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INVENTORY OF THE METHODOLOGIES AND INITIATIVES TO IMPROVE SOCIAL ACCEPTANCE OF THE AQUACULTURE SECTOR

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Deliverable: Inventory of EU Initiatives carried out at the European and International level, aiming at improving social acceptance of economic phenomena's and activities with proven results that have potential to be adapted to the aquaculture activities and territories

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1 Introduction

The world is off track to end hunger and malnutrition in all its forms by 2030. Degraded ecosystems, an intensifying climate crisis and increased biodiversity loss are threatening jobs, economies, the environment, and food security around the globe, all aggravated by the impacts of the COVID-19 pandemic, the war between Ukraine and Russia and other humanitarian emergencies.

Today, 811 million people suffer from hunger and 3 billion cannot afford healthy diets.

This has elevated the calls to urgently transform our agrifood systems to ensure food security, improve nutrition and secure affordable healthy diets for a growing population, while safeguarding livelihoods and our natural resources.

Aquatic foods are increasingly recognized for their key role in food security and nutrition, not just as a source of protein, but also as a unique and extremely diverse provider of essential omega-3 fatty acids and bioavailable micronutrients. Prioritizing and better integrating fisheries and aquaculture products in global, regional and national food system strategies and policies should be a vital part of the necessary transformation of our agrifood systems.

Seafood is a vital food group and form of income for millions of people around the world. The seafood industry has more than quadrupled in the last 50 years and is estimated to be worth around EUR 170 billion in 2021[1].

Around 200 million tonnes of seafood are produced globally every year. This comes from a combination of wild catch and aquaculture. The rapid rise of fish and crustacean farming in the last two decades now means that more seafood is produced via aquaculture (106 million tonnes) than comes from wild catch (94 million tonnes), according to the most recent data collected by Our World in Data.

1.1 Global Fish Production

Global production of fish and seafood has quadrupled over the past 50 years. Not only has the world population more than doubled over this period, but the average person also now eats almost twice as much seafood as half a century ago.

[1] Global seafood market value 2020-2025, Statista (2021)

This has increased pressure on fish stocks across the world. Globally, the share of fish stocks which are overexploited – meaning we catch them faster than they can reproduce to sustain population levels – has more than doubled since the 1980s and this means that current levels of wild fish catch are unsustainable.

One innovation has helped to alleviate some of the pressure on wild fish catch: aquaculture, the practice of fish and seafood farming. The distinction between farmed fish and wild catch is similar to the difference between raising livestock rather than hunting wild animals. Except that for land-based animals, farming is many thousand years old while it was very uncommon for seafood until just over 50 years ago.

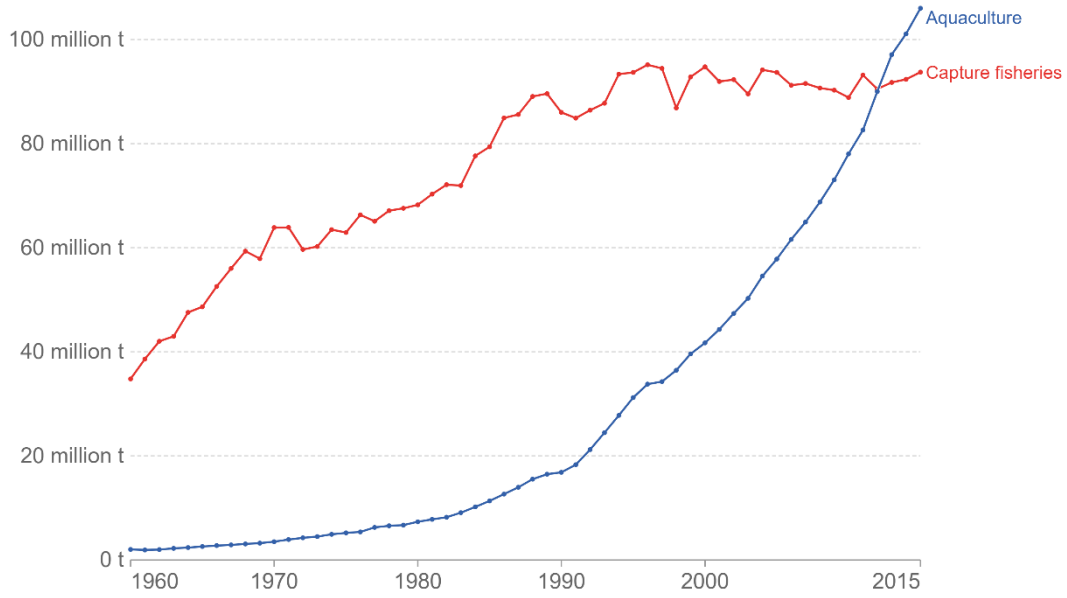

Figure 1. Benchmarking: Global fish production, Fish catch vs Aquaculture, World Bank [2]

1.2 The Global Consumption of Aquatic Food

Global consumption of aquatic foods (excluding algae) has increased at an average annual rate of 3.0 percent since 1961, compared with a population growth rate of 1.6 percent. On a per capita basis, consumption of aquatic food grew from an average of 9.9 kg in the 1960s to a record high of 20.5 kg in 2019, while it slightly declined to 20.2 kg in 2020.

[2] World Bank, World Development Indicators

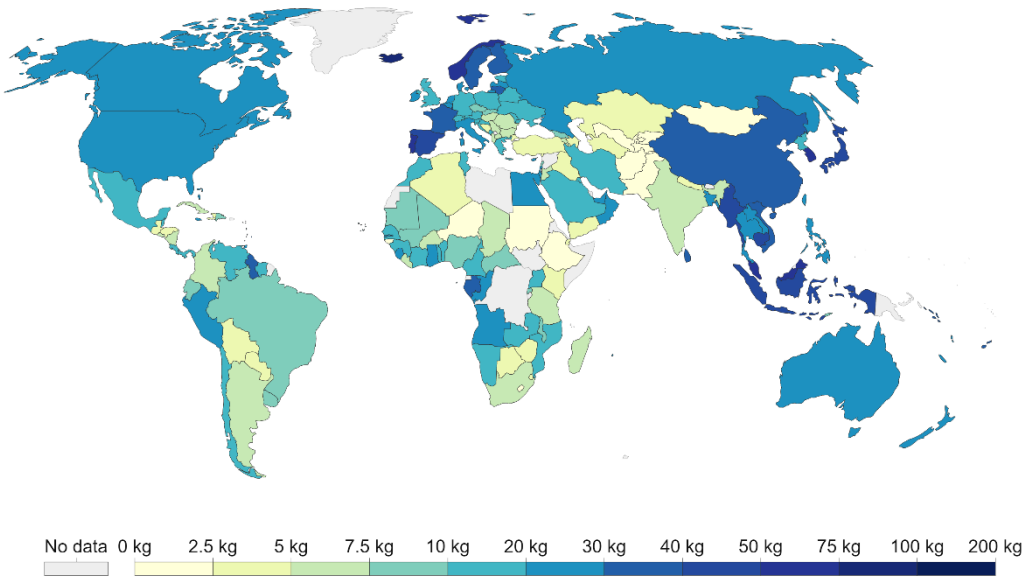

Figure 2. Fish and seafood consumption per capita, World Bank (2017)

Rising incomes and urbanization, improvements in post-harvest practices and changes in dietary trends are projected to drive a 15 percent increase in aquatic food consumption, to supply on average 21.4 kg *per capita* in 2030.

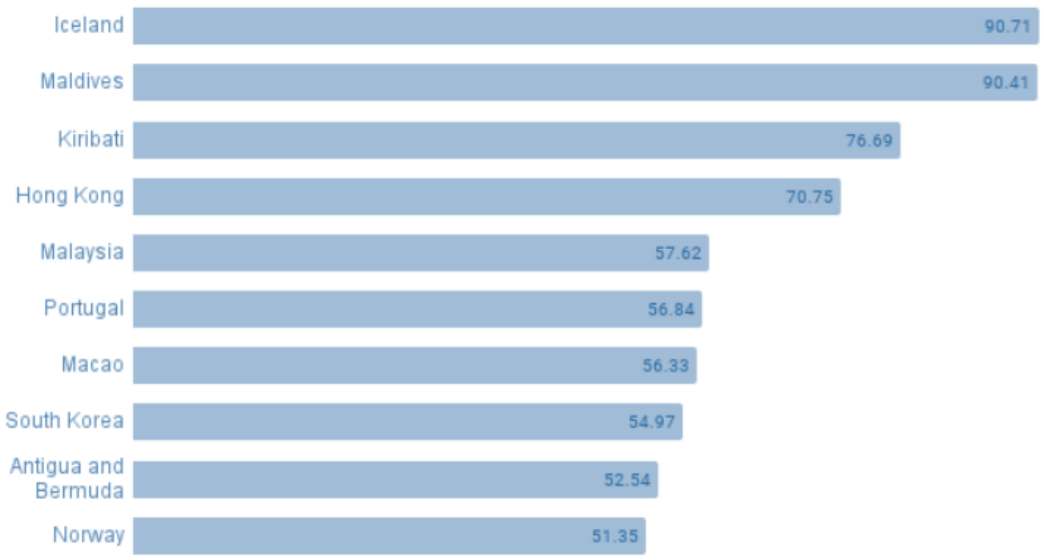

Figure 3. Top 10 seafood consumers: Annual consumption (kg) per capita, FAO

EU citizens consume an average of 23kg of seafood each year and nearly a quarter of this comes from aquaculture, demonstrating the contribution of the industry to health and nutrition as well as the economy. [3]

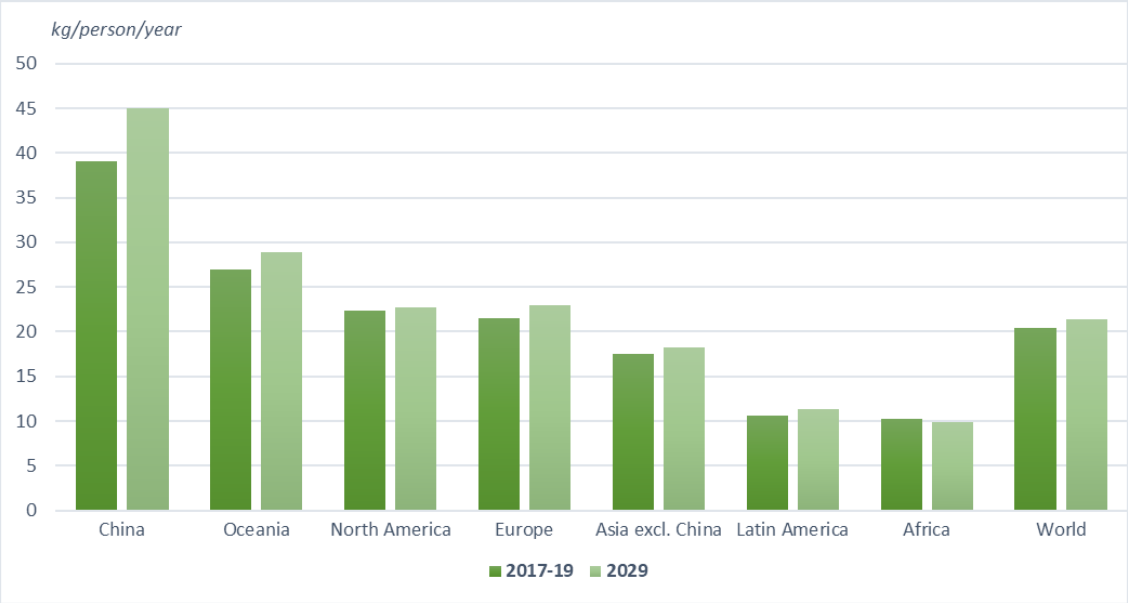

Figure 4. Per capita fish consumption outlook, OECD [4]

It is clearly demonstrated that over time, aquatic-based feeding has been responding to the nutrition needs of the world's population.

Looking at the Agricultural Outlook envisioned by OECD for the period 2017-2029, except for the African continent, we can find a growing fish consumption trend worldwide, placing an unprecedented responsibility on world's fisheries and aquaculture production capacity.

1.3 Sustainability on Fisheries

Sustainable fishing, by its fisheries definition, is catching just the right amount. If you harvest too much then fish stocks decline. When defining the sustainability of fisheries we need to know three terms:

Overfished

These are fish stocks where we catch fish faster than these populations can reproduce. As a result, populations decline and stocks become depleted to levels lower than the most productive level.

[3] EIT Food, website
[4] OECD/FAO (2020), "OECD-FAO Agricultural Outlook 2020-2029"

Maximally sustainably fished

These terms might be interpreted negatively by some, but actually this is the 'sweet spot' that fisheries are aiming for. This is the maximum sustainable yield, where we're catching as much fish as possible without reducing fish populations below the most productive level.

Underfished

This is when fish catch is less than the reproduction rate of fish populations. We could catch more fish without fish populations declining. From a resource point-of-view this is suboptimal because we're missing out on a key food source and income from fishing communities.

The breakdown of these three categories is shown in the chart. Combined, underfished and maximally fished would be considered to be sustainable because fish stocks are not declining.

