Intelligent Fish feeding through Integration of Enabling technologies and Circular principle

Horizon 2020 Grant Agreement (GA) No: 818036

D6.5

Overview on stakeholder engagement actions

– Aquaculture sector -

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1 Summary

The primary objective of this deliverable was to implement and monitor the stakeholder engagement strategy, aiming to showcase the potential and address the limitations of the technology developed by the iFishIENCi project. This strategy was designed to expand the network and enhance stakeholder understanding of our technologies, processes and products while streamlining tasks in other work packages of the project and promoting the integration of our technology across the European Union and beyond.

By proactively engaging a diverse group of stakeholders, including operators, farmers, technology providers, and international organizations, the iFishIENCi project effectively disseminated information about its technology and gathered valuable insights from end users. The strategic development and implementation of demo sites, workshops, trainings, and engagement activities during conferences allowed the project to assess the success of its engagement efforts and ensure alignment with its overarching goal of fostering the adoption of innovative advancements within the aquaculture sector.

2 Introduction

2.1 IFishIENCi innovation

Today, most of the aquaculture production takes place in land-based flow-through or pond systems, marine cages, or recirculating aquaculture systems (RAS), each with varying production costs and environmental impacts. The rising demand for fish has led to the development of more costly and intensive fish aquaculture solutions, with increasing sizes of rearing environments on land (RAS), coastal (semi-closed containment systems), and offshore systems. This expansion presents new challenges in reducing stress to maintain fish health and welfare in these systems. Minimizing stress is essential for mitigating its detrimental effects on fish behaviour, development, feeding, growth, reproduction, and immune function, ultimately improving overall health and welfare.

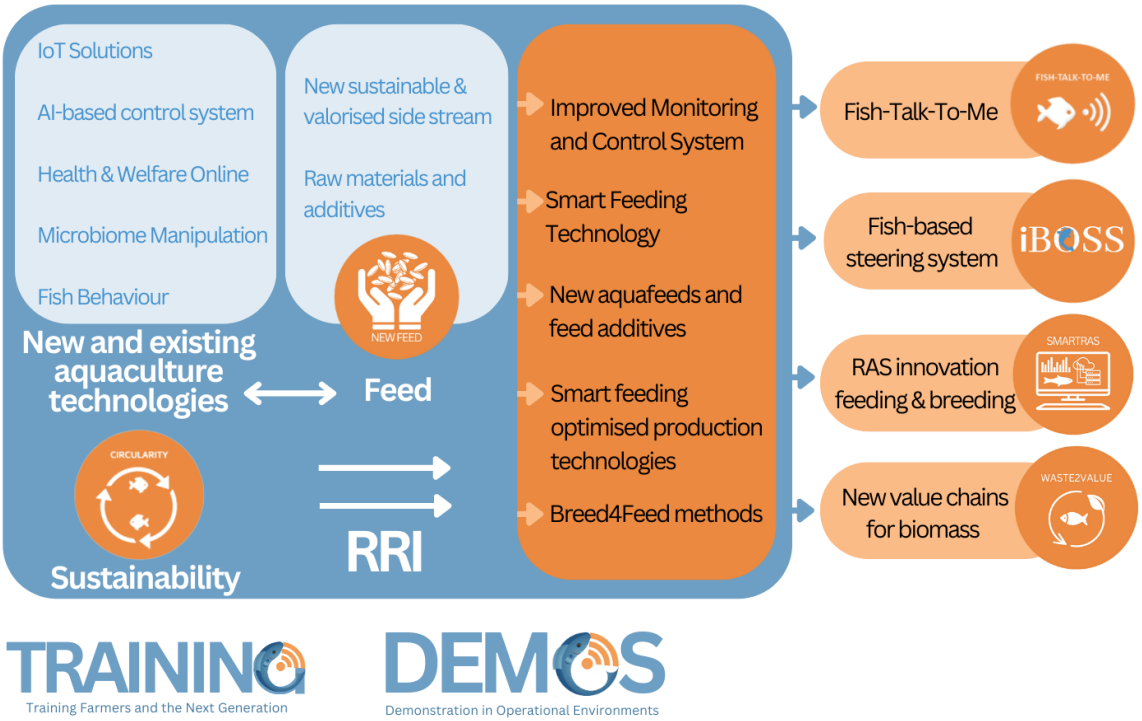


Figure 1. iFishIENCi innovations.

Fish-Talk-To-Me is a comprehensive system that incorporates fish tagging technology for the continuous collection of fish physiological data, camera technology for automated assessment of fish behavior, echo-sounders, and a digital twin of fish digestion efficiency (FishMet). This innovative solution integrates a variety of technologies and data processing systems to work seamlessly with online monitoring systems.

By combining these diverse technologies, Fish-Talk-To-Me enables the aquaculture industry to gain valuable insights into fish health, welfare, and overall performance. The system aids in the early detection of potential issues, optimization of feeding strategies, and improvement of environmental conditions. This holistic approach helps aquaculture producers enhance efficiency, reduce environmental impact, and promote the well-being of fish in their care.

iBOSS, or the flexible Biology Online Steering System, is an innovative development designed to monitor all critical aspects of fish and their environment that are essential for healthy and sustainable

farmed fish. The primary goal of iBOSS is to maximize feed utilization and minimize environmental impacts through the implementation of Smart Feeding strategies.

By leveraging advanced technology, sensors, and data analytics, iBOSS continuously monitors various parameters, such as water quality, temperature, dissolved oxygen levels, and fish growth and behavior. This real-time monitoring and analysis enable aquaculture producers to make informed decisions and adjustments to optimize feeding schedules, feed formulations, and overall management practices.

By adopting Smart Feeding strategies, iBOSS ensures efficient use of resources, reduces waste, and mitigates the environmental footprint of aquaculture operations. This comprehensive approach supports the industry's goal of producing high-quality, sustainable farmed fish while minimizing negative impacts on the surrounding ecosystems.

Smart RAS is a cutting-edge development in European research, innovation, and piloting capacity, focusing on Recirculating Aquaculture Systems (RAS). This advanced system is fully equipped with the innovative iBOSS technology, which monitors critical aspects of fish and their environment to ensure healthy and sustainable farmed fish production.

By integrating iBOSS technology into the Smart RAS, the aquaculture industry can leverage the power of real-time monitoring and data analytics to optimize feed utilization, minimize environmental impacts, and maintain fish health and welfare. This integration provides a comprehensive solution for managing aquaculture operations more efficiently and sustainably.

The aim of Smart RAS is to bring this advanced, environmentally responsible technology to the global aquaculture market. By promoting and implementing Smart RAS on a broader scale, the industry can take a significant step toward sustainable growth, reducing its ecological footprint, and ensuring a continuous supply of high-quality farmed fish for consumers worldwide.

Waste2Value is an innovative approach that aims to transform waste and sludge generated from aquaculture production systems into valuable products or resources. It focuses on optimizing the valorization of waste and sludge, taking into account the specific fish species and feed products involved. The primary goal of Waste2Value is to minimize the environmental impact of aquaculture while simultaneously creating economic value from waste and provide recommendations for valorisation of aquaculture waste streams in the aquaculture sector.

Application of Responsible Research and Innovation (RRI)

The iFishIENCi project's application of Responsible Research and Innovation (RRI) principles ensured that its outcomes were in line with societal values, needs, and expectations. By engaging stakeholders in the aquaculture sector and actively involving them in the project's research and innovation processes, the project was able to effectively transfer knowledge, motivate early adopters, and support the exploitation of its results.

Some key aspects of the project's RRI implementation included:

Collaboration with Project Champions: The project worked closely with five champions representing RRI, Innovation, International Cooperation, Valorisation & Circularity, and Policy. This collaboration helped align the project's goals and methods with RRI principles.

In-reach Efforts: The iFishIENCi project focused on building competency and experience in RRI among its work package and task leaders, who identified RRI synergies through annual workshops.

Outreach Communication: The project actively involved end-users in the development of its technologies by organizing co-creation workshops, questionnaires, and interviews. This enabled a dialogue with consumers and increased their awareness of the project's technologies.

Knowledge Transfer: The project ensured that its research findings were effectively communicated to stakeholders and early adopters, thereby promoting the adoption of innovative technologies in the aquaculture sector.

By actively engaging stakeholders and end-users, the project fostered a strong sense of ownership and shared responsibility for its outcomes. This collaborative approach ultimately aims to lead to a more sustainable and socially responsible aquaculture sector.

Some additional benefits of the project's RRI application include:

Addressing Societal Challenges: By involving stakeholders and end-users, the iFishIENCi project was better positioned to address the pressing societal challenges facing the aquaculture sector, such as environmental sustainability, resource efficiency, and food security.

Enhanced Trust and Acceptance: The project's emphasis on transparency and dialogue increased the level of trust between researchers, industry stakeholders, and the public, leading to greater acceptance of the project's innovations.

Ethical Considerations: Integrating RRI principles helped ensure that the iFishIENCi project addressed potential ethical concerns and maintained a strong commitment to social and environmental responsibility throughout its development and implementation.

Adaptive Innovation: By actively involving stakeholders and end-users, the project was able to adapt its research and innovation processes based on the feedback received, ensuring that the project's outcomes remained relevant and valuable to the aquaculture sector.

This approach not only improved the overall quality of the project's outcomes but also increased their social and environmental impact. By engaging with various stakeholders and end-users throughout the project's lifecycle, the iFishIENCi project was able to more effectively address the complex challenges facing the aquaculture industry, while fostering a sense of shared responsibility and commitment to sustainable and responsible innovation.

3 Strategizing Engagement

Task 6.3 of the iFishIENCi project incorporated the Half Double methodology. This methodology was chosen because the task's objective was to strategically design and implement activities that would effectively engage stakeholders. The Half Double methodology offered a clear and concise process for achieving results in a timely manner. Its emphasis on streamlining workflow, maximizing value, and minimizing delays, as well as unnecessary activities, facilitated a shared understanding of the project's objectives and goals among all stakeholders. By utilizing the Half Double methodology in the development of Task 6.3 of the iFishIENCi project, we achieved several key benefits, such as:

- Significantly improved stakeholder engagement through well-designed communication paths and active participation opportunities, leading to a better understanding of stakeholders' needs and greater alignment with the project goals.
- Increased efficiency in the implementation of stakeholder engagement activities, resulting in more effective communication and collaboration.
- Effective completion of the task, despite challenges presented by the COVID-19 pandemic and the cost-neutral extension of the project. The methodology enabled the team to adapt and complete the task with the expected impact.

In addition to these benefits, the methodology enabled clear and effective communication between task leaders, work package leaders, and coordinators, facilitating the planning and execution of diverse dissemination activities at the European and international levels. To effectively communicate and engage with stakeholders, we used traditional digital communication platforms such as our project website, social media platforms including Facebook, Twitter, Instagram, LinkedIn, newsletters, and YouTube. Additionally, we explored other digital media platforms to reach a wider audience, including both scientific and practitioner-related professionals. Key platforms that we utilized were the OpenAIRE Community Gateway, Zenodo, and the CORDIS wire.

To ensure consistency and ease of communication, we developed standardized templates for the collection of key information from workshops, conferences, and symposiums. These templates were designed to facilitate the consistent and efficient collection of data and feedback from stakeholders, allowing us to effectively track and analyse engagement activities. Additionally, the use of templates ensured that all relevant information was captured, minimizing the risk of missing important insights or feedback.

In addition to these benefits, we also implemented several activities aimed at engaging stakeholders, such as:

- Workshops and seminars to gather feedback and input from stakeholders
- Surveys and questionnaires to gather data and information from stakeholders
- Focus group discussions to gather qualitative data from stakeholders
- Virtual and face-to-face meetings with stakeholders to discuss progress and address questions or feedback.

To ensure smooth progress and effective communication with our partners, we also developed a clear set of regular meetings to follow up on the task development. The minutes of the meetings were constantly shared in an online shared document where partners were able to work simultaneously in the document, this enabled partners to stay informed and up-to-date on the task's progress, and also to contribute their expertise and input in a timely manner. This approach helped us to ensure alignment and collaboration with all partners. The developed strategy not only focused on completing the task successfully, but also ensures continued engagement and communication with stakeholders to share the results and impact of the project after completion of iFishIENCi.

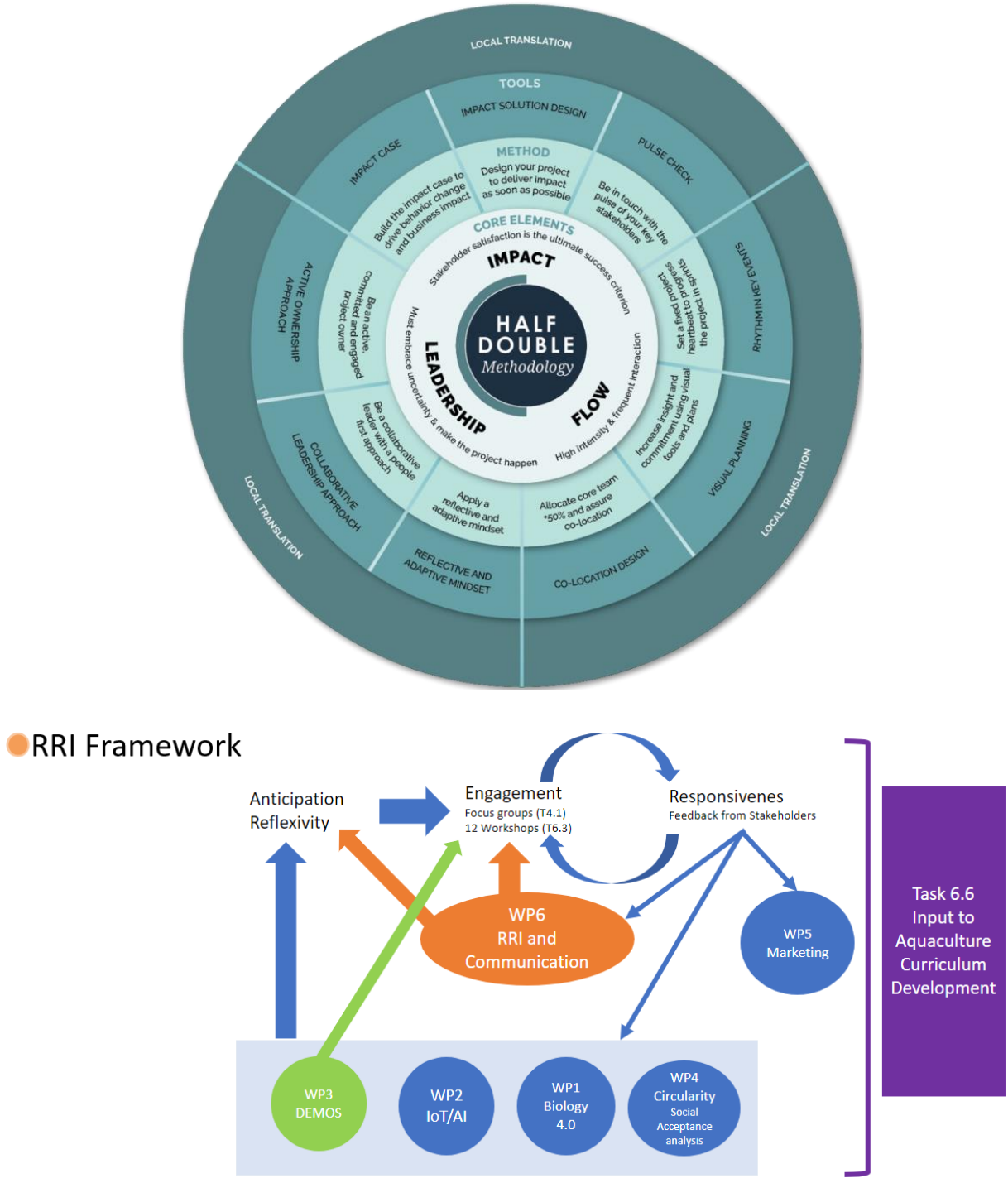


Figure 2. iFishIENCi Technologies: Stakeholder Engagement Plan and RRI Framework.

3.1 Mapping and Identifying Stakeholders

Through a coordinated effort involving tasks 6.3, 6.4, and 6.5, we identified stakeholders present along the entire aquaculture value chain. The following list summarizes the different types or classifications of stakeholders that were identified:

- Operators
- Fish farmers
- Industrial users
- Feed developers and suppliers
- Breeders
- Technology suppliers
- Deep tech suppliers
- Fish biology (research and industry)
- Aquaculture businesses and research organizations (producers and developers)
- Aquaculture end-users
- Communities and associations
- projects and expert communities: FP7 and H2020 funded projects and the cluster initiatives behind related projects such as sister projects under DT-BG-04-2018-2019: AquaIMPACT, FutureEUAqua, NewTechAqua and MicrobiomeSupport
- Marine and maritime clusters
- European R&D organizations
- NGOs

In the iFISHIENCi project, an extensive Stakeholder Identification/Mapping exercise was implemented to identify and engage key stakeholders from the aquaculture sector, policy makers, and consumers. All project partners contributed to mapping local, national, and international stakeholders and public authorities that they had been or were in contact with. The RRI Champion and Task 6.1 leader led the analysis of the stakeholders and accompanying power analysis. This stakeholder mapping was also related to Task 4.1, which the RRI Champion also led. To facilitate communication and engagement with stakeholders, personal e-mail addresses of participants at events organized or participated by the iFISHIENCi project were collected and managed by our partner ABT in compliance with relevant regulations on data protection. As a result of this engagement strategy, an impressive number of institutions were directly bounded to iFishIENCi, with over 330 institutions worldwide being reached.

3.2 Engaging Research Institutions: A List of Participating Organizations

Table 1 List of identified Research Institutions

Stakeholder	Country	Website
APC - Advance Planning-Consulting	Greece	www.apc.gr
Viqon Water Solutions	Netherlands	https://www.viqon.com/
Joint Research Centre Brussels	Belgium	www.ec.europa.eu/jrc/en/about/jrc-site/brussels
Joint Research Centre Geel	Belgium	www.ec.europa.eu/jrc/en/about/jrc-site/geel
Joint Research Centre Karlsruhe	Germany	www.ec.europa.eu/jrc/en/about/jrc-site/karlsruhe
Joint Research Centre Ispra	Italy	www.ec.europa.eu/jrc/en/about/jrc-site/ispra
Joint Research Centre Petten	Netherlands	www.ec.europa.eu/jrc/en/about/jrc-site/petten
Joint Research Centre Seville	Spain	www.ec.europa.eu/jrc/en/about/jrc-site/seville
IRB - Institut Ruđer Bošković	Croatia	www.irb.hr
IZOR - Institute of Oceanography and Fisheries	Croatia	www.izor.hr
LUKE - Natural Resources Institute Finland (Aquaculture)	Finland	https://www.luke.fi/en/natural-resources/fish-and-the-fishing-industry/aquaculture
CEVA - Algae Technology and Innovation Centre	France	https://www.ceva-algues.com/en/
CNRS - Centre National de la Recherche Scientifique (Institut écologie et environnement)	France	www.cnrs.fr
IFREMER - Institut Francais de Recherche pour l'Exploitation de la Mer (Aquaculture)	France	https://aquaculture.ifremer.fr/
Nouvelles Vagues - Business and Research Organization	France	http://pfinouvellesvagues.com/?lang=en
Alfred- Wegener- Institut Helmholtz- Zentrum für Polar- und Meeresforschung (AWI)	Germany	https://www.awi.de/
GEOMAR - Helmholtz-Zentrum für Ozeanforschung Kiel	Germany	www.geomar.de
GMA - Gesellschaft für Marine Aquakultur - Technological Platform	Germany	www.gma-buesum.de
Leibniz Centre for Tropical Marine Research (ZMT) GmbH	Germany	https://www.leibniz-zmt.de/en
Thünen Institute (Institute für Fischereiökologie)	Germany	https://www.thuenen.de/de/fi/
HCMR - Hellenic Centre for Marine Research	Greece	www.hcmr.gr
Aquatt - Business and Research Organization	Ireland	http://www.aquatt.ie/services
Marine Institute	Ireland	www.marine.ie
Marine Institute (Aquaculture)	Ireland	https://www.marine.ie/Home/site-area/areas-activity/aquaculture/aquaculture
OGS - National Institute of Oceanography and Experimental Geophysics	Italy	www.inogs.it
SZN - Anton Dohrn Marine Station	Italy	www.szn.it
European Fisheries and Aquaculture Research Organisations - Association composed of the Directors of the main European Research Institutes involved in Fisheries and Aquaculture research	Netherlands	www.efaro.eu
NIOZ - Royal Netherlands Institute for Sea Research	Netherlands	www.nioz.nl
Pro-Sea Foundation - Centre of expertise initiating, developing and conducting courses on marine awareness and sustainability to professionals working with or at the ocean	Netherlands	www.prosea.info
Havforskningsinstituttet (HI) - Institute of Marine Research	Norway	www.hi.no
Institute of Marine Research	Norway	http://www.imr.no/en
NOFIMA	Norway	https://nofima.no/en/research/capture-based-aquaculture/
Nowergian VETERINAERINSTITUT - research-based knowledge and contingency support in the fields of animal health, fish health and food safety	Norway	https://www.vetinst.no/en
NTNU AMOS - Centre for Autonomous Marine Operations and Systems	Norway	www.ntnu.edu/amos
SINTEF Fisheries and Aquaculture	Norway	www.sintef.no/en/ocean/aquaculture/#/
IO-PAN - Institute of Oceanology of the Polish Academy of Sciences	Poland	www.iopan.gda.pl
CIIMAR - Interdisciplinary Centre of Marine and Environmental Research - Biology, Aquaculture and Seafood Quality	Portugal	https://www2.ciimar.up.pt/research.php?research_line=1
CIMAR - Centre of Marine and Environmental Research	Portugal	www2.ciimar.up.pt
FCT - Science and Technology Foundation	Portugal	www.fct.pt
AZTI Tecnalia (Sustainable Fisheries Management)	Spain	https://www.azti.es/
CETMAR - Technological Centre of the Sea	Spain	www.cetmar.org
IEO - Institute Espanol de Oceanografia	Spain	http://www.ieo.es/en/acerca-del-ieo
Spanish Institute of Oceanography	Spain	www.ieo.es
PTEPA - Technological Platform for Fisheries and Aquaculture	Spain	www.ptepa.es
TÜBITAK - Scientific and Technological Research Council of Turkey	Turkey	www.tubitak.gov.tr
NOC - National Oceanography Centre	UK	www.noc.ac.uk
The Conservation Fund Freshwater Institute - Science & innovation - state-of-the-art RAS technology	USA	https://www.conservationfund.org/our-work/freshwater-institute
Ryan Institute for Marine, Environmental and Energy Research		www.nuigalway.ie/ryaninstitute/

