M&A WORLDWIDE

AQUA FARMING

Agri, Food & Beverages Sector

INDUSTRY REPORT 2022

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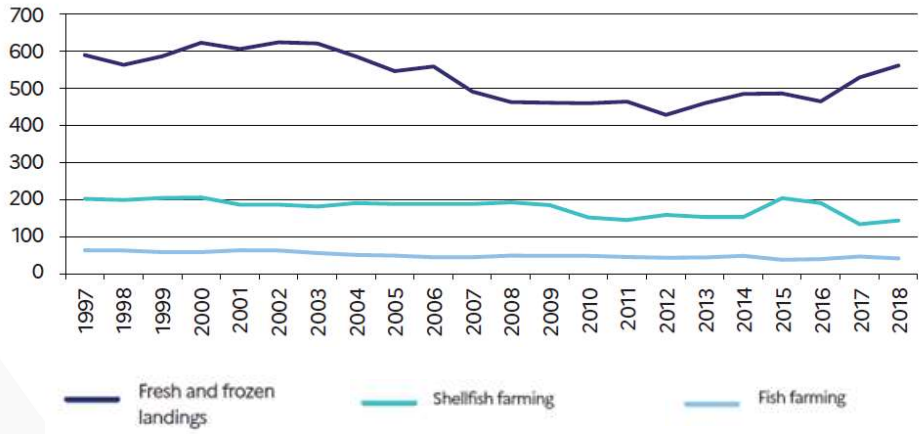
AQUACULTURE: A GROWING INDUSTRY

Aquaculture refers to the breeding of animal or plant species (algae) in an aquatic environment. It includes two specialities: continental (freshwater) and marine aquaculture. According to the FAO, the world organisation for agriculture and food, half of the aquatic foodstuffs currently consumed by humans come from aquaculture, which is growing at a rate of around 5% per year. The other half comes from fishing, where production has stabilised. It should be remembered that in Europe, sea fishing catches are strictly controlled and monitored and that all fishermen apply fish stock management measures.

Marine farms are growing rapidly worldwide, but are struggling to develop in France, despite recognised know-how in fish breeding, reproduction and feeding.

Total sales / metropolitan France and overseas territories (1 000 tons)

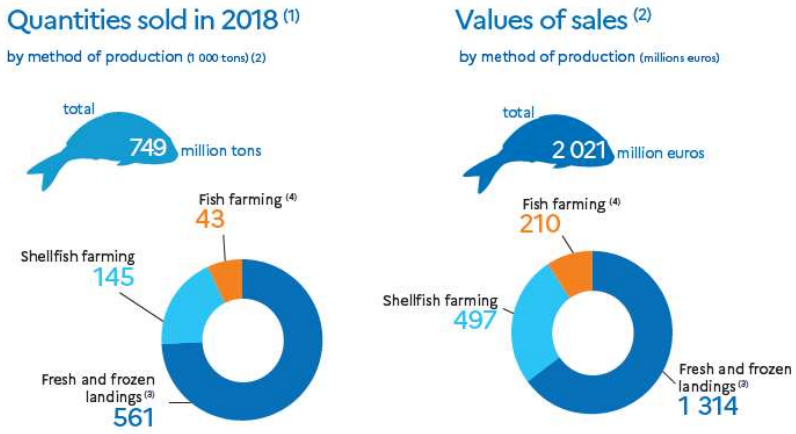


Source : FranceAgriMer "The fisheries and aquaculture sector in France" - 2021

In France in 2018, the total fisheries and aquaculture market represented €2 billion. France also has the 4th largest European aquaculture production (€707M in 2018) but remains far behind Norway.

Norway relies on a highly developed salmon farming industry, which enables it to produce more than all the other European countries combined. France is specialised in shellfish farming, with numerous oyster and mussel farms on the Atlantic coast.

