures are consolidated in the private sector, there is a considerable potential contribution to national economic growth. The aquaculture sector is the best choice to increase production and income and to generate employments. The products on offer contain high levels of quality

BOX 1 (CONTINUED)

protein and provide other nutritional benefits (essential amino acids and fatty acids, vitamins, minerals) that can help in reducing the risk of cardiovascular diseases, among other things. In a context where the demand is high, low market prices and low production costs (lower than in other countries, especially in terms of labour, energy and taxes), the aquaculture sector in Egypt is profitable. However, ecological and economic needs must be linked to social issues, and development projects should contribute to advance socio-economic levels in the coastal zones, thereby improving the living standards of the population.

The International Centre for Advanced Mediterranean Agronomic Studies, Institute of Bari (CIHEAM Bari) and the General Authority for Fish Resources Development (GAFRD) in Egypt are supporting the development of marine aquaculture in Egypt through the project "Marine Aquaculture Development in Egypt" (MADE project), funded within the Italian–Egyptian Debt for Development Swap Programme. The MADE project aims at consolidating the marine aquaculture sector in Egypt while taking into account both economic and ecological needs, through the promotion of a sustainable and responsible approach and the provision of support such as training courses, the construction of a new hatchery and pilot productions to cater to the demand of the private sector. The topics addressed by the project include marine aquaculture strategy, pond farming management, hatchery technologies for quality fingerlings production, systematic approach for human resources and training.

Introduction

CIHEAM Bari and GAFRD have implemented the technical assistance component of the project, which included drafting the sector roadmap/strategy proposal and preparing a stakeholders analysis. Three best management practices for marine hatchery, cages and pond management, six technical reports and manuals, two business models for cages and hatcheries as well as environmental impact guidelines were also prepared for stakeholders in both the public and private sectors. This initiative aimed at drawing up the sector strategy proposal and at reviewing best management practices/technical manuals, for both the public and private sectors, in order to enhance human resources, improve the performance capacity of Egyptian institutions, support the private sector through technical actions and consolidate dialogue between public and private stakeholders.

Methodology

Several experts contributed to the preparation of the sector roadmap by reviewing the available literature (grey literature) and data and carrying out interviews with key stakeholders in both the public and private sectors. These interviews were based on questionnaires and field visits were organized to aquaculture farms and facilities. The team of experts cross-checked and analysed the data obtained through literature and through interviews in order to ensure consistency. The legislation framework and administrative structure in place were reviewed in an attempt to identify the drawbacks and pitfalls to be avoided.

A stakeholder analysis aimed at describing the different stakeholders involved in the Egyptian marine aquaculture sector and the best management practice documents provided general indications on how to improve production quality in cages, ponds and hatcheries.

Technical manuals were prepared for cages and hatcheries management with specific emphasis on the technical aspects of marine aquaculture to be considered by farmers. They also provided details on the procedures for fingerlings and table-sized fish production.

Business models suggested potential investors tools to facilitate the launch of new marine aquaculture activities (hatcheries and cages) taking into consideration three different investment models in term of size and potential investor.

Factsheets on the main and new candidate species provided an overview of potential new species for aquaculture in Egypt.

A report on potential marine areas for cage farming identified marine areas suitable for installing cages in the open sea. Potential areas were selected on the basis of well-defined criteria. A report on fish handling and processing was prepared for those involved in a processing facility and should be considered as a tool for improving processing control. A report on environmental impact assessment cage unit model aimed to provide information and indications to all those involved or working in a cage or inland aquaculture farm as well those interested in launching such activities. A report on environmental impact assessment guidelines was prepared as an instrument to implement EIA process for fish cage systems and inland aquaculture farms in order to achieve an ecologically sustainable management of farms. Finally, a report on Italian aquaculture aimed at providing figures on the Italian marine aquaculture.

Results and discussion

The sector roadmap was elaborated within the framework of the MADE project with the aim to design a strategy for the development of the Egyptian marine aquaculture sector. It also reflected the contents of other technical documents prepared as part of the technical assistance implemented by CIHEAM Bari. Among the main findings, it showed that the Egyptian market for seabass and seabream appears to be highly profitable (approximately 8 euros/kg) as the costs of production in Egypt are substantially lower than in Europe (in particular, the costs of energy, labour and taxes). In terms of export, only six establishments are currently authorized for exportation to the EU. Export volumes are expected to increase in future years; however, international standards and regulations must be adopted as these would help establish a quality process from which local markets and Egyptian consumers would also benefit. The Egyptian private sector is hungry for knowledge, know-how, technology, information and support in relation to new developments and opportunities. The national institutions in Egypt should provide guidelines to private enterprises that take into account both economic and ecological needs and promote a sustainable and responsible approach/governance. Technological advancements in marine aquaculture can increase the socio-economic status of the local communities involved and can also have a significant impact on the living standards of target groups. Sustainability stands as one of the main factors in the project management guidelines. By focusing on this essential aspect, this new sector should be able to thrive.

The stakeholder analysis described the different actors involved in the marine aquaculture sector in Egypt and considered a range of categories including: marine fish farmers, hatchery operators, suppliers (feed, cages, technical assistance, etc.), traders, retailers, wholesalers, credit institutions, consumers, research institutes, authorities, international agencies and potential donors. All of the stakeholders were presented based on key data and information available, and their current interests and motivations for change were evaluated. This analysis was summarized into a stakeholder matrix where possible actions to address their interests were outlined.

The best management practices for cages highlighted the importance of adopting proper management practices for cage farms in order to determine their technical and economic efficiency, especially when introducing a new rearing technology. Given that, at present, the majority of Egyptian aquaculture production is realized in ponds, the best management practices for ponds have been reviewed to provide farmers with a set of best practices that could strongly improve the technical and economic efficiency of farms as well as their sustainability. These practices have been prepared with

due consideration of the current conditions prevailing in the Egyptian aquaculture sector. The best management practices for hatcheries are fundamental for ensuring the technical and economic efficiency of the hatcheries. This document provided all hatchery workers with a set of best practices to reduce mortality while rearing fish, to improve the quality of hatchery production and to increase worker safety.

While these three sets of best management practices were intended for all farm and hatchery workers, the technical manual for cages was specifically focused on the technical aspects of marine aquaculture and was intended in particular to scientists in charge of cage farms. It included detailed information on the most common structures of offshore cages and on the main activities to be realized. A key issue for Egyptian hatcheries is the low level of production both in terms of quantity and quality. This strongly limits the efficiency of fish farms that buy fish fry or fingerlings, since they experience low survival rates and a high percentage of deformities at the end of the fattening phase. The technical manual for hatcheries provided details on procedures for fingerling production in a marine hatchery. The standard procedures used in intensive European finfish hatcheries were adapted to the level of existing Egyptian technology and know-how.

Since the MADE project strongly focused on the development of the private sector, efforts were made to provide potential investors with tools that could ease the launch of new marine aquaculture activities. In this perspective, the report on business models for cages intended to briefly describe and assess the economic and financial feasibility of investment in cages for marine fish farming, taking into consideration three investment models that differ in term of size and potential investor. The same rationale led to the realization of a report on business models for hatcheries.

The main and new candidate species factsheets provided a clear overview of new species that could potentially be farmed in Egypt. This document was based on the proposals for new species received during meetings as well as on suggestions drawn from the literature. These proposals were screened according to two criteria: i) criteria for exclusion (environmental concerns – e.g. alien species –, dependency on imports of seeds, etc.) and ii) criteria for retention (rearing cycle duration, presence on the market as wild catches, environmental adaptability, reduced dependency on imported inputs for viable rearing, market acceptability in Egypt and potentialities for export).

The report on potential marine areas for cage farming identified marine areas suitable for installing cages in the open sea. Potential areas were selected on the basis of well-defined criteria such as the environmental context, the presence of other activities (such as tourism), the accessibility of the area and the presence of infrastructures. The selected areas were observed using Google Earth™ to report corresponding geographical coordinates as well as a location name, a satellite photo and a brief description of the choice. The report on fish handling and processing was addressed to those involved in a processing facility. It should be considered a tool to achieve a better control of processing fish and should not, therefore, serve as a specific technical manual. Its aim was to spread, as much as possible, knowledge between stakeholders on procedures and technologies in order to reach good standards of hygiene and maintenance, and to understand the main solutions for adding value to raw products. In light of the current developmental stage of fish cage farming in the Mediterranean and the Red Sea, the report on environmental impact assessment cage unit model and the report on environmental impact assessment guidelines aimed to provide information and indications to all those involved or working in a cage or inland aquaculture farm as well those interested to start such activity. It should be considered as an instrument to implement EIA for fish cage systems or inland aquaculture farms and to achieve an ecological sustainable management in farming. The report on Italian aquaculture aimed at providing figures on the state of Italian marine aquaculture in order to identify possible synergies between the Italian and Egyptian marine aquaculture sectors.

All the reports were conceived as stand-alone documents so that every stakeholder could directly focus on its area of interest (authorities, investors, aquaculture farmers, etc.). However, a transversal reading of all of them would be needed to obtain a comprehensive image of the sector and the associated strategy. These documents could be easily adopted and adapted by investors for developing their business ideas and present them to the commercial and financial partners.

Finally, technically-oriented activities implemented during the project have also been outlined in the corresponding technical reports.

Conclusions

The marine aquaculture sector in Egypt, as in most of the world, can bridge the gap between expected demand and fish food supply from the wild in order to maintain the current level of per capita consumption. This is all the more relevant given the likely stagnation in harvest from capture fisheries and freshwater aquaculture production.

The best practice and technical reports prepared within this initiative should be considered as a contribution towards the sustainability of the sector. The proposed approach was a development cooperation model that includes carrying out a sectoral analysis, formulating indications to enhance productivity and evaluating issues related to technical and economic parameters and to the environment.

INSTITUTIONAL CAPACITY BUILDING AND HUMAN RESOURCE DEVELOPMENT

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Introduction

Enhancing human resources is one of the main components of the MADE project[29]. As part of this component, training courses were organized both in Italy and Egypt in order to improve the performance capacity of the private sector through GAFRD/public institutions technical actions. CIHEAM Bari and GAFRD organized an international training in Italy for nine technicians in one marine hatchery in Puglia (May 2012) and on-the-job training in Egypt for 50 technicians (2013 and 2014 productive seasons). On-the-job training sessions were carried out according to traditional approaches, using hormonal treatment to spawn seabass and seabream according to the natural thermo-photoperiod. This included analysing the development of the oocytes. Enrichments for rotifer and artemia, swim bladder quality control and tank management issues were also pointed out during the on-the-job training sessions.

Methodology

The Egyptian technicians involved in this activity acquired experience and know-how for the production of seabass and seabream fingerlings and on the use of the following technologies:

- brood stock management and reproduction in tanks equipped with thermo-photoperiod system, recirculation system and filtration unit, liquid oxygen, eggs incubators;
- algal production with six bioreactors for high density management;
- rotifer and artemia high-density production using artificial diet (enrichments);
- larval rearing management, high-density in small-sized tanks (3–7 cubic metres, with recirculation system, filtration unit and liquid oxygen);

[29] For more information on the MADE project, please refer to Box 1.

– nursery/weaning sectors, (15 cubic metres tanks) with recirculation system, filtrations unit and liquid oxygen; and
– water quality, ozone and liquid oxygen management.

In Egypt, 50 technicians participated in on-the-job training sessions at the El Agami K21 marine hatchery (productive seasons 2013 and 2014) on the following technologies:

– brood stock management with hormonal treatment (luteinizing hormone-releasing hormone [LHRH] and gonadotropin-releasing hormone analogue) using outdoor tanks of 70 cubic metres;
– algal production in large quantities;
– rotifers and artemia sections, in large tanks using algae, yeast and commercial enriching materials;
– larval rearing with swim bladder development control in tanks of 10 cubic metres (open circuit); and
– weaning/pre-fattening sector in raceways (30 cubic metres).

Training results were evaluated both in Italy and in Egypt, monitoring the daily activities. Trainees also prepared a written report and final written tests were organized.

Results and discussion

Trained technicians acquired know-how on the thermo-photoperiod management of seabass (*Dicentrarchus labrax*) and seabream (*Sparus aurata*) reproduction and egg production. This technology allows temperature and daylight length control, thereby triggering and postponing spawning and egg production without the use of hormonal treatments. Training sessions placed an emphasis on bioreactor technology for high-density production (1 billion cells/ml) of unicellular algae (*Nannochloropsis* sp.). The quality of artemia (*Artemia salina*) and rotifers (*Brachionus plicalitis*) is a crucial factor for larval rearing; enrichment techniques ensure high levels of highly unsaturated fatty acids (HUFAs), in particular eicosapentaenoic acids (EPA) and docosahexaenoic acids (DHAs). Fatty acid enrichment for rotifers and artemia reduces the skeletal deformities during the larval rearing.

The training sessions that took place noted swim bladder development as a critical phase in larval rearing both for seabass (7–10 rearing days; water temperature 16° C) and seabream (12–18 rearing days; water temperature 18° C). They also highlighted that aeration, light, feeding and water/air interfaces must be carefully controlled in order to achieve the target of 95 percent of good swim bladder development in the larval tanks. Fingerling quality control involved the swim bladder test (anaesthetics and bath with high salinity water at 70 parts per million). In modern marine hatcheries, adequate water quality is ensured by disinfection with ozone, ultraviolet lamps and liquid oxygen. For closed circuits in breeders, larval and weaning hatchery sectors, mechanical and biological filtrations are necessary.

Conclusions

At the end of the training sessions, the final reports and tests carried out demonstrated the professional development achieved by GAFRD technicians who were trained within the MADE project. The MADE project therefore enhanced human resources in order to improve the performance capacity of Egyptian institutions, support the private sector through technical actions and consolidate dialogue between public and private stakeholders. The training component, based on practical experience in marine hatcheries, is a good example of a successful partnership cooperation model which can be adapted to other Mediterranean countries such as Algeria, Lebanon, Morocco and Tunisia.

IMPROVING LAND-BASED AQUACULTURE DEVELOPMENT AND ENVIRONMENTAL PROTECTION BY USING INTEGRATED MULTI-TROPHIC AQUACULTURE (IMTA) IN EARTHEN PONDS

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Earthen ponds are the main aquaculture production system in Portugal; however due to high production costs of extensive and semi-intensive fish culture and low productivity, this activity is not financially sustainable yet. One possibility for increasing profitability and reducing risk is to integrate the culture of organisms from different trophic levels in the same earthen pond following the principles of integrated multi-trophic aquaculture (IMTA) practices (Soto, 2009). The presence of low-trophic-level organisms in fish ponds may also help control the development of fish parasites (dinoflagellates such as *Amyloodinium* spp.), micro-organisms and microalgae blooms. It can also reduce the organic matter load in the system.

Between 2010 and 2013, the Portuguese Institute for the Sea and Atmosphere (Instituto Português do Mar e Atmosfera) carried out experiments, using oysters as filter feeders and sea cucumbers as detritivores combined with various local fish species to answer the following questions:

- Which is the best combination of fish species?
- What are the best structures to grow oysters with fish in earthen ponds?
- How can oysters affect fish production and water/sediment quality?
- Can oysters achieve similar growth performance to that of estuaries and lagoons?
- What is the health/hygiene quality of oysters?

The species involved were various seabream species (*Sparus aurata, Diplodus puntazzo, D. sargus, D. cervinus* and *D. vulgaris*), meagre (*Argyrosomus regius*), oysters (*Crassostrea angulata* and *C. gigas*) and a sea cucumber (*Holothuria tubulosa*). Data was collected to evaluate growth, survival and condition index, for fish and oysters, and fish stomach contents (except for meagre). The most appropriate oyster grow-out structures to be used in earthen ponds were lantern nets, hanging baskets and mesh bags. Water and sediment quality and health quality of IMTA oysters were compared to that of natural oysters. The trials were performed in six earthen ponds (0.5 ha each) – three with species in integration (IMTA) and three only with fish (non-IMTA).

