European Fisheries and Aquaculture Research Organisations

EFARO

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To RTD-KBBE-STAKEHOLDERS@ec.europa.eu

Subject : Stakeholders' consultation 2014 H202 Societal challenge 2

Dear Madam/Sir,

Herewith I sent you the EFARO contribution to the Stakeholders' consultation questionnaire. We hope this is a valuable contribution.

Sincerely Yours,

For EFARO President Gerd Kraus
Rian Schelvis,
Science Officer of the Executive Secretariat

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STAKEHOLDERS' CONSULTATION 2014
HORIZON 2020 SOCIETAL CHALLENGE 2

Food Security, Sustainable Agriculture, Marine, Maritime and Inland Water Research and the Bioeconomy

Identifying the challenges

1) In the framework of the Horizon 2020 Societal Challenge 2, what are the most important specific challenges which require immediate actions in order to achieve smart, sustainable and inclusive growth?

Under challenge 2.3. Unlocking the potential of aquatic living resources, section 2.3.1. Developing sustainable and environmentally-friendly fisheries:

1.1) High quality and integrated monitoring and assessment systems (suggested for 2016)

Correct implementation of new the CFP and MSFD will require cost efficient acquisition, monitoring and use of reliable data. The following aspects shall be covered:

i. spatial distribution of marine living resources including their predators, prey and fisheries including full documentation of catches,

ii. develop methodology for analyzing impacts of aquaculture activities in coastal areas in order to minimize spread of diseases and negative impact on the benthic and marine ecosystem,

iii. improved and automated monitoring systems, delivering information required for assessing the impact of fisheries on marine ecosystems and habitats or the implementation of the Maximum Sustainable Yield (MSY) to ensure relevant, timely assessments and stock forecasting.

Combining DCF & MSFD monitoring and data needs using technological advancements and ships of opportunity to cope with additional information demands. Activities should not only focus on the acquisition of data (including remote sampling systems) beyond present pilot projects, e.g. the North Sea/Celtic Sea DGENV tender on integrated monitoring and related JPI Ocean pilot action, but also systems to ensure data quality, and databases needed to allow rapid and easy access by users.

1.2) Institutional setting of Regional Fisheries Management Systems (RFMS) at EU, regional and cross sectorial level (suggested for 2016)

To achieve the objectives set out in the EU Integrated Maritime Policy and various EU Strategies and sectoral policies, an analysis of existing governance structures and their performance is needed to identifying structures able to implement the ecosystem approach for the management of marine resources on regional scales with appropriate delegation of self-governance to the industry.

In order to handle this complex task within a sufficient time horizon, a new governance instrument for the EU fisheries management needs to be developed in cooperation with relevant international scientific and advisory bodies (e.g. ICES, CIESM) and regional seas conventions (OSPAR, HELCOM, BAECELONA) as well as regional fisheries management organisations (e.g. NEAFC, GFCM, NASCO) and industry representatives (e.g. RAC). For that, the following need to be addressed:

i. regional implementation of the revised CFP (and its interconnection with the MSFD)

ii. change of management systems in the direction of self-governance, e.g. rights based management and co-management. This should include demographic aspects, gender, unemployment and working conditions as well as self-responsibility for sustainability and data collection.

Focus should be on the development of indicator frameworks, criteria, monitoring systems and management evaluation tools being able to handle ecological, economical and social aspects to guide and follow the performance of both existing and future management approaches. The development of Regional Fisheries Management Systems should be tested in the field by considering different types of main fisheries from each of the EU eco-regions.

1.3) Effects of climate change on biodiversity and productivity of marine fishery resources in the Mediterranean Sea (suggested for 2016)

Climate change is altering marine ecosystems by modifying spatial distribution of species and communities, and, ultimately, their productivity. This is particularly evident for the Mediterranean Sea which is characterized by high biological diversity. Furthermore, because of its interface position between temperate and tropical biomass, the Mediterranan Sea can host both cold- and warm-affinity species. Increasing sea water temperature as well as the connection with the Suez Canal results in a deep modification of fishing assemblages, especially in the Eastern Mediterranean, with alien species becoming the main target of fisheries. More than 20% of fish species living in the Levant Sea are migrants from the Red Sea, including venomous fish. As general pattern two main processes are occurring: (i) gradual migration of Mediterranean warm/hot affinity species from the southern coast to the north, and (ii) invasion of alien species from the Red Sea and the Atlantic Ocean.

