



EUROFISH MAGAZINE



Norway

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Aquaculture: Using geothermal energy to farm fish



Processing: Polish project suggest ways to add value to carp





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Norway ensures its future as a blue economy



The fisheries and aquaculture sector in **Norway** is an increasing contributor to the country's GDP. As growth in the oil and natural gas sector plateaus, fisheries and aquaculture (as well as other parts of the economy) must be prepared to take up the slack. The portents for this are good as the sector has the potential to increase output by a factor of six by the year 2050. However, to reach this level, to which the fish farming sector is expected to contribute the most, several challenges including feed, escapes, and lice, will need to be overcome. There are also more strategic concerns that will need to be addressed if the industry is to realise its potential. These relate to, among others, the way the sector is organised, the need to simplify administration, the importance of marine research and development and the ability to convert this into innovation. Read more from [page 38](#)



This year's editions of **Seafood Expo Global** and **Seafood Processing Global** were the biggest ever, so much so in fact that an additional hall (the eighth) was needed to accommodate the over 1,700 exhibitors from 75+ countries. While there was no shortage of products on offer, new features tended to be incremental rather than radical. That said, the exhibitions were for most an unqualified success. Most of the exhibitors with whom Eurofish spoke emphasised the importance of the event for their business. Several said the SEG was the only fair where they invested in a stand, and virtually everyone said they would be back again next year. Although the SEG is the most international seafood fair in the world it is a very useful meeting point even for companies that are trading mainly on their domestic markets. In short, it offers something for everyone. Read more on [page 17](#)



The **North Atlantic Seafood Forum** celebrated its 10th anniversary with a comprehensive programme that addressed the range and complexity of the issues surrounding the fisheries and aquaculture sector in the region. In the salmon session, reviewed here, the audience heard that the Norwegian salmon sector is expected to be responsible for most of the global growth in salmon production in 2015 with contributions from North America, the UK and Ireland. Production in Chile and the Faroe Islands is forecast to decline. Demand for salmon is set to rise significantly in the EU this year, while in Russia, assuming no change in the ban on seafood imports, deliveries are expected to fall further. Read more on [page 36](#)



The ban imposed by **Russia** on imports of certain food products from the EU and other countries in August 2014 certainly had an impact on seafood exporters in those countries. However, the impact on the Russian market was equally profound as imported fish disappeared from retail shelves and food service establishments. Some of it was replaced by fish from countries unaffected by the ban, but the administration has also embarked on a programme to increase the production and availability of domestic fish both wild and farmed. This is a significant logistical challenge as the overwhelming majority of fish captures are in the Russian Far East, which is thousands of kilometres from the big centres of consumption in the western part of the country. Efforts to improve terrestrial transport links are ongoing and the administration is also exploring the possibility of a northern sea route. Read more from [page 46](#)



Organic agricultural production is a significant and growing activity in many parts of the world covering a wide variety of crops, dairy and meat products. The same, however, cannot be said for the **organic aquaculture** sector, which remains a tiny and specialised niche within the overall fish farming industry. Part of the reason is that organic fish producers are often small companies so their output is naturally modest. Organic fish is usually much more expensive than conventionally produced fish due to the higher costs of inputs, which also limits the market. If limited choice and high prices are not enough, there is also a bewildering variety of organic labels, with which the consumer is confronted. Despite these unfavourable circumstances, production is expected to grow. Read more on [page 56](#)

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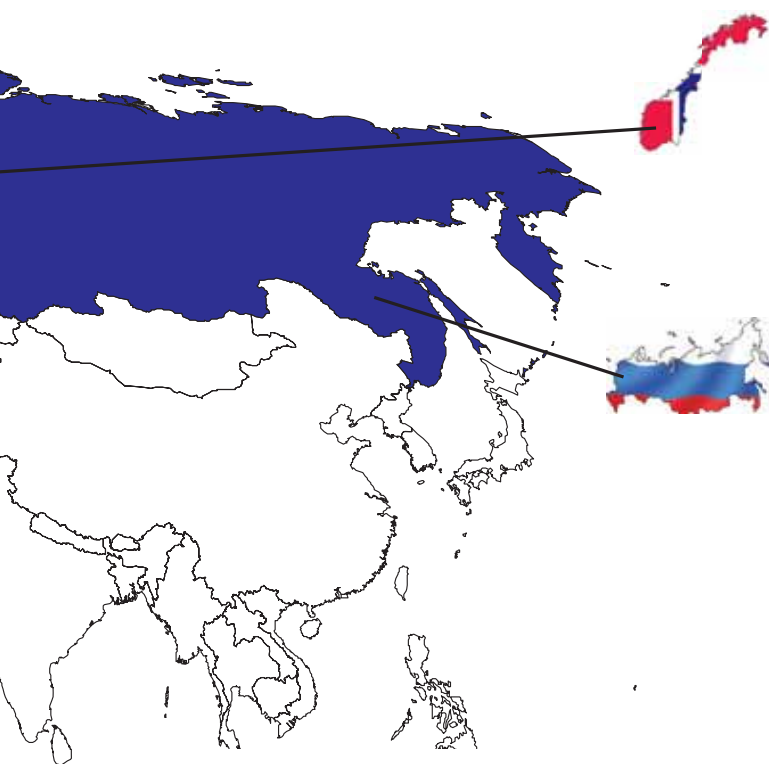
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Salmon underpins seafood export boom from Norway



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Front cover picture courtesy FHL/Are Kvistad

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Prince Joachim to open Europe's leading fishing fair in Aalborg

There will be a royal visit to Aalborg in early October, when HRH Prince Joachim officially opens the fair DanFish International for the third time. The first time Prince Joachim opened the fair was in 2007 and the second time in 2011, when the aquaculture event DanAqua was launched as part of DanFish International. DanFish has been internationally acknowledged for its successful seminar programme, which is helping to provide a deeper insight into the fishing industry. As patron of DanFish International, HRH Prince Joachim will hold the official opening address on Wednesday, 7 October at 10.00 in Aalborgshallen.