Based on our results, IMTA practices in earthen ponds indicated that:

- sea cucumber (*Holothuria tubulosa)* does not grow well in earthen ponds;
- the integration of *S.aurata/A. regius, D. sargus* and *D. puntazzo* with oysters may be the optimal combination for IMTA in earthen ponds. Using fish was more robust according to the condition index suggesting a better degree of nourishment in these ponds;
- mesh bags floating at the surface are the most suitable grow-out structure for oysters in earthen ponds;
- *Crassostrea gigas* grow faster than *C. angulata*;
- the bacterial load in fish mucus is highly reduced by the presence of oysters;
- IMTA tanks have higher benthic diversity, which helps in the remineralization processes and subsequently increases water quality; and
- oysters growth was acceptable for commercial standards but mortality rates need to be reduced in order to increase overall productivity.

The overall picture revealed a promising future for IMTA practices in Portugal and other countries with a strong focus on earthen pond aquaculture in Europe.

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GESTION ET VALORISATION DES GISEMENTS DE SOUS-PRODUITS DE LA MYTILICULTURE MÉDITERRANÉENNE

Jean-Jacques Thibaut and Florent Tarbouriech (Médithau Marée SA)

La mytiliculture est désormais identifiée comme une source de protéines adaptée à la croissance des besoins alimentaires des populations. Avec une bonne rentabilité liée à de faibles coûts de production, des besoins en main d'œuvre agissant positivement sur les bassins d'emploi et un bilan environnemental positif, la mytiliculture présente un triple bilan qui lui permet de répondre durablement aux demandes des consommateurs. Deux paramètres principaux contraignent son développement: l'accès aux concessions d'élevage par extension ou la création de zones de production et l'impact des pollutions anthropogènes ou changements climatiques sur la qualité des milieux. Une gouvernance transnationale devrait être engagée dans le développement de la capacité de production et dans l'essor d'innovations en ingénierie écologique, en vue de pérenniser la qualité des milieux d'élevage. La mytiliculture méditerranéenne pourrait ainsi relever les défis de sa croissance et porter sa production de 300 000 tonnes à plus de 700 000 tonnes par an à l'horizon 2030. Un franc succès est donc promis à cette filière si elle adopte une stratégie de croissance durable tant sur le plan économique que social et environnemental.

Dans ce contexte favorable émerge un défi de croissance important: la gestion des déchets solides et liquides générés lors du traitement à terre des productions. À l'image d'autres filières aquacoles, une médiatisation négative de l'impact environnemental de ces rejets serait préjudiciable au maintien du bon niveau d'acceptation de ces produits par les consommateurs. Ainsi, afin de maîtriser ce risque, il convient d'initier une réflexion au niveau législatif visant à instaurer un régime réglementaire spécifique à ce type de flux, et de conduire des efforts de recherche appliqués à l'identification de solutions techniques permettant la gestion et la valorisation de ces déchets mytilicoles. Selon l'origine des produits, leur zootechnie d'élevage et les modes de traitement appliqués, ce flux de déchets, qui représente de 10 à 40 pour cent de la masse brute, est composé d'une part solide, constituée de coquilles de moules associées à divers coproduits biologiques, et d'eaux usées, chargées d'éléments organiques et minéraux issus de l'ensemble des étapes de traitement. Des logiques de collecte sélective et de prétraitement, compatibles avec les besoins des filières de valorisation, sont donc proposées comme levier de croissance de cette filière aquacole. Ces innovations devront être adaptées aux réalités productives, réglementaires et culturelles des zones de production; elles contribueront à renforcer l'image naturelle positive des produits mytilicoles.

La calcite bioassimilable, l'aragonite et certaines protéines aux propriétés texturantes sont des substances de la coquille de moule qui présentent un intérêt. Des voies de valorisation préférentielles ont été identifiées dans les domaines de la cosmétique, de la médecine humaine et vétérinaire et des compléments alimentaires. La part organique solide, constituée de restes de chairs de moules et de divers coproduits biologiques, peut constituer une source de lipides et de protéines valorisables en alimentation animale. Le phosphore et l'azote organique, présents dans les flux liquides de déchets, sont les principales composantes valorisables selon des logiques d'écologie industrielle ou d'aquaculture multi-trophique intégrée. Cette approche d'identification et d'extraction de substances actives devrait sensibiliser certains acteurs aquacoles et les inciter à prendre en compte la production d'actifs à haute valeur ajoutée dans leurs diversifications à venir.

Par son volume, sa turbidité et sa composition, qui peuvent avoir un impact significatif sur l'équilibre écologique de la zone de rejet, le flux de déchets liquides constitue une problématique technique et législative centrale. Dans ce sens, des seuils réglementent les teneurs en matières en suspension, la charge bactérienne et la concentration en carbone organique total. Les dispositifs de traitements des eaux usées compatibles avec le respect de ces seuils sont techniquement et financièrement très lourds au regard des marges individuelles dégagées par cette activité. Les solutions innovantes à proposer doivent donc être des combinaisons de dispositifs individuels et de systèmes collectifs, en gestion publique ou privée, dimensionnés selon les besoins d'une zone de production.

Ces approches techniques sont limitées par la capacité financière et foncière des acteurs économiques de la filière mytilicole. Seule une action institutionnelle capable d'impulser une évolution législative permettra de maîtriser totalement ce frein de croissance. Par son origine marine et sa composition, ce flux de déchets liquides doit pouvoir bénéficier d'un statut réglementaire spécifique qui prenne en compte son origine marine et sa nature agricole ainsi que son incidence agroécologique positive. À cet égard, les seuils réglementaires applicables à la nature agricole de ces rejets doivent être modifiés dans les procédures de mise en conformité de ces rejets ou au titre des réglementations de protection des zones naturelles.

Side event 2
Boosting markets for aquaculture / Advancing aquaculture innovations

EXPLORING THE BIOLOGICAL AND SOCIO-ECONOMIC POTENTIAL OF NEW/ EMERGING CANDIDATE FISH SPECIES FOR THE EXPANSION OF THE EUROPEAN AQUACULTURE INDUSTRY (DIVERSIFY)

Aldo Corriero (University of Bari), Constantinos C. Mylonas (Hellenic Center for Marine Research) and Rocio Robles (Andalusian Aquaculture Technology Center)

In contrast to the rapid increase in aquaculture worldwide, aquaculture production in the EU is still limited and remains far from achieving its full potential. Aquaculture production levels in the EU have been steady or even declining throughout the last decade. Meanwhile, import levels of farm seafood are increasing, currently representing 65 percent of all seafood consumed. The limited range of farmed species is contributing to this situation, which leads to intense competition and price reductions whenever there is an increase in production. The Diversify project (FP7-KBBE-2013, GA 603121; www.diversifyfish.eu) started in December 2013 with the main objective of acquiring the necessary knowledge for the diversification of the European aquaculture production based on new/emerging finfish species. This project is coordinated by the Hellenic Centre for Marine Research and has a total budget of 11.8 million euros for a five-year duration – which makes it one of the largest research projects funded by the European Commission in the field of aquaculture. The Diversify consortium includes 20 research and academic institutions, three large-sized enterprises, nine small and medium-sized enterprises, five professional associations and a consumer non-governmental organization.

The Diversify project has identified a number of new/emerging finfish species that offer great potential for the expansion of the EU aquaculture industry. Although the emphasis is on Mediterranean cage culture, fish species suitable for coldwater, pond/ extensive and freshwater aquaculture have been included as well. These new/emerging species are fast-growing and/or are large finfishes marketed at a large size and can be processed into a range of products to provide the consumer with both a greater diversity of choice in fish species and new value-added products. The fish species are: meagre (*Argyrosomus regius*) and greater amberjack (*Seriola dumerili*) for warmwater marine cage culture; wreckfish (*Polyprion americanus*) for warmwater and coolwater marine cage culture; Atlantic halibut (*Hippoglossus hippoglossus*) for marine coldwater culture; grey mullet (*Mugil cephalus*) – which is a euryhaline herbivore – for pond/ extensive culture; and pike-perch (*Sander lucioperca*) for freshwater intensive culture that uses recirculating systems.

Research is focusing on the following areas: reproduction and genetics, nutrition, larval and grow-out husbandry, fish health, final product quality and socio-economics. The combination of biological, technological and socio-economic research within the Diversify project is expected to support the diversification of the aquaculture industry and help in expanding production, increasing the range of aquaculture products and the development of new markets. Besides the technical improvement of the selected species, socio-economic research under the Diversify project includes finding solutions related to the perception of aquaculture products, market demand, buyer preferences, new product

development, value adding and market development. These outcomes should benefit the aquaculture sector in the EU and also help the supply industry in proceeding with targeted marketing and improving its international competitive position. Based on the development of the market in the EU and on demand characteristics, the following socio-economic bottlenecks were identified during the preparation of the Diversify project:

- demand for seafood in the EU is increasing;
- negative attitude of EU consumers towards aquaculture fish and products;
- demand for new aquaculture products in the EU market and, subsequently, in the world needs to be developed;
- demand for European aquaculture products in the world markets needs boosting;
- the range and added-value of aquaculture products needs to increase; and
- the sustainability of the aquaculture sector needs to be enhanced.

All these aspects underline the fact that the image of the aquaculture sector should be enhanced. New and high added-value products need to be developed and small- and medium-sized enterprises should be more innovative in the introduction and market development of these new species. Each of the species selected for the Diversify project has the potential for market growth and for being perceived as an added-value product; their biological and economical potential is expected to stimulate the growth of the European aquaculture sector. The combination of biological, technological and socio-economic research activities planned within the Diversify project are expected to support the diversification of the aquaculture industry and help in expanding production, increasing aquaculture products and developing new markets.

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MARINE HATCHERY CONSTRUCTION IN EGYPT: AN ITALIAN SYSTEM ACTION

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Introduction

The main factor for a profitable aquaculture activities is a source of high quality fingerlings – which can be produced through new technologies and approaches. There are currently three marine hatcheries only in Egypt, and the quantity and quality of fingerling production is not at the level of farmer demand, which creates a bottleneck. It should also be noted that the fingerlings currently available to private sector farmers are either wild-caught or imported from Turkey and Tunisia.

To address this situation, the MADE project[30] has prepared an executive project including technical drawings, for the construction, using the latest Mediterranean technologies, of a marine hatchery for the production of European seabass (*Dicentrarchus labrax*) and gilthead seabream (*Sparus aurata*). The objective of this initiative is to improve the quality of fingerling offer in the private sector.

Methodology

CIHEAM Bari and GAFRD have organized the activity related to the construction of the marine hatchery in the Alexandria Agami area and were responsible for the

[30] For more information on the MADE project, please refer to Box 1.

preparation of technical drawings, technologies selection and cost estimation. The project was carried out by a group of Italian and Egyptian experts using an Italian hatchery as a model (Jonica Aquacultura Taranto). This hatchery has the following main characteristics:

- brood stock sector/reproduction in tanks equipped with thermo-photoperiod system, recirculation system and filtration unit, liquid oxygen, eggs incubators;
- algae production sector with six photo-bioreactors for high density management;
- rotifer and artemia sector for high density production using pure oxygen and artificial diet;
- larval rearing sector, high density in small-sized tanks (3–7 cubic metres), with recirculation system, filtration unit, pure oxygen;
- nursery/weaning sectors, (15 cubic metres tanks) with recirculation system, filtrations unit, pure oxygen;
- water quality, ozone and pure oxygen management; and
- productive capacity of approximately 5–7 million fingerlings (1–5 g each).

Results and discussion

A group of Italian and Egyptian experts has evaluated existing hatchery technologies in order to identify those suitable for the construction of a marine hatchery in Egypt. The experts proposed to GAFRD the following features:

- Brood stock sector for reproduction with thermo-photoperiod system, recirculation system and filtration unit, pure oxygen, eggs incubators. The layout of the new hatchery foresees the presence of six tanks, 40 cubic metres each. Each tank is equipped with mechanic and biological filtration, temperature control, a compensation tank for closed circuit and an egg collector. The closed circuit will ensure the exchange of water approximately 4–5 times per day and renewal of around 30 percent of the volume of water in the tank per day. This technology allows for the control of temperature and daylight length to trigger or postpone spawning and egg production without the use of hormonal treatments;
- Stocking density for seabass and seabream can reach 4–5 kg/cm. Based on the density of breeders (250 kg/tank), the male:female ratio and the productivity data given by the model hatchery (Jonica Acquacultura Taranto), where the photoperiod and water temperature were controlled. Each tank can produce around 120–160 kg of seabream eggs and around 16–22 kg of seabass eggs in one season. Such production can guarantee approximately 360–480 kg of seabream eggs and 48–66 kg of seabass eggs over the year (from October to July);
- The larval rearing process foresees the use of three cubic metre tanks for seabass and seven cubic metre tanks for seabream with recirculation systems, filtration units, temperature control and pure oxygen;
- The weaning sector foresees the use of 12 tanks (15 cubic metres each) with recirculation system, filtration unit, temperature control and pure oxygen;
- The raceways sector foresees the use of 12 tanks (30 cubic metres each) with recirculation system, filtration unit, temperature control and pure oxygen as well as the use of 12 tanks (each at 30 cubic metres) without a recirculation system;
- A photo-bioreactor technology is used for high-density production (one billion cell/ml) of unicellular algae (*Nannochloropsis* sp.). An algae production section is foreseen with six photo-bioreactors for high-density management;
- A rotifer and artemia section for high-density production using pure oxygen and artificial diet; the quality of artemia and rotifers is a crucial factor for larval rearing; enrichment techniques ensure high levels of HUFAs, in particular EPAs and DHAs. Fatty acid enrichment for rotifers and artemia reduces the incidence of skeletal deformities during the larval rearing stage; and

– Adequate water quality is ensured by disinfection with ozone, ultraviolet lamps and pure oxygen. For closed circuits in breeders, larval and weaning hatchery sectors, mechanical and biological filtrations are necessary.

Conclusions

A group of Italian and Egyptian experts evaluated the existing hatchery technologies and used a scenario where maximum productive capacity was at 5–7 million fingerlings (1–5 g each). Such scenario could potentially be achieved through a sound planning of productive seasons, effective management of human resources and the provision of adequate skills development and training.

The MADE project is now constructing a marine hatchery in Egypt using the Italian/Mediterranean system and know-how in the Alexandria K21/Agami area and operations are expected to start in time for the 2015–2016 productive season. It is anticipated that the hatchery will make a significant contribution to the Egyptian marine aquaculture sector by consolidating the private sector and strengthening dialogue between public and private stakeholders.

The approach used for this project serves as a good example of successful partnership cooperation model which can be adapted to other Mediterranean countries such as Algeria, Lebanon, Morocco and Tunisia.

THE ITALO-EGYPTIAN COOPERATION: SEABASS AND SEABREAM FINGERLINGS PRODUCTION

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Introduction

Marine aquaculture can play a greater role within the Egyptian economy. One key factor for a profitable aquaculture activities is a high quality source of fingerlings. New technologies and approaches can offer high quality seed to the farmers. There are currently only three marine hatcheries in Egypt that are producing European seabass and gilthead seabream fry/fingerlings. Two of them are run privately while the third one (Alexandria/Agami K21) is operated under the umbrella of GAFRD and has been reorganized. The MADE project[31] sold the produced fingerlings (3 033 600 seabass and 346 700 seabream between 0.2 and 1 g) to both private farmers and government fish farms. The productivity levels achieved in the K21/Agami marine hatchery illustrated the technical feasibility and economic profitability of marine hatcheries.

This project component aimed to increase fingerling production (seabass and seabream) in order to support the private sector in the Nile Delta area, between Alexandria and Damietta, by evaluating the profitability of marine hatcheries and encouraging new private companies to invest in this activity.

Methodology

The GAFRD/public sector hatchery in Alexandria/Agami K21 area has been reorganized and set up to produce fry/fingerlings of seabass and seabream. The productive activity for the 2014 season is described as follows:

– seabass breeders stock: 60 females (average body weight 1.4 kg, total weight 84 kg) and 40 males (average body weight 1.1 kg, total weight 44 kg). The females have been hormonally induced to spawn through LHRH injection (10 µg/kg) and stocked in outdoor concrete tanks of 70 cubic metres;

[31] For more information on the MADE project, please refer to Box 1.

