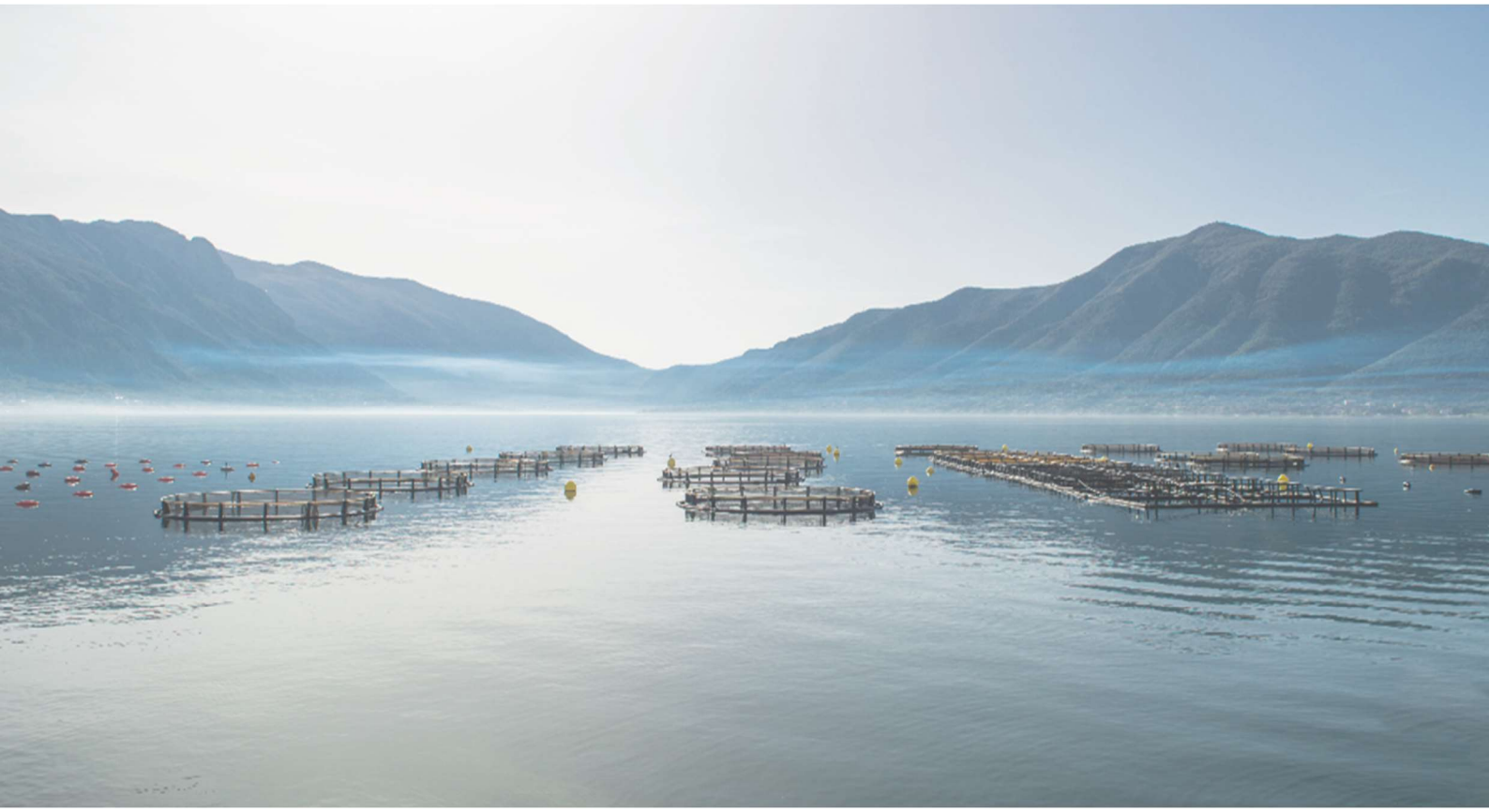
# Project Newsletter #1

November 2023



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# 1. Introduction from the Coordinator

