

12 APRILE 2022
10:00 – 12:00

«La Blue Bioeconomy
nell'area
mediterranea:
strategie
e opportunità
d'innovazione per le
regioni italiane»

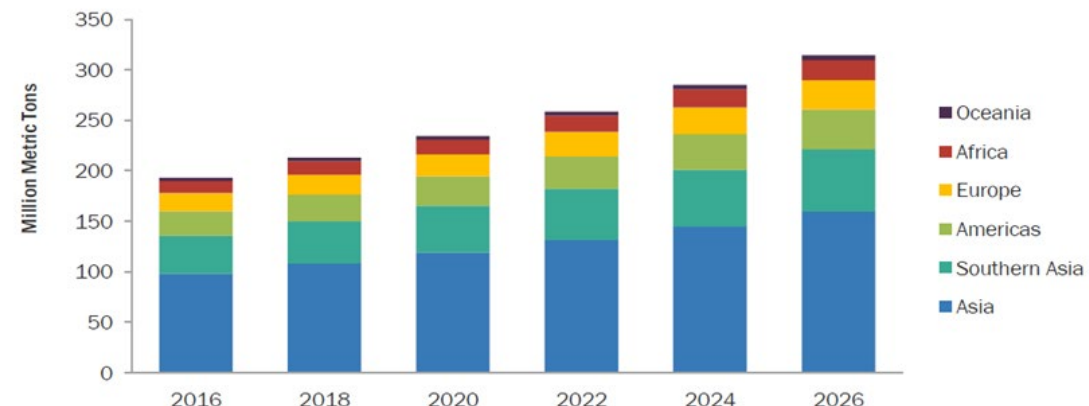
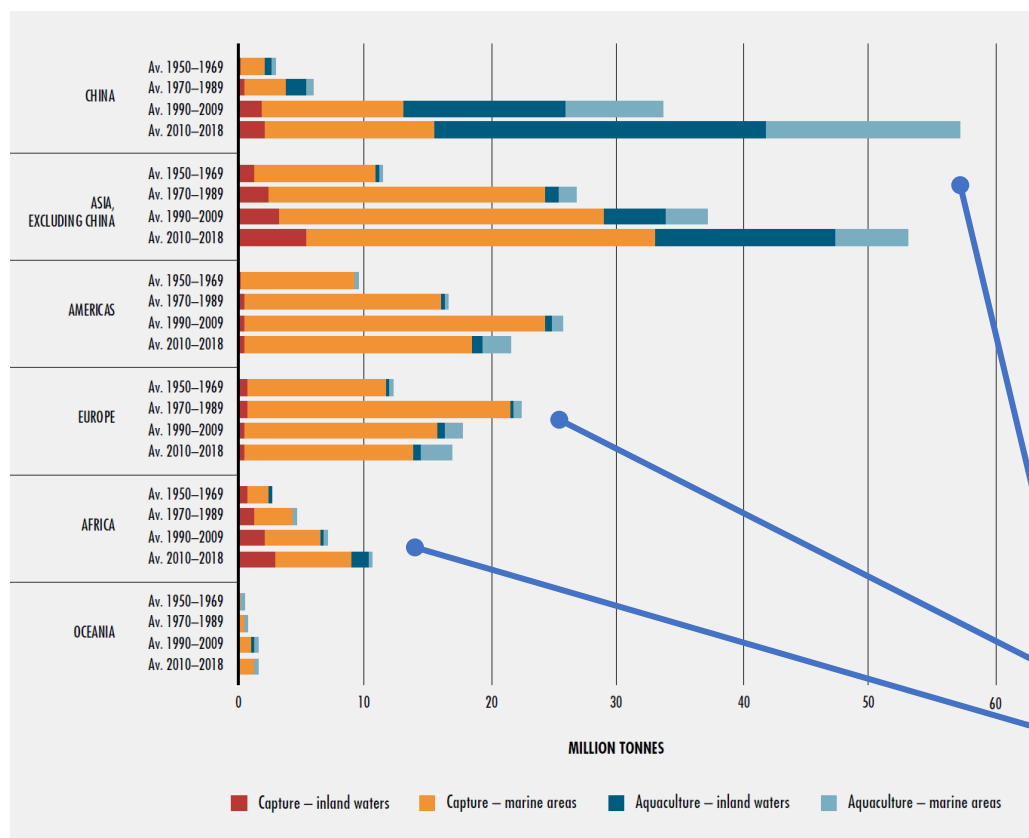


Technology and market trends per Fishery and Aquaculture

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I. FISHERY AND AQUACULTURE

The consumption of marine products from fishery and aquaculture is growing in time and this positive trend is expected to grow in the future



Analysis of production by country vs consumption by country highlights:

- Countries highly dependent on seafood;
- Countries increasing market demand;
- Main producers;

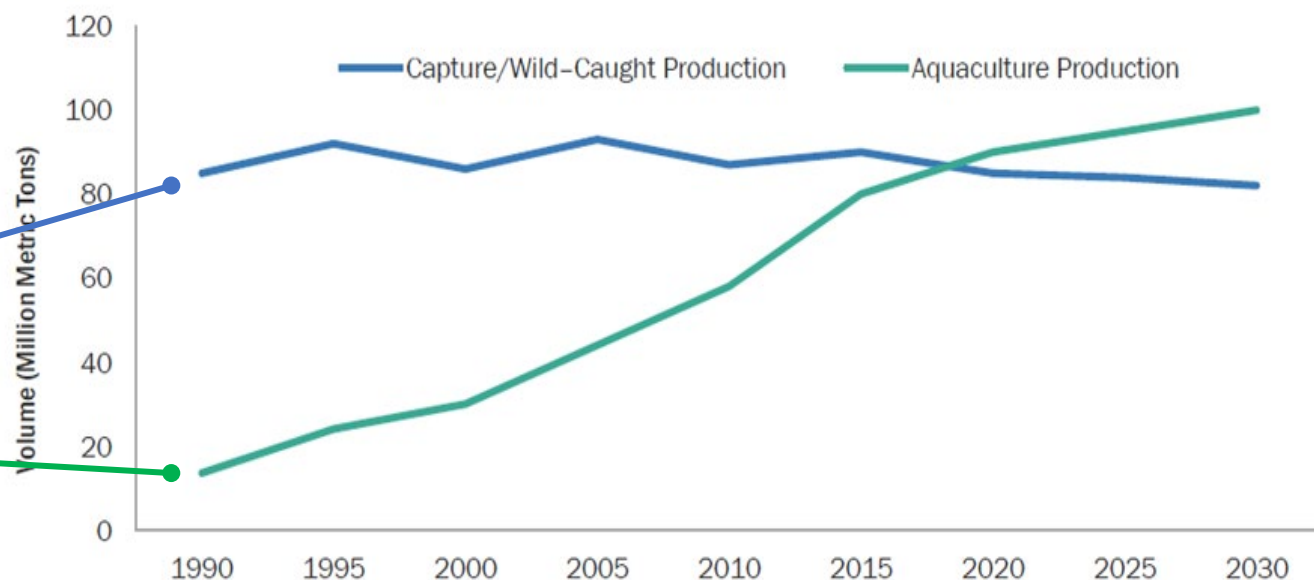
Insights:

- China and Asia are the main global producers esp. for aquaculture
- Europe is a net importer (especially of aquaculture products)
- Africa has large potential

Source: FAO, SOFIA, 2020

I. FISHERY AND AQUACULTURE

Nevertheless fisheries and aquaculture have very distinct patterns and issues: fisheries is worldwide declining in production, aquaculture is strongly increasing



For both there are issues related to **sustainability** but in quite different aspects:

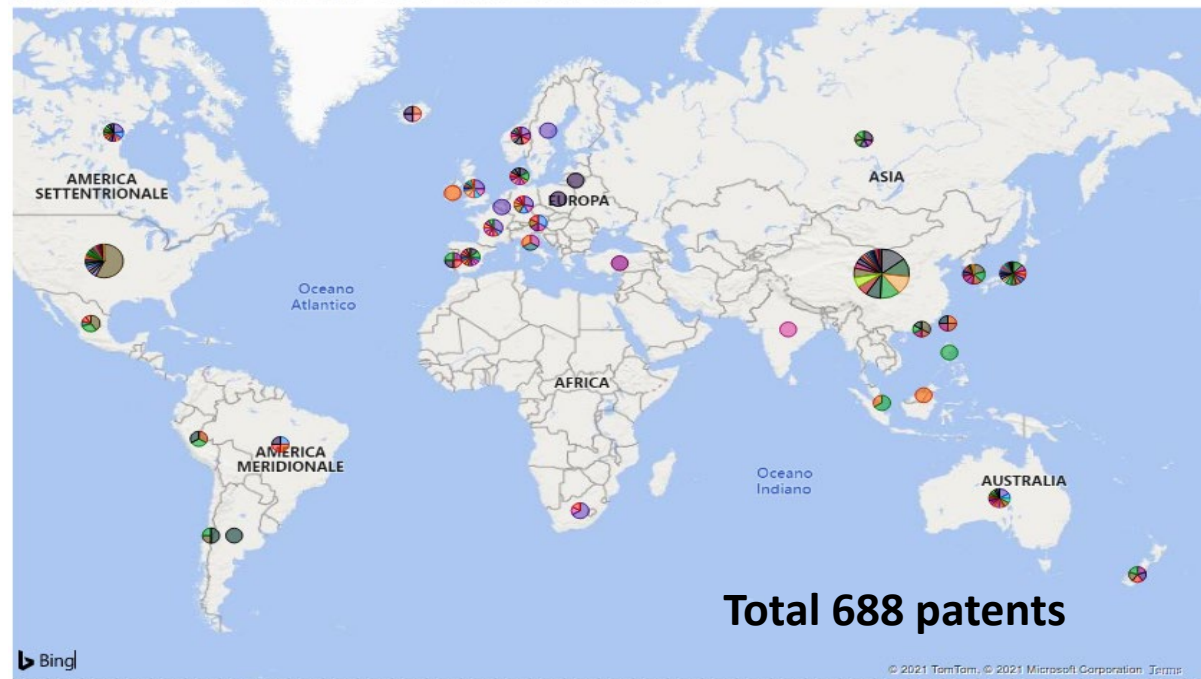
- FISHERIES: is suffering for general **overcapacity and overfishing**, there is great need to control exploitations through strong management to avoid overexploitation. This implies to **not increase exploitation but increase sector EFFICIENCY** (e.g., reduction of costs), increase **SELECTIVITY** (e.g., less discards), improving technological activities after catch operations.
- AQUACULTURE: is improving but needs to **avoid ecological IMPACTS**, and this is pursued through **SUBSTITUTION of FISH PROTEINS** in feed, **improved rearing technologies** and rearing of low trophic level species.

I.a Fisheries: Pelagic and Demersal Large-Scale Fisheries (LSF) and Distant Water Fleet (DWF)

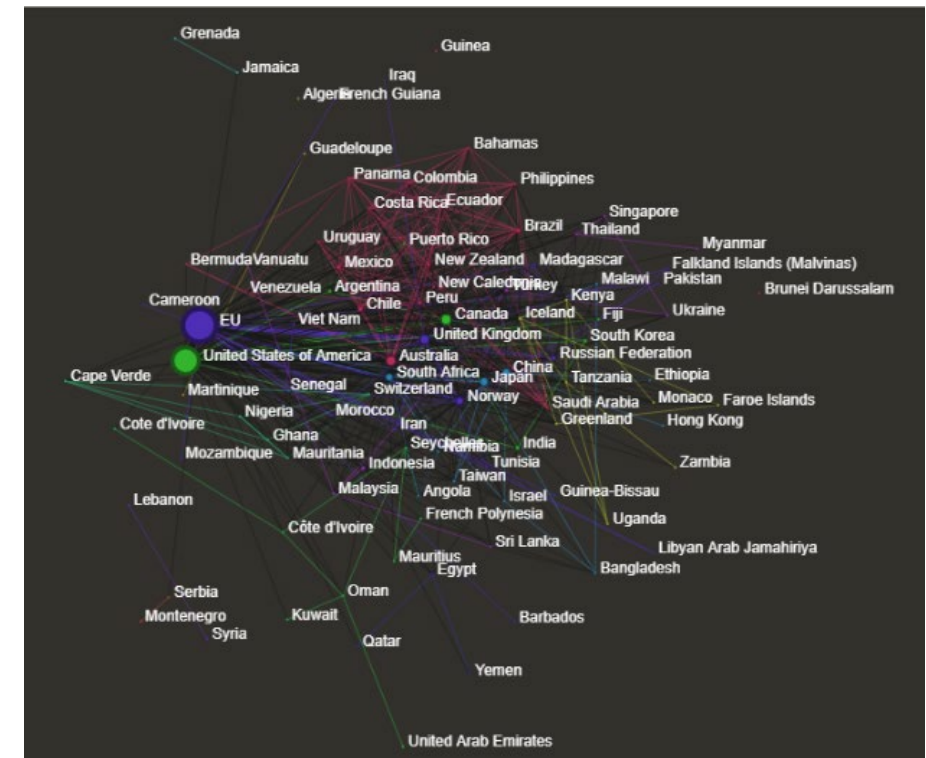
PATENT ANALYSIS: Relevant impact on the commercialization of innovative technical solutions on fisheries sector regard especially territories such as the USA or China

Nr. of filing events partitioned according to the earliest filing year (EP and PCT not included):

earliest_filing_year ● 2015 ● 2016 ● 2017 ● 2018 ● 2019 ● 2020



NPL ANALYSIS: Other divulgation modalities (such as the scientific publications, the books, the reviews, funded projects etc) showed a relevant proportion of attention being concentrated in the EU countries.



