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SUSTAINABLE BLUE ECONOMY PARTNERSHIP
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MISSION ARENA 4
28-29 April 2025 | Sopot, Poland

Blue Foods

Freya Robinson

29 April. 13:30 – 15:00

Theme: Blue Foods

Interreg Baltic Sea Region
Co-funded by the European Union
BLUE ECONOMY TETRAS
BLUE MISSION BANOS

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Funded by the European Union

Interreg
Baltic Sea Region

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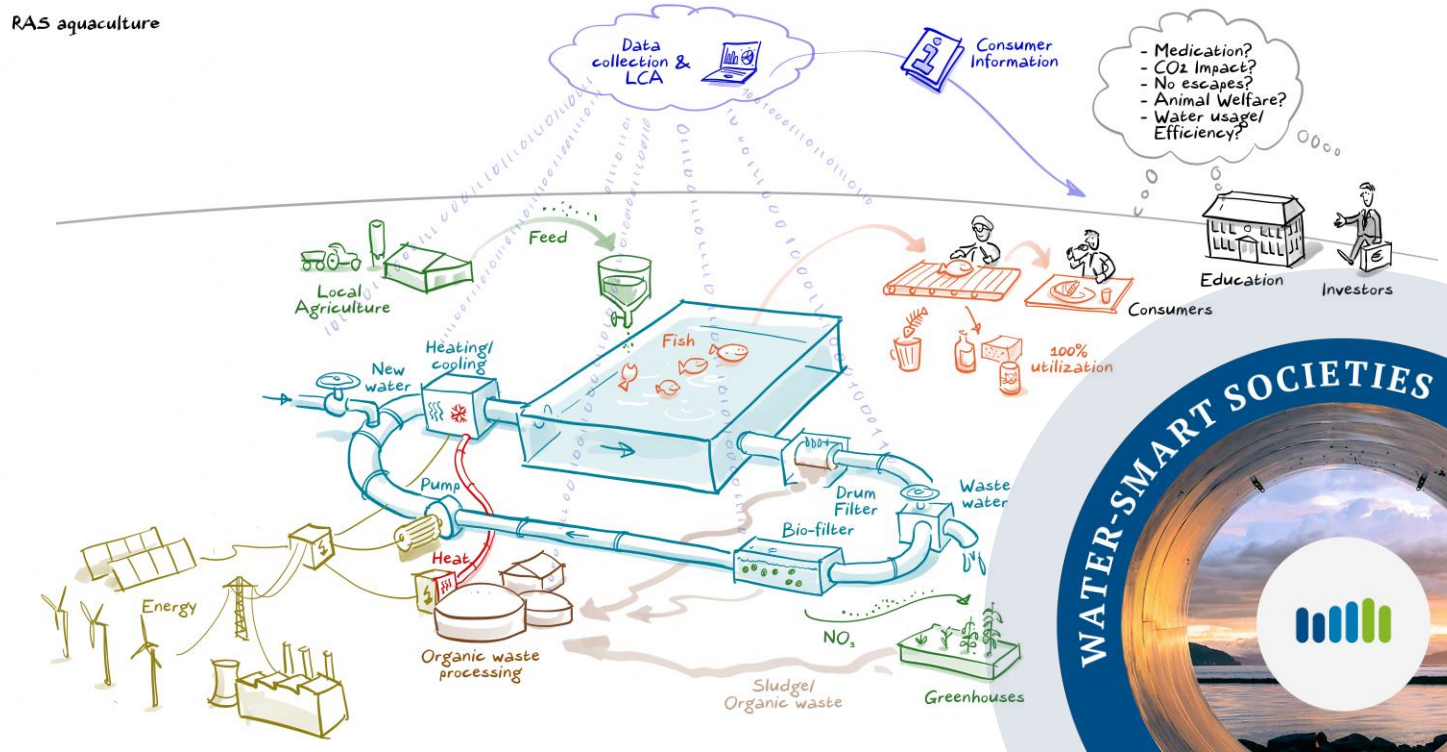
BLUE ECONOMY
TETRAS

Technology Transfer for Thriving Recirculating Aquaculture Systems in the Baltic Sea Region

Improve the economic and environmental sustainability of recirculating aquaculture systems (RAS) by demonstrating new concepts of **industrial symbiosis** to increase resource efficiency (i.e. water, energy) while producing affordable and healthy food.

One process's waste or residual is another process's resource..



Budget
3 Million EUR
(80% Financing)

Duration
36 months
01.2023 – 12.2025

Consortium
10 partners
LT • DE • DK • EE • PL

Solutions
4 pilots
LT • DK • EE

Tomasz Kulikowski – Fish Market Development Association, AquaLoop

Remigiusz Panicz – West Pomeranian University of Technology, SAFE, BlueBoost

Monika Normant-Saremba - University of Gdansk, AquaLoop

Anna Sowa & Marek Harenda - Experyment Science Center, Mr.Goodfish3.0

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Quality, Convenience, and Price in Consumer Choice: Key Factor Shaping Aquaculture Species Preferences

Tomasz Kulikowski
AQUALOOP

Theme: Blue Foods

Interreg South Baltic — Co-funded by the European Union

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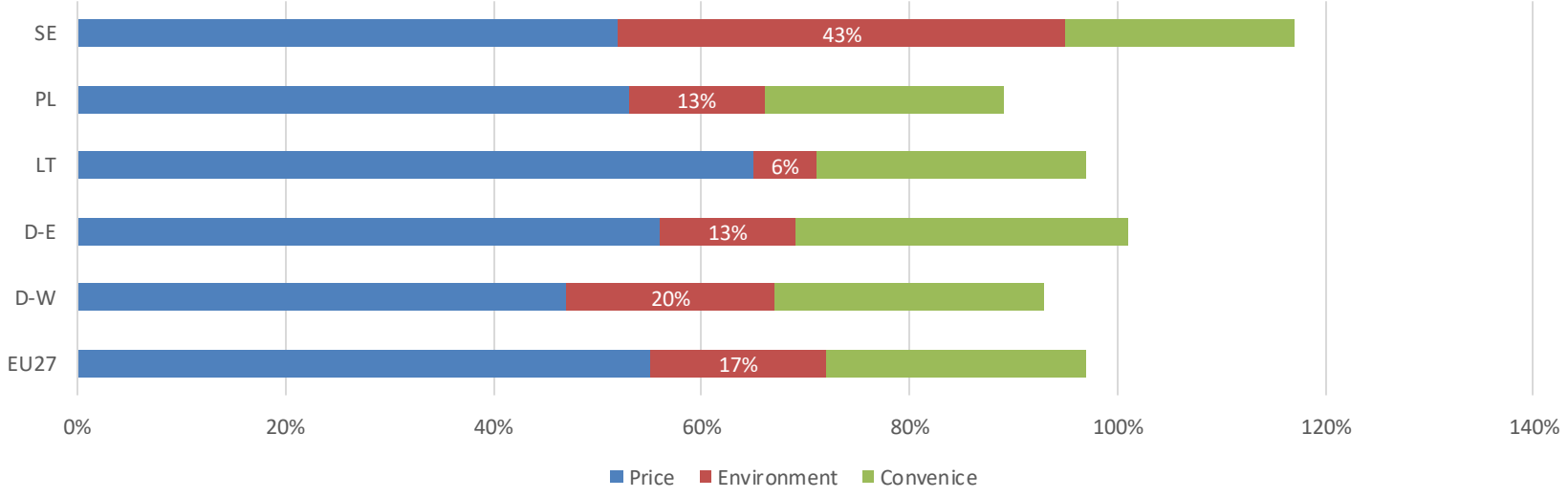
Top Motivators Behind Seafood Purchases

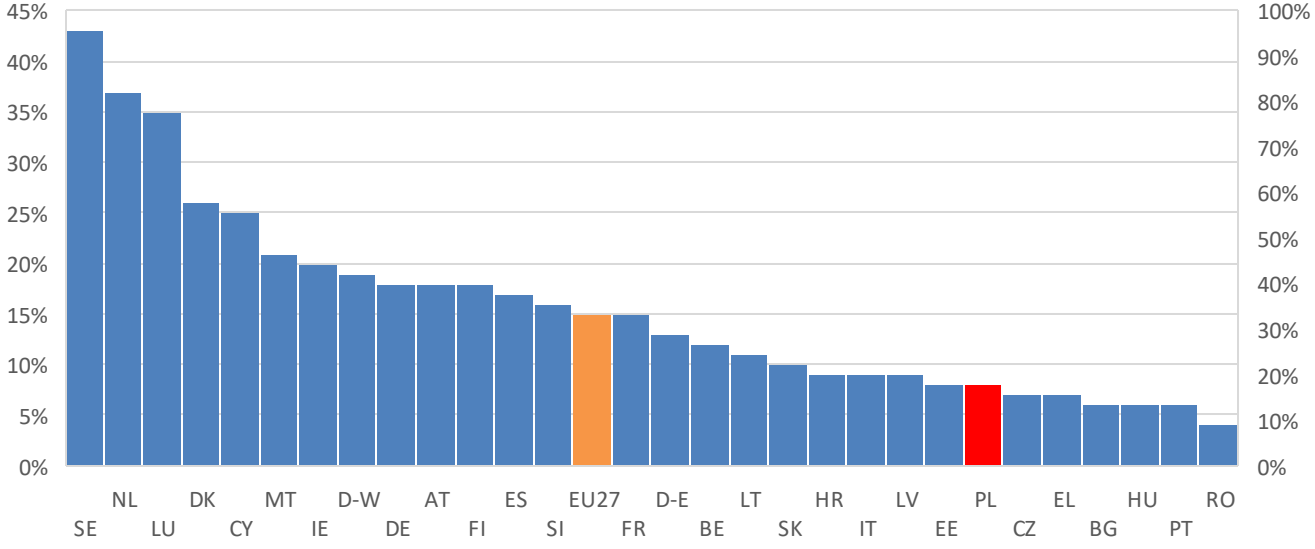
When you buy fishery and aquaculture products, which of the following aspects are the most important for you?

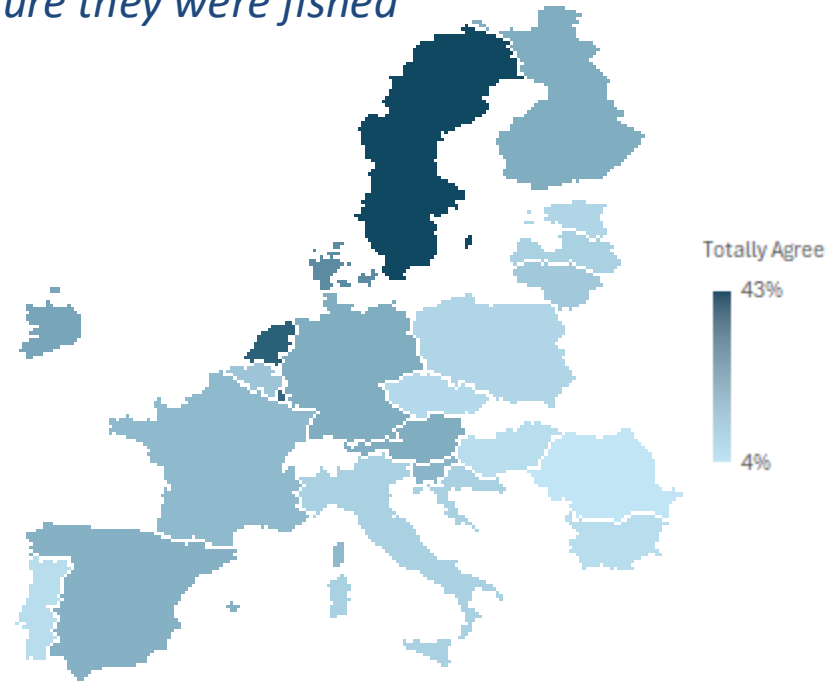


Own elabaration, based on Eurobarometer 2024 (EC 2025)

Paying More for Planet-Friendly Fish?

