



European Aquaculture
Technology and Innovation Platform

EATiP Position Paper & Recommendations

2019

EATiP Position paper

As an industry-driven multi-stakeholder platform, the European Aquaculture Technology and Innovation Platform (EATiP) has prepared this position paper that represents the consensus position of its membership. The paper's specific objective is to provide recommendations for the programme of Horizon Europe and other future funding facilities on actions that will better co-ordinate, stimulate, support and promote technology and innovation to unlock the potential of European aquaculture.

Aquaculture provides safe food of the highest quality and nutritional value, across a wide range of products that have adapted to consumer preferences and lifestyles. Increased attention to non-food aquaculture products also highlights new opportunities for aquaculture to fulfil its potential as a fully-fledged component of the Blue Bioeconomy. European policy documents and strategies recognise aquaculture as the most promising approach to acquiring global food¹ and nutrition security. However, reaching this vision requires the fulfilment of three major conditions for the sector: growth, sustainability and innovation.

Ensuring and Improving Conditions for Growth

Globally, aquaculture continues to grow faster than other major food sectors (at a rate of 5.8%/year in the period 2000-2016) . However, the position of European aquaculture does not match this global trend². The absence of a legal level-playing field for allocating aquaculture licences is a serious obstruction to attaining a common strategy for sustainable growth and development in Europe. A pan-European review of existing aquaculture regulations is needed for the development of a predictable, scientific and evidence-based licensing system that could be applied across European countries and beyond.

Engaging with citizens and addressing public perceptions are other critical factors for sectoral growth and that require more attention. Making sure that citizens acquire a better understanding of how the sector operates and how the products are produced is a key to ensuring the social licence to operate successfully. Actions needed include societal and market research, the stimulation of openness of the industry towards society at large, accompanied by engagement with broader Ocean Literacy initiatives.

¹European Research & Innovation for Food & Nutrition Security (2016); Report on the Blue Growth Strategy (2017); Food from the Oceans Scientific Opinion (2017); Future-proofing our food systems through research and innovation (2018); Proposal for a regulation on the European Maritime and Fisheries Fund (2018); Review of the 2012 Bioeconomy Strategy (2018); Mission-Oriented Research & Innovation in the European Union (2018)

²FAO 2018. The State of World Aquaculture and Fisheries

Sustainable Development

As a dynamic component of the Bioeconomy, aquaculture has the potential to be a global contributor to the mitigation of climate change since seafood production has a far lower carbon footprint compared to other livestock systems. At the local level, the sector should target acceptable environmental footprints through sound ecosystem-based management and decision-making. The development of appropriate governance models is highly complex but needs to be addressed. Within this context, integrated monitoring and transparent data collection systems are required, as well as a standardisation of critical environmental and production indicators.

Diseases and adverse health conditions pose important challenges to aquaculture producers, both for effective animal welfare and economic cost-effectiveness. The transition of focus from a treatment-based strategy to the use of preventive measures, such as selective breeding for robustness, vaccination and adapted management practices needs to be encouraged.

Aquaculture production can be further optimised, notably through the deployment of new technologies and operating methods for better control and higher efficiency. Exchange of best practice and the adaptation of tools and methods from other sectors will also contribute to high-precision farming with a predictable and improved livestock performance.

Limitations on specific resource supplies for compound feeds, combined with increased awareness and data on the environmental footprint of different ingredients, underline the continued search for alternative and sustainable feed materials. In addition to contributing to sectoral sustainability, it is critical that ingredients should not affect dietary needs nor the health attributes of the final product. Development of technologies and methods for valorising aquaculture production waste streams along the value chain are required for the sector to contribute more to the circular economy and reduce wastage. To be achieved, it is equally important to provide funding mechanisms that prioritise areas with a high degree of sectoral relevance.

Promoting Innovation

In order to resolve the issues that hinder aquaculture sustainability and growth, the sector should adopt a food system approach that frames food production processes within a socio-economic and environmental perspective throughout the value chain. Due to its complexity, such a transformation requires an open and inclusive dialogue between industry, scientists and policy makers, as well as between experts across different disciplines. For real progress to be achieved, it is equally important to provide funding mechanisms that prioritise areas with a high degree of sectoral relevance.