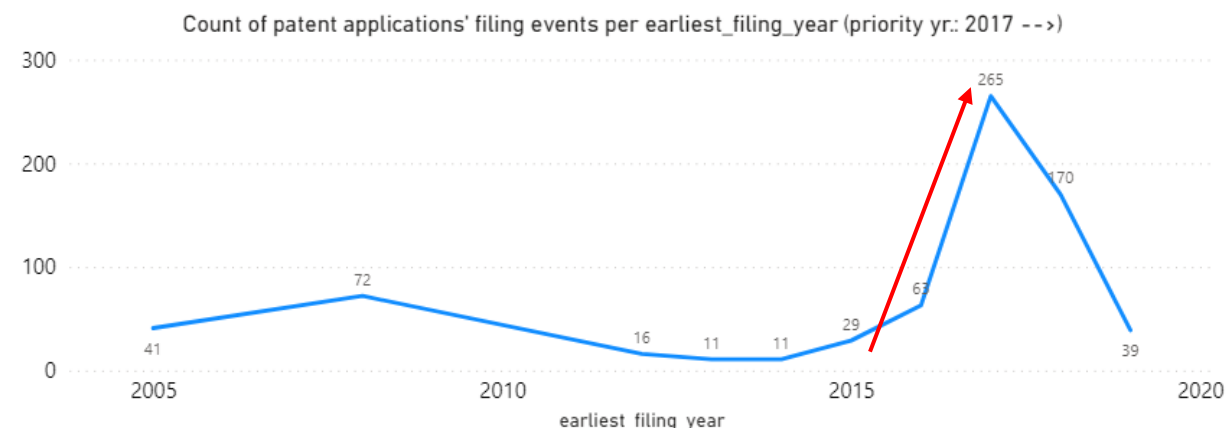
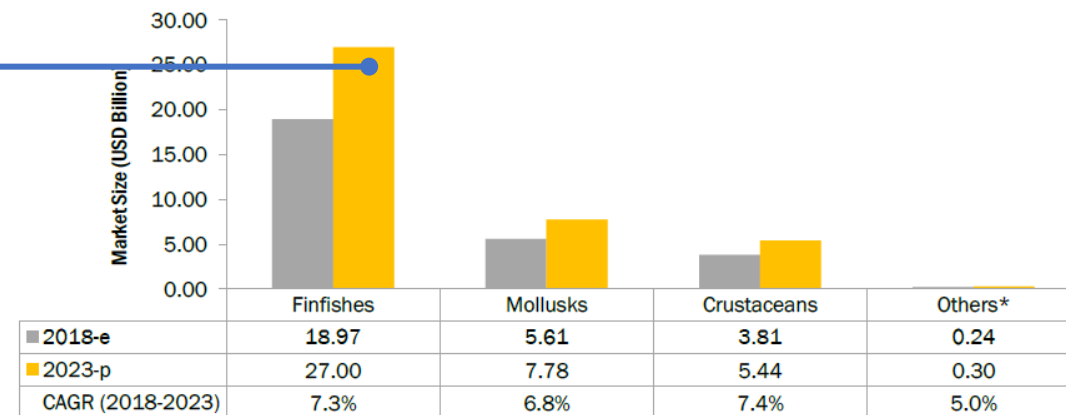
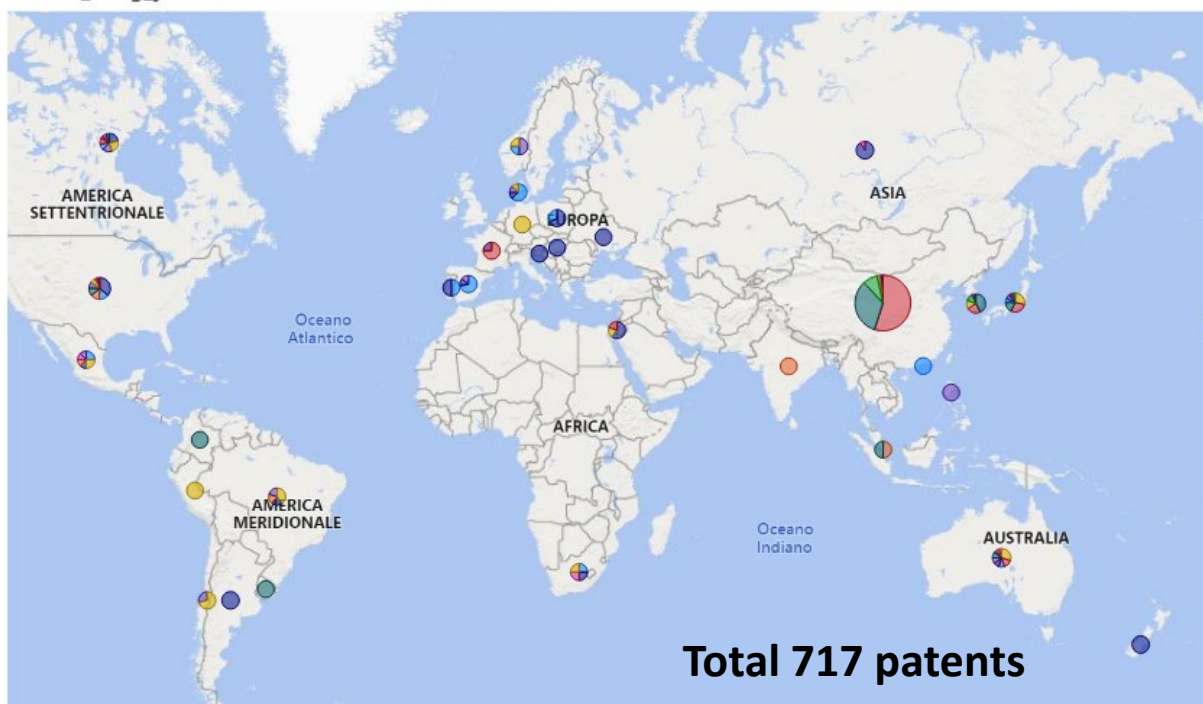
I.b Aquaculture: Marine Finfish aquaculture (MFA) and Shellfish aquaculture (SA)

Market demand for products is robustly forecasted as increasing in the next future.

After a period of relative stagnation, after 2015 there was a relevant positive trend in patents[↑] due to European countries.