- seabream breeders stock: 33 females (average body weight 1.8 kg, total weight 59.4 kg) and 20 males (average body weight 0.7 kg, total weight 14 kg). The females have been hormonally induced to spawn through LHRH injection (7 µg/kg); and stocked in outdoor concrete tanks of 70 cubic metres;
- seabream breeders stock: 42 females (average body weight 1.8 kg, total weight 75.6 kg) and 20 males (average body weight 0.7 kg, total weight 14 kg), spawned naturally during the second part of the season in outdoor concrete tanks of 70 cubic metres;
- algal production in great volume outdoor tanks (18 cubic metres in each tank);
- rotifer with enrichment and great volume indoor tanks (6 cubic metres in each tank);
- larval rearing and weaning phase, in 10 indoor tanks without recirculation system (10 cubic metres in each tank), initial larval density = 50 larvae per litre. The larval rearing was carried out in a tank of 4–10 cubic metres using green water technology and ensuring an algal density of 0.8 million cells per ml (seabream) and 0.3 million cells per ml (seabass);
- feeding with rotifers started from day 4 to day 12 for seabass and from day 4 to day 32 for seabream. Artemia feeding started from day 8 to day 55–60 for seabass and from day 16 to day 55 for seabream. Both artemia and rotifers were enriched to ensure a high level of HUFAs, in particular EPAs and DHAs for reducing the skeletal deformities during the larval rearing;
- fry shifted to artificial feeding from day 16, according to the water temperature; and
- prefattening was carried out in 10 of the indoor raceways (30 cubic metres each).

Results and discussion

The injected seabass female (60 animals for a total of 84 kg) spawned 12.27 kg of eggs in total, of which 7.22 kg were viable and hatched. The breeding season started in January (water temperature 15° C; 10 hours and 30 minutes sunlight) until March (water temperature 19° C; 12 hours and 30 minutes sunlight). The survival rate during the larval phase was of 60 percent and the swim bladder inflation was properly developed in more than 98 percent of the larvae in all the rearing tanks (10 cubic metres).

The seabream breeders stock (33 females for a total weight of 59.4 kg, hormone treatment) spawned after induction and with natural photoperiod, producing 54.33 kg of eggs, of which 37.575 kg were viable and hatched. The breeding season started in December (water temperature 15° C; 10 hours of sunlight) until March (water temperature 19° C; 12 hours of sunlight).

A second seabream breeders stock (42 females, average body weight 1.8 kg, total weight 75.6 kg; 20 males, average body weight 0.7 kg, total weight 14 kg), spawned naturally during the second part of the season producing 60.11 kg of eggs, of which 22.67 kg were viable and hatched.

This breeding season started in February (water temperature 18° C; 11 hours of sunlight) and lasted until March (water temperature 19° C; 12 hours of sunlight).

Demand among Egyptian fish farmers is mainly centred on seabass. Consequently, only 2.5 million hatched seabream larvae have been reared (swim bladder development at 89 percent).

After 30–40 days hatching, the animals were transferred to the raceways for weaning; size selection was planned and carried out in order to reduce cannibalism. A very low incidence of heavy skeletal deformity was recorded, always lower than 0.8 percent of the total sample. The produced fingerlings (3 033 600 seabass and 346 700 seabream) were sold from the weight of 0.2 g to 1 g, both to private farmers and government fish farms. In addition, approximately 400 000 fingerlings prepared for the MADE project cage component were stored in the K21 hatchery.

Conclusions

The MADE project has served as a model for fish farmers, providing an opportunity to the private sector to evaluate the profitability of marine aquaculture by testing the performance of cultured species. The productivity levels observed at the K21 marine hatchery in Alexandria/Agami illustrated the technical feasibility and the economic profitability of marine hatcheries. This demonstrated that integrating traditional and new technologies is still a valid option and can provide a spark for the sector in moving towards new technological approaches – such as photoperiod control, bioreactor system, rotifers with flow-through production system, larval and fry rearing facilities with recirculation systems, water oxygenation and water sterilization.

Several farmers bought the fingerlings produced at the K21 and the project is following their activities and the rearing management, by both monitoring quality and providing advice related to feeding, stocking density and water quality. The outcomes of this project have encouraged new private companies to invest in marine aquaculture activities in Egypt.

TRANSFERTS DE TECHNOLOGIES EN OSTRÉICULTURE MÉDITERRANÉENNE

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Dans le Golfe du Lion, sur la lagune de Thau (département de l'Hérault, France), l'ostréiculture (*C. gigas*) est pratiquée en suspension sur des structures métalliques fixes de 50 mètres sur 10 mètres. Les juvéniles d'huîtres sont collés manuellement avec du ciment sur des cordes qui sont ensuite accrochées aux parties émergées de cette structure. Cette production est caractérisée par l'incidence positive de cette zootechnie sur la forme des individus, ainsi que par des vitesses de croissance élevées principalement liées à la température des eaux et à leur richesse trophique. Cette croissance confère à la production régionale des caractéristiques propres, en termes d'épaisseur, de densité, de propreté de coquille, de taux de remplissage et de durabilité sur l'étal, qui sont en nette «rupture» avec les standards qualitatifs nationaux.

En s'appuyant sur ces points de force, un programme de développement local a permis de réaliser des sauts technologiques en ostréiculture lagunaire méditerranéenne. Le procédé innovant protégé par des brevets d'invention consiste en un dispositif permettant l'exondation automatisée et programmée d'huîtres creuses en cours d'élevage. Ce procédé autonome en énergie, photovoltaïque et éolienne, a pour objectif de maximiser certaines des caractéristiques organoleptiques des huîtres dans l'optique d'obtenir des produits commercialisables d'excellente qualité.

La réussite globale de ce programme incite au transfert de connaissances et de technologies dans d'autres zones géographiques afin d'améliorer la rentabilité d'ostréicultures existantes ou de créer de la valeur ajoutée nouvelle et durable dans de nombreuses zones méditerranéennes compatibles avec cette ostréiculture innovante.

Certains facteurs sont indispensables au succès de ce projet de diffusion, notamment l'accès aux concessions d'élevage, les soutiens financiers publics et privés pour les phases de recherche et d'investissement, la «qualité» technique et financière des partenaires locaux, la maîtrise sanitaire des productions et l'absence de conflits d'intérêt majeurs avec des parties prenantes du territoire. Ainsi, la réussite des projets de transfert de connaissances et de technologies serait favorisée par l'identification de compétences expertes, institutionnelles et privées, de niveau transnational, capables de conduire rapidement des actions de lobbying et de conseil auprès des institutionnels locaux en charge des différentes composantes administratives de ces projets.

Il convient de mettre en évidence le fait que le succès de telles initiatives repose sur la pertinence du fonctionnement d'un triptyque principal constitué d'acteurs de la production, d'institutions de tutelle et de représentants de la recherche académique. Les innovations à venir pourraient donc être organisationnelles afin d'identifier

les acteurs les plus pertinents et d'optimiser le fonctionnement de leurs relations. L'objectif principal de ce triptyque serait ainsi de maximiser les chances de succès des projets par l'analyse et la maîtrise des risques mais également de minimiser la durée entre l'obtention d'une concession et la première commercialisation d'une production.

En parallèle, et afin de pérenniser cette nouvelle forme d'ostréiculture, les recherches en sélection génétique, en zootechnie et en ingénierie écologique doivent être poursuivies et renforcées. Des techniques de sélection dirigée de géniteurs doivent permettre de disposer de juvéniles résistants aux pressions zoosanitaires et adaptés à l'évolution des contraintes climatiques et environnementales. De nouvelles bonnes pratiques culturales issues de la transposition du concept d'agroécologie à ce système productif doivent être intégrées afin de maîtriser une biodiversité et une composition chimique de la colonne d'eau favorisant le bien-être animal. Ces pratiques pourraient se baser sur le concept d'aquaculture multi-trophique intégrée, notamment en vue de favoriser la minéralisation de la matière organique par des populations ou des cultures annexes de bactéries, d'algues ou d'invertébrés fouisseurs.

Appendixes

Appendix 1
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Appendix 2
Conference programme

EXPERT PANELS

9–10 December 2014
CIHEAM Bari, Italy
Working languages: English and French

Tuesday 9 December 2014
Morning, 09.00–13.00 hours

OPENING

Opening remarks

Presentation of the Regional Aquaculture Conference 2014 and of the FAO-GFCM Aquaculture Multi-stakeholder Platform

Presentation of the expert panels

PANEL 1: ENABLING GOOD GOVERNANCE IN AQUACULTURE

Panel introduction
François René, Chairperson of the GFCM Scientific Advisory Committee on Aquaculture

Opening
Majida Maarouf, Director of the National Agency for the Development of Aquaculture, Morocco

Riccardo Rigillo, General Director for maritime fisheries and aquaculture, Ministry of Agriculture, Food and Forestry Policies, Italy

Background of panel 1
Keynote speaker: **Rosa Chapela Pérez**, Head of the fisheries socio-economic department, Technological Center for the Sea, Spain

Presentation of panellists

Question and answer session

Open discussion

Synthesis and key messages

Tuesday 9 December 2014
Afternoon, 14.30–17.30 hours

PANEL 2: A HEALTHY ENVIRONMENT, A STRONGER AQUACULTURE INDUSTRY

Panel introduction

Opening
François Simard, Deputy-Director and Senior Advisor for fisheries of the International Union for Conservation of Nature

Giuseppe Arcangeli, Director of the National Reference Centre for fish, mollusc and crustacean diseases and Head of the Laboratory for safety of processed seafood, Italy

Background of panel 2
Keynote speaker: **Mohamed Salah Romdhane**, Professor at the National Agriculture Research Institute of Tunis, University of Carthage, Tunisia

Presentation of panellists

Question and answer session

Open discussion

Synthesis and key messages

Wednesday 10 December 2014
Morning, 09.00–13.00 hours

PANEL 3: BOOSTING MARKETS FOR AQUACULTURE

Panel introduction

Opening
Aina Afanasjeva, Director of the International Organisation for the Development of Fisheries in Central and Eastern Europe

Ferit Rad, Professor at the Department of Aquaculture of the University of Mersin, Faculty of Fisheries, Turkey

Background of panel 3
Keynote speaker: **Katia Tribilustova**, Market Specialist at the International Organisation for the Development of Fisheries in Central and Eastern Europe

Presentation of panellists

Question and answer session

Open discussion

Synthesis and key messages

Wednesday 10 December 2014
Afternoon, 14.30–17.30 hours

PANEL 4: ADVANCING AQUACULTURE INNOVATIONS

Panel introduction

Opening
Alistair Lane, Executive Director of the European Aquaculture Society

Jean-Paul Blancheton, Senior Scientist at the French Research Institute for Exploitation of the Sea, France

Background of panel 4
Keynote speaker: **Javier Ojeda**, General Secretary of the Spanish marine aquaculture farmers association, Spain

Presentation of panellists

Question and answer session

Open discussion

Synthesis and key messages

HIGH-LEVEL CONFERENCE

11 December 2014
CIHEAM Bari, Italy
Working languages: English, French and Italian

Thursday 11 December 2014
Morning, 10.00–13.30 hours

Opening remarks

Statements by delegates of participating countries

Statements by representatives of participating organizations

Synthesis and conclusions of conference panel discussions
Panel 1: enabling good governance in aquaculture
Panel 2: a healthy environment, a stronger aquaculture industry
Panel 3: boosting markets for aquaculture
Panel 4: advancing aquaculture innovations

Presentation and adoption of the Bari conclusions to foster sustainable aquaculture in the Mediterranean and the Black SEA

Closing remarks

Appendix 3
Side events programme

SIDE EVENT 1

Tuesday 9 December 2014
Afternoon, 17.45–18.45 hours

ENABLING GOOD GOVERNANCE IN AQUACULTURE / A HEALTHY ENVIRONMENT, A STRONGER AQUACULTURE INDUSTRY

Chaired by Pablo Ávila and Houssam Hamza

Opening (by chairpersons)

Marine aquaculture sector strategy and best management practices in Egypt
Mohamed Fathy Osman, Alessandro Buzzi, Riccardo Ceccarelli, Biagio di Terlizzi, Mohamed Elaraby, Riccardo Germano, Gianluca Pizzonia, Stefano Morett, Francesca Ottolenghi, Attilio Spanò, Roberto Ugolini and Gabriele Verginelli

Institutional capacity-building and human resources development
Mohamed Fathy Osman, Riccardo Ceccarelli, Mohamed Elaraby, Attilio Spanò, Agostino Totagiancaspro, Marco Notarangelo and Roberto Ugolini

Improving land-based aquaculture development and environmental protection using integrated multitrophic aquaculture in earthen ponds
Maria Emília Cunha, Hugo Quental-Ferreira, Florbela Soares, Domitília Matias, Sandra Joaquim, Laura Ribeiro and Pedro Pousão-Ferreira

Gestion et valorisation des gisements de sous-produits de la mytiliculture méditerranéenne
Jean-Jacques Thibaut and Florent Tarbouriech

Discussion and closure

SIDE EVENT 2

Wednesday 10 December 2014
Afternoon, 17.45–18.45 hours

BOOSTING MARKETS FOR AQUACULTURE / ADVANCING AQUACULTURE INNOVATIONS

Chaired by Pablo Ávila and Houssam Hamza

Opening (by chairpersons)

Exploring the biological and socioeconomic potential of new/emerging candidate fish species for the expansion of the European aquaculture industry (Diversify)
Aldo Corriero, Constantinos C. Mylonas and Rocio Robles

Marine hatchery construction in Egypt: an Italian system action
Mohamed Fathy Osman, Mohamed Elaraby, Attilio Spanò, Agostino Totagiancaspro, Marco Notarangelo, Francesco Santamaria and Roberto Ugolini

The Italo-Egyptian cooperation: seabass and seabream fingerlings production
Mohamed Fathy Osman, Mohamed Elaraby, Attilio Spanò and Roberto Ugolini

Transferts de technologies en ostréiculture méditerranéenne
Jean-Jacques Thibaut and Florent Tarbouriech

Discussion and closure

Appendix 4
Official statements
(in their original language)

OFFICIAL CONFERENCE OPENING

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Giuseppe Castiglione, Under-Secretary of State, Ministry of Agriculture, Food and Forestry Policies, Italy

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Abdellah Srour, Executive Secretary, General Fisheries Commission for the Mediterranean, Food and Agriculture Organization of the United Nations

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Dear Under-Secretary for Agricultural Policies of Italy, Mr Giuseppe Castiglione,
President of the GFCM, Mr Stefano Cataudella,
Executive Secretary of the GFCM, Mr Abdellah Srour,
Secretary General of CIHEAM, Mr Cosimo Lacirignola,

Dear representatives of the Mediterranean and the Black Sea countries and of the European Commission,
Representatives of partner organizations,
Ladies and gentlemen,

I am extremely pleased to be here today among you at this high-level session of the regional conference on aquaculture in the Mediterranean and the Black Sea, an event that the GFCM has spearheaded together with FAO. I would like to convey my sincere gratitude to those who supported us in the preparation and organization phase, namely the Government of Italy, currently presiding the Council of the European Union, the European Commission, our host the CIHEAM, and our partners Eurofish and IUCN. I thank you all for your efforts and cooperation.

Although I could not attend the two-day technical panels which have taken place within the remit of this conference, I am aware that very good outcomes were achieved and I would like to congratulate all the participants for their excellent work. The panels in particular: (i) recognized good governance as a key element to guarantee sustainable aquaculture development, (ii) identified several areas of intervention to address the complex interactions between aquaculture and environment, (iii) offered possible solutions to shift from a production-oriented approach to a market-oriented approach in aquaculture and (iv) fostered progress towards aquaculture innovations, research and development. I am also glad that important aquaculture tools and instruments developed by FAO, such as the guidelines on ecolabelling and traceability and aquaculture risk analysis, were duly considered during these working days. Given these encouraging premises, I look forward to the conclusions that will be agreed upon today.