Successful innovation is fostered by entrepreneurship. Blue invest and similar funding programmes that encourage company-driven innovation and business-to-business/research-to-business interactions have been proven to be successful; these should therefore be encouraged to strengthen their efforts. Nonetheless, more attention should be given to support for demonstration and pilot actions to scale up promising technologies and methods.

A competent and adaptable workforce will be key to maintaining the competitiveness and for the sector to move forward dynamically. Intensified mobility between academia and industry and an alignment of formal and informal training and capacity-building programmes adapted to current and future industry needs, including new skills, are vital in this respect. Aquaculture producers in Europe are mainly SMEs, and as the early pioneers retire, the sector needs a plan to ensure their legacy and adapt to generational change. Therefore, talent attractiveness of the sector is crucial as well as its ability to adapt and incorporate new and developing skills in a wide range.

Cooperating at a Global Level

European aquaculture is part of a global seafood economy and many production and supply companies have global operations. Measures to support international, mutually beneficial collaboration will add to European excellence and strengthen its worldwide position. The export of European technology, products and services can provide a significant contribution to global food and nutrition security.

Recommendations provided to the position paper – 2019

EATiP strongly welcomes and agrees with the Blue Growth approach, making special reference to the aspects concerning stakeholders' collaboration models, open innovation, cross-cutting sectoral knowledge transfer, open knowledge, entrepreneurship promotion, amongst others, as referred to throughout this paper.

Stakeholders at both the regional and European levels, are highly aware of the lack of operating and implementation plans that should accompany the strategies developed for European aquaculture. Achieving these confirms the need for innovative and collaborative multi-stakeholder platforms, the availability and adequacy of funding programmes and blue funds for new companies, impact measurement and blue skills promotion. EATiP intends to support the Blue Economy concept by implementing a participatory approach with the engagement of its Mirror Platforms (MiPs) and members³.

The presented recommendations contribute to many of the UN Sustainable Development Goals, specifically Zero Hunger (2), Good health and well-being (3), Quality Education (4), Decent work and economic growth (8), Industry, innovation and infrastructure (9), Responsible consumption and production (12), Climate change (13), Life below water (14), and Partnerships for the goals (17).



³EATiP list of members and MiPs

Methodology for preparation of Recommendations

The EATiP position paper relates principally to strategies for development where the recommendations highlight the challenges and constraints that were identified, through a bottom-up process, by EATiP members and MiPs.

Recommendations were first developed through a consultative process with MiP stakeholders, applying a focus on industry R&I needs. The EATiP MiPs represent a total of about 850 aquaculture entities, 65% of which are from the producer or supplying industry. A highly participatory process was ensured by these clusters, by inviting their members to take part in the process, or by contributing with consolidated recommendations that had been identified at a regional or national level prior to the exercise. These were collected along four different working groups: Marine - Cold Water, Marine – Mediterranean, Freshwater, Shellfish and other species. The recommendations reflect the major concerns of stakeholders in the aquaculture community, identifying insufficiently supported opportunities. Key actions and collaborative efforts and projects have been identified for achievement at both European and cross-regional levels. These should be considered as a supplement to the goals and sub-goals described in the EATiP Strategic Research and Innovation Agenda Review document⁴.

Aligned with the main objectives of this position paper, the results of the survey have been integrated and synthesised, into three main axes:

1. Ensuring and improving conditions for growth
2. Sustainable development
3. Promoting innovation (cross cutting issues)

Across the axes, a need for cooperation at a global level is also expressed.

⁴EATiP, 2017. A review of the Strategic Research and Innovation Agenda

Thematic areas identified for actions

The 2012 EATiP Vision document and Strategic Research and Innovation Strategy was defined along the lines of the following 8 Thematic Areas. These are also being reflected in the recommendations put forward by the EATiP membership.



PRODUCT QUALITY, CONSUMER SAFETY AND HEALTH



TECHNOLOGY AND SYSTEMS



MANAGING THE BIOLOGICAL LIFE CYCLE



SUSTAINABLE FEED PRODUCTION



INTEGRATION WITH THE ENVIRONMENT



KNOWLEDGE MANAGEMENT



AQUATIC ANIMAL HEALTH AND WELFARE



SOCIO-ECONOMICS, MANAGEMENT & GOVERNANCE

1. Ensuring and Improving Conditions for Growth

Growth is considered not only in terms of increasing volume of total production but also in respect of revenues.



