
Demonstration of Innovative Functional food production systems based on more sustainable value chains of marine and freshwater raw materials for conscientious EU consumers

A large, stylized graphic on the left side of the slide. It consists of a green leaf-like shape at the top, a blue water droplet in the center, and three curved blue lines at the bottom, all in a light blue or green color. The graphic is partially obscured by the dark blue box containing the section headers.

3.0 Legal requirements, policies and quality management

3.4 The importance of traceability

Main objective

-  Understand how to implement and manage effective digital systems for consistent and resilient seafood and aquaculture traceability.

Learning outcomes

-  Learn the importance of traceability not only in the aquaculture sector, but in the whole food system (from farm to fork)
-  Recognise and compare innovative technologies and practical applications such as IoT, blockchain, QR codes, RFID, and satellite technology.
-  Analyse practical case studies to understand real-world benefits and applications.

Agenda

-  Introduction – digital traceability in seafood and aquaculture
-  Standards, Recommendations, and Technologies
-  Case studies
-  Group exercise – Design a digital traceability system

Digital Traceability in Seafood and Aquaculture

Digital traceability in seafood and aquaculture refers to the use of **electronic systems** and **technologies** to record and track the **journey** of aquatic **products** through the **supply chain**, from their origin (catch or farming) to the **consumer**, by means of digitized data and **information sharing**.

Digital traceability lies in its ability to provide **transparency**, **efficiency**, and **verifiability** to the seafood and aquaculture **value chains**.

Digital traceability is a key element in fostering the **adoption** of the **Farm to Fork** EU strategy.



Digital Traceability in Seafood and Aquaculture is crucial for

Enhancing food safety

- By enabling rapid identification and withdrawal of products in case of issues

Combating IUU

- Combating illegal, unreported, and unregulated (IUU) fishing, fraud, and species substitution by verifying the origin and history of products.

Improving supply chain management

- through better data collection, storage, and analysis, leading to increased efficiency and reduced costs.

Facilitating market access

- by meeting increasing consumer and regulatory demands for product information and sustainability.

Building consumer trust

- by providing detailed and verifiable information about the products they purchase.

Supporting sustainability efforts

- by tracking environmental and social parameters associated with production.

Enabling interoperability

- between different traceability systems through standardized data formats and sharing mechanisms.



Standards, Recommendations, and Technologies



Regulation (EC) No 1224/2009 and its Implementing Regulation (EU) No 404/2011

- **legal requirements** for the **traceability** of **fishery** and **aquaculture** products within the EU
- traceability information through **codes**, **barcodes**, electronic **chips**, or marking systems
- Operators must ensure they are based on internationally recognized standards and specifications.



GS1

- specific **traceability guidelines** for the **seafood sector**, aiming to align with the latest EU regulations and provide practical guidance for industry operators.



ISO 22005:2007 and ISO 12875:2011

- guidelines for implementing traceability in the **seafood sector**.