Stakeholder	Country	Website
Inagro vzw	Belgium	https://www.inagro.be/inagro_en
APEXAGRI SAS	France	http://www.apexagri.com/
INRA Agronomics Research Institute	France	http://www.inra.fr/
ETA - Estonian Academy of Sciences	Estonia	www.akadeemia.ee
Blue Growth Community - contributing to the sustainable socio-economic development of the Mediterranean area through innovative investments in the Blue economy	France	www.blue-growth.interreg-med.eu/
KDM - German Marine Research Consortium	Germany	www.deutsche-meeresforschung.de
Blue Med Community Portal - Research and Innovation for Blue jobs and growth in the Mediterranean Area	Italy	www.bluemed-initiative.eu/bluemed-community-portal/
CNR - National Research Council	Italy	www.cnr.it
CoNISMa - National Inter-University Consortium for Marine Sciences	Italy	www.conisma.it
The Research Council of Norway	Norway	www.forskningsradet.no
MASTS - Marine Alliance for Science and Technology Scotland	UK	www.masts.ac.uk
NERC - Natural Environment Research Council	UK	www.nerc.ukri.org
University of Ghent (Aqua UGent) - research for Sustainable Aquaculture	Belgium	http://www.aqua.ugent.be/
DTU - Technical University of Denmark - DTU Aqua - National Institute of Aquatic Resources	Denmark	www.aqua.dtu.dk
University of Helsinki - Fisheries and Environmental Management Group	Finland	www.helsinki.fi/en/researchgroups/fisheries-and-environmental-management
UM - Marine Universities of France	France	www.universites-marines.fr
Christian-Albrechts-Universität zu Kiel - Team Marine Aquaculture	Germany	www.tierzucht.uni-kiel.de/de/team/marine-aquakultur
University of Applied Sciences in Bremerhaven	Germany	www.hs-bremerhaven.de
SZIU - Department of Aquaculture	Hungary	http://halt.mkk.szie.hu/index.php?page=Introduction&nyelv=en
Universita degli Studi di Udine - Dipartimento di Scienze agroalimentari, ambientali e animali	Italy	https://www.uniud.it/en/uniud-international?set_language=en&set_language=en
Università di Bologna - Department of Veterinary Medical Sciences	Italy	www.unibo.it/it
Ghent University - Department of Animal Sciences and aquatic ecology	Netherlands	https://www.ugent.be/bw/asae/en/research/aquaculture
Wageningen University - Aquaculture and Fisheries group	Netherlands	https://www.wur.nl/en/Research-Results/Chair-groups/Animal-Sciences/Aquaculture-and-Fisheries.htm
NMUC - Norwegian Marine University Consortium	Norway	www.nmu.marint.info
Nord University - Faculty of Biosciences and Aquaculture	Norway	https://www.nord.no/en/about/faculties-and-centres/faculty-of-biosciences-and-aquaculture
NTNU - Norwegian university of science and technology - NTNU Oceans	Norway	https://www.ntnu.edu/
UIT - The Artic University of Norway - International Fisheries Management	Norway	https://en.uit.no/startsida
Universidad de Alicante - Department of Marine Science and Applied Biology	Spain	www.ua.es
Universidad del Pais Basco	Spain	https://www.ehu.eus/en/web/guest/en-home
University of Las Palmas de Gran Canaria - ECOAQUA - Institute of Aquaculture and Sustainable Marine Ecosystems	Spain	http://www.ecoaqua.ulpgc.es/en
University of Gothenburg	Sweden	www.gu.se
KTH Royal Institute of Technology - WaterCentre	Sweden	https://www.kth.se/water
Swedish University of Agricultural Sciences - SLU Aqua - Department of Aquatic Resources	Sweden	https://www.slu.se/en/departments/aquatic-resources1/
Swedish University of Agricultural Sciences - SLU Aquaculture	Sweden	https://www.slu.se/en/Collaborative-Centres-and-Projects/slu-aquaculture/
Istanbul University - Fisheries Faculty	Turkey	www.subilimleri.istanbul.edu.tr/en/
Stirling University Institute of Aquaculture	UK	https://www.stir.ac.uk/about/faculties/natural-sciences/aquaculture/
CTAQUA - Technological Centre of aquaculture	Spain	https://www.cetaqua.com
Dep of Biology, University of Crete	Greece	www.biology.uoc.gr,
Department of Biochemistry and Biotechnology, University of Thessaly	Greece	http://www.bio.uth.gr
School of Biology, University of Thessaloniki	Greece	www.auth.gr
Department of Biology, University of Patras	Greece	http://www.biology.upatras.gr/

3.3 Feed Producers

Table 2 List of identified Feed Producers

Stakeholder	Description	Country	Website

Aller Aqua	Aquaculture feed	Denmark	www.aller-aqua.com/
Biomar	Feed developer and supplier	Denmark	https://www.biomar.com/en/denmark/
AQUALIA	Fish Feed	France	https://www.aqualiafeed.com/
BIOMAR	Fish Feed	France	https://www.biomar.com/
SKRETTING	Fish Feed	France	https://www.skretting.com/fr-FR/
VITAFORT	Fish Feed	Hungary	http://www.vitafort.hu/
Laxá Feedmill	Extrusion	Iceland	www.laxa.is
Skretting	Aquaculture feed	Italy	www.skretting.it
ALLTECH - COPPENS	Fish Feed	Netherlands	https://www.alltechcoppens.com/fr/
Sparos	Feed developer and supplier	Portugal	https://www.sparos.pt/about-us/
Acuinuga	Feed supplier (Biocides)	Spain	http://www.acuinuga.com/es/
Nutreco	Feed developer and supplier	Netherlands	https://www.nutreco.com/
Mira Agro-Industrial Investments,INC. (member of the Parion group)	Aquaculture Feed	Turkey	https://miraagroindustrial.com/
Cargill	Feed producer	United States	https://www.cargill.com/animal-nutrition/species/aquaculture
Feedus	AquaFeed producer	Greece	https://www.andromedagroup.eu
IRIDA S.A.	Feed producer	Greece	https://irida-sa.gr
Zoonomi SA	Feed producer	Greece	www.zoonomi.gr

3.4 Marine Clusters

Table 3 List of identified Marine Clusters

Stakeholder	Description	Country	Website
Marine Cluster Bulgaria	Sustainable development of the Bulgarian maritime economy through partnerships and joint actions of all stakeholders	Bulgaria	www.marinecluster.com/en/
Marine cluster Bulgaria	Sustainable development of the Bulgarian maritime economy	Bulgaria	www.marinecluster.com/en/
Ocean Networks Canada	Data collection on physical, chemical, biological, and geological aspects of the ocean	Canada	www.oceannetworks.ca
OceansAdvance	Companies, institutions, and organizations dedicated to ocean and marine-related technology, education, training, research and development, promotion, delivery and application	Canada	www.oceansadvance.net/about-us/
Eurofish	International Organisation, contributing to the development of fisheries and aquaculture in Europe	Denmark	www.eurofish.dk
EU science Hub – Fisheries and Aquaculture	European Commission's science and knowledge service	EU	www.ec.europa.eu/jrc/en/research-topic/fisheries-and-aquaculture?search
Pôles “Mer Bretagne” (ouest)	Marine cluster	France	www.pole-mer-bretagne-atlantique.com
Poles Mer Province Alpes-Côtes d’Azur (PACA, Sud)	Marine cluster	France	www.polemermediterranee.com
BluEco Net	German-Brazilian Aquaculture Cluster	Germany	www.blueconet.com/
Iceland Ocean Cluster	create value by connecting entrepreneurs, businesses and knowledge in the marine industries	Iceland	www.sjavarklasinn.is
Federazione Del Mare	Italian maritime cluster	Italy	www.federazionedelmare.it
Mare FVG	Maritime Technology Cluster	Italy	www.marefvg.it
Dutch Fish Marketing Board	Marketing Board	Netherlands	www.dutchfish.nl
Rotterdam cluster	Port Authority cluster	Netherlands	www.portofrotterdam.com/en/port-authority/about-the-port-authority/the-port-authority-in-society/port-vision-2030/europes
Cluster Maritimo	Spanish Maritime Cluster	Spain	www.clustermaritimo.es
Marine cluster	Marine cluster	Sweden	www.kth.se/water/research/marine
IMarEST	International society promoting the scientific development of marine engineering, science and technology,	UK	www.imarest.org

Stakeholder	Description	Country	Website
Seafish	Support to UK seafood industry (fishermen, processors, wholesales, food service, retailers and consumers)	UK	www.seafish.org
Marine Technology society	International society promoting awareness, understanding, and the advancement and application of marine technology	USA	www.mtsociety.org
CPMR North Sea Commission	Commissions of the Conference of Peripheral Maritime Regions (CPMR)		www.cpmr-northsea.org
European Cluster Collaboration Platform	Cluster platform		www.clustercollaboration.eu
Nordic Co-operation	Promotes the Nordic region as the most sustainable and integrated region in the world (Denmark, Finland, Iceland, Norway, Sweden, the Faroe Islands, Greenland and Åland)		www.norden.org/en/information/about-working-group-fisheries-ag-fisk
Cluster Acuiplus	Devoted to the promotion and development of sustainable aquaculture	Spain	https://www.acuiplus.org/

3.5 Aquaculture – Fish Farmer

Table 4 List of identified Fish Farmers

Stakeholder	Description	Country	Website
Bretagne Truite	Fish Farmer	France	http://www.bretagne-truite.fr/
Esturgeonnière	Fish Farmer	France	www.caviar-perlita.com
Groupe AQUALANDE	Fish Farmer	France	http://www.groupeaqualande.com/
La Ferme Marine	Fish Farmer	France	https://lafermemarine.fr/
La Ferme Marine de Cancale	Fish Farmer	France	http://www.ferme-marine.com/de/
Pisciculture Charles MURGAT	Fish Farmer	France	http://www.charlesmurgat.com/
Pisciculture La Fajolle	Fish Farmer	France	http://pisciculturedelafajolle.com/
BlueBioTech GmbH	Microalgae producer	Germany	https://www.bluebiotech.de/
Sylter Algenfarm	Macroalgae producer	Germany	https://www.algenprojekt.de/
Kefalonia Fisheries	Fish Farmer	Greece	http://www.kefish.gr/
Selonda	Fish Farmer	Greece	http://selonda.com/en/
Eskja	Seafood	Iceland	www.eskja.is
Ísfélagið	Seafood	Iceland	www.isfelag.is
Síldarvinnslan	Seafood	Iceland	www.svn.is
Vinnslustöðin	Seafood	Iceland	www.vsv.is
Aquaculture ID	Fish Farmer	Netherlands	https://www.aquaculturеid.com/
Lerøy Seafood AS	Vertically integrated seafood company	Norway	https://www.leroyseafood.com/no/
NIRI AS	Fish Farmer	Norway	http://niri.com/
SalMar ASA	Fish Farmer	Norway	https://www.salmar.no/
Aquanaria	Fish Farmer	Spain	https://www.aquanaria.com/
Grupo Regal	Fisher company	Spain	www.gruporegal.com
Aqualife Services Limited	Fish Vaccination	UK	http://www.aqualifeservices.com/
Andromeda SA	Fish farmers	Greece	https://www.andromedagroup.eu
Galaxidi SA	Fish Farmers	Greece	http://www.gmf-sa.gr/
Argosaronikos	Fish Farmer	Greece	https://www.argofish.gr
Philosofish SA	Fish Farmer	Greece	https://www.philosofish.eu/

3.6 Technology Supplier

Table 5 List of identified Technology suppliers

Stakeholder	Description	Country	Website
GRETEC s.r.o. - Turnkey Fish Farms	Technology supplier	Czech Republic	http://turnkeyfishfarm.com/
Apollo A/S	Technology supplier	Denmark	http://www.apollo.dk/en/component/content/article?id=5
AquaProcess ApS	Technology supplier	Denmark	https://www.aquaprocess.dk/
Aquatec Solutions A/S - AKVA Group	Technology supplier	Denmark	https://www.akvagroup.com/home
Billund Aquaculture	Technology supplier	Denmark	https://www.billundaquaculture.com/careers/

Stakeholder	Description	Country	Website
Cowex A/S	Technology supplier	Denmark	http://www.cowex.com/
Hvalpsund Net A/S	Technology supplier	Denmark	http://hvalpsund.com/
Ab Scandi Net Oy	Technology supplier	Finland	https://scandinet.fi/
Arvo-Tec Oy	Technology supplier	Finland	https://www.arvotec.fi/
Finnelma Engineering Oy	Technology supplier	Finland	http://finnelma.com/
Aqualor s.a.r.l.	Technology supplier	France	http://www.aqualor.com/
AGK Kronawitter	Technology supplier	Germany	https://www.agk-kronawitter.de/shop/en/Aquacultur-Pond/Feed-dispensers/
Aquacultur Fischtechnik GmbH	Technology supplier	Germany	https://www.aquacultur.de/
AQUACULTUR Fischtechnik GmbH	Technology provider	Germany	https://www.aquacultur.de/
AquaKultur Abtshagen GmbH	Fingerling producer	Germany	www.pal-aquakultur.de
Enexio	Technology supplier	Germany	https://www.enexio-water-technologies.com/de/komponenten-fuer-die-aquakultur-fischzucht/
MonitorFish	Technology supplier	Germany	http://monitorfish.com/
MonitorFish	Sensor Provider	Germany	http://monitorfish.com/
Neomar GmbH	Technology supplier	Germany	https://www.neomar.de/
PAL Anlagenbau GmbH	Technology supplier	Germany	http://www.pal-aquakultur.de/
Ratz Aqua & Polymer Technik GmbH & Co. KG	Technology supplier	Germany	http://www.ratz-aqua-polymertechnik.de/
WATER - proved GmbH	Technology supplier	Germany	https://www.water-proved.de/de/
Wieland	Technology supplier	Germany	https://www.wieland.com/de/
Proteus S.A. - Nireus Group	Technology supplier	Greece	http://www.proteussa.com/article_detail.asp?e_cat_serial=001001&e_cat_id=305&e_article_id=224
Steinco Fish Farming Technology	Technology supplier	Iceland	http://baggalutur.is/tgapc05/steinco/Steinco_new/STEINCO.html
Stofnfiskur HF	Salmon Egg supplier	Iceland	http://stofnfiskur.is/
Milanese snc	Technology supplier	Italy	http://www.milaneseitalia.com/en/index.htm
REFAMED	Technology supplier	Italy	https://refamed.com/
TECHNOSEA srl	Technology supplier	Italy	http://www.technosea.com/TechnoSEA%20home%20page%20ENG.html
Aqualine	Technology supplier	Norway	https://aqualine.no/en
Aquascan	Technology supplier	Norway	https://www.aquascan.com/
Bio Marine AS - f OxyVision	Technology supplier	Norway	https://www.biomarine.no/en/home/
CageEye	Technology supplier	Norway	https://www.cageeye.no/
Egersund Net AS	Technology supplier	Norway	https://www.egersundnet.no/hjem
Fishguard AS	Technology supplier - fish health	Norway	https://www.fishguard.no/
OxyVision	Technology supplier	Norway	https://www.oxyvision.com/en/home/
Steinsvik AS	Technology supplier	Norway	https://www.steinsvik.no/en/
Stranda Prolog AS	Technology supplier	Norway	https://www.stranda.net/
Aquitec	Technology supplier	Spain	https://www.acuitec.es/es/
Buhler Insect Technology Solutions AG	Equipment supplier	Switzerland	https://www.buhlergroup.com/content/buhlergroup/global/en/industries/insect-technology.html
FTN AquaArt AG	Technology supplier	Switzerland	http://www.ftn-aquaart.com/en/home-englisch/
Hesy Aquaculture B.V.	Technology supplier	The Netherlands	https://www.hesy.com/home/
Akuamaks Company	Technology supplier	Turkey	https://www.akuamaks.com/en/about-us
ASAKUA AQUACULTURE & MARINE LTD	Technology supplier	Turkey	https://www.asaquaculture.com/
MAT Recirculating Aquaculture Systems	Technology supplier	Turkey	https://mat-ras.com/
Aquaculture Equipment Ltd	Technology supplier	UK	https://www.agriculture-xprt.com/companies/aquaculture-equipment-ltd-61736
Bradan Limited	Biosecurity products	UK	http://www.bradanbiosecurity.com/
Gael Force Group	Technology supplier	UK	https://www.gaelforcegroup.co.uk/index.php/our-companies/gael-force-fusion/
Kames	Fish Farmer / Technology provider	UK	https://www.kames.co.uk/
NORFAB	Technology supplier	UK	https://www.norfab.co.uk/
OTAQ	Technology supplier	UK	https://otaq.com/
Pure Well Fish Farming	Technology supplier	UK	https://www.purewellfishfarming.co.uk/
Spirex Aquatec Ltd.	Technology supplier	UK	https://www.spirexaquatec.com/
Stamatiou SA	Technology supplier	Greece	https://aquaculture.stamatiouplastic.gr/

3.7 Retailers

Table 6 List of identified Retailers

Stakeholder	Description	Country	Website
EuroCommerce	Retail, wholesale, and other trading companies Association	Belgium	www.eurocommerce.eu
Seafoodia	Feed - TRADERS, RETAIL, WHOLESALE	France	https://www.seafoodia.com/
Animal Pro Nutrition	Feed - TRADERS, RETAIL, WHOLESALE	Germany	https://www.animalpro-nutrition.de
Edeka-Gruppe	Supermarket corporation	Germany	www.verbund.edeka
Handelsverband Deutschland	Trade association	Germany	www.einzelhandel.de
IHK Nord	Association of 12 chambers of industry and commerce	Germany	www.ihk-nord.de
METRO AG	retailer	Germany	www.metroag.de
Conad	Feed - TRADERS, RETAIL, WHOLESALE	Italy	www.conad.it
COOP Italia	Feed - TRADERS, RETAIL, WHOLESALE	Italy	https://www.e-coop.it/
Esselunga	Feed - TRADERS, RETAIL, WHOLESALE	Italy	www.esselunga.it
BTG Proteins	Feed - TRADERS, RETAIL, WHOLESALE	Poland	https://btgproteins.com/
ANFACO-CECOPESCA	Business association	Spain	www.anfaco.es
CONXEMAR	Association of Wholesalers, Importers, Manufacturers and Exporters of fish products and Aquaculture	Spain	www.conxemar.com

3.8 NGOs

Table 7 List of identified NGOs

Stakeholder	Description	Category	Country	Website
Compassion in World Farming	campaigns to strengthen legislation and enforcement on farm animal welfare	Animal Protection	Belgium	https://www.ciwf.eu/
Eurogroup for Animals	aims to improve the protection of animals	Animal Protection	Belgium	www.eurogroupforanimals.org
Humane Society International	aims to promote the human-animal bond, protect street animals, support farm animal welfare, stop wildlife abuse, eliminate painful animal testing, respond to natural disasters and confront cruelty to animals in all of its forms	Animal Protection	Belgium	www.hsi.org
IFAW – International Fund for Animal Welfare	Animal Welfare	Animal Protection	Germany	www.ifaw.org
Dutch society for the Protection of Animals	Animal Protection	Animal Protection	Netherlands	www.dierenbescherming.nl
Stichting Vissenbeschermin	Fish Protection Foundation	Animal Protection	Netherlands	http://www.vissenbescherming.nl/organisatie/
Compassion in World Farming	aims to place farm animal welfare at the heart of the food industry	Animal Protection	UK	www.compassioninfoodbusiness.com
Fishcount.org.uk	aims to increase awareness of the welfare issues in fish farming	Animal Protection	UK	www.fishcount.org.uk
Food and Water Europe	champions healthy food and clean water for all	Environmental protection	Belgium	www.foodandwatereurope.org
WWF	aims to stop the degradation of the planet's natural environment	Environmental protection	Belgium	www.wwf.eu
Coastwatch Europe	protection and sustainable use of coastal resources, and informed public participation in environmental planning and management	Environmental protection	Ireland	https://coastwatch.org/europe/about/
Environmental Pillar of Social Partnership	creates and promotes policies that advance sustainable development	Environmental protection	Ireland	www.environmentalpillar.ie
Greenpeace	fighting for environmental justice	Environmental protection	Netherlands	www.greenpeace.org/international/
Ecological Association EKO-UNIA	Nature and biodiversity protection	Environmental protection	Poland	www.eko-unia.org.pl
Ecologistas en Acción	ecologist group	Environmental protection	Spain	https://www.ecologistasenaccion.org/