Although DanFish International only opens in October, interest

for stand space has been so intense that it is close to sold out. In previous years the exhibition took up the entire space



of 9,000 sq. m, but because of high demand the space has been extended in to a temporary hall in neighbouring Kildeparken, so there will be place for exhibitors from around 25 countries. The show has been held at two-year



intervals since 1974 in Aalborg. This year is the 24th time that Aalborg Congress and Culture Center will open its doors to DanFish International, which is expected to attract about 15,000 visitors from around the world. The last time, the fair at-

tracted visitors from 44 different countries. The internationally recognised event presents

both Danish and international producers of fishing gear, such as nets trawl wire, electronics, navigation and communication equipment, processing equipment, rescue equipment and much more, and with around 100 specially invited international buyers DanFish is expected to provide the platform for some very large contracts.

DanFish International and DanAqua take place from 7 - 9 October 2015 in Aalborg Congress and Culture Center. For further information contact Ernst Trillingsgaard, director Aalborg Congress and Culture Center at tel. +45 9935 5501 or +45 20735501 or Else Herfort, Trade fair & Exhibition Manager, tel. +45 9935 5518

Belgium: Stakeholders call for global action against illegal fishing

A debate on 'EU markets driving good governance in fisheries' was held at the Seafood Expo Global in Brussels. The debate, hosted by the European Commission, was attended by WWF, the EU fish processors and traders association (AIPCE-CEP) and other important stakeholders. The aim of the debate was to exchange ideas on

how the EU's rules against illegal, unreported and unregulated (IUU) fishing can contribute towards better fisheries governance. Scientists have estimated that IUU fishing accounts for 13-31% of global catch and costs between EUR 8 billion and EUR 19 billion annually. Therefore, WWF and AIPCE-CEP have prepared a joint

call to stop IUU fishing, as illegal fishing is a worldwide problem that requires a global approach to be tackled effectively. The EU is the world's largest seafood market and acts as a global leader in the fight against IUU fishing. The Commission regulates not only within EU waters, but also helps globally and support 50 countries

in achieving international standards on control, enforcement and monitoring. Among the suggested actions during the debate were the need to strengthen the sourcing and labelling of the products, to influence business and governments in third countries, and to enforce existing rules rather than invent new ones.

Ireland: Moving knowledge from the lab to the field

A project funded through the European Commission's Horizon 2020 programme and co-ordinated by tech experts at the Waterford Institute of Technology's Telecommunications Software & Systems Group (TSSG) under the name Aquasmart, aims to boost production and jobs in the global fish farm industry, without harming the environment. The project gathers technology experts, industry and

research partners from Ireland, Greece, Portugal, Spain, Slovenia and Israel. The EUR 3.1 million Aquasmart project will run for two years and aims to develop best practice within the aquaculture sector by helping companies transform data into knowledge. The objectives of the project are focused on bringing cutting edge technology closer to the market for use by fish farmers and their supply chain across Europe, but

at the same time to strengthen the competitiveness and growth potential of the aquaculture production companies globally. Core technologies and cloud infrastructure will be designed and developed in order to be used for hosting and processing aquaculture data. A data collection framework will be generated and large volumes of heterogeneous aquaculture data will be turned into knowledge with the aim to help

companies to access and analyse global open data for the benefit of the sector, with no bad influence on the environment. By offering aquaculture production companies these tools, Aquasmart will help strengthening the competitiveness and growth potential of these companies, and at the social level will also contribute to the development of a highly skilled workforce through on-line training programs.



Indonesia: Asian, African countries urged to end fisheries subsidies

An Indonesian government minister has urged member nations of the Asian-African Conference to end fisheries subsidies that may trigger environmental destruction. Maritime Affairs Minister Indroyono Soesilo asked countries attending the conference to abide by World Trade Organization's (WTO) stipulations on subsidies. He said it was important to prohibit certain forms of fisheries subsidies, which contribute to fleet overcapacity and overfishing. He also urged countries to eliminate subsidies that contribute to illegal, unreported and unregulated fishing and to refrain from introducing new ones. The livelihoods of millions of Indonesians depend on the sea and the fishing opportunities it offers. Illegal



Leaders at the 2015 Asian-African Conference in Bandung, Indonesia in April

fishing in Indonesian waters by other countries' vessels, up to 5,000 a day, threatens fish stocks and jeopardises fishing communities and Indonesia has

begun to crack down on foreign vessels, seizing and destroying fishing boats from Thailand and Vietnam. The government would like to make fisheries more

productive, build marine infrastructure and remove or at least reduce the incidence of vessels from other countries fishing in its waters.

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Denmark: Organic mussel production boom

Production of organically farmed mussels grown on lines is booming in Denmark. This contribution to the establishment and enhancement of a sustainable market for organic mussels is being supported by government funds. Alfred Jokumsen from the Danish research institute, DTU Aqua, at the Technical University of Denmark says the target is to ensure that 10% of Denmark's

mussel production is organic by 2018. The Danish production of mussels takes place in the Limfjord (north west Jutland), where the main producer currently is Seafood Limfjord in cooperation with the mussel processing company Vildsund Blue in Nykøbing Mors. At the moment nine production units have been approved for a total production of some 3,500 tonnes/year.



Alex Mikkesen

Mussels farmed on lines are reared higher in the water column than wild mussels and so more feed is available for their growth.

UK: New protein promises to substitute fishmeal in feed

In 2018, companies in Norway and the UK expect to launch a new sustainable fish feed ingredient that can reduce the aquaculture industry's reliance on fishmeal and fish oil. The new sustainable fish feed ingredient called FeedKind Protein is produced by California-based sustainable life science firm Calysta, Inc. It is non-GMO with minimal land and water use. The protein provides a competitive alternative to conventional fishmeal, and is approved by the EU for

all fish and livestock species. With increasing global demand and the aquaculture industry's need for sustainable products, the protein can be used as an alternative ingredient in feeds. The nutrition value of the protein has been confirmed by studies based on animal growth and health criteria. The new feed is planned to be used as a replacement of fishmeal and soy protein and is expected to offer consumers a new option that is more sustainable and healthy.