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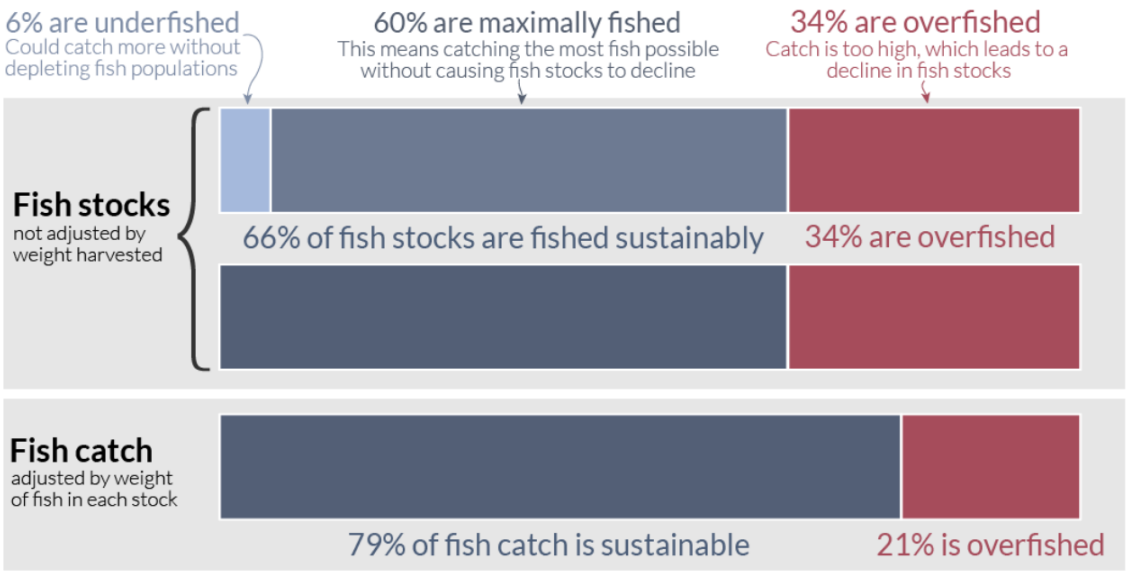


Figure 5. The sustainability of fish catches, OWID [5]

1.4 World's Aquaculture Review

According with «The State of World Fisheries and Aquaculture» 6 In 2020, total fisheries and aquaculture production reached a record of 214 million tonnes, comprising 178 million tonnes of aquatic animals and 36 million tonnes of algae, a slight increase of 3 % from the previous record of 213 million tonnes, in 2018. The limited growth is mainly caused by a 4.4 % decline in

[5] Our World in Data (https://ourworldindata.org/)
[6] FAO (2022), "The State of World Fisheries and Aquaculture"

capture fisheries due to reduced catches of pelagic species, a reduction in China's catches, and the impacts of the COVID-19 pandemic in 2020.

This decline of captures was compensated by a continued growth of aquaculture.

For the same reference period, global aquaculture production reached a record 122.6 million tonnes, including 87.5 million tonnes of aquatic animals' worth EUR 262.59 billion (mainly farmed in inland waters) and 35.1 million tonnes of algae worth EUR 16.36 billion.

Driven by expansion in Chile, China and Norway, in 2020 the global aquaculture production grew in all regions except Africa, due to a decrease in the two major producing countries, Egypt and Nigeria. The rest of Africa enjoyed 14.5 percent growth from 2019. Asia continued to dominate world aquaculture, producing 91.6 percent of the total.

China remains the world's largest exporter of aquatic animal products, followed by Norway and Viet Nam, with the European Union the largest single importing market.

According with FAO, in 2030, the European Union, Japan and the United States of America will account for 39 % of total imported volumes of aquatic food consumption[7].

Marine cold water species represent 70% of total production, freshwater species 14% and marine Mediterranean 16% [8]. The main species produced are salmon, trout, seabream, seabass and carp which represent 95% of the total European production in 2020.

Figure 6. Trade flows of aquatic products by region (2020), FAO 9

[7] FAO (2022), The State of World Fisheries and Aquaculture
[8] Federation of European Aquaculture Producers (2020), *Website*
[9] Share of total imports, in value, by region in 2020

Norway remains the dominant producer in Europe with 58% of the total supply, mainly salmon but also large trout (>1.2 kg) production. The other countries that produce more than 100,000 tons annually are Turkey, United Kingdom and Greece.

The aquaculture industry employs 20.5 million people worldwide!

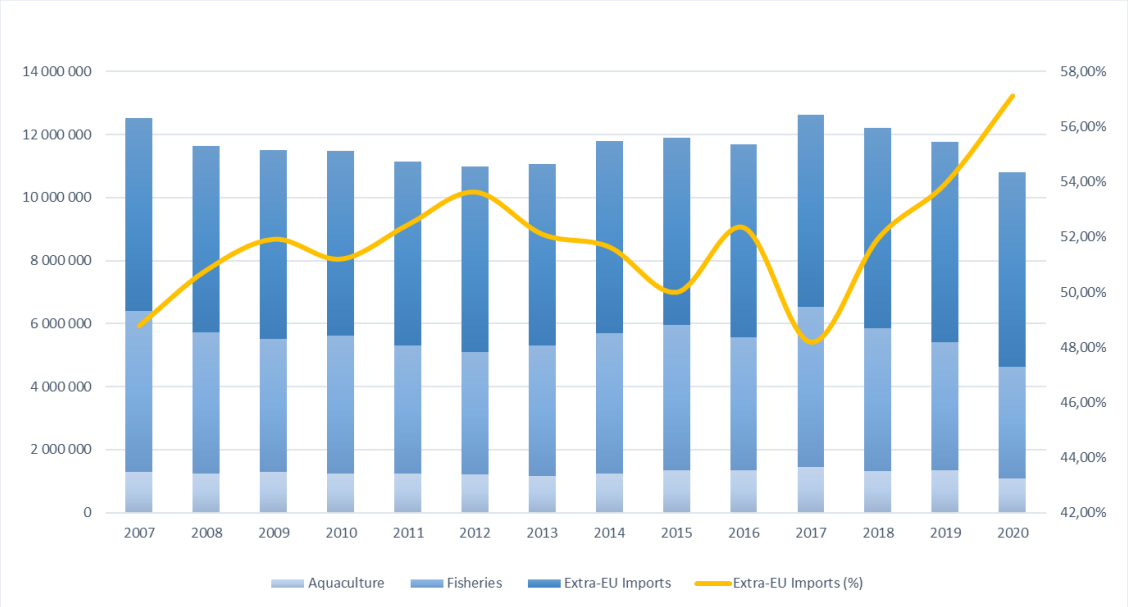


Figure 7. Benchmarking: EU's Seafood Productivity vs Extra-EU Imports, EUROSTAT

It is estimated that aquaculture production in the EU only covers 10 % of the domestic demand for fish and whereas more than a half of the demand for fishery products comes from imports from third countries, mainly from Norway. The EU is by far Norway's most important market, accounting for 60% of Norwegian export value.

The EU does not follow the growing global trend of aquaculture production.

Looking at the time series, with the disaggregated data on catches and aquaculture (Seafood Productivity) compared to the extra-Community imports of the same complacency, we conclude that over time, the European Union has been strengthening its dependencies on third countries, to meet its needs for aquatic-based food resources.

With the significant reduction in catches, the stagnation of aquaculture production and the growing trend of demand for aquatic nutrients, the EU's food sovereignty is increasingly at risk.

1.5 EU's Aquaculture Production

Often in the literature, Global and European trends are confused with the EU's performance on aquaculture production. It is true that globally aquaculture has played a leading role in responding to the decline in fisheries. It is true that worldwide, more than half of the aquatic

food consumed is produced and not captured. However, this same reality does not exist within the European Union. Growth in the aquaculture sector has been at a standstill in the EU for several decades, in contrast to the other world trends.

2017 was the best year for EU's aquaculture production of the last 20 years.

The EU aquaculture sector reached 1.4 million tonnes in sales volume and EUR 5.7 billion in turnover, in 2017. This corresponds to an increase of 2% in sales volume and 4% and 11% in the turnover compared to 2016. The overall EU aquaculture sector has experienced a slight decrease in all economic performance indicators in 2018 compared to 2017.

The negative economic development is driven by the marine fishes' segment, whereas the segments freshwater fishes and shellfish, experienced a slight increase.

The EU's aquaculture production is mainly concentrated in four countries covering 62% of the turnover and 69% of the sales weight in EU27: Spain (27%), France (18%), Italy (12%), and Greece (11%).

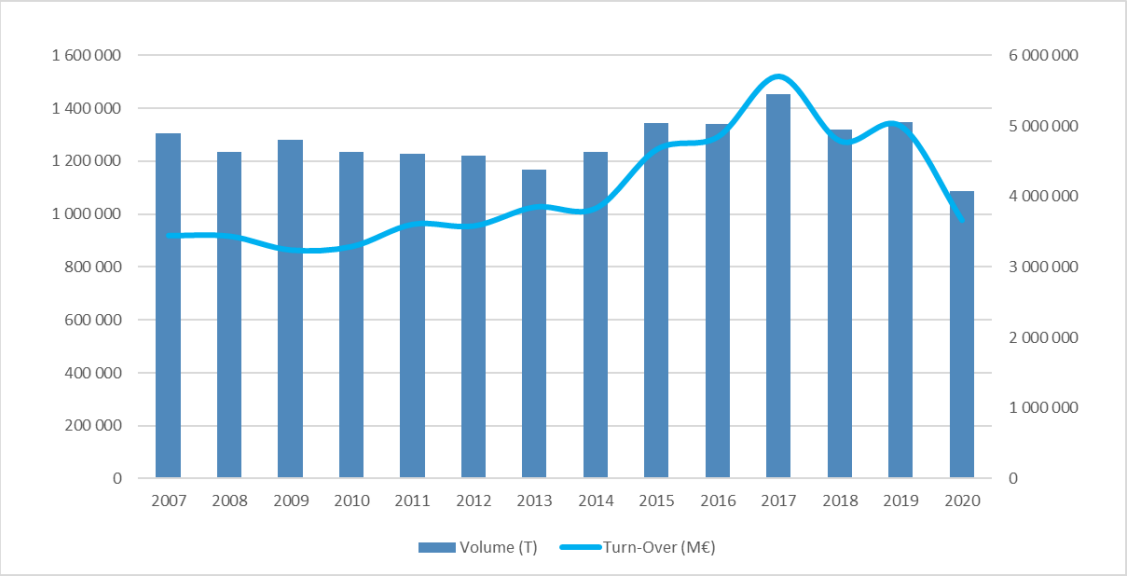


Figure 8. EU Aquaculture's production: Volume (Tonnes) and Tur-Over (M€), EUROSTAT

The EU aquaculture sector has three main production sectors: Marine fish, Shellfish and Freshwater fish production.

The marine fish sector is the most important economically and generated the largest turnover of €1 811 million, followed by the shellfish sector with €1 266 million and the freshwater sector with €1 016 million.

In 2020, the aquaculture's production didn´t move further the 1 million tonnes, representing a decrease around 18,5% regarding the pre pandemic performance[10].

The health crisis imposed by the COVID-19 pandemic brought a market context with unique characteristics in contemporary history, and therefore some analyses were precipitated regarding the behaviour of aquaculture productive capacity and fish consumption in the EU.

However, by analysing the available statistical data at the time of preparation of this report, we find that from 2017 to 2020 there has been a significant drop in the EU's productive capacity.

The EU's production drop was sharp in 2020, year in which the EU broke the record for importing salmon from Norway.

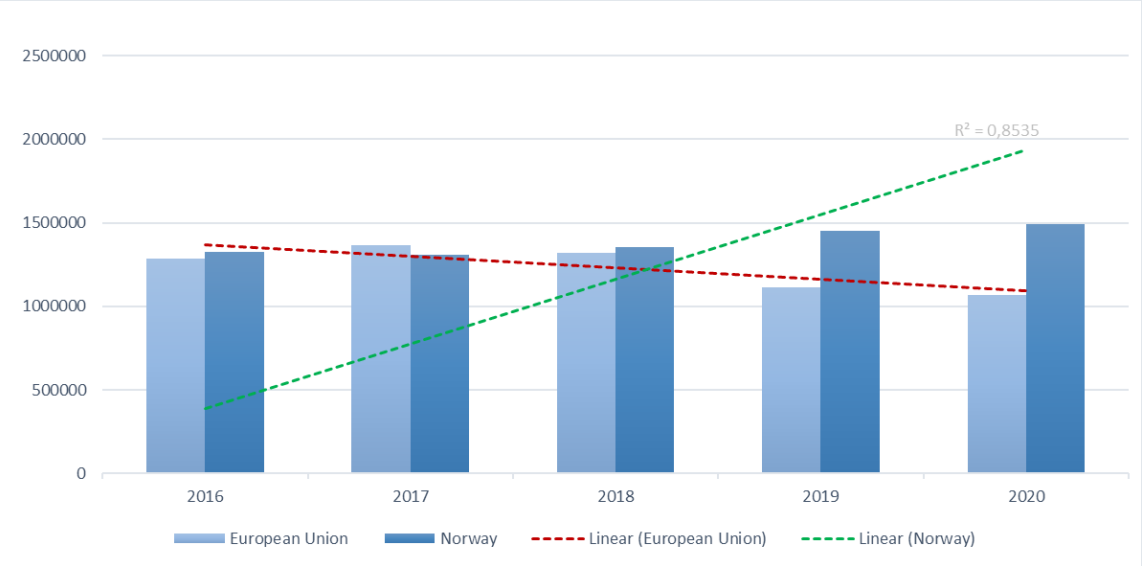


Figure 9. Benchmarking: EU vs Norway Productivity in tonnes, EUROSTAT

Over the past few decades, Norway has seen an impressive growth in its production capacity. In 2016, Norwegian production exceeded all production throughout the European Union.

Despite all of its benefits, aquaculture production and consumption in the European Union (EU) has not grown at the same pace as in other parts of the world. Of the total consumption of fish and seafood by the average EU citizen, only 25% originated from aquaculture.

In 2020, aquaculture production reached 87 million tonnes globally. China is by far the largest producer, accounting for 57% of the world production with 49,6 million tonnes. The second largest aquaculture producer is India with 8,6 million tonnes, accounting for 10% of world

[10] Eurostat (FISH_AQ2A)

production. The EU-27 reached the 10th position, accounting for 1,3% of world production with 1,1 million tonnes produced, covering only 10% of the seafood consumed in the EU[11].

The EU is highly dependent on imported aquatic food, mainly from Norway's salmon industry.

The EU imports over 70% of the fish and seafood that it consumes. It is therefore important to support the further growth and diversification of aquaculture production in the EU in a way that preserves the environment and provides more jobs and economic development to coastal and rural areas.