Total sales / metropolitan France and overseas territories



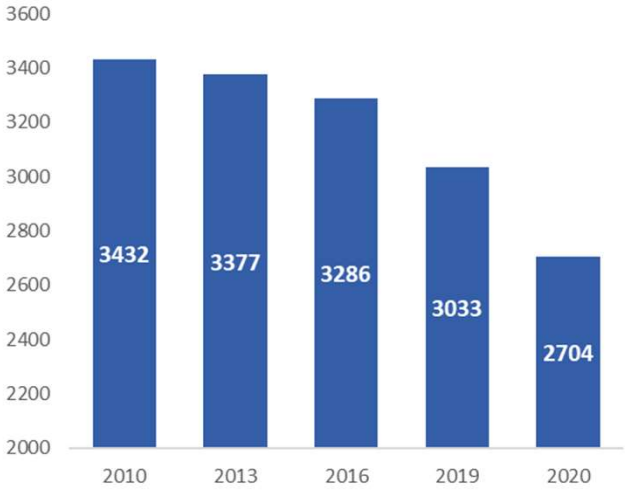
Source : FranceAgriMer "The fisheries and aquaculture sector in France" - 2021

Players in the aquaculture market

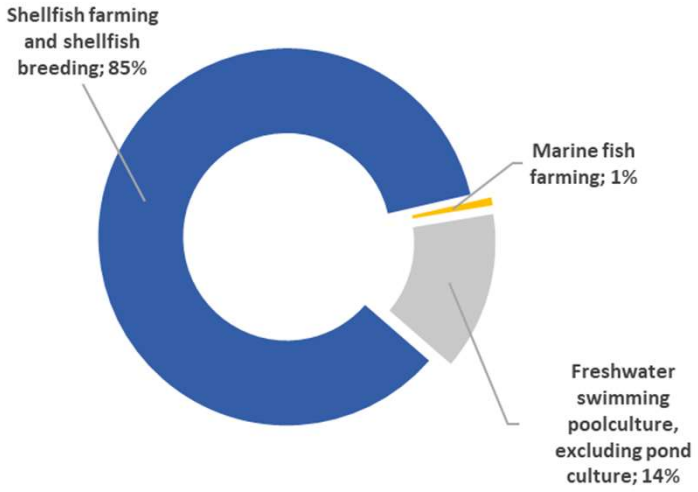
Two French players are leading in the aquaculture segment. The Aqualande group, which specialises in freshwater fish, claims to be the European leader in trout farming. The Gloria Maris group is specialised in marine aquaculture production (sea bass, sea bream, etc.) and controls the entire production chain (genetic selection, hatching, grow-out, breeding). Moreover, these actors were less affected by logistical difficulties than fishermen and adapted better to the health crisis.

Nevertheless, the vast majority of actors in this sector are specialised in shellfish farming and shellfish breeding. These actors have suffered from several deadly epidemics, while fish farming is still struggling to develop. In 2020, shellfish farmers suffered greatly from the health crisis, with the disappearance of 300 businesses.

Total aquafarming companies in France



Total aquafarming companies by type of business



Source: Xerfi « La pêche et l'aquaculture en France » - Sept. 2021

Insect protein to boost the health and growth of fish and shrimp

More and more people depend on aquaculture and fisheries for food and income, according to the FAO. As a result, aquaculture is the world's fastest growing agro-industry. But to support this growth, there is a need to ensure sustainable, high-quality sources of nutrition.

Plant proteins are a good alternative but can impact on performance and nutritional quality if included in higher proportions. At this rate, the FAO predicts a quality protein deficit of between 30 and 40 MT for aquaculture by 2030.

Insects are a natural and sustainable source of high-quality protein for aquaculture. In recent years, insects have also demonstrated their performance in aquaculture farms, reinforcing their role in enabling aquaculture to realise its potential and feed the world of tomorrow.

News & Innovation

In 2018, Innovafeed brought together the entire industry (Innovafeed, the fish farm Truite Service, the retailer Auchan, the label Mister GoodFish and the feed formulator Skretting) to offer French consumers the world's first "insect-fed" trout.