## 1.1 A Perspective from Nives Ogrinc

Welcome to the first newsletter for FishEUTrust! In this issue, we introduce you to the FishEUTrust project with our mission to establish a comprehensive and sustainable fish and seafood supply chain. Our project is dedicated to developing innovative technological solutions, including metagenomic approaches, stable isotopes of light elements, sensor technologies, and AI-based analysis. These cutting-edge tools will be instrumental in ensuring safety, freshness, and traceability throughout the seafood industry, while also driving digitisation forward. Additionally, the project will actively address consumer behaviour and promote the growth of sustainable aquaculture and the blue economy.

From the outset, we wanted the FishEUTrust project to be unique with our digital platform designed with an open architecture. This open approach will enable seamless integration of seafood transparency technologies and foster connections among consumers and various stakeholders in the seafood supply chain.

Over the first year of the project, we have laid solid foundations in terms of technical progress and positive working relationships. We have faced some challenges with the set up and operation of the Co-creation Living Labs (CLLs) covering aquaculture, the gastronomy sector, and industry actors developing aquafarm systems and control technologies. However, we are confident that these CLLs will be able to deliver their objectives to engage key stakeholders and facilitate real-world testing, validation, and demonstration.

Finally, we would like to welcome our Advisory Board members: Dr. Petter Olsen (NOFIMA), Alistar Lane (EAS), Anton Ellenbroek (Consultant, FAO), Paula Landrini (Director, Ecotapes Zeeland), and Independent Ethical Advisor Dr. Lada Timotijević (University of Surrey). Their expertise and guidance will be invaluable on this exciting journey.

We are thrilled to have you join us on this adventure, and we look forward to sharing more updates and progress with you in the future!

**Prof. dr. Nives Ogrinc, JSI**
**FishEUTrust Project Coordinator**

## 1.2 Co-Creation with Sea2See and Other Sister Projects

We are very happy that FishEUTrust has been able to forge a strong, co-creational alliance with the Sea2See EU project, which is also looking to raise awareness and consumption of high-quality EU seafood, albeit through different approaches. Both projects have been in close contact to develop common engagement strategies and stakeholder networks to ensure efficient use of project resources and prevent duplication of effort.

For example, FishEUTrust organised met to discuss stakeholder mapping, engagement, and living labs. Arranged and facilitated by project partner AquaBioTech Group at their premises in Malta, a 2-day workshop was held to discuss mutually beneficial project activities and sharing of information.

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**Figure 1: Stakeholder mapping co-creation with Sea2See at ABT Group in Malta**

A part of this workshop related to defining and maximising engagement with stakeholders within the seafood supply chain as well as consumers. There was also discussion between the Co-creation Living Labs of FishEUTrust to determine synergies between their operations and how to best integrate with the technologies being developed within the project (e.g. sensors, gamification, and digital tools) to maximise impact.

FishEUTrust has also created links with the SAFE and EUMOFA EU projects. Recently, beneficiaries of the three projects joined forces to attend the Aquaculture Europe conference (see Section 3).

## 1.3 Published Public Deliverables

The following public deliverables have been published since the start of the project. These are available to you via our project website:

| Deliverable # | Title | Dissemination Level | Responsible |
|---|---|---|---|
| 8.1 | Dissemination & Communication Plan | Public | WRG Europe |
| 8.4 | Project website | Public | WRG Europe |
| 9.1a | Open Data Management Plan | Public | JSI |
| 9.3 | Gender Action Plan - PART 1 | Public | EuroFIR |

# 2. Technical Updates from Our Work Packages

Below you will find updates on each of the technical Work Packages (WPs) from our Work Package Leaders.

## 2.1 WP1: Creation of the Living Labs (led by IPMA)

We have set up a network of Co-creation Living Labs (CLLs) to demonstrate the innovative approaches and technologies of FishEUTrust. Five CLLs have been identified in partner countries at IPMA (Portugal), CETGA (Spain), ABT (Malta), Bugenvila (Croatia), and OXY (Denmark). See also Figure 2.