1.6 Jobs & Businesses

The aquaculture sector provides an important source of employment, income and livelihoods, especially in rural communities, both coastal and inland, for developing countries. Women constitute a significant proportion of the aquaculture workforce, especially in processing. Global data specific to the aquaculture supply chain is difficult to ascertain. The reason for this is simple: downstream from production, in core activities such as processing and wholesale trade, aquaculture is often combined with capture fisheries, although the two sectors may be entirely different in terms of market price exposures, environmental impacts and governance mechanisms.[12] Informality, which often characterizes small-scale aquaculture production in many developing countries, is another reason.

Global Overview

The aquaculture sector recorded an average annual increase in direct employment of 4.29% from 1995 to 2018. Globally, aquaculture today provides direct work for an estimated 20.5 million people, accounting for approximately one third of all workers engaged in fisheries and aquaculture. While the number of those engaged in these two industries has increased from 36.2 million in 1995 to 59.7 in 2018, there has been a shift towards aquaculture production away from capture fisheries, which originally represented 80% of total employment. [13]

According to available data, women constitute only 14% of those employed in primary production in both fisheries and aquaculture.

European Union Region

The vision advocated by the most recent EU policies and strategic guidelines refer to aquaculture as a strategic economic activity to create jobs while accelerating the green transition.

Employment is an important part of the social dimension of aquaculture sustainability, and the EU has strongly committed to the UN Sustainable Development Goals (SDGs) where social objectives are important.

[11] EUMOFA (2022), "Organic Aquaculture in the EU"
[12] Ulf Johansen et al. (2019), "The Norwegian seafood industry – Importance for the national economy"
[13] FAO, 2017, "Fishery and Aquaculture Statistics"

EU aquaculture sector provides jobs for 69,000 persons in 15,000 enterprises.

This includes ten thousand owners and family members engaged in small family driven businesses contributing to the social dimension. More than 80% of the enterprises in the aquaculture sector are micro-enterprises, employing less than 10 employees.

Although the performance of the sector has not evolved much in recent decades, with regard to its ability to generate jobs, we observed a major change is a significant growth in the number of full-time equivalent people employed, which rose from 36,000 in 2013 to just under 44,000 in 2016[14] and around 69,000 in 2020[15].

The degree of specialization slightly decreased from 2017 to 2018, which is considered the effect of the increasing contribution from the shellfish sector resulting in a decrease in the ratio between employees and FTE's. The use of part time labour contributes significantly to the workforce in the European aquaculture sector. The average yearly wage was €25 700, corresponding to an 11% increase compared to 2017.

An analysis of social data collected under the EU-MAP show that the persons employed in the sector are primarily male (76%) and that the age class 40-65 constitutes about 43% of total employment.

Education level shows large differences among MS's, the production technology used and production sectors.

The majority (83%) of people employed in the aquaculture sector are nationals of their own country, whereas the rest mainly comes from other EU MS's. This is true for all technologies and production segments as well.

1.7 Feeding the Growing Population

Globally, agriculture is being relied upon to feed a population projected to reach 9.3 billion in 2050. To achieve that, food production will need to increase from the current 8.4 billion tonnes to almost 13.5 billion tonnes a year.

As the global population increases the competition for already scarce land, water and energy resources intensifies. And there is the growing impact of climate change to contend with, to which agriculture itself contributes significantly.

However, the recent growth in aquaculture has helped increase the supply of seafood, kept the overall price of fish down and eased the pressure on wild-caught fish stocks.

[14] European Commission (2018), "The EU Aquaculture Sector – Economic Report (STECF-18-19)"
[15] European Commission (2020), "The EU Aquaculture Sector – Economic Report (STECF-20-12)"

Most importantly, when it is carried out responsibly aquaculture is an environmentally friendly source of healthy and nutritious protein that will play a critical role in feeding the world's growing population.

2 Sustainable Aquaculture Overview

2.1 The Overall Concept

The increase of production required to feed the growing population will be impossible without large-scale changes in the world's food systems. Responsible production of farmed fish is a huge challenge and must consider large, complex, and dynamic sets of interactions to put in place effective management plans that are not a trade-off for aquaculture's production benefits.

Unacceptable social trade-offs in aquaculture may include the abuse of workers' and community rights, policies that favour large operators, inequality and discrimination, slavery, and child labour.

Unacceptable environmental trade-offs in aquaculture may include the degradation and the disruption of an ecosystem, contribution to climate change, and loss of biodiversity. Aquaculture growth has often occurred at the expense of the environment. Sustainable aquaculture development remains critical to supply the growing demand for aquatic foods.

To fulfil the demands of the future, aquaculture must follow the **three pillars of sustainability** and be economically, socially and environmentally friendly:

Economic: aquaculture must be a viable business opportunity with a positive long-term outlook.

Social: Aquaculture must be socially responsible and contribute to community health and well-being.

Environmental: aquaculture should not create significant disruption to the ecosystem or be responsible for the loss of biodiversity or significant pollution impact.

Our oceans and waterways are all connected, therefore what we do in one place has an impact on the ecosystem in another place.

In furtherance of ensure everyone can continue to farm these environments for food, we need to practice responsible, sustainable and smart (technological enabled) aquaculture. However, this can be challenging as aquaculture is dynamic in how it operates. Its development has not been standardised globally as each system varies with species, location, societal norms and available technologies[16].

[16] World Bank (2014), Sustainable Aquaculture

Sustainability Policies to Aquaculture

To address global food demand and sustainability challenges, aquaculture has appeared as an essential element in food systems, and an increasing number of national aquaculture policies have emerged over the past decades. However, several of these policies have failed because of an often-argued inability to anticipate their far-reaching implications on environmental and socio-economic variables.

Nevertheless, there is a range of international policies and best practice guidance available to help ensure aquaculture is practiced sustainably. For example, the FAO's **Code of Conduct for Responsible Fisheries**[17] outlines principles and international standards for the use of fisheries and aquaculture resources. This aims to ensure the effective conservation, management, and development of aquatic species.

In the European Union the sustainable development of aquaculture is one of the main objectives of the **Common Fisheries Policy (CFP)**[18]. Recently, the European Commission introduced new strategic guidelines for a more sustainable and competitive EU aquaculture to contribute to the **European Green Deal**[19] and for **EU's Farm to Fork strategy**[20]. Those guidelines aim to accelerate the transition to a sustainable European food system, by adopting a strategy to recognises the potential of sustainable aquaculture to provide food and feed with a low carbon footprint, while also creating economic opportunities and jobs. It states that aquaculture should not only have its own guidelines but also be integrated into wider EU strategies and policies, using a systems approach.

When we look at the externalities of the aquaculture sector, we must understand that their impacts go far beyond the ability to feed the world's population. In fact, the EU's strategic vision for climate emergency has recognised the role of aquaculture in a wide range of positive externalities.

As is assumed in many scientific literatures, as well as in several strategic documents published by European organisations, the aquaculture sector can also contribute: (1) towards the decarbonisation of the economy; (2) the fight against climate change and to mitigate its impact; (3) the pollution reduction; (4) the conservation of ecosystems; and (5) towards a more circular management of resources.

Nevertheless, as shown in previous graphs, no matter all the strategic recommendation, the EU's aquaculture production remains relatively stagnant compared with the rising rates of farmed seafood production at world level or event compared with other European countries, such as Norway.

[17] FAO (1995), Code of Conduct for Responsible Fisheries
[18] European Commission (2013), Common Fisheries Policy
[19] European Commission (2020), A European Green Deal
[20] European Commission (2020), Farm to Fork Strategy

2.2 Standards and Certification for Sustainable Aquaculture

Given consumer scepticism and all the doubts raised by opinion makers regarding the conduct and good practices of the aquaculture sector, certification has been a vital role to play in restoring trust, through external accreditation mechanisms in the quality of good practice. However, this import resulted in an exponential growth in the number of entities and standards for the sustainability certification of the sector.

In this chapter we will establish a brief description of the certification schemes most adopted in countries such as Norway, Chile and Scotland.

Aquaculture Stewardship Council (ASC) [https://www.asc-aqua.org/]

Adopted by the salmon industry of Chile, Norway and Scotland. These standard addresses responsible aquaculture with focus on key environmental impacts of farming, set requirements for workers' rights and protect communities surrounding certified farms.

It intends to minimise or eliminate the key negative environmental and social impacts of salmon farming, while permitting the industry to remain economically viable.

GLOBALG.A.P [https://www.globalgap.org/]

It is a farm assurance program, translating consumer requirements into Good Agricultural Practice. The standard was developed using the Hazard Analysis and Critical Control Points (HACCP) guidelines published by the United Nations Food and Agriculture Organization, and is governed according to the ISO/IEC 17065 for product certification schemes

The certification scheme was adopted by Chile, Norway and Scotland and it aims the economically, ecologically, socially and culturally responsible agriculture and aquaculture.

Friend of the Sea (FOS) [https://friendofthesea.org/]

Adopted by Norway, Chile and Scotland, Friend of the Sea it is a specific standard for marine aquaculture and it aims to Conserve the marine environment while ensuring sustainable fish stocks for generations to come.

Friend of the Sea has become the leading certification standard for products and services which respect and protect the marine environment. The certification awards sustainable practices in Fisheries, Aquaculture, Fishmeal and Omega 3 Fish Oil. Friend of the Sea also promotes pilot projects related to restaurants, sustainable shipping, whale and dolphin-watching, aquaria, ornamental fish, UV creams and others.

Some of the main world retailers participate on it scheme development (Carrefour, Coop Italia, Manor, Finiper, Aligro, Citysuper, Coldstorage, Conad, Despar, Esselunga, Fairprice, Lidl, Metro,

Rewe, Spar, Walgreens, Walmart). Currently, Friend of the Sea is the only standard for sustainable fisheries to be recognized by the national accreditation bodies.[21]

International Featured Standards (IFS) [https://www.ifs-certification.com/]

IFS Standards are uniform food, product and service standards. They ensure that IFS-certified companies produce a product or provide a service that complies with customer specifications, while continually working on process improvements.

Adopted by Norway and Chile, IFS it is focused on Quality assurance and food safety.

BRC Global Standards (BRC) [https://www.brcgs.com/]

The BRCGS Global Food Safety Standard has set the benchmark for over 20 years. Adopted by over 20,000 sites in 130 countries, the standard is accepted by 70% of the top 10 global retailers, 60% of the top 10 quick-service restaurants, and 50% of the top 25 manufacturers.

Developed with input from industry, it provides a framework to manage product safety, integrity, legality and quality, and the operational controls for these criteria in the food and food ingredient manufacturing, processing and packing industry.

Royal Society for the Prevention of Cruelty to Animals (RSPCA) [https://www.rspca.org.uk/]

The standard was adopted only in Scotland and it is focused on animal welfare.

The Royal Society for the Prevention of Cruelty to Animals (RSPCA) is a charity operating in England and Wales that promotes animal welfare. The RSPCA is funded primarily by voluntary donations. Its patron is Queen Elizabeth II. Founded in 1824, it is the oldest and largest animal welfare organisation in the world

Global Aquaculture Alliance (GAA) [https://www.globalseafood.org/]

The certification scheme was adopted by Chile, Norway and Scotland and it aims food safety, social welfare, environmental, animal health and Welfare

The GAA includes two certification schemes: The Best Aquaculture Practices and the Best Seafood Practices.

The Best Aquaculture Practices is the only third-party aquaculture certification program that encompasses the entire production chain, including the processing plant, farm, hatchery and feed mill. The Best Seafood Practices program provides assurances to the marketplace that wild seafood has been harvested and processed in an ethical manner with respect for the wellbeing and security of all employees across the supply chain.

Scottish Salmon Producers' Organisation (SSPO) [https://www.salmonscotland.co.uk/]

[21] FAO (2008), Ecolabels and Marine Capture Fisheries: Current Practice and Emerging Issues

Adopted only by Scotland, the SSPO certification scheam aims to Balance between industry activities and regulatory detail or bureaucracy, assurance of quality, high minimum standard and continuous improvement.

2.3 The Sustainability Pitfalls

The study "The operationalisation of sustainability: Sustainable aquaculture production as defined by certification schemes"[22], published by Global Environmental Change journal, has reviewed the metrics and methodology of eight global sustainability certification schemes for aquaculture of 8 different certification schemes.

The analysis shows that the schemes have a relatively narrow definition of sustainability – tending to prioritise environmental indicators at the expense of other benchmarks.

Though the emphasis on environmental factors could make the aquaculture industry greener, the narrow focus risks skewing the industry and public definition of sustainability, making it less workable long-term. The researchers stress that sustainability is multi-dimensional. Unless independent certification schemes can apply the full definition of sustainability to their audits, the aquaculture industry won't make any progress in achieving its sustainability goals.

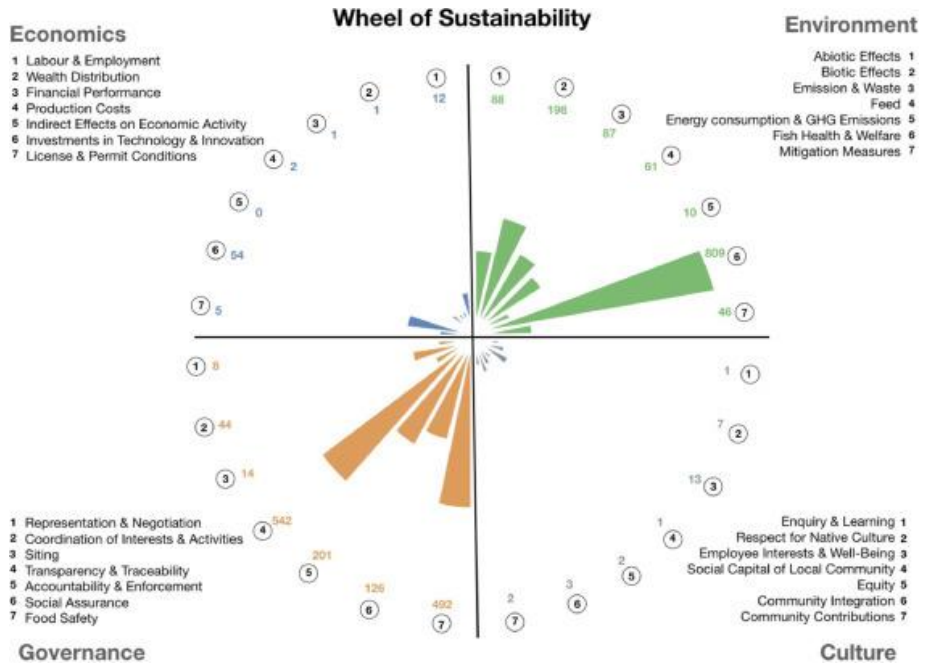


Figure 10. Distribution of indicators across the subdomains of the Wheel of Sustainability

[22] Tonje C. Osmundsen et al (2020) "The operationalisation of sustainability: Sustainable aquaculture production as defined by certification schemes"

The researchers suggest embracing the "wheel of sustainability" model when creating certification schemes. This concept moves beyond the triple-bottom-line or three E's and defines four elements of sustainability: economics, environment, governance and culture.