Pure Salmon has chosen the industrial port area of Verdon-sur-Mer (Gironde), and its site delivered "turnkey", to set up its first salmon aquaculture farm in France. More than 275 million euros are to be invested in the work, which will start in 2023. 250 direct jobs are envisaged. The company hopes to market its first salmon at the end of 2026 with a production of 10,000 tonnes per year.

On 6 April 2022, Umiami, the producer of meat and fish cuts from vegetable proteins, set up an R&D unit and an industrial unit thanks to a first round of €25 million underwritten by the Luxembourg-based Alternor Ventures, the Swiss Redalphine, French Partners and historical investors.

On 8 April 2022, Virbac acquired 34% of the shares of the Chilean group Centrovet, bringing its stake to 100%. Sébastien Huron, Virbac's CEO, commented: "With this acquisition, we are strengthening our position in the future aquaculture market, which is also a strategic segment for Virbac.

LAND-BASED AQUAFARMING & AQUAPONICS (Germany/ Switzerland/Austria)

Aquaponics

ECF: Ecofriendly Farmsystems, founded 2014 in Berlin. Their first farm was a 1,800-square-metre plant where plants and fish are grown together in a cycle. The farm collects rainwater on the roof for the perches. This saves about 20,000 Euros in water costs per year. The liquid excretions of the fish, toxic ammonium, are converted into nitrate by microorganisms, and is a valuable fertiliser that is used in the own greenhouses. The annual production of the Berlin plant is about 400,000 units of basil and about 8 annual tonnes of perch. As of today ECF has built 4 fishfarms (Berlin, Bad Ragaz /CH, Brussels/Belgium and Wiesbaden/Germany. The fishfarm in Wiesbaden started in May 2021 and was built on the roof of a REWE GREEN FARMING supermarket; it's the first supermarket in Europe with an integrated rooftop farm.

Fischerei Müritz-Plau GmbH, the largest inland fishing company in Germany, has built a demonstration plant for the combined production of fish and vegetables.

TopFarmers GmbH has developed their own technology based on aquaponics, called "AquaTerraPonik" in 2014. In the closed fish-plant cycle, the water from aquaculture is utilised materially by the crops. The substances contained in the aquaculture wastewater are made available to the plants by means of biological-chemical processes..

The plants convert the substances into biomass and thus purify the water, which is then returned to the aquaculture. The uniqueness of AquaTerraPonics lies in the special attention paid to the substrates. They not only serve to hold the plant, but also provide space for many microorganisms and enable an optimal supply of nutrients to the plant. Topfarmers realized their first AquaTerraPonik city farm plant in 2017 near Berlin. Every year, 50 tonnes of African catfish and 30 tonnes of lettuce, herbs, tomatoes and cucumbers are produced, as well as exotic produce (bananas, Ceylon spinach, passion fruit). Topfarmers operates the plants by themselves but are looking for financial partners at individual locations, who also complement with their local network.

Land-based aquaculture

Crusta Nova (founded 2012) is Germany's leading land-based farm for brine shrimp as well as seafood boutique for high quality fish and seafood. The company breeds brine shrimp in a land-based aquaculture recirculation system.

Swiss shrimp AG operates a saltwater acqualculture shrimp farm in Rheinfelden/CH. Market-entry was 2019 and since then the so-called SwissShrimps have been available at Migros, Coop and specialist retailers and via the SwissShrimp webshop. The Rheinfelden plant is designed for an annual production of 60 tonnes and now aims to expand in order to double the production volume. The Rheinfelden model could also be implemented at other suitable locations.

IRISH AQUACULTURE MARKET

The aquaculture market in Ireland is dominated by two aquaculture products, molluscs (and other crustaceans) and salmon. Ireland's seafood production has historically been driven by fishing rather than farming. However, the global increase in interest in aquaculture and sustainable seafood sourcing presents an opportunity for Ireland to utilise its coastal borders and engage in a vibrant market that gains economic relevance worldwide. Irish people are eager to engage in the market, with c.83% of coastal area residents supporting the expansion of the aquaculture sector.