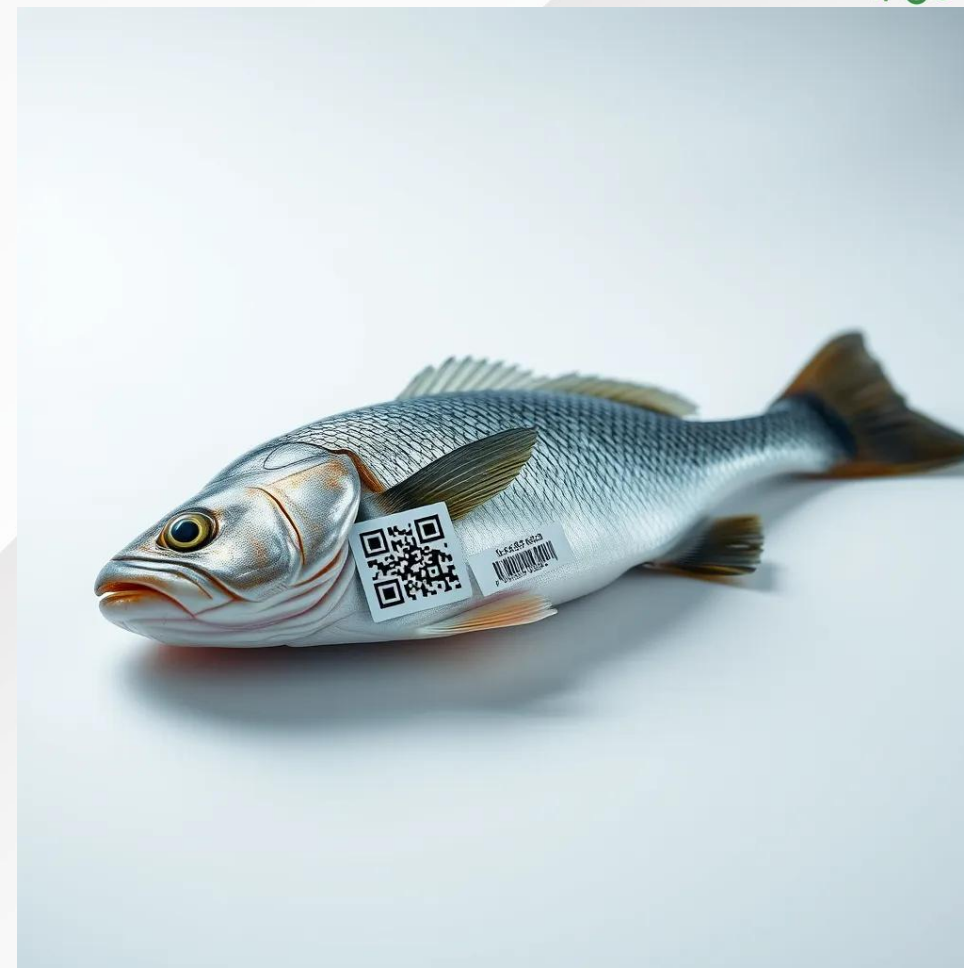
Standards, Recommendations, and Technologies



Technologies: IoT, Blockchain, QR, RFID

ISO 23455:2022

- use of **blockchain** and distributed ledger technologies (DLT) for the **cold chain**
- defines **functional requirements** and use cases for applying blockchain to track temperature-sensitive products
- Goal: ensure data integrity, real-time **monitoring**, and transparent **traceability** of environmental conditions.



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the European Union

Traceability in Fisheries – Case Study "e-Fish®"

e-Fish solutions for the fisheries supply chain

-  widely adopted in Italy
-  ensure the **traceability** of **seafood products**, starting from fish markets
-  enables seamless interaction among all supply chain stakeholders
-  enhances traditional labelling by integrating **advanced technologies** (QR codes, RFID, and blockchain)



Traceability in Fisheries – Case Study "e-Fish® Solutions for the fisheries supply chain"

e-Fish Objectives and achieved results



Full **traceability**, supporting sustainable fishing practices and **Farm to Fork** strategies.



The digital supply chain promotes **origin-based branding** and greater **transparency**.



The system has **QR codes**, **RFID tags**, and **blockchain** interact with **mobile applications** for operators and consumers.



Results over the past 20 years: 5 million boxes amounting to 25,000 tons of fish across 70,000 auctions were tracked

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Asta: BIANCA
 Vendita: n.741
 Data: 17/01/2020
 Ora: 05:01:01

Ragione Sociale Produttore Srl
 Indirizzo sede legale, civico - Città (PR)
 M/P o Sito: ITA000000000 D. MOTOPESCHERECCIO
 Porto e data di sbarco: ITXXX del 17/01/2020
 Metodo di produzione: PESCATO
 Data di produzione: 16/01/2020
 Metodo di cattura: OTB - Reti da traino
 Zona: 37.2.1-17 Mar Adriatico Settentrionale