Although the General Fishery Commission for the Mediterranean have recommended studies on substitution of new species as fisheries target in some areas of the Eastern Basin, no projected impacts of climate change on marine resources and fisheries is available. The knowledge of the structure and functions of fishing assemblages in the new "warm" phase is a prerequisite for addressing impacts of climate change on sustainable exploitation of biodiversity in the Mediterranean fisheries.

1.4) Implementation of MSY and fisheries management plans (Suggested for 2017, awaiting output from FP7 projects MYFISH, SOCIOEC, ECOFISHMAN and MAREFRAME)

The objective is to improve and implement integrated multispecies stock (incl. processes such as competition and recruitment) and fisheries analyses and models (incl. regulatory, economic and social drivers), being spatially stock and fleet specific and covering biological, ecological, economic and social aspects, with the aim to evaluate the present performance and design of future fisheries management plans and targets, including the implementation of MSY within the boundaries of the MSFD. The integration of MSFD requirements into fisheries management requires definition of environmental constraints for fisheries to be factored into fisheries management plans on a regional level, considering direct and indirect effects of fisheries on Good Environmental Status as defined by the MSFD.

The following cross cutting challenges linking across several Societal Challenges (Bioeconomy (challenge 2), Climate and Environment (5), Transport (section 4), Energy (3) are suggested to be addressed in cross cutting Blue growth calls:

1.5) Marine pollution: exploration, mitigation and remediation (suggested for 2016)

The objective is to describe and quantify cycling, impact and elimination in food webs and accumulation in seafood, including establishment of monitoring tools, assessment models and technologies for efficient and innovative mitigation and remediation. This should be achieved by bringing together marine scientists, technology providers and end-users (including policy makers), with a view to the exploration of new approaches for efficient and innovative mitigation and remediation of pollution, also within the scopes of the MSFD implementation, characterization of good environmental status, and the enhancement of a sustainable European maritime economy.

Analysis of marine coastal areas and open sea environments affected by point-source and/or dispersed contamination of traditional and emerging contaminants, radionuclides and littering combined to specific understanding of :

i. specific biogeochemical cycles,
ii. dispersion models,
iii. transfer in the marine trophic web and eventually
iv. potential effects on human health should be taken into account as sound based knowledge to explore new approaches for efficient and innovative mitigation and remediation by new and integrated methodologies.

1.6) Climate change impact on marine resource exploitation in the Arctic (suggested for 2016)

Future climate and ecosystem scenarios should form the basis for assessing potential economic opportunities under climate change. Reduced ice cover will result in greater oil and gas as well as mining possibilities. It will also change productivity in the Arctic ecosystem, producing shifts in fish distributions and increase access to fishermen. As an important consequence it may lead to substantial changes in fishery opportunities. The project should address ecosystem production forecasts (mainly for fishes), policy options, including marine spatial planning, for sustainable development, whilst protecting and preserving the Arctic environment. The governance, including Regional Fisheries Management Systems, and geopolitical aspects in relation to these multilayered cross-sectorial activities and climate change need also to be addressed, including foresight and assessment of the economic impacts.

The expected developments have the potential to impact the environment through increased pollution, increased species invasions, , and removal of key ecosystem components through fishing thereby having important consequences and resulting in feedbacks to the Arctic ecosystems. These should be explored and measures to mitigate negative impacts (e.g. protection of sensitive habitats, , necessary infrastructure, , application of new resource extraction and fishing technologies, etc.) should be identified. The interdisciplinary approach within the project is expected to provide the tools needed for ecosystem-based management and sustainable development in the marine Arctic.