Greenland: Sustainable Fisheries Partnership Agreement between EU and Greenland

Greenland and the EU have now reached agreement on a new protocol to implement the EU-Greenland Sustainable Fisheries Partnership Agreement, which will enter into force on 1st of January 2016 for a period of 5 years. The agreement will ensure the continuity of fishing activities for EU vessels in line with the reformed Common

Fisheries Policy and enhance sustainable fishing based on the quotas established. The agreement with Greenland is the third most important for the EU in terms of its economic value. It also means that EU will pay a financial contribution of EUR18m per year for fishing rights and quotas in Greenland's Exclusive Economic Zone.

Belgium: Spaniards are the EU's biggest fish consumers

At the Seafood Expo Global, Brussels, Européche presented a survey on fish consumption and the fishing sector's role in Europe. The survey was conducted in the UK, Spain, France, Italy, Germany, Poland, Denmark and the Netherlands. The results

showed that Spain leads the EU in fish consumption. It also reveals that 75% of Spaniards consume seafood 2-3 times per week, while 70% of Europeans consume fish only once a week. Over four fifths of Europeans prefer to eat fish at home, rather than at a restaurant

and 73% buy it in the supermarket. More than half of European consumers say that the details of the origin of fish and its method of capture is interesting and 54% of them state that the sustainable capture is a decisive factor in the purchase.

As regards their view of the fisheries sector, 81% of Spaniards think it has a vital role in feeding the world's population and 92% call for government support to this industry, compared with 71% and 84% of Europeans, respectively.

Belgium: MEPs vote for sustainable fishing in the Baltic Sea

The Fisheries Committee of the European Parliament voted in Brussels on a multiannual management plan (MAP) for fisheries in the Baltic Sea, for managing Baltic cod, sprat and

herring stocks. This means that these three interacting species will be managed through a single plan, which as a result should also make fishing in the Baltic more sustainable. At the

same time, the plan should also ensure management measures reflect the most up-to-date scientific advice on stock status, interactions between species and ecological needs. The new

plan will replace the existing cod management plan and bring the fishing sector from the region closer to the decisions making process in fisheries management.

UK: New model from NEF suggests ways to increase jobs, profits

A study published by the New Economics Foundation (NEF) reveals that poor management of European fish stocks and fishing quotas has cost Europe millions in lost landings, profits and jobs. Analysts say the reformed Common Fisheries Policy, in force since 2014, is an opportunity for change. They estimate that a new division of EU fishing quotas would deliver additional EUR 824 million net profit per year and 102 thousand new jobs.

The current system of allocation of quotas is favorable for the largest and most harmful to the environment fleets and it does not take into account the economic, social and environmental aspects

of the business. The NEF study demonstrates that sustainable fisheries management and reallocation of quotas would provide numerous economic benefits: increase revenues and create jobs more effectively than the current allocation system, which is based on historic share. Reallocating quotas mean less fish for fleets that have traditionally received more access to the resource. Although profitability and wages would decrease, reallocating fishing quotas to lower-carbon fleets would provide an additional 14,584 jobs and save 624 thousand tonnes of carbon per year. Increasing quota to fleets that support more jobs per ton of fish landed would create

102 thousand jobs, but increase carbon emissions.

Keeping the fish stocks below MSY (maximum sustainable yield) in the last five years caused a total loss of 8.6 million tonnes of catch and EUR 7.1 billion in revenues. Rebuilding most commercial EU fish stocks in North Atlantic waters to their MSY would deliver more than 2 million tonnes of additional fish per year, sufficient to meet the annual demand of 89.2 million EU citizens. It would also bring EUR 1,565 million additional gross yearly revenues as well as EUR 824 million additional net profits per year. The change would also result in provision of up to 64,092 new jobs and EUR 8,273 additional fishing

wages each year. All these benefits would accrue directly to the EU.

The presented data was obtained using a model called the bio-economic model of European fleets, on the development of which the NEF has worked for the past two years, together with scientists and institutions from across the European Union. The model was used to analyze 221 fleets and 73 % of all EU landings, including 10 Polish fleets (67% of Polish landings). In contrast to the previously used method based on historical catch data, BEMEF is the first model used to estimate the economic impact of the redistribution of quotas by alternative criteria (employment, fuel, profit, volume).

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Latvia: Fisheries control, a prerequisite to implement the Common Fisheries Policy

On 27-28 April, under the Latvian Presidency of the EU Council, an informal meeting of Directors-General and attachés for fisheries from the EU Member States took place in Jūrmala, reports the Latvian Ministry of Agriculture. Such meetings are organised once every six months by the country holding the Presidency of the EU Council, where the participants discuss topical issues concerning the EU fishing industry and learn about the characteristics, traditions and culture of the industry in the host country.

The focus of discussions was fisheries control, a critical component of the Common Fisheries Policy (CFP). Opening the meeting, Normunds Riekstiņš, Director of the Fisheries Department at the Latvian Ministry of Agriculture, emphasised: "Fisheries control is fundamental for the implementation of the Common Fisheries Policy. Effective and, in terms of costs, balanced implementation will determine the success of the European Union in achieving the



Directors-General of Fisheries as well as fisheries attachés attended a meeting in Jūrmala, Latvia in connection with the Latvian Presidency of the EU Council

objectives of its new Common Fisheries Policy."

At the meeting participants, including representatives from the European Commission and the European Fisheries Control Agency, discussed the changes brought about by the reform of

the CFP. The introduction of the new CFP has led to changes in resource management that have also had an undeniable impact on fisheries control. For example, the landing obligation has entered into force, as has the CFP regionalisation principle, which opens

up an opportunity to seek regional solutions for the use of fish stocks. The implementation of such innovations is, however, complex as, for example, the price for under-sized fish is so low that fishermen have no incentive to comply with the landing requirements.