44.2 - Tracina o ragno medio

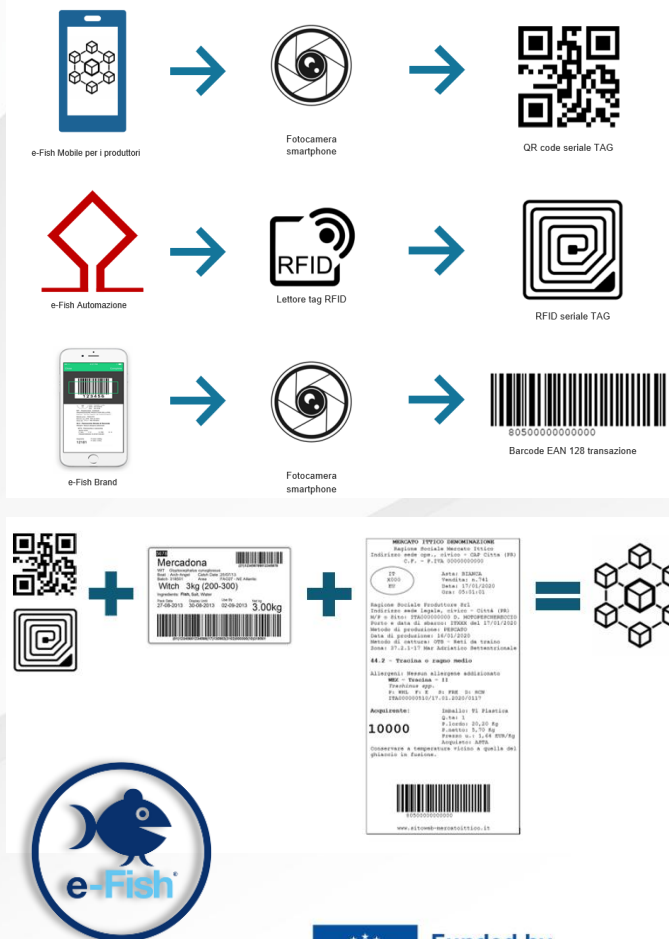
Allergeni: Nessun allergene addizionato
WEX - Tracina - II
Trachinus spp.
 P: WHL F: E S: FRE D: HCN
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Acquirente: Imballo: T1 Plastica
 Q.ta: 1
 P.lordo: 20,20 Kg
 P.netto: 5,70 Kg
 Prezzo u.: 1,64 EUR/Kg
 Acquisto: ASTA

Conservare a temperatura vicino a quella del ghiaccio in fusione.

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Innovating Fisheries Traceability using Satellites and Blockchain

Copernicus Marine Service (CMEMS)



Copernicus (Earth observation component of the EU's Space programme) offers information services drawn from both satellite and in-situ data.