Stakeholder	Description	Category	Country	Website
Swedish Society for Nature Conservation	Nature Conservation	Environmental protection	Sweden	www.naturskyddsforeningen.se
IUCN - International Union for Conservation of Nature	Nature Conservation	Environmental protection	Switzerland	www.iucn.org
ECOCERT	Certification	Fish Labelling	France	www.ecocert.fr
Aquaculture Stewardship Council ASC	certification and labelling programme for responsible aquaculture	Fish Labelling	Netherlands	https://www.asc-aqua.org/
MSC - Marine Stewardship Council	label applied to wild fish or seafood certified to a science-based set of requirements for sustainable fishing	Fish Labelling	UK	www.msc.org
Funding Fish	international funders collaborative	Grant Programme	UK	www.fundingfish.eu
Pew Charitable Trusts	serve the public interest by improving public policy, informing the public, and invigorating civic life	Grant Programme	USA	www.pewtrusts.org
Seas at Risk	Environmental NGOs from across Europe that promotes ambitious policies for marine protection at European and international level	Marine conservation	Belgium	www.seas-at-risk.org
Finnish Association for Nature Conservation	environmental protection and nature conservation	Marine conservation	Finland	www.sll.fi
MedPAN - Network of Marine Protected Area Managers in the Mediterranean	aims to promote, through a partnership approach, the sustainability and operation of a network of Marine Protected Areas in the Mediterranean	Marine conservation	France	www.medpan.org
Deepwave	Protection of the oceans	Marine conservation	Germany	www.deepwave.org
Project Blue Sea	ocean conservation	Marine conservation	Germany	www.projectbluesea.de
Irish Seal Sanctuary	marine wildlife rescue NGO	Marine conservation	Ireland	www.ien.ie/irish-seal-sanctuary
Irish Wildlife Trust	aims to conserve wildlife and the habitats they depend on	Marine conservation	Ireland	www.iwt.ie
Sciaena - Marine Sciences and Cooperation Association	ocean conservation	Marine conservation	Portugal	www.sciaena.org
Ocean Sentry	works as a wide awareness program, dialogue and respect for marine environment and those who inhabit it.	Marine conservation	Spain	www.oceansentry.org
Baltic Sea 2020	aims to improve the environmental condition in the Baltic Sea	Marine conservation	Sweden	www.balticsea2020.org
Coalition Clean Baltic	aims to promote the protection and improvement of the environment and natural resources of the Baltic Sea Area	Marine conservation	Sweden	www.ccb.se
Fair-fish	establishing a database of all ethological findings of various fish species in the wild and in aquaculture	Marine conservation	Switzerland	www.fair-fish.net
IUCN-Med	International Union for Conservation of Nature - Centre for Mediterranean Cooperation	Marine conservation	Switzerland	www.iucn.org/regions/mediterranean
OceanCare	marine wildlife protection	Marine conservation	Switzerland	www.oceancare.org
ClientEarth	fighting against climate change and to protect nature and the environment	Marine conservation	UK	www.clientearth.org
MCS - Marine Conservation Society	charity for the protection of seas, shores and wildlife	Marine conservation	UK	www.mcsuk.org
Oceana	ocean conservation	Marine conservation	USA	www.oceana.org
Journal of Insects as Food and Feed	Journal	Publication	France	https://www.wageningenacademic.com/loi/jiff
L'Encre de Mer	Magazine for artisanal fishermen	Publication	France	www.l-encre-de-mer.fr
Revue de l'Alimentation Animale	Magazine	Publication	France	http://www.revue-alimentation-animale.fr/
Fisch Magazin	Magazine of the Aquaculture and Seafood Industry	Publication	Germany	https://www.fischmagazin.de/

Stakeholder	Description	Category	Country	Website
CFFA – Coallition for Fair Fisheries Arrangements	advocates at European institution level so that the voice of artisanal fishing communities in third countries is heard	Sustainable Seafood Sector	Belgium	www.cffacape.org
Women in the Seafood Industry	highlight women's contribution to the seafood industry, to raise awareness of gender issues and to promote professional equality between men and women in the seafood industry	Sustainable Seafood Sector	France	https://wsi-asso.org/
Good fish foundation	aims to accelerate the transition to a sustainable seafood sector	Sustainable Seafood Sector	Netherlands	http://goodfish.guide/
ICSF - International Collective in Support of Fishworkers	works towards the establishment of equitable, gender-just,self-reliant and sustainable fisheries, particularly in the small-scale, artisanal sector	Sustainable Seafood Sector	Netherlands	www.icsf.net
PONG Pesac - Plataforma de Organizações Não Governamentais Portuguesas sobre a Pesca	aims to promote the sustainable exploitation of fisheries resources in all their aspects, ecological, social and economic, with a view to the conservation of marine ecosystems	Sustainable Seafood Sector	Portugal	www.pongpesca.wordpress.com
Mediterranean Blue Economy Stakeholder Platform	regional networking platform for sharing knowledge and for supporting the development of the blue economy	Sustainable Seafood Sector	Spain	www.medblueconomyplatform.org
EMB - European Marine Board	think tank in marine science policy	Think-Tank	Belgium	www.marineboard.eu
IIEA - Institute of International and European Affairs	international affairs think tank	Think-Tank	Ireland	www.iiea.com
The Coastal and Marine Union (EUCC)	think-tank in the field of marine management and maritime planning	Think-Tank	Netherlands	www.marine-team.eucc-d.de/

4 Innovation through Comprehensive Stakeholder Engagement: The iFishIENCi Project's RRI Framework and Multi-Angled Strategy

The RRI framework implemented in the iFishIENCi project effectively facilitated communication and engagement with key stakeholders, such as the key players at European aquaculture sector, policymakers, consumers, and the scientific community. The framework's primary objective was to assess the expectations and needs of fish farmers, who were identified as key stakeholders and potential beneficiaries of the project's technology. Moreover, the RRI approach emphasized "outreach" efforts to engage external stakeholders and "inreach" measures to integrate input and feedback from fish farmers into the technology development process by the iFishIENCi consortium partners. This comprehensive approach to stakeholder engagement, which combined both "inreach" and "outreach" strategies, enhanced the overall robustness and impact of the RRI framework.

The iFishIENCi project team successfully engaged fish farmers through a well-developed methodology and strategy, which encompassed the following activities:

1. Feedback collection: Focus groups (T4.1) were conducted to gather input from fish farmers regarding their expectations for the tool, helping the team understand the stakeholders' needs and requirements.
2. iFishIENCi product development and improvement: Feedback from fish farmers informed the development and refinement of iFishIENCi products, ensuring they were tailored to meet their needs.
3. Iterative feedback: Additional focus groups (T4.1) were conducted to update fish farmers on the integration of their needs into the development process and to gather feedback on the improved iFishIENCi products. This approach ensured continuous refinement and improvement based on the feedback received.
4. Integration into circularity and market strategies: Feedback from fish farmers was incorporated into the circularity and market strategies of WP4 and WP5 to increase the likelihood of market uptake.
5. Workshops and pilots: The team organized workshops and pilot events (T6.3) in Malta, Greece, Hungary, France, Denmark, Spain, and non-EU countries such as Laos, Singapore and Norway, to demonstrate the iFishIENCi products to fish farmers and collect further feedback on their practical usability, including through questionnaires.
6. Reflecting on concepts: Data from WP3 and WP4 was used to evaluate the concepts and their functionality, which also informed stakeholder education.
7. Dissemination of videos: Videos recorded during workshops (potentially featuring stakeholder interviews) were disseminated to promote the iFishIENCi products.
8. RRI approach: The RRI framework was utilized to inform curriculum development (T6.6), ensuring a holistic approach to the project.

These activities enabled the iFishIENCi project team to effectively engage fish farmers and ensure their needs and expectations were considered throughout the project.

Stakeholders were engaged at world Aquaculture events (listed under 4.1), through existing digital platforms and with virtual interactions.
Stakeholders were approached in three phases:

1) traditional project communication,
2) dissemination interactions with technical stakeholders with RRI outreach during development of iFishIENCi tools (focus groups in T4.1), and

3) demonstration workshops of the integrated technological tools and solutions (workshops in WP3)

All these engagement actions are described in detail in the next section (4.1-4.3 and 5.1 to 5.3). The efficiency of engagement actions measured using KPIs define in 4.5.

4.1 Engaging stakeholders at events

Considering the major COVID-19 pandemic crisis the world was experiencing in 2020-2022, most events had been postponed or cancelled, and there were strict rules in some countries banning events with 50 or more people. The safety of all stakeholders was be taken as priority in all cases. Therefore, iFishIENCi decided to adapt the Engagement Strategy to include virtual options of approaching stakeholders in the engagement plan in case the traditional communication and dissemination channels which involve physical contact among people (conferences, trade fairs, etc) were not allowed or recommended as unsafe. iFishIENCi project partners attended major events, where workshops were organised along some of those events only if such event take place and following international safety recommendations accepted by the consortium. However, to cover the gap created by the cancellation of some of these event and potential limitations in feedback and training workshop organizations, more effort was put in virtual options (e.g. live webinars, live or recorded training videos see §4.4) addressing the different categories of stakeholders in order to interact online on a higher frequency and targeted dissemination of outcomes and results of the project. Technology end-user preference questionnaires for input and feedback needed by technology developers/dissemination champions are also based online (see Annex 1).

The following table lists the events where iFishIENCi was directly disseminated through oral presentation, scientific posters, and with flyers, boosting synergies and facilitating engagement with stakeholders. In the light of COVID-19 travel restrictions, the events of the middle project years are primarily online:

Table 8 Aquaculture Industry dissemination events

Name of event	Date	Location	Website	Estimated size of audience	Partners	Organiser of event
Nasjonal konferanse om hausting og dyrking av mikro- og makroalger	10 – March 2019	Oslo, Norway	-	100	NORCE	Sjømat Norge
XVII Congreso Nacional de Acuicultura	7 - 10 May 2019	Murcia, Spain	https://www.observatorio-acuicultura.es/comunicacion/agenda/xvii-congreso-nacional-de-acuicultura	200	LEITAT	Sociedad Española de Acuicultura (SEA)
ALGAEUROPE 2019	12 May 2019 2019	Paris, France	https://www.valuemag.eu/events/algaeurope-2019/	500	NORCE	EABA, DLG Benelux European Algae Biomass Association (EABA), Algae Tech Conference
Growing microalgae for aquaculture in a Nordic climate: opportunities and challenges	28 May 2019	Trondheim, Norway	-	60	NORCE	NTNU, SINTEF, Biokraft
AGRIAQUA'19, 3rd edition of the Global IoT Summit (GIoTS)	17th to 21st of June 2019.	Aarhus, Denmark	https://globaliotsummit.org/giots-2019-aarhus/	200	BIOC, EGM	IEEE and the IoT Forum

Name of event	Date	Location	Website	Estimated size of audience	Partners	Organiser of event
AquaNor 2019	20th to 23rd August, 2019	Trondheim, Norway	https://www.guneboindustries.com/News/AquaNor-2019/	3 000	ABT, HCMR, TSIC, SZIU	Nor-Fishing Foundation.
Aquaculture Europe 2019	October 7 – 9, 2019	Berlin, Germany	https://www.aquaeas.eu/uncategorised/402-welcome-to-aquaculture-europe-2019	2 700	ABT/AAR/SZIU/ /TSIC/ EGM	Aquaculture Europe 2019
Malta Innovation Summit 2019	October 9 2019	Malta		15	ABT	Government of Malta
Focus Fish International Conference	January 21st and 22nd , 2019	Bremerhaven	https://ifishienci.eu/2019/11/08/meet-us-at-the-focus-fish-international-conference-in-bremerhaven/	150	TTZ	TTZ
15th International Symposium on Agriculture	20-22 February 2020	Vodice, Croatia		100	TTZ/SZIU	ASEAN
Aquaculture Europe 2020	7th to 10th October 2019	Online	https://www.aquaeas.eu/uncategorised/553-ae2020-online-full-programme	2700	LEITAT	European Aquaculture Society
Horizon4Aquaculture	15,22,29 June, 2021	Online	https://ifishienci.eu/horizon4aquaculture/	300	All	European Commission, IMPAQT; GAIN; iFishIENCi
Aqua Nor 2021	24th to 27th August, 2021	Trondheim, Norway	https://aquanor.no/en/2021/08/27/summing-up-aqua-nor-2021/	1600	ABT; NORCE	Nor-Fishing Foundation
GAIN summer school – ecological transition in aquaculture	30 August to 3rd September 2021	Online	https://www.epcsrl.eu/gain-summer-school/	50	ABT	GAIN, European Commission
EATiP 'On The Horizon' webinar	September 29th , 2021	Online	https://www.newtechaqua.eu/events/save-the-date-eatip-on-the-horizon-webinar/	120	All	European Aquaculture Technology and Innovation Platform (EATiP) with the support of the Federation of European Aquaculture Producers (FEAP). NewTechAqua, iFishIENCi, AQUAEXCEL; AquaImpact
Good Food Good Fish World Food Day Initiative	16th October 2021	Online		25	TTZ	TTZ Bremerhaven

Name of event	Date	Location	Website	Estimated size of audience	Partners	Organiser of event
Aquaculture Going Circular	9 Nov, 2021	Online	https://ifishienci.eu/media/events/aquaculture-going-circular/	150	All	NewTechAqua, iFishIENCi, AQUAEXCEL; AquaImpact; IMPAQT;GAIN;FutureEU AQUA, Climate KICICIRCLE ECONOMY, ASTRAL, AquaVitae
Malta Agri Fair 2022	20 to 22nd May 2022	Malta	https://agrifair.gov.mt/	500	ABT	ABACO group, Malta Agri Fair
AquaFarm Pordenone Fiere	25 to 27 May 2022	Pordenone, Italy	https://www.fierapordenone.it/en/events/aquafarm-2022/	1200	ABT, EGM	AquaFarm International Fair
International Symposium on Fish Nutrition and Feeding - ISFNF 2022	5th to 9th June 2022	Sorrento Italz	https://aquabt.com/event/isfnf-2022/	400	ABT	International Symposium on Fish Nutrition and Feeding Foundation
ISME 18, International Symposium on Microbial Ecology	14-19TH August 2022	Lausanne, Switzerland	https://isme18.isme-microbes.org/	1700	Leitat, HMCR	International Society for Microbial Ecology.
Technical Committee of ELOPY meeting	2nd September 2022	Crete, Greece	-	7	HCMR	Hellenic Organization of Aquaculture Producers
SmartAgriHubs final event conference	26th to 28th September 2022	Lisbon, Portugal	https://www.smartagrihubs.eu/latest-events/Save-the-date-SAH-Final-Conference	250	ABT,EGM	SmartAgriHubs Communications Team, Ministry for Agriculture, Fisheries, and Animal Rights
Nordic Algae Symposium	8-9TH June 2022	Turku, Finland	https://nas22.fi/	150	NORCE	Nordic Algae Symposium, Nord Aqua
3. Ocean Convention Rostock	16 TO 17TH November 2022	Rostock, Germany	https://www.rostock-business.com/events/veranstaltungsdetails/rostock-ocean-convention/	200	AAR	Rostok Business GmbH/Fraunhofer IGB
Aquaculture Europe 2022	27-30 September 2022	Rimini, Italy	https://aquaeas.org/Meeting/AE2022	2000	AAR, NORCE, HCMR, LEITAT	European Aquaculture Society
African Catfish in SmartRAS demo event	10th December 2022	Online	https://aquabt.com/african-catfish-in-smartras-an-ifishienci-virtual-demo-event/	70	ABT	iFishIENCi, European Commission
Farmer demonstrations iFishIENCi land-based ponds Hungarian demo event	JANUARY 18TH 2023	Hungary	https://ifishienci.eu/media/events/	60	MATE Eyg	iFishIENCi

Name of event	Date	Location	Website	Estimated size of audience	Partners	Organiser of event
12th Fishing and Angling Professional Conference in Gödöllő	26 January 2023	Gödöllő, Hungary	-	140	MATE, Egy, NORCE, HCMR, ABT, VITAFORT	Institute of Aquaculture and Environmental Safety (AKI), Hungarian University of Agriculture and Life Sciences (MATE), College of Fishing and Angling, Foundation for the Development of Fish Sciences, Hungarian National Fishing Association
From data interoperability to data spaces in the aquaculture domain-	28th February 2023	Online	https://ifishienci.eu/from-data-interoperability-to-data-spaces-in-the-aquaculture-domain/	70	ABT, EGM	iFishIENCi, European Commission
Stakeholder workshop on Argri/Aquaculture innovation Kenya	4 April 2023	Kisumu, Kenya	-	24	ABT	FOODLAND Project
FutureEUAqua Final Conference	20 April 2023	Bari, Italy	https://futureeuaqua.eu/index.php/events/final-conference/	-	Coordinator	FutureEUAqua, European Commission
Salt- and Freshwater Aquaculture in Europe Romania– Sustainable Seafood for the Future	23 May 2023	Bucharest, Romania	https://eurofish.dk/events/2023-05-aquaculture-ro/	178	GYE	Eurofish
SMARTRAS DEMONSTRATION: SALMON	24 May 2023	Malta & Online	https://ifishienci.eu/smartras-demonstration-event/	30	UiB, EGM, BIOC, ABT	iFishIENCi, European Commission
Promoting Aquaculture 4.0 at farm level, NewTech Aqua Webinar	5 July 2023	Online	https://www.newtechaqua.eu/events/promoting-aquaculture-4-0-at-farm-level/	Future	HCMR	NewTechAqua
Aquaculture Europe 2023	18-21 September 2023	Vienna, Austria	https://aquaeas.org/	Future	All	European Aquaculture Society

4.1.1 XVII Congreso Nacional de Acuicultura

iFishIENCi partner, Leitat, attended the XVII Spanish Aquaculture Con gress organized by SEA-Acuicultura between the 7th and 10th of May in Cartagena (Murcia, Spain). The event showcased the latest scientific innovations in aquaculture aligned with the Blue Growth strategy. The 4-day congress included sessions on circular economy, 4.0 aquaculture, nutrition and food, reproduction, genetics, economics and production, plant engineering, instrumentation, and processes, as well as round table discussions. iFishIENCi's general objectives and expected outcomes were introduced by LEITAT during the round table discussion on "Closing the loop in the aquaculture sector through sustainability."

Figure 3. XVII Congreso Nacional de Agricultura.

4.1.2 Global IoT Summit

The iFishIENCi partner, Philippe Cousin from Easy Global Market, chaired a workshop specifically designed for the aquaculture sector at the Global IoT Summit in Aarhus, Denmark. The "First Workshop on Agriculture and Aquaculture (AGRIAQUA'19)" featured a full session with three papers discussing the applications of IoT (Internet of Things) in aquaculture. On June 17th, the iFishIENCi project was presented during this session, highlighting the significant role of IoT, including the development of AI (Artificial Intelligence) applications for smart feeding and other aspects of aquaculture management. For more information, visit: https://globaliotsummit.org/

Figure 4. Global IoT Summit.

4.1.3 Aqua Nor

The iFishIENCi project was present at Aqua Nor between the 20th and the 23rd of August in Trondheim, Norway. The iFishIENCi team, NORCE, and AquaBioTech Group were at Hall A, by stand number A-138 and at Hall D, by stand number D-332. Presentations and side seminars were held on the 22nd of August. Björgolfur Hávardsson from NCE Seafood Innovation Cluster presented iFishIENCI during the session on "Digitalisation in aquaculture" at the PHARMAQademy at 10 am at Banksalen, Kongens gate 4. Dorinde Kleinegris and Lars Ebbesson from NORCE introduced iFishIENCi's novel fish feed ingredients at the mini-symposium on "Driving sustainable development of aquaculture".

Figure 5. Aqua Nor.

4.1.4 Aquaculture Europe Berlin 2019

The iFishIENCi project effectively engaged stakeholders at Aquaculture Europe in Berlin, where over 2,700 participants from 85 countries came together to learn about the latest aquaculture research and innovations. At this event, iFishIENCi joined forces with sister projects AquaIMPACT and FutureEUAqua in a common session, sharing their approaches and experiences.

Lars Ebbesson from NORCE introduced iFishIENCi's approach to digitizing and optimizing feed production for sustainable and profitable European aquaculture. Franck Le Gall from Easy Global Market emphasized the project's plans for accelerating the use of the Internet of Things (IoT) and Artificial Intelligence (AI) in the aquaculture field. Finally, Steven Prescott from AquaBioTech Group presented on using life cycle assessment to compare aquaculture products.

This collaborative engagement allowed the project to connect with a diverse audience and showcase its advancements in aquaculture technology and innovation, demonstrating its commitment to sustainability and stakeholder involvement.

Figure 6. Aquaculture Europe.

4.1.5 Focus Fish International Conference

The iFishIENCi project engaged stakeholders at the Focus Fish international conference, held on the 21st and 22nd of January in Bremerhaven. Organized by project partner ttz Bremerhaven, the event served as a meeting point for the fish industry and aquaculture. Participants had the opportunity to learn about innovative technologies for quality improvement of fish and seafood, developments, challenges, and trends in the aquaculture sector, as well as the iFishIENCi project itself. This event allowed iFishIENCi to connect with industry professionals and experts, showcasing the project's dedication to fostering innovation and collaboration in aquaculture.

Figure 7. Focus Fish International Conference.

4.1.6 AE2020 Online Program of Aquaculture 4.0 Presentations

Due to the COVID-19 pandemic, many events and gatherings were significantly impacted, resulting in the need to shift towards online platforms. The iFishIENCi project has also been affected by these limitations and restrictions, prompting the team to implement online programs and presentations to maintain stakeholder engagement. The AE2020 Online Program of Aquaculture 4.0 Presentations was one such event that was held virtually, ensuring that interested stakeholders could participate regardless of their location or any travel restrictions. This approach has not only expanded the project's reach but has also enabled a more inclusive and accessible platform for stakeholders to participate in sustainable aquaculture development.

Figure 8. European Aquaculture Society.

Figure 9. Programme.

4.1.7 iFishIENCi at Aquaculture Europe 2021 Madeira

The iFishIENCi project had a strong presence at the Aquaculture Europe Conference in Madeira Island, with three oral presentations and one poster presentation. The team was thrilled to share their work with the wider aquaculture community, and even found time for an in-person meeting to discuss upcoming project work. Collaboration with sister Aquaculture 4.0 projects in dissemination and communication activities was also a highlight, with joint social media strategy and hashtag usage creating engaging online dialogue with attendees.

Figure 10. Presentation Digital Twin.

4.1.8 Malta Agri Fair 2022

The iFishIENCi project attended the Malta AgriFair 2022, a national event organized by the Ministry for Agriculture, Fisheries, and Animal Rights to promote local produce, machinery, systems, and technological developments in the agricultural and fisheries sectors. The fair aimed to bring together major stakeholders in the field, from large organizations to small and medium-scale enterprises (SMEs).