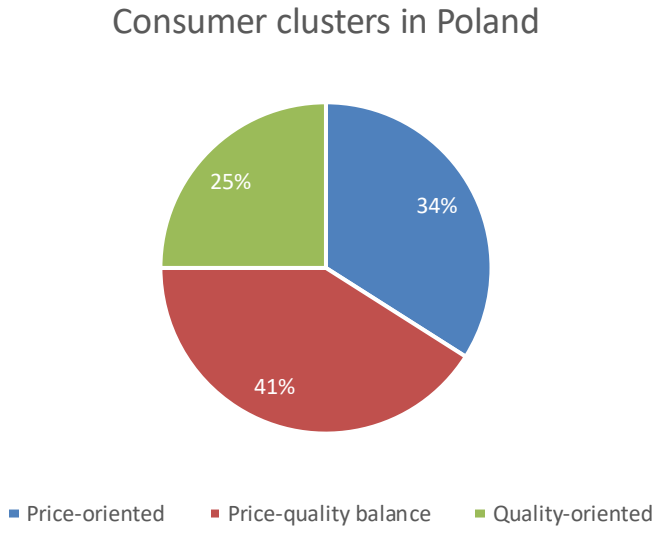
You would be willing to pay more for fish or shellfish products if you were sure they were fished or farmed in a sustainable way?

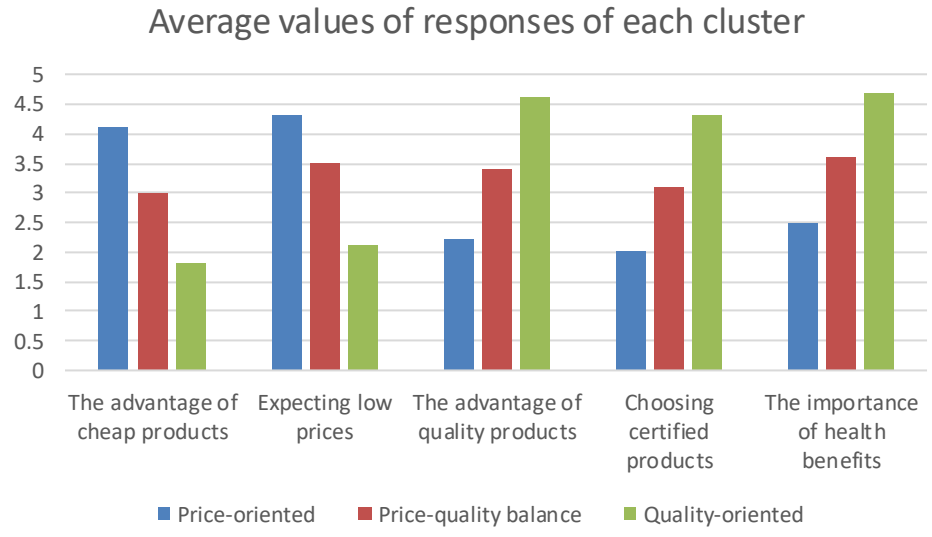




Own elabaration, based on Eurobarometer 2024 (EC 2025)

Looking Deeper: Segments Within the Seafood Market

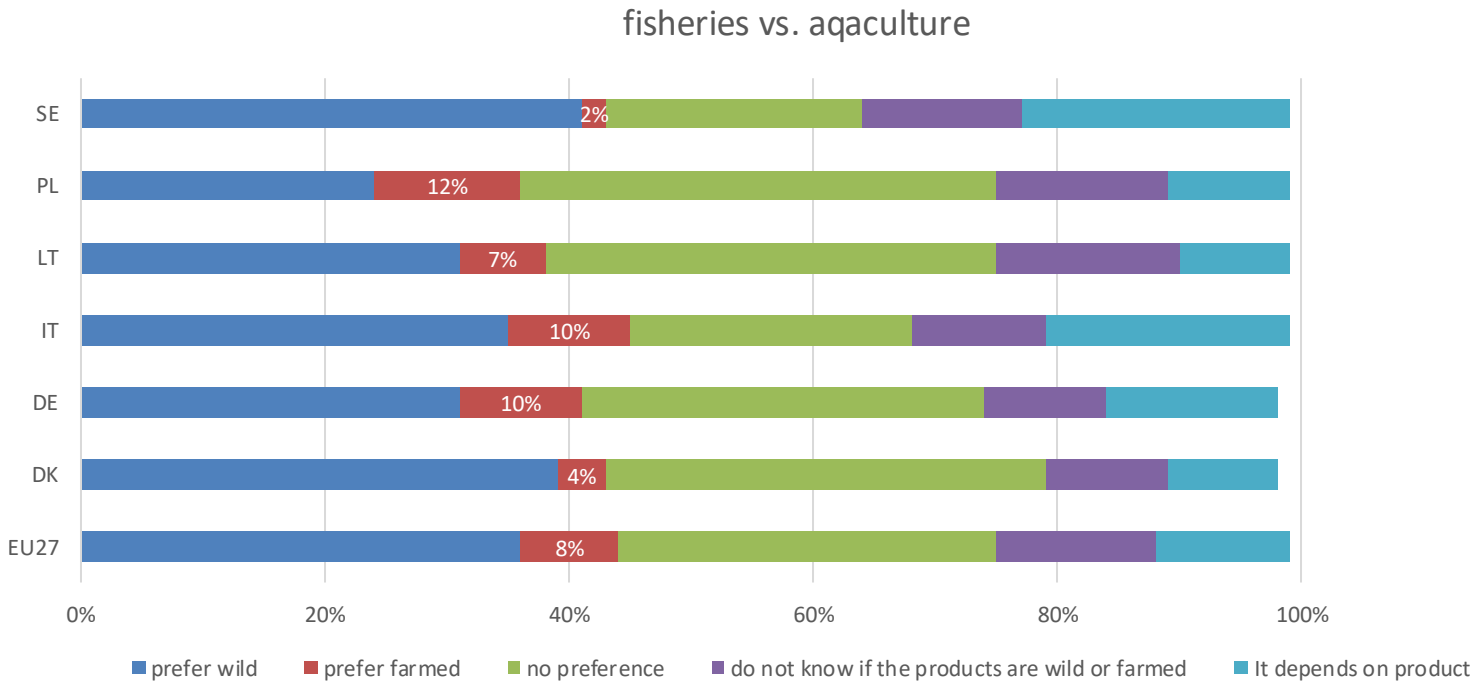


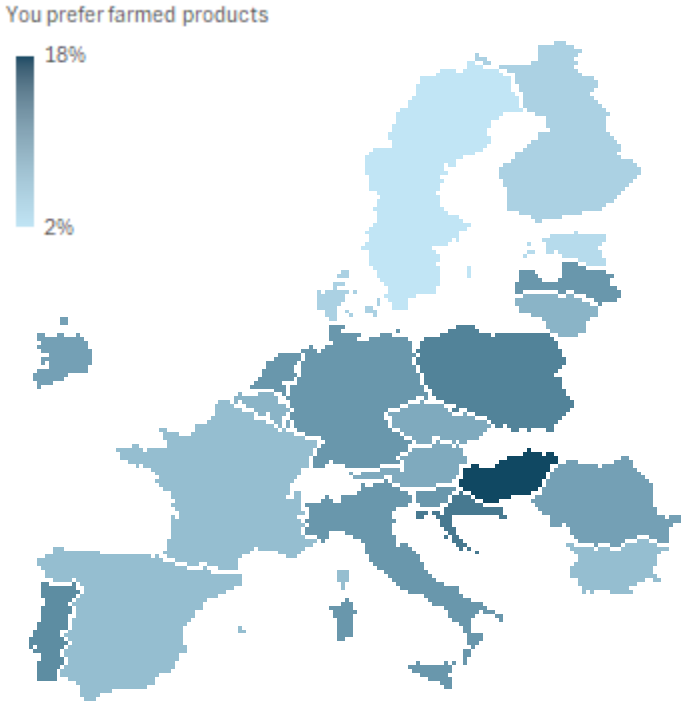


Indicator	Quality-oriented (%)
Age	30-44 years old (38%)
Residence	City over 100 thousand (38%)
Education	Higher (50%)
Personal monthly income	Over 6,000 PLN (30%)
Monthly household income	Over 15,000 PLN (20%)
Number of people in the family	Four (27%)

Own elaboration, Kulikowski, T., Szulecka, O., & Kabiesz, D. (2025). An analysis of consumer attitudes and purchasing behavior in the fish and seafood market [Unpublished manuscript]

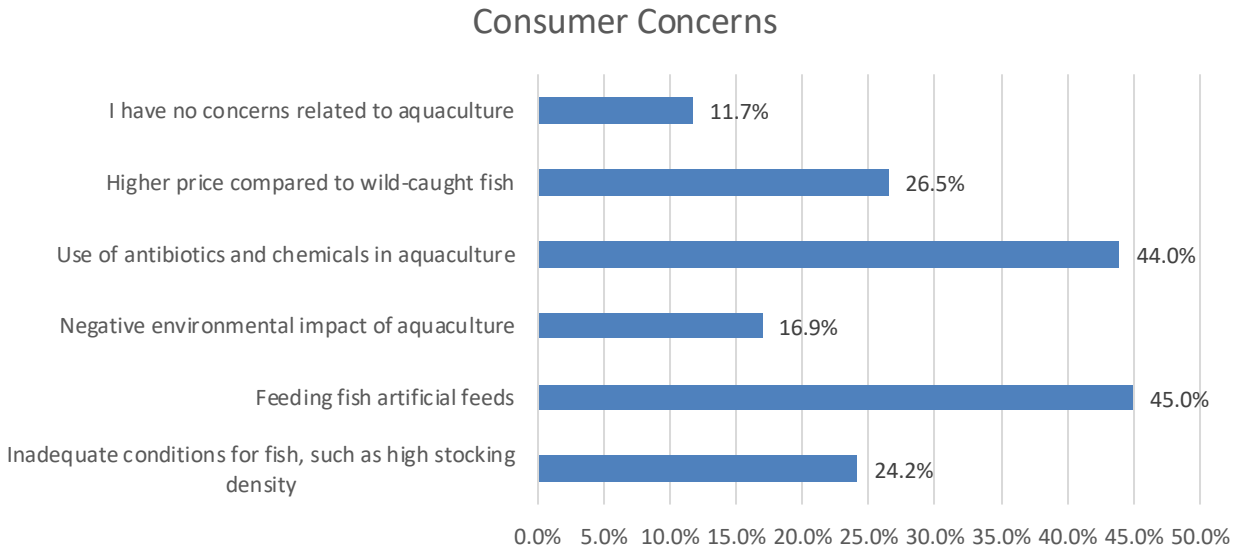
Aquaculture: Are Consumers On Board?