Against this backdrop, allow me to stress the importance of the recently launched FAO Blue Growth Initiative that revolves around aquaculture and marine capture fisheries as means to make a significant contribution to food security and to the livelihoods of millions of people along the world's seashores and waterways.

The FAO has estimated the global production of aquaculture and marine capture fisheries at roughly 153 million tonnes in 2012, supplying around 18.4 kg/capita per year and 16.5 percent of global animal proteins and essential micronutrients. However, while fish production from capture fisheries has stagnated at around 88 to 90 million tonnes in the recent years, the demand for fish and fishery products has continued to rise. This increasing demand has been steadily met by a robust increase in aquaculture production, but vulnerable populations in low income food deficiencies countries in particular will rely even more on fish in the future for their intake of animal proteins. The FAO is well aware of this, as it is aware of the fact that some 56 million people are directly employed in marine capture fisheries and aquaculture all over the world and a further 140 million are employed along the value chain from harvesting to distribution. These rough figures point to the livelihoods of some 880 million people who are dependent on these two sectors.

We have been advocating the Blue Growth Initiative in order to supplement the framework for marine capture fisheries and aquaculture already put in place by the FAO with its Code of Conduct for Responsible Fisheries twenty years ago. Our challenge is now that of providing incentives and adequate resources to adapt and implement this framework at the local, national and regional level, in order to secure political commitment and governance reform. This includes building effective institutions that result in the adoption of ecosystem approaches to fisheries and aquaculture with fair and responsible tenure systems.

Our position is not a purely theoretical one. Governance reforms consistent with the FAO Blue Growth Initiative are already happening and the GFCM is a concrete example of that. Last week, the 150th Session of the FAO Council has approved, in Rome, the amended GFCM Agreement thus officially concluding the reform of the GFCM initiated in 2011. The amended GFCM Agreement not only includes in its preamble a reference to blue growth, but contains a set of modern provisions that underpin the role of aquaculture in the Mediterranean and the Black Sea, fully consistent with applicable FAO policies. I strongly believe in the role of regional fisheries bodies such as the GFCM to transpose what FAO does at the global level and tailor it to the specificities of the different subregions of the world. Because of this, I have high expectations on this regional conference and I am positive we will receive from you the necessary guidance to further enhance the sustainable development of aquaculture in the Mediterranean and the Black Sea.

I wish you success and I thank you for your attention.
Thank you very much,

Giuseppe Castiglione
Under-Secretary of State
Ministry of Agriculture, Food and Forestry Policies
Italy

Presidente,
Segretario esecutivo,
Autorità,
Eccellenze,
Signore e signori,

Sono stato informato delle attività molto intense che si sono svolte in questi due giorni di lavoro. In occasione dell'ultima sessione della Commissione generale per la pesca nel Mediterraneo, tenutasi a Roma, l'Italia aveva assunto l'impegno che, nell'ambito del semestre di presidenza europea, avremmo tenuto una conferenza regionale sull'acquacoltura. Oggi, abbiamo quindi la piena soddisfazione di aver realizzato quest'impegno, soprattutto alla luce dei risultati ottenuti da questi due giorni di lavoro, che non mi hanno visto partecipe ma di cui sono stato puntualmente informato, e che certamente hanno prodotto, e produrranno, un tavolo di argomentazione molto forte.

Ringrazio in particolare il CIHEAM per l'ospitalità, per l'impegno e per l'organizzazione di quest'iniziativa.

Abbiamo organizzato quest'iniziativa perché diamo particolare rilevanza al tema dell'acquacoltura nel Mediterraneo, che richiede una crescente cooperazione per il futuro. Come sapete, la conferenza è stata articolata in due fasi. Durante la fase che ha coinvolto gli esperti in quattro *panel*, si è lavorato per una buona *governance* dell'acquacoltura, per creare un ambiente sano per un'acquacoltura solida, per dinamizzare il mercato dell'acquacoltura, ma sopratutto per puntare all'innovazione in acquacoltura. I risultati di questi *panel* sono stati sintetizzati e produrranno le conclusioni che saranno in seguito discusse e condivise. Queste conclusioni saranno poi utilizzate dalla CGPM, che le sottoporrà alla sua prossima sessione ai singoli stati membri.

Quando abbiamo preparato il programma del semestre di presidenza europea ed abbiamo deciso di dedicare una particolare attenzione alla pesca e all'acquacoltura, certamente abbiamo pensato al Mediterraneo come un'area, una regione condivisa, e abbiamo affrontato il tema della pesca nell'ambito del *blue growth*. All'acquacoltura, come attività in rapida crescita, abbiamo voluto dedicare, con l'Unione europea, un evento di portata regionale, con scelte comuni che saranno sviluppate a livello regionale.

Lo stato delle risorse biologiche della pesca richiede oggi urgenti misure, mentre il deficit dei prodotti alimentari cresce nell'Eurozona. Noi siamo anche alla vigilia di un grande appuntamento, Expo 2015, una grande sfida culturale che metterà l'Italia al centro dell'attenzione e che sarà dedicata al tema della nutrizione e dell'alimentazione del nostro pianeta. Le risultanze di quest'evento saranno quindi, per noi, preziosi spunti da far valere in quest'ambito.

L'importazione, in molti casi, supera addirittura il 60%, e l'acquacoltura appare quindi come una scelta a cui è impossibile rinunciare: non vogliamo rinunciare alla grande opportunità che viene offerta dall'acquacoltura. Un'affermazione così netta, così sostanziale, così importante, richiede anche delle scelte politiche opportune. Per quanto ci riguarda, siamo alla vigilia della nuova programmazione e dobbiamo mettere in campo la nuova politica comune della pesca. Sopratutto, dobbiamo poter utilizzare quelle risorse che non siamo stati capaci di utilizzare nella programmazione precedente. Oggi, puntiamo quindi ad una lungimiranza e ad una programmazione più accurata, più puntuale, che ci mette in posizione di fare scelte politiche sostanziali e importanti ma anche di poter utilizzare in maniera proficua le risorse che l'Unione europea mette a nostra disposizione.

La riforma della politica comune della pesca assegna all'acquacoltura una grande responsabilità per produrre di più, per produrre meglio, ma sopratutto per produrre in maniera sostenibile. Tuttavia, per noi, nel Mediterraneo, ogni politica di sviluppo non può avere corso se non consideriamo il contesto geografico condiviso in cui operiamo. Il Mediterraneo è un solo mercato, una grande area di scambio, una grande area di impatti ambientali. Dobbiamo poter attivare, in questa grande area, delle politiche regionali. Per questo, pensiamo che la CGPM sia la sede istituzionale più appropriata, più idonea, anche grazie ai contenuti della riforma, per poter avviare un processo formale di crescita nel Mediterraneo.

In questi due giorni avete parlato di *governance*, di temi ambientali, di mercato e di innovazione. Dobbiamo adesso trarre soggetti di interesse regionale cercando inoltre le necessarie sinergie con il mondo della pesca, riducendo i conflitti sullo spazio e sul mercato, e creando nuove opportunità nella fascia costiera attraverso la pianificazione. Sono informato che, su questo aspetto, la CGPM, con la collaborazione di diversi attori, ha fatto davvero grandi passi in avanti. Diamo all'acquacoltura l'attenzione particolare che veramente merita, ma cerchiamo anche una via per una maggiore armonizzazione, per una grande sfida, per avere regole comuni e condivise. Dobbiamo aprire il Mediterraneo ad un orizzonte più globale, più ampio, perché possiamo lavorare a ridurre l'eccesso di offerte con una migliore organizzazione dei mercati, di cui sicuramente potrebbero beneficiare sia i consumatori che i produttori. Tutto ciò si inquadra in una maggiore partecipazione di tutti gli attori che sono in campo, facendo dell'acquacoltura una vera e grande opportunità comune, tra i beni dell'umanità, per usare al meglio gli oceani.

Nella seguente fase di attuazione e di utilizzazione delle risorse, dobbiamo mettere in campo anche una *governance* vera e dei meccanismi istituzionali, delle semplificazioni. Oggi, tutti gli operatori che ho avuto il privilegio di incontrare in questi mesi hanno lavorato su un tema centrale, quello della semplificazione, della sburocratizzazione, per far sì che queste opportunità, queste intuizioni, questa voglia di creare, questo spazio comune, questa volontà di costruire veramente una politica attorno all'acquacoltura, siano anche prolungate con l'attività di semplificazione che, purtroppo molto spesso nel nostro paese, non è stato possibile ancora fare.

Quindi, grazie Presidente, complimenti per le attività che avete svolto, faremo tesoro di ciò che verrà fuori da questi giorni di lavoro. Ringraziamo di nuovo il CIHEAM. Ho avuto il privilegio di seguire questi lavori e porgo il saluto ai lavori di questa importantissima conferenza da parte del Ministro Martina, che ne segue personalmente i progressi e che informerò puntualmente.

Il prossimo appuntamento non sarà solo ad Expo, non solo alla sessione della CGPM, ma sarà un anno importante di lavoro che ci vedrà impegnati in maniera comune. Grazie e complimenti per l'iniziativa.

Stefano Cataudella
Chairperson
General Fisheries Commission for the Mediterranean
Food and Agriculture Organization of the United Nations

Ladies and gentlemen,

Let me present the position of the GFCM Bureau. As a chairman of the GFCM, I have followed with great interest the debates of the technical panels and the discussions that took place on 9 and 10 December. I am very satisfied, in particular, for the way in which the views were exchanged and the debate was fostered. In this regard, I can affirm that we have worked according to the spirit of the GFCM reform, which has constantly promoted a broad consultation process open to different stakeholders and actors. In so doing, we have followed the approach of the GFCM amended Agreement endorsed on 20 May by the thirty-eighth session of the Commission. While reiterating the importance of the regional fisheries management organizations established under the Article XIV of the FAO Constitution in addressing fisheries- and aquaculture-related issues in the Mediterranean and the Black Sea, this amended Agreement has put forward a more modern and efficient framework for the functioning of the Commission.

We are facing many new generation challenges and we need special equipment to discuss them via a systemic approach. The most recent findings by the GFCM Scientific Advisory Committee on Fisheries (SAC) concerning the status of stocks in the Mediterranean and the Black Sea are alarming. The majority of these stocks were found to be in overfishing status and this situation does not only pose biological and ecological concerns to the conservation of the resources, but generates also social and economic concerns such as coastal community livelihoods and the viability of markets, which are of course related to the concept of sustainability.

I am stressing the findings of the SAC here because the status of stocks points to the need for further developing aquaculture in a sustainable way. However, I am not implying that the role of aquaculture is simply that of making up for the decrease in production of marine capture fisheries; aquaculture is a strategic activity that urgently needs political attention at the regional level in the Mediterranean. The continuity of the aquatic ecosystem that we discussed in the panels and the physical flows of fluid dynamics impose international policies. In fact, local impacts have become global ones. There is no possibility to separate them: fluids, atmosphere and aquatic environment, everything is closely embedded. Species, diseases, pollutants could cover large spaces, thus becoming common issues.

After all, we are all aware that there are positive and negative interactions between marine capture fisheries and aquaculture which we have to duly take into account. We urgently need to build upon the positive interactions between marine capture fisheries and aquaculture in order to ultimately reframe the regional policy. We need to shift the focus of the aquaculture sector from the national dimension to its transnational implications deriving from the use of marine spaces, the environment, the spread of pathogens, the diversification of farmed species and market demand. We should remember here that we discussed more than aquaculture opportunities for development and that there is a large part of local communities where people live using aquatic resources. Sometimes, there is a strong overlapping with other uses, labour conditions are not very good, and so on. We should bear in mind that our vision and our task, as the ADG mentioned before, fall under the umbrella of the general vision and mission of the FAO.

This can happen only if, and when, political institutions and governments agree upon common and shared rules through a participatory approach. The international legal framework identifies the GFCM as the forum where regional policies can be formulated,

including through binding measures as in the case of the capture fisheries sector. These policies should aim at promoting the sustainable development of aquaculture in the Mediterranean and the Black Sea, consistent with international agreements governing the law of the sea such as the FAO Code of Conduct for Responsible Fisheries, which recognizes the importance that the aquaculture sector deserves beyond the national level. We also need to bring to the Commission our knowledge, inputs, advice and suggestions, so that these issues can be taken into account to ensure the sustainability of aquaculture in the region through concerted actions.

It is my understanding that we will facilitate this process by making sure that the conclusions of the conference and all the material and papers presented by the experts in the panels will be disseminated by the GFCM Secretariat and transmitted to all the countries in the region, whether they participated or not in this conference. I am sure that the Secretariat will play a very efficient role, and I want to thank the Executive Secretary, the Fisheries Officer, and especially the Aquaculture Officer, Fabio Massa, for their contribution in this very strong effort. This effort indeed provides us with the opportunity to capitalize on the work done and decide how to advise the Commission internally because the work of the Commission rests on a participatory approach: each country is sovereign in taking decision and will take part in the decision-making process, and policies will thus be developed together and on a consensual basis. The degree of maturity that we have showed here in Bari reveals that we possess the skills necessary to develop aquaculture sustainability against the backdrop of the FAO Blue Growth Initiative and ecosystem approach to fisheries. The time has arrived to adopt a set of common and equitable rules that will apply to Mediterranean and Black Sea aquaculture.

For these reasons, I am here expressing my confidence in this conference and in the Commission.

Thank you very much for your attention.

Abdellah Srour
Executive Secretary
General Fisheries Commission for the Mediterranean
Food and Agriculture Organization of the United Nations

Merci Monsieur le Président,
Bonjour,

Au nom du Secrétariat de la CGPM, je souhaite adresser mes plus vifs remerciements à la présidence italienne du Conseil de l'Union européenne qui nous a offert le soutien et le cadre nécessaires à l'organisation d'une telle conférence. Ce n'est un secret pour personne, nous attendions ce moment depuis plusieurs années, et c'est finalement grâce aux efforts de tous que nous sommes parvenus à organiser cette conférence, dont les résultats feront l'objet d'un suivi dans le cadre de la CGPM, comme l'a souligné Monsieur le Président de la CGPM.

Je tiens également à remercier tous les collègues de la FAO, et notamment Monsieur Árni M. Mathiesen, qui nous ont fourni toute l'aide et le soutien nécessaires pour pouvoir mener à bien cette mission.

J'exprime également toute ma gratitude au CIHEAM, qui nous a offert ce cadre magnifique et qui a apporté tout le soutien logistique nécessaire à l'organisation de cette manifestation.

Je remercie toutes les organisations partenaires, Eurofish, le CIHEAM, etc. pour leur collaboration fructueuse avec le Secrétariat de la CGPM.

Ma reconnaissance va aussi à l'ensemble des participants pour leur contribution très active pendant ces deux journées de réunion.

Un grand merci à tout le personnel du Secrétariat, qui a travaillé d'arrache-pied pour rendre possible cette réunion.

Enfin, je remercie les interprètes pour leur patience et leur professionnalisme.

Gianluca Nardone
Director
Agriculture, Rural and Environmental Development Department
Apulia region
Italy

Buongiorno a tutti,

Porto i saluti del Presidente Vendola e del governo regionale, e saluto in maniera particolarmente affettuosa il Sottosegretario Castiglione, con il quale constantemente ci confrontiamo su questo tema, che credo sia da mettere tra i primi posti della prossima agenda politica. Credo che in qualche maniera l'acquacoltura, la risorsa mare, debba diventare un elemento economico essenziale nel sistema Italia e, in maniera particolare, nel sistema pugliese.

Abbiamo invitato il Sottosegretario Castiglione, insieme al Dottor Rigillo, che saluto anche con piacere, a partecipare a un tavolo di coordinamento politico, che si terrà il 17 dicembre a Roma proprio sul tema della risorsa mare e in maniera particolare sul tema dell'acquacoltura e in cui dibatteremo per definire anche le logiche e le risorse da dover utilizzare per la prossima programmazione.

Ci confrontiamo costantemente perché credo che, in qualche maniera, la Puglia, e non solo la Puglia ma il sistema Italia, probabilmente non hanno potuto porre grande attenzione nel confronto di questa risorsa che credo che debba diventare una risorsa importante.