Proposals should contribute to implementing the Transatlantic Research Alliance launched by the Galway Statement on Atlantic Ocean Cooperation in May 2013, and should benefit from the inclusion of partners from the United States of America and Canada. Cooperation is also encouraged with other international partners.

1.7) Scientific support to the European Aquaculture Strategy (suggested for 2016):

The development of the European aquaculture behind the global increase in aquaculture to cover the growing demand for seafood in the world. In order to safeguard the supply of healthy seafood, support of the European aquaculture is needed. In Europe there is only room for aquaculture with a low footprint, this requires on the short term:

i. Sustainable intensification using knowledge based models for environmental management, spatial planning and governance, mitigation of risks (escapees, diseases) and nuisance.
ii. Improved (climate smart) production systems (onshore RAS, offshore IMTA), with robust and efficient species, supported by smart breeding, customized feeding and nutritious alternatives for fish oil and fish meal
iii. Offshore seaweed production, in combination with offshore energy production

2) What key research and innovation areas need to be addressed in order to tackle these specific challenges, and meet the specific objectives of Societal Challenge 2?

Fisheries and Aquaculture Sciences; Economics and social sciences; Marine environmental sciences; Marine and underwater technology; Blue Biotechnology; Blue bioeconomy; Fish farming and fisheries; Animal production sciences (fish); Plant production sciences (seaweed)

3) What are the key assumptions underpinning the development of these areas (research & innovation, demand side and consumer behaviour, citizens' and civil society's concerns and expectations)?

The identification of research priorities is based on an analysis of research required to implement policy principles of major marine and maritime European strategies, policies and directives, such as the CFP, MSFD, EU Maritime Policy, EU Aquaculture Strategy; EU Strategy 2020, EU Sea Basin Strategies and European Strategy for Marine and Maritime Research, but also global commitments such the Convention of Biodiversity (CBD).

Tackling bottlenecks & gaps

4) What are the bottlenecks – in practices and research – in addressing these areas, and what are the inherent risks and uncertainties, and how could these be addressed?

H2020 requires close collaboration between the industry sector, government funded science and academic science. These separate funding streams create problems where performance indicators and intellectual property (IP) rights hinder such collaboration. The performance of university scientists is usually measured by publications in high impact journals whereas applied science to support industry is measured more by the effectiveness of the implementation of policy or commercial solutions. Furthermore if IP remains in commercial hands and is not publicly available this prevents many scientists from career development as their scientific success cannot be measured through publications. For applied research funding to be successful there needs to be a system of performance measures that incentivises publicly/academically employed scientists to work with industry in a way that enhances their career development. There is also a need for industry to be more willing to allow research to be made publicly available in quality journals.

5) Is there evidence for any major gap (knowledge, science and technology, markets, policies, competences, skills)?

The move to more environmental and ecosystem based policy for both aquaculture and fisheries requires much more sophisticated knowledge of marine systems and relevant mathematical models to test management scenarios. At present ecosystem models are still in a stage of development and few can be used reliably to investigate policy options robustly. There is a shortage of modelling skills particularly in the area of biology and ecology to develop such models. The same applies to aquiring the data needed for these types of models and analyses underpinning ecosystem based management and policy with a comprehensive yet robust science base. There is a need for developing integrated and cost efficient monitoring and data acquisition programs addressing both fisheries advice as well as advice on marine ecosystems and environment.
Many of the challenges in marine science require multidisciplinary teams that include natural science as well as social sciences to address them. While co-operation between these disciplines is improving there remain major cultural differences in approach that need to be overcome to make such teams truly effective. This problem also affects the way in which project proposals are evaluated where multidisciplinary projects often score less well where reviewers from different scientific and social scientific cultures are overly critical of the scientific approach of other disciplines. Much more education is required to break down such prejudices to take advantage of inter-disciplinary collaboration.

Sustainable intensification of aquaculture requires a multidisciplinary approach as well. In the next step op aquaculture development the expertise from the domain of livestock production science (breeding, feeding, health care) is needed.