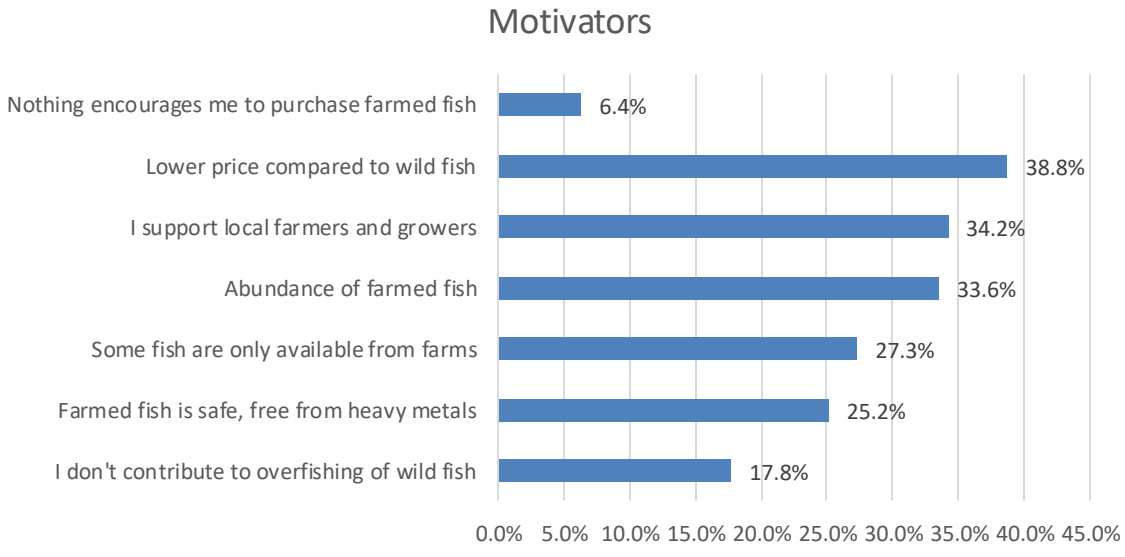




Own elabaration, based on Eurobarometer 2024 (EC 2025)

Aquaculture: Breaking Down Consumer Consumer Doubts and Drivers





Own elabaration, based on NMFRI research in IMPRESS project (H2020), https://mir.gdynia.pl/impress/

Co-funded by the European Union
IMPRESS

Recap and Insights

- While consumers across all EU countries, including Poland, declare that price is the main driver for seafood purchases, a deeper analysis shows that quality-oriented and price–quality balancing consumer segments are quite significant in Poland. Among quality-focused consumers, there is a strong interest in certified products.
- Sustainability (low environmental impact) as a purchasing criterion varies widely in importance — from very high in countries like Sweden and the Netherlands, to relatively low in Poland and Lithuania. In these latter markets, consumers are generally not willing to pay more for sustainability; they may view environmental friendliness as a "nice-to-have" extra, but not a reason for higher prices.
- Acceptance of (and willingness to consciously choose) aquaculture products is a different story. The majority of EU consumers still prefer wild-caught fish. Acceptance of farmed fish is slightly higher in Central and Eastern Europe, likely linked to traditional pond aquaculture practices in the region.
- To encourage consumers to eat more farmed fish — including new species — it is not enough to simply promote sustainability narratives. It is crucial to address consumers' concerns, particularly around issues like "artificial" feeds and the use of antibiotics.

Thank you!

Tomasz Kulikowski
Fish Market Development Association
mprfish@gmail.com

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New BlueFood products from multitrophic freshwater aquaculture

Prof. Remigiusz Panicz
West Pomeranian University of Technology in Szczecin

Theme: Blue Foods

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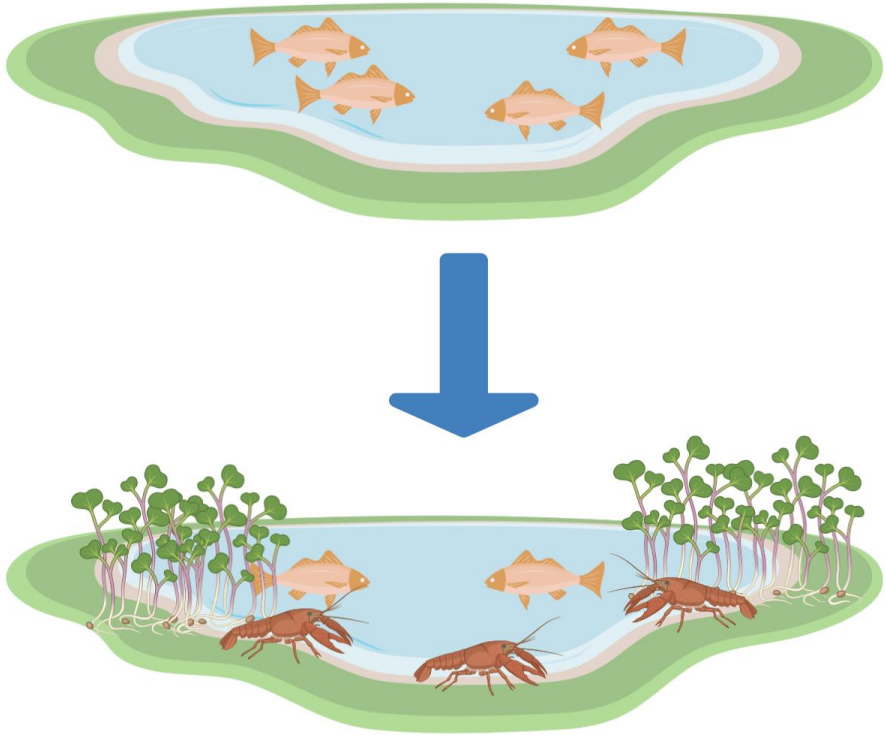
Freshwater aquaculture

- Production of world inland aquaculture – 59.1 mln t,
- European inland aquaculture – 0.9% of the world production,
- Horizontal expansion is highly restricted (numerous reasons),
- Intensification and diversification of production,
- Consumer and environment-oriented strategies,
- Integration with other sectors.

Development of F-IMTA

A farming method where multiple aquatic species from different trophic levels are cultivated together to create a more efficient and sustainable system.



Multispecies production

Common carp, other fish species

Native crayfish species

Watercress, herbs

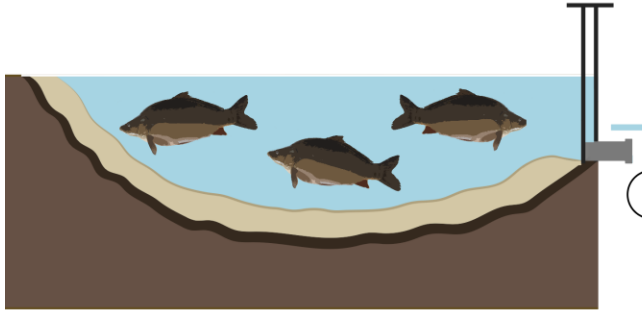
The environment of a freshwater farm allows for flexible allocation of fish, crayfish, and plant production units to meet the needs of each species, considering all key production stages, i.e., a single-pond production or a decoupled strategy.

F-IMTA reduces eutrophication and supports biodiversity

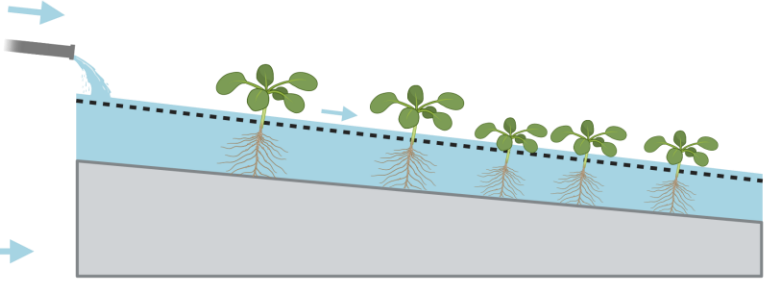
SAFE

BLUE BOOST

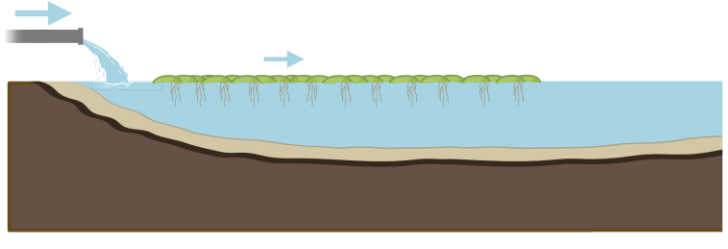
1 Common carp pond aquaculture



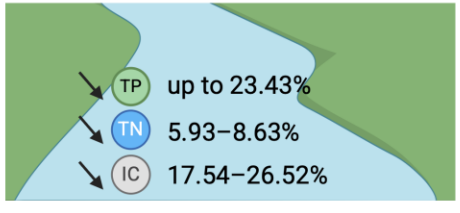
2 Watercress production systems

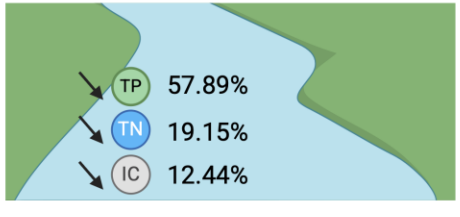


2 Duckweed production

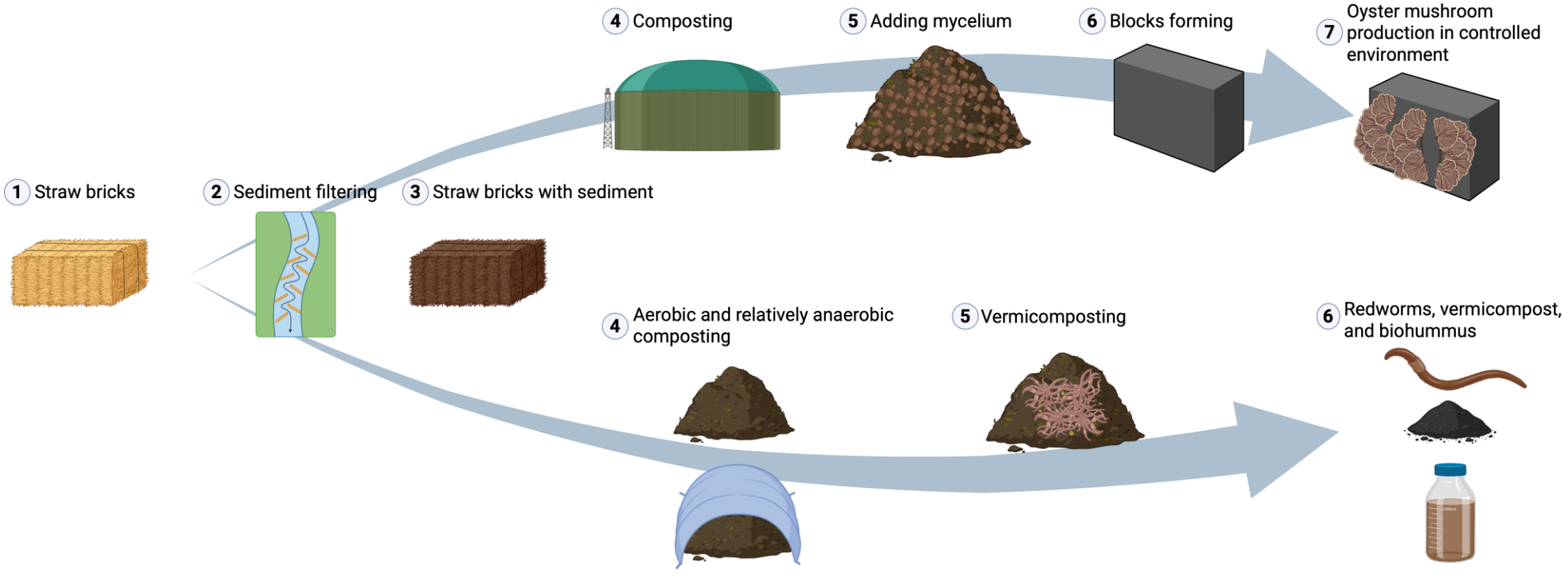


2 Bioremediation effect





Cross-sectoral cooperation



Trans-sectoral production

Oyster mushrooms

(food and feed components)

