Terms of Reference
SCAR-Fish SWG

NAME OF GROUP

SCAR-Fish SWG, Strategic Working group on Fisheries and Aquaculture Research in the Bioeconomy

1 Rationale

Europe is a coastal continent. At 22 million km^2, the Exclusive Economic Zone (EEZ) of the European Union (including EU overseas territories) is the largest in the world. Additionally, Europe is rich in freshwater bodies, mainly lakes and rivers, some of them transnational in nature. In 2019, the EU Blue Economy directly employed close to 4.45 million people, generating €667 billion of turnover and ca €184 billion in gross value added[1]. Almost half of the EU population lives less than 50 km from the sea; the majority is concentrated in urban areas along the coast. Ocean and sea basins and inland waters are connected as a global ecosystem and dynamic economic space. Underpinning Europe's approach to developing the Blue Economy is the concept of sustainable use, i.e., supporting the implementation of the ecosystem approach. This includes accountability for maintaining aquatic ecosystem structure and function so that the value chain, and societal wellbeing are protected and sustainable. **Aquatic food systems** should be developed through **a Sustainable and Circular Blue Bioeconomy Approach**. This should be the key framework for Research and Innovation (R&I) priorities and needs in the aquatic domain during the forthcoming years.

Fisheries and aquaculture play a significant role in the Europe's food security by producing raw material for food and feed. More generally, Europe's food security critically depends on aquatic resources in the supply of protein, minerals, and renewable energy. The Covid19 pandemics and the Russian war against Ukraine generated high disruptions on all economic sectors, including fisheries and aquaculture. The resulting challenges, like the need for increased level of food security and safety, and for decreased operation costs of the industry, together with the need to adapt to/mitigate climate change, as well as to secure biodiversity and reduce environmental impacts, put pressure on new R&I actions.

Such actions need to be ambitious and diverse, and cover a wide range of research disciplines and industries. They should address the capacity to observe, tackle challenges and explore opportunities, both on land and in offshore, coastal and freshwater ecosystems, many of which are interlinked. Integrated views and system-wide solutions are needed to cover the production and utilisation of renewable biological resources from both terrestrial and aquatic ecosystems by sustainable means.

2 Mission and objectives

SCAR-Fish is a strategic group of DG RTD inside SCAR, the Standing Committee on Agriculture Research, with focus on research and innovation activities in the aquatic domain, including fisheries and aquaculture, both marine and freshwater, and their environmental impacts. Our mission is to maintain a network that creates the required necessary critical mass to contribute to define EU research and innovation priorities, for example, within the Horizon Europe, including the EU Mission "Restore our Ocean and Waters" and the HE Partnerships, aligned with relevant EU policies**,** directives and strategies,

[1] European Commission (2022). The EU Blue Economy Report. 2022. Publications Office of the European Union. Luxembourg

most importantly the Common Fisheries Policy (CFP), Marine Strategy Framework Directive (MSFD), Maritime Spatial Planning Directive (MSPD), the Biodiversity Strategy for 2030, the Water Framework Directive (WFD), the Green Deal (including the Farm to Fork Strategy and the Circular Economy Action Plan), the Bioeconomy Strategy, the Food 2030 Policy, and the BIOEAST Initiative.

This network will rely on interdisciplinarity to address **the sustainability triangle of environmental protection, economic competitiveness and social acceptability**, by strategic discussion and sharing views and information between Member States (MS), Horizon Europe Programme Associated Countries (AC), the European Commission (EC) and observers from funding agencies, international marine science organizations (ICES, EFARO), intergovernmental and other multi-actor platforms in the aquatic domain (JPI Oceans, EATiP, EMB), policy makers, and NGO's (Eurogroup for Animals), with an aim to identify common priorities which could lead to coordinated or joint initiatives in the domains detailed above.