Lithuania: Brazilian market opens for Lithuanian fishery products

On 3 April 2015 the head of the Sanitary and Phytosanitary Department of the Ministry of Agriculture, Livestock and Food Supply of Brazil informed the State Food and Veterinary Service of Lithuania that the country's market was now open to Lithuanian fishery products. Negotiations between the two parties had lasted almost two years. In 2013 Brazilian specialists assessed the efficiency of the official food and veterinary control system implemented in Lithuania and the guarantees provided by this system in respect

of the safety and quality of Lithuanian fishery products. "The positive findings of the audit conducted by the Brazilians contributed to the successful result of the negotiations. Although the process has taken a long time, we are very pleased with the outcome. At the moment, Lithuanian fish processors export their production to more than 30 countries worldwide. I am aware that a number of businesses are planning to develop markets in Brazil, and are searching for commercial partners to help them gain a foothold in the

largest market in South America," said Jonas Milius, Director of the State Food and Veterinary Service.

Among these companies is one of the biggest producers of crab sticks, surimi products and fish in Europe, the Viciunai Group. Although not a new market for the company, as it already exports its products to Brazil from a factory in Spain, the head of the group, Visvaldas Matijošaitis, says that products from Lithuania will replace those from the facility in Spain. "Brazil is a huge market. It is a maritime

country, where fish is popular. They know our products because we export them from the Spanish factory. From now on we will export the Lithuanian production to Brazil", said Mr Matijošaitis. The Brazilian market will benefit from a broadened variety of products, which are produced in Lithuania. Mr Matijošaitis also mentioned another advantage of expanding in the new market. Viciunai Group collaborates with 500 small businesses in Lithuania, and these enterprises will now be able to expand in the Brazilian market.

UK: New campaign to support sustainable fishing

A sustainable fish city campaign in the UK is helping to kick-endangered and unsustainably caught fish off menus. The campaign aims to work with fish-serving businesses to secure a sustainable future for the fisheries and marine environment. Already in

a couple of cities across the UK restaurants and catering establishments have made a commitment to serve a majority of meals only with sustainable fish. The leading city in its commitment to make a positive difference to the future of oceans,

Bournemouth, has been crowned as the world's first sustainable fish city. Primary schools, leisure centres, theatres, workplace canteens, Bournemouth University, all major hospitals and restaurants support and take part in the initiative offering

sustainable fish meals to their customers. The Sustainable Fish City campaign can have a profound impact on the local and national supply chain for fish, and could inspire other towns and cities to commit to offering 100% sustainable fish.

Lithuania: Baltic seals a threat to fishermen's catch and income

Grey seals appearing in greater numbers in the Baltic Sea are raising concerns for Lithuanian fishermen. These marine mammals not only eat catches of smelt, cod and Baltic herring, but also destroy the fishing nets. The lack of compensation for damage to the nets or catches caused by seals complicates the situation even more. Yet, according to specialists from

the Lithuanian Ministry of the Environment, the situation is not as severe as the fishermen describe. Also since they are registered in the Lithuanian Red Book, grey seals cannot be hunted and their number cannot be that big. Mr Budrys, Chief Specialist from the Nature Protection Department of the Lithuanian Ministry of Environment, adds that the currently

noticeable increase in seal population in the Baltic Sea is associated with the migration of fish. According to the latest census, the population of grey seals in the Baltic Sea amounts to at least 30,000 individuals, while the estimated population ten years ago, in 2001, was only slightly above 10,000. Over 5,300 of the animals live in Estonian waters. Experts say that the

population of the grey seal in Estonian waters is sufficient to permit limited hunting again. In the early 1970s it was banned due to low population. Estonia has been permitted to hunt seals and opened the season on 15 April 2015, which will last until the end of the year. A total of 53 animals, which represents 1% of last year's grey seal population, will be culled.

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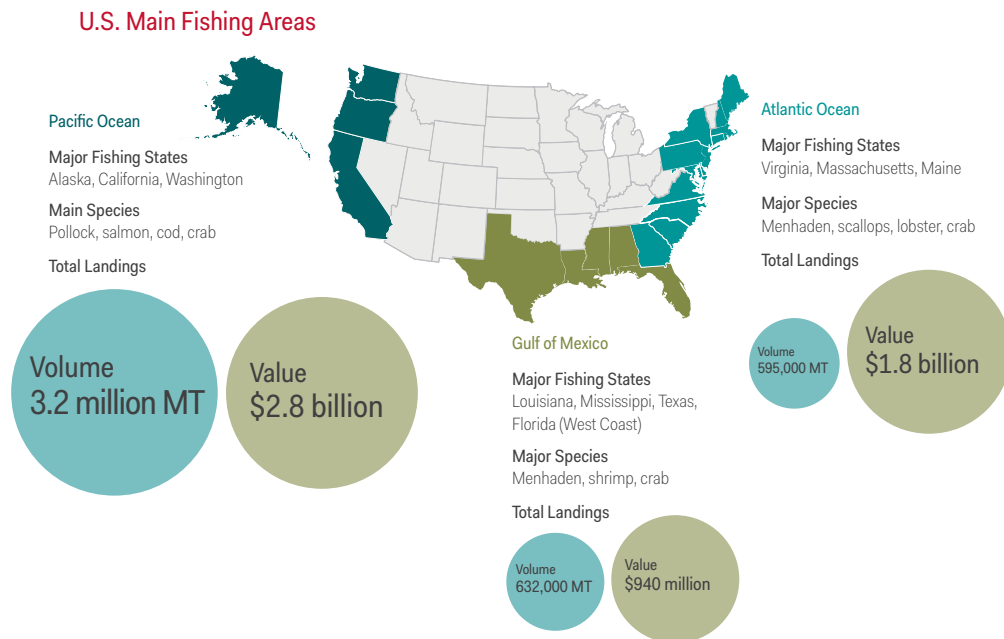


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Iceland: US imports nine tenths of its seafood requirements