Siamo orgogliosi di avervi tutti qui oggi, per questo momento di grandissima importanza, che si concluderà con questo documento che dovrà metterci in condizione di fare veramente una politica di sviluppo sul settore dell'acquacolura. Lasciatemi fare anche un passaggio sul settore della mitilicoltura, che credo sia un elemento essenziale della nostra Puglia. Questo documento ci permette di mettere in rete 18 paesi e anche il Mediterraneo e il Mar Nero, affinché possano incominciare ad integrarsi, a fare politiche intelligenti.

Personalmente, ho dedicato molto tempo alla risorsa mare. Il mio percorso finirà tra qualche mese, poi non sappiamo quello cosa succederà dopo. Mi auguro che questo percorso possa essere seguito in maniera molto attenta, efficace ed efficente, perché ci credo molto. Sopratutto, credo molto che questo settore possa essere uguagliato al settore dell'agricoltura, in termini di interessamento nei confronti dei giovani, dell'innovazione, della ricerca. Credo che sia un elemento essenziale per farlo sviluppare in maniera seria.

Grazie a voi per essere cui e mi auguro che questo documento ci possa mettere in condizioni di poter lavorare in maniera veloce, ma sopratutto in maniera efficiente.

Colgo anche l'occasione per salutare tutti quanti voi e anche chi ci ospita, al di là del fatto che siete in Puglia, il CIHEAM, in particolar modo il Dott. Lacirignola, che ringrazio per il suo impegno.

Grazie a voi.

Vojo Bregu
Secretary General
Ministry of Agriculture, Rural Development and Water Administration
Albania

Within the fisheries and aquaculture industry in Albania, aquaculture is the sector that is attracting the attention of investors and it is potentially the fastest growing one and, including the food-production sector, as it provides fish for human nutrition and poverty alleviation.

Aquaculture in Albania has a rather long history since it started about 60 years ago, with the polyculture of the carp family spectrum. Today it is gaining a new vision, a new structure and technology. It has been developed with the intensive aquaculture of marine species along the Ionian coast (cage culture), the intensification of cold water salmon systems (*Oncorhynchus mykiss* and *Salmo letnica*), the extension of mussel culture from the Butrinti lagoon to the open sea. It has become an important component of the Albanian economy, meeting the fish consumers demand, creating benefits for the farmers – benefits that provide employment and increase income – and improving the spectrum of protein food for consumers. Today, aquaculture production is reaching about 5 000 tonnes/year.

The potential of aquaculture for continued expansion and growth in Albania is great and essential. Our challenge now is how to ensure the sustainability of aquaculture development. Taking measures that encompass environmental, economic and social aspects through better governance process is the answer.

In a context where several reforms have been undertaken by the Albanian Government, the Ministry of Agriculture, Rural Development and Water Administration is planning to establish a proper institutional framework with distinct legal aspects for fishery and aquaculture, through a comprehensive strategy, national and local plans as well as policies.

The existing legislation on aquaculture shows the importance of aquaculture in Albania and aims at ensuring:

- a deserved place for aquaculture in the management plans for integrated coastal zone management;
- the identification of allocated zones for aquaculture and the definition environmental assessment policies;
- the development of responsible aquaculture through fish production control and fish quality to guarantee good aquaculture practices;
- meeting the standards of quality and hygiene;
- facilitating licensing procedures and policies through transparent processes in issuing authorization for aquaculture at lower cost and with shorter timeframes;
- the establishment of data collection systems to overpass today's insufficient and/or unreliable data; and
- subsidiarity.

The Albanian challenge for the aquaculture industry is high, but thanks to the support provided by international and regional organizations such as the European Union, the FAO, the GFCM and Eurofish, we believe that achieving them will be easier and sucessful.

Rafik Moualek
Director of Studies
Ministry of Fisheries and Fishery Resources
Algeria

Monsieur le Président,
Mesdames et Messieurs,
Honorable assistance,

C'est pour moi un honneur et un grand plaisir de prendre part à cet évènement spécial de haut niveau traitant du rôle de l'aquaculture dans le développement durable et de vous présenter, quoique brièvement, les progrès accomplis ces dernières années par l'Algérie dans ce domaine afin de hisser cette activité à la mesure des potentialités nationales.

Je voudrais, avant de commencer, saisir cette occasion pour exprimer mes vifs remerciements à la FAO et à la CGPM pour avoir organisé cette rencontre qui sera, sans aucun doute, la meilleure tribune pour la communauté internationale à même d'adopter de nouvelles approches de développement durable de l'aquaculture fondées sur l'écosystème, la promotion de la coopération et l'accès à l'investissement et aux marchés. Nous les félicitons pour cette louable initiative.

Monsieur le Président,
Mesdames et Messieurs,

Résoudre le problème du déficit des produits halieutiques issus de la pêche, œuvrer pour la reconstitution des stocks, adapter l'effort de pêche pour assurer la durabilité de la ressource, sont les raisons qui ont fait que l'aquaculture est actuellement en plein essor dans beaucoup de pays.

Il est vrai que le développement de l'aquaculture a connu un véritable essor dans de nombreux pays générant ainsi diverses richesses au plan socio-économique, mais qu'il demeure minime voire naissant dans une grande partie des régions du monde et, plus particulièrement, sur le continent africain, où il est resté très limité. Les raisons en sont multiples et résident dans une série de facteurs liés notamment à la faiblesse des capacités des producteurs, aux difficultés d'accès aux technologies et de mobilisation des ressources financières nécessaires, à l'absence d'assistance pour soutenir les politiques de développement dans ces pays et à leur incapacité à concilier le plus souvent le développement de l'aquaculture avec les autres usages des espaces convoités en matière d'allocation et/ou d'exploitation des ressources naturelles disponibles.

Aussi est-il nécessaire, aujourd'hui plus que jamais, de s'intégrer en harmonie avec les exigences de l'heure, afin de renforcer la coopération dans ces régions d'une manière ciblée qui ne saurait être effective qu'à travers notamment un renforcement des dispositifs institutionnels, juridiques, financiers et environnementaux y afférents, et ce, grâce à la prise en compte de considérations relatives à l'écosystème afin de garantir durablement le développement de l'aquaculture en Afrique.

Monsieur le Président,
Mesdames et Messieurs,

Lutter contre la dégradation de l'environnement n'a plus de frontière. En effet, l'écosystème aquatique est aujourd'hui victime à la fois des incidences d'une pêche effrénée mais également des dommages exogènes dont, particulièrement, la pollution et les changements climatiques. Il nous incombe, à cet égard, de favoriser davantage des pratiques d'aquaculture responsables dans le but de réduire au minimum les effets

nuisibles à l'écosystème tout en conciliant, bien entendu, les objectifs économiques et les objectifs environnementaux de développement durable en Afrique.

Ainsi, les activités aquacoles, y compris les pêches continentales, ont bénéficié, dès 1999, d'une politique soutenue de la part du Gouvernement algérien, tant en termes d'actions de développement que de mesures d'accompagnement, afin de les intégrer durablement dans le processus de l'économie sectorielle, eu égard aux potentialités naturelles que recèle le secteur et qui sont susceptibles d'être valorisées par l'aquaculture.

Monsieur le Président,
Mesdames et Messieurs,

Sur le plan institutionnel et organisationnel, le secteur de l'aquaculture, au niveau des zones littorales, a été caractérisé par un élargissement de ses missions et prérogatives à l'effet d'une meilleure prise en charge des dispositifs d'administration et de gestion des activités planifiées, où l'on enregistre la présence de quatorze directions de la pêche et de l'aquaculture à façade maritime.

Au même titre, au niveau continental, notre action s'est soldée par l'institution à l'intérieur du pays de sept directions de développement de l'aquaculture à compétence territoriale, intervenant sur les différents étages biogéographiques du territoire national, et ce, afin d'encadrer le développement des activités aquacoles par les eaux superficielles et souterraines, notamment les ressources hydriques sahariennes, pour les valoriser par la pisciculture d'espèces de poissons d'eau chaude.

Sur le plan juridique, l'action sectorielle a été caractérisée par l'adaptation des législations et réglementations nationales en matière de codification des activités aquacoles nationales et des autres établissements d'aquaculture, dont les fondements et principes se sont basés particulièrement sur l'article 9 du Code de conduite pour une pêche responsable de la FAO, en l'occurrence le concept d'utilisation durable des potentialités.

Parallèlement à ces encadrements, l'engagement du secteur a été également caractérisé par une série d'actions d'investissement public revêtant un caractère de démonstration et de vulgarisation envers la profession, à travers la réalisation d'unités d'aquaculture pilotes dans les filières de conchyliculture, mariculture, pisciculture d'eau douce (pisciculture et crevetticulture) et techniques de pêche continentale, et ce afin d'accompagner le secteur privé et de mettre à niveau ses capacités dans ces domaines en fonction des évolutions technologiques en la matière.

Au même titre, tout un dispositif d'action et de solidarité gouvernementale a été lancé en vue d'assurer une meilleure intégration des activités d'aquaculture avec l'environnement, les ressources en eau, l'agriculture, le développement rural, l'industrie, les travaux publics et le tourisme notamment, l'objectif étant de renforcer les passerelles d'intersectorialité de réunir les conditions d'une stratégie durable de développement à long terme dans le cadre du programme Aquapêche 2020.

Toutes ces actions ont permis, à la faveur d'une série de mesures incitatives gouvernementales, l'émergence de diverses opportunités de création d'entreprises privées dans le domaine de l'élevage et de la capture, notamment la création de fermes aquacoles marines et d'eau douce, l'installation d'établissements conchylicoles et la réalisation de centres de pêche continentale sur le littoral et à l'intérieur du pays, voire même dans le sud.

Monsieur le Président,
Mesdames et Messieurs,

L'expérience aquacole menée en Algérie durant cette dernière décennie a été confrontée à un certain nombre de contraintes complexes d'ordre environnemental, réglementaire et/

ou relatif à l'accès foncier, au crédit, à l'indisponibilité des intrants, au manque de savoir-faire etc. Ces contraintes ont freiné le développement de l'aquaculture et leur persistance dans le future risque de mettre en cause la pérennité et la durabilité des filières aquacoles, car elles s'avèrent particulièrement importantes notamment quand il s'agit de questions fondamentales telle que l'utilisation du territoire, l'accès au crédit, etc.

À cet effet et en prévision du lancement du prochain programme de développement de l'aquaculture, une réflexion a été lancée associant toutes les parties prenantes du développement de l'aquaculture au niveau national: universitaires, chercheurs, administrateurs, formateurs, producteurs investisseurs, banquiers, etc.

De cette stratégie de développement adoptée par le secteur, il est attendu, à l'horizon 2020, la création de plus de 352 projets d'aquaculture d'eau de mer et d'eau douce, toutes filières confondues, visant une production de 100 000 tonnes répartie entre l'aquaculture marine, avec 80 000 tonnes, et l'aquaculture d'eau douce, avec 20 000 tonnes, et plus de 10 000 emplois directs créés. Pour la concrétisation de ce programme, il a été mis en place un système d'accompagnement à l'investissement productif des filières de la pêche et de l'aquaculture (bonification des taux d'intérêts, encadrement et suivi technique, formation, identification des zones d'activités aquacoles, etc.). Au cours de la première phase du programme, la priorité sera accordée aux filières de pisciculture marine et de conchyliculture, par l'intensification de la pisciculture marine offshore et le développement de la conchyliculture. Ce choix est justifié par l'avantage qu'offre cette option aux investisseurs, car elle leur permet d'entrer en production dans des délais relativement courts. Ainsi, pour cette première phase, les concessions déjà octroyées à des investisseurs et les zones d'activités aquacoles déjà affectées serviront d'assiette de terrain pour recevoir les projets de pisciculture marine et de conchyliculture.

Toutes ces initiatives auront certainement des effets probants sur la production ainsi que sur le plan socioéconomique, à court et moyen terme, mais nous restons convaincus que des efforts supplémentaires restent à déployer, à long terme, en vue d'éviter les erreurs du passé et de se prémunir des effets négatifs et des expériences malencontreuses vécues dans différentes régions du monde.

C'est là que se situent nos préoccupations et nos besoins d'assistance. Nous avons besoin de mieux planifier nos efforts de développement tout en tenant compte, bien entendu, des aspects liés à la sécurité sanitaire des produits d'élevage, au commerce international, à l'amélioration des circuits d'information statistiques et à la gouvernance du secteur d'une manière générale, et ce, afin de garantir à l'aquaculture son véritable rôle dans le développement durable.

Je vous remercie, Monsieur le Président, Mesdames et Messieurs,
pour votre aimable attention.

Željana Đođo
Counsellor of the Minister for Fisheries
Cabinet of the Minister for Fisheries
Ministry of Agriculture
Croatia

Ladies and gentlemen,

On behalf of the Minister of Agriculture of Croatia I would like to greet you. I am very honoured to be here in Bari at this very important conference. First of all, I would like to thank the organizers for such a great organization and also Fabio Massa for inviting us to participate in this conference.

Croatia is the newest European Member State, the youngest one in Europe. The accession to the European Union has been demanding but beneficial. The aquaculture sector in Croatia comprises both marine aquaculture and freshwater farming. Croatian marine products output has increased over the last few years and aquaculture represents today a high-value industry whose further development depends on the availability and sustainable use of natural resources in the continental and coastal environment.

The most important aspect is the public perception of how these resources are utilized. This can have a significant effect on aquaculture development and it can also provide an incentive for its further development or, on the contrary, represent an insurmountable obstacle. The best way to improve the public perception of the aquaculture is to ensure an active presence of the industry itself in synergy with the state and the regional and local administrations which support and monitor aquaculture development. The task of administration bodies is to provide a quality legislative framework which enables the sustainable development of aquaculture. The task of the industry is to provide the public with insights into production practices and to demonstrate that, during the production process, appropriate attention is devoted to all the aspects related to environmental protection, welfare of organisms in farming, safety and quality of products.

So far, several surveys have been conducted in Croatia in order to gain an insight into consumers' attitude regarding farmed fish as opposed to wild fish. Among other things, the objective of these surveys was also to determine the level of public awareness concerning fish farming in Croatia. The results of these surveys have showed that as many as 8 out of 10 Croatians select wild fish as opposed to farmed fish, and that only 1 out of 5 Croatians does not have prejudices concerning the quality of farmed fish. Consumers often stated that they thought farmed fish was fattier, softer and less tasty and that the prerequisite for introducing farmed fish into their diet was lower price, lower fat percentage, increased diversity, labelling, good level of processing and improvement of accessibility. Based on these results, it appears clearly that the national market requires targeted informative and marketing activities in order to increase the consumption of farmed products.

Furthermore, Croatia is a popular tourist destination and it is necessary to conduct zone planning. In that sense, a careful approach to spatial planning is a key factor. We can proudly say that we have started with those activities and that we are aware of the possibilities to establish fish and shellfish farms. A consistent implementation of spatial planning enables a coordinated and integrated approach to the management of the natural environment, assuming responsibilities and ensuring transparency while involving relevant stakeholders and enabling a better understanding of the effects and interactions among the users of the resources as well as between users and the environment. Spatial planning also provides an efficient mechanism for achieving aquaculture sustainability and it introduces transparency into policies and decision-

making processes while enabling a better understanding of the needs related to the improvement of the legal framework.

Aquaculture also has significant effects on the social and economic situation at the local level. It represents an economic activity that provides employment for the local people throughout the year and it has the potential to reduce the trends of depopulation of rural areas, sensitive coastal areas and islands communities while also helping to preserve the cultural heritage. The fisheries and aquaculture sector in Croatia makes a very small contribution to the national GDP, estimated at about 0.2 percent and 0.7 percent. This low proportion hides significant regional differences; in some parts of Croatia, aquaculture should be an important source of employment for local communities.

Finally, expanding our products and certifying them offer a number of possibilities that may add value to the basic product and differentiate it from similar products found on the market thanks to a recognition of the specific characteristics of the production, which Croatia certainly has.