As part of our stakeholder engagement strategy, the project team participated in the fair to meet with other stakeholders and promote our research and practices for sustainable aquaculture. We had fruitful discussions with industry professionals, policymakers, and researchers on various topics related to local produce, technology, and sustainable agriculture.

The fair provided a platform for us to interact with other stakeholders, learn about new research and ideas, and explore collaborations with industry professionals and researchers. We had the opportunity to network and establish new connections that have helped us advance our work on sustainable aquaculture.

During the fair, we showcased our innovative solutions and research findings to interested stakeholders. Although we did not present posters, we had the opportunity to share our work through oral presentations and discussions with other attendees.

The iFishIENCi project remains committed to engaging stakeholders and promoting sustainable aquaculture development through collaboration and knowledge-sharing initiatives.

Figure 11. Agri Fair.

4.1.9 Fish International 2020 and 2022

At the Fish International event in Bremen February 2020, iFishIENCi partner ttz Bremerhaven engaged attendees by utilizing a questionnaire to collect information. The gathered responses are set to be evaluated using a social acceptance analysis framework currently under development by the iFishIENCi team. As the only German trade fair for fish and seafood, Fish International attracts around 12,000 visitors biennially from the fish and hospitality industry, including fish wholesalers and food retailers. This engagement strategy allowed the iFishIENCi project to connect with relevant stakeholders and gather valuable insights to further refine their approach.

In September 2022 the ttz was represented at the fair in a joint stand with Bremerhaven University of Applied Sciences, the Thünen Institute and the Alfred Wegener Institute.

Figure 12. Fish International 2020/2022.

4.1.10 AQUA FARM 2022

The iFishIENCi project participated in the Aquafarm exhibition event and convention, a two-day B2B event dedicated to operators of the sustainable Euro-Mediterranean aquaculture and fishing industry. The event aimed to provide a platform for operators to network, exchange knowledge and insights, and join demand with supply.

As part of our stakeholder engagement strategy, the project team participated in the event to showcase our research and practices for sustainable aquaculture. We met with industry professionals, policymakers, and researchers from various sectors related to the fishing and aquaculture industry, including breeding, processing, transformation, distribution, and consumption. We had fruitful discussions on topics related to sustainability, innovation, and the future of the industry.

The event was an excellent opportunity for us to interact with other stakeholders, learn about new research and ideas, and explore collaborations with industry professionals and researchers. We had the opportunity to network and establish new connections that have helped us advance our work on sustainable aquaculture.

The Aquafarm exhibition event and convention targeted a broad range of stakeholders, including the fish farming industry, sustainable wild fishing industry, wholesalers, importers, and distributors, fish processing and processing industry, food industry at all stages of processing and production, large distribution, Ho.re.ca, communities, public administrations, retail, manufacturers and distributors of various systems, installations, equipment, and more.

Overall, the iFishIENCi project's participation in the Aquafarm exhibition event and convention was a valuable experience, enabling us to exchange knowledge and insights with other stakeholders in the sustainable aquaculture and fishing industry. We look forward to participating in similar events in the future.

Figure 13. Aqua Farm.

4.1.11 Aquaculture Europe 2022

Aquaculture Europe 2022 is one of the most important conferences for the European Aquaculture sector, where experts, researchers, and stakeholders come together to share their knowledge and innovations. The conference provides a platform for discussions on the latest advancements and challenges in the aquaculture industry and aims to facilitate the development of sustainable and efficient aquaculture practices.

The iFishIENCi project was highly active during the conference, engaging with stakeholders and presenting its innovative solutions to the challenges faced by the aquaculture industry. The project held a partner meeting, delivered multiple oral presentations at various sessions, and presented

posters. At the partner booths, the iFishIENCi team met with stakeholders, distributed flyers, and sparked interest in their innovations.

The stakeholder engagement activities during Aquaculture Europe 2022 were crucial for the iFishIENCi project to gain valuable feedback and insights from industry experts and potential end-users. The team engaged in discussions and received feedback on their innovative solutions, which enabled them to refine and improve their strategies for optimal impact. Additionally, the team established new partnerships and collaborations with other projects and stakeholders in the industry, fostering a network for future endeavors.

All of the conference proceedings and program are now available online from the EAS website, providing a wealth of information and knowledge for anyone interested in the latest developments and advancements in the aquaculture sector.

Table 9 Table of invited talks and posters and authors

Abstract Accepted	iFishIENCi Authors
Influence Of *Microchloropsis Gaditana* Extract Supplementation On The Growth, Morphological, And Body Quality Traits Of Asian Seabass Lates Calcarifer At Two Different Salinities	G.M. Cusimanoa*, JC. Chianga, N.E. Panasiaka, S.G. Prescotta, F. Nagelb, S. Balsells Claramuntc, D.M.M. Kleinegrisd, S. Deguaraa T. Bardócza A Aquabiotech Group, Mosta, Malta B Aller Aqua Research Gmbh, Büsum, Germany C LEITAT Technological Center, C/De La Innovació, 2, 08225, Terrassa, Spain D NORCE Norwegian Research Centre, Thormøhlensgate 53, NO-5006 Bergen, Norway
Individual Telemetry Of European Seabass In Seacages Reveals Behavioural And Positional Pattern Changes Indicating Food Anticipatory Activity	I. Chen 1*, D. G. Georgopoulou 2, D. Voskakis 2, L. Ebbesson1, N. Papandroulakis2 1 NORCE Norwegian Research Centre, 5008 Bergen, Norway 2 Hellenic Centre For Marine Research, 71500 Gournes, Crete, Greece
Tracking And Analysis Of The Swimming Activity Of European Seabass *Dicentrarchus Larbax* In Sea Cages And Its Relation To Feeding	Dimitra G. Georgopoulou1 *, Charalabos Vouidaskis1, Nikos Papandroulakis1 1. Institute Of Aquaculture, Hellenic Centre For Marine Research, Aqualabs, 71500, Gournes, Heraklion, Greece
Normalizing Data Models For Interoperability In Aquaculture	A. Abid*, E. Ravagnan1, F. Le Gall*, N. Papandroulakis¦, T. Bardoz2, C. Jensen©, N. Prost * EGM, Sophia Antipolis, France NORCE Norwegian Research Centre, 5008 Bergen, Norway Aquabiotech Group, Mosta, Malta
IFishIENCi Project: The Role Of Nutrient Assimilation In The Circular Economy	Checa, D; Escamilla, M.; Sanchez, LEITAT Technological Centre C/ de la Innovació, 2 · 08225 Terrassa (Barcelona)

Figure 14. Impressions Aquaculture Europe.

4.1.12 Nordic Algae Symposium 2022

The iFishIENCi project participated in the Nordic Algae Symposium held in Turku, Finland from 8th to 10th June 2022. The three-day symposium brought together excellent teams from academia and industry and focused on advances with cyanobacteria, micro-and macroalgae.

The Nordic Algae Symposium is an annual event initiated in 2018 by the University of Turku and has been organized in different Nordic countries to provide a professional arena for Nordic algaeneers.

The iFishIENCi project team participated in the symposium to meet with other stakeholders and promote our research and practices for sustainable aquaculture. We had fruitful discussions with industry professionals, policymakers, and researchers on topics related to sustainable algal biotechnology and its application in aquaculture.

The symposium provided an opportunity for us to interact with other stakeholders, learn about new research and ideas, and explore collaborations with industry professionals and researchers. We had the opportunity to network and establish new connections that will help us advance our work on sustainable aquaculture.

Overall, the iFishIENCi project's participation in the Nordic Algae Symposium was a valuable experience, enabling us to exchange knowledge and insights with other stakeholders in the field of algal biotechnology and aquaculture. We remain committed to engaging stakeholders and promoting sustainable aquaculture development through collaboration and knowledge-sharing initiatives.

Figure 15. Nord Aqua, Biocity.

4.1.13 iFishIENCi workshop and pitch at SmartAgriHubs Synergy Days

iFishIENCi successfully participated in the SmartAgriHubs Final Event, where we presented our project innovations to a diverse group of stakeholders in the Agrifood sector. Our team highlighted synergistic research, including the use of sensor detection, digital twin, and IoT for farm and aquafarm monitoring and management, as well as waste valorisation and circularity developments. We had the opportunity to pitch our project, showcase our work at Stand 6 in the Market Place, and host a workshop titled "From Blue to Green."

Figure 16. Smart Hubs.

4.1.14 ISFNF 2022

The iFishIENCi project coordinator, ABT, participated in the 2022 International Symposium on Fish Nutrition and Feeding (ISFNF) held in June. The symposium is a well-known global event that brings together researchers, industry professionals, and stakeholders to discuss the latest advances and challenges in fish nutrition and feeding.

As part of our stakeholder engagement strategy, the project team organized several activities during the symposium to promote our research and practices for sustainable aquaculture. We presented posters and oral presentations, showcasing our innovative solutions and research findings, which generated significant interest among attendees. We also participated in discussions and workshops on a wide range of topics related to fish nutrition, health, and welfare.

The symposium was an excellent opportunity for us to interact with other stakeholders, learn about new research and ideas, and explore collaborations with other industry professionals and researchers. The project team also had the opportunity to network and establish new connections that will help us advance our work on sustainable aquaculture.

Figure 17. ISFNF 2022.

4.1.15 ISME 18

The iFishIENCi project participated in ISME18, the 18th edition of the non-profit symposium for microbial ecology held every two years. This conference is a leading event in the field of microbial ecology and attracts an average of around 1,750 international scientists.

As part of our stakeholder engagement strategy, the project team organized several activities during the symposium to promote our research and practices for sustainable aquaculture. We presented posters and oral presentations, showcasing our innovative solutions and research findings, which generated significant interest among attendees. We also participated in discussions and workshops on various topics related to microbial ecology, including the role of microbial communities in aquaculture systems.

The symposium was an excellent opportunity for us to interact with other stakeholders, learn about new research and ideas, and explore collaborations with other industry professionals and researchers. The project team also had the opportunity to network and establish new connections that will help us advance our work on sustainable aquaculture.

Figure 18. ISME18.

4.1.16 EAFP – Hannover 2022

As part of our stakeholder engagement strategy, our partner AAR participated in the 18th Joint Conference of the German-speaking sections of the EAFP from October 4th to 8th, 2022, in Hannover. The event fostered scientific discussions on fish health and welfare, covering a range of topics such as disease diagnosis and prevention, animal welfare in aquaculture and fisheries, and the impact of climate change. AAR contributed to the conference's scientific program, sharing their expertise on various aspects of fish health and welfare. The event also promoted young talent through the Wilhelm-Schäperclaus Award, encouraging young EAFP scientists to submit their work for consideration.

AAR's involvement in this conference highlights our commitment to fostering collaboration and knowledge-sharing within the aquaculture sector, contributing to the promotion of sustainable practices.

EAFP-Tagung 2022

Figure 19. EAFP Hannover.

4.1.17 SmartAgriHubs Final Event

The iFishIENCi project was delighted to attend the SmartAgriHubs Final Event in Lisbon from 26 to 28 September 2022 as part of our stakeholder engagement strategy. The event was an opportunity to reflect on the achievements of the project members and the legacy and sustainability of SmartAgriHubs.

During the event, we participated in discussions and workshops on various topics related to the digitalization of the agricultural sector, including IoT, robotics, and artificial intelligence. We also shared our innovative research and practices for sustainable aquaculture with other attendees and explored potential collaborations with industry professionals and researchers. Insights shared from the Nefratiti H2020 project on tools for demonstrations of agriculture technologies on farm informed the finalisation of the iFishIENCi Farm Demo Events, and the tools created were adapted for the aquaculture industry by iFishIENCi, a fantastic cross fertilisation.

Overall, the SmartAgriHubs Final Event was a valuable experience for us, enabling us to exchange knowledge and insights with other stakeholders in the field. We remain committed to engaging stakeholders and advancing sustainable aquaculture through collaborative initiatives and research activities. This event was also the inspiration for the From Blue to Green workshop, organised by iFishIENCi in collaboration with other projects (ASTRAL, Sea2Land, algacycle) through synergies at this conference.

Figure 20. Smart Agri Hubs 2022.

4.1.18 Ocean Con2022

The iFishIENCi project participated in the Rostock Ocean Convention held in Rostock, Germany on November 16th-17th, 2022. The convention brought together participants from the business, science, and politics sectors to discuss the latest developments, trends, and projects in digital underwater technology.

The convention provided an attractive networking platform for companies, researchers, and policymakers and served as a communication platform for more than 170 participants, speakers, and partners. It showcased the latest trends, newest developments, and projects in digital underwater technology and positioned Rostock as a leading location for digital underwater technology. The convention also integrated innovative products and start-ups and was jointly organized by Rostock Business, Subsea Monitoring Network, and Fraunhofer IGD.

The iFishIENCi project team participated in the convention to meet with other stakeholders and promote our research and practices for sustainable aquaculture. We had fruitful discussions with industry professionals, policymakers, and researchers on topics related to the Blue Economy and new technologies in the underwater domain.

The convention provided an opportunity for us to interact with other stakeholders, learn about new research and ideas, and explore collaborations with industry professionals and researchers. We had the opportunity to network and establish new connections that will help us advance our work on sustainable aquaculture.

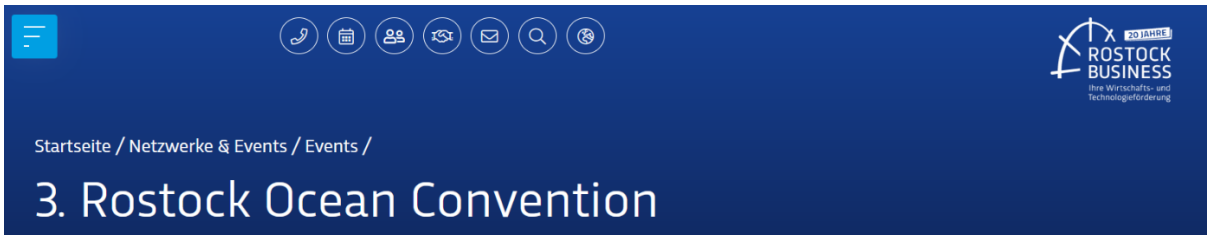


Figure 21. Ocean Con Rostock.

4.1.19 XVIII Congreso Nacional de Acuicultura

iFishIENCi and Leitat recently participated in the XVIII Spanish Aquaculture Congress held from November 21st to 24th, 2022, in Cádiz. The event was an excellent opportunity for the project to engage with industry stakeholders and showcase its general objectives and expected outcomes.

In addition to networking opportunities, the conference provided valuable insights into the latest advancements in aquaculture, future direction of the sector, and sustainability issues. iFishIENCi was able to participate in the round table discussion on "Closing the loop in the aquaculture sector through sustainability," highlighting the project's commitment to a sustainable future in the sector.

Apart from the round table discussion, the conference featured various sessions covering topics such as circular economy, 4.0 aquaculture, nutrition and food, reproduction, genetics, economics and production, plant engineering, instrumentation, and processes. Technical and cultural visits were also offered, providing attendees with valuable learning experiences and networking opportunities. Overall, iFishIENCi's participation in the XVIII Spanish Aquaculture Congress allowed the project to gain valuable insights, network with industry professionals, and showcase its commitment to a sustainable future in the sector.

Figure 22. XVII Congreso National de Acuicultura.

4.1.20 12th Fishing and Angling Professional Conference in Gödöllő, Hungary

Organised by the Institute of Aquaculture and Environmental Safety (AKI), Hungarian University of Agriculture and Life Sciences (Magyar Agrár- és Élettudományi Egyetem (MATE)), College of Fishing and Angling, Foundation for the Development of Fish Sciences and Hungarian National Fishing Association, this event invited partners Lars Ebbeson (NORCE Norwegian Research Centre), Nikos Papandroulakis (Hellenic Center for Marine Research HCMR), Tamás Bardócz (AquaBioTech Group), Balázs Kovács (MATE-AKI), Varju-Katona Milán (Bajcshal), and Márton Orbán (Vitafort Első Takarmánygyártó és Forgalmazó Zrt.) Over 200 Hungarian fish farmers attended, and presentations focused on the importance of digitalization in aquaculture and how it can help them be more sustainable. Topics presented by iFishIENCi partners were: The examination of feed additives and potential raw materials in the iFishIENCi project and in other R&D programs, Innovative developments

in cage aquaculture of sea bream and sea bass in Greece, The importance of digitization in Norwegian salmon farming, Opportunities of the circular economy in aquaculture based on the results of the iFishIENCi project, African catfish selection breeding program within the iFishIENCi project, and Results achieved by the iFishIENCi project at BAJCSHAL Kft.

Figure 23. Demonstration Training Gödöllöi.

4.1.21 Blue Economy and Fish Processing

In March 2023, the international conference "Blue Economy and Fish Processing" was held for the first time in Bremerhaven, translated into English and can be attended both in presence and via livestream. Organised by partner TTZ, this conference brings together the fish processing and food industries, technology providers, researchers, government officials and other stakeholders to highlight the current state of the art in resource efficiency and sustainable utilization of fish and seafood. International speakers presented innovations for process optimization with a view to improving raw material yields, optimizing process flows, and exciting approaches to generating more value from by-products. Both the classic by-products, such as skin and bones, and the process waters, which have not been the focus of attention to date, represent potential for utilization that has not yet been sufficiently exploited.

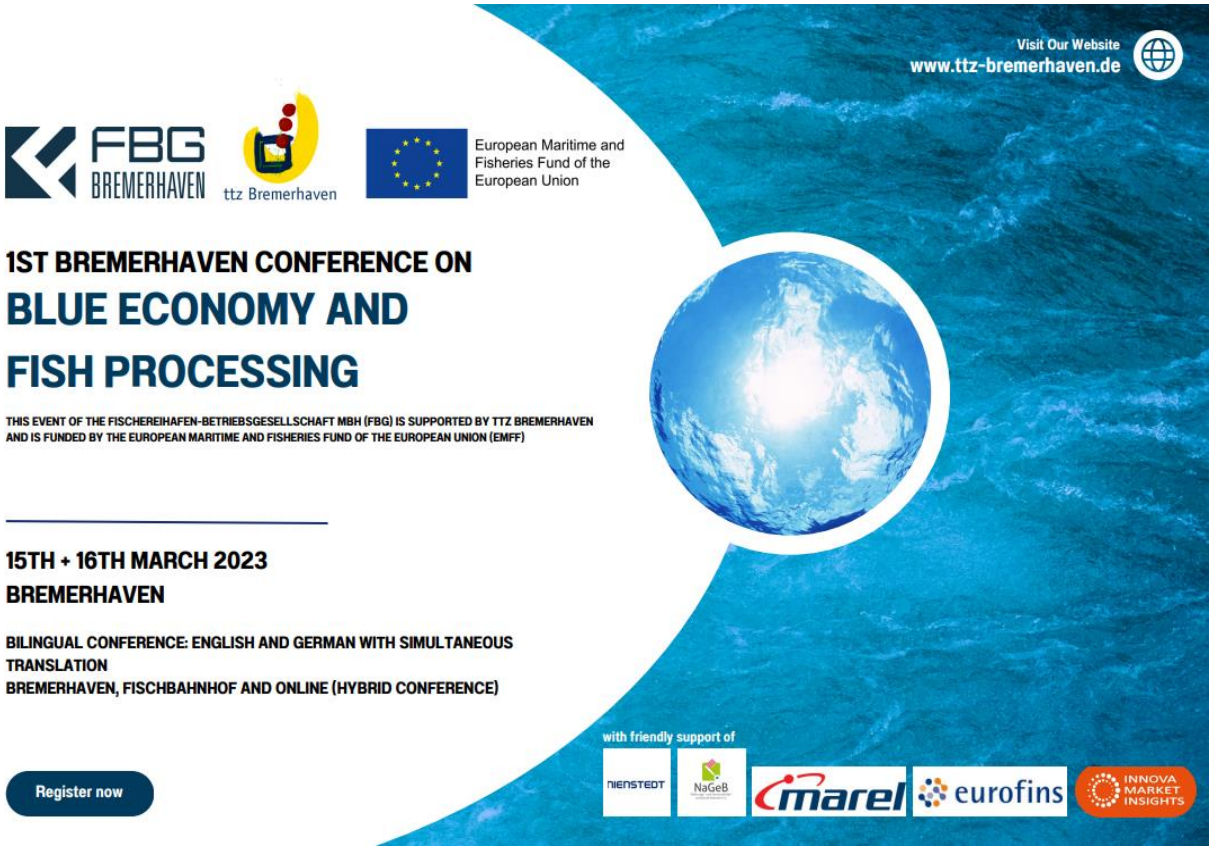


Figure 24. Blue Economy and Fish Processing.

4.1.22 FutureEUAqua Final Conference

The final conference of Aquaculture 4.0 Sister project FutureEUAqua aimed to summarize the results and outcomes achieved during the project four-year life, highlighting the challenges faced and accomplish issues and tasks. A discussion and debate platform to pave the way for future collaborative project proposals and new initiatives for the organic and conventional aquaculture sector, it was attended by sister projects, policy makers, researchers and partner organizations. The coordinator if iFishIENCi attended to discuss the important developments and present the synergistic and complimentary work of the iFishIENCi project.

Figure 25. Future EUAqua.

4.2 Engaging Aquaculture Sector Stakeholders with Digital Platforms

4.2.1 Zenodo

As the iFishIENCi project progresses, we aim to effectively communicate our findings and results to a wide range of audiences. To this end, we utilized traditional digital communication platforms such as our project website, social media platforms including Facebook, Twitter, Instagram, LinkedIn, as well as newsletters and YouTube. Additionally, we will also explore other digital media platforms to engage a wider audience including both scientific and practitioner-related professionals. Some key platform that we utilized are the OpenAIRE Community Gateway, Zenodo, and the CORDIS wire. OpenAIRE is a European initiative that aims to support open access to research publications and data. The OpenAIRE Community Gateway is a platform that allows researchers, research institutions, and funding bodies to track the impact of their research and to monitor compliance with open access policies.