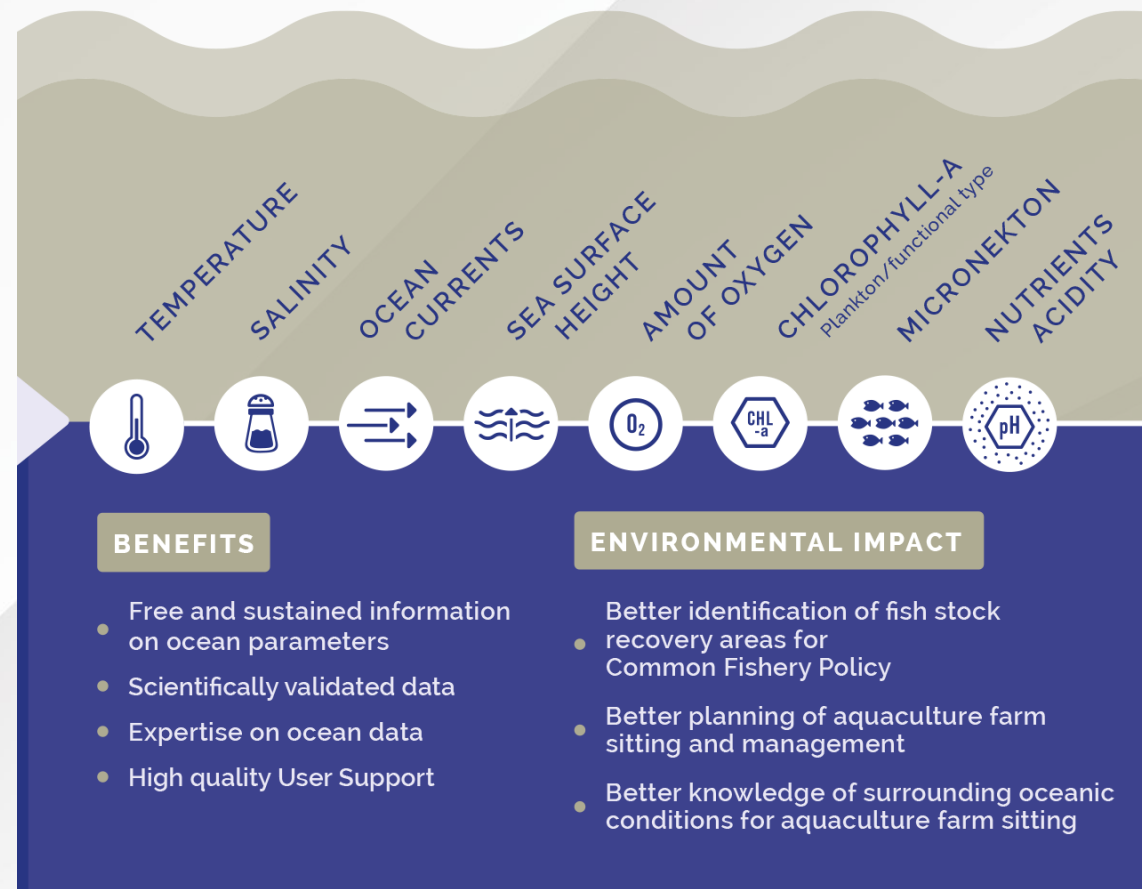
CMEMS supports **aquaculture farming**, tracks environmental parameters, and ensures sustainable practices in **fishing**.



The service uses data from the **Sentinel-3** and **Sentinel-6 satellites** (ocean color imagery, sea surface temperature, and sea level measurements).



GPS technology can be used to trace the exact origin of **fishing operations** within the **traceability** process.



Source: <https://marine.copernicus.eu/services/markets/marine-food>



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Innovating Fisheries Traceability using Satellites and Blockchain

Blockchain in seafood value chains



The **Food and Agriculture Organization (FAO)** actively **supports** the **adoption of blockchain** technology in **seafood** value chains.



Through guidelines, capacity building etc. the FAO promotes the use of blockchain to strengthen **traceability**, reduce fraud, and **increase transparency** across the sector.



Case studies show how this technology can **support sustainability goals**, improve monitoring and verification, and contribute to **safer** and more **reliable seafood** systems globally.



The new “net” in fishing - ©2024 images by F. Blaha.



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Innovating Fisheries Traceability using Satellites and Blockchain