These CLLS cover three different areas of Europe – Mediterranean, Atlantic, and North Sea – and integrate all sectors of the value chain to support the development, testing, and validation of the FishEUTrust innovations. The CLLs cover aquaculture (IPMA, CETGA, ABT), the gastronomy sector (Bugenvila), and industrial partners developing aquafarm systems and control technologies (OXY). Pilot innovative aquaculture ecosystems were established at three different locations (CETGA, ABT, and IPMA) covering different interests related to fish health, traceability, and the consumer.

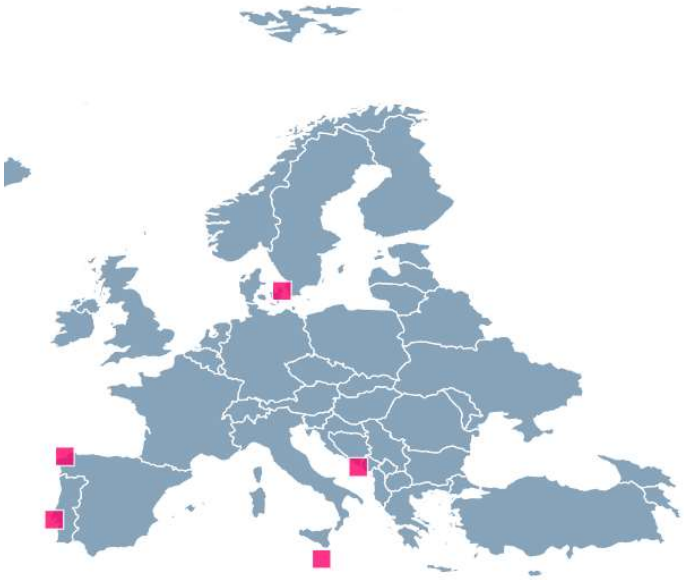

**Figure 2: Locations of the FishEUTrust Co-creation Living Labs**

The location, logistics, equipment, human and financial services necessary to set up the CLLs have been determined. Maps of stakeholders who might be interested in the innovations have been constructed by the CLL teams according to the quintuple helix model (education, industry, government, public, and environment). We are looking forward to establishing these CLLs and setting up strategies to promote our exciting innovations to both industry and the consumer. Look out for the further updates!

## 2.2 WP2: Consumer Awareness & Intervention Strategies (led by UNIBO)

The aim of WP2 is to design and validate an initial tailored set of intervention strategies to stimulate behavioural change in consumers and suppliers, increase consumer trust, and promote seafood products and solutions. To reach this goal it is fundamental to identify socio-economic and cultural barriers and identify local determinants of choices related to fish-based products.

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Within this framework, the activities conducted in WP2 during the first year of FishEUTrust aimed at consolidating the understanding of the factors driving consumers' preferences toward fish products and the importance they give to their environmental sustainability.

To do so, an extensive review of scientific literature and reports produced by international and professional organisations was conducted in Task 2.1 under the coordination of Redinn and with the collaboration of all WP partners. The review considered a total of 164 documents (73 scientific papers and 73 reports) and allowed partners to systematise the state of the art of the literature investigating factors influencing consumers' decisions related to fish products, considering their motivations, their opportunity to buy fish products and their capabilities in managing them.

**Figure 3: Word cloud from surveys on barriers and drivers for seafood consumption**

The literature review was the base for an extensive household survey conducted in Task 2.2 under the coordination of WRG. The survey was responded to by groups of 1000 consumers in three countries: Denmark, Italy, and Slovenia. The results allowed for the completion and expansion of the outcomes of the literature review, and identification of profiles of consumers with common behavioural patterns. The identification of those patterns will help to design effective and tailored interventions to nudge consumption of sustainable fish products.

## 2.3 WP3: Sustainable Supply Chain & Business Models (led by EUROFISH)

The primary objective of WP3 is to nurture the development and utilisation of efficient and sustainable digital supply chains, whilst propelling advancements in business models that champion transparency and consumer trust of seafood products.