Our project, iFishIENCi, has its own community on Zenodo, which is a platform for sharing and preserving research outputs such as publications, datasets, and software. The community is called "iFishIENCi" and can be accessed at https://zenodo.org/communities/ifishienci/.

This community is linked to OpenAIRE, allowing us to take advantage of the various features and benefits offered by the OpenAIRE Community Gateway. One of the main advantages of using the OpenAIRE Community Gateway is that it helps to increase the visibility and accessibility of our research outputs. By registering our publications, datasets, and software on the platform, we are able to make them more discoverable to a wider audience. This can lead to more citations and greater impact for our work. Additionally, the compliance monitoring features of OpenAIRE Community Gateway allows us to ensure that we are meeting the open access mandates and policies of funding bodies, research institutions, and other organizations. We can easily track and report on our compliance, which can be beneficial for obtaining funding or other support for our project.

Furthermore, using the OpenAIRE Community Gateway allows us to easily engage with stakeholders such as other researchers, funding bodies, and research institutions. This has been beneficial for disseminating our results, obtaining feedback and input from other experts in the field, and establishing collaborations with other groups working on similar topics. Overall, the OpenAIRE Community Gateway is an important tool for iFishIENCi project to improve the visibility and impact of our research and increase the dissemination of results for our stakeholders.

https://cordis.europa.eu/project/id/818036/results

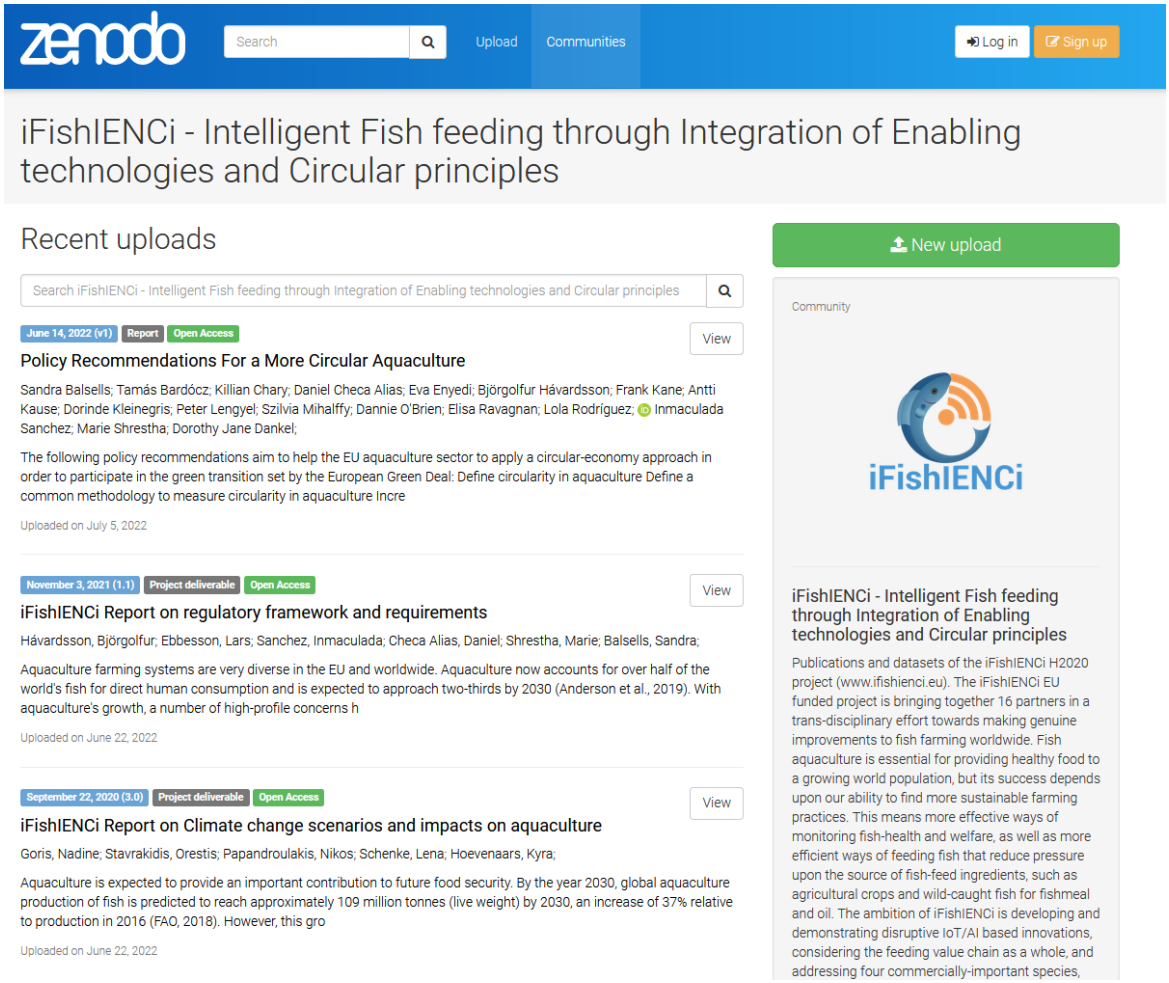


Figure 26. Zenodo.

4.2.2 CORDIS

In addition to utilizing the OpenAIRE Community Gateway, our iFishIENCi project has also used CORDIS wire, a platform provided by the European Commission to promote communication and dissemination of results from research projects funded by the European Union. The results of our project can be accessed on CORDIS wire at https://cordis.europa.eu/project/id/818036/results.

Using CORDIS wire provided several advantages for engaging stakeholders in our project. First, it allowed us to reach a large and diverse audience, including researchers, policymakers, industry representatives, and members of the public. This was especially beneficial for disseminating our results remotely when the COVID-19 restrictions forced us to organise our events digitally and promoting the impact and relevance of our project.

Second, it offers a central location to access information about our project, including research results, publications, and project deliverables. This makes it easy for stakeholders to find and access the information they need, increasing the visibility and accessibility of our project outputs.

Third, CORDIS wire also provided features for networking and collaboration, such as project partner directories and events calendars. This enabled us to connect with other researchers and organizations working on similar topics, and to establish new collaborations to further the impact of our research.

Finally, CORDIS wire also helps us to reach a wider audience beyond the academic research community and by connecting us to industry stakeholders and policy makers in EU. Which was useful to promote the application of our findings and to create new opportunities for the research results.

Overall, using CORDIS wire as a platform in addition to the OpenAIRE Community Gateway, enhanced the visibility and impact of our research and increased the dissemination of results for our stakeholders.

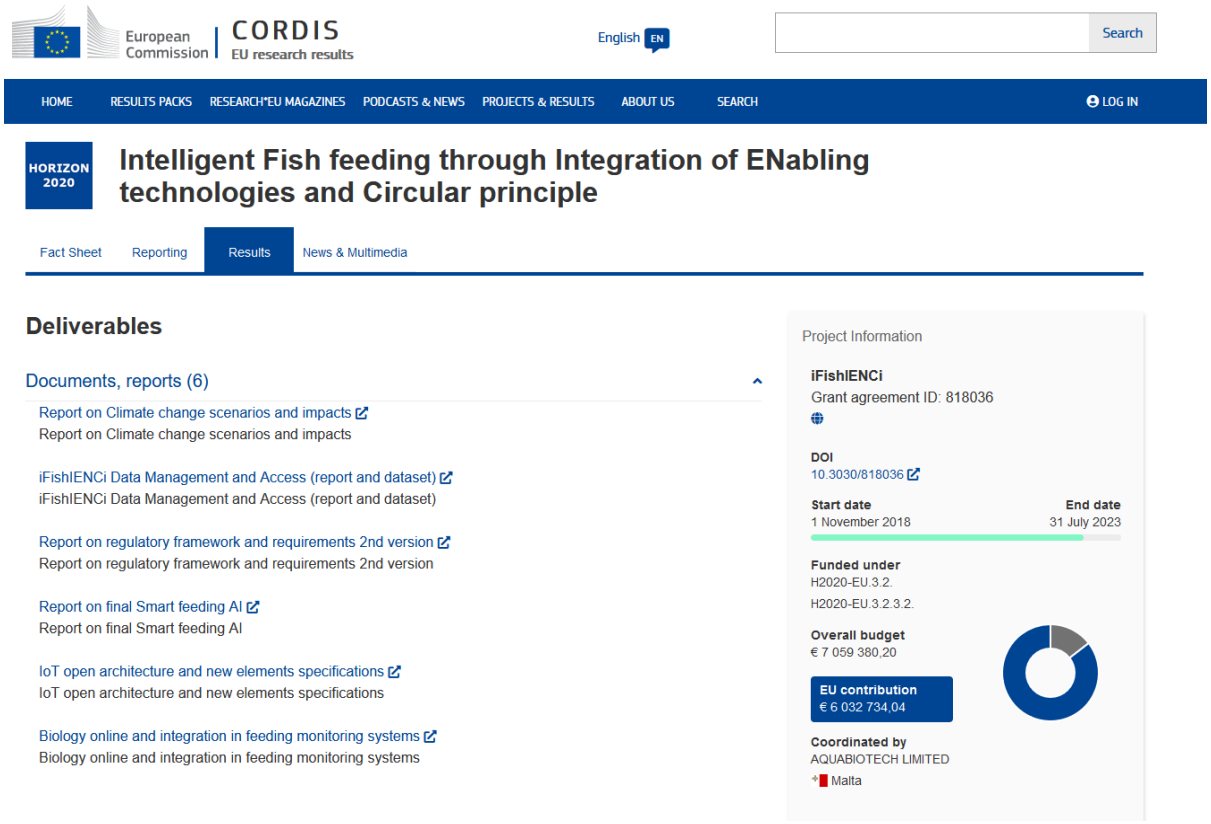


Figure 27. Cordis.

4.2.3 Synergising SMART AGRI HUBS

Smart Agri Hubs is a European initiative aimed at promoting and accelerating the digital transformation of the agriculture and farming sector. It is funded by the European Union's Horizon 2020 research and innovation program. The project connects a wide range of stakeholders, including agri-food companies, research institutions, technology providers, and end-users, to foster the development and adoption of digital technologies in agriculture.

Smart Agri Hubs focuses on building a pan-European network of Digital Innovation Hubs (DIHs) that facilitate collaboration, knowledge exchange, and the provision of digital solutions to address the challenges faced by the agri-food sector. The initiative aims to enhance productivity, sustainability, and resource efficiency in agriculture while supporting the growth of innovative agri-tech startups and small and medium-sized enterprises (SMEs). By connecting various stakeholders and leveraging the power of digital technologies, Smart Agri Hubs aims to drive innovation and ensure the long-term competitiveness and sustainability of European agriculture.

Figure 28. Smart Agri Hubs.

4.3 Empowering Stakeholder Engagement through Dynamic Virtual Interactions

4.3.1 Sustainable Aquaculture: Consumer insights

iFishIENCi project gained valuable insights into retail consumer attitudes towards aquaculture through an adaptive online social survey led by their partner, ttz Bremerhaven. In response to COVID-19 lockdown restrictions, the project team designed accessible options for stakeholder engagement through digital platforms. Utilizing SoScisurvey, questionnaires were distributed via ttz Bremerhaven's website, Twitter, and Facebook to investigate consumers' views on fish/seafood products, aquaculture, and sustainability. The results revealed that consumers associate sustainability with regulated catches, compliance with catch quotas, and conservation of fish stocks and the sea. Additionally, no significant sensory differences (taste, texture) were reported by consumers between aquaculture products and wild catch. This information helped the iFishIENCi project better understand retail consumer perspectives on aquaculture production and effectively engage stakeholders during challenging times.

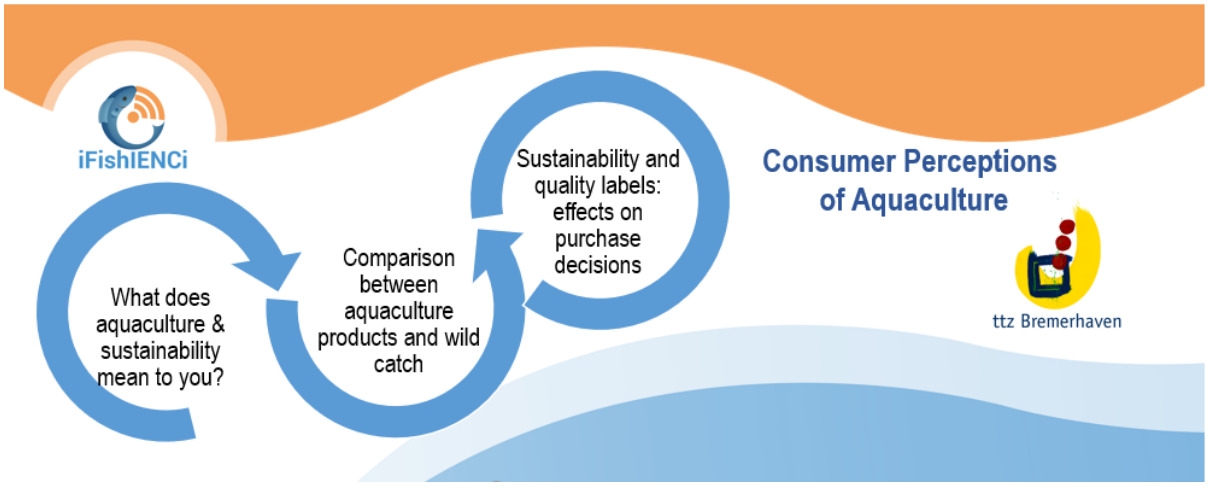


Figure 29. Consumer Perceptions Aquaculture.

The iFishIENCi project is continuously updating its surveys to gather the most relevant and up-to-date information from stakeholders. The survey link remains active and is regularly distributed when partners attend events. By participating in these surveys, stakeholders can help shape the future of sustainable aquaculture and contribute valuable insights to the project's ongoing development.

With industry surveys the project gathers relevant information about the needs and bottlenecks of the technology users:

https://lnkd.in/dCn8yDEe

The future of aquaculture: The impact of industry 4.0 technologies worldwide (2023).

Figure 30. Survey of experts; Challenges faced by business within the Aquaculture 4.0 market.

By the participation in this survey stakeholders contributed to defining, integrating and scaling-up better solutions that aim to accelerate the blue growth economy. Topics explored were: Barriers to adopt and include new technologies, access to information, main technical risks, the definition of

performance indicators, its flexibility and adaptation to company operations, common standardisations, regulatory issues and restrictions, availability to trainings. Issues addressed are aquaculture challenges and the need to prioritise specific needs, such as fish welfare, monitoring fish behaviour, reducing the need for pharmaceutical use, reducing waste products, reducing overuse of resources, standardisation, improving consumer and investor awareness, increasing profitability.

4.3.2 Aquaculture Going Circular Online Event

In November 2021, the iFishIENCi project hosted a successful event titled "Aquaculture is Going Circular," which attracted over 300 international participants, including officers from the European Commission and representatives of ministries, authorities, and policy makers. This informative and collaborative gathering brought together high-level thinkers, circular economy experts, and leading aquaculture professionals to discuss the future of circularity in the aquaculture industry. The event also featured collaborations with sister and synergistic projects, further expanding its reach and impact.

"Aquaculture is Going Circular" provided a platform for experts and participants to engage in meaningful discussions about the potential for circular economy principles to revolutionize the aquaculture industry. The event covered a wide range of topics, including resource efficiency, waste management, innovative solutions for sustainable aquaculture practices, and the role of digital technologies in facilitating circular approaches.

The presence of officers from the European Commission and representatives of ministries, authorities, and policy makers enriched the discussions and highlighted the importance of aligning industry innovations with regulatory frameworks and policies. The event hosted panel discussions and interactive sessions, allowing attendees to exchange ideas, learn from one another, and collaborate on strategies to advance circularity in the industry.

By incorporating ideas and expertise from sister and synergistic projects, the event showcased diverse perspectives on the challenges and opportunities facing the aquaculture sector. The collaborative atmosphere fostered the exchange of innovative ideas and the development of strategies to promote sustainable aquaculture practices.

Further information can be found here: https://ifishienci.eu/media/events/aquaculture-going-circular/

Figure 31. Key Online Event: Aquaculture Going Circular 2021.

4.3.3 Horizon for Aquaculture Online Event

In June, the European Commission's strategic guidelines for EU aquaculture 2021-2030 reinforced the notion that aquaculture and sustainable growth go hand in hand. Initiatives aimed at achieving eco-intensification, preserving biodiversity, and developing better practices and technologies are paving the way for a more environmentally friendly and efficient aquaculture industry.

Sharing this goal, the EU H2020 funded projects GAIN, iFishIENCi, and IMPAQT launched Horizon4Aquaculture, a three-day online event held on the 15th, 22nd, and 29th of June. The event focused on three key aspects: Policy and Regulation, Circularity, and Precision Aquaculture. Horizon4Aquaculture invited researchers, aquaculture farmers, policymakers, national and pan-national aquaculture development organizations to join the conversation and contribute to the present and future of the sector.

The event began on the 15th of June with a session dedicated to discussing policies, practices, and regulations. Participants analysed gaps and opportunities along the entire value chain of aquaculture production, from pre-production to the consumer market. On the 22nd of June, the debate centred on "Progress towards Circular Aquaculture." Experts in circular economy and aquaculture gathered to share knowledge and views on what circularity means in aquaculture, how it should be addressed and measured, and how it can become part of the business for aquaculture producers. Finally, on the 29th of June, the focus shifted to "Precision Aquaculture in the Blue Economy," examining its demands and impacts on sustainability, cost-efficiency, and consumer confidence. This session included a Demo Day that showcased the latest innovative technologies developed by GAIN, iFishIENCi, and IMPAQT. Attendees had the opportunity to see firsthand how these cutting-edge solutions contribute to solving problems and optimizing aquaculture production.

Horizon4Aquaculture proved to be a valuable platform for collaboration and knowledge exchange among various stakeholders in the aquaculture industry. By addressing crucial topics such as policy and regulation, circularity, and precision aquaculture, the event facilitated constructive discussions and encouraged participants to work together toward a more sustainable and efficient future for the sector.

In conclusion, Horizon4Aquaculture successfully brought together experts and stakeholders from the aquaculture industry to explore the potential for sustainable growth and innovation. The event's collaborative atmosphere fostered the exchange of ideas and experiences, contributing to the ongoing development of environmentally friendly and efficient practices in aquaculture. Further information can be found here: https://ifishienci.eu/horizon4aquaculture/

Figure 32. Horizon for Aquaculture.

4.3.4 EATiP 'On The Horizon' webinar

As part of our stakeholder engagement strategy, the iFishIENCi project has actively participated in events and initiatives related to sustainable aquaculture development, including the EATiP 'On The Horizon' webinar series. Our project team has contributed to these webinars by sharing our knowledge and insights on various topics, such as innovative technologies and practices for sustainable aquaculture.

Through our participation in these webinars, we have not only shared our project's progress and achievements with a wider audience but have also gained valuable feedback and perspectives from other stakeholders in the aquaculture industry. This inclusive approach aligns with our project's commitment to engaging stakeholders from diverse backgrounds and creating a collaborative platform for sustainable aquaculture development.

Figure 33. EATiP "On The Horizon" Webinar.

4.3.5 From Blue to Green Online Webinar

The iFishIENCi project recently co-presented a successful webinar titled "From Blue to Green," which focused on aquaculture innovation and explored synergies between the aquaculture and agriculture industries. Held on October 25th, the interactive workshop brought together researchers and professionals to discuss key issues in both sectors, aiming to enhance collaboration and promote sustainable innovation.

During the webinar, researchers from four projects working in the areas of circularity, waste valorization, and digitalization in aquaculture shared their findings and experiences. The workshop emphasized the importance of identifying synergies and lessons to be learned for the benefit of both Green and Blue industries. Participants gained valuable insights into the potential for collaboration and knowledge-sharing between aquaculture and agriculture industries, driving sustainable innovation in both fields.

Furthermore, the webinar highlighted the significance of integrating research and innovation in circularity, waste valorization, and digitalization for the mutual benefit of both sectors. By fostering a "Blue to Green" mindset, environmentally friendly practices in aquaculture and agriculture can be promoted, paving the way for a more sustainable future in food production.

In conclusion, the "From Blue to Green" webinar, co-presented by the iFishIENCi project, served as a valuable platform for showcasing the opportunities that arise from collaboration between the aquaculture and agriculture industries. By identifying and capitalizing on these synergies, both sectors can benefit from shared knowledge, resources, and innovations, ultimately contributing to the global goal of sustainable food production.

Further information can be found here: https://www.youtube.com/watch?v=TBGCLFNTDrU&t=2s

Figure 34. From Blue to Green online workshop October 25th 2022.

4.3.6 African catfish in SmartRAS virtual demo event

The iFishIENCi project recently held a successful event at the AquaBioTech Group Innovia Research Facility, demonstrating the scale-up of its project innovations. Attendees had the opportunity to witness the SmartRAS system in action, learn about ongoing feed trials with Candida yeast meal, and explore the African catfish selective breeding program. The event offered a chance for stakeholders to gain valuable insights into the advancements made in the iFishIENCi project.

During the event, participants observed the SmartRAS system at work and learned about the feed trials underway using Candida yeast meal, a fishmeal replacement protein source produced by NORCE for the project. The African catfish, specially selected as part of MATE's selective breeding program for their utilization of alternative protein feeds, were showcased in flow-through systems in Hungary.

The event also highlighted the comparison between selected African catfish and non-selected African catfish in AquaBioTech Group's precision Recirculating Aquaculture Systems (RAS), demonstrating the applicability of these innovative solutions to other production methods. Dr. Giovanni Marco Cusimano, the study coordinator, and the technical team explained how their demonstration trials are advancing the SmartRAS system and the New Feeds and Breeding program of the project.

Further information can be found here: https://www.youtube.com/watch?v=q_cHU7QehJ0

Figure 35. African Catfish in Smart RAS virtual demo event.