Nr. of filing events partitioned according to the earliest filing year (EP and PCT not included):

earliest_filing_year ● 2005 ● 2008 ● 2012 ● 2013 ● 2014 ● 2015 ● 2016 ● 2017 ● 2018 ● 2019

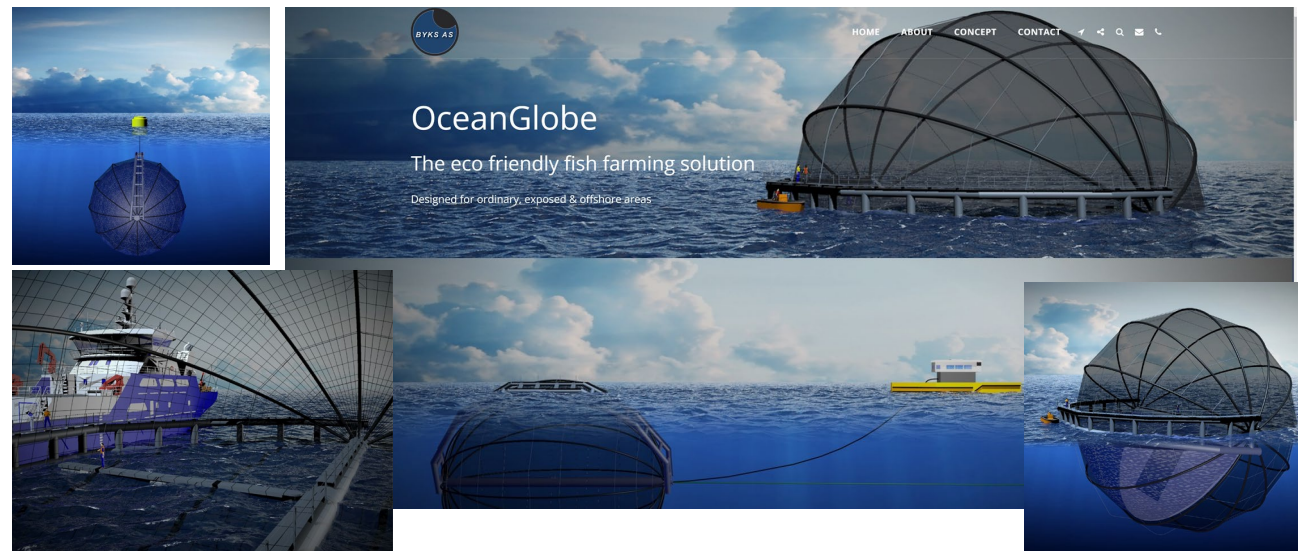


I.b Aquaculture: Marine Finfish aquaculture (MFA) and Shellfish aquaculture (SA)

Players to be monitored.

Example 1: BYKS AS (NO)

OceanGlobe is a globular fish farming construction designed to be used in both ordinary, exposed and offshore locations. Developed for farm fish in exposed and offshore areas. Flexible anchoring, working platform, continuous centre pole, can be emerged and submerged, elevate and submerge the complete fish farm, rotation (also for easy cleaning). Volume of about 40,000 m³, for fish farming but also for storage and transportation of wild fish.



Example 2: HAUGE AQUA (NO)

Egget is sheltered workplace addresses health and safety for the staff by eliminating many high-risk operations. The water intake is located at the bottom of the unit.



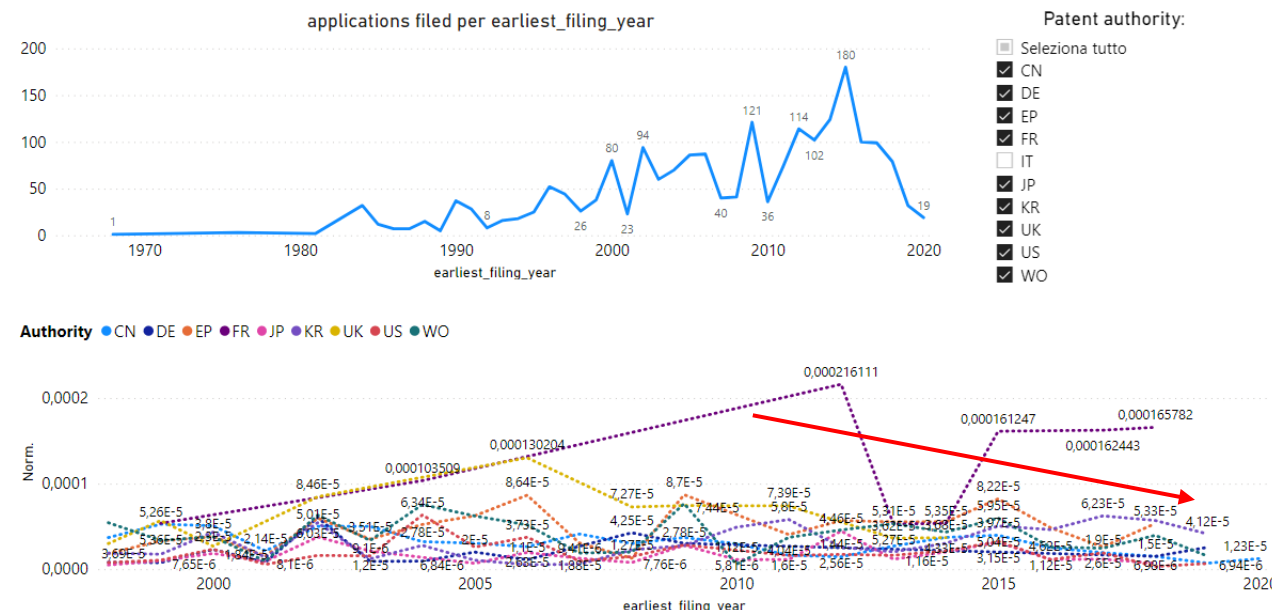
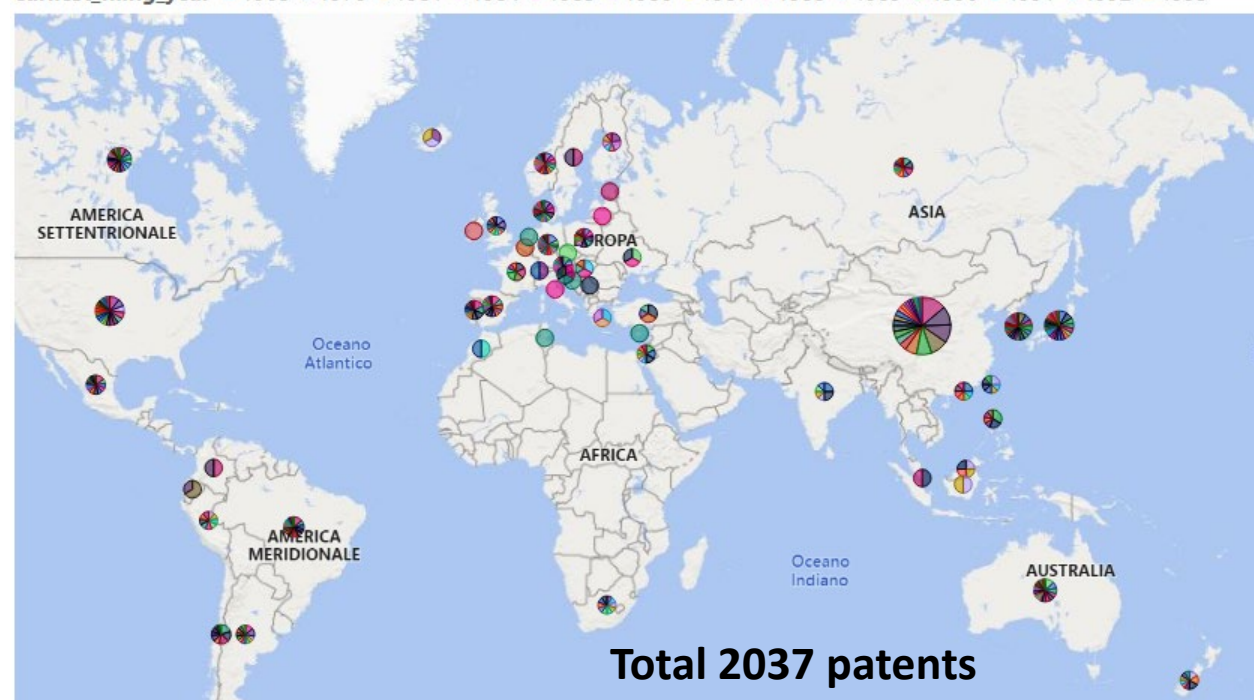
I.c Fish meal

PATENT ANALYSIS: large number of patents, great importance of European countries and in particular France (largest in EU) with several companies.