A new report from Islandsbanki provides insights into key trends and issues shaping the US seafood industry. The US was the fourth largest harvester of wild caught seafood in the world in 2013 and is one of the most important markets for seafood. With its large commercial fishing areas in the Atlantic Ocean, Pacific Ocean and Gulf of Mexico the total value of the US catch has increased steadily since the early 2000s, reaching USD5.5 billion in 2013. During the past 20 years, total landings averaged 4.3 million MT and landings increased by 5.6 percent to 4.5 million MT in 2013. The Pacific region in particular has become the largest fishing area for the US and one of the largest in the world, primarily due to an increase in the total allowable catch for pollock, whereas the Atlantic and Gulf Coast regions are smaller when measured by volume, but



Main fishing areas in the United States.

generally consist of higher value shellfish species. The US is the fifth largest exporting country and the second largest importer of seafood. The country also

imports approximately 90 percent of its seafood, about half of which is from aquaculture. Seafood imports increased 81 percent between 2004 and 2014.

The full report is available at https://www.islandsbanki.is/library/Skrar/Seafood-Reports/International_Seafood_Report_low.pdf.

Islandsbanki Research, United States Seafood Market Report, April 2015

UK: Mackerel exports grow despite Russian ban

The Russian ban on imports from the EU also had an impact on mackerel (*Scomber scombrus*) exports from the UK between August and December 2014. In 2013 the United Kingdom exported EUR22m worth

of the pelagic fish to Russia, the single-biggest importer of pelagic fish in the world. Elizabeth Truss, UK Environment Secretary promised to support businesses and promote greater trade elsewhere. As a result the

UK Government led on negotiations to promote mackerel to Asian buyers and had meetings with the Nigerian government to reduce import restrictions that hindered EU businesses exporting fish to that country. Due to

these changes exports grew by almost EUR23 million between August and December 2014 compared to the same period a year ago. Exports to China increased by nearly EUR7m during the same period.

Poland: Baltic salmon and halibut on the list of endangered fish

Within 40 years, some species of fish and seafood may become extinct. These include Baltic halibut, eel, salmon and lobster. According to the FAO, as much as 90% of world's fish stocks are overfished or fished to the highest possible level. To prevent this, Poles, among others, should

change their eating habits and remove endangered species from their menus. WWF Poland has taken the initiative to help consumers choose responsibly and issued guidance suggesting which fish species should be chosen and which species should be consumed responsibly.

The WWF has developed a brochure "What fish for dinner", showing which fish are affected by overfishing and which are not. It is divided into three colors: light green suggests that fish can be eaten without restriction; yellow is for fish, whose consumption should be

limited; while red is for fish, which should not be consumed as they are threatened by extinction. The green list is quite long and includes herring, sprat, carp as well as octopus, lobster and oysters, says Olga Sarna from the WWF.

Norwegian company honoured at Brussels event

Top honours at the Seafood Expo Global were awarded to Salmon Brands of Oslo, which won the Pris d'Elite in the best new retail product category. The Norwegian

company was selected from 37 other finalists representing 11 countries. The award was for its product Salmaraw, a ready-to-eat sashimi kit, which contains

90 grams of fresh salmon sashimi with sachets of ponzu sauce and sesame seeds, and specially designed cutlery. Salmaraw also won the special award for

originality. All the finalists were judged on taste and overall eating experience, packaging, marketability, convenience, nutritional value and originality.

Russia: Russia and Argentina sign agriculture and fishing cooperation programme

Vladimir Putin, Russia's leader, and visiting President of Argentina, Cristina Fernandez de Kirchner, have made a joint statement on the establishment

of a comprehensive strategic partnership between Russia and Argentina. One of several signed documents was a programme of corporation in agriculture, fishing

and aquaculture for 2015-2016. In 2014 Argentina became one of Russia's largest trade partners in Latin America, and as a result the food export from Argentina

to Russia has now exceeded USD1bn. Argentina exported 50 percent more beef and frozen fish to Russia in 2014, and increased exports of shellfish by 150 percent.

Switzerland: Ocean wealth valued at US\$24 trillion, but sinking fast

A report, *Reviving the Ocean Economy: The case for action - 2015*, released by WWF in April values the wealth of the ocean at USD24 trillion, but also outlines concerns about the speed at which it is declining, and the threats leading to its collapse. The report describes the sea's enormous wealth through assessments of goods and services ranging from fisheries to coastal storm protection, and the unrelenting

assault on ocean resources through over-exploitation, misuse and climate change. The EU is the world's largest seafood market and the world's 4th largest producer of fish and aquaculture products. The oceans are a central and crucial part of its economy, and the report admonishes that Europe needs to put more effort and invest in the ocean's future, and not only exploit its valuable assets. According to the report, more than

two-thirds of the annual value of the ocean relies on healthy conditions to maintain its annual economic output. Collapsing fisheries, mangrove deforestation as well as disappearing corals and sea grass are threatening the marine economic engine that secures lives and livelihoods around the world. The over-exploitation is a major cause for the ocean's decline, with 90 per cent of global fish stocks either

over-exploited or fully exploited. The Pacific bluefin tuna population alone has dropped by 96 per cent from unfished levels. *The Reviving the Ocean Economy* report demonstrates that it is not too late to reverse the troubling trends and ensure a healthy ocean that benefits people, business and nature by presenting an eight-point action plan that would restore ocean resources to their full potential.



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Latvia: Baltic fishing industry looks forward to implementation of new fisheries policy

Karmenu Vella, Commissioner for Environment, Maritime Affairs and Fisheries, visited Latvia on 13 April 2015, reports the Latvian Ministry of Agriculture. During his visit the Commissioner met with Jānis Dūklavs, Latvian Minister of Agriculture, and discussed various topical issues concerning the EU fisheries sector. Latvia as well as other Baltic Sea states are eager to reach agreement by EU institutions on a multi-annual multi-species plan for Baltic cod, herring and sprat, thus responding to the industry's expectations of a predictable operating environment. The officials discussed the harmonised implementation of the landing obligation in all EU Member States, which entered into force for the Baltic Sea fisheries on 1 January 2015. However, the efficient use of undersized fish, a potential source of protein, remains an unsolved issue. EU legislation prohibits the use of fish below minimum conservation reference size for human consumption.