By adopting this model, the schemes could provide practical and concrete ways for aquaculture firms to achieve sustainability benchmarks. It also gives consumers more accurate information on sustainable production, justifying the premium they pay for sustainable produced seafood.

2.4 The EU's Organic Farming Strategy

In its Farm to Fork Strategy and the Biodiversity Strategy, the Commission has defined the objective of 'at least 25% of the EU's agricultural land under organic farming and a significant increase in organic aquaculture by 2030'. In its resolution of 15 January 2020 on the European Green Deal, the European Parliament has highlighted that agriculture and aquaculture has the potential to help the EU reduce its emissions through sustainable practices, such as organic farming.[23]

Therefore, the Commission is putting forward this action plan for organic farming supported by the following two axis:

Organic food and products for all: stimulate demand and ensure consumer trust

By stimulating the demand for organic products by increasing the awareness of its benefits and consumer trust in the organic logo. Member States themselves can also stimulate the consumption of organic products, for instance by lower the VAT rates for organic based production.

The set of actions envisaged in this domain will cover the following topics: (1) Promotion of organic farming and the EU logo; (2) Promotion of organic canteens and increasing the use of green public procurement; (3) Reinforcement of organic school schemes; (4) Prevention of food fraud and strengthening consumer trust; (5) Improvement of the current traceability methods.

Organics leading by example: improving the contribution of organic farming to sustainability

A sustainable and resilient agricultural and aquaculture sector depends on enhanced biodiversity, which is fundamental for a healthy ecosystem and critical for maintaining nutrients cycles in the soil, clean water and pollinators.

Under this intervention axis, the action plan focuses on promoting organic farming and its contribution to sustainability, in order to: (1) Reduce climate and environmental footprint; (2) Enhance genetic biodiversity and increasing yields; (3) Produce alternatives to contentious inputs and other plant protection products; (4) Enhance animal Welfare; and make the use of resources more efficient.

[23] European Commission (2021), Action plan for the development of organic production

To achieve the ambitious target of 25% of agricultural area under organic farming and a significant increase in organic aquaculture by 2030 as outlined in the Farm to Fork and the biodiversity strategies, the European Commission assumes that is necessary to provide the organic sector with tools to trigger the change in EU agriculture and aquaculture towards the high-quality standards that EU consumers value.

Although it is not mentioned as an explicit objective of European policies and strategies, in fact, the approximation to the values of ecology is in line with environmental importance perceived by society and, therefore, with the social acceptance of people in the agroanimal production sectors.

3 Social Acceptance and Consumer Information

Seafood is a healthy source of animal protein, providing calcium and minerals, omega-3 and other beneficial fatty acids, and vitamins B12 and D[24]. Seafood also has an environmental advantage in terms of resource use in relation to other animal protein production systems. With an efficient feed conversion rate (FCR), estimated as the proportion of feed intake by the weight gained by the animal, fish production has a lower environmental impact as less feed is required to produce a ton of fish[25], between 1.0 and 2.4, compared to 6.0–10.0 in beef, 2.7–5.0 in pigs and 1.7–2.0 in chicken[26].

This efficient FCR, along with high fertility rates, also contributes to a significantly lower greenhouse gas (GHG) emission intensity than ruminants, another important contribution of seafood aquaculture to environmental sustainability.[27]

Despite the understanding of its ability to address the challenges of global nutrition and technological advances that have allowed better monitoring of environmental impacts, as well as optimizing the management of productive activity, the aquaculture industry still faces strong animosity from the local communities regarding new projects for fear of the environmental harm the farms may cause. [28] [29]

In fact, the concerns regarding the environmental impacts of aquaculture and agriculture are leading the agenda of scepticism or social rejection about agromania production activities.

[24] U.S. Department of Agriculture and U.S. Department of Health and Human Services (2020), "Dietary Guidelines for Americans, 2020-2025"
[25] d'Orbcastel, E.R., J-P. Blancheton, and J. Aubin (2009), "Toward Environmentally Sustainable Aquaculture: Comparison between Two Trout Farming Systems Using Life Cycle Assessment."
[26] Fry, J.P., N.A. Mailloux, D.C. Love, M.C. Milli, and L. Cao (2018), "Feed Conversion Efficiency in Aquaculture: Do We Measure It Correctly?"
[27] MacLeod, M.J., M.R. Hasan, D.H.F. Robb, and M. Mamun-Ur-Rashid (2020), "Quantifying Greenhouse Gas Emissions from Global Aquaculture."
[28] Bacher (2015), "Perceptions and Misconceptions of Aquaculture"
[29] Bacher et al. (2014), "Stakeholders' perceptions of marine fish farming in Catalonia (Spain): a Q-methodology approach"

In this chapter we will try to understand the social perception about aquaculture, the importance of the media in the construction of public opinion, among other areas that refer to the importance of providing clear, transparent and scientifically verified information to society.

3.1 Aquaculture in the Media

Aquaculture is one of the most demonized productive activities by conspiracy theories and media sensationalism. News headlines from developed nations have been shown to be overall more negative than those of developing countries.[30]

An analysis of German media showed positive coverage of aquaculture was the most prevalent tone, and when negative tones were used, they were often counteracted with ways in which such an issue could be dealt with, leaving the readers with an overall positive to neutral impression of the industry.[31]

There is a huge inequality between the media space that the actions of protest aquaculture and the voice of the sector to enlighten the consumer. How the public perceives the industry influences the acceptance and implementation of new aquaculture operations.[32] [33]

Outside the domains of the media, but with enormous weight as an opinion-makers, film documentaries have played a decisive role in building or destroying the image of various economic activities. Recently, fisheries and aquaculture were under attack in "Seaspiracy" documentary available in the popular media streaming platform (Netflix).

"Seaspiracy" dehumanises aquaculture sector on its sensationalist and subjective approach to the health of the oceans. The existence of these media productions is not counterbalanced with other contents that allow elucidation of the activity rather than casting suspicions and therefore they contribute to feed the need to justify theories that seek to destroy the credibility of productive activities.

[30] Froehlich et al. (2017), "Public perceptions of aquaculture: evaluating spatiotemporal patterns of sentiment around the world"
[31] Feucht and Zander (2014), "What do German Consumers Expect from Sustainable Aquaculture?"
[32] Knapp and Rubino (2016), "The political economics of marine aquaculture in the United States"
[33] Verbeke et al. (2007), "Consumer perception versus scientific evidence of farmed and wild fish: exploratory insights from Belgium"

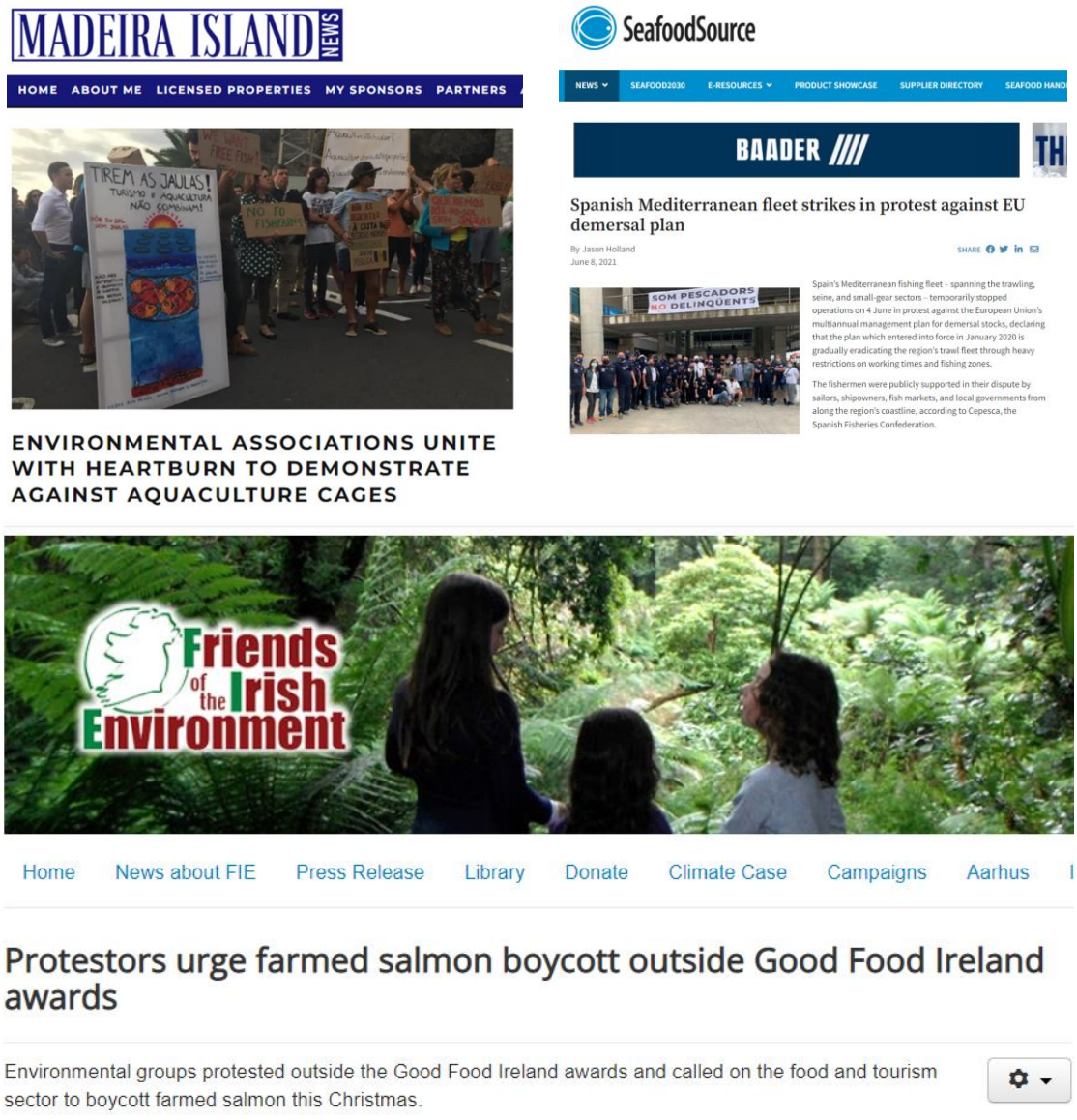


Figure 11. Social conflicts on media

Considering all global trends, aquaculture will continue to be a booming productive sector, therefore tensions between industry and communities are expected to be intensified in the short term. Therefore, media training of the main aquaculture's stakeholders (ie.: producers) and an investment on media literacy about aquaculture could provide short-time results, at least, in order to reduce fake news and conspiracy theories amplified by the spread of the media.

3.2 Understanding Factors Influencing Social Acceptability

Community and consumer's perceptions of aquaculture and, consequently social acceptance, are quite variable and are likely influenced by a combination of factors. Several studies have identified factors that may lead to any potential opposition of the industry, but perhaps the most notable are perceived environmental risks and credibility of information sources. [34] [35] [36]

Additionally, previous studies have found that the public is most often concerned with any potential risks for human health if farmed products are consumed, with little focus on benefits such as what the industry means for local economies. [37] [38]

Aquaculture's public opinion is interlinked with the understanding of its environmental interactions[39] and impacts and this understanding is often informed by the media.[40] While media effects theory is complex, and an ever-growing field of study, research has shown that mass media can heavily impact public awareness of certain topics and issues, their perceptions towards the issue, and in some cases, can even influence individual behaviours.[41]

In the case of aquaculture, the media may not have the ability to tell people *what to think*, but rather may be quite successful in telling people *what to think about*.[42] It is also possible that media coverage follows public opinion *to confirm what they believe*, as a way to expand and maintain their audience.[43] [44]

The battle of the audience is, in fact, the great ambition of media's actions. They could still vary in the tone used to cover certain topics and issues, but public opinion would be the main driver of media coverage, rather than the reverse. As such, given that media can influence public perceptions or reflect public opinion, understanding how media portrays aquaculture can provide valuable information regarding factors of social acceptability and consequently inform decision-making.

[34] Bacher et al. (2014), "Stakeholders' perceptions of marine fish farming in Catalonia (Spain): a Q-methodology approach"
[35] Freeman et al. (2012), "Public attitudes towards marine aquaculture: a comparative analysis of Germany and Israel"
[36] Mazur and Curtis (2008), "Understanding community perceptions of aquaculture: lessons from Australia"
[37] Amberg and Hall (2008), "Communicating risks and benefits of aquaculture: a content analysis of US newsprint representations of farmed salmon"
[38] Schlag, 2011, "Aquaculture in Europe: media representations as a proxy for public opinion"
[39] Feucht and Zander (2014), "What do German Consumers Expect from Sustainable Aquaculture?"
[40] Osmundsen and Olsen (2017), "The imperishable controversy over aquaculture"
[41] Macnamara (2005), "Media content analysis: its uses; benefits and best practice methodology Asia Pacific Public Relations"
[42] Olsen and Osmundsen (2017), "Media framing of aquaculture"
[43] Gentzkow and Shapiro (2010), "What drives media slant? Evidence from US daily newspapers"
[44] George and Waldfogel (2006), "The New York Times and the market for local newspapers"

3.3 The Common Myths of Aquaculture

Aquaculture products are commonplace in markets around the world. However, despite efforts to minimize the negative perceptions towards aquaculture, several misbeliefs or myths persist, and thus globally consumers tend to value wild fish more highly than farmed fish. The lack of information has been shown to be one of the most important causes of this preference, driving buying decisions to be more emotional than rational.