For all these reasons, the conclusions we hope to reach at this conference will be very valuable for us.

Thank you for your attention.

Mohamed Osman Fathy
Professor of Fish Nutrition
Faculty of Agriculture
Ain Shams University
Egypt

Your Excellency Mr Castiglione, Italian Presidency of the Council of the EU,
Mr Stefano Cataudella, Chairperson of the GFCM,
Mr. Árni M. Mathiesen, Assistant Director-General of FAO,
Mr Abdellah Srour, Executive Secretary of the GFCM,
Mr Cosimo Lacirignola, General Secretary of CIHEAM,

At first, let me convey to all of you the greetings of Prof. Dr Adel El-Beltagy, Minister of Agriculture and Land reclamation of Egypt, and his best wishes for a successful and fruitful meeting which will adopt recommendations to meet the interests and aspirations of the people of the Mediterranean basin countries.

The interest of Egypt in the new concept of aquaculture has evolved since the early 1980s and the Egyptian Law 124 has been established to facilitate the expansion of the aquaculture sector and to support investors at all levels, including in very small projects, so that they could launch new activities without any obstacles. At the outset, aquaculture was not so advanced and the need for aquaculture products was very limited. However, starting from the early 1990s, the government launched a strategy to fill the animal protein gap by increasing fishing activities; this helped raise awareness of the importance of fish products as a healthy source of animal protein and led to an increase in demand. At the same time, natural fish resources were exhausting due to overfishing. Semi-intensive aquaculture projects started to be disseminated around the north lakes of the country, where most of the aquaculture farms are now established.

The need for environmental impact assessment was also very vital. Therefore, a new law to organize the relationships between aquaculture and surrounding activities is a must to avoid any harmful effects on the environment. The General Authority of Fish resources Development is now responsible for guiding sustainable aquaculture, as one of the most important sources of animal protein.

Today, the strategy in Egypt is based on the utilization of all water resources in an efficient way, with the reuse of fresh water through aquaculture–agriculture integration now taking place in all new reclamated desert areas through a cycle water well–fish ponds–plant irrigation. In addition, marine aquaculture and marine hatcheries are also operating.

We hope that the new concept of integrated aquaculture will be the new target of Mediterranean countries to utilize all available resources efficiently.

Thank you again and wishing you a successful meeting.

Fabrizio Donatella
Head of unit
Directorate-General for Maritime Affairs and Fisheries
European Commission

Ladies and gentlemen,

It is an honour for me to attend this conference. I have heard that the last two days have been vibrant and a source of interesting discussions.

This conference comes at a time of new opportunities. The Juncker Commission took office one month ago. Commissioner Vella has responsibility both for maritime affairs and for the environment. He has a clear mandate to promote blue growth and green growth – to deliver more sustainable jobs in Europe. This new set-up clarifies even further that sustainable aquaculture and the protection of the environment are two sides of the same coin. Indeed, the European Commission has already recognized the need to provide further guidance on the implementation of environmental legislation such as the Water Framework Directive and the Marine Strategy Framework Directive to achieve harmony in the development of European aquaculture while protecting, preserving and enhancing marine and freshwater habitats.

In April last year, we published the EU Strategic guidelines which identified the main barriers to growth in the sector and challenged the Member States to develop strategic plans including concrete actions to address the barriers to growth.

Member States have now started to submit their detailed national plans for the sector and we are encouraged by the initial response. Member States are definitely taking this challenge seriously and reflect a unifying confidence and optimism for expansion in the sector over the next 10 years. Available economic data suggest that EU aquaculture has weathered the financial crisis and is now in a phase of consolidation, with good potential for economic growth in the coming years. This is the time to address the barriers that hinder this potential.

We are already witnessing the first actions being taken to make administrative procedures more efficient. For example, some (Mediterranean) EU Member States have announced the establishment of structures such as interministerial aquaculture task forces or dedicated units, at the national and regional level, to ensure better coordination within the public administration. Various Member States have also indicated their intention to create a permanent platform to ensure an ongoing dialogue between the public administration and the industry. We welcome these timely initiatives, and look forward to supporting the work of these new structures by providing them with information and examples of best practice from all over Europe and beyond.

Another popular measure foreseen by a number of Member States to improve administrative procedures is the establishment of a one-stop-shop for aquaculture licensing, so that applicants do not have to interact with several different offices. This is yet another example of good practice which can be transferred and applied in different countries in order to reduce the administrative burden on aquaculture producers. A one-stop-shop is not a silver bullet that will solve all the problems and remove all administrative burdens, but experience in different countries shows that it can help make the licensing process more efficient.

Maritime spatial planning is also high on the agenda of many Member States in their strategic aquaculture plans, as an important tool to manage and to choose between conflicting and complementing activities. Competition for maritime space – for renewable energy equipment, aquaculture and other growth areas – has highlighted the need for efficient and sustainable management, to avoid potential conflict and create synergies between different activities. We have now put in place a very effective new legal tool, unique in the world, in fact. The Maritime Spatial Planning Directive will

allow EU countries to manage the competition for space, to assess the human impact in a cumulative way, and choose the right spots for the right activities.

The Directive, which came into force in September, offers better transparency and predictability on marine planning issues. The removal of uncertainty regarding access to suitable space for marine aquaculture will lead to much greater potential in the sector to attract private investment. Spatial planning does more than facilitate fair competition for space: it is a tool which puts better business conditions in place for producers and investors, which paves the way for increased investments, delivering jobs and growth.

Some Member States have indicated their intention to carry out studies to designate or identify the most suitable areas for aquaculture. Other Member States already have planning activities at an advanced stage with detailed interactive and analytical maps of areas with potential for aquaculture development and harmonization of regional planning frameworks.

Spatial planning is also being addressed on a cross-border basis. Adriplan is an EU-funded project giving regions and stakeholders of the Adriatic a clearer view of how shipping, offshore installations, aquaculture farms, marine protected areas or tourism can sustainably coexist. Seven coastal countries are involved, including Italy, Slovenia, Croatia, and Greece as partners. This is great because the project will develop for the first time a common approach to cross-border marine spatial planning in a region (Adriatic and Ionian Sea).

Besides breaking down the administrative obstacles to investment and growth, it is also important to give aquaculture the positive image it deserves by providing better consumer information and enhancing awareness about locally farmed seafood, its quality and sustainability.

The benefits of research and development with strong industry partnerships are widely recognized across Member State plans as a key to improving competitiveness. The transfer of new technologies and innovations from the lab to the farm is a priority and will lead to improvements in efficiency, modernization, and reduction of environmental impact.

Member States plan to achieve this by financing projects which target, for example, the development of hatcheries focusing on species diversification and advanced breeding programmes, as well as initiatives on diseases, improvements in production equipment, and animal health and welfare. These are all aspects which can further improve production standards and highlight the true added value of farmed seafood.

In this context, another common theme across plans is the pooling of resources through the creation and strengthening of producers organizations. The plans identify them as opportunities to achieve a greater economy of scale for elements like transport and raw materials costs, while also greatly strengthening the impact of marketing measures. A number of Member States plan dedicated studies and surveys through the producers organizations to better understand existing and potential markets for their products, which will be followed up by targeted information and promotional campaigns.

We will press Member States to deliver the objectives and targets outlined in their strategic plans through monitoring and review of their actions, but we will also continue to support them in their efforts.

Ladies and gentlemen,

Marine fisheries and aquaculture are crucial, both socially and economically, to many countries of the Mediterranean region and the Black Sea, providing animal protein and supporting food security for millions of people. We must continue to build the right conditions for aquaculture to flourish in harmony with the environment, and in a shared market, through modern governance, experience and knowledge sharing,

and cooperation in the area. The EU will continue to do all it can to deliver and meet this challenge, to establish a framework to provide support and the conditions that encourage aquaculture to grow.

Philippe Maraval
Deputy Head
Shellfish Farming and Coastal Environment Department, Maritime Fisheries and Aquaculture Directorate
Ministry of Ecology, Sustainable Development and Energy
France

Mesdames et Messieurs,

L'ensemble de ma délégation souhaite remercier la présidence italienne de l'UE, le Centre international de hautes études agronomiques méditerranéennes pour la qualité de son accueil, ainsi que la CGPM et la FAO pour l'organisation de cette conférence, mais également tous les participants pour leurs contributions de grande qualité.

Les débats et les échanges ont été riches et il ne m'est pas possible de revenir sur tout, d'autant plus qu'on a pu constater avec satisfaction une grande convergence sur les principaux enjeux et problématiques. La déclaration finale le reflètera.

Je souhaiterais particulièrement insister sur les questions de méthode et de gouvernance: la France se réjouit de voir la planification spatiale maritime ainsi que l'approche participative mises en avant, notamment à l'échelle sous-régionale, car elles sont primordiales lorsqu'il s'agit de faciliter l'implantation et l'acceptation de projets aquacoles au sein des territoires. Nous espérons que le Comité scientifique consultatif de l'aquaculture de la CGPM puisse pleinement s'emparer de ces sujets et leur donne les prolongements qu'ils méritent.

J'ajouterai également que la connaissance des marchés, ainsi que la bonne prise en compte des interactions entre l'environnement et l'aquaculture, de la conception de projets à la question des effluents en passant par la prise en compte des services écosystémiques que peut rendre l'aquaculture, sont autant d'éléments qui ont été évoqués durant cette conférence et qui constituent des pistes de recherche que doivent explorer nos scientifiques dans le but de donner à ce secteur d'avenir qu'est l'aquaculture, toute la place qu'il mérite dans le développement régional.

La France tient enfin à souligner que de telles conférences sont indispensables car elles permettent de renforcer l'entraide entre les pays méditerranéens et de favoriser la diffusion de bonnes pratiques, en vue de renforcer notre capacité collective à assurer la sécurité alimentaire de nos populations et à produire de la richesse en tirant profit, de manière durable, des ressources d'un écosystème commun remarquable: la Méditerranée.

Marina Petrou
Director of unit
Directorate General for Fisheries
Ministry of Rural Development and Food
Greece

On behalf of the Minister of Rural Development and Food, I would like to underline that:

- The development of sustainable aquaculture for food security is a responsibility and dominant national priority.
- To achieve this goal we recognize the importance of the cooperation of stakeholders and the need of assistance of the scientific society in order to exploit opportunities and develop innovative methods.
- We support all the efforts at the international level, in particular within organizations such as GFCM/FAO.

Tamar Ziv
Deputy Permanent Representative to the UN Organizations in Rome
Embassy of Israel in Roma
Israel

Ladies and gentlemen,

I would like to express Israel's honour and appreciation to our Italian hosts and the GFCM for inviting us to this important conference. I convey the sincere regrets of our Minister, Mr Yair Shamir, and our Director-General, Mr Ramy Cohen, for not being able to attend this ministerial conference on "Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security".

Israel's aquaculture provides about 25 percent of the national consumption, through two main sectors: inland aquaculture (fresh and brackish water) and marine aquaculture. In Israel, inland aquaculture is a traditional activity, practised mainly by Kibbutzim (collective communities) on the periphery maintaining a stable production level through the last two decades. It combines the usage of dual-purpose reservoirs (for irrigation and fish production) and contributes to open space sceneries, migrating birds, and provides natural assets to the public. Marine aquaculture is practised in the Mediterranean waters. Following the removal of cage cultures from the Red Sea, a serious effort is being devoted to the development of offshore cage farming. Offshore farming in the Mediterranean Sea is practised today in a fully exposed site, 12 km offshore, facing a long stretch of sea coming all the way from Italy to the east Mediterranean coast, where waves can reach up to 12 metres and more.

Presently, Israel's planning authorities are intensely involved in spatial planning of its territorial and economic zone in the Mediterranean Sea. This activity is mainly derived by the recent discoveries of gas reservoirs and the acceleration of the economic interest of many stakeholders in the Israeli Mediterranean, including marine aquaculture.

At present, Israel's aquaculture, while striving to retain sustainability, is facing three main challenges: environmental, social and economic. On the environmental front, the government is involved in promoting a reform that will reduce externalities while improving production performances. On the social and economic fronts, marine aquaculture is competing with other users of marine areas in the Mediterranean, by proposing policy documents of large scale development of offshore farming. Israel, along with the other countries that surround the Mediterranean and the Black Sea, recognizes the importance of developing sustainable aquaculture for both open marine and inland fishing resources. Sustainable aquaculture is essential in order to ensure food security for the populations within the region and the entire world for generations to come.

We welcome the joint efforts to rehabilitate the fishery resource along the eastern coast of the Mediterranean Sea and stress the importance of cooperation between all the Mediterranean countries in order to contribute jointly to the economy and welfare of their people as a whole.

Israel's aquaculture is sharing similar challenges as in other Mediterranean countries, including promoting proactive governance, reducing the dependency on fishmeal and oil, and developing domestic and international markets. Israel would be happy to share its knowledge developed with all countries concerned, to collaborate on research and development, to transfer technology and seek commercial opportunities for its products and technologies.

We believe that this international blue growth venue is an important step and we hope to be involved in future initiatives.

Thank you.

Riccardo Rigillo
Director General
Directorate General for Maritime Fisheries and Aquaculture
Ministry of Agriculture, Food and Forestry Policies
Italy

L'iniziativa odierna raccoglie tutti gli attori dell'acquacoltura mediterranea, quale elemento fondamentale per la crescita e per lo sviluppo di una sicurezza alimentare sostenibile.

Nel Mediterraneo, le misure miranti ad armonizzare le politiche per regolare l'uso sostenibile degli spazi – spesso condivisi – richiedono una particolare attenzione ai modelli di cooperazione e sussidiarietà da utilizzare. Dal punto di vista dell'Unione europea, il caso del Mediterraneo rappresenta un modello geopolitico unico. Infatti gli Stati membri rappresentano un numero ridotto, se confrontato con il numero di Stati delle sponde sud-orientali di questo bacino. Ciò comporta che la pesca in questo quadro sia un tema sensibile, anche in riferimento al ruolo che la nuova Politica comune della pesca europea vuole dare alle misure di gestione finalizzate ad un uso sostenibile, che garantisca allo stesso tempo i beni comuni e le attività economiche a lungo termine.

Per questi motivi, tra le iniziative del semestre di Presidenza italiana del Consiglio dell'Unione europea, l'Italia – attraverso il Ministero delle politiche agricole alimentari e forestali – ha dedicato particolare attenzione alle politiche della pesca, con uno specifico riferimento alla regione Mediterranea. Ad Augusta, in Sicilia, lo scorso 30 ottobre, abbiamo affrontato i temi della pesca nell'ambito della economia blu: ci siamo confrontati con i vari attori istituzionali e della società civile, e abbiamo dato spunti per riflessioni che pongano sempre più, nell'ambito della crescita blu, i temi della pesca. Il tutto per evitare un allontanamento tra temi ambientali ed attività socioeconomiche dalla cui saldatura dipenderà invece il nostro futuro. Qui a Bari, con l'ospitalità dello IAM di Bari e la collaborazione della FAO e della CGPM – competente anche in materia di acquacoltura nella sua area geografica di riferimento – la Presidenza italiana e l'Unione europea hanno deciso di dare un contributo al dibattito politico sull'acquacoltura, partendo dalle più qualificate esperienze tecnico-scientifiche nonché dal mondo della produzione.

L'acquacoltura è parte della politica della pesca, e si integra alle politiche agricole nelle zone continentali. Essa infatti contribuisce alla produzione di organismi acquatici destinati, per lo più, all'alimentazione umana. Lo stesso Codice di condotta per una pesca sostenibile della FAO, all'articolo 9, definisce i principi di una acquacoltura consapevole delle necessità di non ledere importanti diritti – come quelli legati alla conservazione dell'ambiente ed alla tutela dei consumatori – garantendo nel tempo qualità, sicurezza alimentare e benessere generale. L'acquacoltura, per i non addetti ai lavori, potrebbe essere messa a giusto titolo tra le attività zootecniche, ma in realtà lo svolgersi delle attività in mare e la continuità degli ecosistemi acquatici la rendono un' attività con sue specifiche caratteristiche.