From left, Normunds Riekstiņš, Director of the Fisheries Department at the Latvian Ministry of Agriculture; Karmenu Vella, Commissioner for Environment, Maritime Affairs and Fisheries; and Jānis Dūklavs, Latvian Minister of Agriculture

After a meeting with non-governmental organisations and the Fisheries Advisory Council Mr Dūklavs pointed out that

products from the Latvian fisheries sector have very high added value and that it was important that export-oriented companies

have every opportunity to thrive, which, Mr Vella added, Latvian exporters are well positioned to do over the coming years.

Spain: First ever European anchovy fishery receives MSC certification

The first ever European Anchovy (*Engraulis encrasicolus*) fishery has been awarded Marine Stewardship Council (MSC) certification. The certification was awarded after an independent assessment by accredited certification body, Bureau Veritas, against the MSC Fisheries Standard. Between 2005

and 2010, the fishery was closed to upgrade its stock management methods. The news that the stock had been certified was a major milestone for the anchovy fleet, which is made up of the Spanish Inshore Producers Organisations from Viscaya and Guipúzcoa and San Martín de Laredo fishermen's

guild, and an important acknowledgement of the joint work by the fleet, the government and the scientific organisations. Speaking on behalf of the fleet, Miren Garmendia, secretary of the federation of fishing guilds of Gipuzkoa said that Cantabrian anchovy fishers had supported responsible fishing

for years, using selective fishing methods like the purse seine. Consumers can rest assured that they are buying an anchovy that has been captured according to the MSC standard and that they will always be able to trace our product back to its source, the Cantabrian Sea, he added.

India: Seafood exports to the EU on the rise

The Marine Products Export Development Authority of India (MPEDA) announced that seafood exports to the European Union have steadily increased for the last decade. At an event organised by MPEDA during the Brussels seafood fair, the chairperson of the authority said that exports of Indian seafood to the

EU which amounted to USD227m in 2000-01, were expected to reach USD1.06bn in 2014-15. Shrimp, squid and cuttlefish are the main species imported from India. In fact, India is the largest non-EU supplier of shrimp to the EU with amounts over 75,000 metric tonnes. cuttlefish imports amount to 44,000

metric tonnes, and squid, 30,000 metric tonnes. The main importing EU countries are Spain with USD188m followed by Belgium with USD187m, Britain and Italy with USD128m each and France with USD106m. Apart from the EU, India exports seafood to 101 countries including the US, South East Asia, and the Middle East.

The main exported products are frozen shrimp, frozen fish, cuttlefish, dried products and squid. In the last couple of years, Indian seafood exports around the world have doubled and even tripled. Compared with 2008-09, when exports amounted USD1.9bn, the current expectation is to reach USD5.7bn.

Women in the seafood industry

Entrenched barriers hinder equal participation

Women participate in all segments of the seafood industry, though the degree of their representation varies from segment to segment. However, the widespread lack of consideration for their role and work in the seafood industry is, in many respects, a disadvantage that ultimately bars them from full and equitable participation in the industry. The FAO has just released a study, which explores and sheds lights on this important, yet often ignored aspect of the seafood industry.

Marie Christine Monfort, the author of the recent report, explores the role of women in the seafood industry. The first part of the document reports the results of social science research, which rarely leaves the academic world to reach policy makers and business leaders. This report attempts to bridge these two separate worlds. The second part presents the level of knowledge and understanding of the role of women in the seafood industry in six selected countries: Croatia, Egypt, France, Iceland, India and Senegal.

A male-dominated sector

Where information is available, in the fishing, farming, processing, trading, monitoring and administering segments, in both developing and developed countries, there is evidence that women's participation is constrained or affected by strong cultural rules, rigid societal conventions and even, in some cases, by discriminatory laws.

Social scientists have shown that the seafood industry is male dominated, where hierarchy, authority, power, competition,

development, control of human and natural resources and domination of others is shaped by males for their own benefit.

The conditions of participation of both genders in the industry and related services are organised according to these rules

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Concentration of women in the seafood industry, by sector

	No/low	Medium	High
Industrial fishing (highly capital intensive)	X		
Industrial aquaculture (highly capital intensive)	X		
Professional organisations	X		
Fisheries management	X		
Leadership level	X		
Small scale fishing (low capital intensity)		X	
Fisheries support activities (ashore)		X	
Ex-vessel selling and marketing		X	
Administration		X	
Quality inspection		X	
Researchers, marine and social sciences		X	
Source of knowledge other than scientific		X	
On-shore aquatic items collecting			X
Small scale aquaculture (low capital intensity)			X
Seafood processing			X
Environment activists			X
Seafood purchase for households			X

at all levels from workers to decision makers. For instance women may be deprived from ownership rights, and thus hindered from running fish farming businesses, or they may not

be allowed to access financial and insurances services. Consequently, their limited access to capital constrains their capacity to invest in modern and competitive technology in fishing,

farming, processing, storage, and limits their capacity to upgrade their knowledge and skills. The presence and participation of women at decision making levels is even more seldom, and at top management level they are simply excluded. Out of the 100 largest seafood companies, only one is led by a woman, and 55% have no women on their boards. Irrespective of the segment of industry, or the country considered, women are clearly not employed to their full potential.

Patchy data make comparisons difficult

The country case studies review the state of the knowledge in the field. How many women occupying which positions, and holding what power is poorly known. Out of the six countries only Iceland collects gender disaggregated data over the full employment spectrum in the seafood industry.