Space2Sea project – case study



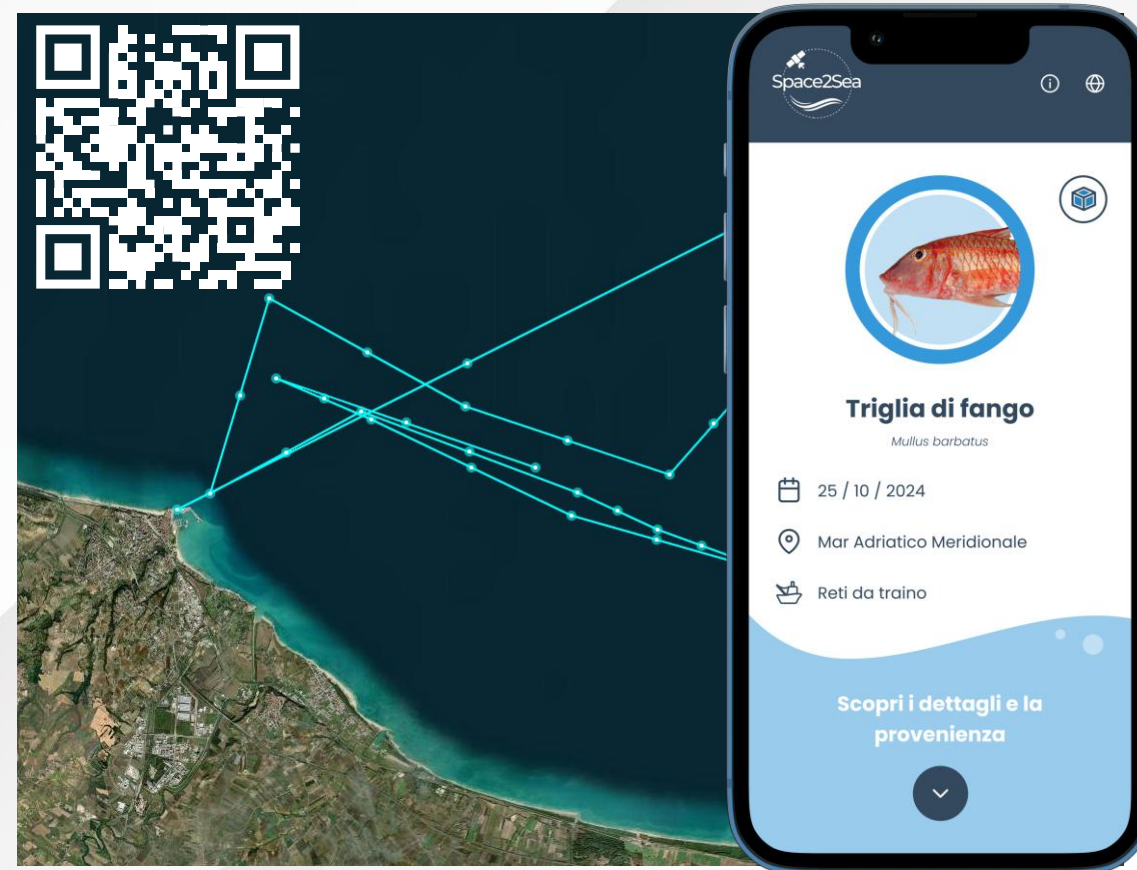
Space2Sea explores the integration of **satellite** technologies with **blockchain** systems to **enhance traceability** within the maritime and **fisheries** sectors.



The project aims to improve **supply chain accountability** and to support the **sustainable management** of marine resources.



This **innovative synergy** of **space-based** monitoring and **blockchain** technology builds trust among stakeholders and aligns local practices with broader **sustainability** and **digitalization** goals.



[Space2Sea](#) consumer interface for seafood traceability –
Funded by Lazio region – “Smart Specialisation Strategy” (RIS3)