Sul piano delle politiche, l'acquacoltura non è una attività di interesse esclusivamente nazionale. Infatti, siamo qui tutti insieme proprio per identificare i problemi di interesse transnazionale, che richiedono politiche condivise e una forte propensione alla cooperazione. Molti trattati internazionali, nel contesto multilaterale, considerano l'acquacoltura volta a volta nell'ambito delle politiche ambientali, delle regole dello scambio delle merci, delle barriere sanitarie e doganali. Per questo, abbiamo pensato che promuovere, da parte dell'Unione europea, una serie di riflessioni sul tema, possa aprire la strada a future modalità regionali per gestire questo tema strategico. L'acquacoltura ha, infatti, un ruolo strategico in quanto genera produzioni alimentari, occupazione, e può – se ben programmata – sostenere le politiche di conservazione delle risorse della pesca.

Il Mediterraneo è sostanzialmente un mercato unico per i prodotti del mare. Gli scambi tra i paesi sono molto importanti e oggi, in questa regione, le produzioni di pesca equivalgono a quelle di allevamento, considerando pesci e molluschi. Dunque, è necessario lanciare politiche pubbliche e una cooperazione costruttiva tra le imprese per aumentare le *performance* di questo settore. In tal senso, abbiamo pensato di coinvolgere la FAO per il suo ruolo multilaterale come agenzia esecutiva delle Nazioni Unite, e la stessa CGPM, che è una delle organizzazioni regionali della FAO, competente anche per l'acquacoltura. In questo quadro, tutti i paesi possono contribuire a costruire un sistema di regole comuni finalizzato a condividere le opportunità e a superare gli eventuali limiti allo sviluppo sostenibile. I risultati del nostro lavoro saranno a disposizione della CGPM, che ha competenza anche sul Mar Nero, e le opportune istanze decisionali ne potranno fare l'uso più appropriato per deliberare secondo le regole dell'accordo.

Quello che a noi preme oggi è la possibilità di far emergere appieno le potenzialità di un settore che, a livello internazionale, è cresciuto più di altri settori delle produzioni alimentari, nella certezza che gran parte dei prodotti ittici nel futuro sarà prodotto da questa attività. È nostro compito far emergere le specificità mediterranee e rendere gli stati e le amministrazioni consapevoli della necessità di condividere, pur nelle regole di mercato, le opportunità che questo settore ci offre. Ritengo che vada fatto uno sforzo comune di ricerca pubblica per attuare controlli utili a difendere l'acquacoltura di qualità, amica dell'ambiente, e facilitando il ruolo delle imprese attraverso la semplificazione burocratica e l'abbattimento delle vecchie barriere. Lo scambio commerciale, il trasferimento delle tecnologie, la formazione e lo scambio delle risorse umane sono i temi al centro dell'attenzione, così come lo sviluppo di sistemi di certificazione, intesi non come vincoli ma come opportunità per premiare chi meglio opera sul piano ambientale, della sicurezza alimentare, dei diritti di chi lavora e dell'ambiente.

Il mare è il grande spazio comune che ci resta. Conosciamo i limiti dello sviluppo sulla terraferma e dobbiamo farne tesoro per una acquacoltura veramente proiettata nel futuro. Penso ad esempio allo sviluppo nell'uso di materie prime alternative alle sole farine di pesce – una sfida non facile; penso al controllo delle patologie; penso all'uso programmato degli spazi con regole comuni, in un mare comune. Spesso leggo che l'acquacoltura è soprattutto – su scala globale – un'attività asiatica. In quella regione si concentra oltre l'80 percento delle produzioni mondiali. Ritengo tuttavia che anche alle nostre latitudini dobbiamo prendere coscienza che quest'attività ha opportunità non del tutto utilizzate. Dobbiamo prenderne coscienza, a partire da oggi, per far sì che un limite che è stato finora un limite di visione e quindi un limite delle politiche, non diventi sempre più un limite per l'operare delle imprese.

Grazie.

Hassan Nhhala
Head
Aquaculture Centre of M'diq
National Halieutic Research Institute
Morocco

Mesdames et Messieurs,

La délégation marocaine tient, en premier lieu, à vous informer que le représentant du Ministère de la Pêche Maritime n'a pas pu être parmi nous pour des raisons d'empêchements majeurs. Ensuite, et à l'instar des autres pays, la délégation marocaine tient aussi à présenter aux organisateurs ses vifs remerciements pour la tenue de cette importante conférence et pour l'excellente organisation de cette rencontre sur une thématique fort intéressante et d'actualité.

Certes, comme vous le savez, le Maroc est un important pays de pêche mais il s'intéresse aussi à l'aquaculture, tout comme les autres pays de la Méditerranée et de la mer Noire. En effet, l'aquaculture au Maroc a débuté dans les années 1920 pour la branche continentale et dans les années 1950 pour la branche marine. Cependant, elle n'a pas connu un développement important à la hauteur des potentialités naturelles nationales.

Dans l'objectif de redynamiser son développement de manière intégrée et durable, le Maroc a établi récemment une stratégie nationale traduisant sa volonté politique de développer le secteur des pêches maritimes et de l'aquaculture. Cette stratégie a été axée sur trois piliers stratégiques: la performance, la compétitivité et la durabilité. En outre, elle a érigé l'aquaculture en tant que moteur majeur de croissance des pêches maritimes.

La présente conférence et les sujets débattus s'inscrivent parfaitement dans le contexte de la stratégie nationale et sont conformes aux actions entreprises. La délégation marocaine est particulièrement satisfaite d'avoir été invitée à participer à cette conférence et réitère son soutien aux efforts menés par la CGPM et par son Comité scientifique consultatif de l'aquaculture et exprime sa volonté de coopérer dans l'intérêt tant national que régional en Méditerranée et en mer Noire.

Je vous remercie.

Mihaela Laurenta Alexandrov
Senior Scientist/Projects manager
Laboratory for Ecological Recovery and Aquaculture
Department for Marine Living Resources
National Institute for Marine Research and Development "Grigore Antipa", Constanta
Romania

I am here to thank for the invitation and support given to Romania to participate in this regional conference. We are a European country with a shape like a fish, with a rich waters network, a traditional preference for fish consumption and a unique and specific sea, which is part of the Mediterranean basin, the Black Sea.

I come from the National Institute for Marine and Development "Grigore Antipa" Constanta, which is the focal point for Black Sea fisheries and aquaculture, reporting to the Black Sea Commission and to all European authorities for fisheries and aquaculture, and acting as technical secretariat for the National Committee of Coastal Zones in Romania, which is responsible for the marine monitoring since more than 40 years.

The lessons learnt from these conference days are the following:

- In this world where all kind of changes occur (climate, demographic, political, etc.), a change in mentalities is more than necessary. This cannot be too difficult if we take into account the fact that, all over the world, fisheries and aquaculture problems are similar; as a consequence, the objectives and approaches should be the same.
- Aquaculture should developed in an economical but also ecological way, taking into account that the waters are more and more degraded, in spite of all the solutions proposed and all the measures which have been taken. If properly managed, aquaculture could contribute to the improvement of water quality, to biodiversity conservation, to the protection of threatened and valuable species and to the improvement of marine resources.
- Education should play an important role in improving the profession but should be carried out in an integrative way, because there are too many examples when at the same table there are experts and specialists in one field (hydrology, technics, technologies, biology, ichthyology, genetics, etc.) but there is nobody to integrate the analyses and present the results. We could mention as example the strategy for sturgeons in the Danube River, forgetting that they are living their whole life in the sea; another example is the apparent extinction of coastal bivalves due to the lack of the substrate place for larval fixing which causes organic degradation; we can also mention the decisions taken by hydrologists and hydrotechnicians without consultation with biologists and ecologists, and so on and so forth.
- In the economical, ecological and social paradigm, fisheries and aquaculture aspects are closely related to other sectors of agriculture and industry, but with dedicated communities. Under the co-management umbrella, there are possibilities for synergies and there is vision for the future.

I express again my gratitude to the GFCM for its support and to all the European bodies which keep us informed and active as well as to all organizers and participants, for their great professional skills and friendship. I wish you all good luck in life and in career.

Javier Remiro Perlado
Managing Director
Spanish Aquaculture Observatory Foundation
Spain

Authorities,
Country representatives,
Ladies and gentlemen,

Good morning. I would like first of all to apologize for the Minister of Agriculture, Food and Environment who was invited by the Italian Government to participate in this conference today. Our Minister is attending today the United Nations Framework Convention on Climate Change and therefore could not be here with us.

I would like thank the General Fisheries Commission for the Mediterranean, the Italian Government and the CIHEAM for organizing this interesting conference which allows us to keep working towards improving cooperation between all the Mediterranean and Black Sea countries and promoting sustainable aquaculture in the region.

As you know, aquaculture is a strategic sector for our country which generates around 300 000 tonnes of healthy products, 25 000 direct employees and more than 450 million euros of economic value.

Last July, the farmers associations, the autonomous regions and the Ministry of Agriculture, Food and Environment approved the strategic multiannual plan 2014–2020 for aquaculture in Spain. This plan includes 37 strategic and concrete actions at the national level and more than 300 strategic actions at the regional level. In both cases, actions will be implemented over the next years with the objective of increasing our aquaculture production in a sustainable way, generating new opportunities of socio-economic development and employment in many rural and littoral areas throughout the country.

As we have discussed during these three days, there is a lot of work to do over the next years especially to improve aquaculture governance and image, and I would like to invite you all to join us in a very concrete action, the celebration of the Aquaculture Day, that will take place next year on 30 November. I invite you to organize on this occasion activities that can put our sector close to society.

Thank you very much.

Foued Mestiri
Director General
Directorate General for Fisheries and Aquaculture
Ministry of Agriculture, Water Resources and Fisheries
Tunisia

Monsieur le Directeur Général Adjoint de la FAO,
Monsieur le Président de la CGPM,

Monsieur le Secrétaire exécutif de CGPM,
Monsieur le Secrétaire général du CIHEAM,
Mesdames et Messieurs les experts des pays participants,

J'ai l'honneur de vous transmettre les salutations les meilleures de Son Excellence Dr Lasaad Lachaal, Ministre de l'Agriculture tunisien.

Je tiens tout d'abord à remercier le Ministère italien de l'agriculture pour cette invitation, ainsi que la CGPM et le CIHEAM Bari pour cette excellente organisation.

Mesdames et Messieurs,

La Tunisie a lancé, depuis 2012, la préparation d'une stratégie avant-gardiste pour la pêche et l'aquaculture dont les orientations visent à une aquaculture qui soit rentable avec des procédures simples pour les professionnels, accessible et saine pour le consommateur, gérable par le décideur et non délétère à l'environnement et aux autres usagers de l'espace. Ainsi, l'aquaculture tunisienne se veut tout simplement durable.

Cette durabilité requiert, comme vous le savez très bien, une volonté réelle de changement et d'amélioration.

En Tunisie nos priorités sont les suivantes:

- Appuyer l'élaboration et la mise en œuvre de stratégies spécifiques à l'aquaculture;
- Élaborer des textes juridiques harmonieux spécifiques à l'activité aquacole;
- Renforcer les capacités institutionnelles par la mise en place d'organes de gouvernance spécifiques à l'aquaculture;
- Favoriser la collaboration et les échanges d'informations à travers la mise en place et le fonctionnement d'un réseau spécifique à l'aquaculture qui s'intègre au cadre institutionnel existant;
- Mettre en place des zones affectées à l'aquaculture;
- Élaborer des code de conduite et des guides de bonnes pratiques aquacoles tenant compte des aspects techniques, sanitaires et environnementaux pour un développement durable;
- Élaborer des procédures de maîtrise de la traçabilité pour assurer la certification, notamment grâce à un registre d'élevage;
- Conduire une étude prospective sur la capacité de résorption des marchés à une échelle locale, régionale et internationale;
- Promouvoir l'acceptabilité de l'aquaculture à travers la mise en place de stratégies de communication pour garantir la durabilité et la rentabilité économiques des fermes aquacoles;
- Obtenir un appui et un encadrement des organisations professionnelles représentatives et indépendantes susceptibles de constituer des partenaires fiables; et
- Renforcer le rôle des organisations d'aquaculteurs dans le processus de concertation et de prise de décision.

Nous comptons sur nos compétences nationales mais aussi sur l'expérience des pays de la région et sur les organismes régionaux tels que la CGPM et le CIHEAM pour atteindre ces objectifs prometteurs.

Ilhan Aydin
Director, Central Fisheries Research Institute
President, Turkish Journal of Fisheries and Aquatic Sciences
Second Vice-Coordinator, GFCM Working Group on the Black Sea
Turkey

It is well known that aquaculture is one of the fastest growing food production activities in the world, a trend that is certainly true in Turkey. Aquaculture in Turkey has grown considerably over the past ten years and it has reached 233 000 tonnes in 2013, which contributed by 38 percent to total fishery production. There are 2 353 fish farms in Turkey representing a 463 000 tonnes total capacity. The main farmed species are the rainbow trout (55 percent), seabass (29 percent) and seabream (15 percent). In parallel with the increase in production, trade has continued to grow. Turkey encourages just production, not export.

The first priority for Turkey in the field of fisheries and aquaculture is to utilize its resources sustainably and to benefit at optimum levels from the present potentials of fisheries and aquaculture for the welfare of the community. Turkey is committed to the sustainable and effective management of its wild resources and to environmentally friendly aquaculture, using sustainable farming techniques.

As one of the leading country in its region, Turkey transfers know-how and technology to other countries and contributes to their developments. Turkey is the main supporter and contributor of the FishDev and CacFish projects which have already produced a remarkable effect on the capacity and cooperation on fisheries and aquaculture production and management in the region.

Thank you.

Cosimo Lacirignola
Secretary General
International Center for Advanced Mediterranean Agronomic Studies

Grazie Secretario esecutivo,

È con molto piacere che do il benvenuto alle delegazioni, alle autorità militari, e in particolare all'Amiraglio De Tullio, in rappresentanza della nostra grande e bella guardia costiera. Do anche naturalmente il benvenuto all'Unione europea e alla FAO. Un ringraziamento doverosissimo alla presidenza del Consiglio europeo, al Sottosegretario Castiglione e naturalmente un grazie sincero alla CGPM che ci ha permesso, in questi giorni, di condividere con quest'organizzazione della FAO, dei momenti intensi, che ci han permesso anche di entrare un po' nel merito e di condividere con voi quello che il CIHEAM, come organizzazione internazionale intergovernativa regionale, fa nel contesto dell'agricoltura, della pesca e dell'aquacoltura.

Parto proprio da quello che ha detto il Vicedirettore Generale della FAO, l'amico Mathiesen, per ribadire il concetto. La settimana scorsa con il Sottosegretario Castiglione, il CIHEAM e la regione Sicilia, la Presidenza italiana ha organizzato la seconda Conferenza euro-mediterranea dei Ministri dell'Agricoltura. In quell'occasione, il Direttore Generale della FAO ha sottolineato questo aspetto strategico che può rappresentare il Mediterraneo, e gli stessi ministri convenuti a questa conferenza hanno sottolineato il legame intrinseco che esiste tra l'alimentazione, quello che dà l'agricoltura e quello che dà la pesca. E quindi già abbiamo un momento di partenza importante con quest'ulteriore iniziativa della Presidenza italiana, in vista naturalmente del grande appuntamento che sarà rappresentato da Expo 2015 che, rammento, è l'appuntamento non soltanto di Milano, non soltanto dell'Europa, ma del mondo, che parlerà di alimentazione.