Redworms

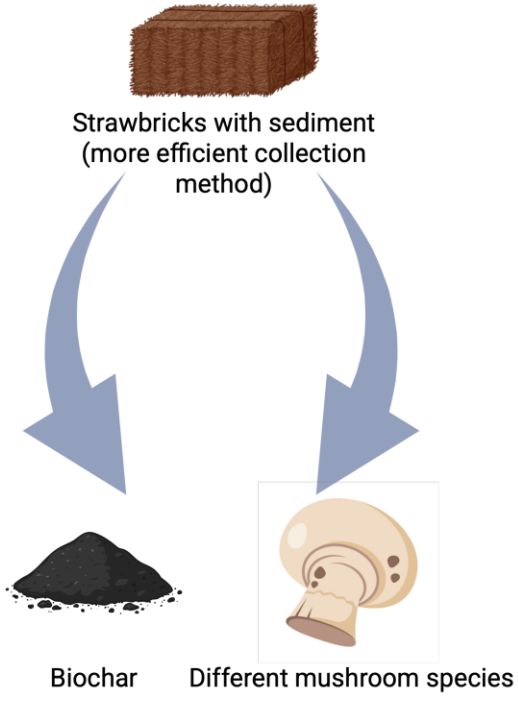
(vermicompost, biohummus)

How will climate change affect the resilience of freshwater food systems?

OCCAM

1

Improved carbon footprint of freshwater aquaculture through trans-sectoral integration



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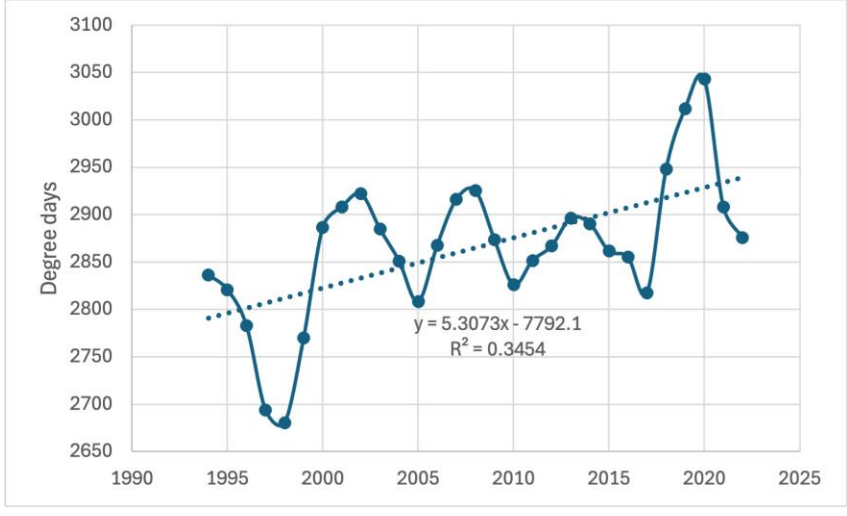

Water availability self-assessment framework to improve production quality

Take-home message

- Freshwater aquaculture enables the production of a vast array of new BlueFood,
- The main obstacles to overcome include:
  - reconsideration of traditional thinking and production methods,
  - creating solid bidirectional links within the aqua-agri sector,
  - familiarisation of the consumers with new BlueFood products,
  - removal of legislative barriers.

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West Pomeranian University of Technology Szczecin

Thank you for your attention

Prof. Remigiusz Panicz

Contact:
rpanicz@zut.edu.pl

SAFE

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OCCAM

Funded by the:

NCBR National Centre for Research and Development

Sustainable Blue Economy Partnership

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POTENTIAL OF WHITELEG SHRIMP (*Penaeus vannamei*) AS A SUSTAINABLE BLUE FOOD IN POLAND: INSIGHTS FROM EXPERIMENTAL TRIALS AND STAKEHOLDER PERSPECTIVES

MONIKA NORMANT-SAREMBA
UNIVERSITY OF GDAŃSK, POLAND

Theme: Blue Foods

Interreg South Baltic
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University of Gdańsk
Fahrenheit Universities
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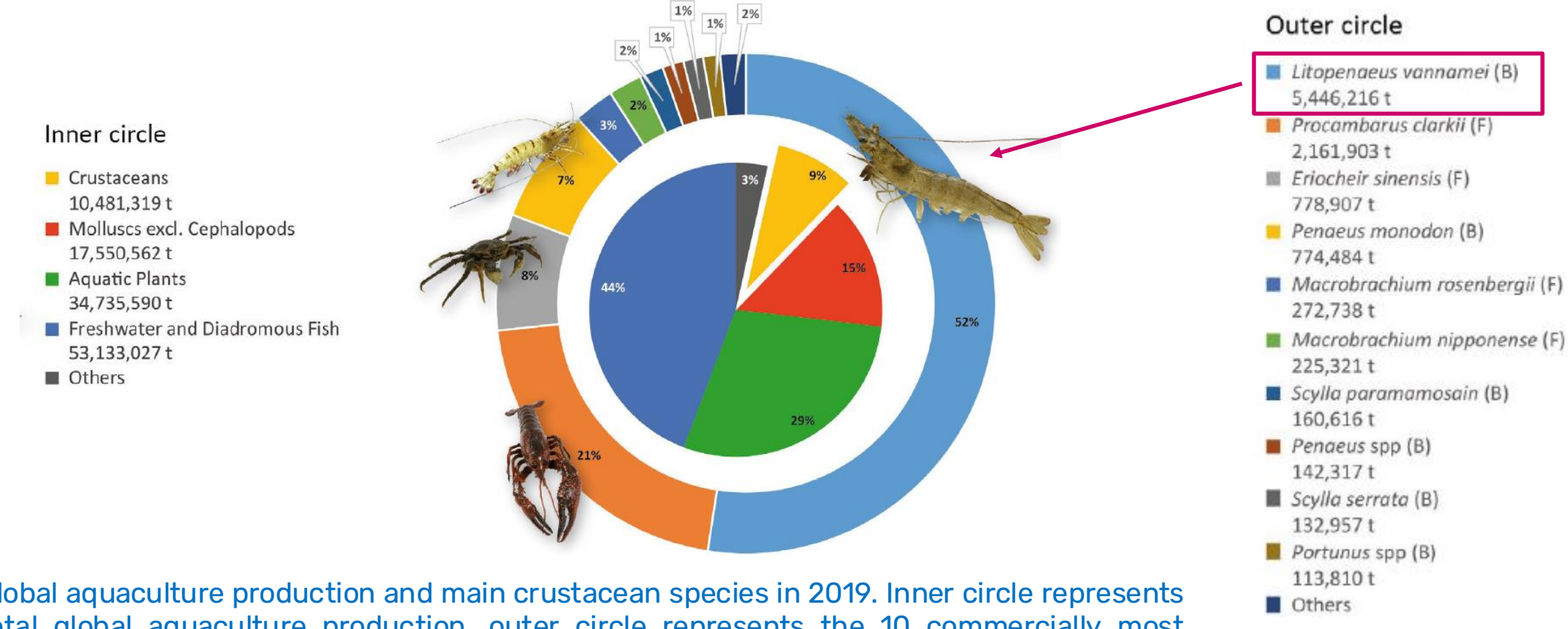
WHITE LEG SHRIMP IN THE GLOBAL CRUSTACEAN PRODUCTION



Global aquaculture production and main crustacean species in 2019. Inner circle represents total global aquaculture production, outer circle represents the 10 commercially most important crustacean aquaculture species, B- brackish, F- freshwater (**source:** Röthig et al., 2023, Journal of Insects as Food and Feed 9 (9): 1115-1138).

WHITE LEG SHRIMP - NUTRITIONAL AND HEALTH BENEFITS

Source of:

- ✓ Protein
- ✓ Omega-3
- ✓ Vitamin B12
- ✓ Selenium
- ✓ Iodine
- ✓ Phosphorus

WHITE LEG SHRIMP - ADVANTAGES FOR AQUACULTURE

- **Salinity:** tolerates 0.5-45 ppt, is comfortable at 7-34 ppt, **grows particularly well at 10-15 ppt;**
- **Temperature:** very tolerant to low temperatures (**down to 15°C**), is comfortable at 26-30 °C;
- **Potential to grow: up to 3 g/wk** (under intensive culture conditions even faster);
- **Stocking density:** at super-intensive systems even as high as **400 ind./m²**;
- **Feed and production efficiency:** low protein feed (20-35%), **FCR of 1.2**;
- **Seed for stocking:** Specific Pathogen Free (SPF) free larvae are available;

Photo credit: Piotr Kendzierski

All these advantages make this species better for aquaculture than other shrimp species!

GROWTH OF WHITE LEG SHRIMP AQUACULTURE IN EUROPE

KEY REASONS

- Europeans are the one of the World´s top white leg shrimp consumers along with the Americans and Chinese
- Demand for high-quality fresh (not frozen) shrimp in markets
- Preference for local produce (low carbon footprint)
- Negative perceptions associated with imported shrimp (questionable labor practices, environmental degradation, poor hygiene control, human trafficking, etc.)