First and foremost, we will be defining innovative digital methodologies and business models that enhance supply-chain efficiency, ushering in shorter, more streamlined supply chains. Simultaneously, we will identify and validate more efficient supply protocols, overcoming policy and legislative hurdles along the way. The team is dedicated to cultivating exploitation potential by implementing and refining these pioneering business models. We ultimately hope to create exemplars for the seafood industry to follow and create real impact and benefit.

**Figure 4: Photo courtesy of Dr Manfred Klinkhardt**

Crucially, this progress will be achieved through close collaboration with an international expert team comprising partners such as Belit (Serbia), JdIC (Spain), REDINN (Italy), each contributing their expertise to different facets of the project. Additionally, robust cooperation with the organisers of the Living Labs will be instrumental in showcasing the unique business models devised within FishEUTrust.

Ultimately, this work package plays a pivotal role in ensuring that the project's results and innovations seamlessly transition into commercial applications. By doing so, it is set to competitively consolidate and expand existing markets. As a consequence, the desired socio-economic impacts, including enhanced public health, EU market growth, and environmental sustainability, will be not only envisaged but achieved.

## 2.4 WP4: Sensor for Quality, Safety & Traceability (led by UNIFI)

The main goal of WP4 is to develop a suite of tools integrating metagenomic, genetic, and stable isotope approaches that will determine quality, safety, and traceability of FishEUTrust seafood products within the supply chain. This is incredibly important for the consumer to feel confident in purchasing seafood.

Standard Operating Procedures (SOPs) for preparation of seafood samples for testing and for subsequent use in the supply chain have been developed. During the preparation of these SOPs, we documented instructions and guidelines to outline the steps to be followed for the DNA extraction. These SOPs are designed to ensure consistency, efficiency, and safety in performing routine analysis operations. They provide a standardised approach that helps employees and stakeholders involved in sampling and DNA extraction to understand the correct sequence of actions to achieve the desired DNA extraction.

Figure 5 shows the location from which fish have been acquired for analysis. The DNA extractions produced using the outlined SOPs have been evaluated and are sufficient to produce Next Generation Sequencing (NGS). Furthermore, the IsoFoodTrack database has been updated with the stable isotope and elemental composition data of fish and shellfish to secure food chain traceability and verify the products' claims and labelling. Our progress lays the foundation for the successful completion of the biomarker identification process.

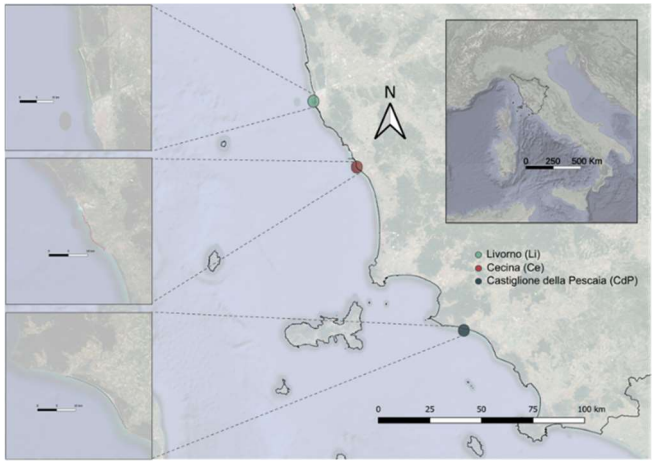


**Figure 5: Locations of the seafood for DNA sampling**

## 2.5 WP5: Control Systems for Quality & Safety (led by UMF)

WP5 will produce a smart control system and unique solutions for monitoring the presence of pathogens, antibiotics, and biotoxins across the seafood supply chain, with measurement of freshness addressed for the consumers and retailers. In this regard, two major classes of sensors are being developed: for freshness (measuring the impedance) and for the detection of toxins, pathogens, and antibiotics (voltamperometric sensors). By the end of the project, the integration and demonstration of the sensors on the same platform will be achieved.