È in questo contesto che si inserisce l'azione del CIHEAM, che rafforza quelli che sono stati i contenuti di questi due giorni intensi di dibattito, di dialogo, di partenariato. Come molti partner che si sono avvicendati a questo tavolo, noi abbiamo sviluppato una attiva partecipazione, penso all'Egitto, alla Tunisia, all'Albania, al Marocco, all'Algeria. Tutti quei paesi che fanno parte della nostra organizzazione e con i quali scambiamo buone pratiche. L'ascolto di questi due giorni ci ha permesso di rafforzare questo dispositivo. Che cosa significa rafforzare questo dispositivo? Noi sviluppiamo diverse attività in diversi progetti e il governo italiano, attraverso una cooperazione con il MiPAAF, ci mette a disposizione degli strumenti al servizio delle comunità territoriali, per cui il tema che ora sviluppiamo è la piccola pesca. Perché noi vogliamo un'agricoltura con agricoltori, vogliamo una pesca con pescatori. Quindi, questo rapporto intrinseco che esiste tra la pesca e l'agricoltura ci interessa perché le aree costiere sono il punto, non di separazione di due mondi, ma di congiungimento di questi due mondi.

Ecco perché i quattro pilastri che hanno sviluppato l'azione del CIHEAM, come organismo internazionale, rispettano soprattutto l'*institutional building*, costruire rapporti di dialogo e di partenariato attivo. Quindi, ascoltiamo i bisogni dei 13 membri che fanno parte della nostra organizzazione, e su questo sviluppiamo azioni di formazione, di cooperazione e ricerca. Quando parlo della formazione parlo di una cosa che non è accademia; per me, la formazione è futuro.

Parliamo tutti di spreco: di risorse, di acqua, di terra, di risorse ittiche. Perciò, una forma di spreco che interessa il futuro dei nostri figli è lo spreco della conoscenza. Questa conoscenza, che esiste, deve essere adattata ai nostri bisogni, ai bisogni dei pescatori. Penso al piccolo pescatore, che vede la conoscenza, la sente, però dice: "Perché io non posso avere accesso a questa conoscenza?". È questo il ruolo del CIHEAM: essere a fianco alle comunità, attraverso una formazione che parte dalla

formazione più alta e arriva al pescatore, all'agricoltore. E lo facciamo, così come lo abbiamo fatto nei vari progetti. Penso al progetto sull'aquacoltura che sviluppiamo anche con l'Egitto – e penso al presidente della nostra organizzazione, il Professor Adel El-Beltagy, che è anche il Ministro della pesca e dell'aquacoltura egiziano – con l'Unione europea, e vorrei ringraziare la DG MARE e i suoi rappresentanti per essere qui. Questi sono i temi che noi sviluppiamo, ci sono diversi progetti, che troverete nella nostra brochure, che attraversano queste capacità di collaborazione.

Mi rivolgo al Presidente della CGPM per dire che noi siamo a fianco alla CGPM, proprio perché siamo diversi, e nella diversità, siamo perfettamente complementari. L'azione di mentore, importante, strategica, che la CGPM, così come la FAO, può fare, deve essere rinforzata perché anche tra organismi internazionali, penso all'IUCN, all'ICCAT, a Eurofish, abbiamo bisogno di aggregazione, non possiamo più camminare in parallelo. Il mondo è cambiato, dobbiamo governare la scarsità. Scarsità non vuole dire povertà, vuole dire semplicemente durabilità, sostenibilità, tante parole che devono diventare fatti concreti, perché tante volte si accusano le grandi organizzazioni di grandi dichiarazioni e di poche azioni. Dobbiamo quindi agire, e quest'azione significa essere accanto ai ragazzi, ai giovani agricoltori, ai giovani pescatori, che era il tema della Conferenza euro-mediterranea dei Ministri dell'Agricoltura. Perché l'agricoltura e la pesca sono i paria della società, sono settori dimenticati. I grandi della Terra parlano di raddoppiare la produzione agricola risparmiando le risorse e poi si dimenticano che per mangiare qualcuno ci deve essere che fabbrica o che pesca o che svolga un'attività di acquacoltura.

Questo settore ha bisogno di innovazione. Se però andiamo a vedere i dati, quanti giovani agricoltori e pescatori si rivolgono a questo settore? Pochissimi. L'età media degli agricoltori in Tunisia è 58 anni, ed è la stessa età per l'Italia. Ma se vediamo in Tunisia quanti giovani ci sono, scopriamo che nel Mediterraneo, 250 milioni di persone, 160 milioni hanno meno di 30 anni. Questi 160 milioni di giovani, dove vanno? Agricoltura, pesca? No. Quindi dobbiamo portare un po' di città nelle campagne, nel nostro mare. Perché è da lì che dobbiamo attrarre i giovani. Ecco, in modo sintetizzato, il messaggio che il CIHEAM diffonde negli consessi internazionali.

Siamo grati alla Presidenza italiana, alla Commissione, alla FAO, alla CGPM per averci dato la possibilità di ascoltarvi soprattutto, di trarre insegnamenti e, attraverso questi, di avere capacità di ascoltare la società civile. Perché tra di noi non ci sono soltanto i rappresentanti dei governi, ci sono anche rappresentanti di associazioni della pesca, che ringrazio, dell'università, del mondo scientifico.

Lo sviluppo del ventunesimo secolo ha bisogno di un approccio sistemico, lo ha detto il Presidente Cataudella, quindi non possiamo lavorare con i paraocchi e dobbiamo allargare la vista. Il Mediterraneo rappresenta un laboratorio fantastico di biodiversità, di capacità, di competenze, ma questo Mediterraneo ha bisogno sopratutto di dialogo, di ascolto reciproco; non c'è nessuno che da e nessuno che riceve. Tutti quanti noi dobbiamo abbracciare questo mare, che io spero non deve essere la vostra tomba. Ogni volta dobbiamo estrarre corpi di bambini e donne, anziani che cercano di attraversare questo mare. Deve essere un mare, e lo abbiamo fatto in qualche progetto, di dialogo.

Saluto l'Assessore Nardone, in rappresentanza alla regione Puglia, che è anche il coordinatore nazionale degli assessori italiani.

Concludo con ancora un grazie alla Presidenza italiana, al Governo italiano, alla CGPM e alla FAO, sono sicuro che insieme concluderemo azioni importanti. Grazie ai miei colleghi e collaboratori, a tutte le persone che lavorano dietro di noi, per aver reso possibile questa bella iniziativa, grazie ai colleghi del Segretario Esecutivo M. Srour e agli altri collaboratori presenti che hanno permesso questi tre giorni intensi di discussione, di dialogo, ma io spero soprattutto di costruzione, di progetti, di programmi, di attività concrete che permetteranno ai nostri ragazzi e ragazze di guardare al futuro non con paura, non con rancore, ma con grande speranza. Grazie a tutti.

Aina Afanasjeva
Director
International Organisation for the Development of Fisheries in Central and Eastern Europe

Distinguished delegates,
Ladies and gentlemen,

I am extremely delighted to be here today and to address this high-level conference jointly organized by several institutions and partner organizations.

This event is of the utmost importance for the Mediterranean and Black Sea countries.

I am very pleased to see that the collaboration that has started between Eurofish and the GFCM, by signing a memorandum of understanding a few years ago, has enabled us to achieve successful outcomes. Building upon our close collaboration, it has provided us with an opportunity to streamline other activities, such as data collection and analysis, knowledge transfer, public awareness and promotional activities, and to implement them jointly.

The cooperation framework gives us an excellent opportunity to find synergies, work closer for the benefit of the countries in the region, and especially those that are members of both our organizations and which include Albania, Croatia, Romania, Spain, Turkey and Italy, the hosting country of this conference.

I would also like to stress that, given the rapid growth of the aquaculture sector in the Mediterranean and the Black Sea, there is still much to be done; and this has been stressed by the technical panels held during the past two days. It demands cooperative efforts and close partnership from all of us.

In the light of these new opportunities, the time has come, for each of us and in all ways, to demonstrate our commitment to work together, side by side for the benefit of the Mediterranean and Black Sea region, of the current generations and of the generations to come.

Thank you very much for your attention.

Courtney Hough
General Secretary
European Aquaculture Technology and Innovation Platform

Firstly, I would like to express my thanks and pleasure for having been able to participate in such a constructive and forward-looking meeting. In 1993, as the new General Secretary of the Federation of European Salmoniculture, I remember being asked by the President, Baron Charles de Fierlant Dormer, to examine how best to interface with the FAO and, notably, the EIFAC – responsible for inland fisheries and freshwater aquaculture – the only international body that looked at trout farming.

Around the same time, the Federation evolved to become the Federation of European Aquaculture Producers (FEAP), including freshwater and marine fish farming interests throughout Europe. At the present, the Federation is composed of 26 national associations from 24 European states. The FEAP eventually obtained liaison status with the FAO and has participated in a number of collaborative efforts covering both inland and Mediterranean aquaculture during the last 20 years.

One of the first debates focused on Article 9 of the FAO Code of Conduct for Responsible Fisheries, where the FEAP felt that this section on aquaculture should be taken further. This led directly to the formulation of the FEAP Code of Conduct for European Aquaculture, which itself provided the basis for several detailed codes of practice developed by European national associations. More recently, the FEAP prepared its Dublin Declaration, which lays out specific principles and actions to enable handing over a sustainable professional activity to the next generations. These documents demonstrate how common, integrated principles can be developed and implemented through informed debate and understanding.

Within this focus of this special European meeting on the Mediterranean, it is necessary to mention that the FEAP has participated in and promoted many of the CIHEAM training courses and workshops. Of a very high standard, CIHEAM's contributions to advancing skills and training within the Mediterranean aquaculture sector have to be recognized.

It is also necessary to mention the collaboration that FEAP has established with the IUCN, which was initiated through the work of its Mediterranean Centre in Malaga. With a common focus on sustainable aquaculture development, the FEAP and IUCN signed a memorandum for cooperation in 2004 to this purpose and which, among other actions, has led to the preparation of specific recommendations on site selection and indicators for sustainable development.

In recognizing the need for focused research and innovation activities to enable and support the development and growth of professional aquaculture in Europe, FEAP and other professional representatives, leading companies and numerous research institutes and universities agreed to create the European Aquaculture Technology and Innovation Platform (EATiP) in 2007. EATiP covers principally fish and mollusc rearing, and also recently included algae culture within its remit. Following delivery of its vision and strategic research and innovation agenda in 2012, EATiP was recognized by the European Commission as an official European technology platform in 2012.

This was the first multi-stakeholder initiative for aquaculture and, incorporated as a statutory international non-profit organization, its main goal is to promote and follow research and innovation activities that support the sustainable development of the European aquaculture sector. Many individuals present today have contributed to these developments and it is necessary to commend the actions of the GFCM Scientific Advisory Committee on Aquaculture and the European Commission 7th Framework Programme AquaMed project for the specific consideration of the Mediterranean aquaculture sector.

Within its operating structure, the FEAP has a dedicated commission on Mediterranean aquaculture and, in May 2014, it communicated a resolution covering its concern on the lack of improvement in technical performance in the cultivation of seabass and seabream. This was followed by a special workshop held within Aquaculture Europe 2014, organized jointly by the EATiP and the European Aquaculture Society, which has provided specific recommendations for research and innovation. It is hoped that these recommendations could lead to new research and innovation actions within the research programme of the European Commission, Horizon 2020.

Both the FEAP and the EATiP recognize the importance of involving dynamic small and medium-sized enterprises within both the debates for development and the research actions envisaged. This can be facilitated through mirror platforms of the EATiP, which can best mobilize small and medium-sized enterprises' participation. In addition, the profile of the GFCM Aquaculture Multi-Stakeholder Platform should also provide additional opportunities for the ambitions of Mediterranean aquaculture producers, facilitating contact with Mediterranean states as well.

The EATiP puts forward that close cooperation should be established between the GFCM Aquaculture Multi-Stakeholder Platform and the EATiP so as to develop common research priorities and activities that can assist and support the sustainable development of Mediterranean aquaculture.

In summary, this brief *exposé* of a wide range of collaborative activities, covering principles, training, research, development and, above all, cooperation, demonstrates that real progress depends on common understanding between all actors and agreed actions that facilitate and lead to development and growth.

Driss Meski
Executive Secretary
International Commission for the Conservation of Atlantic Tunas

Monsieur le Président,
Monsieur le Sous-Secrétaire de la Pêche en Italie,
Monsieur le Directeur Général Adjoint de la FAO,
Monsieur le Secrétaire exécutif de la CGPM,
Mesdames et Messieurs,

Je voudrais tout d'abord remercier la CGPM et l'ensemble des organisateurs pour avoir invité l'ICCAT à cette importante conférence qui se tient dans cette belle région de l'Italie. Je tiens à féliciter toute l'équipe pour cette excellente organisation.

Cette rencontre qui s'articule autour de l'aquaculture en général et la Méditerranée en particulier constitue une grande opportunité pour discuter tous les tenants et aboutissants de sa problématique.

L'ICCAT, en tant qu'organisation régionale de gestion des pêches est appelée à tenir compte des techniques et aspects aquacoles qui ont tendance à prendre d'importantes dimensions récemment dans les espèces des thonidés. Les travaux de cette conférence que nous clôturons aujourd'hui ont été très riches en idées et ont ouvert de grands chantiers.

J'espère que cette importante conférence constituera un bon départ pour faire de l'aquaculture un appoint à la pêche et favoriser une utilisation durable des ressources halieutiques.

Je suis convaincu que l'ICCAT et la CGPM, qui ont beaucoup de choses en commun, vont coopérer ensemble pour la mise en place de mesures adoptées dans ce secteur.

Je vous remercie.

François Simard
Deputy Director and Senior Advisor for Fisheries
International Union for Conservation of Nature

The International Union for Conservation of Nature (IUCN), through its Centre for Mediterranean Cooperation and its Global Marine and Polar Programme, has been a long-term partner of the GFCM supporting its work on aquaculture for more than 10 years.

IUCN recognizes that aquaculture needs to grow and develop in order to meet with the global needs in terms of food security. Aquaculture is using ecosystem services and, at the same time, may have negative impacts on those ecosystems; therefore, IUCN recognizes that interactions between aquaculture and the environment are very complex. On the other hand, IUCN believes that aquaculture is a responsible activity which is making its best to be sustainable at all levels.

However, in order to be sustainable with regard to the interactions between aquaculture and the environment, IUCN recommends the following:

- To strengthen research in order to fully understand these interactions;
- To develop all relevant technologies that may reduce and/or mitigate the impacts from aquaculture operations on the environment whether they are direct (site level, wider regional level) or indirect along the processing chain, and including the fish feed sector;
- To implement sound site selection processes within the framework of the ecosystem approach, integrated watershed and coastal zone management, and marine spatial planning principles, in relation with the establishment of marine and coastal protected areas; and
- To involve the local populations in site selection processes and, as possible, in aquaculture operations.

Finally, IUCN recommends that aquaculture and marine conservation work more together toward achieving a wise and sustainable use of marine and fresh water natural resources, considering that conservation of ecosystem processes and services is fundamental for the future of the Mediterranean and Black Sea environment, as well as for food security in the region.

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Regional Conference Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security

9–11 December 2014
Bari, Italy

The Regional Conference "Blue Growth in the Mediterranean and the Black Sea: developing sustainable aquaculture for food security" was organized by the General Fisheries Commission for the Mediterranean (GFCM) of the Food and Agriculture Organization of the United Nations (FAO) in collaboration with the Italian Presidency of the Council of the European Union, the Italian Ministry of Agriculture, Food and Forestry Policies (MiPAAF) and the European Commission and in partnership with the International Organisation for the Development of Fisheries in Central and Eastern Europe (Eurofish) and the International Union for Conservation of Nature (IUCN). This event took place at the International Centre for Advanced Mediterranean Agronomic Studies, Institute of Bari (CIHEAM Bari), Italy. The conference was attended by more than 140 representatives of governments and international organizations, delegates, experts and practitioners from 16 Mediterranean and Black Sea riparian countries, who exchanged their views on the most salient issues connected to sustainable aquaculture development in the region. The conference acknowledged the key role to be played by the sector in achieving food security, employment and economic development in the region, under a blue growth perspective. All participating countries reached a consensus on the need to foster cooperation and implement coherent and coordinated strategies to face challenges ahead and ensure the sustainable and responsible growth in the sector in the Mediterranean and the Black Sea. This event was also marked by the adoption of conclusions and recommendations, which laid the groundwork for the establishment of a GFCM Task Force on a Strategy for the sustainable development of Mediterranean and Black Sea aquaculture.

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