Photo credit: Piotr Kendzierski

RECIRCULATING AQUACULTURE SYSTEMS (RAS)

ADVANTAGES

- flexible location and time
- parameter control
- water conservation
- minimal space
- improved biosecurity

Source: http://tirol.orf.at/news/stories/2833497

Garnelen made in Austria: Tiroler Bauer züchtet White Tiger-Garnelen

26. April 2017 13:35 — 8 Kommentare

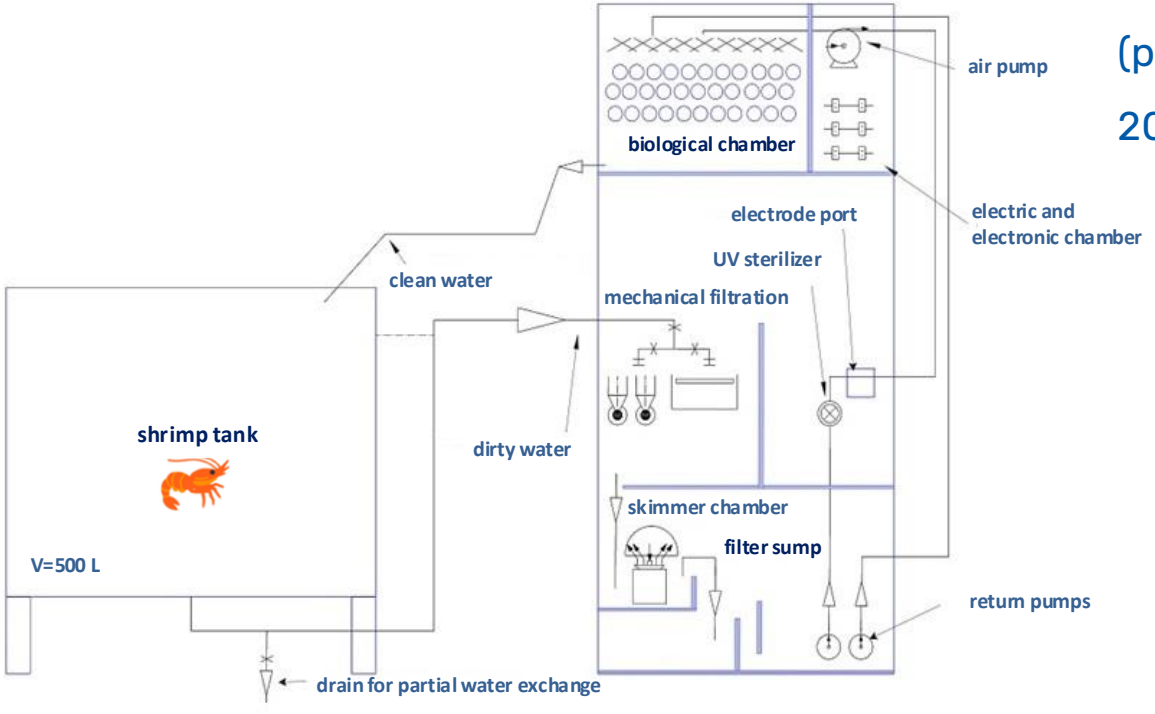
Das ist die erste "Alpen-Garnele" der Welt. - © APA, Glomex

Ein Tiroler Bauer züchtet die pazifische White Tiger Garnele in den österreichischen Alpen.

Source: http://www.vol.at/garnelen-made-in-austria-tiroler-bauer-zuechtet-white-tiger-garnelen/5254210

→ **+ green energy = efficient and sustainable shrimp production**

WHITE LEG SHRIMP - EXPERIMENTAL CULTURE IN POLAND



Scheme of experimental RAS-500 (AquaMedic Poland Bartosz Blum).

- ✓ **2017:** first experimental culture at the University of Gdańsk (project: **InnoAquaTech**, Interreg SBR Programme 2016-2019)

Photo credit: Monika Normant-Saremba

- **Maximal final length and weight:** 14 cm and 18 g
- **Quality of meet:** good

EXPERIMENTAL CULTURE OF THE WHITE LEG SHRIMP IN POLAND

✓ two next experimental shrimp cultures within the projects:

- **2020-2022:** AquaVIP ("Aquaculture Virtual career development Platform for the South Baltic region", Interreg SBR Programme 2014-2020);
- **2023-2026:** AquaLoop ("Aquaculture expert floor for circular economy practice", Interreg SBR Programme 2021-2027);

significant increase in knowledge and experience in shrimp aquaculture

Downstream news

EU shrimp industry on its path to industrialization

Source: https://www.aquafeed.com/newsroom/farming-news/eu-shrimp-industry-on-its-path-to-industrialization/

Photo credit: Piotr Kendzierski

THE POTENTIAL OF SHRIMP AQUACULTURE IN POLAND INCREASES

REASONS

- shrimp hatcheries in EU
- shrimp commercial feed
- shrimp RAS optimisation
- shrimp certification services
- support of professionals and networkers

Photo credit: Skretting

https://www.globalseafood.org/advocate/extruded-shrimp-feeds-reemerge/

EURO SHRIMP

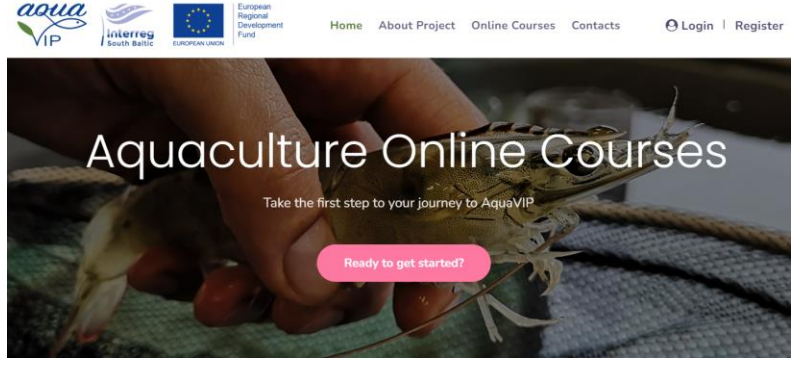
https://www.euroshrimp.net

STAKEHOLDERS' INTEREST IN SHRIMP FARMING IN RAS

- numerous participation in the project events - summer schools, various training courses, study visits to modern European farms;

https://www.2020.submariner-network.eu/news/39-aquaculture-news/422-innoaquatech-study-visit-to-belgium-a-breath-of-fresh-air-for-european-aquaculture

Visit to Belgian shrimp farm CreveTec in 2018 (20 participants).



https://www.aquavip.eu/

https://oig.ug.edu.pl/media/aktualnosci/78905/w_kierunku_hodowli_skorupiakow_innowacyjna_akwakultura_-_krewetka_biala_-_litopenaeus_vannamei

Summer school on innovative shrimp aquaculture in 2018 in Poland (30 participants).

STAKEHOLDERS' INTEREST IN SHRIMP FARMING IN RAS

✓ surveys carried out in 2019 within the **InnoAquaTech** project showed:

- high interest among restaurateurs and entrepreneurs to introduce a farmed RAS shrimp into the market;

https://www.freepik.com/

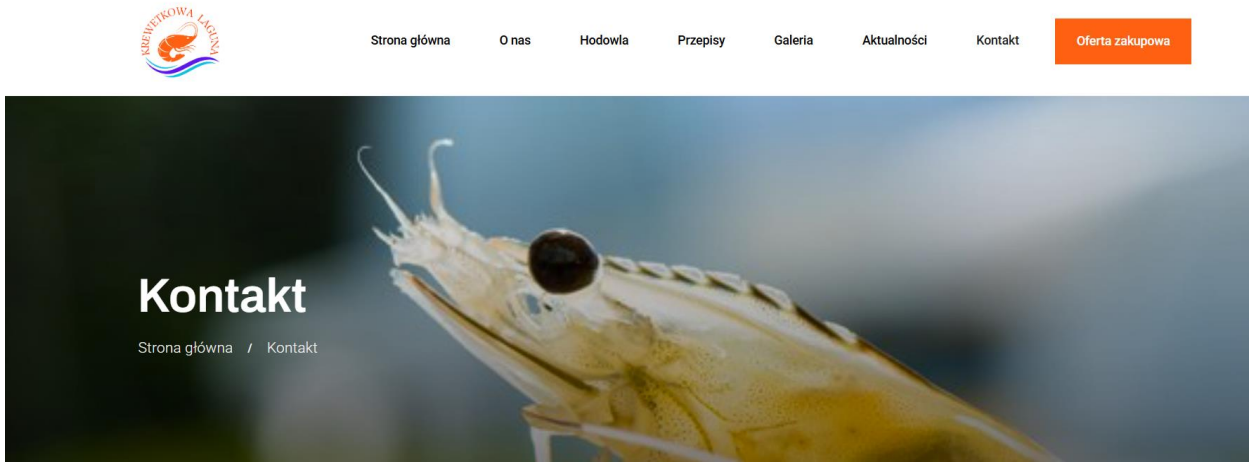
- high demand for consumer awareness raising campaigns in the area of sustainably farmed crustaceans;

https://www.freepik.com/

https://www.freepik.com/

THE FIRST WHITE LEG SHRIMP COMMERCIAL FARM IN POLAND

✓ Krewetkowa Laguna (in eng. Shrimp Lagoon) was established around 2023;



https://krewetkowalaguna.pl/kontakt/

Price:

around 33 euro per kilo
of 20-32 g shrimps

- **System:** indoor hybrid (RAS/ biofloc)
- **Total volume:** 32 000 L
- **Temperature:** 27-29°C
- **Salinity:** marine water
- **Feed:** high quality shrimp feed

https://www.google.com/maps

WILL THERE BE MORE SHRIMP FARMS IN POLAND?

- ✓ probably yes - another shrimp culture is being developed near Gdansk;

but

- ✓ fresh shrimps are a luxury product - do they have a chance in Poland to beat cheaper (frozen) shrimps from the supermarket?

https://www.citywatchla.com/la-election-2022/29075-homelessness-and-the-million-dollar-question

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Thank you!

and thank you to all project collaborators, especially:

Basia Dmochowska

Hania Łądkowska

Halina Kendzierska

Joanna Hegele-Drywa

University of Gdańsk

Interreg South Baltic Co-funded by the European Union

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Mr. Goodfish3

Empowering Sustainable Seafood Choices

Anna Sowa, Marek Harenda

Theme: Blue Foods

Experyment

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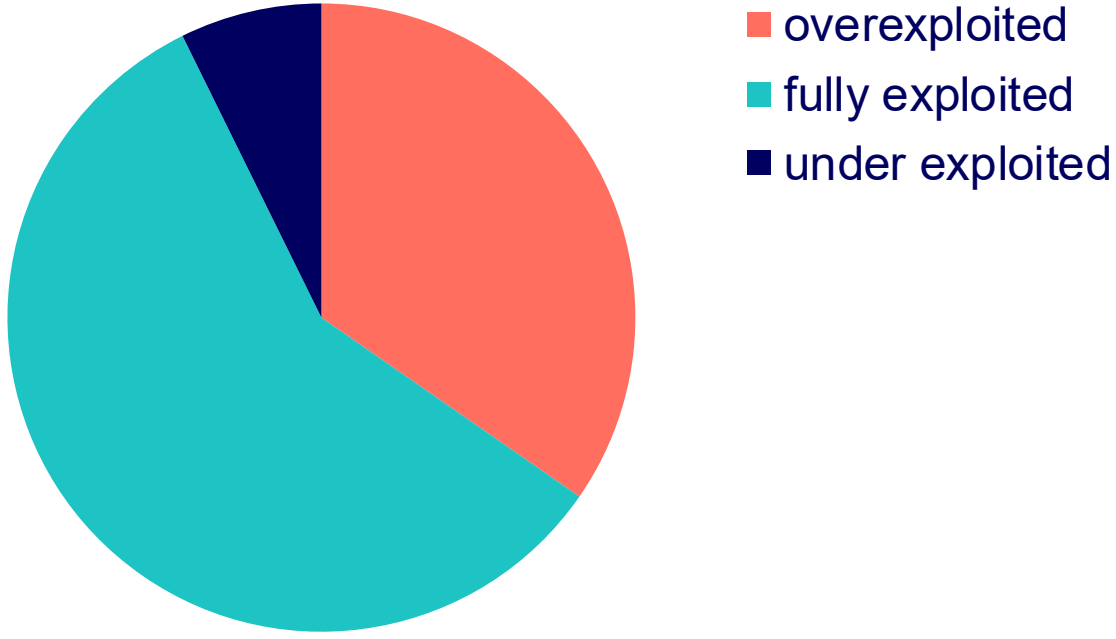
Reduce human pressure on vulnerable stocks by changing the practices of fishing industry and consumers

Global observation of seafood stocks at global level (FAO, 2024):