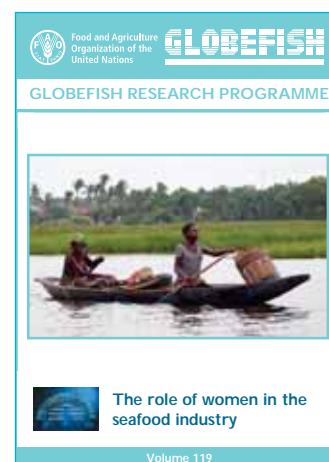
The report shows that the quality of information and knowledge varies greatly between

countries and, interestingly enough, it is not linked to the level of economic development. Some developing countries, such as India and Senegal, offer relatively good records because these important fishing and aquaculture nations have received the attention of gender sensitive development aid agencies. In contrast, the participation of women in the industry is still poorly documented and researched in countries such as France and Croatia. Hopefully, the recent introduction of gender sensitive parameters in the new European Maritime and Fisheries Fund (EMFF) constitutes a positive and encouraging step. For the first time, the role that women play in the fishing business will be recognised.

The primary aim of this unique report is to increase the awareness of business leaders and policy makers, about the value women bring to the seafood industry, and to encourage them to consider the gender aspect each time they develop a new project or a policy.



Women are better represented in some sectors of the fish industry such as fish sales, than, for example, industrial fishing.



The role of women in the seafood industry, Globefish Research Programme Vol. 119, can be purchased from shop.eurofish.dk for EUR30.

Brussels seafood fairs set new exhibitor record

SEG and SPG strong as ever, Prix d'Elite falters

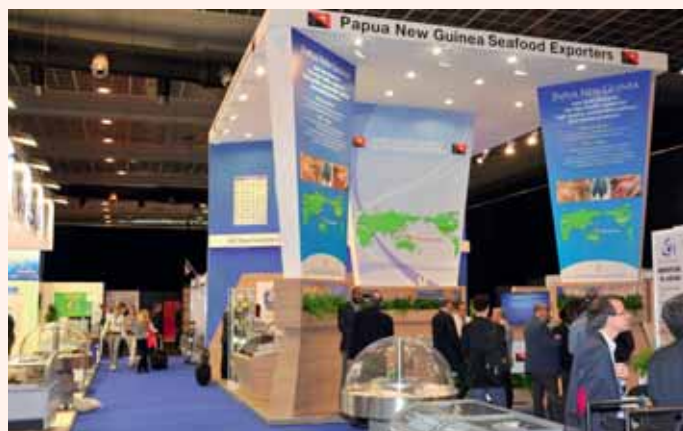
Never before was professional interest in the two Brussels seafood shows larger than this year which marked the 23rd edition of Seafood Expo Global (SEG) and the 17th of Seafood Processing Global (SPG). Both fairs broke all previous records. The number of exhibitors forced the organisers to open up an eighth exhibition hall with which exhibition space totalled a good three and a half hectares. More than 1,700 companies from over 75 countries presented their products and services in the exhibition halls from 21 to 23 April, among them exotics such as Tanzania and Papua New Guinea.

Anyone who still harboured lingering doubts that the two Brussels seafood fairs had been rather presumptuous in using the word “global” in the title was given evidence this year. Never before had the two fairs been bigger, brighter or more interesting than in 2015, although people still probably looked in vain for that ultimate innovation or ground-breaking new trends within the industry. The selection of products on display was broad and varied as in previous years, but most of them were little more than variations of already sufficiently known products. Even the trendy “street food” products, small snack like bites for on the go with which more and more suppliers want to serve the booming “to go” market seemed painfully familiar on closer inspection. Exactly the same idea is to be found in finger food, seafood snack boxes, wraps and of course fish rolls that were popular long before anyone talked about “take away”. In spite of this, there was certainly no stagnation in Brussels. The PR statement of the organisers, who interpret the growth of their fairs as an indicator of the positive state and optimism of the global seafood industry is quite true. And really that is not surprising for with the increase in standard of living nearly everywhere in the world

interest in fish and seafood is growing. According to the FAO global seafood production has risen eight-fold from 20 million tonnes in the year 1950 to 156 million tonnes in 2012, with average per capita consumption rising from 9.9 kg in 1960 to 19.1 kg in 2012. Behind this remarkable success are the achievements of all those involved in the fish industry – fishermen and fish farmers, processors, importers and exporters, wholesalers and retailers, service providers, catering establishments and many others. And a lot of them are drawn every year to Brussels which with its two exhibitions provides a comprehensive overview of familiar and new seafood products, equipment and industry-specific services.

Sustainability is a prerequisite for successful business

The term “sustainability” has been a must at every fish trade fair for a decade. It would probably be difficult today to find any reputed company that has not integrated this claim into its corporate philosophy, and so promises of sustainability were visible in many of the exhibition presentations. The well-known logos, labels and seals were emblazoned throughout the halls in Brussels



Papua New Guinea was this year one of the new exhibiting countries with an interesting product range.

making it impossible to overlook the industry's achievements in its struggle towards more sustainability. The fairs offer certification organisations and providers of

sustainability standards a unique chance to attract the attention of more enterprises. Nearly all of them had recent successes to report and also made use of the

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I International Fisheries Stakeholders Forum

20th ANNIVERSARY OF THE CODE OF CONDUCT FOR RESPONSIBLE FISHERIES (FAO)

Co-organized by



Food and Agriculture
Organization of the
United Nations



Preliminary Program

DAY 1 8th October

08:00-09:00 h. REGISTRATION

09:00-09:40 h. OFFICIAL OPENING

09:40-10:40 h. SESSION I THE CODE OF CONDUCT FOR RESPONSIBLE FISHERIES (CCRF)

09:40-10:00 h. Past and Future: situation and challenges

10:00-10:20 h. Bottlenecks and constraints in CCRF implementation. EU Bluegrowth / Blue-economy

10:20-10:40 h. How do we move forward?