In aquaculture, the emergence of widely held but false beliefs or ideas has been described concerning various topics such as feed [45] [46], genetic manipulation, or the use of therapeutic products.[47] Some of these myths condition consumer's perception of aquaculture and its products. The negative perceptions included the lack of sufficient information about aquaculture and quality.

A negative perception by local stakeholders of aquaculture activities, notably their impact on the environment and other economic activities, is often an obstacle to the establishment of new aquaculture facilities. Therefore, it is critically important to ensure more accurate information and transparency about how aquaculture activities are carried out.

3.4 Increase Transparency and Consumer's Information

Information is essential to meet the increasing consumer demand for sustainable products. [48]

Making consumers more aware of the efforts made by EU producers is important to allow EU production to reap the benefits of high sustainability and quality standards. This will help to make EU aquaculture products more competitive and also ensure a level playing field with other aquaculture products that may not offer equivalent sustainability and quality.

Communication will be necessary to realise the potential of a more diversified aquaculture to meet the challenges identified in the European Green Deal. These challenges include increasing the knowledge and consumption of aquaculture products with a lower environmental footprint, under-exploited low-trophic species such as algae, shellfish and other invertebrates, and herbivorous fish.

In the 2021, the communication from the European Commission to the European Parliament, the European Council, the European Economic and Social Committee and the Committee of the Regions Empty, "Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030", identified a mix of different tools to improve the information available to consumers and the public on EU aquaculture production, including the following efforts: (1)

[45] Ayvaz (2017), "Consumer preference for seafood: the myths and realities, in: fifth international conference sustainable postharvest and food technologies"
[46] Hardy (2005), "Fish meal myths concerning omnivorous farmed fish"
[47] Bergh (2007), "The dual myths of the healthy wild fish and the unhealthy farmed fish"
[48] European Commission (2021), "Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030"

Labelling and marketing standards; (2) Information campaigns about the EU aquaculture sector and production that involve retailers; (3) Clarifying the scientific basis of the debate on the impacts of aquaculture activities in the EU; (4) Further opening the sector to the public; (5) Ensuring close and early engagement of authorities and industry with stakeholders' groups, including NGOs; (6) Promoting the use of branding and quality labels; (7) Promoting the value of EU aquaculture as 'local and fresh' with short food circuits.

4 Initiatives

Just like any other activity, the expansion of aquaculture also requires social acceptance (so called "social license to operate"). As mentioned above, the perception of aquaculture activities remains negative among certain stakeholders.

This is mainly due to concerns about aquaculture's impact on the environment or about how it conflicts with other economic activities such as fisheries or tourism.

It is important to address these concerns by: (1) ensuring transparency and the early involvement of local stakeholders in the planning of an aquaculture activity; and (2) seeking synergies with existing activities (e.g. fisheries, tourism, the processing industry) and protected areas. In addition, there is great potential in creating local value chains and short supply circuits, which should contribute to environmentally, economically and socially sustainable food production.

The experience gathered from the work of fisheries local-action groups (FLAGs), as well as projects funded under the EMFF in some Member States, show some good practices in this area.

4.1 EIT Food – Sustainable Aquaculture [https://www.eitfood.eu/]

The European Institute of Innovation & Technology (EIT) is the world's largest and most dynamic food innovation community. The work in collaboration with all the stakeholder of food value chain, aiming to build an innovative and resilient food system that in turn creates a healthier society and planet.

EIT FOOD developed the Sustainable Aquaculture programme aiming to transform the sector by reducing its carbon footprint, transitioning to circular economy, and ensuring food security and safety.

In all the initiatives developed by the EIT, training courses and competitions to stimulate sustainable innovation in the aquaculture. Recently, EIT has selected SMEs and start-ups with solutions in an advanced state of development from 15 European countries, including devices that obtain drinking water from the air or IoT sensors to improve the efficiency of irrigation, to participate in the EIT Community Water Scarcity initiative.

Water scarcity is one of the major current and future problems in Southern Europe, which affects the entire value chain of the agri-food industry and for which it is necessary to find urgent solutions. The objective is to facilitate the transition to a water-saving economy and to contribute, in the long term, to reduce water consumption, waste and pollution in Europe. 40 start-ups and SMEs from 15 different countries have been selected, some of them directly related to aquaculture or water quality management challenges in aquaculture production.

4.2 Irish Ocean Literacy Network (IOLN) [https://irishoceanliteracy.ie/]

Based on the international Ocean Literacy concept, IOLN goals include creating a membership of Ocean Literacy Champions on the island of Ireland, who collaborate, share and co-ordinate marine outreach and Ocean Literacy projects, while providing a platform for engagement between stakeholders.

Following the path of literacy and education, within the various activities developed by the network, include projects that allow young communities to be sensitized to the importance of aquaculture in society.

4.3 Primary Science and Maths Programme (DPSM) [www.primaryscience.ie]

DPSM is part of Science Foundation Ireland's Education and Public Engagement Programme, which aims to increase interest in science, technology, engineering and mathematics (STEM) among students, teachers and members of the public. DPSM originated in 2003 with the goal of introducing primary school students to science in a practical, hands-on, enjoyable and interactive way. Since 2010 the programme has been run in conjunction with the European Space Education Resource Office (ESERO) Ireland which uses space to inspire and engage young people in science and technology in the world around them.

Seascapes Project [https://emff.marine.ie/]

Seascapes, described in its own words as '… very much concentrating on the Seascape Character Areas at the regional scale and an online survey is available also, focusing on the draft names, boundaries and key characteristics'

It is a cultural characterization of the Irish coast that could be likened to a geological survey; the corollary is characteristically mapping the coastline human activity and interaction. This project is being sponsored by the Marine Institute.

4.4 BIM: EMS for Aquaculture [https://bim.ie/aquaculture/]

Helps farmers and producers implement an Environment Management System (EMS) on fish and shellfish farm, based on agreed targets to improve your farm's environmental performance, including: (1) waste management; (2) nature conservation; (3) visual impact; (4) even the use of public piers.

4.5 Catchments.ie [https://www.catchments.ie]

Catchments describes inshore and inland water quality for a spectrum of users, from bathing quality to fishing A, B, C quality. This is a water quality management GIS tool and as such is not an initiative to improve social acceptability per se. In that it includes all usages—from bathing quality and aquaculture on the same platform, it provides a context for visibility of marine farming adjacent to and co-existing with marine tourism.

4.6 SEMRU Leisure Activities Survey

SEMRU Socio-Economic Marine Research Institute: Marine socio-economic research unit based in the National University of Ireland, NUI Galway - Interdisciplinary, focus on marine socioeconomics and coastal development. SEMRU launches a new report valuing domestic coastal and marine tourism and leisure activities in the Republic of Ireland: A survey of domestic coastal and marine tourism an leisure activities in Ireland.

4.7 Initiatives in the UK to promote seafood

Seafood is not very popular in the UK, consumption is low (19.73 kg/ capita) in comparison with other European countries (average of Access2Sea countries is 35 kg/capita[49]).

According to the U.K. government's Department for Environment, Food, and Rural Affairs (Defra), the average person in Wales eats 145.9 grams of seafood per week (7.6 kg/capita/year), which is lower than the U.K. average of 152.8 grams per person per week. Fish is served at UK schools only once a week, often as an option and it is the only kind of seafood offered. In general, cost and lack of knowledge on how to cook it seem to be the main obstacles to increase seafood consumption in the UK.

Most UK initiatives and campaigns about fish and aquaculture focus on raising consumers awareness of the health benefits to eat more fish and shellfish. Sea fish, a Non-Departmental Public Body (NDPB) set up to support the £10 billion UK seafood industry, supports some of these initiatives, which include Fish is the Dish (with recipes), Eat 2 fish a week (which labels packs with more than 50% of fish product) or the Seafood 2040 Strategic Framework. However, critical to increase UK seafood consumption is to sustainably increase domestic seafood production.

[49] OWID (2017)

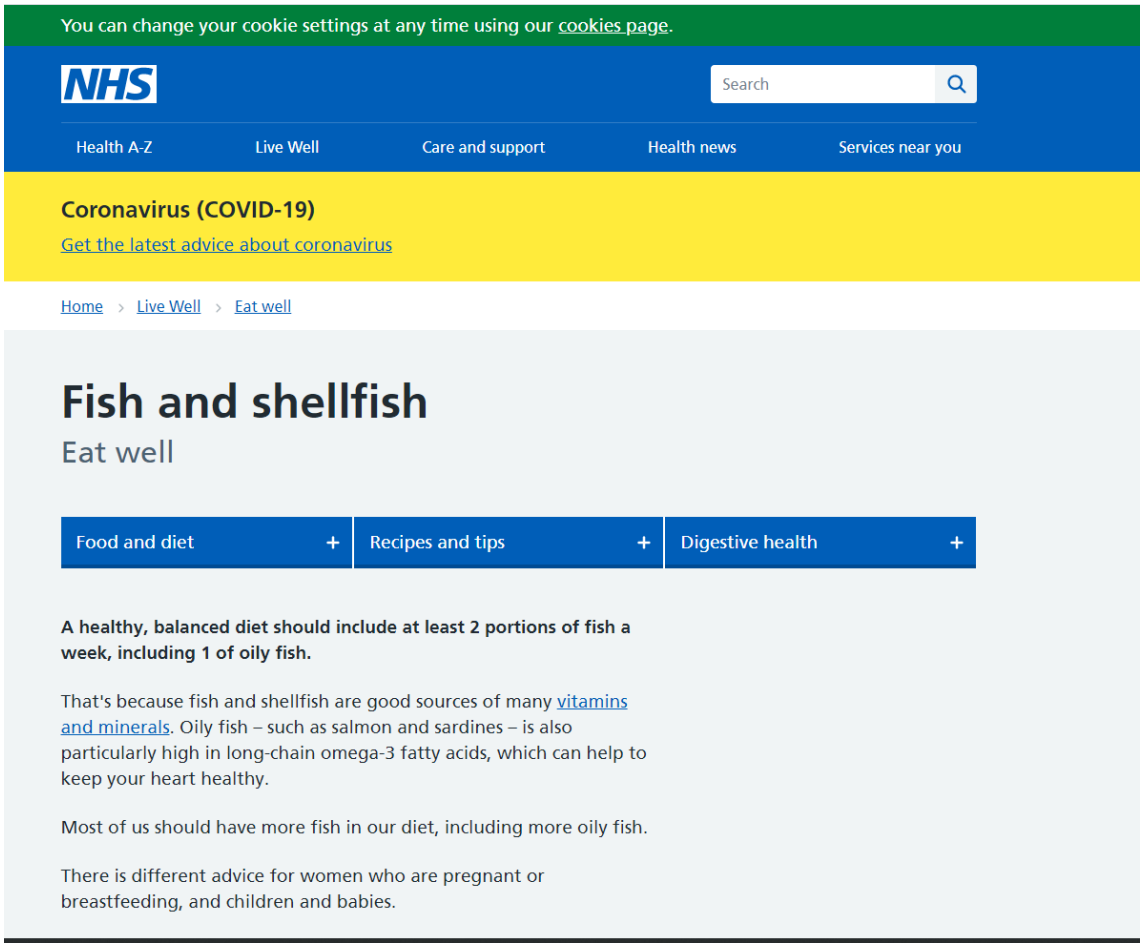


Figure 12. NHS fish intake recommendations 50

In the UK, aquaculture is synonym of salmon farming. Salmon is by far the most important aquaculture species by value and volume. But farming of carnivorous fish such as salmon and trout is heavily targeted by sustainability and welfare advocates (CIWF). Several NGO campaigns focus on bringing awareness to fish as sensitive and intelligent animals (e.g. Re-think Fish).

Environmentalists and welfare advocates support the consumption of species lower on the food chain that do not eat other fish and recommend a decrease in seafood consumption overall (e.g. CIWF). With an aging population a greater portion of UK consumers are older than 50; their food habits and buying options reflect their preferences: health, taste and convenience (Seafish, 2018).

Sustainability labels currently do not play a major role in food consumers' choices [51]. Increasing sustainable production needs, the collaboration of all the stakeholders involved in producing

[50] 5 March 2020, NHS *website*

[51] Bacher (2015), "Perceptions and misconceptions of aquaculture: a global overview"

sustainable fish feeds, addressing biosecurity and emerging diseases and dealing with public perception and miscommunication.

Wales fish farm focuses on lumpfish (a non-chemical alternative to fight parasites in salmon farming) but several NGOs have raised concerns about lumpfish welfare. Welfare standards are lacking, and the industry has highlighted the need to implement welfare standards specific to lumpfish.

CSAR has been engaging with salmon and lumpfish farmers on how to develop welfare tools and for this, CSAR organised the first UK-based symposium on Welfare in Aquaculture – Welfare Indicators for Novel Species, which included a lumpfish welfare workshop. This event attracted 78 participants from a range of stakeholders including representatives of 26 companies, 6 Higher Education Institutions and 7 international speakers.

A white paper to be published soon will highlight the need to develop welfare standards and ways to implement it. CSAR is seeking the opportunity to develop a set of tools including an app and online training which should be included in WP7 action 4.

Although some welfare indicators exist for lumpfish not all can easily be used by fish farmers, and it is only recently that a rapid lumpfish operational welfare score index (LOWSI) was developed and validated by our group for use under farm conditions26. What we propose is to bring to the market the operational welfare score index for lumpfish based on the assessment of fin and skin damage, eye condition, and suction cup deformities, as these traits are the most informative, and can be easily scored visually without any specialised equipment. Given that loss of weight is one of the major welfare challenges for lumpfish, we will also develop the Lumpfish Weight Watcher, an online calculator to estimate the body mass index (BMI) of lumpfish to allow farmers to detect underweight fish and take remedial action.