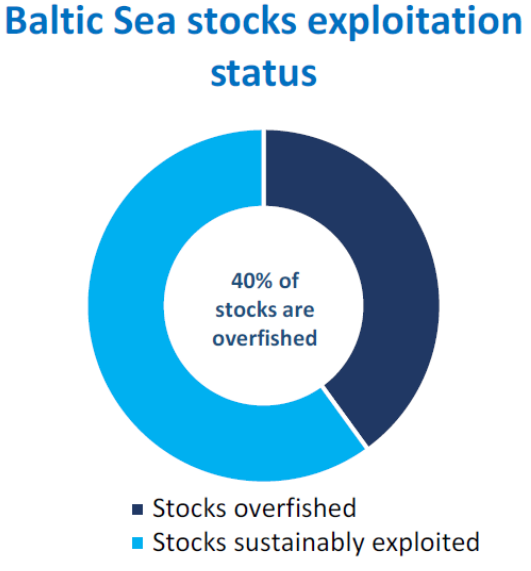
Overexploited stocks **37,7%**

50,5% fully exploited

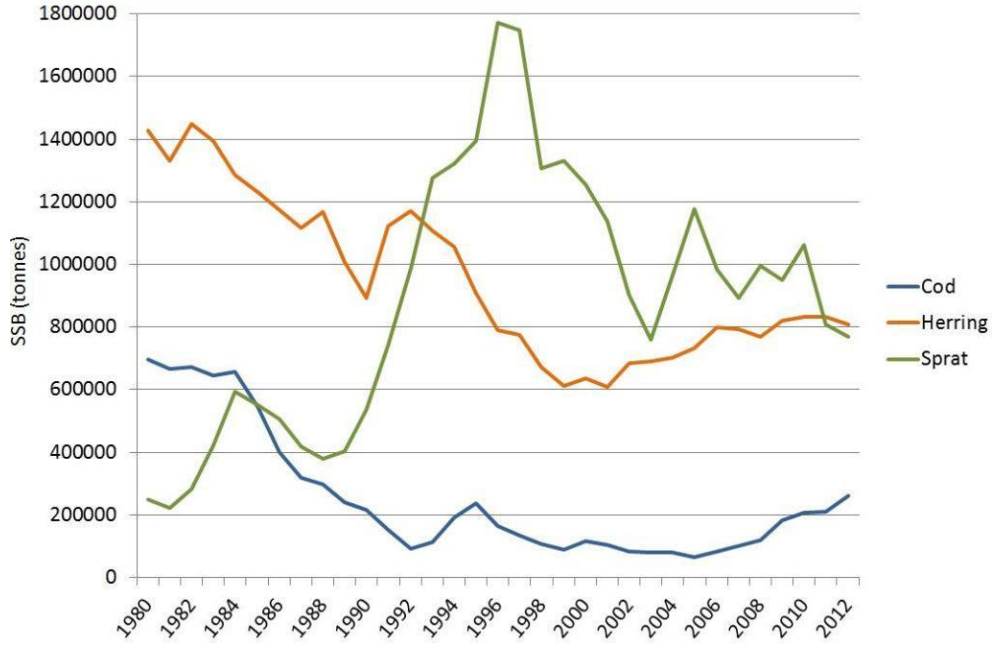
11,8% under-exploited



Fish consumption in the Baltic Sea region



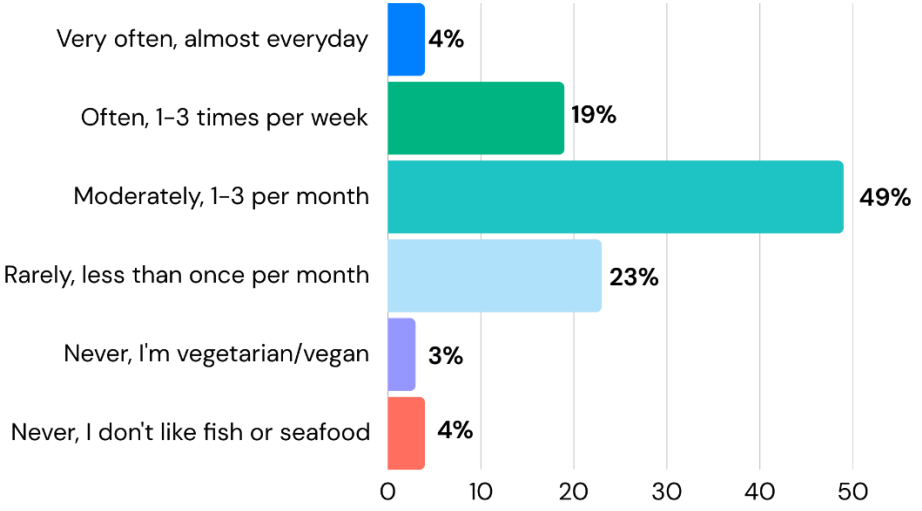
(OCEANA: Baltic Sea: Status and potential productivity of fish stocks, 2017)



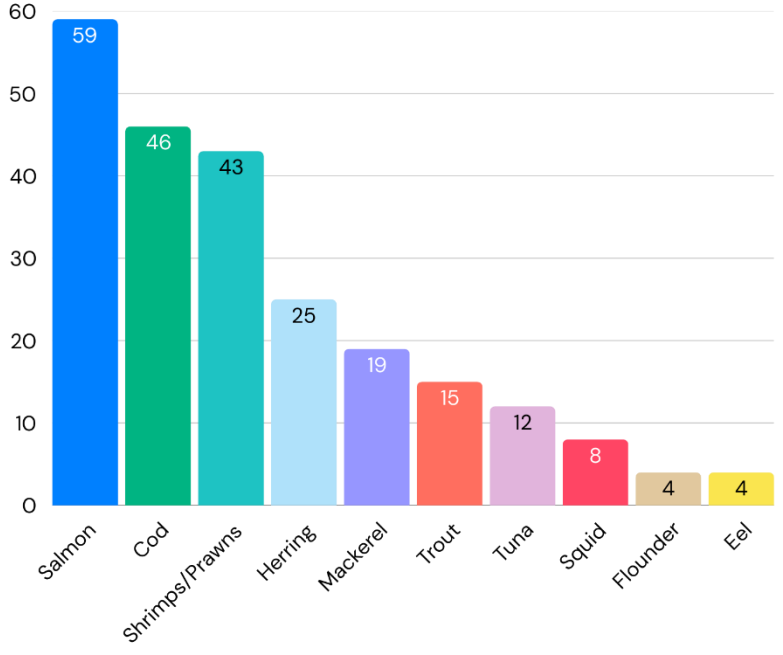
(ICES)