4.3.7 Aquaculture domain online workshop

The iFishIENCi project, in collaboration with the H2020 ASTRAL project, successfully organized and executed a virtual workshop on 28th February 2023, focusing on the significance of data spaces within the aquaculture domain. The event brought together industry experts and stakeholders to discuss and explore the potential of data pooling and sharing in driving the European economy and society forward.

As one of the world's fastest-growing food production systems, aquaculture plays a critical role in the blue-green economy. Ensuring interoperability and trust in data exchanges between stakeholders across the aquaculture lifecycle is essential for maximizing the value of data. Although technical solutions are available, they need to be explicitly defined, and governance rules for stakeholder involvement should be thoroughly discussed.

Event Highlights:

The virtual workshop featured presentations on several ongoing initiatives and included a panel discussion that delved into the creation of a European Union (EU) data space specifically for aquaculture. The event provided valuable insights and opportunities for stakeholders to share their perspectives on the challenges and opportunities presented by data spaces.

Key Takeaways:

- The importance of data spaces in promoting data pooling and sharing, and their potential to benefit the European economy and society.
- The need to address technical and governance issues to ensure interoperability and trust in data exchanges among aquaculture stakeholders.
- The significance of collaboration and open dialogue among stakeholders in driving innovation and progress in the aquaculture sector.
- The potential for an EU data space to facilitate data-driven decision-making and sustainable growth in aquaculture, by providing access to a wealth of knowledge, resources, and expertise.

The joint ASTRAL & iFishIENCi virtual workshop successfully facilitated discussions around the relevance of data spaces in the aquaculture domain. By addressing key technical and governance issues, the event has set the stage for further collaboration and innovation in data pooling and sharing within the industry. As the aquaculture sector continues to grow and evolve, the creation of an EU data space will play a crucial role in enabling stakeholders to unlock the full potential of data-driven decision-making and sustainable development.

For more information and insights from the workshop, please visit the iFishIENCi website at:
https://ifishienci.eu/from-data-interoperability-to-data-spaces-in-the-aquaculture-domain/

Figure 36. Successful Completion of the Joint ASTRAL & iFishIENCi Virtual Workshop on Data Spaces in Aquaculture.

4.4 Demonstrate iFishIENCi systems to answer needs of the aquaculture industry stakeholders

In order that systems developed in the project will be suited to answer the demands of technology stakeholders and end-users, there are a number of directly applied end-user interactions during technology development, which will analyse the relevance, acceptance, and applicability of technologies developed in iFishIENCi.

Questionnaires and interactive workshops were developed in Task 4.1 in order to find out demands that are not supplied by existing technologies (see Annex 1). Also, co-creation workshops where end-user have the opportunity to interactively show demands (RRI outreach) and test if the technologies offered can supply what they need (see tables below) were organised. Consumer demand questionnaires were also developed in Task 4.1 and applied in different countries (see Annex2). Interviews are also planned with key-stakeholders (see Annex 1). Another impact from this is to Increase consumers' positive perception and acceptability of systems before-after test trials (Task 4.1).

The Workshops listed below are active technical training workshops (T6.3) focused on iFishIENCi technologies developed and on the future potential technology end-user (fish farmers) as well as the scientific community. In order to appropriately develop these workshops and to guarantee the exploitation of results and market uptake of technologies beyond these workshops, a targeted stakeholder roadmap (considering the target end users for each of the exploitable products) is being formulated in alignment with WP5 - Exploitation of results and our engagement strategy from WP6.

WP 5 includes exploitation workshops in order to assess the key exploitable results. These are workshops to align and explore the market potential of the results made on a yearly basis, for internal discussion between the consortium and to align partner interests for commercialisation

The target audience of the event programme disclosed below is fully aligned with the stakeholder groups already defined for exploitation and replicability in WP5: individual farmers, feeding companies, technology developers and equipment vendors and investors.

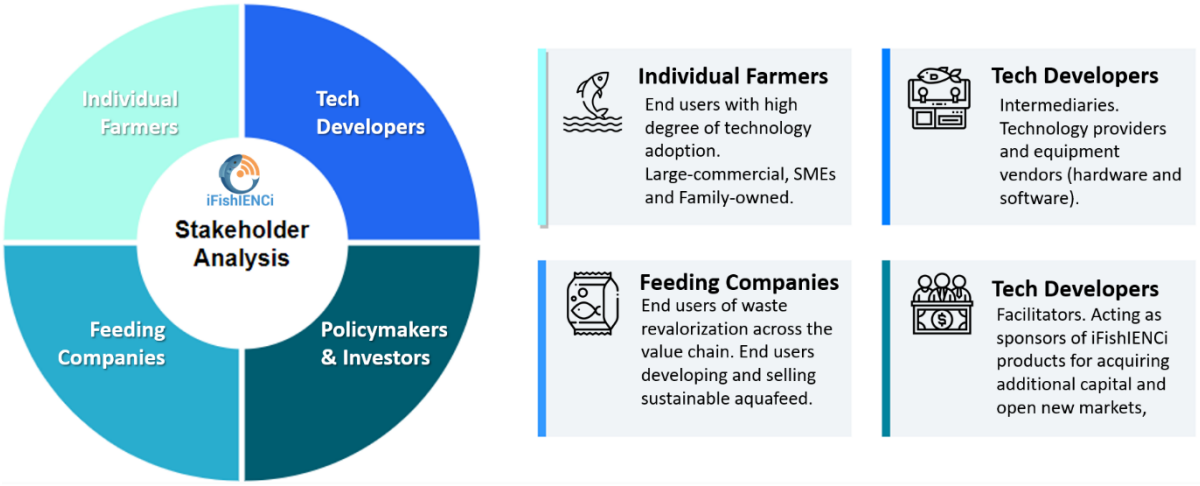


Figure 37. iFishIENCi Stakeholder analysis for exploitation.

The geographical focus for these groups has been identified according to the different product-to-market strategy of each one of the exploitable products within the scope of the iFishIENCi project (Fish-Talk-To-Me, i-BOSS, SMART RAS and Waste2Value).

Task 6.3 prepared a general outline (programme, general presentations, flyers, roll-ups) for each workshop. However, the workshop hosts adapted the content to the specificities of each pilot site (cage, semi-closed, RAS, flow-through) and/or fish species and were in charge of inviting the target stakeholders. WP6 in collaboration with WP3 prepared a common feedback questionnaire to be distributed to the workshop attendees which was also translated if needed to local languages (eg. Greek, Hungarian). The feedback will be used to support market uptake.

4.4.1 Events focused on technology end-user feedback for fine-tuning of technology

Table 10 Schedule of Events focused on technology end-user feedback

HOST	Event/Objective	Programme/activities	Type of event	Target audience
ABT	To acquire end-user feedback on **Fish-talk-to-me" technology**	Brief Participants in Advance Present progress, videos from Demonstration of technologies for Marine, semi-closed, RAS and land based Potential measurements still missing Synthesis and recommendations	Physical + video recording	8-10 participants maximum Fish farmers/scientific community in aquaculture (end-user of iFishIENCi technology) *when recruiting participants, focus on what data are we expecting to get from the workshop*
EGLOBALMARK	To acquire end-user feedback on the Usability of the **tool iBOSS**	Brief Participants in Advance Present progress, videos Feed-back questionnaire, Potential Case study application to test usability Improvements	Virtual	6-10 participants farmers/scientific community in aquaculture

When it comes to usability needs and validation that can be tested with end-users, the tool iBOSS and the Technology "Fish-talk-to-me" was the focus of these workshops. International cooperation on the feedback will be ensured by including non-European countries in the target audience, aligning technologies with crucial aspects of international demands. A preliminary list of potential target countries has been drafted in WP5 according to each key exploitable result. On this context there are three main target country groups identified for a preliminary analysis: 1) Europe, 2) Southeast Asia and 3) North Africa.

4.4.2 Events focused on Demonstration and Training of main iFishIENCi KERs in different systems

4.4.2.1 iFishIENCi Farmer Training Program Successfully Held at the 12th Fishing and Angling Professional Conference in Gödöllő, Hungary

The iFishIENCi project recently participated in the 12th Fishing and Angling Professional Conference, which took place in Gödöllő, Hungary. The event was organized by the Institute of Aquaculture and Environmental Safety (AKI), Hungarian University of Agriculture and Life Sciences (MATE), College of Fishing and Angling, Foundation for the Development of Fish Sciences, and Hungarian National Fishing Association. Hungarian aquaculture farmers in attendance had the opportunity to participate in the iFishIENCi Farmer Training Program, which was a great success.

The comprehensive training program featured presentations and hands-on training by expert partners from various organizations, including Lars Ebbeson (NORCE Norwegian Research Center), Nikos Papandroulakis (Hellenic Center for Marine Research HCMR), Tamás Bardócz (AquaBioTech Group), Balázs Kovács (MATE-AKI), Varju-Katona Milán (Bajcshal), and Márton Orbán (Vitafort).

Key Topics Covered:

- ✓ Examination of feed additives and potential raw materials in the iFishIENCi project and other R&D programs.
- ✓ Innovative developments in cage aquaculture of sea bream and sea bass in Greece.
- ✓ The importance of digitization in Norwegian salmon farming.
- ✓ Opportunities for circular economy in aquaculture based on the results of the iFishIENCi project. African catfish selection breeding program within the iFishIENCi project Results achieved by the iFishIENCi project at BAJCSHAL Kft.

Figure 38. Hungarian aquaculture farmers attending the 12th Fishing and Angling Professional Conference in Gödöllő, Hungary, Organised by the Institute of Aquaculture and Environmental Safety (AKI), Hungarian University of Agriculture and Life Sciences (MATE).

iFishIENCi Farmer Training Program at the 12th Fishing and Angling Professional Conference in Gödöllő, Hungary, was a resounding success. Participants gained valuable insights into various aspects of aquaculture, including feed additives, cage aquaculture, digitization, circular economy, and breeding programs. The event fostered knowledge-sharing and collaboration among professionals in the field, contributing to the development and growth of the aquaculture sector. Further information can be consulted here: https://szakmainap.e-lapozo.hu/lapozhato/

Looking ahead, the iFishIENCi project has continuously shared its expertise and engagement with aquaculture farmers and stakeholders through various events and training programs, promoting innovative and sustainable practices within the industry.

4.4.2.2 iFishIENCi land-based ponds Hungarian Demonstration

The demonstration event in Hungary for breeding and various aspects of aquaculture brought together professionals in the field.

Figure 39. Demonstration event.

4.4.2.3 Technology Fish-Talk-To-Me

The events and trainings were organised alongside the demonstration experiments from WP3 Technology: Fish-Talk-To-Me (4 events)

Table 11 Demonstration of Fish-Talk-To-Me

HOST	Date	Event/Objective	Programme/activities	Target audience
HCMR	03.2023	Demonstration in marine open systems (Cage trials)	Show development of Technology Show benefits Show weak points vs. Advantages Life-Demo-sessions in order to provide opportunity to relevant stakeholders of observing real, running systems	Science, Industry, technology developers
NORCE	04.2023	Demonstration in Semi-closed containment systems and cage systems		
ABT	01/02.2023 05.2023	Demonstration in Recirculation Aquaculture Systems catfish and salmon		
MATE	10.2022	Demonstration in land-based flow-through and pond systems		

It is worth mentioning that much of the technology being developed explores the digital realm of usability. The tool Fish-Talk-To-Me enables continuous monitoring and control of fish behaviour, health, physiology, and welfare, with further integration in online monitoring systems.

4.4.2.4 Online Tool: iBOSS (3 events)

Table 12 Demonstration of IBOSS

HOST	Date	Event/ Objective	Programme/ activities	Target audience
EGLOBAL-MARK	04.2022	Demonstrate the potential of iBOSS tool and its different applications	Presentation of project Presentation of tool Presentation of practical examples Synthesis and recommendations for validation Life-demo and virtual	Fish farming Industry
BIOCEANOR	04.2022			
OXYGUARD	04.2022			

The iBOSS tool will also stimulate digital continuous monitoring of fish behaviour, health and welfare and reduce response times to aberrations in all production systems.

4.4.2.5 Platform: Smart RAS (1 event)

Table 13 Demonstration of Smart RAS

HOST	Date	Event/Objective	Programme/activities	Target audience
ABT	05.2023	experimental bay (Bay0) Training using smart RAS PLATFORM	Project presentation RAS platform structure presentation and types of information the system offers Demonstration of SmartRAS, iBOSS and Fish-talk-to-me Life-demo and virtual	Aquaculture producers in the Mediterranean, aquaculture suppliers, aquaculture students

4.4.2.6 Processing chain: Waste2Value (2 events)

Table 14 Events focused on demonstration of Waste2Value

HOST	Date	Event /Objective	Programme/activities	Target audience
LEITAT	06.2022	Workshop to Disseminate service from Waste2Value for fish farmers Training / Virtual	Dissemination of W2V service for fish farmers	Science and industry

			Thematic discussion on waste valorisation and Circularity	
NORCE	07.2023	Workshop to Disseminate service from Waste2Value for fish farmers Training / Virtual		Science and industry

4.4.2.7 *New Feeds: outreach for clients and customers*

Table 15 Draft outline and schedule of Events focused on clients and customers

Event hosted by	Date	Event/Objective	Programme/activities	Target audience
AAR	12.2022	New feed developments to encourage sustainable solutions Webinar	Salmon- Feed development and solutions	Salmon farmers from Chile (n=8)
AAR	11.2022	New developments in feed development and feeding programmes Life-Demo	Feed developments and improvements, feeding programmes and recommendations for trout and carp	Fish farmers from Serbia (n=40)
AAR	10.2022	New developments in raw materials, feed development and feeding programmes Life-Demo	Feed developments and improvements, feeding programmes and recommendations for trout and carp	Danforel ,Denmark (n=5)
AAR	12.2022	New developments in trout farming Life-Demo	Trout farming: effect of temperature and how feeds and raw materials could improve fish health and performance	Ustka, Poland (n=45)

5 Methods to Increase Awareness about iFishIENCi

The communication and dissemination strategy were made of three phases to approach stakeholders throughout the project.

- Phase 1 included the traditional project communication channels and promotional material, for example, flyers, poster, project website, videos, which include information about the project goals and what is being developed, including feedback from potential technology users prior to the development of the iFishIENCi technologies.
- Phase 2 consisted of dissemination interactions with technical stakeholders regarding the tool, technologies and results already developed for fine-tuning of systems.
- Phase 3 involved demonstration workshops of the integrated technological solutions.

5.1 Increase Awareness about iFishIENCi

The creation of initial awareness and organizing the collection of feedback regarding requirements was achieved via the following Communication channels (website, social media, printed materials, scientific & trade journals). The stakeholders were offered to be informed regularly about project though Newsletters (two per year) and whoever was interested to be invited to iFishIENCi co-creation events to engage in the iFishIENCi project.

Materials used for phase 1 were:

- Standardized promotional material is available (Task 6.2): flyer, project description, project presentations, project website, videos
- Communication strategy (D6.2)
- Press release via specialized trade newspapers & magazines (Task 6.2)
- Website (Task 6.2)
- Public Awareness workshop participation: 3 workshops
- 2 papers for broad audience (T6.2)
- Social media network (Facebook, Twitter, LinkedIn, Instagram (Task 6.2)
- Video (T6.2)

Regarding Potential synergies with other projects, iFishIENCi has sought cooperation with sister projects funded under DT-BG-04-2018-2019 - Sustainable European aquaculture 4.0: nutrition and breeding (AquaIMPACT, FutureEUAqua, NewTechAqua and MicrobiomeSupport). Many synergies between the projects (common partners, common aims, common tools i.e FutureEUAqua Stakeholder platform, MicrobiomeSupport ambassadors) have been used to improve the efficiency of engagement with Stakeholders from aquaculture sector, policy makers and consumers. The projects are not in competition but rather aim to work together towards a sustainable EU aquaculture 4.0.

5.2 Engage Stakeholders from the Aquaculture sector in Technical Interactions

In coordination with WP4, questionnaires were sent to interest groups based in the technology sector. The aim was to obtain their expectations of the IBOSS tool and to align them with the needs of technology users. Technology users in Norway, Germany and Hungary were contacted. Different interest groups have already been identified here. Norway stands out here with its high level of technology and infrastructure in the salmon industry, followed by Germany and Hungary with users in the freshwater industry.

- Questionnaires for technology demanding stakeholders (Task 4.1)
- Conference papers via all partners

- Stakeholder interviews (x10) (Task 4.1)
- Co-creation workshops (x2): specific seminars and hands-on workshops addressing different groups of users, With RRI outreaching approach
- Industry stakeholder workshop (x2)

5.3 Demonstrate iFishIENCi systems to answer needs of the Aquaculture sector

Demonstration events for industries in the aquaculture sector where presentation of prototypes/results at sectorial events consisted of demonstration of pilot systems developed, discussion of lessons learned and engagement in follow-up exploitation stages.

One major element was to present to what extent the input brought by the stakeholders through their engagement (results of RRI outreach) has been considered in the developments.

- Demo industry event (presentation of prototypes/results at sectorial events)
- Final conference: International Concluding Symposium with major European Fish association (federation of Greek maricultures, Aquimer, European Aquaculture Technology and Innovation Platform, or FAO, and DG-Mare)
- Demo and feedback workshops (x3) WP3 and Workshop best practices: cooperation between WP3 and Task6.6 to integrate the best practise and demo into new curricula to be developed in T6.6 – SEE DELIVERABLE 6.10 Public Deliverable
- Aquaculture Industry users' workshop (x3): training courses dedicated to operators of fish-farms, who have decided to implement the iBoss system: cooperation between WP3 and Task6.6

Training courses were be tested within the consortium before being deployed in Europe and beyond.

Further dedicated training courses (x2) on educating the next generation fish farmers and workers in the Blue Economy is completed in Task 6.6 consisting of mapping relevant higher education curricula on aquaculture in Europe and update of academic curricula by proposing additional modules on new technologies and skills required for the future job market (use of innovative and efficient techniques, as propagation of sustainability and forward vision in the long term and to encourage technology transfer)

iFishIENCi cooperated with sister projects funded under DT-BG-04-2018-2019 - Sustainable European aquaculture 4.0: nutrition and breeding (AquaIMPACT, FutureEUAqua, NewTechAqua and MicrobiomeSupport). There are many synergies between the projects (common partners, common aims, common tools i.e FutureEUAqua Stakeholder platform, MicrobiomeSupport ambassadors) that can be used to improve the efficiency of engagement with Stakeholders from aquaculture sector, policy makers and consumers. The projects are not in competition but rather aim to work together towards a sustainable EU aquaculture 4.0. For example, as part of the FutureEUAqua project a free online multi-stakeholder platform is currently being developed where aquaculture experts (industry, policy, academia etc.) will be able to find solutions through access to a wide range of aquaculture experts, share best practice, and develop ideas, skills, and knowledge.

6 International aspects of the engagement

This is a first attempt to explore the potential for foreign dissemination channels that already exist in the iFishIENCi consortium in order to implement worldwide know-how transfer of iFishIENCi results to aquaculture stakeholders outside the EU. The first rule of major dissemination throughout Europe is through Aquaculture Associations, which might have connections to non-European countries. Such organizations can disseminate quick information to their many members and facilitate when choosing a targeted type of stakeholder or end- user.

As it is specified with further detail in D7.3 (Working with Champions), the International Cooperation Champion of iFishIENCi monitors the international scope of the stakeholder engagement process to ensure this impact is addressed and maximised as much as possible.

Highlights of connections with iFishIENCi partners and other associations and networks across the world during the project are as follows:

6.1 Malaysia

At the 9th International Fisheries Symposium in Aquaculture Systems and Management held in Kuala Lumpur, Malaysia, Tamás Bardócz from the AquaBioTech Group presented the iFishIENCi project to an international audience. Organized by Universiti Putra Malaysia and held during the ASEAN Fisheries Education Network (ASEAN-FEN), the event facilitated valuable discussions and raised the possibility of cooperation with similar projects in the South-East Asia region. By showcasing the iFishIENCi project at this prominent event, the team successfully engaged stakeholders and explored potential collaborations, expanding the project's reach and impact.

Figure 40. International Fisheries Symposium in Aquaculture Systems and Management, Kuala Lumpur.

6.2 United Arab Emirates

iFishIENCi partner AquaBioTech Group participated in AgraME 2020 at the Dubai World Trade Centre in UAE, showcasing the iFishIENCi project to attendees at stand number Z5.H20. As an annual exhibition focused on sustainable farming and food security, AgraME provides a valuable platform for networking and knowledge sharing among professionals seeking innovative solutions and products. By attending this event, the iFishIENCi project was able to connect with a targeted audience and promote their efforts in developing sustainable aquaculture solutions.

Figure 41. Agra ME 2020.

6.3 Laotian-Vietnamese-Hungarian Forum, 14-15th of November 2022, Vientiane

The iFishIENCi project team was honored to be invited to present at the Laotian-Vietnamese-Hungarian Forum in Vientiane. János Szakáli from Vitafort showcased our project's accomplishments and findings at this prestigious event, which was attended by prominent figures in the aquaculture industry. Among them were the Deputy Director of the Department of Livestock and Fisheries of the Laotian Agricultural Ministry and the Vice Dean at the Faculty of Fisheries, Head of the Department of Aquatic Environment and Fish Diseases, at the Vietnam National University of Agriculture.

We were excited about the opportunity to demonstrate the current progress of the iFishIENCi project in Laos and expand our influence on an international level, especially within the burgeoning aquaculture markets of Laos and Vietnam. Our presentation emphasized our innovative contributions to sustainable aquaculture and our dedication to tackling global challenges, such as climate change, resource consumption, and evolving consumer demands.

Figure 42. Laotian-Vietnamese-Hungarian-Forum.

Fellow participants at the forum delivered topical presentations on fish value chain development, sustainable fish feed production using alternative protein sources, and tilapia disease prevention strategies. These talks contributed to the wealth of knowledge and insights exchanged at the event.

As one of the world's fastest-growing food production sectors, aquaculture requires collaborative efforts between Europe and Asia to address global challenges and achieve sustainable growth. The Laotian-Vietnamese-Hungarian Forum facilitated inter-regional collaboration and knowledge-sharing, offering potential benefits to all participating countries and regions. We remain steadfast in our commitment to engaging stakeholders and advancing sustainable aquaculture development through cooperative and knowledge-sharing initiatives.