Defining opportunities

6) What are the emerging opportunities for advances in the areas tackled by Societal Challenge 2, taking into account the EU position in research and innovation?

As the focus is on ecological sustainability and blue growth inter- und transdisciplinary approaches across the humanities and natural sciences should be promoted as they are essential for obtaining full system understanding, which in turn is required to propose solutions to the challenge of combining conservation and growth aspects.

7) In which areas is the strongest potential to leverage innovation and, in particular, ensure the participation of industry including SMEs?

The monitoring and data collection of marine activity (such as fisheries) and the ecosystem is currently very costly and relies heavily on research vessels and manpower. New technologies such as the use of image analysis, automated data recording and remotely operated vehicles (ROVs) offer the potential to reduce data collection costs and could be done with the collaboration with the private sector.
The main European aquaculture industry is now developing into a consolidation of SMEs in multinational companies. However, in innovative new developments SMEs are still in the lead and requires scientific support. Especially in the domain of a new perspective species (Seriola), in seaweed cultivation; and in environmental improvements using recirculating techniques and IMTA (multi-trophic) approaches .

8) How could Horizon 2020 Societal Challenge 2 best contribute to EU policies, and leverage and complement Member States' efforts for growth and job creation?

In the field of fisheries and aquaculture H2020 can make major contributions to the implementation of the reformed CFP and the operation of the MSFD by contributing to the development of better systems of governance, more environmentally sustainable use of living resources and meeting the challenge of food security in the face of climate change. New jobs will be in the field of technology development and operationalizing autiomated marine observation and data acquisition technologies in the field of marine environment, fisheries and aquaculture.
Fisheries and aquaculture are sectors that still create many jobs in the seafood industry, including the processing plants and transport sector. Aquaculture has the economic and market potential to double in size.

9) What types of cross-cutting and trans-disciplinary activities would best tackle these challenges/opportunities based on the first experience of Focus Areas such as Blue Growth or Sustainable Food Security[1]?

The exploitation of the marine environment for whatever human activity needs to be supported by multidisciplinary science. The development of good fishery policy, for example, needs close collaboration between biologists, economists and social science. Other human activities require very similar types of collaboration to ensure that they are sustainable biologically, support profitable industries and meet the need of societal expectations in terms of ethical use.

[1] Horizon 2020 Work Programme 2014-2015 on Societal Challenge "Food Security, Sustainable Agriculture and Forestry, Marine and Maritime and Inland Water Research and the Bioeconomy"
http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-food_en.pdf

Major costs savings may be possible in terms of data collection and monitoring through the collaboration of scientists and technologists to develop and apply new technology to data acquisition as described in Q7.
From a cross-sectoral perspective there are more prospects than have been addressed so far: viz. seafood and seawood production in connection to renewable offshore energy production; and a stronger cross-link between livestock and fish production.

Output and impacts

10) What type of output could be foreseen and what could the impacts (on science and technology, innovation, economy, environment and society) be based on your identification of priority areas for action? What would success look like? How would you measure it?

The results of the priorities discussed above would be fisheries:

i. that are self-compliant and do not require heavy policing
ii. Data acquisition that is automated and economical to collect providing real-time analysis of fish stock status
iii. Yields from fisheries that are substantially higher and sustainable than current levels
iv. Able to adapt to ecosystem changes caused by climate change

And for aquaculture:

i. Low impact fish farms that are climate smart
ii. Production that is less dependent on wild fish as a food source
iii. Use multitrophic systems that can make good use of primary production
iv. Smart selection of cultivated species inform a European market perspective (salmon, troiut, seabass, seriola)

11) Which related innovation aspects could reach market deployment within 5-7 years?

A major step is expected to happen in automated and cost efficient monitoring technologies as well as related data acquisition, handling and analyses.
In aquaculture this will be: next generation RAS and IMTA systems; market introduction of Seriola; seaweed farming technology; fishless feed.