Operators

Fish and Shellfish are currently farmed in 14 Irish coastal counties, where SMES and families grow salmon, oysters, mussels, and other seafood. The industry sustains 1,833 direct jobs in rural parts of the country, mostly in the west of Ireland (~80%). There are upwards of twenty seafood farms in Ireland, primarily focusing on mussels and salmon. The Irish Seafood Producer Group is Ireland's leading farmed salmon and trout exporting company and one of the largest seafood companies in the country. Bord Iascaigh Mhara ("BIM") is an Irish state agency responsible for developing the Irish Seas Fishing and Aquaculture industry. Their primary objective is to expand the value, quantity, and output. BIM's approach is to focus on the opportunities for growth in the sectors while seeking to alleviate constraints that impede development.

Irish Mussel Farming

Mussel farming is among one of the most sustainable vectors of aquaculture, and a large part of the market in Ireland. Mussel production in Ireland has moved from being fishery driven over the last 20 years to having a majority of the mussels produced to be farmed and harvested by dredge. The mussel industry in Ireland is the largest aquaculture sector by tonnage, and third only to salmon and oyster in terms of value. Ireland bottom and rope grown mussel farms received their Marine Stewardship Council certification in 2013 and 2019 respectively, and allow the farms to use the MSC ecolabel, which indicates these farmed products are both sustainable and from a well-managed fishery. Ireland's mussel industry is mainly export focused, and MSC certification of both types of mussel farms provide valuable evidence to the market of the sustainable environment in which Ireland's seafood is produced.

Irish Salmon Farming

Presently, there is not much by way of investment in aquaculture in Ireland. Recent years have seen Ireland rely on consuming salmon from Scotland, Norway, and the Faroe Islands because Ireland is not producing enough salmon to satisfy its own market for salmon. For context, mainstream salmon farming began almost 30 years ago, and Ireland and Norway produced roughly 20,000 tonnes of fish a year at the onset. Presently, Norway, which has made significant investment into the aquaculture sector over these past 30 years, now produces 1.2 million tonnes, while Ireland produces about 19,000 tonnes. Over the same amount of time that global aquaculture has grown by 164% (since the year 2000), output in Ireland has fallen by as much as 24%. In 2010, Irish government policy targeted an increase in aquaculture production to 36,000 tonnes by the year 2020, but by the year 2018, there has been a decrease of 7,000 per annum rather than an increase. All this to say, there is a significant gap between the market demand for farmed salmon products via aquaculture, and the current capability of Ireland to meet that demand. Part of the problem is the licensing system that Ireland currently uses to permit aquaculture across the country. Ireland's licensing system was stalled by a 2007 ruling form the E.U. Court of Justice, which found that Ireland failed to apply the Birds Directive and the Habitats Directive (Natura 2000) in coastal areas of conservation when the country was initially granting aquaculture licenses.

Approximately 80% of Irish marine aquaculture is centered on such sites, and the ruling caused Irish authorities to go through a program of assessments of these sites, and in the process create a backlog of licenses which is only recently beginning to show signs of being unblocked. Reports state that there are 22 salmon farms in Ireland currently operating with expired licenses, some farms waiting between 10 and 15 years for their license renewal. This is troubling news amidst encouragement from the European Commission to encourage member states to increase production and simplify administrative procedures to ensure the development of aquaculture sectors. There is currently an 8 million tonne gap between EU seafood consumption, and sea fisheries catch. To help to close this gap, and to revitalize the aquaculture market in Ireland, there must be significant reformation, driven by the Department of the Marine.

Hatch Blue

One promising prospect to help strengthen the aquaculture market in Ireland is an aquaculture tech investment firm called Hatch Blue. Hatch Blue's mission is to "catalyse farmed and alternative seafood innovation through responsible investment, expertise and insights, supported by a strong, committed community." Hatch Blue has invested in more than thirty companies and run three successful cohorts, with offices in Hawaii, Singapore, and Norway. Hatch Blue also has Irish roots via an Irish founding member, Wayne Murphy.