CSAR delivered a questionnaire targeting 16 to 18 years old students from local Welsh colleges on the 16th of March 2020, during the Marine Energy Event, Bridge Innovation Centre, Pembrokshire, Wales.

Dr Sara Barrento delivered 4 workshops attended by 69 students aimed to disseminate the Access2Sea project. It was also the ideal platform to deliver the aquaculture awareness questionnaire.

Most students knew what aquaculture is when given a MCQ (Annex 1).

But they are divided when it comes to aquaculture environmental impacts – it can be positive (52% agree), but it can also be negative (58% agree).

Most students agree on two things: (1) Aquaculture can be good to the local economy; (2) It can have negative impacts on fish welfare.

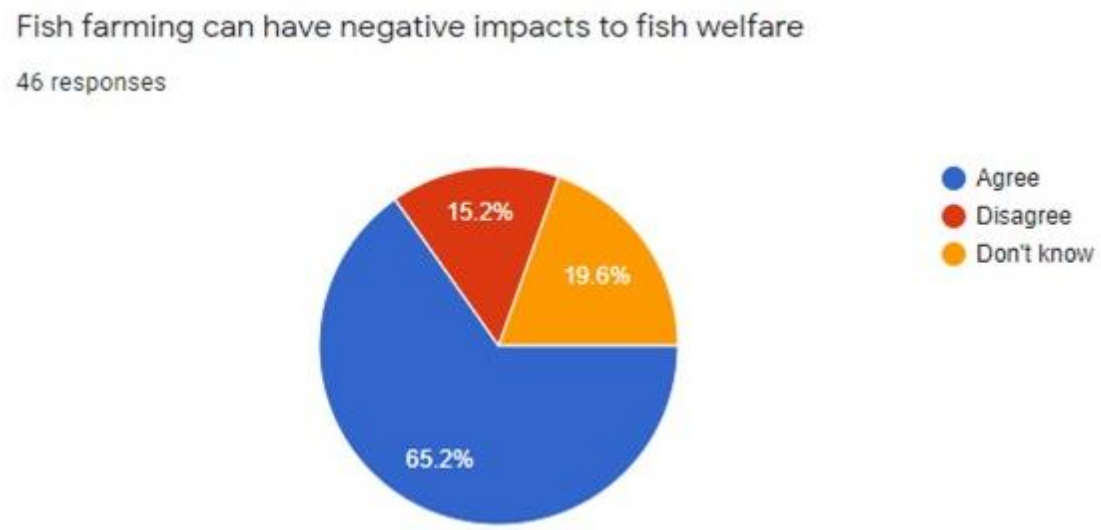


Figure 13. Concerns about fish welfare.

But a large part of the general public is relatively uninformed: European consumers do not seem to differentiate between farmed and wild products when purchasing seafood and aquaculture issues are not at the top of the minds of many consumers.

Opinion and sentiments towards aquaculture depend on many factors including objective knowledge, but also preconceived ideas and beliefs.

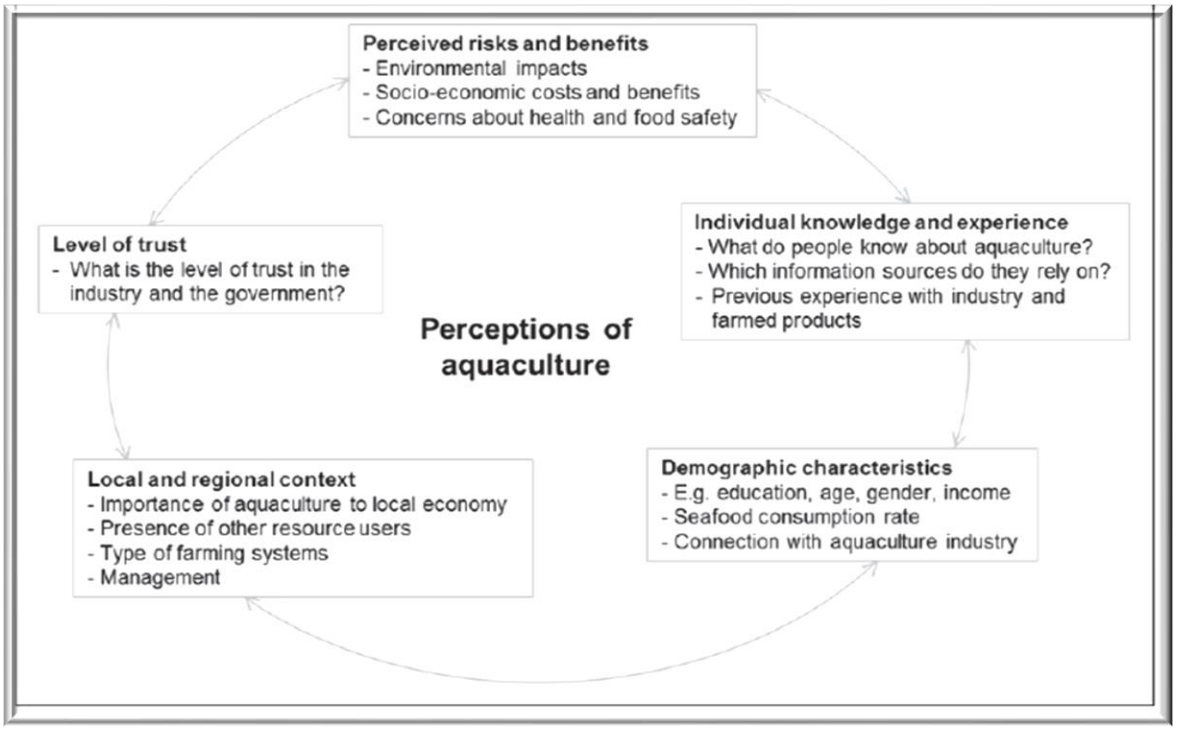


Figure 14.Diagram of factors affecting public perceptions of aquaculture 52

The importance given to these different factors varies depending on a person's background, interest, level of knowledge and understanding.

Media acts as an intermediary for scientific information reaching the public, particularly in the food sector. Most consumers receive information about the food industry through popular press and television. A study on sentiments and opinions of the public around aquaculture revealed that newspaper `aquaculture' headlines have increased and are overall more positive than negative, especially in Wales [53]. But sentiment was negative for headlines with "salmon" included in the title. Sentiment also varies on distinct forms of aquaculture: while there is an expanding positive trend of general `aquaculture' coverage, the opposite is true for `marine' and `offshore' aquaculture which appeared more negative.

[52] Adapted form Bacher (2015)

[53] Froehlich, H. E., Gentry, R. R., Rust, M. B., Grimm, D., and Halpern, B. S. (2017), "Public perceptions of aquaculture: evaluating spatiotemporal patterns of sentiment around the world"

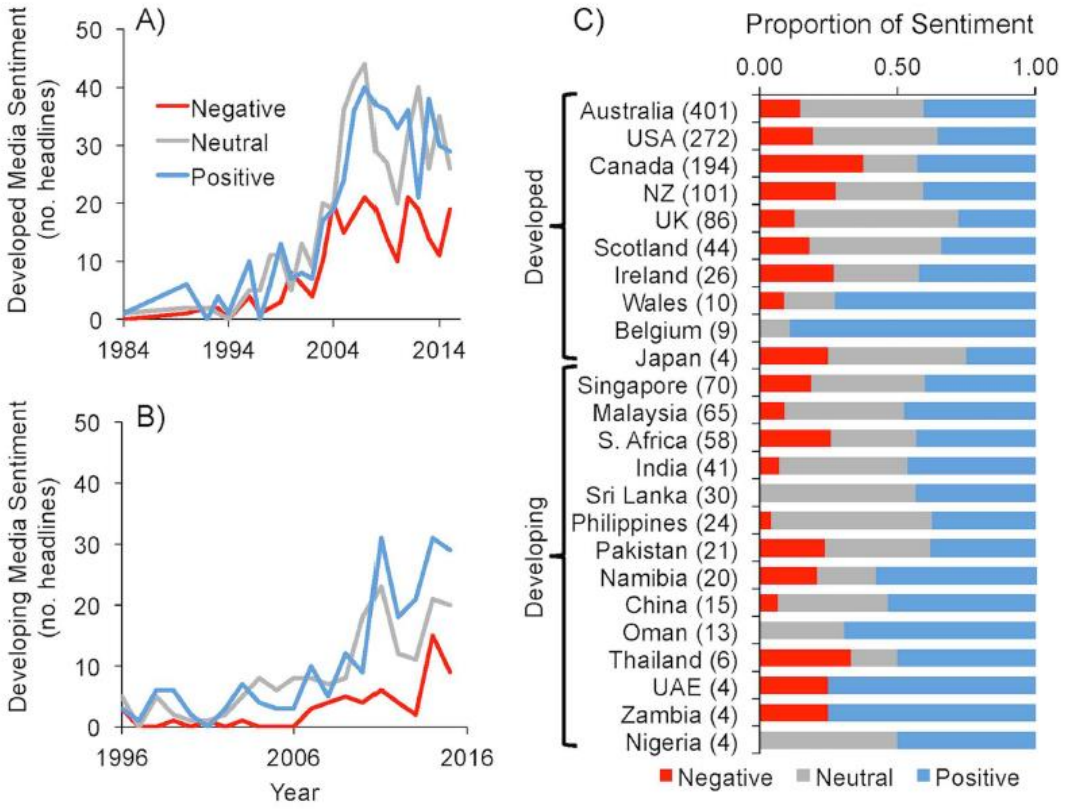


Fig 1. Newspaper 'aquaculture' media sentiment. Sentiment over time based on the frequency of newspaper headlines with negative (*red*), positive (*blue*), and neutral (*gray*) titles for **(A)** developed (n = 1,165) and **(B)** developing (n = 430) nations. Also depicted are the **(C)** proportional contributions of sentiment headlines relative to each developed and developing country, with the number of headlines from each country shown in parentheses. Only countries with more than 4 headlines are shown; 44 countries that contributed only 4.5% of the total headlines are not depicted, but can be found in the S1 Table. Headlines were compiled using the LexisNexis® platform.

doi:10.1371/journal.pone.0169281.g001

Figure 15. Aquaculture media sentiments

Consumers are starting to realize how their food is produced; they are becoming more sensitive to the welfare of animals and the wellbeing of workers (M&S).

As a result, farming companies are challenged by advocate groups, retailers seeking to supply consumers wishes at the cheapest price and highest quality, and the odd consumer or "YouTube trolls".

Governments, on the other hand, are challenged by the farming companies who seek support (e.g agile licensing process; more relaxed food regulations) and consumers/voters who want healthy, sustainable and affordable food.

Most of the initiatives taking place in the UK have two general aims: to increase consumers awareness about seafood, or to gain consumers trust about a specific brand (e.g. aquaculture farm company or retailers).

These initiatives usually happen at two different levels:

Company

Marketing Strategies

- Salmon farms seek certification and labelling of products (e.g. Global Aquaculture Alliance, ASC).
- Aquaculture farms and retailers launch marketing campaigns focusing on health benefits, sustainably sourced products and how to cook and easy recipes.
- Aquaculture farms participate in events and awards.

Products

- Seafood companies focus on convenient and healthy products
- Development of apps (recipes, sustainable guides to fish buying, find a sustainable restaurant;)

Government

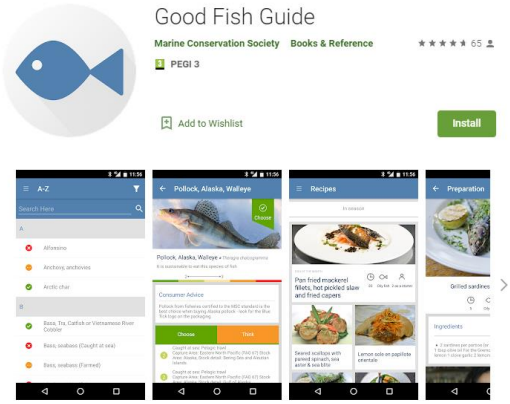
- facilitating the promotion of seafood consumption through marketing and branding campaigns (e.g. Fish the Dish campaign run by SEAFISH, table 1)
- funding projects to create a national brand (e.g. Welsh seafood brand)

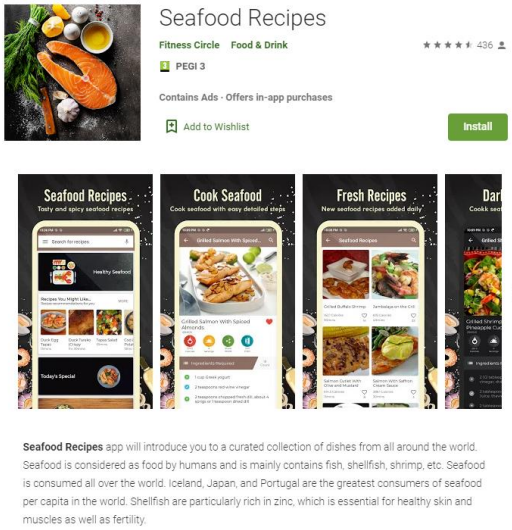
Examples of strategies to promote seafood consumption.

Strategy	Format	Species	Date
1. M&S promotes Scottish Sea Farms	TV commercials	Salmon	July 2019
2. Fish the Dish is a campaign to promote seafood consumption lead by SEAFISH	Campaigns	Farmed and fished seafood	Ongoing
3. Cardigan Bay Seafood Festival	Seafood Festivals	Farmed and fished seafood	Annual basis
4. Pembrokeshire Fish Week Festival		Farmed and fished seafood	Annual basis
5. Lampeter Food Festival		Farmed and fished	Annual basis

		seafood	
6. Seafood week SEAFISH annual campaign		Seafood	Annual basis
7. Best Aquaculture Practices (BAP) certification.	Certification schemes & Awards*	salmon	Annual awards
8. Article from The Guardian	Online Media	Oily fish	2017
9. Article from Spectator Life	Online Media	Fish	2017
10. Fish advisor – types of fish to eat or avoid The Wildlife Trust of South & West Wales	Website	Seafood	Webpage na
11. Buying seafood online, map with fishmongers and seafood merchants	Website page	Seafood	Fish the Dish
12. Good Fish Guide Marine Conservation Society guide to sustainable seafood	App	Seafood	2019
13. Find a Sustainable Restaurant serving Friends of the sea Certificate sustainable product		Seafood	2019
14. Seafood Recipes curated collection of seafood dishes from all around the world		Seafood	2020

It is important to highlight that the public uses a wide range of information sources about aquaculture, with different degrees of credibility. The results of several studies indicated that information transmitted through personal contact, such as friends and family, the fishmonger, retail sellers or visiting an aquaculture farm, were considered important and trusted, while the most common information sources - internet, television, radio, advertising and written media - are considered less-trusted sources.