The figure below shows how the FishEUTrust sensor technologies will integrate into the complete supply chain:

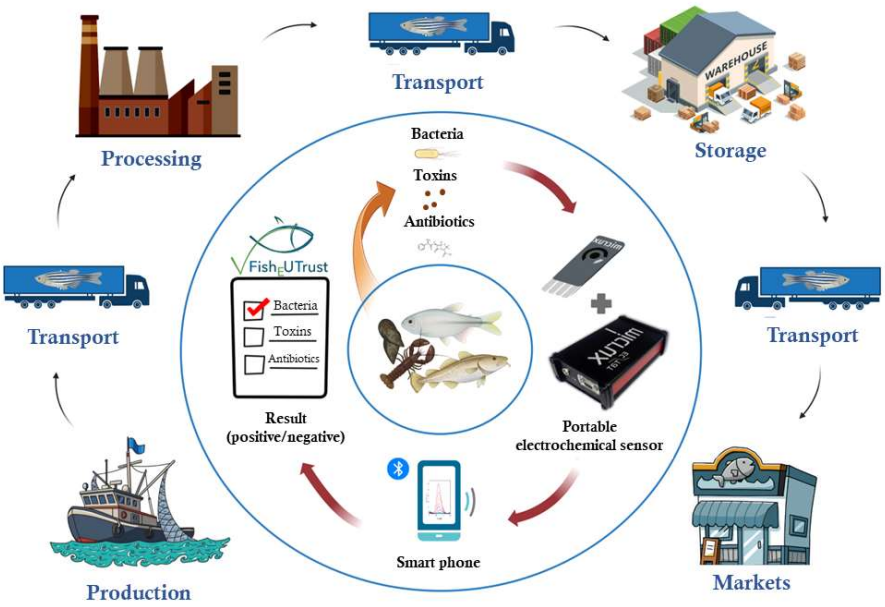


**Figure 6: Integrating FishEUTrust sensors into the supply chain**

An innovative nanoplatform has been fully characterised, tested, and integrated into a sensor. Once fully demonstrated, these technologies will be vital in creating a paradigm shift in how the seafood supply chain operates, bringing “built-in” quality assured products to the consumer.

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## 2.6 WP6: Environmental Footprint & Social Impacts (led by DTU)

The primary goal of WP6 is to perform a sustainability assessment of aquaculture production systems, seafood products and solutions to improve their environmental, economic, and social performance. This means assessing the impacts of the supply chain at every stage, an example of which is to assess contributions to carbon dioxide emissions, as shown in Figure 7.

To date, the available data have been collected to model the Life Cycle impacts and the social and economic impacts of seabream, comparing offshore (or in-shore) production with a recirculating aquaculture system (RAS), including the distribution logistics.

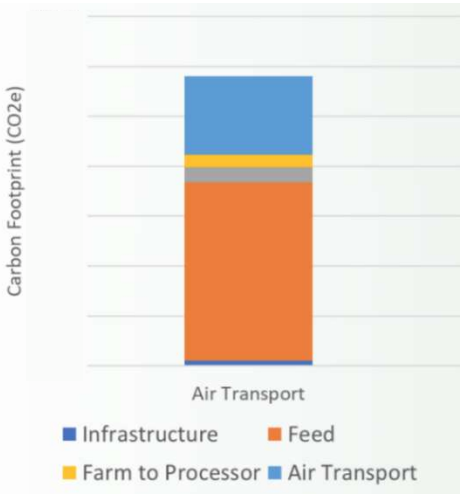


**Figure 7: Estimated CO2 contribution of supply chain activities**

## 2.7 WP7: Digital Technologies for Consumer Trust (led by JSI)

Data is an essential factor in the creation of sustainable seafood systems. In Work Package 7, data will be collected and used for a variety of purposes. Firstly, data are to be gathered along the food supply chain and processed using blockchain technology. Secondly, data will be acquired either from laboratories or via the innovative sensor devices developed within the project.