Objectives:

- To forge a strong linkage between MS and AC Ministries in charge of activities in the aquatic domain (in the seas and oceans, as well as the freshwater ecosystems) related to the production and use of biological aquatic resources, including fisheries and aquaculture, and the European Commission (DG RTD, DG MARE, DG ENV), by developing and implementing strategic approaches and actions for timely advice on R&I activities, for example informing on the European Framework Programmes (Horizon Europe) and providing recommendations for the relevant European Partnerships.
- To ensure that R&I are effectively addressed between MS and AC, on a long-term basis, to achieve a cost-efficient system of R&I effort in the areas of sustainable fisheries and aquaculture aligned with the relevant policies, directives, and strategies.
- To provide evidence-based information on R&I needs to advise R&I policymakers so that they can design and implement efficient and effective sustainable fisheries and aquaculture related R&I initiatives and policy at EU and national levels.
- To collate existing information and where necessary collect new information in the areas of foresight and common research agendas with other SCAR groups, namely the SCAR Foresight, Strategic Working Groups (especially SCAR AKIS, SCAR Food Systems, SCAR Bioeconomy), and Collaborative Working Groups (especially SCAR AHW).

3 Organisation and rules of procedure

3.1 Coordination - Chair and Co-Chair – a rotating scheme

SCAR-Fish is coordinated by a chair and a co-chair. The chair is rotated between MS/AC. A MS/AC will agree to chair SCAR-Fish for a 12-month period. The chair is responsible for guiding the work and organize (with the facilitation of the Commission) and chair four consecutive meetings.

A co-chair will also be agreed upon, from a different MS/AC origin, to work closely with the chair for the 12-month period, replacing him/her in his/her functions on mutually agreed occasions or in justified absences of the chair, and being responsible to draft the minutes of the meeting. When the chairs' term of office finishes, the co-chair will become the chair and a new co-chair will be agreed upon by the group.

The chair/co-chair represent(s) SCAR-Fish at SCAR SG and SCAR Plenary, when required.

3.2 Participants

SCAR-Fish is open to all EU MS and the HE AC Ministries with interests in fisheries- and/or aquaculture-related R&I. Each MS/AC Ministry will nominate up to three delegates that will be present as formal representatives of their country and not as individual experts, ensuring appropriate coordination with national SCAR liaisons and representatives in other groups working in areas relevant for the fisheries and aquaculture in an EU context. SCAR-Fish is also attended by observers of external organizations that are active players in the blue bioeconomy. In addition, other parties representing, e.g., the other SCAR working groups, or HE partnerships, may be invited to participate in the meetings when deemed relevant.

DG RTD facilitates SCAR-Fish in its operation. In particular, it facilitates the chair and co-chair in the preparation of meetings, including the archiving of documents (agenda, presentations, minutes etc.) on CIRCABC and has an important role as a liaison to representatives of (new) MS and other European Commission services. DG RTD alongside DG MARE also actively participate in the meeting of the group. Other Commission services may participate depending on the agenda of the meeting.

A map of SCAR-Fish members is maintained on the SCAR-Fish website. In addition, a list of members and observers is maintained in CIRCABC.

3.3 Sub-groups

SCAR-Fish may set up sub-groups (task forces) to deal with questions relevant to its work programme, with a clear purpose and a limited time of duration. The sub-groups will work inter-sessionally and report their work back to the group at the SWG meetings.

3.4 Meetings

SCAR-Fish shall meet at least four times per year, mainly online with one in-person meeting per chairmanship period. In-person meetings can take place in the premises of the EC or the facilities of a MS in Brussels and at different MS and AC, or in the premises of an observer organisation. Whenever possible, the in-person meetings will be organised as one-day meetings and held in conjunction with other relevant meetings, workshops, or conferences. Additional activities may include workshops (jointly organised with other initiatives or SCAR groups) and on-site visits in the MS/AC allowing participants to witness good examples.

Agenda:

A minimum of 20 working days in advance of the meeting the agenda items and their contents shall be suggested by all the delegates. A provisional agenda shall be drafted by the chair and sent to the group up to 15 working days before the meeting, together with any relevant documents related to the agenda items. The agenda will be approved in the beginning of each meeting.

Minutes:

Minutes of meetings will be prepared by the co-chair up to 10 working days after each meeting and submitted to the chair for approval with DG RTD in copy. The minutes shall then be distributed to the group for comments and approved in the beginning of the following meeting.

Correspondence:

All correspondence to the group shall be addressed by e-mail to the chair, with the co-chair and DG RTD in cc. Conversely, all correspondence from SCAR-Fish to the delegates shall be addressed by the chair, with the co-chair and DG RTD cc.

3.5 Reporting

SCAR-Fish reports to SCAR Plenary and informs SCAR regularly (at SG and Plenary meetings) about its work. The reports and other deliverables alike, the ToR and the work plan are published on the SCAR-Fish website.