The frequency and top choices of Polish consumers

Fish & Seafood Consumption



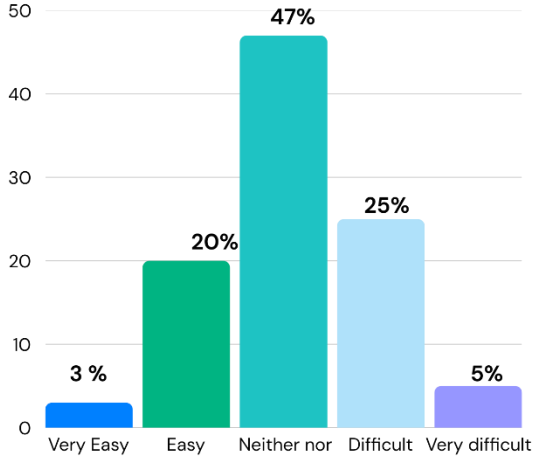
Top 10 Fish and Seafood



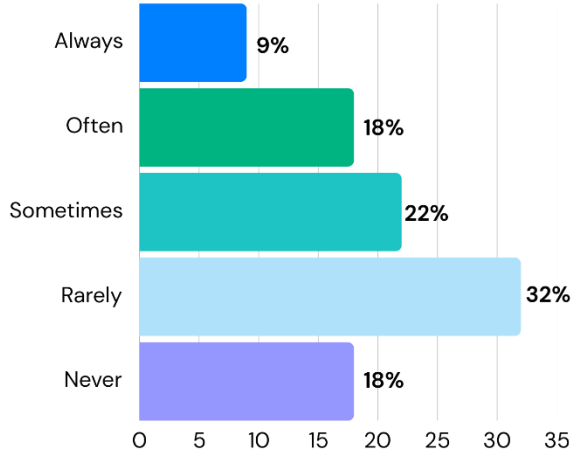
Experyment

Consumer perspectives on sustainability messaging

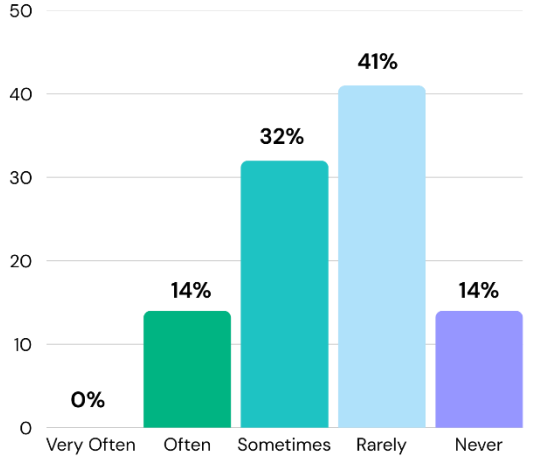
Information on Packaging



Research Habits Before Buying Fish



Encounter Sustainability Messages



GOALS

chefs and food influencers
contributing with recipes and stories onto the app

educational workshops

participations in activities at
local food or farmers' markets

serious game
played with adults

schools involved in educational activities

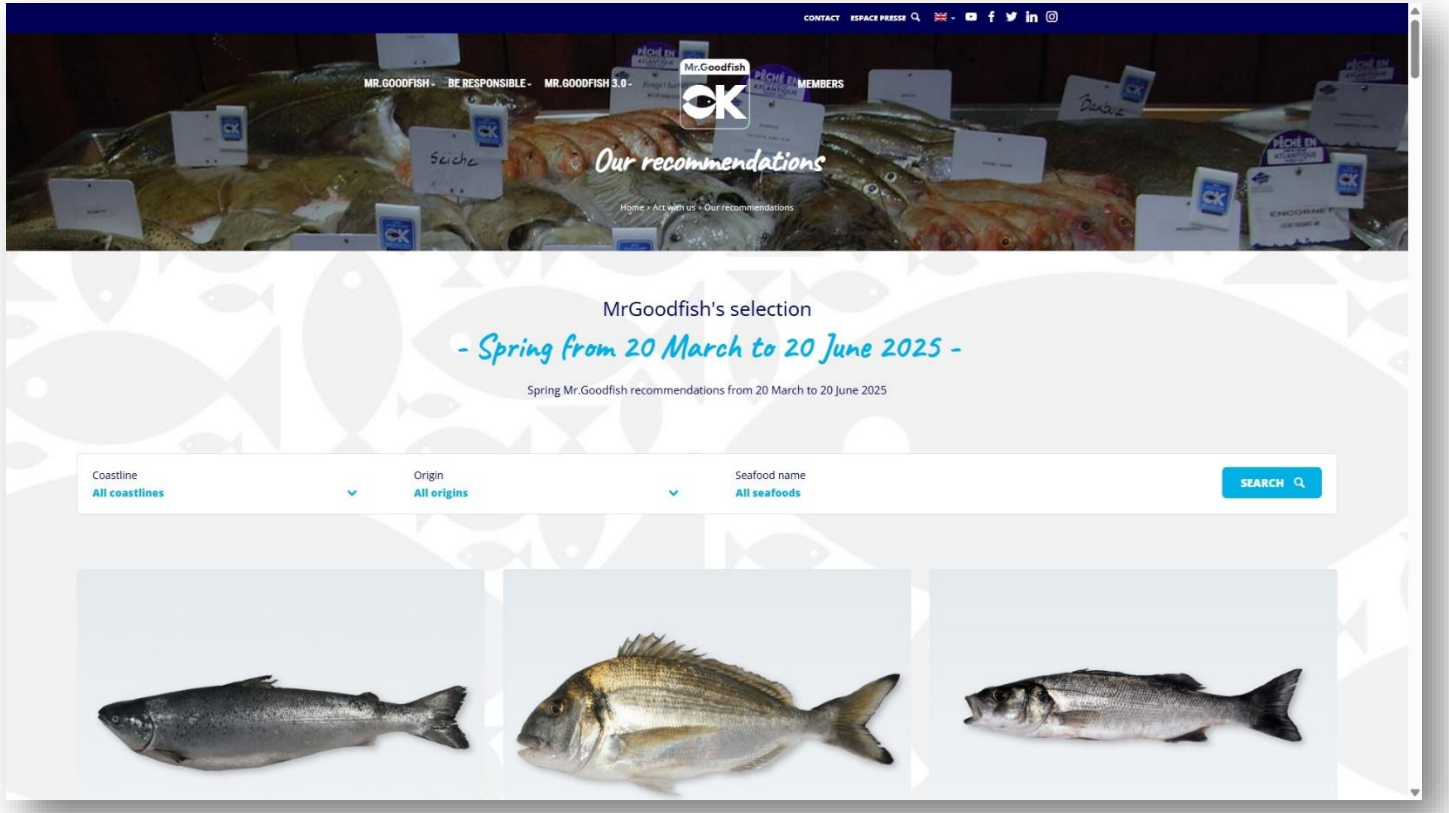
buisnesses branded with MGF label

chefs and restaurant owners reached

hundreds of pupils informed though MGF3.0 educational activities

Experyment

Website



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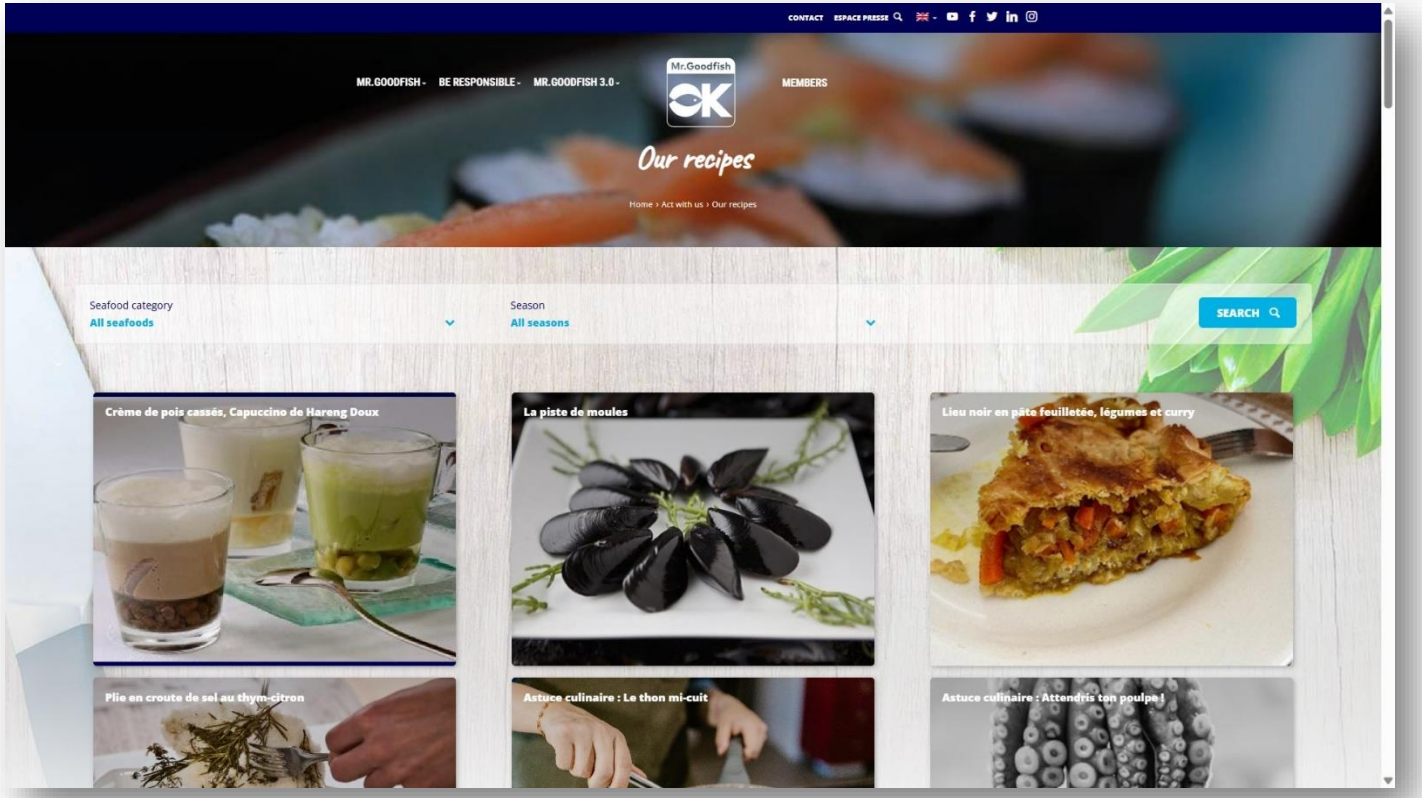
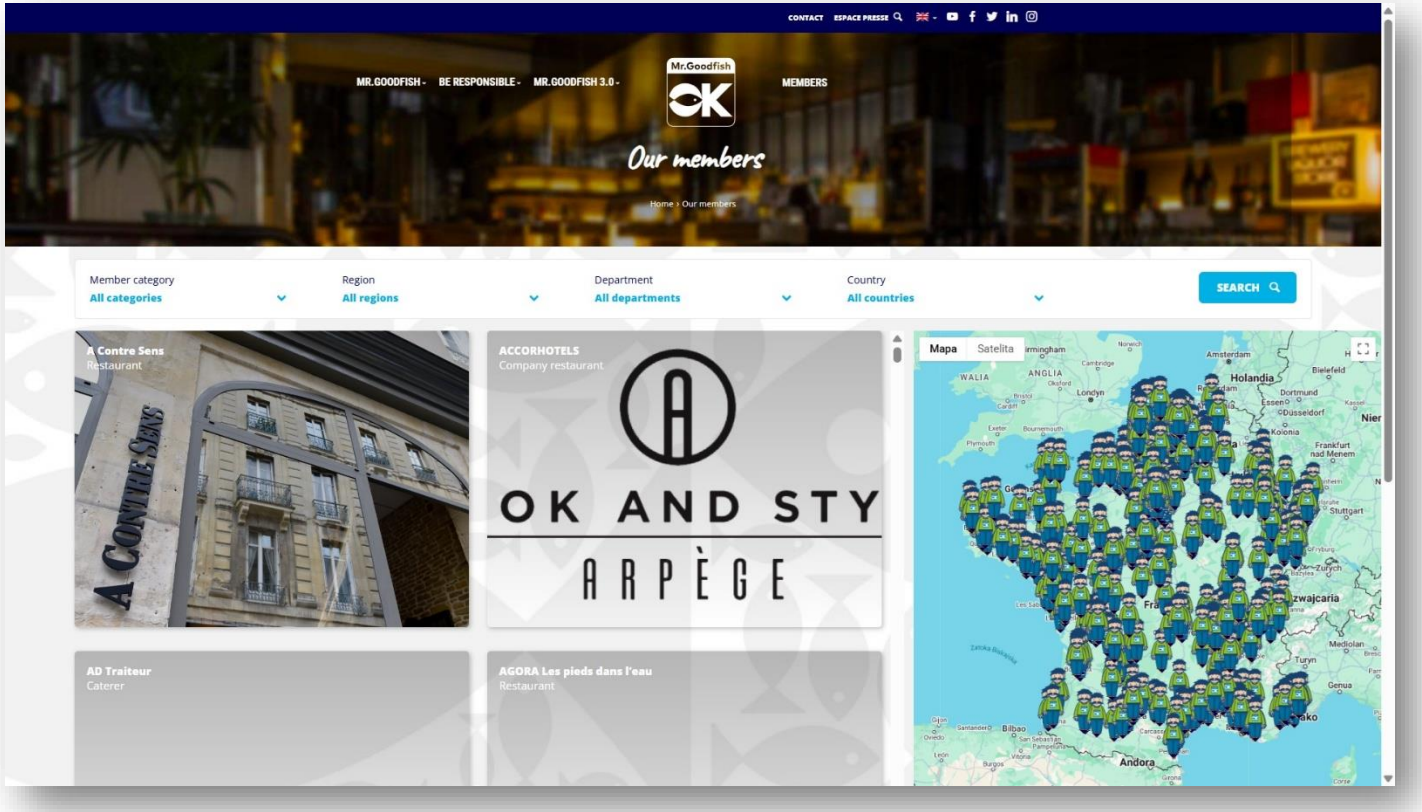

CONTACT
ESPACE PRESSE
MR.GOODFISH
BE RESPONSIBLE
MR.GOODFISH 3.0
Mr.Goodfish
MEMBERS
Our recipes
Home › Act with us › Our recipes
Seafood category
All seafoods
Season
All seasons
SEARCH
Crème de pois cassés, Capuccino de Hareng Doux
La piste de moules
Lieu noir en pâte feuilletée, légumes et curry
Plie en croute de sel au thym-citron
Astuce culinaire : Le thon mi-cuit
Astuce culinaire : Attendris ton poulpe !