To date the team has explored available blockchain technology that can be applied to achieve the aims of FishEUTrust. Moreover, the team is developing an AI-based methodology for analysing heterogeneous (consisting of dissimilar elements) data from the laboratories. To normalise heterogeneous data, the team has started developing semantic resources and our first scientific paper was published in the top-ranked peer-reviewed journal *Scientific Reports*. The challenge the team is currently facing is finding an optimal way of acquiring data from different sensor devices in real time.

Initial ideas for gamification solutions have been acquired to be implemented in the next period of the project, which will support consumer engagement with and purchasing of seafood products.

# 3. Dissemination & Communication Update

## 3.1 Website & Social Media Performance

The FishEUTrust project website was launched in September 2022. The website was created using Adobe Dreamweaver, which is a low-level coding application running the latest HTML, PhP, and JavaScript tools for modern, dynamic, responsive websites. Since its launch, the website has been updated with new features, including news, digital media, a Living Labs interactive map, and newsletter sign-up.

We are very happy with the web traffic statistics, with over 7000 site visits since the website launch and nearly 15,000 page views.

**Figure 8: FishEUTrust website homepage**

At the beginning of the project, WRG set up FishEUTrust LinkedIn and Twitter (now X) accounts. Posts on LinkedIn are mainly aimed at professional organisations (i.e. academia and industry), focussing on events, results, and exploitable results. While Twitter/X is also good for reaching academic and industrial organisations, it is more appropriate for public outreach and engagement.

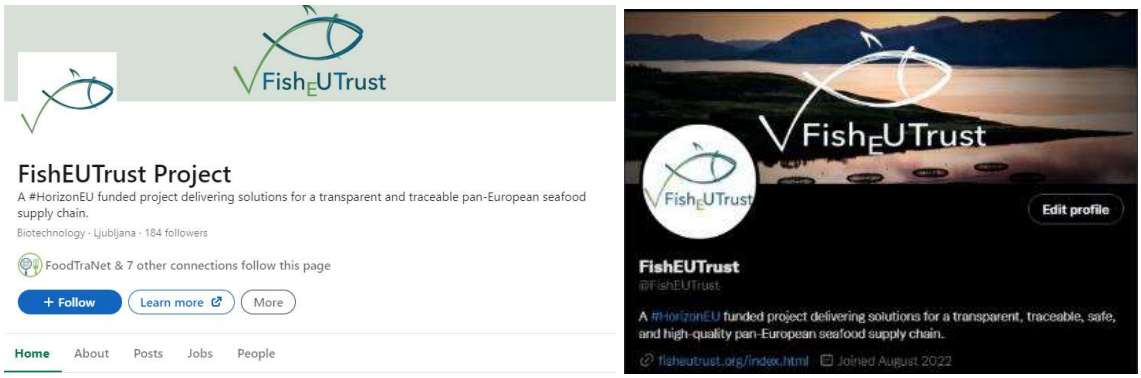


**Figure 9: FishEUTrust Social Media Profiles**

Our LinkedIn page is approaching 200 followers with over 3000 impressions. Our Twitter/X account now has 40 followers with nearly 2000 impressions. While the social media strategy will continue to use both platforms, there will be a greater focus on LinkedIn because of its ability to efficiently connect with key industrial and academia organisations and networks.

## 3.2 Project Digital Media & Publications

**Publication in *EuroFish Magazine***

*EuroFish Magazine* is an industrially significant trade publication focussing on seafood and aquaculture produced by our project partner. In April, *EuroFish Magazine* published a joint publication by FishEUTrust and our sister project Sea2See. The full-page article described both projects and their mutually beneficial but differing approaches to sustainable seafood produce.