3.6 Timeline

Duration of the next Mandate: June 2023- June 2026 (Terms of Reference to be approved by SCAR Plenary on the 8th of June 2023).

3.7 Resources

Resources from MS are basically all in kind (time of chair/co-chair and task force members, and of all other members); additional resources need to be sought, e.g., from RefreSCAR (CSA), to support the organisation of workshops, facilitation of special working formats, drafting of deliverables (especially when more complex inputs need to be processed) and allow for the reimbursement of external experts, as well as for commissioning of desk studies where appropriate.

4 Work Plan

The work plan is tri-annual with the possibility for adjustment when found relevant and necessary during the new mandate period, e.g., due to altered conditions in the operational environment. The work plan will partly build upon the activities, results, and deliverables from the earlier mandates, and it has synergies with the relevant policy frameworks as indicated in Section 2.

There are four main themes (summarised below in Subsection 4.1) identified that SCAR-Fish plans to advance during the new three-year mandate period. The activities under the themes focus on selected topics that SCAR-Fish considers timely and necessary for defining R&I gaps in tackling challenges related to sustainable development of the aquatic food systems.

The work plan serves as a basic framework for the SCAR-Fish actions during the mandate. The activities will be further defined to be aligned with the activities of other SCAR working groups, the HE Partnerships, in particular, and the SCAR-Fish observers, and adapted to the needs of the involved MS/AC. SCAR-Fish will follow closely and contribute to the work of SCAR Protein Task Force and SCAR Foresight, feeding into the finetuning of the group's work, and vice versa, during the following three years. A portfolio analysis of research on alternative proteins from the aquatic environment has already been initiated by SCAR-Fish.

The implementation of the work plan will include: 1) Collating and analysing knowledge from different sources, like HE projects, MS/AC, SCAR-Fish observers and other stakeholders, concerning the current state of affairs, 2) Identifying R&I gaps, 3) Drafting R&I recommendations and other deliverables, and 4) Disseminating the results and outputs to target groups. The results and outputs will primarily serve the European Commission, the SCAR and the MS/AC.

4.1 Themes and planned activities

THEME 1. COEXISTENCE OF AQUACULTURE AND FISHERIES WITH OTHER ECONOMIC ACTIVITIES

The massive buildout of energy-infrastructures at sea is a key driver for the need of new knowledge, e.g., in terms of fisheries displacement, socioeconomic impact on fishing sector, or multi/co-use aspects. Numerous installations will have new impacts on the marine biodiversity, ecosystem structure and functioning as well as the ecosystem services upon which we rely, e.g., for food security. Such effects are

neither captured nor anticipated or acted upon in the past/current observation, modelling and governance systems. While these structures may be a threat for the fisheries sector, they may potentially provide new opportunities for aquaculture or other economic activities.

Activities will focus on:

- Elucidating potential synergies and conflicts between industries and defining the main problems and the R&I gaps, e.g., scaling effects and other effects on the ecological system, development of new models, indirect impacts, like socio-economic aspects, the need for new ecosystem-based management regimes, and new technologies for developing fisheries and aquaculture in co-use scenarios.

THEME 2: IMPLEMENTATION OF THE BIODIVERSITY STRATEGY AND THE POTENTIAL NATURE RESTORATION LAW IN THE AQUATIC DOMAIN

Biodiversity protection and habitat restoration are now a primary focus of EU policy. Implementation of the EU's Biodiversity Strategy for 2030 and its key element, the newly drafted Nature Restoration Law, has the potential to significantly disrupt our approach to food production from the seas, oceans, and the freshwater ecosystems. Sustainable seafood production must come with less impact on the natural environment. This will have an influence on capture fishing and aquaculture because of the need to mitigate their environmental impacts. On the other hand, recovery of the degraded aquatic habitats and ecosystems, e.g., via restored river connectivity, or improved quality of the reproduction habitats, may in turn enable the revival of the declined fish populations, and ultimately pave the way for their sustainable use. There are open questions concerning the implementation and impacts which creates the need for R&I to find and promote sustainable solutions.

Activities will focus on:

- The role of networks of marine protected areas (MPA) in the preservation and restoration of carbon-rich ecosystems and sinks as well as ecological refugia to limit the impacts of increasing human activities.
- Nature-based solutions within aquaculture and fisheries and impacts arising from ecosystem management services and / or habitat restoration.
- The development of technologies to mitigate the environmental impacts of capture fishing (bycatch and impacts on habitats, including marine litter) and the contribution of enhancement actions (eco-engineering or bioremediation actions like culturing seaweed or mollusc) in the mitigation of the impact of multiple pressures degrading the habitats and ecosystems.