Good Fish Guide
Marine Conservation Society
Books & Reference
65
PEGI 3
Add to Wishlist
Install
The definitive guide to sustainable seafood from the Marine Conservation Society.
This App tells you which fish are good to eat, along with some suggested recipes for cooking them, and which to avoid based on whether they come from well-managed, sustainable stocks or farms.
The guide includes almost every fish you could hope to find in UK shops, restaurants and markets, allowing you to make the best seafood choices.


Seafood Recipes
Fitness Circle
Food & Drink
436
PEGI 3
Contains Ads · Offers in-app purchases
Add to Wishlist
Install
Seafood Recipes
Cook Seafood
Fresh Recipes
Seafood Recipes app will introduce you to a curated collection of dishes from all around the world. Seafood is considered as food by humans and is mainly contains fish, shellfish, shrimp, etc. Seafood is consumed all over the world. Iceland, Japan, and Portugal are the greatest consumers of seafood per capita in the world. Shellfish are particularly rich in zinc, which is essential for healthy skin and muscles as well as fertility.


Buying Seafood Online
Get UK seafood delivered direct to your door. From traditional fishmongers and specialist online seafood retailers who deliver UK-wide to quayside fishermen and merchants.
We are working with seafood businesses across the UK to bring you direct access to some of the best fish and shellfish from around our shores.
Check out our handy map below and happy cooking.
SEAFORD YOURSELF
FILTER :
Postcode, City or Town
All
Fishmongers
Nationwide Delivery
United Kingdom
Ireland
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5 Case Studies: Social acceptability good practices in aquaculture

5.1 Promotion of aquaculture in Madeira Island (Portugal)

Sea bream is the most produced species in aquaculture in Madeira. It is a great source of omega 3 polyunsaturated fatty acids, like other species fished in the region. These fatty acids are essential for the development of the central nervous system and associated with the prevention of cardiovascular diseases. The high quality and freshness of Madeira' sea bream is recognized by the market, so it is distinguished by the highest price.

The Autonomous Region of Madeira, despite the small land territory, has great potential for the development of this activity in its component of floating fish cultures in the open sea, confirmed by a pilot project in the Bay of Abra and later made a reality by private enterprises. The discussions around the topic should be serious, constructive, with data and concepts from safe and credible sources, to consolidate the growth of this activity in a sustainable way, from an economic, social and environmental point of view. It is a booming sector. By 2020, Madeira wants to reach 5,000 tonnes of aquaculture production, at a time when aquaculture already earns five million euros for Madeira. Pointed as a sustainable alternative to fish imports, this activity is also seen as a way to reduce pressure on wild fish populations, but not everything is a benefit.

Madeira has two competitive advantages compared to other regions: the water temperature and the existence of research, under the responsibility of the Calheta Mariculture Center. The opportunities offered by the regional sea do not go unnoticed in the eyes of investors and aquaculture has proved to be a promising activity, hitherto well accepted by residents but the recent controversy in Ponta de Sol casts doubts about the impact of this activity and has generated some challenge and even demonstrations against the installation of sea cages.

About 500 people participated in a demonstration against the approved aquaculture project for the seafront in the municipality of Ponta do Sol, west of Madeira, alerting to the environmental impact and questioning the added value in the local economy, which is based on tourism. The President of the Pontassolense Autarchy counted on the support of hundreds of popular people who have promoted some protest actions and that have also stimulated a group entitled 'Vigília do nosso mar' on social networks. At stake is the visual impact of the cages on the landscape of the municipality that can be disadvantageous for tourist recipes.

Figure 16. Public petition against aquaculture

In October 2020, the Minister of the Sea, Ricardo Serrão Santos was in Madeira for two events related to the sea, the MARE @ Porto Santo 2020 expedition and the public presentation of the National Strategy for the Sea 2021-2030.

Figure 17. Minister of the Sea, Ricardo Serrão, visiting fish farm production

The document refers to the “maturity” of aquaculture in Madeira, to the knowledge and experiences generated over the 20 years of regional production - the Region was a pioneer in the country – and as “a line of action to continue, valuing and capitalizing on knowledge acquired and promoting drag effects to other sectors, such as tourism and other offshore activities. During the presentation of the National Strategy for the Sea 2030, the Minister repeatedly underlined the importance of responsible and sustainable development of aquaculture for the blue growth of the country and Madeira, pointing to Madeira as “an example”.

Marismar, a regional marine aquaculture production company, and Bluegrowth, a technological innovation consultant for sea affairs, organized a gastronomic event where they gathered several public figures in Funchal, in an event where the aquaculture sea bream from Madeira’s coast was the main star of six dishes designed by three experienced chefs. The event was set to promote the consumption of aquaculture sea bream and to increase the social acceptability of aquaculture in general.

Figure 18. Engagement of Chefs in aquaculture’s promotion

Public figures such as Rui Unas were present, participating in a set of initiatives to encourage the development of gastronomic and aquaculture tourism, having been participating in several related initiatives. This initiative was a joint organization of Marismar and Bluegrowth. Since last year, these two partner companies have been cooperating in the development of new projects

and campaigns aimed at stimulating the sustainable development of the aquaculture and fisheries value chain.

Figure 19. Engagement of Public Figures with gastronomic value of aquaculture

Figure 20. Engagement of Public Figures diving in a cage

5.2 Salmon aquaculture industry in Chile

In Chile, aquaculture is almost synonymous with salmon farming. Salmonid production represents 94% of exports from the aquaculture sector, concentrated in three species: Atlantic salmon (67.1%), Pacific or coho salmon (15.6%) and rainbow trout (9.2%). During the last decade, the production of other species has also emerged in an important way, such as algae and mollusks.

The Chilean mussel or mussel has an important participation in terms of production (27.8%), but very low in terms of exported value (4.1%). Unlike the latter, salmon production is almost exclusively export-oriented. The extensive coastline of Chile and the abundance of fjords with adequate temperatures and hydrographic conditions in the southern part of the country represent important natural comparative advantages for salmon farming in Chile.[54] But the industry was not born from the free action of the market, but was the result of the significant and successful effort of development and transfer of knowledge and technological capabilities carried out by the State, in conjunction with various semi-public institutions and public-private alliances, and continuous international cooperation since the 1970s and, in particular, the 1980s. These initiatives allowed the subsequent entry of private actors of national and foreign origin, who, taking advantage of the accumulated stock of knowledge and contributing new technologies, gave a strong stimulus to the growth of the sector.

The emergence and the development of the Chilean salmon industry demonstrate the important role of technology transfer in industrial development. Technology transfer has enabled Chile to build a globally competitive and innovative salmon industry over the last two decades. The industry has become one of Chile's main export sectors and a significant contributor to regional development. Today, Chile is the second largest salmon producer in the world and develops technology for the production of other fish species.

The development of the industry was a painstaking process and success was not assured. Chile undertook several trials, including attempts to stock rivers and lakes, spanning several decades in order to master fish-farming technologies. It solicited technical support from several international institutions with experience in fish breeding and farming and used its national institutions to acquire, assimilate, develop and diffuse fish farming technologies. Some of the early firms were created by public institutions and researchers that had accumulated some basic operational knowledge and skills in fish farming.

The close cooperation between government agencies and the salmon producers played a vital role in the growth of the industry, especially in the development of licensing regulations, sanitary standards and supporting research and development activities (R&D). Similarly, R&D institutions have worked closely with the national fishing agency, the National Commission for Science and Technology and the salmon industry.

[54] Marine Harvest (2018)

The Chilean Salmon Industry Association A.G. (SalmonChile) and the Technological Institute of Salmon (Intesal), which is the technical arm of the union, recently joined the international organization Global Aquaculture Alliance (GAA). “This - according to what was assured by SalmonChile - thanks to the work and efforts made in matters of sustainability and social responsibility that allowed the union and the more than 50 small, medium and large companies that make it up to join this network that promotes responsible aquaculture”.

Oceanic aquaculture will reduce conflicts with other users, increase sustainability levels and gain higher levels of social acceptance, given that its installation will only be in sectors that do not generate conflicts with other users and that one-way currents will reduce the prevalence of diseases. However, the difficulties in accessing the maritime resource are compounded by the growing rejection by the community of the operation and expansion of salmon farming in the territory. Communities have blocked the operation of companies in certain places, affecting production possibilities and the level of uncertainty they face. In the medium to long term, a bad relationship with the community, and with society in general, can translate into regulatory and legal changes that significantly impede the sector's action. Some examples of this are the unsuccessful attempts to relocate, the constant attempts to stop the expansion of the sector by different political and social groups or the difficulty in making the legal changes that allow the development of ocean aquaculture. For this reason, an alternative to the dilemma of how to grow is to regain and maintain trust and the social license to operate. A last relevant edge corresponds to the relationship with indigenous communities, given the special bond that many of these have with the territory. The so-called Lafkenche Law, in particular, can have a significant impact on the activity of the industry. The current applications for Maritime Coastal Spaces of Indigenous Peoples (ECMPO) overlap with approximately 70% of the total aquaculture production area in Chile; and, currently, 41 aquaculture concessions in a state of renewal have been suspended since 2014 due to the preference given to the request of ECMPOs. The potential for conflict with indigenous communities can further damage the image and approval of the sector.

The boom in the industry has meant the occupation of important coastal areas with cage rafts for salmon farming, which have tended to diminish the attractiveness of the environment. The productive work of this industry implies truck traffic, death of native species, waste of blood water, aesthetically inappropriate facilities, change in the transparency of the waters, all of which is openly an aesthetic devaluation of the landscape.

The installation of cage rafts in the coastal areas of southern Chile has been incorporated as a new element to the landscape, which has contributed to changing the historical image of these places, especially the Chiloe Archipelago. According to the officials of the salmon industry, this has been a contribution to the landscape and tourism as they have attracted more visitors. However, this version - clearly intentional - should be supported in a technical, documented and impartial way, since a contrary opinion is regularly expressed by locals and tourists, who consider the presence of cage rafts as a visual contamination, due to the profound transformation of the landscape they represent. Although the latter is not documented either,

this rejection is as obvious as that manifested by any other type of contamination that alters the lifestyle and original landscape of sites affected by severe environmental impacts. On the other hand, the locals, who traditionally developed a mixture between small agriculture and artisanal fishing, have seen their extractive activity of coastal marine resources curtailed by the granting of aquaculture concessions that have reduced the surface of the coastal zone suitable for fishing operations.

To date, there is no study or antecedent that measures, quantifies and relates the effect of cage rafts on the landscape and on tourism, probably because the development of this last sector is subject to multiple factors, especially economic (exchange rate, general economic situation of the country, situation of neighboring countries, etc.), and not only environmental.

As a way to mitigate the suspiciousness of the general public about farmed salmon and to promote aquaculture salmon, the Chilean salmon farming industry organizes several social and cultural events on a routine basis. The salmon national festival is an event that, year after year, brings together fishermen from all over the country to participate in the deep-sea fishing contest that is the main attraction of the celebration. Every year the festival is a sporting event that has become a tourist attraction over the years.

Furthermore, there are a lot of gastronomic events in which farmed salmon is the key dish, as a way to promote the product and help to increase the social acceptability of the species. This kind of events attract a lot of tourists and are beneficial for the country's economy.

5.3 European campaign about aquaculture - #FARMEDintheEU

The European Commission set up the 'Farmed in the EU' campaign to promote fish farming and aquaculture products to European consumers, one of the objectives being to increase this activity as an alternative to traditional fishing. The European Union considers aquaculture a growth sector, which will create a significant number of jobs and is able to provide consumers with high-quality, healthy fish with sustainable production.

This campaign was particularly addressed to schools and students, and to aquaculture farmers and to promote an exchange of experiences.

A great example of these promotion activities came from Spain. Spanish authorities, producer organizations and research institutes arranged open door visits and conferences across Spain to celebrate the annual "Día de la Acuicultura". This year, the European Commission joined in the celebrations, supporting the "Di sí a la acuicultura sostenible" ("Say yes to sustainable aquaculture") competition launched by the Observatorio Español de Acuicultura from Fundación Biodiversidad (MITECO).

Figure 21. Aquaculture's Day (Spain)

As part of the campaign, the "FARMED in the EU" schoolkit developed by the European Commission was promoted to hundreds of schools across the country. To date, more than 1700 Spanish pupils from 37 schools and 27 aquaculture experts (producers, scientists, officials) have been involved in 62 workshops under the label #CRIADOenlaUE. The European Commission underlined the exemplary campaign carried out by the Spanish authorities, emphasising the sustainability of these "farmers in the water". In a video message, Commissioner for Fisheries and Maritime Affairs Karmenu Vella congratulated the organisers on the campaign's success, while emphasising the crucial role of teachers as the link between youth, science and industry.

Spain is the EU's number one in terms of aquaculture production (226,000 tonnes in 2013) and jobs (20,000 producers out of 85,000) and is among EU leaders in research.

5.4 Case study of social acceptability of Aquaculture in Monastir's bay: Tunisia

This study is part of the Project MedAID (Mediterranean Aquaculture Integrated Development) that is an H2020 European Project that bring together 32 partners from the research and aquaculture sector to increase the overall competitiveness and sustainability of the Mediterranean marine fish-farming sector, throughout the whole value chain. The "University of Bretagne Occidentale" and the research centre "Ifremer" that are partners of the "Technopole de Quimper" and "Investir en Finistère" take part in the project and led this study.