6.4 iFishIENCi at World Aquaculture Singapore 2022: Global Engagement & Sustainable Innovation

In 2022, our consortium held a series of diverse meetings to formulate an international strategy for stakeholder engagement, aimed at promoting and implementing the groundbreaking iFishIENCi technologies. After careful deliberation, the World Aquaculture Singapore 2022 event was chosen as a strategic platform to assess the potential for implementing our innovative solutions in the industry.

World Aquaculture Singapore 2022 was an international event that brought together participants from countries across the Asian-Pacific region and around the world. Aquaculture has been rapidly growing in the Asian-Pacific region and is increasingly being integrated into Singapore's food systems. As such, 2022 was the perfect time for the global aquaculture community to focus on Singapore.

Figure 43. World Aquaculture Singapore, 2022.

Figure 44. Trade Show, World Aquaculture Singapore.

During the event, our consortium organized various activities to facilitate meaningful connections with stakeholders and promote our cutting-edge technologies. One of the highlights was our Trade Show Booth at the major international trade show, where partners OxyGuard and AquaBioTech Group collaborated to showcase our iFishIENCi solutions. This booth provided an opportunity for our team to engage with stakeholders in person, demonstrate the practical applications of our technology, and discuss potential collaborations.

Figure 45. Session on Recirculating Aquaculture Systems, World Aquaculture Singapore.

The trade show at World Aquaculture Singapore 2022 was the ideal venue for learning about the latest aquaculture technologies presented by exhibitors from around the world. In addition to the Trade Show Booth, our consortium held two informative presentations, each focusing on different aspects of iFishIENCi technologies. The first presentation outlined the underlying principles and overall objectives of our project, while the second delved into specific case studies and the real-world benefits of implementing our solutions in the aquaculture industry. These presentations were well-received by attendees, sparking fruitful discussions and fostering a deeper understanding of the advantages of iFishIENCi technologies. Moreover, they showcased our commitment to developing sustainable and innovative solutions for the global aquaculture sector.

The World Aquaculture Singapore 2022 event proved to be an excellent opportunity for our consortium to engage with international stakeholders and assess the potential for the widespread adoption of iFishIENCi technologies. We remain dedicated to fostering global collaboration and driving the adoption of sustainable practices in the aquaculture industry.

6.5 International Final Event

This task aims to implement a worldwide technology know-how transfer of the innovative developments from iFishIENCi. The project results were presented and discussed in an International Concluding Event hosted at NCE Seafood Innovation Cluster, Bergen, Norway. This event was designed in a way to showcase the primary results to the industry and policy stakeholders in a storytelling showcase format, coupled with in depth workshops on the technology (iBOSS), policy (Circualrity, regulation, EU taxonomy and Green Deal impacts) and Waste2Value innovations, in close relationship with these stakeholders at European level the promotion of sustainable development of Aquaculture resources.

The iFishIENCi Aquaculture 4.0 Event was held at the NCE Seafood Innovation Cluster in Bergen.

Main events of the event:

- IBOSS and FishTalkToMe digitalisation solutions in open cages and RAS
- technical workshop on waste and circularity
- technical workshop on IBOSS
- Policy round table: aquaculture 4.0 taxonomy and the Green Deal

A dedicated event page on the website was set up to promote the event, and later, to share video recordings and presentation documents from the day to promote their further reuse.

https://ifishienci.eu/final-event/

Figure 46. Final Symposium Bergen, 2023.

6.6 Empowering Sustainable Aquaculture through Diverse Stakeholder Engagement

Through our dynamic stakeholder engagement strategy, we have successfully established direct connections with key players in the aquaculture industry, sparking excitement and fostering collaboration. By incorporating remote participation options for online programs and presentations, we have significantly expanded our reach and granted virtual access to essential events. This approach enables stakeholders from around the world to actively engage with our project, exchange valuable insights, and stay abreast of the latest advancements in sustainable aquaculture.

Our efforts have yielded remarkable results, as numerous stakeholders have expressed keen interest and registered for our events. We are delighted to have directly engaged with and informed a diverse range of stakeholders, including:

- Executives from leading aquaculture companies
- Fisheries associations and cooperatives
- National and international government agencies
- Renowned academic institutions and researchers
- NGOs and environmental organizations

- Pioneers and practitioners in sustainable aquaculture

We are convinced that fostering these direct connections with stakeholders (Annex 1.) is vital for championing sustainable aquaculture practices and propelling our project's objectives forward. As we continue to engage with stakeholders, we remain committed to pursuing new avenues for collaboration and knowledge-sharing, further solidifying our position as a leader in sustainable aquaculture innovation.

7 Conclusion

Our stakeholder engagement strategy has not only fostered connections on a regional scale but has also achieved remarkable success on both European and international levels. By offering participation in workshops, trainings, and various other educational events, we have managed to involve a diverse array of stakeholders from across the globe, strengthening our network and promoting sustainable aquaculture practices worldwide.

These workshops and training sessions have covered essential topics such as innovative aquaculture technologies, environmentally-friendly practices, and regulatory compliance, which have been instrumental in empowering stakeholders to make informed decisions and adopt sustainable approaches in their operations. By providing access to such resources, we have also facilitated the exchange of knowledge and expertise between European and international stakeholders, enabling the aquaculture community to learn from one another's successes and challenges.

Moreover, our strategy has led to the establishment of valuable partnerships and collaborations among stakeholders, further driving the adoption of sustainable aquaculture practices and innovations. These partnerships have resulted in joint research initiatives, knowledge-sharing platforms, and even the development of new products and technologies that address pressing challenges in the industry.

Our stakeholder engagement strategy has also generated interest from various media outlets and industry publications, amplifying our reach and impact on the global aquaculture community. By leveraging these channels, we have been able to share our project's achievements and inspire others to embrace sustainable practices and innovative solutions.

In summary, our stakeholder engagement strategy has achieved tremendous success on both European and international levels by offering participation in workshops, trainings, and other educational events. These efforts have fostered collaboration, promoted knowledge-sharing, and encouraged the adoption of sustainable practices across the global aquaculture industry. As we continue to expand our reach, we remain dedicated to empowering stakeholders and driving positive change in the aquaculture sector worldwide.

7.1 Strategies for overcoming the barriers to market adoption and market penetration

Objectives of the project were to prove the economic viability of the iFishIENCi products and to contribute with them to a more sustainable and circular approach. iFishIENCi involved all the aquaculture value chain actors in the field and has tried to capture the diversity of the various aquaculture systems. And additionally minimizing and avoiding potential risks at the point of market entry. Therefore, a market strategy was developed (D5.6).

Table 16. Product applications and market adoption

iFishIENCi product:	**Application in:**	**Market:**
i-BOSS	Smart feeding systems Monitoring fish behaviour	Feeding management services, farmers, feeding companies, tech developers, investors
Smart RAS	Used in feed farming systems; two version: experimental and commercial Smart RAS	Experimental Smart RAS: research, feed producers

		Commercial Smart-RAS: fish-specific: e.g. salmon, barramundi, trout, turbot
Fish-Talk-to-Me	Cloud-based service; together with IBOSS monitoring system (echo, camera, tagging, feeding)	Feeding management services, farmers, feeding companies, tech developers, investors
Waste2 Value	Knowhow for aquaculture industry -> Publications (WP1)	Aquaculture feed producers, feed producers

With the iFishIENCi-products developed, aquaculture high-tech solutions are available to the market, to improve the monitoring on fish behaviour and boost fish welfare, and the opportunity to bring new sustainable and valorised products. Therefore, iFishIENCi products were of relevance for on the one hand a market with high technology adoption and awareness (high degree of technology maturity, Europe) and on the other hand for a market with the need of improving feeding conditions, fish welfare, excess of food supply and regulatory friendly (market with a high degree of innovation potential, international). An analysis of the key markets and the product-market fit for the European and international market is done in D5.6.

The products serve as intermediaries for aquaculture companies to enable the transition to a more digitalized and circular economy. For individual farmers, technology developers, feeding companies and investors and policy makers different business models apply. For individual farmers (SMEs) arrangements with buyers or contracts with larger agribusiness companies can help to increase their success and to increase the possibility to become users of the new aquaculture technologies. Strategic partnerships can not only mean a reduction in risk, but can also lead to an improvement in image, in which the trust of the end user, i.e. the retail- consumer, has a positive effect on the product fish. For farmers and technology developers not only strategic partnerships but also leasing arrangements can help to overcome financial barriers and to adopt and integrate new technologies to their production sites. Partnership between feeding companies, producers and technology providers can be a win-win strategy, not only by reducing risk of integration new technology but also by generation trust in the end customer. Investors and policy makers have a responsibility to improve quality standards, promote innovation and foster the industry's resilience. However, the conditions for easy integration of new technologies and pathways must not only be created at national level, but also at EU level.

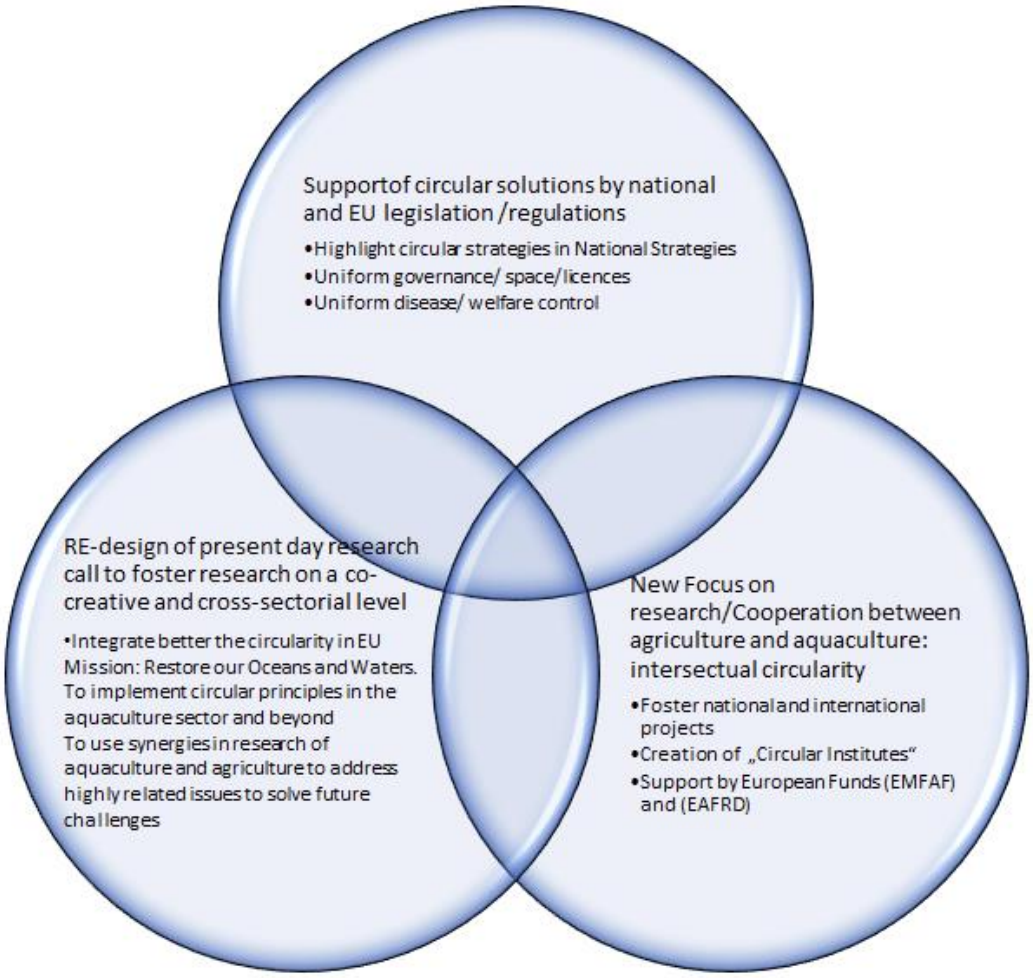
7.2 Strategies for adapting new technologies

Space and licences for aquaculture should be simplified. The setting up for new aquaculture operations, which intend to use circular technologies must be simplified. Countries should encourage new operations with circular technologies in national strategies. It is necessary to unify governance and disease and welfare control. Further research and development should be put in innovation which link aquaculture and agriculture (valorisation of waste, kelp farming to mitigate methane production).

Comprehensive industry cooperation should be pushed, here fore, structures that need to be put in the right place are both of governance as well as financial character (-> next round of calls). Early-stage industry processes need support through clusters and governmental/industrial funding schemes. One idea is the creation of “Circular institutes" which connect the blue and green industry, working in close cooperation with research institutes, the industry and governmental bodies.

Further, future funding schemes should be more targeted. Research topics could be bunched together, e.g. kelp and blue mussel research, research on new locations with societal impact and resilience of the ecosystem and society.

The search for new feed materials is essential to increase sustainability and to enable future growth of this sector. Agriculture and aquaculture must explore its potential to make use of material from both sectors.



Digital transformation will be the core in future management systems, simple implementations and solutions must be found that can be individually adapted but also used cross-sectionally and are affordable not only for global players but also for smaller companies.

7.3 Strategies for implementing an effective circular economy -waste management namely reuse, recycle or valorisation

Recommendations on how a sustainable circular economy can be implemented in EU aquaculture focus on four key points. First, the basic definition of circular economy in aquaculture. Then the identification of methods and metrics to measure the circular economy. Increasing circularity in all areas of production such as feed and waste processing. And finally, linking different production sectors in order to promote a sustainable and circular economy.

As mentioned in the policy recommendation for a more circular aquaculture, 53 of the 169 goals of the UN SGDs are relevant for Recirculating Aquaculture Systems. But sustainability in aquaculture is

Figure 47. Strategies to booster new technologies.

implemented very differently by the various players and different concepts for sustainable management exist. The challenge in the near future will be to determine knowledge-based indicators to measure sustainable management with the help of new technologies. Especially in the area of waste management, the circular economy is approached very differently, with aspects such as reuse, recycling and valorisation. Here too, parameters are required that can clearly define and measure sustainability in relation to the system's own requirements, but also in relation to environmental impacts.

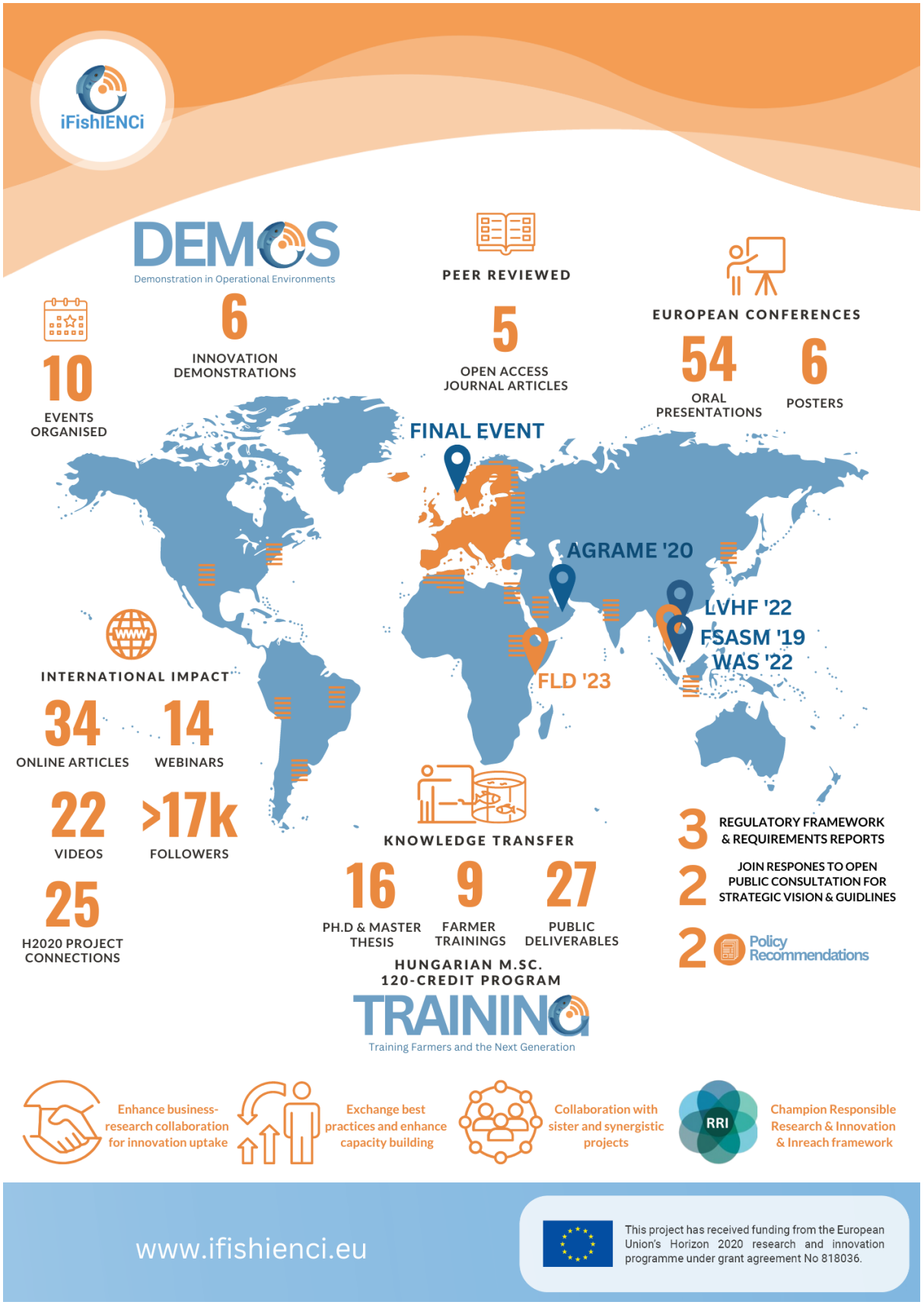


Figure 48. Engagement in number

8 Effectiveness of stakeholder engagement

As part of iFishIENCi, we have involved numerous institutions in our research work and successfully presented it to relevant stakeholders. As part of the iFishIENCi project, we have seen a huge increase in demand for sustainable technological solutions for the aquaculture sector. As the market demands sustainably produced products, more and more companies are investing in products that make the use of raw materials and energy more sustainable and in the circular economy. We see that companies from different sectors, aquaculture and agriculture, are looking for joint solutions to utilize residual materials efficiently and profitably. Through our workshops and seminars, but also at conferences, we have seen that cooperation between different disciplines opens up the way for us to think on a larger scale and offers us the opportunity to look at problems from different perspectives. We believe it is essential to continue expanding networks in order to promote this exchange in particular. Targeted funding programs would support the ambitious goals of this sector.

The great interest shown by the stakeholders involved, from fish farmers and feed producers to technology providers, in our products and in exchanging ideas with each other, has shown us that this market needs new tools and economic channels, but that these must be linked to clear guidelines from the national authorities and the EU and must also be financial incentives and not financial hurdles.

In Figure 48 the engagement in numbers is shown.

Annex 1.