1.1 Create a legal level-playing field for the allocation of aquaculture licenses



EATiP urges preparation of a review of existing regulations and move towards a predictable and evidence-based aquaculture licensing system throughout the European countries. The potential of available satellite and high-resolution in-situ environmental and farm data should be fully utilised for the development of appropriate decision-making models. These should be applied to the siting of new farms and the management of existing production plants within the entire operational range of aquaculture (i.e. ponds, land-based systems, closed/semi-closed/open surface and submersible cages, including those designed for exposed locations). Licensing protocols need to adopt a holistic ecosystem approach, such as promoted by UNESCO IOC⁵.

1.2 High-precision farming: Better control and higher efficiency



High animal welfare standards can be promoted by using improved physiological biosensors, better tools for behavioural monitoring and high-precision breeding. Reliable models will allow the prediction of critical changes in production profiles. Sharing farm data and integrating Big Data, the Internet of Things, Artificial Intelligence and Deep Learning into husbandry practices will contribute to standardisation and the possibility to benchmark the best production conditions. This will lead to better growth predictability and feeding regimes, more precise welfare and health monitoring, autonomous operations and improved safety conditions for aquaculture workers.

⁵Intergovernmental Oceanographic Commission, Marine Spatial Planning Global;
<http://www.mspglobal2030.org/>

The development of market intelligence models and innovative products can empower the sector to diversify and to develop more products appreciated by the consumer. Specific high-precision models should be designed for different sized farms so as to cover the whole production sector.

1.3 Generate a more positive public perception



The public debate on aquaculture should be strengthened by documented facts on environmental interactions, animal welfare, product quality, and food security. Societal research, and the stimulation of openness of the industry towards the society at large, are clear priorities to restore people's confidence in farmed products. Also, the communication of aquaculture as a potential global contributor to climate change mitigation by means of its smaller carbon and environmental footprint compared to other animal production processes should be underlined. In this respect, the shellfish and low-trophic seafood industry, that contribute to carbon sequestration and eutrophication mitigation, deserves attention.

Designing effective and innovative campaigns that involve the public, providing access to commercial-scale production sites, educational and outreach programmes are actions that may help to improve public perception. Linked to the high attention being given to (micro)plastics, the impact of plastics on the aquaculture sector should be analysed, in terms of economic impact and public perception. The same argument applies to a range of other pollutants, such as PCBs, dioxins, pesticides....

Expected results from on-going or finalised European projects can contribute to such an approach.

2. Sustainable Development

Sustainability is understood as being the continuity of the economic activity without prejudice of future generations in terms of economic, social and environmental impact. To be applied at farm, ecosystem and regional levels.

2.1 Establish appropriate governance models



Efforts to improve key performance indicators (KPIs), including animal welfare, will encourage the application of certification schemes at farm level. More knowledge and better technologies to determine the carrying capacity of the ecosystem are needed to implement an ecosystem-based approach to governance. Stimulating transfer of innovative but well-proven technologies from other branches, both within the Blue Economy and the Green Bioeconomy, provides a large potential for optimising efficiency and sustainability in aquaculture. Waterborne transport of seafood as an alternative to airborne or transport by road should be encouraged. The optimization of novel food processing technologies and packaging techniques to improve the shelf-life of seafood, will contribute to speed up this trend.

2.2 Develop alternative feed ingredients



There is a need to look further into the sourcing of feed materials and the potential of new ingredients from sources at lower trophic levels. Fatty acids and/or proteins from microalgae, gas (LNG, CO₂), macroalgae, insects, unicellular organisms, fungi, wood and other terrestrial plants present important opportunities for aquaculture. In all cases, the safety and reliability of the fish feed, and its effects on product quality are of critical importance. A risk assessment framework for the use of alternative feed materials in aquaculture should be developed. The establishment of biomarkers that are indicative of the nutritional status and the food conversion rate for assessing the potential of new ingredients are needed. Optimised feed formulations that are cost-efficient, resulting in better growth performance and quality, as well as contributing to improved public perception, are of the utmost importance.

2.3 Promote measures to promote animal welfare and to prevent adverse health conditions



Operational animal welfare indicators throughout the production chain, including transport and slaughtering, need validation. An improved understanding of the multivariate factors that affect livestock health and welfare is critical, implying the development of models for epidemiological studies in aquaculture, implementation of sanitary control, design of effective biosecurity plans and the application of (immune)prophylaxis measures. The development of Integrated Pest Management programmes for Aquaculture Zones has been suggested.