Experyment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Our members
Home › Our members
Member category
All categories
Region
All regions
Department
All departments
Country
All countries
SEARCH
A Contre Sens
Restaurant
ACCORHOTELS
Company restaurant
OK AND STY
ARPÈGE
AD Traiteur
Caterer
AGORA Les pieds dans l'eau
Restaurant
Mapa
Satelita
Holandia
Andora

Experyment

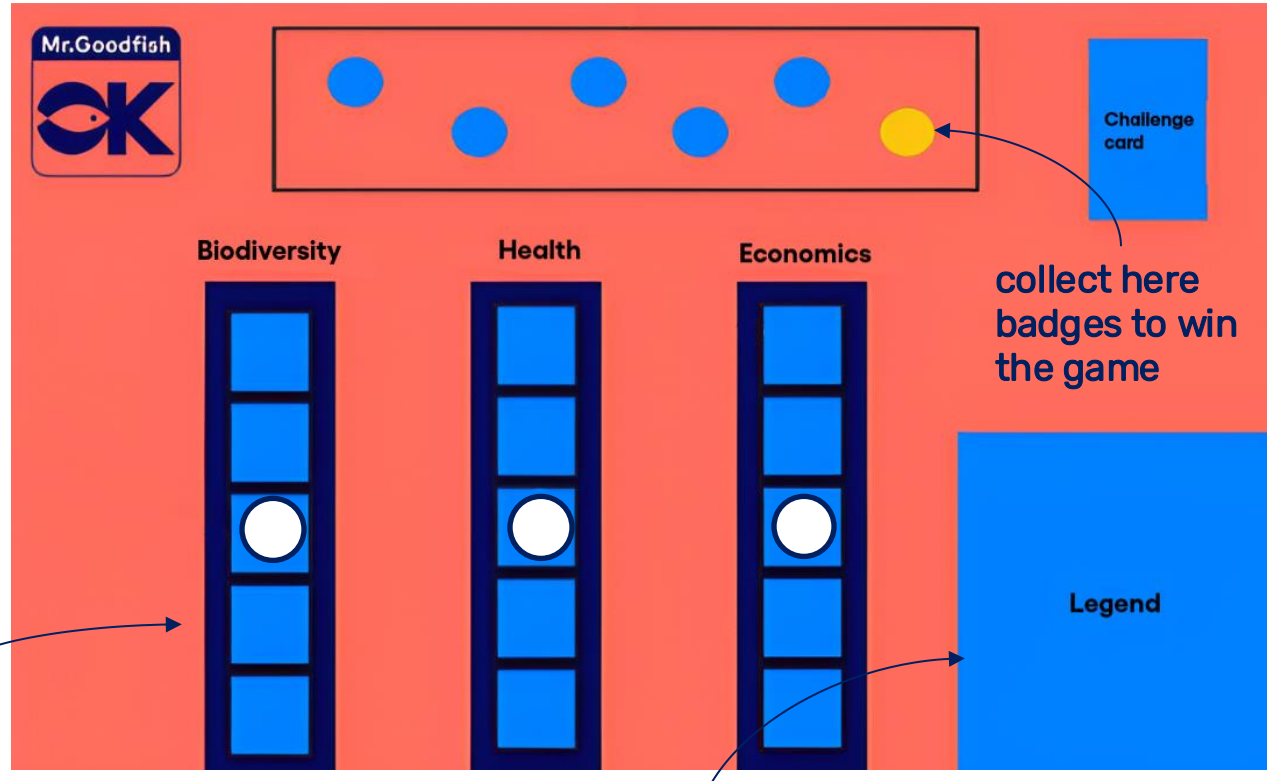
Mobile app

Experyment

Serious Game

Experyment

Pillars Of The Sea



decide the paws position according to the level of difficulty

quest cards divided per areas/sea basins

instructions about characters abilities, along with corresponing symbols

Experyment

Character card

Mr.Goodfish

Deep-sea Fisher

Quest card

Mr.Goodfish

Baltic Sea
Algae Bloom Crisis

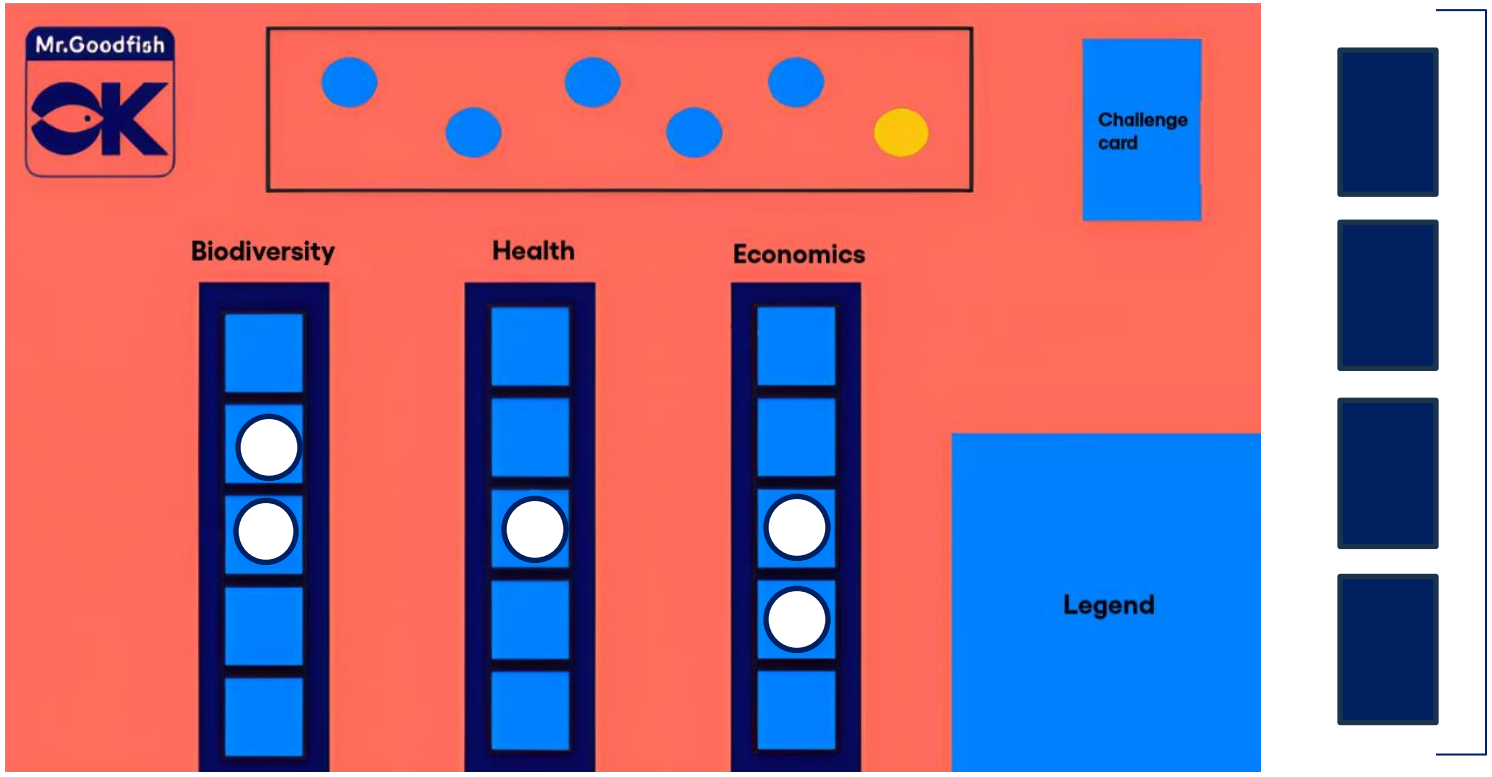
Every summer, parts of the Baltic Sea turn green from toxic algae blooms. Warmer waters and excess nutrients from agriculture make it worse each year. A recent bloom is threatening fish stocks and local tourism.

What do you do?

a) **Ban fertilizer use near the coast.** Effective long-term, but unpopular with local farmers.
- Environment: +1
- Economy: -1

b) **Launch a public awareness campaign.** Slower impact but builds community engagement.
- Environment: +1
- Economy/Health: 0

c) **Invest in algae harvesting tech.** Innovative, but expensive and untested.
- Health: +1
- Economy: -1


Mr.Goodfish
Challenge card
Biodiversity
Health
Economics
Legend

Character card

Mr.Goodfish

Deep-sea Fisher

Quest card

Mr.Goodfish

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Challenge card

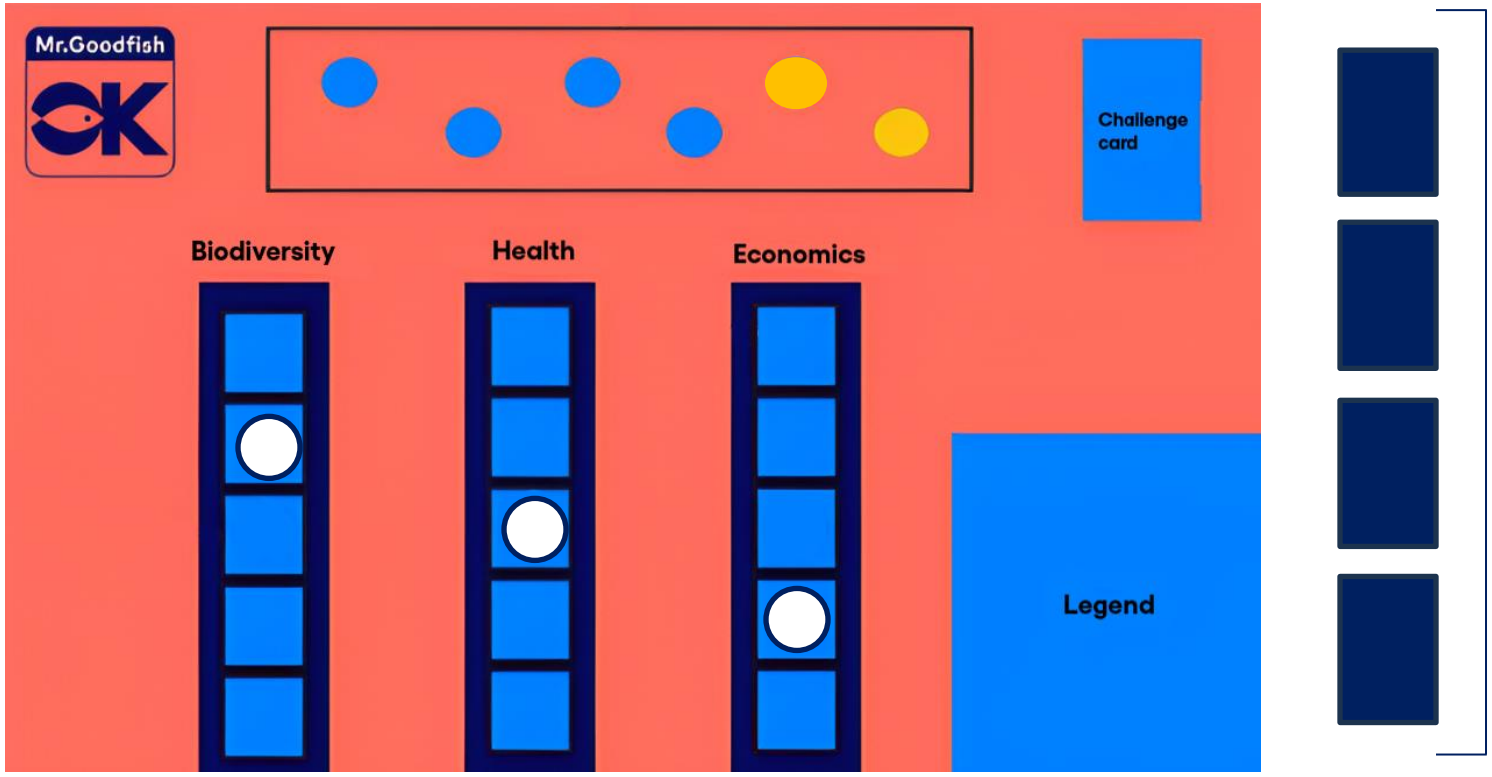
Mr.Goodfish

Baltic Sea ★

Which of the following fish species had the lowest spawning stock biomass (SSB) in the Baltic Sea during last 40 years?

a) herring
b) sprat
c) cod

Experyment


Mr.Goodfish
Challenge card
Biodiversity
Health
Economics
Legend

Educational Workshops

Experyment

MISSION BANOS
SUSTAINABLE BLUE ECONOMY BALTIC FORUM
ECONOMY PARTNERSHIP

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Patronage of the Polish presidency of the Council of the EU
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1 February 2025 – 1 June 2025

Experyment Science Center, Gdynia

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MISSION BANOS ECONOMY BALTIC FORUM

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Patronage de la présidence polonaise du Conseil de l'UE

Mr.Goodfish3.0

Mr.Goodfish

"Choose the right fish at the right season!"

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Experyment Science Center in Gdynia

https://experyment.gdynia.pl/

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Thank you for your attention

Freya Robinson

Contact:
fr@submariner-network.eu

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