In the last decade slightly declining in EU.

Nr. of filing events partitioned according to the earliest filing year (EP and PCT not included):

earliest_filing_year ● 1968 ● 1976 ● 1981 ● 1984 ● 1985 ● 1986 ● 1987 ● 1988 ● 1989 ● 1990 ● 1991 ● 1992 ● 1993



Several patent applications referring to:

- substances helpful to reinforce the fish skeleton
- vitamins to be used in aquaculture applications
- use of microalgae or other products for animal feed production

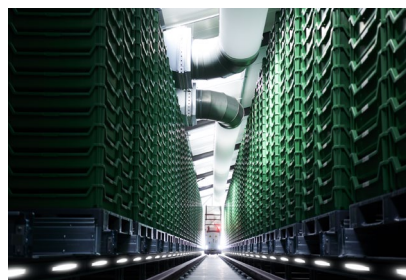
I.c Fish meal

Players to be monitored: example YNSECT (FR)

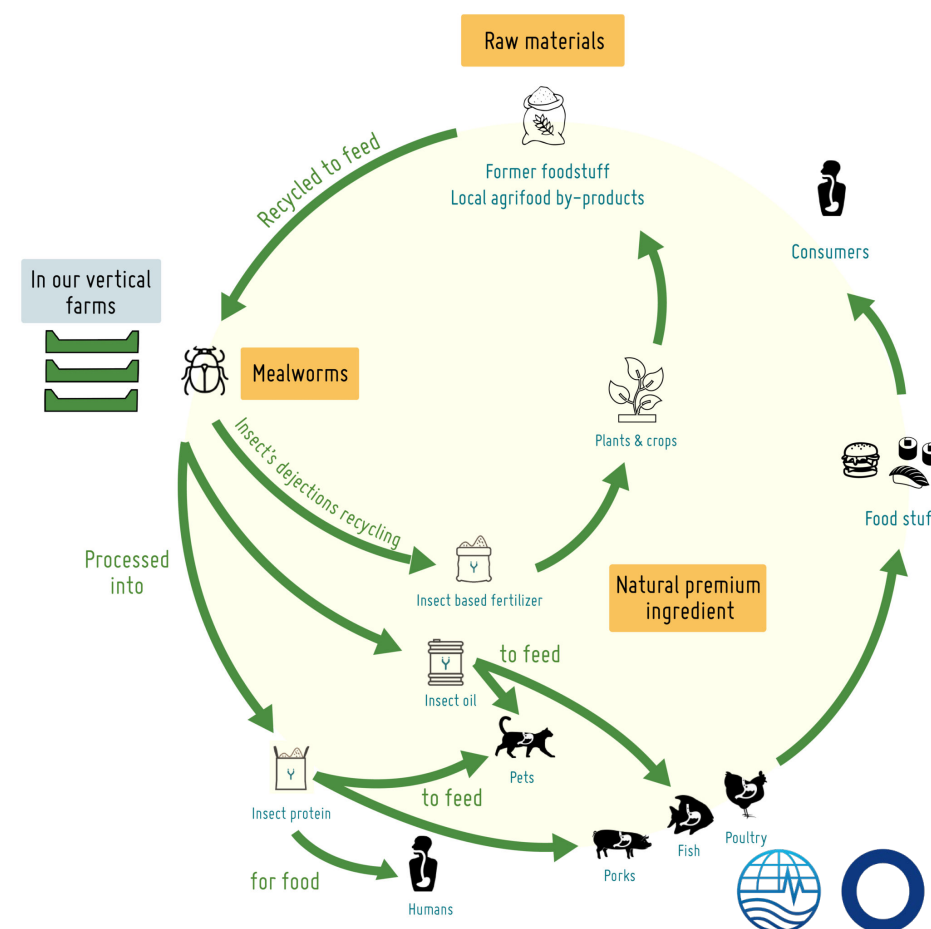
Ynsect uses pioneering proprietary technology protected globally by c.300 patents to produce Molitor and Buffalo mealworms in vertical farms.

Ynmeal is an ingredient naturally rich in highly digestible proteins (more than 70%). Formulated with Molitor larvae, and produced in powder form, Ynmeal is perfectly suitable for the nutrition of farmed fish and shellfish. It is used at a level of 5 to 30% in the formulation of nutritional rations

Ynoil is a light oil, rich in polyunsaturated fatty acids, extracted by a mechanical process from Molitor larvae. Ynoil is perfectly adapted to the diet of farmed fish and shellfish



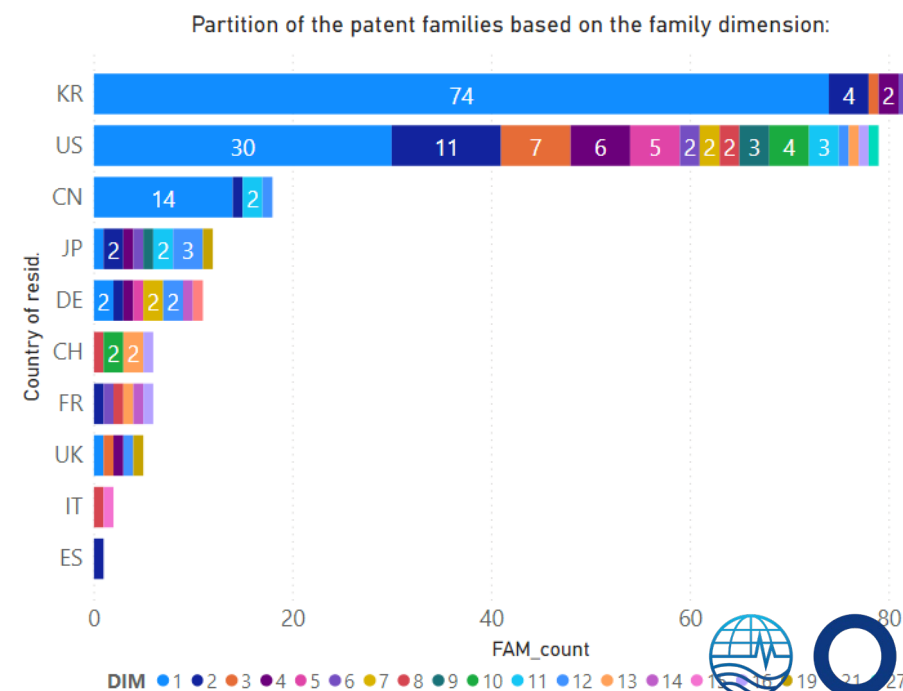
YINSECT CIRCULAR MODEL



I.d Seafood processing and trade

The processing of seafood adds value to the production of fisherman and small fish farmers, diversifying the sources of income of coastal communities and reduces the seasonality mainly linked to the biological cycles of exploited resources (mainly wild but also farmed). Includes transformation, preparation, transformation, packaging, preservation... Notably the international trade for processed fish products is increasing. EU patent trend is stable.