Hatch Blue offers innovation services that cover industry, investor, and government sectors, all meant to jumpstart aquaculture sector growth. These services include setting up workshops and accelerator programs, developing aquaculture innovation clusters, and even start-up support in early-stage capital raising to finance these programs.

Hatch Blue has invested in more than 30 companies and raised an initial fund of over eight million dollars. They are a useful and promising resource that not only has the potential to help refocus and revitalize the Irish aquaculture market, but also to increase the efficiency and productivity of aquaculture globally through investing in research and innovation in the aquaculture sector.

AQUACULTURE IN THE SCANDINAVIAN MARKET

Source. Financial Times article. FT.com

Between 2008 and 2018, employment in Norway's seafood sector grew by 10 per cent to reach 30,000.

The Scandinavian country is the world's second-biggest exporter of fish after China, with sales increasing by 72 per cent between 2008 and 2018. By 2050, the country plans to produce 5m tonnes of salmon and trout a year, nearly five times its current volume. Globally, aquaculture accounts for 52 per cent of the seafood eaten around the world and, since 1990, production has risen more than 500 per cent. But, while its carbon footprint is appealingly low — accounting for less than 0.5 per cent of greenhouse gas emissions in 2017, according to one study, compared with 14.5 per cent for livestock — it can cause severe damage to marine environments. Among the problems are chemical pollution, escaping fish, and the spreading of diseases and parasites. Land-based aquaculture has been praised, however, as it is more sustainable and less harmful to the environment than conventional fishing and sea-based fish farming. Some have even billed it as the future of sustainable seafood because of its smaller carbon footprint and potential proximity to markets.

After China, Norway is the world's second-biggest exporter of fish "People see it as being the future," says Rob Fletcher, senior editor at aquaculture website The Fish Site. "The cost of producing them at sea is going up. There's limited availability of where to grow them at sea and, with these land-based RAS [recirculating aquaculture systems], you can in theory have them anywhere.." RAS technology, of the sort used at Fredrikstad, provides a controlled environment for the fish. The water in which they swim is passed through a filter that cleans and recycles it into the tank system without the waste, uneaten feed and ammonia naturally produced by the fish. The RAS — recirculating aquaculture system — at Fredrikstad was custom-designed by Danish engineers. The system allows water to be continuously filtered. The company uses saltwater from the nearby River Glomma, which is pumped in and cooled before it enters the RAS. Salmon are acquired as smolt — juvenile fish which, in the wild, would be preparing to migrate from rivers to the sea — and raised in circular pools in two warehouse facilities. The fish, about 280,000 in total, spend their entire lives in these tanks without ever going to the ocean, a practice that is still being tried and tested in the industry, Fletcher says. The salmon are typically cultured for two years, explains Fredrikstad chief executive Bernt-Olav Røttingsnes. They are then harvested, processed and transported by truck to customers in Oslo and neighbouring countries, all within a 12- to 24-hour radius.

"We don't think that land-based [aquaculture] is something you should place very far away from the market," Røttingsnes says. While some see land-based aquafarms and RAS as a sustainable way forward, critics worry about the amount of energy and resources required, the wellbeing of the fish, and the feed being linked to deforestation.

In Norway, 93 per cent of the electricity generated comes from hydro power; however, in regions where renewable energy is less accessible, such as in parts of the Middle East and in the US, these energy-intensive facilities can have a much bigger carbon footprint, Fletcher points out. Røttingsnes does not see this as a problem for Fredrikstad. "Yes, of course, there are pluses and minuses, with the land-based energy consumption [being] a minus for land-based," he acknowledges. "But then putting the production close to the market makes up for it," he adds.

Nordic Aquafarms, the parent company of Fredrikstad Seafoods, also has a plant in Denmark that produces yellowtail kingfish, and is planning two new farms in the US, in Maine and California. It says it intends to buy renewable energy or to install solar panels to reduce the carbon footprint.