THEME 3: TOWARDS A MORE SUSTAINABLE AQUACULTURE PRODUCTION

Aquaculture has been one of the fastest-growing food sectors in the world, although with decreasing growth rates in recent years[2]. At the same time, European aquaculture production volumes have stagnated and, in some instances, decreased. The EU imports 70% of the seafood it consumes whilst EU aquaculture accounts for less than 2% of global production[3]. This sector is an important source of healthy protein for human consumption, and thus plays an important role in our food security and supply.

[2] FAO. 2022. The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation. Rome, FAO. https://doi.org/10.4060/cc0461en

[3] COM (2021) 236 Final – Strategic Guidelines for a more sustainable and competitive EU aquaculture for the period 2021 – 2030

Although the production may already be regarded as more sustainable than meat production from the perspective of carbon footprint, for certain species the production itself still requires energy, protein and lipids derived from animal-based sources, either from terrestrial or aquatic origin. In addition, aquaculture can result in environmental impacts, including eutrophication or environmental stress from nutrient loading and treatments, spreading of diseases, extensive use of water (land-based aquaculture), and use of antibiotics. Solutions for a sustainable scaling of aquaculture production, while reducing associated negative impacts, are urgently needed.

Activities will focus on:

- The role of microbiome and fungi in aquaculture, e.g., for better growth, health status, pathogen control, management of water quality management, etc..
- The best practices (incl. breeding and genetics) and aquaculture systems (from intensive RAS to extensive IMTA, including conventional and organic aquaculture) to improve the environmental performance of this sector, e.g., by enhancing nutrient or particulate uptake, absorption of carbon, or biodiversity, and by reducing the use of antimicrobials and other treatments, in a cost-effective way, to also support MS in the implementation of the EU Aquaculture strategy towards more sustainable and lower impact food production.
- The potential of new concepts for operation in exposed marine areas (offshore aquaculture) to enhance food security and supply, e.g., by increasing space for aquaculture. This may result in also biodiversity benefits through decreased pressure on wild fishery stocks and provision of offshore farming structures. Several challenges such as engineering, monitoring, optimal species and environmental sustainability, must still be addressed.
- The potential and possibilities of the use of alternative bio-resources for food and feed through harvesting or cultivation, along with innovative valorisation pathways, to strengthen food security and supply raw materials sustainably without impacting aquatic ecosystem beyond their carrying capacity.

THEME 4: THE POTENTIAL OF DIGITAL TRANSITION IN FISHERIES AND AQUACULTURE

A key enabler for reaching the Green Deal objectives is the leverage of the potential of the digital transition. Transforming our food system into a more productive and sustainable version will inevitably involve better exploitation of the potential of the seas and oceans, and the freshwaters, as well as a development of the aquaculture sector by means of digitalisation. Fisheries and aquaculture are areas where the incorporation of the innovation developed digital technologies, such as artificial intelligence, 5G, cloud and edge computing and the internet of things, can greatly contribute improve the design and operation of capturing and processing systems, being extremely important from a circular blue bioeconomy perspective. Digitalization and the development of the digital twin of the Ocean will support more efficient and sustainable food production enabling increased traceability from capture to consumption, ensuring transparency and validation of good practices within the local industry, policy makers and civil societies.

The focus of **Activities** will be specified during the first half of the mandate period responding to the progress of this fast-developing field. This may include, e.g., digitalisation for better control and higher predictability, decision support systems, automation and robotisation of operations.

4.2 Risk and risk mitigation

- Lack of resources in some MS/AC for a more active participation.

  Mitigation: Investigate funding possibilities from supportive bodies, like RefreSCAR (CSA).

- Small group of MS/AC being actively involved.

  Mitigation: Actively search for new members and motivate them to participate.

- Urgent policy matters not foreseen during the planning of the mandate may call for short notice adjustments to the work plan.

  Mitigation: The group is flexible and can react to upcoming policy matters. Adjustments of the (draft) work plan during the mandate are expected and will be discussed with the group members. If necessary, major changes will be discussed with the SCAR SG and/or the Plenary.