Filing years: 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020



I.d Seafood processing and trade

Players to be monitored

Example 1: Marine Techno/Trade Korea (KR)

Low-Molecular Fish Collagen Jelly Stick ABC Juice / 20g x 30 Packets / Vegetable. ABC juice that allows to detoxify body with fresh ABC juice and replenishes lacking nutrients and collagen



Example 2: BADABON/Trade Korea (KR)

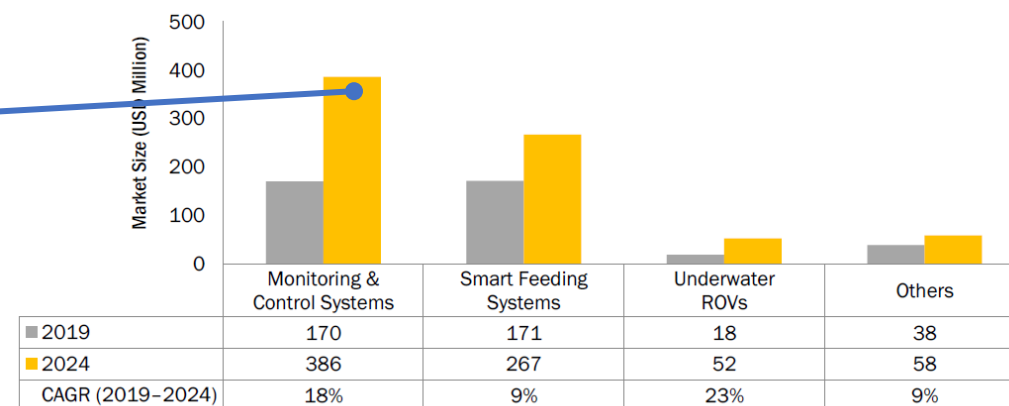
Spicy and sweet tteokbokki filled with the scent of seafood using shrimp, squid, shellfish, and red crabs is also hygienic and easy to cook with powder soup development



III.d Precision aquaculture

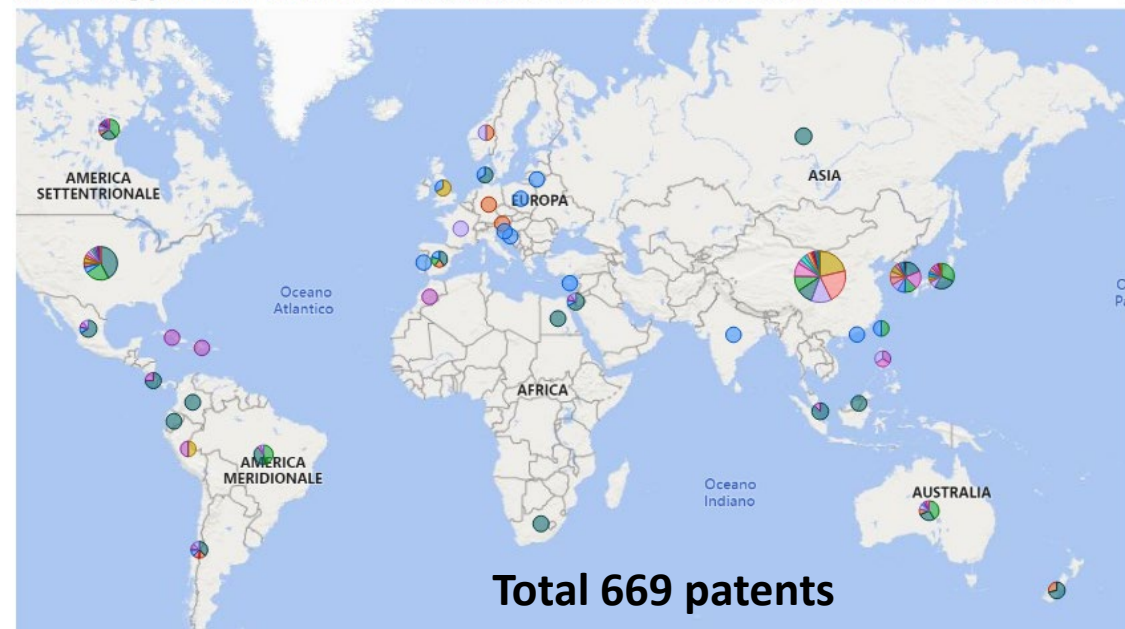
Precision aquaculture market is increasing.

PA market include adoption of advanced technologies such as Internet of Things (IoT), remotely operated vehicles (RoVs), and artificial intelligence (A.I.) in aquaculture farms.



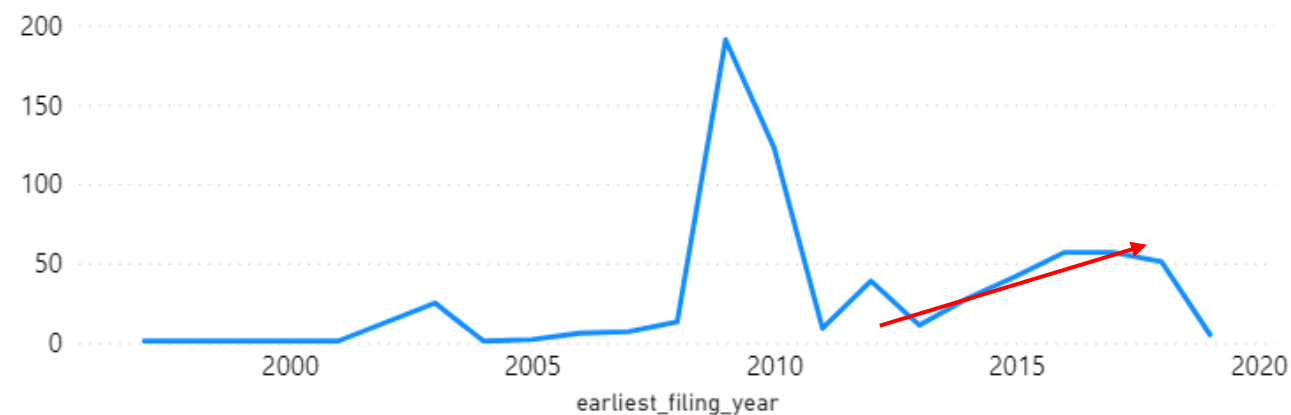
Nr. of filing events partitioned according to the earliest filing year (EP and PCT not included):

earliest_filing_year ● 1997 ● 2001 ● 2003 ● 2004 ● 2005 ● 2006 ● 2007 ● 2008 ● 2009 ● 2010 ● 2011 ● 2012 ● 2013