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**Figure 10: FishEUTrust Publication in EUROFISH Magazine**

**FishEUTrust in *Nature***

Our project colleagues at the Jožef Stefan Institute have recently released a paper in *Nature* entitled "From language models to large-scale food and biomedical knowledge graphs". In this study, the performance of three state-of-the-art relation-mining pipelines (FooDis, FoodChem, and ChemDis) is evaluated to extract relations between food, chemical and disease entities from textual data. The full paper can be read at https://www.nature.com/articles/s41598-023-34981-4

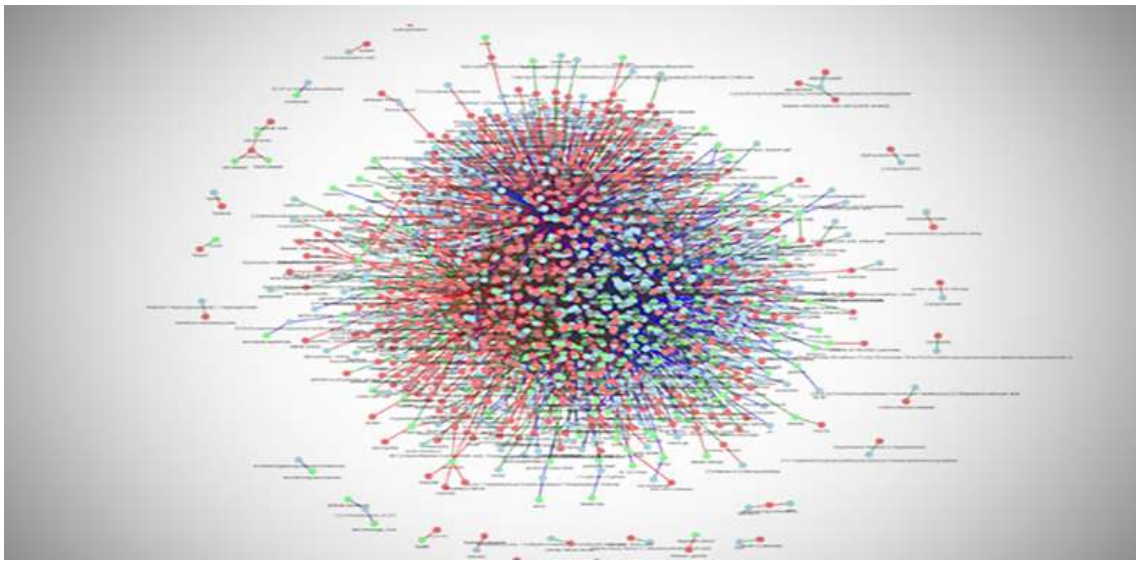

**Figure 11: JSI Publication in Nature Magazine**

## 3.3 Conferences & Events

**ISO-FOOD Symposium 2023**

The 2nd ISO-FOOD Symposium in Slovenia brought together a diverse group of experts in the food technology industry. This symposium provided an excellent platform for interdisciplinary discussions, as researchers, scientists, policy makers, and stakeholders gathered to share new findings and innovative solutions. The event was the perfect platform for FishEUTrust to showcase our cutting-edge technology and solutions to a global audience. Our presentation was well-received by industry experts.

**Figure 12: Nives Ogrinc (JSI) and Leonardo Piccinetti (REDDIN) at ISO-FooD 2023**

Our participation in the ISO-FOOD event was a clear indication of our commitment to driving innovation in the food technology industry.

**Aquaculture Europe 2023**

FishEUTrust also attended Aquaculture Europe in Vienna in September. This is a premier European event covering all aspects of seafood and aquaculture.

**Figure 13: Aquaculture Europe Conference**

FishEUTrust was part of an exhibition stand designed and enabled in conjunction with EuroFish and co-hosted with related EU projects Sea2See, EUMOFA, and SAFE. The stand was a co-ordinated and co-creational approach to sustainable seafood and aquaculture from the four projects. The coordinator, Nives Ogrinc, also presented the project at the technical sessions in conjunction with the Sea2See project.

**Figure 14: Members of FishEUTrust at the Aquaculture Europe stand**

## 3.4 Public Engagement

**School Hackathon at AquaBioTech**

We are very grateful to our project partner AquaBioTech in Malta for holding a Hackathon on seafood for a local school.

**Figure 15: ABT Group hosting the school hackathon**

A group of children from St Aloysius College, Malta, along with their two teachers, were invited to ABT's research facilities in Mosta, Malta, to learn more about seafood, its production as wild caught or farmed fish, health and environmental issues, transport, and food safety and trust.