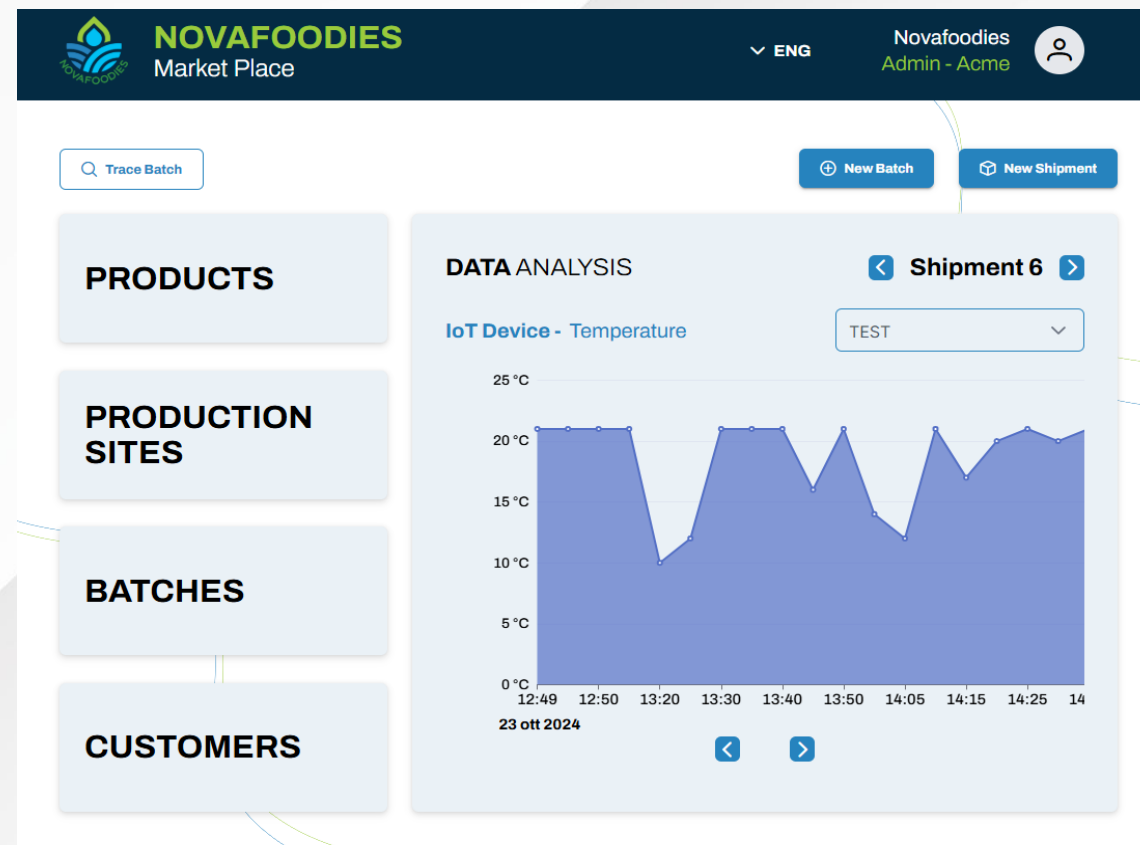
Traceability in Aquaculture – NOVAFOODIES Case Study

Market Place platform for traceability

Used by farmers to collect and manage **key information** about their production sites, products, **certifications**, **nutritional values**, and **IoT data**.

The tool allows producers to implement **additional and voluntary traceability**, going beyond standard legal requirements.

In doing so, they offer greater **transparency** and build **stronger trust** with **consumers** and partners **along** the seafood and aquaculture **supply chain**.



Consumer Engagement through Digital Traceability

Consumer experience



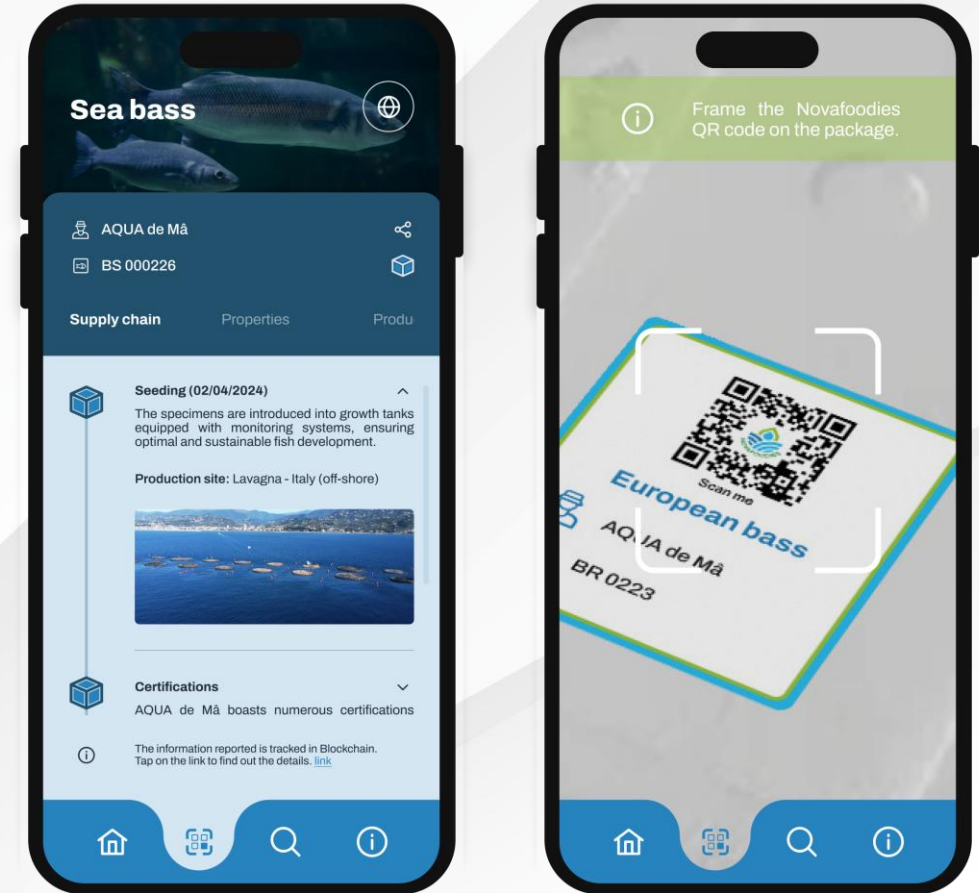
Through the **Mobile App**, consumers can scan a **QR code** to access **detailed information** about the seafood product they are about to purchase.