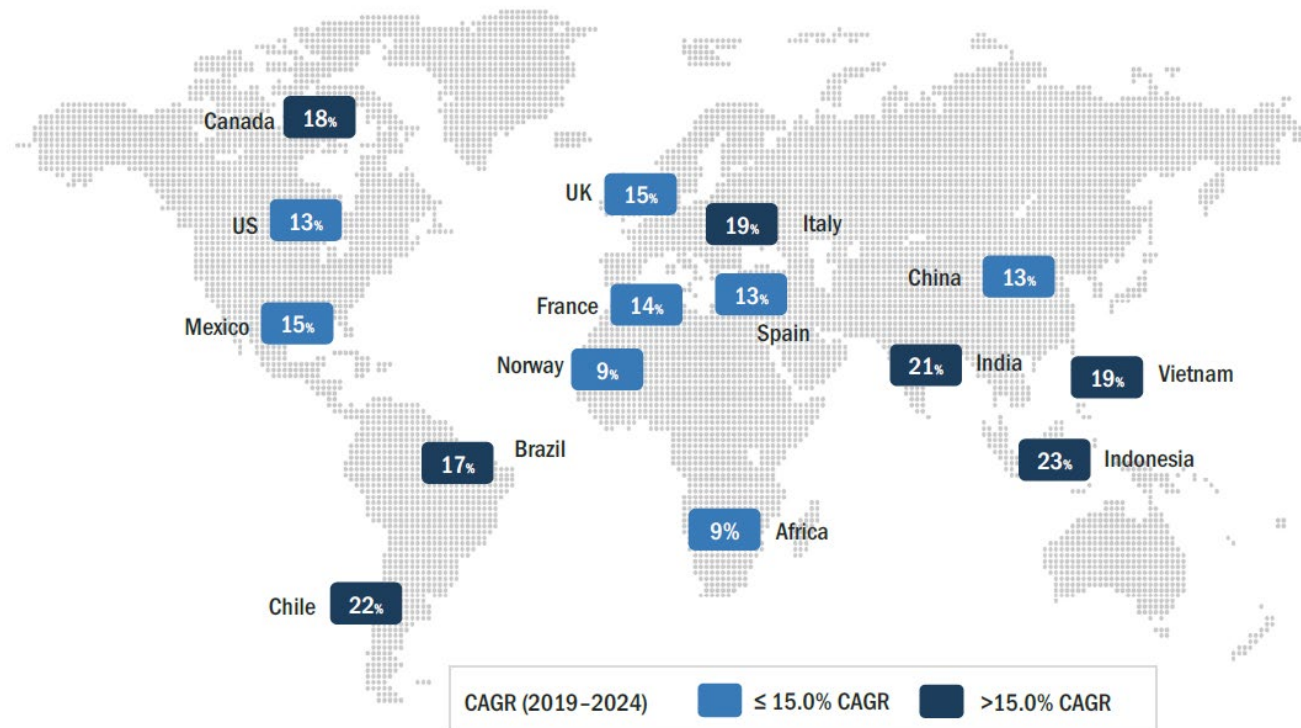
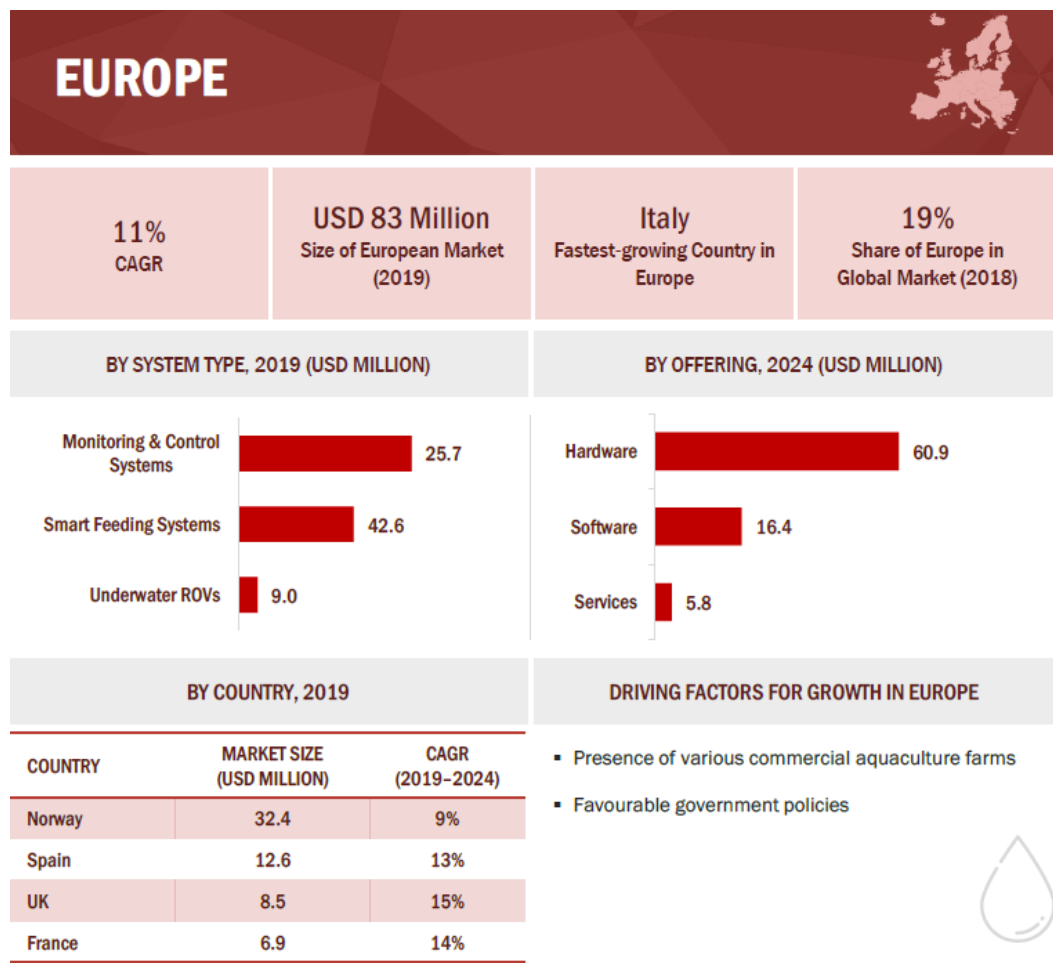


- Growing investments for adoption of innovative devices;
- Rising demand for protein-rich fish feed (smart feeding);
- Increasing worldwide the governments' support.