Aquaculture stakeholders directly contacted and informed about iFishIENCi through events, online discussions and personal meetings

A.I.A. AGRICOLA ITALIANA ALIMENTARE S.P.A.	Italy	Industrial users
AC3A (French agricultural technical centre)	France	Agricultural technical centre
ACONDICIONAMIENTO TARRASENSE ASSOCIACION	Spain	Aquaculture businesses and research organizations (producers and developers)
ACRI-HE	France	Aquaculture businesses and research organizations (producers and developers)
Acuinova	Portugal	Aquaculture company
ADMINI TECH	Greece	IT solutions provider
AEres - Dutch Centre for One Health	Netherlands	Research institution focused on One Health
Agencia Estatal Consejo Superior de Investigaciones Cientificas	Spain	Aquaculture businesses and research organizations (producers and developers)
AGRIFOOD AND BIOSCIENCES INSTITUTE	United Kingdom	Aquaculture businesses and research organizations (producers and developers)
AIR Centre	Portugal	European R&D organizations
AkvaReforma	Norway	Operators
AkvaReforma	Norway	Company offering R&D and innovation services for aquaculture
Alfalaval	Sweden	Company offering products and services for various industries, including aquaculture
ALFATECH	Greece	Company offering R&D and innovation services
Alfred Wegener Institute for Polar and Marine Research,	Germany	Fish biology (research and industry)
ALFRED-WEGENER-INSTITUT HELMHOLTZ-ZENTRUM FUR POLAR- UND MEERESFORSCHUNG	Germany	Fish biology (research and industry)
Alieia	Greece	Company offering products and services for aquaculture
Aligma	Slovenia	Company offering AI solutions for fish farming
ALINTEL SRL	Italy	SME
ALLER AQUA GROUP AS	Denmark	Feed developers and suppliers
ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA	Italy	Fish biology (research and industry)
ALMAPLASMA SRL	Italy	SME
Aqua World	Greece	Company offering products and services for aquaculture
aquabt	Greece	Company offering products and services for aquaculture
Aquabt	Norway	Operators
Aquabt	Norway	Operators
AQUAEAS	Belgium	Feed developers and suppliers
Aquafeed	Belgium	Company offering information and consultancy services for aquafeed
AQUALITA	Greece	Company offering R&D and innovation services for aquaculture
AQUANETIX LIMITED	United Kingdom	SME
Aquaproducts	Greece	Company offering products and services for fish farming
Aquarius Lawyers	Australia	Law firm specializing in marine and fisheries law

AQUICULTURA BALEAR SA	Spain	Fish farmers
ARGANS LIMITED	United Kingdom	SME
Aristotle University of Thessaloniki	Greece	Research university in Thessaloniki
arxada	Greece	Company offering products and services for aquaculture
ASOCIACION NACIONAL DE FABRICANTES DE CONSERVAS DE PESCADOS Y MARISCOS-CENTRO TECNICO NACIONAL DE CONSERVACION DE PRODUCTOS DE LA PESCA	Spain	ONG
Atlantic International Research Centre	Portugal	Research
Austral Center for Scientific Research	Chile	Fish biology (research and industry)
AVRAMAR AQUACULTURE SOCIETE ANONYME	Greece	Fish farmers
AZTI - Tecnalia	Spain	Research and technological center focused on marine and food research
Batangas State University	Philippines	University in Batangas
Benchmark Genetics Norway AS	Norway	Breeders
BFZR	Germany	Federal research institute focused on animal health and food safety
BIM - Bord Iascaigh Mhara (Irish Sea Fisheries Board)	Ireland	Seafood development agency
Bio Key Technologies Co	China	Company specializing in biometric technology
BIOceanOR - Ocean Research	France	Company offering R&D and innovation services for marine science
Biomar	Denmark	Feed developers and suppliers
BIR - Norwegian Institute of Bioeconomy Research	Norway	Research institution focused on bioeconomy
Bord Iascaigh Mhara (Irish Sea Fisheries Board)	Ireland	Aquaculture businesses and research organizations (producers and developers)
BSP Group, Malaysia	Malaysia	Industrial users
CAMLI YEM BESICILIK SANAYI VE TICARET ANONIM SIRKETI	Turkey	Feed developers and suppliers
CAMPDEN BRI MAGYARORSZAG NONPROFITKFT	Hungary	Aquaculture businesses and research organizations (producers and developers)
CASALI ROBERTO	Italy	SME
Center for Research and Technology Hellas	Greece	Aquaculture businesses and research organizations (producers and developers)
CENTRE INTERNATIONAL DE HAUTES ETUDES AGRONOMIQUES MEDITERRANEENNES	France	ONG
CENTRO INTERNAZIONALE DI ALTISTUDI AGRONOMICI MEDITERRANEI	Italy	Research
CETMAR - Centro Tecnológico del Mar	Spain	Marine technology center
CHAROKOPEIO PANEPISTIMIO	Greece	Research
CIBNOR	Mexico	Fish biology (research and industry)
CIBO E SALUTE SRL	Italy	SME
Circle Economy	Netherlands	NGO focused on circular economy
Climate-KIC	Belgium	EU initiative focused on climate innovation
COISPA TECNOLOGIA & RICERCA SCARL	Italy	Aquaculture businesses and research organizations (producers and developers)
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Australia	Aquaculture businesses and research organizations (producers and developers)
CONSIGLIO NAZIONALE DELLE RICERCHE	Italy	Research
Council for Scientific and Industrial Research South Africa	South Africa	Aquaculture businesses and research organizations (producers and developers)

CROMARIS DIONICKO DRUSTVO ZA MARIKULTURU	Croatia	Fish farmers
Crowdhelix	Ireland	SME
CSIC Institute of Marine Sciences	Spain	Research institution focused on marine science
CULMAREX SA	Spain	Fish farmers
Cyprus Marine and Maritime Institute	Cyprus	Aquaculture businesses and research organizations (producers and developers)
DALHOUSIE UNIVERSITY	Canada	Fish biology (research and industry)
DANISH SALMON AS	Denmark	Operators
DANMARKS TEKNISKE UNIVERSITET	Denmark	Research
DOKUZ EYLUL UNIVERSITESI	Turkey	Aquaculture businesses and research organizations (producers and developers)
Dorset Council	United Kingdom	Local government council in Dorset
Dorset Identification B.V.	Netherlands	Technology suppliers
Dr. Tim's Aquatics	United States	Company offering products and services for aquariums
EASY GLOBAL MARKET SAS	France	SME
ECO ARK	Taiwan	Company specializing in sustainable aquaculture
ento industries	Australia	Company offering insect-based products for aquaculture
Erin	Ireland	Company offering R&D and innovation services for aquaculture
Eruvaka	India	Technology suppliers
ESTBarreiro - Instituto Politécnico de Setúbal, Portugal	Portugal	Polytechnic Institute offering degrees in aquaculture
European Aquaculture Society	Belgium	ONG
European Aquaculture Technology and Innovation Platform (EATiP)	Belgium	ONG
European Bureau for Conservation and Development	Belgium	NGO focused on conservation and development
European Commission	Belgium	EU governing body
Eva Agriculture Co.	Greece	Company offering products and services for agriculture
Faculty of Fisheries and Marine Science, Universitas Airlangga	Indonesia	Aquaculture businesses and research organizations (producers and developers)
FEAP	Europe	NGOs
FEAP	Spain	Federation of European Aquaculture Producers
FEDERATION EUROPEENNE DES PRODUCTEURS AQUACOLES ASSOCIATION	Belgium	ONG
FEED FUTURE	Denmark	Company offering sustainable feed for aquaculture
Ferme Marine du Douhet SAS, FMD	France	Fish farmers
FischInfo e.V.	Germany	Information center for fish and seafood
Fisheries Development Oman	Oman	Government agency responsible for fisheries
FONDAZIONE EDMUND MACH	Italy	Research
Forever Oceans	United States	Aquaculture company focused on sustainable seafood
FORTE BIOTECH	Greece	Company offering R&D and innovation services for biotechnology
Fraunhofer IMTE	Germany	Technology suppliers
Fraunhofer Institute for Marine Biotechnology and Cell Technology	Germany	Research

Fraunhofer Institute for Microstructure of Materials and Systems	Germany	Research
FUNDACION EMPRESA UNIVERSIDAD GALLEGA	Spain	Aquaculture businesses and research organizations (producers and developers)
Galaxidi Marine Farm	Greece	Fish farmers
GALAXIDI MARINE FARM AE	Greece	Fish farmers
GEOPONIKO PANEPISTIMION ATHINON	Greece	Research
Ghent University	Belgium	Research university
GILDESKAL FORSKNINGSSTASJON AS	Norway	Aquaculture businesses and research organizations (producers and developers)
GREENOVATE ! EUROPE	Belgium	ONG
Grobest Aquatic	Taiwan	Aquaculture company
HATCH	Norway	Accelerator program for aquaculture startups
Hi-En Technology	Taiwan	Technology suppliers
HIGASHIMARU CO,. LTD	Japan	Fisheries company
Hungarian Ministry of Agriculture and Rural Development	Hungary	Government ministry responsible for agriculture and rural development
Hungarosalmon	Hungary	Aquaculture company
HUVEPHARMA	Belgium	Company offering animal health solutions
IBM IRELAND LIMITED	Ireland	Company
ICHTHYOKALLIERGEIES ARGOSARONIKOU ANONYMI ETAIRIA	Greece	Fish farmers
ICLOUD	Germany	Technology suppliers
ICSE-M	Spain	Aquaculture businesses and research organizations (producers and developers)
IFAU APS	Denmark	Aquaculture businesses and research organizations (producers and developers)
IIT Delhi - Indian Institute of Technology Delhi	India	Research university
IL VIGNETO SOCIETA AGRICOLA A RESPONSABILITA LIMITATA	Italy	Producer of agricultural products
IMEC - Interuniversity MicroElectronics Center	Belgium	Research institution focused on nanoelectronics
Innovafeed	France	Company offering insect-based products for animal feed
INSTITUT DE RECERCA I TECNOLOGIA AGROALIMENTARIES	Spain	Research institution focused on agrofood technologies
Institut Français de Recherche pour l'Exploitation de la Mer, Ifremer	France	Research institution dedicated to studying marine resources and ecosystems
INSTITUT FRANCAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER	France	Research institution dedicated to studying marine resources and ecosystems
Institute for Fisheries Research and Development	Vietnam	Aquaculture businesses and research organizations (producers and developers)
Institute of Food and Agriculture - University of Tartu	Estonia	Research institution focused on agriculture and food
Institute of Research and Technology of the Sea	Portugal	Research institution focused on marine science and technology
INSTYTUT OCEANOLOGII POLSKIEJ AKADEMII NAUK	Poland	Research institution focused on oceanography and marine biology
INTERNATIONAL FEDERATION OF ORGANIC AGRICULTURE MOVEMENTS EUROPEAN UNION REGIONAL GROUP	Belgium	Advocacy group promoting organic agriculture in the European Union

International Platform for Sustainable Fish Production	Netherlands	NGO focused on sustainable fish production
INVE Technologies NV		Company specializing in aquaculture technology and nutrition
INVESTORNET-GATE2GROWTH APS	Denmark	Business network for investors and startups
IPS-Konzalting	Croatia	Consulting firm specializing in fisheries and aquaculture
IRIDA AE-PRODUCTS FOR ANIMAL PRODUCTION-SERVICES	Greece	Company offering products and services for animal production
Irish Sea Fisheries Board	Ireland	Seafood development agency
Istambul University	Turkey	Research university in Istanbul
ISTITUTO ZOOPROFILATTICO SPERIMENTALE DELLE VENEZIE	Italy	Research institution focused on animal health and food safety
IUAV University of Venice	Italy	University in Venice focused on architecture
James Cook University	Australia	Aquaculture businesses and research organizations (producers and developers)
James Cook University	Australia	Research university in Queensland
JOHANN HEINRICH VON THUENEN-INSTITUT, BUNDESFORSCHUNGSINSTITUT FUER LAENDLICHE RAEUME, WALD UND FISCHEREI	Germany	Federal research institute focused on rural areas, forestry, and fisheries
Jordbruksverket	Sweden	Government agency responsible for agriculture and rural development
KEFALONIA FISHERIES INDUSTRIAL AND COMMERCIAL COMPANY AE	Greece	Fisheries company
LEBECHE SPAIN SL	Spain	Provider of consultancy services for the seafood industry
Leitat Technological Center	Spain	Technology suppliers
Leitat Technological Center	Spain	Technology center focusing on innovation and R&D
Les Sources de l'Avance	France	Company specializing in marine ingredients for animal feed
LONGLINE ENVIRONMENT LIMITED	United Kingdom	Company offering sustainable fishing solutions
Lucta	Spain	Industrial users
M&O Partners	Spain	Consultancy firm specializing in the seafood industry
MarinBio	United States	Biotechnology company focused on marine products
Marine Collagen	United Kingdom	Company offering collagen products for various industries, including aquaculture
Marine Conservation Society	United Kingdom	Charity focused on protecting marine life and habitats
MARINE FEED SWEDEN AB	Sweden	Company developing sustainable feed for aquaculture
Marine Institute	Ireland	Marine research institute
Marine Institute	Ireland	Marine research institute
MARINE INSTITUTE (Ireland)	Ireland	Marine research institute
Mediterranean Agronomic Institute of Zaragoza / International Centre for Advanced Mediterranean Agronomic Studies	Spain	Research and training center focused on agriculture and rural development
Mekasense	Norway	Company offering water quality monitoring solutions
Ministry of Agriculture, Rural Development and Environment	Cyprus	Policy Maker
MINISTRY OF AGRICULTURE, RURAL DEVELOPMENT AND ENVIRONMENT OF CYPRUS	Cyprus	Government agency responsible for agriculture, rural development, and the environment

MINNOWTECH	United States	Technology company focused on improving fish handling and processing
MOWI ASA (former Marine Harvest Norway ASA)	Norway	Aquaculture company
MOWI GENETICS AS	Norway	Company specializing in salmon genetics and breeding
NACE Aquaculture	Norway	Operators
NACEE	Greece	Business network for the clean energy sector
NAGASE	Japan	Trading company offering products and services for the food industry
NaSSO	Norway	Association of Norwegian seafood companies
National Association of Young Scientists	Poland	Association for young scientists and researchers
National Observatory of Athens	Greece	Research institution focused on earth sciences and astronomy
National Research Institute for Agriculture, Food and Environment, INRAE	France	Research institution focused on agriculture, food, and the environment
NETAS TELEKOMUNIKASYON ANONIM SIRKETI	Turkey	Telecommunications company
NETCOMPANY-INTRASOFT SA	Greece	IT solutions provider
NIBR - The Norwegian Institute of Bioeconomy Research	Norway	Research institution focused on bioeconomy
Nippon Koi Farm PTE LTD	Singapore	Koi breeding company
NIVA - Norwegian Institute for Water Research	Norway	Research institution focused on water research
NMBU - Norwegian University of Life Sciences	Norway	Research university focused on life sciences
NOFIMA AS	Norway	Food research institute
NORCE Norwegian Research Centre	Norway	Aquaculture businesses and research organizations (producers and developers)
Nord AS	Norway	Company offering products and services for aquaculture
Nord University	Norway	Aquaculture businesses and research organizations (producers and developers)
Nord University	Norway	Research university in the northern region
Nordic Aquaculture Consult ApS	Denmark	Consulting firm specializing in aquaculture
Norges Mollene - Norway's Shellfish	Norway	Shellfish production company
North Sea Farmers	Netherlands	Aquaculture end-users
Nova Scotia Aquaculture Alliance	Canada	Communities and associations
Nova Scotia Department of Fisheries and Aquaculture	Canada	Government agency responsible for fisheries and aquaculture in Nova Scotia
OASIS - The Company ONE	Greece	Company offering R&D and innovation services
Ocean Nutrition / Ocean Aquaculture	Canada	Company offering products and services for aquaculture
Olaisen Blue	Norway	Aquaculture company
OSLAND STAMFISK AS	Norway	Salmon breeding company
Oxyguard International	Denmark	Technology suppliers
OxyGuard International A/S	Denmark	Company specializing in water quality monitoring
PANEPISTIMIO DYTIKIS ATTIKIS	Greece	University in the Athens area
PANEPISTIMIO THESSALIAS	Greece	University in the Thessaly region
Philosofish	Greece	Company offering products and services for aquaculture

Philosofish	United States	Fish farmers
Plast Solutions ApS	Denmark	Company offering solutions for plastic waste
Pôle Aquimer	France	Aquaculture businesses and research organizations (producers and developers)
Pôle Mer Bretagne Atlantique	France	Marine innovation and business cluster
Polemer-ba	Belgium	Company offering R&D and innovation services for the food industry
ProBio Nutrition	Greece	Company offering products and services for animal nutrition
PROQUIMSA	Spain	Company offering products and services for aquaculture
PS - Instituto Politécnico de Setúbal	Portugal	Polytechnic institute offering degrees in aquaculture
RARA AVIS BIOTEC SL	Spain	Company specializing in biotechnology for aquaculture
Recirkfisk	Norway	Company offering recirculating aquaculture systems
RIMFROST	Norway	Company offering krill products for human consumption
River Stone Aquaculture	United States	Aquaculture company focused on sustainable seafood
Sagremarisco-Viveiros de Marisco Lda	Portugal	Shellfish production and processing company
Salem Microbes	United States	Biotechnology company focused on agriculture
SALMAR FARMING AS	Norway	Aquaculture company
SALTEN HAVBRUKSPARK AS	Norway	Aquaculture company
SAMS	United Kingdom	Marine research institute
Savon Taimen Oy	Finland	Fish farming company
SCF Aquatech	Norway	Company offering products and services for aquaculture
Scottish Association for Marine Science	United Kingdom	Marine research institute
Seaentia	Spain	Company offering products and services for aquaculture
Seafood Innovation Cluster	Norway	Network for seafood industry innovation
SEOKA	South Korea	Fisheries company
SGS	Switzerland	Testing, inspection, and certification company
SHINTAIHO	Japan	Company offering aquatic products for human consumption
Shrimp Vision, Norway	Norway	Company developing technology for shrimp farming
SHRIMPL	United States	Shrimp breeding company
SIMONA	Germany	Manufacturer of thermoplastic products
SINGAZ GLOBAL	South Korea	Trading company offering seafood products
SINTEF	Norway	Research institution focused on various scientific disciplines
SINTEF Fisheries and Aquaculture	Norway	Research institution focused on fisheries and aquaculture
SIR-ScanMAT CNRS	France	Research institute focused on materials science
Skretting Aquaculture Research Centre AS	Norway	Aquaculture research institution
SOUTH CHINA SEA FISHERIES RESEARCH INSTITUTE, CHINESE ACADEMY OF FISHERIES SCIENCES	China	Research institution focused on marine fisheries

Spanish National Research Council (CSIC)	Spain	Research institution focused on various scientific disciplines
SPAROS Lda	Portugal	Company offering R&D and innovation services for aquaculture
Stavanger Kommune	Norway	Local government council in Stavanger
Steen-Hansen AS	Norway	Company offering products and services for aquaculture
STICHTING DELTARES	Netherlands	Independent institute for applied research in the field of water and subsurface
STICHTING NOORDZEEBOERDERIJ	Netherlands	Organization promoting seaweed cultivation in the North Sea
Stichting Wageningen Research	Netherlands	Research institution focused on agrofood and the environment
Stora Enso	Sweden	Company offering packaging solutions for various industries, including aquaculture
Sustainable Innovations	United States	Deep tech suppliers
Svensk Fiskodling	Sweden	Fish farmers
SVERIGES LANTBRUKSUNIVERSITET	Sweden	Agricultural university
SWAN Products, LLC	United States	Company offering products for aquaculture water treatment
Swedish Board of Agriculture	Sweden	Government agency responsible for agriculture
Swee Chioh Fishery Pte Ltd	Singapore	Fisheries company
Syndel	Canada	Company offering products and services for aquaculture
SYNDICAT DES SELECTIONNEURS AVICOLES ET AQUACOLES FRANCAIS	France	Association of French poultry and aquaculture breeders
Syndicat des Sélectionneurs Avicoles et Aquacoles Français SYSAAF	France	Association of French poultry and aquaculture breeders
TAGLIAPIETRA E FIGLI SRL	Italy	Company offering products and services for aquaculture
Tanta University - Egypt	Egypt	University in Tanta
Tanta University - Faculty of Science	Egypt	Faculty of science at Tanta University
TEMASEK	Singapore	Investment company
TEQUISA	Mexico	Company offering seafood products
The Andersons	United States	Company offering agricultural products and services
The Company ONE	Greece	Company offering R&D and innovation services
THE OPEN UNIVERSITY	United Kingdom	Distance learning university
The Product Makers	Singapore	Company offering product development services
The Scottish Association for Marine Science	United Kingdom	Marine research institute
THE SCOTTISH ASSOCIATION FOR MARINESCIENCE LBG	United Kingdom	Marine research institute
The University of Edinburgh	United Kingdom	Research university
The University of Stirling	United Kingdom	Research university
Third Rail Technologies	United States	Deep tech suppliers
TIL Biosciences	Norway	Biotechnology company focused on fish health
TLL- Temasek Life Sciences Laboratory	Singapore	Aquaculture businesses and research organizations (producers and developers)
Toulouse INP (Institut National Polytechnique de Toulouse)	France	Research university focused on engineering
Tropical Futures Institute	Indonesia	Research institution focused on tropical agriculture and aquaculture
Tropical Marine Science Institute	Singapore	Research institution focused on marine science

TROVAN	Norway	Company offering microchip technology
TTZ Bremerhaven	Germany	Aquaculture businesses and research organizations (producers and developers)
TTZ Bremerhaven	Germany	Research institution focused on food technology
UMITRON	Japan	Company offering products and services for aquaculture
Uni-MATE - University of Szeged	Hungary	Research university in Szeged
Uninsubria	Italy	Research university in Lombardy
United Nations Industrial Development Organization	Austria	UN agency focused on industrial development
Universidad de Las Palmas de Gran Canaria	Spain	University in the Canary Islands
Universidad de Murcia	Spain	Aquaculture businesses and research organizations (producers and developers)
UNIVERSITA CA' FOSCARI VENEZIA	Italy	Research university in Venice
Universita degli Studi dell'Insubria	Italy	University in the Lombardy region
UNIVERSITA DEGLI STUDI DI BARI ALDO MORO	Italy	Research university in Bari
UNIVERSITA DEGLI STUDI DI ROMA TOR VERGATA	Italy	Research university in Rome
UNIVERSITA POLITECNICA DELLE MARCHE	Italy	Research university in Marche
Università Politecnica delle Marche	Italy	Research university in Marche
Universiti Malaysia Terengganu	Malaysia	Aquaculture businesses and research organizations (producers and developers)
UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK	Ireland	Research university in Cork
University of Bergen	Norway	Research university in Bergen
University of Cape Town	South Africa	Research university in Cape Town
UNIVERSITY OF HAIFA	Israel	Research university in Haifa
University of Iceland	Iceland	Research university in Reykjavik
University of Kiel	Germany	Research university in Kiel
University of Stirling	United Kingdom	Aquaculture businesses and research organizations (producers and developers)
University of Technology and Education	Hungary	Aquaculture businesses and research organizations (producers and developers)
University of Thessaly	Greece	Research university in the Thessaly region
University of Trento	Italy	Research university in Trento
University of West	Norway	University in the western region
University of West Hungary	Hungary	Aquaculture businesses and research organizations (producers and developers)
UNPARALLEL INNOVATION LDA	Portugal	Company offering R&D and innovation services
UVAXX	United States	Biotechnology company focused on animal health
Vertical Oceans	Norway	Company offering products and services for aquaculture
VETERINAERINSTITUTTET	Norway	Veterinary research institute
Vietnam Hydrocarbon Instruments	Vietnam	Company offering instruments for hydrocarbon detection
Viking Aqua	Norway	Aquaculture company
Viking Aquaculture	Norway	Aquaculture company
VITA Fort Asia	Malaysia	Company offering products and services for aquaculture
VORK DAMBRUG	Denmark	Aquaculture company

Wageningen University	Netherlands	Research university in agrofood and the environment
WAISTER AS	Norway	Company offering sustainable waste management solutions for aquaculture
WINGS ICT SOLUTIONS INFORMATION & COMMUNICATION TECHNOLOGIES IKE	Greece	IT solutions provider
WUR - Wageningen University and Research	Netherlands	Research university focused on agrofood and the environment
YELLOW SEA FISHERIES RESEARCH INSTITUTE, CHINESE ACADEMY OF FISHERY SCIENCES	China	Research institution focused on marine fisheries
ZACHODNIOPOMORSKI UNIWERSYTET TECHNOLOGICZNY W SZCZECINIE	Poland	Technical university in Szczecin
ZEIGLER	United States	Feed manufacturer for aquaculture
ZOOCA	Greece	Company offering products and services for aquaculture