The event was held by the FishEUTrust Malta Living Lab as an educational outreach activity for the project, in association with the iFishIENCi project (https://ifishienci.eu/) consumer outreach activities, Blue Schools Med programme (https://www.blueschoolsmed.eu/), and European Maritime Day In My Country (https://maritime-day.ec.europa.eu/my-country_en).

The fisheries and aquaculture expert team - including Dr Adrian Love, Sean Dimech, Justin Galea, and Alex Boyle - covered all bases, from why seafood is healthy to how can we farm and catch fish, all while taking into account the potentially harmful effects it can have on the environment.

The enthusiastic participants already had a very good knowledge of seafood through their ongoing Blue Schools Med engagement and were very active in giving their perspectives and opinions. They co-created interesting communication materials with the scientists to disseminate their knowledge on seafood issues, under the mentorship of marketing guru Jolanda Viviers and Malta FishEUTrust Living Lab leader Stela Karovic.

**FishEUTrust at Aqua Nor 2023**

**Figure 16: ABT Group and NORCE at Aqua Nor 2023**

The Aqua Nor 2023 bi-annual conference was held between 21st – 23rd August in Trondheim, Norway. Along with the tradeshow and fair, a student camp was developed to reach as many students as possible who were curious about the aquaculture industry and wanted to contribute with ideas for sustainable development. During the Aqua Nor Student Camp, students learned how to work with complex, industry-related issues, had the opportunity to work closely with actors from the industry, and got to know other students. The overall theme was: Green future for blue food.

Mentors from different organisations pitched their challenges to the students on the first day of the conference and the students had the next two days to develop their solutions in groups with dedicated time with their mentors. On the final day of the conference, students presented their solutions to a panel of judges.

AquaBioTech Group (ABT) and NORCE teamed up to present a challenge to the students under the scope of FishEUTrust. The background for the challenge highlighted how aquaculture is transforming rapidly through the integration of new farming tools, techniques, and methods. Farming in closed and semi-closed systems, including Recirculation Aquaculture Systems, are some of the breakthrough innovations transforming the Norwegian and global aquaculture industries, improving sustainability indicators. Despite this, the perception by consumers of these new farming techniques has not yet been qualified and quantified extensively.

The challenge: “You are a business or a governmental organisation (Norwegian Seafood Council, the Norwegian Food Agency, etc.) that has adopted these new farming methods (e.g., RAS). You wish to communicate to consumers and retailers/wholesalers how these methods of production positively impact the end product through an improved production environment. How would you achieve this? Highlight the benefits of these production methods, identify any business, marketing and communication gaps, or shortcomings in the current market, and address them in your proposal.”

The solution focused on a Norwegian wide educational program for all high schools. The curriculum would cover sustainable production methods, the value of research and development, significance of health enhancing diets, and the role of food culture in identity and heritage.

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# 4. And Finally - Interesting Facts About Seafood

Seafood may be humanity's most important food, after cereals, representing about 15 percent of the world population's protein intake. Over one billion people rely on seafood as their primary source of animal protein.

## Testing the freshness of fish yourself

You can tell if a piece of fish is fresh by doing your own little test. Get a pot of cold water and put the piece of fish in the water. If the fish floats, it means that it has been caught pretty recently. If the fish sinks, it may not be as fresh as you would like it to be.

## Cooking fish properly

Fish should always be cooked at a low to medium temperature. When you do this, you are going to ensure that all the moisture that the fish has preserved is still there upon consumption. Never cook fish at a temperature more than 170°C (350°F). Above this temperature, you'll dry out the fish and lose a lot of flavour.

## Don't fear frozen fish

The best fish is caught in your local area and sold and consumed on the day of the catch. However, if you don't have access to a high-quality seafood restaurant, store or seafood department at your local supermarket, frozen fish is a great choice. Fish are usually frozen immediately after being caught, which means that frozen seafood is often of a higher quality than that found fresh at the seafood counter.

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