Green party MP Ramus Hansson, who sits on the business and industry committee in Norway's parliament, agrees that land-based aquaculture has the potential to be sustainable. But he adds that, because the aquaculture industry as a whole is so big, it is important to consider what the fish are fed. "Feed is imported from Brazil and other places like that and there [are] the well-known issues about deforestation etc. connected to that," he explains. "There is no basis for calling the feeding of that industry sustainable at this stage." Røttingsnes says Fredrikstad's feed comes from Europe, and emphasises that energy consumption and fish welfare are also important to the company.

Currently, land-based fish farming accounts for only a small fraction of global aquaculture. Although this is unlikely to change quickly, owing to a skills shortage and the difficulty of finding sites with the necessary water and transport infrastructure, the long-term outlook is promising. "Everything that's happening now with climate change, the focus on how we live in the future, will make people more aware of where their food is from," Røttingsnes says.

Source. Financial Times article. FT.com

COMMERCIAL MARINE AGRICULTURAL PRODUCTION ON LAND IN JAPAN

There is a conspicuous movement of trading companies and electric power companies to enter the onshore aquaculture of marine products such as shrimp and salmon. Amid concerns about the depletion of fishery resources worldwide due to population growth and overfishing, it contributes to the stable supply in the future and is in line with the direction of the Sustainable Development Goals (SDGs) set by the United Nations.

The Survival Plan of the Fisheries Industry

The demand for marine products around the world is increasing year by year, as diets, particularly in emerging countries, improve their diets and increase their healthy orientation in developed countries. From the viewpoint of the SDGs, such as reducing environmental impact, including marine pollution, aquaculture in large water tanks on land is expected to contribute to stable supply in the future. It is attracting attention as a way to survive Japan's fishery industry, which is facing a decline in the working population and aging population.

The Kansai Electric Power Co., Inc. announced that it will enter the seafood production and processing and sales business using a land aquaculture method in the fall of 2020. Yukinoya Kaiko (Osaka City), a startup that developed the indoor shrimp production system (ISPS), established jointly with IMT Engineering (IMTE, Niigata Prefecture), will conduct a production, processing, and sales business for Banamei shrimp.

Banamei shrimp, which has a umami flavor comparable to tiger prawns, will be sold to food processing companies and restaurants under the brand name "Kohebi". For this reason, the company plans to build a new aquaculture plant in Iwata City, Shizuoka Prefecture, and plans to start production in January 2020 and ship about 80 tons per year since the start of shipment in May 2022. Until then, the company plans to produce about 14 tons of OEM (oem-based brands) at IMTE's plant in Myoko City, Niigata Prefecture.

IMTE is a land aquaculture plant development company that aims to popularize Japan's only indoor shrimp production system developed in collaboration with the government in Japan and overseas. Kansai Electric Power will utilize dx (digital transformation) technologies of the group, such as the Internet of Things (IoT), artificial intelligence (AI), and image analysis, for the management and control of water quality, temperature, feeding, etc.

For Kansai Electric Power, this is part of the creation of new business other than energy. It was judged that domestic production can be realized through a production system that can take advantage of the characteristics of going around the water of the Banamei species, which currently has a lot of imports, and can respond to the growing demand for sustainable fisheries and marine products worldwide.

Faster and smarter farming

Companies from various industries are working on closed circulation type land aquaculture in teams.

NTT, NTT East Japan, NTT DOCOMO, UBE Industries, Ebara Corporation, and Dentsu began building a closed recycling system in the fall of 2020 with food tech startup Regional Fish (RF, Kyoto City). (Figure above)

Each will form a partnership agreement with RF to develop a next-generation aquaculture system that combines seafood breeding technology (high-speed) and smart aquaculture (aquaculture automation). NTT DOCOMO Ventures, Ube Industries, and Ebara Corporation invested in RF in conjunction with the collaboration.

RF was established with the seeds of breeding technology for marine products such as Kyoto University and University as its core, and through open innovation, it has the breeding technology of marine products. We aim to eliminate the global protein shortage, revitalize japan's fisheries industry, revitalize the region, and prevent marine pollution. The company will provide red sea bream truffug seedling, breeding know-how, and aquaculture farms that have been improved by RF's product breeding technology.

