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Research roadmap from the shellfish industry in Europe

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Knowledge issues and needs of the shellfish industry

INTRODUCTION

Within the Euroshell project in total 7 consultation workshops (France: 3, Italy, Spain, Ireland and the Netherlands) and 2 stakeholders meetings have been organized. Participants from industry, science and extension groups discussed knowledge questions and research priorities, in order to develop a European mollusc research agenda. The agenda will be used for the development of a European research program within the EMFF and Horizon 2020 through EATIP and the national platforms.

The knowledge questions have been ordered along the topics environment, market, production and governance. The outcomes of the regional workshops were the basis for the second stakeholders' discussion. The round table discussions in the stakeholder meeting in Rotterdam have delivered the final list of relevant knowledge questions and the priorities. It is acknowledged that different regions may have different questions and priorities, and this has been addressed in the discussion as well.

The main questions that were addressed during the stakeholders meeting were:

1. **Knowledge questions:** have the proper items been addressed or are there other issues that need attention?
2. **Research priorities:** What items need to be addressed given the urgency of the problem, the ongoing studies and the knowledge gaps that were identified? How to come to a common European research agenda for the mollusc sector, including regional differences?
3. **Implementation:** How should the research agenda be addressed, given differences in orientation per region and differences in national research policies? What are the possibilities for the national input in the EMFF program development?

The list of knowledge questions is presented below, based on the regional workshops and the final stakeholder meeting. In the 3 round tables, the questions were discussed by item, and additional issues were addressed, including the relevance of the different items. This was also the basis for prioritization. Initially, priorities were based on the regional workshops; during the round tables, amendments were made with respect to the following issues:

Product quality: labelling, quick diagnostic checks, supply chain monitoring were recommended as important issues (product).

Ecosystem services: this is considered as a good tool to address the positive aspects of shellfish culture (environment).

Risk assessments: important in relation to translocation, invasive species and cultivation of new species (environment).

In the annex, an overview is presented of the knowledge issues that have been prioritized by the shellfish community.

1 - PRODUCT – PRODUCTION

1.1 Development of new technologies

In addition to the development of new technologies, the improvement of existing technologies is also considered important. The innovation agenda should address the following issues:

- = Develop new technologies for product packaging and processing
- = Diversify products and species (find alternatives to *Crassostrea gigas*), favoring indigenous species
- = Develop offshore production techniques to minimize land use conflicts. Studying the hardship, cost, profitability, predation, etc.
- = Understand the causes of the mortality crisis and find solutions to them
- = Develop new zootechnical practices / cultivation
- = Find solutions to fight against predators / competitors / invasive species
- = Develop by-products (eg waste shells)

1.2 Shellfish quality, consumption and human health

- = Improve shelf life, also during transport, apply supply-chain monitoring.
- = Strengthen traceability, labeling of products and control of the quality.

1.3 Lifecycle and biology of cultivated species

- = Trophic capacity : conduct studies on shellfish nutrition sources (plankton); competition with invasive species can be a limiting factor for shellfish culture in some areas, and studies on mitigation measures are recommended; EU water quality policy (marine and water framework directives) may lead to low nutrient levels in shellfish culture areas and consequences for food availability need to be addressed
- = Conduct studies on the lifecycle and its variation in different natural production areas
- = Develop life cycle analysis for Integrated Multi-Trophic Aquaculture (IMTA); address the risk of pollution and other negative impacts caused by the other components of IMTA on shellfish
- = improve management of wild shellfish stocks

1.4 Spat supply

- = Improve the management of natural wild settlement to allow better natural collection
- = Develop hatcheries to diversify supply and improve year-round availability.

2 - TERRITORY-ENVIRONMENT

2.1 Water management

Water quality is considered as a first concern. Although it is not a novel issue, it is a high priority for the shellfish farmers. In some countries water quality concerns mainly sanitary control, while in other areas harmful blooms and contaminants are issues. If translocation is at stake, water quality issues deal with areas of origin as well as areas of destination.

The workshop has addressed the following topics of concern:

- = System to have an early warning of harmful algal blooms, and measures to mitigate impacts
- = Focus research on the impact of pollutants on shellfishes' health (eg pesticides) and the means to eradicate the sources of pollution
- = Improve watershed management in shellfish culture areas
- = A system to improve the classification from B to A class if data show this to be allowed
- = Bioremediation and phytoremediation for shellfish aquaculture
- = Improve water treatment systems in areas with discharges
- = Special protection for shellfish waters
- = Biosecurity: monitoring and prevention of invasive species

2.2 Spatial planning

Spatial planning of aquaculture is highly relevant for the shellfish industry, as space is considered as the main limiting factor for expansion of the industry. The main research issues are:

- = how to deal with shellfish cultivation in protected areas (Natura 2000)
- = Implement measures to protect territories, particularly those where shellfish farming is practiced, while ensuring that these measures do not constitute barriers limiting shellfish farming.
- = Identify and classify suitable areas for shellfish farming with appropriate criteria such as access to the coast

2.3 Shellfish health

Shellfish health and diseases are major topics, given the vulnerability of shellfish culture for diseases; the main research topics are:

- = Develop predictive tools to be able to maximize farming practices and to respond to crises (closures)
- = Improve environmental monitoring and information towards professionals, including a better responsiveness of monitoring networks
- = Develop techniques allowing companies to adapt to health issues (innovative equipment, closed loops, water treatment techniques, etc.)
- = Risk management – biotoxins, disease and microorganisms

2.4 Relation with other stakeholders

= Analyse constraints arising from other plans

2.5 Climate change

The impacts of climate change for the shellfish include risks of storm damage, invasive species and acidification

= specific studies are needed to understand the effects of acidification on shell formation

2.6 Ecosystem services

During the Rotterdam workshop more attention was given to ecosystem goods and services of shellfish, as a concept that should be applied to identify the productive aspects of shellfish culture to other stakeholders and interest groups; it is recommended to:

= Conduct research on the goods and services of shellfish aquaculture, and quantify them in order to better address the benefits of shellfish culture in a broader context.