Monastir Bay is one of most important regions in terms of Aquaculture in Tunisia. This bay host 12 of the 20 active finfish farms of Tunisia. Finfish farm concessions have an area area of 15 to 80 hectares, on which 8 to 72 cages with a diameter of 22 to 25 meters are laid out. The total production capacity of all these farms is 15,490 tons. The vast majority of farms in the region are located in the port of Teboulba, which is now showing signs of saturation.

Aquaculture is not the only economic activity present in Monastir Bay. Fishing also plays an important role in the territory with six ports, including one deep-water port, which accommodates boats from inshore to offshore fishing. In contrast to aquaculture, the quantities landed by fishermen have sharply declined or stagnated in recent years for species such as cuttlefish, squid, octopus and king prawns. Monastir Bay is also an attractive touristic area. The bay is also an exceptional natural site. It is home to remarkable natural species especially in the Kuriat island that are protected.

Monastir's bay, the difficulties experienced by the stakeholders (fishermen, aquaculture, tourism…), precise interactions that exists on the territory and to do a diagnosis of social acceptability of aquaculture in the bay. 26 interviews have been carried out with the stakeholders of the bay (tourism sector, fishermen, aquaculture sector, administration, environmental association…) A workshop has been held and brought together 22 stakeholders of the bay. This workshop aim was to produce a shared knowledge of challenges generated by aquaculture development in the bay, analyses the possible impacts the aquaculture development and think about possible actions to reduce this impact.

The interviews results have shown that problems with aquaculture were due to:

- The fact the aquaculture benefit was not shared with the different stakeholders of the bay. Aquaculture products are eaten by local people and aquaculture businesses doesn't provide jobs to local people as people from other areas of Tunisia have been employed in the aquaculture farms.
- Aquaculture environmental impacts are a serious concern amongst local people but it's more how these impacts are managed by the local government that is a problem. Local people said that they want that the local government must do more to control the sector. There a question of local governance behind this.
- Fishermen said that their activity should be more considered in the processes of aquaculture development. Fishermen complained that they were not involved in the mapping plan of the bay that regulate the activities of the bay.

With this different result the authors highlighted conditions of acceptability and thus some factors favouring the development of aquaculture projects.

- Participation to decisions: Enable stakeholders of the bay (fishermen, local population…) to take part in the decision process about aquaculture farms. This improve social acceptability.

- Lot of people interviewed have said that they wanted to take part in the installation stages of aquaculture farm
- It could improve the acceptance of aquaculture farm because it enable to every stakeholders to appropriate the project and be more favourable to it.
- It increases trust between stakeholders and enable stakeholders to feel more respected and considered.

Territory diagnosis: Ensure that the territory is adapted to aquaculture activities and adapt the project to territory's need/constraints.

- Taking into account social, environmental and economic aspects but also governance and value given by the public to the territory selected for aquaculture projects. In Monastir bay, it has been deplored that only economic aspects were taken into account and environmental and social aspects were forgotten.
- Identify synergies and incompatibilities of aquacultures with others sectors already present on the territory (for example with tourism, fishing) could improve acceptability of the project.
- Spatial planning with all stakeholders of the territory that shows where are and where will be located all the activities on the territory (fishing, tourism, houses, environmental concern…). In Monastir Bay local people regretted that the first aquaculture project hasn't been associated with the global planning of the bay.

Communication upstream and during the project: Inform people on the project about its positive and negative impacts.

- Inform people is important as the public will know if the project is good.
- In Monastir Bay, people said that they would like to be more informed and wanted feedback about the studies that are realised.
- It is very important that the people could react, explain their concerns and their point of views. It's also very important that these feedbacks are really taken into account by authorities.
- Communicate about negative or positive aquaculture impacts. In Monastir Bay many oppositions are related to negative impacts of aquaculture or the positive impact that are not well distributed.
- People will not support the project if they don't know its positive impact.

Political framework to ensure these processes:

- People want to be sure that a project like that would lead in a sure and responsible way.
- In Monastir's bay, lot of concerns were related to the fact the project will respect laws and regulations.

5.5 Breizh Mer: Social acceptability of Offshore windmills in Brittany

Christophe Chabert is responsible of the SME EOLFI that is specialized in floating offshore wind turbines. He presented in a conference, the social acceptability process that he implemented to install offshore wind turbines in the area of Groix Island. The social acceptability of this project was quite challenging as there is lot of fishing and touristic activities, there is also a high housing density on the coast. These factors could have increased a lot the local contestation of the project.

He summarized his social acceptability process with 3 points: Anticipation, listening and transparency.

Anticipation: He started to anticipate this question of social acceptability very early in 2008 (so ten years before a possible installation). He consulted the fishermen organization in the area, local administration and local people to know where the best spot to install the wind turbines would with the best possible compromise.

Christophe Chabert also said that transparency was a key when they negotiated and explained the project with local stakeholders. He said that they have been very transparent on their needs about the area they needed, they have transparent when they communicated on the project on the positive impacts and the possible negative impacts of the wind turbines implantation.

Listening is also a very important part of a successful social acceptability process. Christophe Chabert said that they listened the fishermen to understand the different issues the fishermen to adapt the project to them.

The last and very important measure that has been implemented is that Eolfi created a job dedicated to the social acceptability of the project. This job's aim is to communicate on the project, deal with local concerns, adapt to local and fishermen requirements. It has been seen that this as improved a lot the acceptability of the project.

As a result, the project of Windturbine installation did not yet receive contestations and judicial remedy which is quite rare in the sector. In total more than 30 concertation meeting have been held with local stakeholders. Moreover, Eolfi created a touring exposition that presented the project locally to multiply information point to be as close as it can from local stakeholders' concerns.

5.6 Social acceptability on renewable energy project on the French Coastal Area

"Conflits et stratégies d'acceptabilité sociale autour des énergies marines renouvelables sur le littoral français». Annaig Oiry, 12/2015. PHD research study.

Installation of offshore wind projects share many similarities with the installation of aquaculture farm projects: both need to be installed in coastal areas that are usually already characterized by multiple uses (weight of professional fishing sector with major fishing ports, importance of the tourism sector, environmental issues, local people concerns, etc.). Actions that have been

implemented to improve the social acceptability of the offshore wind turbines gives information about social acceptability of economic activities in coastal areas.

This document presents the results of a study that analyses strategies undertaken by industrial groups to improve the social acceptability of the installation of 2 offshore wind turbines parks (wind turbine park of Saint Nazaire bay, Wind turbine park of Saint-Brieuc bay) and 2 water Turbines Park (Water turbines park of Paimpol-Brehat and Water Turbine park of Raz de Blanchard, Normandy). All of these projects have been accepted and received an authorization from the government between 2015 and 2019.

This study has been made as a part of a PHD research study made by Annaig Oiry, Université Paris 1, Panthéon- Sorbonne, laboratory of physical geography.

Three main survey techniques were selected to carry out this research: the practice of semi-directive interviews, observation during marine renewable energy promotion fairs, and the constitution of documentary corpuses. Sixty interviews were conducted with a variety of stakeholders: users of the sea (fishermen, nautical activities), the local population (main or secondary residents), local associations, local authorities (mayors of municipalities and inter-municipalities), project leaders (also referred to as techno-industrial groups in this article), those responsible for and organisers of consultation procedures (consultation agencies, members of special commissions for public debates), public decision-making bodies (Directorate General for Energy and Climate).

Different categories of opponents seem to be distinguishable: the residents, environmental associations, and the fishing world.

The raisons used to justify a position against marine renewable can be grouped into four types: arguments mobilizing the problems of the living environment, arguments arising from a criticism of consultation procedures, arguments of a socio-economic (job losses) nature and, finally, arguments based on environmental issues. These raisons can be compared to the ones that the professionals of aquaculture face when they want to install new aquaculture farms even if the economical dimensions are different between wind turbine farm and aquaculture farm installation.

Manage conflict with social acceptability's strategies

The following text presents different activities that have been undertaken to improve social acceptability of the project amongst the local people:

Industrials that carry Wind Turbine farms projects develops social acceptability strategies upstream the project to assess the probabilities of its appropriation in order to limit the risks of possible rejection, repositioning the project or the technology itself if necessary. Windfarms project leaders are thus led to carry out real work on social acceptability, conceived here as a way of obtaining the consent of civil society. Industrials create communication strategies that aims to make this new infrastructure desirable for the local people.

Create "Consultation events" to improve the social acceptability of the projects:

Industrials that are responsible of the installation of offshore wind turbines or water turbine project, highlight the fact that their projects are concerted and that they have created a close dialogue with the local inhabitants. For them, consultation takes place through different types of initiatives such as the local consultation, meeting with a "monitoring body" (that is a group of local actors of the political, economic and environmental which meets regularly to follow the progress of the project), as well as public debate about the project. Public debates enable industrials to pass on information and to consult local stakeholders. Public debate is also an opportunity to implement various communication strategies to achieve acceptance of their energy infrastructure.

Project leader sometime hire professional agencies of council, communication and concertation to support them in the concertation processes:

These agencies use a precise methodology to prepare the public debate and to try to improve social acceptability of the project that consist in:

A territorial analysis of the selected site: this consists of a documentary analysis and a context study based on interviews with the local people in the territory. This first study is used to identify the people who have potential concerns on the project, to study their discourse, to question the local stakeholders on their expectations regarding the consultation process and to evaluate the image that the local people have of the project. This will have to support the industrials to prepare solid argument for the public concertation events. The agency prepares the debate by helping the project owner to draw up the project presentation file. The agency also organises sessions to prepare project leaders for public speaking by providing coaching and media training sessions. They can also organize convivial events where all stakeholders are invited such as aperitif of presentations of the projects.

Negotiating marine renewable energies presence projects through compensation:

Compensation can be defined as the allocation to a territory suffering the negative impacts of a development declared to be of public utility, of a set of measures aimed at improving its acceptability. Several types of compensation can be made within the framework of energy projects: financial compensation (which takes the form of direct or indirect financial compensation), environmental compensation (restoration of destroyed resources, re-establishment of species, classification of another territory as a protected area in compensation for the equipment of the first, etc.) or accompanying measures (financing of ancillary activities). In the aquaculture sector, this could be carried out with the organization of the professionals of aquaculture or the local/regional authority.

The fishing industry is particularly involved in these negotiations on compensation as fishing areas could be reduced with this kind of projects. During the construction phase of the installation of the first tidal turbine off the island of Bréhat, on the north coast of Brittany, some fishermen, those whose fishing area was temporarily inaccessible, were financially compensated. Measures for investment in public goods were also envisaged, including the financing of refrigerated lobster tanks (for the Saint-Brieuc offshore wind farm and the Paimpol-Bréhat tidal turbines), as well as ecological restoration actions: campaigns to combat the crepidule (a larva whose high densities prevent the recruitment of scallops), shell reseeding

campaigns, immersion of artificial reefs to attract fish, etc. creation of specific jobs for fishermen wishing to engage in the maintenance of offshore wind farms.

The use of local taxation for acceptability purposes

The Winfarms project leaders have set up a tax on maritime wind turbines collected by different actors in the territory. The tax is divided as follows: 50% for the coastal municipalities from which the wind turbines will be visible, 35% for the National Committee for Fisheries and Marine Breeding and the remaining 15% is dedicated to funding contributing to the sustainable development of other maritime activities. The sums involved are not negligible, since they amount to approximately seven million euros per year and per park. The wind tax is an essential modality for the acceptability of mayors of municipalities. For elected officials, one of the determining factors in their acceptability of MRE (Marine Renewable Energy) projects is the issue of local development. Most elected municipal officials and members of local authorities have positions that are rather favorable to the various projects studied, because they see energy transition projects as vectors of local development creating a new economic sector on the territory.

Here the strategies undertaken by Industrials to improve the social acceptability of their Windturbines farm are more related to seduction and sometime manipulation strategies to convince local stakeholders to accept the project. There is here an important difference with the “social acceptability” that is meant to be co-constructed with the different stakeholders of a project.

6 Conclusions

According to the European Commission, aquaculture is among those maritime sectors contributing to the blue economy due to its potential for generating jobs, business opportunities and, most importantly, for ensuring food security in Europe. In 2014, EU member states set new strategies to support sustainable aquaculture and ambitious targets of productions to be met by 2020 in the three segments, marine fish, freshwater fish and shellfish.

A recent assessment made by the European Commission concludes that some countries might not be able to attain the established goals and this paper presents an in-depth analysis of such strategies to identify the social constraints hampering aquaculture growth in France, Italy and Spain as well as the measures established to overcome them. Most of the identified issues are related to the social acceptability of local communities, local stakeholders and consumers, suggesting that this still represents an unsolved issue hampering aquaculture development in Europe. In fact, results show that (a) the sector suffers from a bad image related to its environmental impacts; (b) a lack of integrated spatial planning is leading to increasing conflicts with other activities; and (c) there is predominance of top-down consultation mechanisms.

There is not a single solution to enhance social acceptability of aquaculture since this depends on a number of social, economic and environmental factors that may differ from site to site, and countries need to adopt a more integrated approach where concerns of local communities and stakeholders are understood and taken into account.

Social acceptability of aquaculture still represents an unsolved issue despite the efforts made by the European Commission, the FAO and Member States to enhance it.

The complex and rigorous legislative framework that ensures an environmentally sustainable aquaculture along with healthy seafood has not guaranteed the acceptance of the sector by the local actors where aquaculture is developed and by consumers. From the analysis of the three countries, national reports have emerged that the most relevant environmental regulation is applied, while many differences have been found in the strategies set to improve communication and to establish public participatory programmes. In this context, a long-term commitment to educational projects and medium-short-term investment in media literacy projects can contribute to building a more favourable path than the current context of stagnation and contestation.

There is not a single solution to enhance social acceptability of aquaculture and administrations, aquaculture producers and citizens should collaborate in the development of national and regional strategies under a more integrated perspective, taking into consideration environmental, economic, social and governance related aspects. On the other hand, local and regional administrations need to develop the capability and the tools to recognise when a further aquaculture development is likely to deteriorate the social and economic well-being of their communities.

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