NTT and other companies will combine "smart aquaculture", which visualizes and optimizes the water quality environment in water tanks of onshore aquaculture and enhances productivity, by converting to IoT and AI by improving the ultra-high-speed breeding of RF. In addition, the company is responsible for the construction of closed, circulating land aquaculture systems utilizing technologies such as fluid and thermal control, the purification of cultured water, the reduction and utilization of waste (fertilizerization, feed conversion, etc.), and the development and branding of growth environment control.

Major trading companies to commercialize one after another

Major trad ing companies are all eager to commercialize land aquaculture. In the spring of 2017, Mitsui & Co. invested in FRD Japan (Saitama City), a venture company that developed a closed circulating land aquaculture system for marine products and participated in the salmon onshore aquaculture business.

FRD Japan built a pilot plant at Kazusa Academia Park in Kisarazu City, Chiba Prefecture, and started operation of the pilot plant in August 2018, and first shipped it in June 2019(Mitsui & Co.). "We are still harvesting, and based on this result, we are considering expansion to commercial plants in FY2021" (the same).

FRD Japan's land-based aquaculture system, currently under the umbrella of Mitsui & Co. uses highly filtered technology, using bacteria to maintain water quality while closing and circulating artificial seawater without using natural seawater or groundwater.

As a result, the cost of adjusting the water temperature at the time of water removal, which was a factor of high cost in conventional land-based aquaculture, and the risk of invasion of fish diseases can be greatly reduced, and there is an advantage that aquaculture can be performed inland by selecting a location.

In April 2020, Marubeni partnered with Nippon Suisan (NISSUI) to acquire a Danish company as a subsidiary, enter the closed circulation type land aquaculture business of salmon, and is also considering business development outside Europe.

In the summer of 2019, ITOCHU agreed with a Japanese subsidiary of a Polish corporate group to establish a closed circulating onshore farm in Japan and sell Atlantic salmon in Japan from 2023.

TRANSACTIONS IN THE SECTOR

Target: The Kingfish Company

Activity: Yellowtail breeder in NL

EUR 75 MM debt financing for growth plan

Financed by: P Capital Partners – Swedish Investment house

April 2022

Target: Stranda Prolog

Norway

Buyer: Marel (Iceland)

Stake: 40%

Activity target: Salmon breeder

Jan 2022

Target: Protifarm

Netherlands

Buyer: Ynsect

France

Activity target: Insect proteins

April 2021

BUYER	ACTIVITY	TARGET	ACTIVITY	DEAL / VALUE	DATE	PRODUCT
Vibrac	Animal health	Centrovet	Aquaculture company	43,7M$ for 34%	08/04/2022	
ASTANOR VENTURES , REDALPINE VENTURE PARTNERS , FRENCH PARTNERS , VERSO FUND , NEWFUND , BPIFRANCE INVESTISSEMENT	PE & VC funds	Umiami	Meat and fish from vegetable proteins	Fundraising 25M€	07/03/2022	
LITTO INVEST | LE GOUESSANT | BAMBOO	VC & BA	LISAQUA	Aquaculture of prawns	Fundraising 2.6M€	11/01/2022	
METABOLIC EXPLORER	Biological chemistry, bio processes	METEX NOOVISTAGO	Production of amino acids by fermentation for animal nutrition	31.5M€	07/07/2021	
CREADEV	Family office	Innovafeed	Insect protein for animal feed	Fundraising 70M€	19/11/2020	
ASTANOR VENTURES | UPFRONT VENTURES | FOOTPRINT COALITION | HAPPINESS CAPITAL | SUPERNOVA INVEST | ARMAT GROUP	PE & VC funds	Ynsect	Insect protein for animal feed	Fundraising 60M€	06/10/2020	
LITTO INVEST | LE GOUESSANT | BAMBOO	VC & BA	LISAQUA	Aquaculture of prawns	Fundraising 0.4M€	06/05/2019	

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AGRI, FOOD & BEVERAGES SECTOR

INDUSTRY REPORT 2021

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