3 - MARKET

3.1 Diversification

At the stakeholder meeting, there was some confusion about the terminology of diversification as a marketing tool; it was proposed to use the term “new market development”. The workshop came up with the following knowledge topics:

= Diversify markets, develop new markets, including abroad

= Diversify marketing modes, while maintaining a significant proportion of direct sales in order to reduce dependence on supermarkets and hypermarkets that impose low prices and prevent any monopoly.

= Explore possibilities for diversification of activities (pescatourism, tasting...)

= Diversify product offerings: new species, new products (including processed products)

3.2 Communication

= Communicating on the quality of products, improve education and outreach.

= Improve promotion on other markets, especially abroad to develop export.

= Conduct studies on the carbon footprint of local shellfish products compared to non-EU products and to other products (from aquaculture or others)

3.3 Labelling

= improve the cost-effectiveness of labelling

= Strengthen the traceability with labels, certifications, PGI (Protected Geographical Indication)

3.4 Marketing

= Improve the distribution, delivery and packaging of products, optimize their transportation, etc. especially considering that it is a living product,

= improve supply chain monitoring (temperature loggers) to check and maintain fresh product quality

= Pooling marketing among several producers and / or distributors (cooperative).

= Promote local market of fresh products

3.5 Establishing a "level playing field" within and outside Europe

This objective is obviously desirable, but is considered as a complex issue. Cultural differences make it difficult to work together even within Europe.

= improve mechanisms which enable small producers to compete on markets

4 - MANAGEMENT AND GOVERNANCE

4.1 Knowledge management

= Ensure the availability and effective use of research infrastructure in aquaculture across all boundaries to benefit the production

= Disseminate knowledge to different audiences (consumers, school, public ...)

= Support public funding research

= Encourage applied research

= Improve the accessibility to data resulting from monitoring and control activities

= Create a national information repository (for example under the Ministry of Public Health) to overcome the fragmentation of data of interest for the sector (product data, environmental data)

= Annual showcase of current research

= Facilitate access of industry to participate in research

= Better coordination between scientists and professionals to pool research efforts

4.2 Communication

= Improve the image of the sector: dirty banks, ugly infrastructure ... can give a bad image and harm the interests of the sector.

= Promote the image of shellfish as a symbol of the territorial identity

= Strengthen communication in general, not only on the benefits of shellfish.

= Develop education programs to promote the quality of the product.

= Public and scientific communication

= Develop a common communication strategy

4.3 Assistance for companies

- = Develop a financial and administrative support
- = Develop a « one-stop shop » to help the establishment of young producers
- = Offer trainings to improve fund raising capabilities and access to European programs.
- = Grant interest-free loans
- = Licensing
- = Compensation for disease (as in agriculture)

4.4 Representation of the industry to decision-makers (lobbying)

- = Develop a clear and common message of the industry
- = Increase the empowerment of producers
- = Reinforce confidence, cooperation and pooling between producers

4.5 Promotion and development of human capital

- = Develop block-release training
- = Develop ad hoc training courses to get shellfish farming qualifications
- = Promote the profession of oyster-opener, which gives value to products
- = Better train agents of the shellfish sector and strengthen communication among them

4.6 Socio-economic data

- = Conduct more comprehensive and reliable studies on the profession, other than those relating to the production, to better understand the sector: market conditions, economic importance of the sector, sociological knowledge, business needs, economic sustainability of businesses, etc.
- = Make these data available to the professionals themselves.
- = Promote the social and territorial implantation of the shellfish sector: it creates jobs and is related to other activities. It cannot be relocated.

4.7 Simplification and consistency of regulations and administrative procedures

- = flexibility in governmental policy

- **Development of new technologies** : processing, packaging, species diversification, waste recovery, predation, 'offshore' or integrated culture, mortality crisis, new zootechnic practices...
- **Shellfish quality, consumption and human health**
- **Lifecycle and biology** of cultivated species: trophic capacity, Integrated Multi-Trophic Aquaculture , management of wild shellfish stocks...
- **Spat supply**: natural collection, hatcheries

Product /
Production

- **Water quality** : impact of pollutants on shellfish health, watershed management
- **Spatial planning**: access to the coast, identification of areas, concordance of plans, classification, conflict use...
- **Health monitoring**
- **Adaptation to environment, climate change**
- **Relation with other stakeholders of the territory**
- **Effects of production on the environment**: ecosystemic services

Territory/
Environment

Shellfish farmer

Market

- **Diversification** : of markets, marketing modes, activities, product offering
- **Communication** : labels, certification, promotion abroad...
- **Traceability** : labelling, control on imported products
- **Improved marketing** : distribution, packaging, transportation, delivery; sharing marketing
- Market studies for a **better match between production and consumption**
- Establishment of a "**level playing field**" for aquaculture within and outside Europe

Management/g
overnance

- **Knowledge management** : access to scientific knowledge, access to data resulting from controls
- **Communication** : improve the image of the sector, make it known, education programs
- **Assistance for companies**
- Promotion and development of **human capital** : valorisation of skills, training...
- **Representation of the industry to decision-makers** (lobbying)
- **Socio-economic data**
- **Simplification and consistency of regulations and administrative procedures**