Count of patent applications' filing events per earliest filing year



III.d precision aquaculture



III.d Precision aquaculture

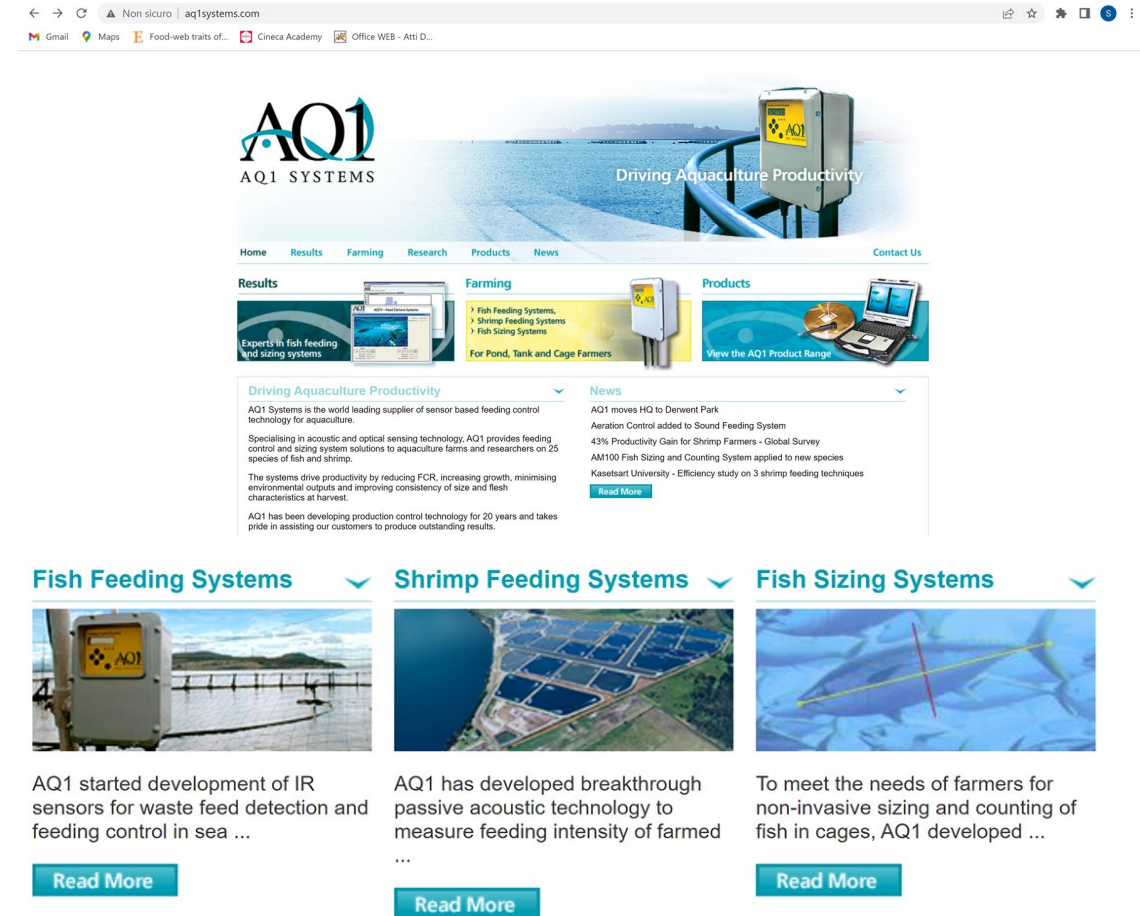
Players to be monitored

Example: AQ1 systems (AU)

The AQ300 Adaptive feeding system uses the Infra Red waste feed sensor and controls automatic feeders and feed cannons (versatile for 18 species) and also monitors key environmental parameters and transmits data locally or globally through the mobile phone network.

AQ1 is a video based feeding systems, the AQTV-Pro connects with one or two single or Pan/Tilt underwater cameras and transmits video images of fish feeding via WLAN to a feed boat/barge or by 3G (internet) to anywhere in the world.

For feeding control on all species the AQTV-Digital offers a cost effective feeding camera solution for centralised feeders or feed cannons.



The screenshot shows the AQ1 Systems website. The header includes the AQ1 logo and the tagline "Driving Aquaculture Productivity". The navigation menu includes Home, Results, Farming, Research, Products, News, and Contact Us. The main content area features three columns: "Fish Feeding Systems" with a description of AQ1's role in waste feed detection and feeding control; "Shrimp Feeding Systems" highlighting breakthrough passive acoustic technology for measuring feeding intensity; and "Fish Sizing Systems" describing non-invasive sizing and counting of fish in cages. Each column has a "Read More" button.

I. FISHERY AND AQUACULTURE

Players to be monitored:

- **BYKS** ([BYKS AS - OceanGlobe](#))
- **THE NEW ZEALAND INSTITUTE FOR PLANT AND FOOD RESEARCH** ([Seafood Technologies: Plant & Food Research \(plantandfood.co.nz\)](#))
- **XYLECO** (<https://www.xyleco.com/impacts/>)
- **DSM NUTRITIONAL PRODUCTS** (<https://www.dsm.com/corporate/about/businesses/dsm-nutritional-products.html>)
- **KIVERDI, Inc.** (<https://www.kiverdi.com/>)
- **HAUGE AQUA** (<https://haugaqua.com/>)
- **GENOCEAN** (<https://opencorporates.com/companies/fr/518466305>)
- **KRAFT FOODS** (<https://www.kraftheinzcompany.com/>)
- **TRUE ORGANIC PRODUCTS Inc.** (<https://true.ag/>)
- **MARINE TECHNO** (https://marinetechno.tradekorea.com/main.do;JSESSIONID=TK=8Uhw6vu8rUdNcBeZ69A0fVM2saYIcu5o-nCmEkic_0057K206CRk!-798423004!1742867100)
- **NESTEC** (<https://www.eitfood.eu/partners/partner/nestec>)
- **YNSECT** ([Ynsect, Premium Natural Feed](#))
- **ADISSEO** ([Nutrition animale | Adisseo](#))
- **FERMENTALG** ([Home - Fermentalg - Algae you can trust](#))
- **NIREUS AQUACULTURE** ([Homepage | NIREUS AQUACULTURE](#))



Patent trends and market trends for Fishery and Aquaculture sector

BBM subsectors		Technologies investigated in the TF	Patent trends	Market trends
1. Fishery and Aquaculture	a. Pelagic and Demersal Large-Scale Fisheries (LSF) and Distant Water Fleet (DWF)	Fishery	↓	↔↑
	b. Small Scale Fisheries (SSF)			↔↑
	c. Marine Finfish aquaculture (MFA)	Aquaculture	↑	↑
	d. Shellfish aquaculture (SA)	Fish feed	↓	↑
	d. Seafood processing and trade	Fish derivatives	↔	↑

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