The industry requires efficient and easy-to-use diagnostic tools to identify and treat health alterations at an early stage. Research should be encouraged to develop tools and indicators for reporting, exploiting data and modelling different mortalities. Finally, access to funds and new legal frameworks for the registration of therapeutics should be reviewed.

2.4 Enable evolution towards a circular economy



New technologies may improve the recovery of high-value waste (including proteins and fish oils) generated during the aquaculture value chain. Research on treatment and the use of effluents, sludge and by-products from aquaculture processing plants will both counteract the challenge of limited access to feed resources and increase the sector's contribution to the circular economy. Processing protocols are required for the conversion of food/biological waste and by-products from other Bioeconomy sectors into feed or additives ingredients.

2.5 Adapting to climate change



Effective long-term planning on the effects of climate change requires the development of regional adaptation strategies which should include high accuracy forecast models appropriate for the aquaculture sector. These should incorporate accumulated information on the effect of the various climate change drivers - other than temperature - such as pH, storms, pathologies... on the main species reared in Europe. Mitigation and adaptation plans should include the selection of more robust animals and increased species diversity.

3. Promoting Innovation

Innovation, linked to growth and sustainability, is paramount for the competitiveness of the European aquaculture sector. Cross-cutting issues have been identified on how to promote aquaculture innovation and, thus, sectoral competitiveness, growth and sustainability.



3.1 Promote open and inclusive dialogue



Design and allocate new tools for technology transfer specifically focused on aquaculture, while underpinning the role of existing multi-stakeholder platforms to reinforce this exchange. Mirror Platforms are well-established clusters operating at a regional level, proven to play a decisive role in supporting an open dialogue between industry (across the value chain), scientists and policy makers, as well as between experts across different disciplines. Establishing coherence among the Mirror Platforms and developing initiatives to promote collaborative actions should be supported with public funding. The strengthening of public – private alliances models, an appropriate regulatory framework and better access to funds and R&D investment can contribute to reduce the gaps between research results and commercial applications.

3.2 Support projects with a high degree of industrial relevance



Enabling technologies, adapted to sector-specific challenges, have the potential to create high-impact innovations. More specifically, it is believed that digitalisation, gene editing, novel materials and engineering systems are areas that have the capacity to optimise the sector's efficiency.

Incentives at European and national levels are needed to enable and de-risk potentially disruptive changes. SMEs require access to low threshold funds for industrially-oriented R&D. Improved mechanisms for effective knowledge transfer and successive projects are required to ensure implementation, demonstration and application of research results. Tracking programmes would allow the measuring the efficiency of projects.

3.3 Stimulate entrepreneurship



Innovation is often driven by small specialized companies and start-ups. Entrepreneurship needs to be encouraged through a number of actions - e.g. adapted collaborative instruments, legislative measures, collaborative platforms, access to funds and technical support. Combined with a stronger interaction between industry and research, these measures will allow the creation of new business opportunities and models.

3.4 Build training and knowledge capacity



The lack of alignment between educational and training programmes at Universities or technical schools and the capacity requirements in the industry needs to be addressed. New sector developments demand a larger flexibility of the programmes, and the implementation of innovative, open learning methodologies that link theory to practice. Collaborative academy-industry mechanisms on local, national and European levels should be reinforced to promote exchange of best practices. The attractiveness of the industry can be supported by creating professional platforms dedicated to young people.

Cooperating at a Global Level



Europe should use the appropriate international channels, such as the FAO Subcommittee on Aquaculture, to recommend and adjust Best Aquaculture Practices and Aquaculture Certification Guidelines. In addition to European funding schemes, there is also a need for national instruments that allow efficient cross-national partnering, hereby protecting innovation progress from wider international political processes (e.g. Brexit).

MEMBER ORGANISATIONS OF THE EATIP

EATiP Mirror Platforms



Commercial companies



Research Institutions



Universities



Organisations



NGO's



Observers



EATiP
European Aquaculture Technology & Innovation Platform
Square de la Paix 28, B-4031 Liège (Angleur)
Tel: +32 4 338 2995
secretariat@eatip.eu - www.eatip.eu

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