They can discover **where** and **how** the fish was **farmed**, how it was **transported** to the store, check **nutritional values**, and view **certifications** such as *GMO-free* or *antibiotic-free*.



All data is stored on a **blockchain** system, ensuring **full transparency** and **authenticity** of the information provided.



Consumer Engagement through Digital Traceability

Impact on trust and purchasing behavior

 **Until recently**, consumer trust relied mainly on brand reputation, the seller's reputation, and **limited information** found on standard traceability labels.

 Using Novafoodies' **fully transparent traceability** system, consumers can now make **informed decisions** based on objective, up-to-date, and tamper-proof data.

 Producers adopting this system are expected to **gain higher consumer confidence**, as shoppers feel more empowered to **choose quality** products with greater **awareness** and **trust**.



Real-Life Implementation – Practical Insights

Pilot cases implementation

 Project partners Aqua de Mà and Kefalonia Fisheries successfully implemented the **traceability** system in **real market conditions**.

 In their [pilot] stores, consumers are engaged through simple but effective tools. **Posters** are displayed near the seafood counter, while **QR code labels** are placed next to the fish products.

 This setup ensures **minimal effort** for store staff and a smooth, informative experience for the end-user.



Group exercise

Design a digital traceability system



Form groups of 4-5 people



Decide on a context (production/distribution process) e.g. aquaculture facility, fishing activity, distribution network



Decide on one or more digital technologies (e.g. blockchain, satellite, cloud computing, IoT, RFID, QR codes, etc.) and draft how it can be applied in different phases of the chosen production or distribution process.



Afterwards: One person per group gives a short summary of the collected input



Time for your presentations!

-  What are your ideas for a traceability system?
-  What are the technologies you suggest to use and why?
-  Are there any uncertainties you came across?



Literature

- Blockchain application in seafood value chains - FAO Fisheries and Aquaculture Circular No. 1207 FIAM/C1207 (ISBN 978-92-5-132453-0)
- Beyond regulatory compliance seafood traceability benefits and success cases – FAO Fisheries and Aquaculture Circular No. 1197 (ISSN 2070-6065)
- White Paper 2 - Digital traceability driving sustainable seafood consumption in the European Union - Laure Guillevic (Fish-X – Horizon Europe Project - www.fish-x.eu)
- Novafoodies TRACEABILITY LIFECYCLE by MARKET PLACE and MOBILE APP

Thank you very much for your attention!



Quiz – Test your knowledge!

Follow this way to the Quiz about Legal requirements, policies and quality management

<https://forms.office.com/e/9zgZTwhVeE?origin=lprLink>

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