10:40-11:10 h. COFFEE BREAK

11:15-13:40 h. SESSION II FISHING FOR THE FUTURE (2035)

11:15-11:35 h. World Production: Fisheries & Aquaculture

11:35-11:50 h. Implications for food security and nutrition

Present situation for major species and by 2035

11:50-12:10 h. Climate change and impacts on stocks assessments

12:10-12:25 h. Tuna

Atlantic / Indian Ocean

Pacific

12:25-12:40 h. Whitefish- Groundfish

Wild (hake, cod, Alaska pollock, hoki)

Farmed (tilapia, pangasius)

12:40-12:55 h. Shrimp

Cold

Warm

12:55-13:10 h. Cephalopods

Squid (pota/calamar), cuttlefish

Octopus

13:10-13:40 h. **PANEL DISCUSSION**

13:40-15:10 h. LUNCH

15:10-16:55 h. SESSION III CONSUMERS & INDUSTRY, TRADE AND CHALLENGES

15:15-15:25 h. Consumption, consumer awareness, trends and urbanization

15:25-15:35 h. World Trade Regime towards 2035

15:35-15:50 h. Challenges - looking into the future

15:50-16:05 h. Social issues: just an afterthought or a crucial part of the solution for a sustainable future?

16:05-16:25 h. Aquaculture growth-too good to be true?

16:25-16:55 h. **PANEL DISCUSSION**

16:55-17:10 h. WRAP UP DAY ONE

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I International Fisheries Stakeholders Forum

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Preliminary Program

DAY 2 9th October

09:00-10:30 h. **SESSION IV FISHERIES MANAGEMENT AND FISHING RIGHTS**

- 09:00-09:15 h. The development of fisheries management in history
- 09:15-09:30 h. Fisheries management in line with Code of Conduct
- 09:30-09:45 h. Fishing rights: overview
- 09:45-10:00 h. Future of fishing rights
- 10:00-10:15 h. Successful fisheries management. Managing shared stocks
- 10:15-10:30 h. **PANEL DISCUSSION**

10:30-11:00 h. **COFFEE BREAK**

11:00-13:00 h. **SESSION V IUU – THE SITUATION AND PROSPECTS**

- 11:05-11:20 h. The EU case: status of the fight against IUU
- 11:20-11:35 h. Civil society in support of the fight against IUU
- 11:35-11:50 h. Public / private partnership in achieving sustainable fisheries
- 11:50-12:05 h. Ensuring sustainability in the supply chain
- 12:05-12:20 h. Changing perceptions - working with industry
- 12:20-13:00 h. **PANEL DISCUSSION**

13:00-14:30 h. **LUNCH**

14:30-16:10 h. **SESSION VI SUSTAINABILITY AND CERTIFICATION**

- 14:30-14:50 h. A necessity or a marketing cost?
- 14:50-15:05 h. Public sector certification schemes
- 15:05-15:20 h. Ensuring the inclusion of all stakeholders
- 15:20-16:10 h. **PANEL DISCUSSION**

16:10-16:30 h. **COFFEE BREAK**

16:30-17:30 h. **SESSION VII THE POLITICAL VIEW. BLUEGROWTH**

- Focus on governance and integrative approaches
- Ministers from different continents (Africa, Asia, Latin America)

17:30-18:00 h. **SUMMING UP. CLOSING OF THE CONFERENCE**

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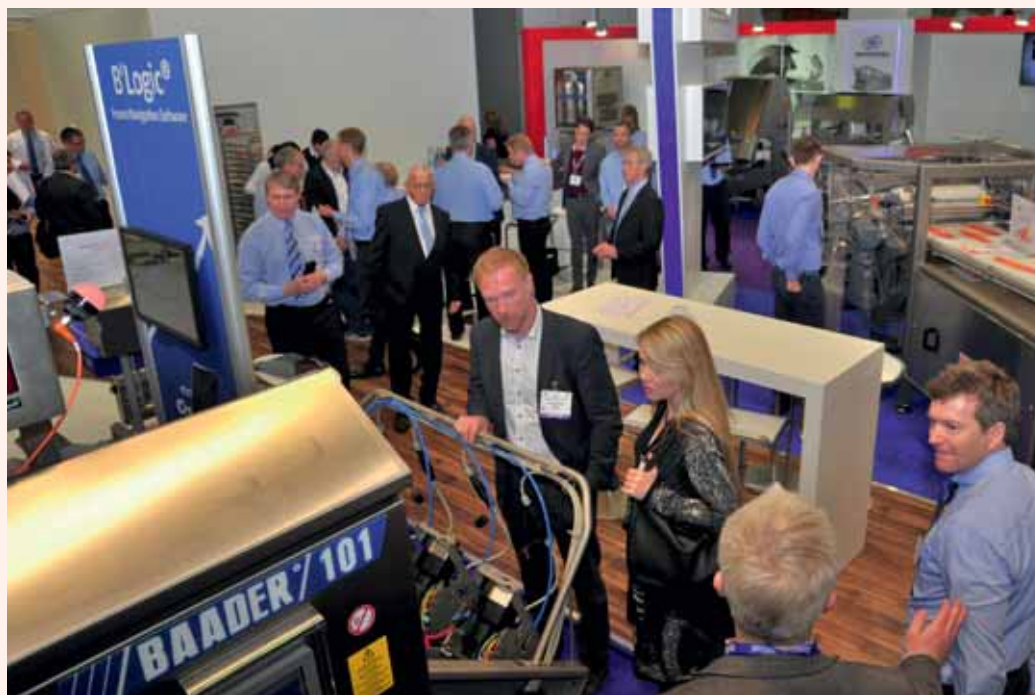
opportunity to celebrate themselves in the process.

Particularly pleasing for anyone interested in certification was that cooperation between the standard providers is making further progress. GlobalGAP, ASC and GAA (BAP) announced in Brussels, for example, that they intend to coordinate their aquaculture standards more and will pursue a strategy of mutual acknowledgement. On the basis of joint check lists combined audits are in future to become possible which would reduce the cost of multiple certifications. GlobalGAP has already implemented this concept with Friend of the Sea (FoS) in an additional module for aquaculture so that potentially interested parties can obtain an additional B2C consumer label for fish products beyond the B2B certificate GlobalGAP without too much effort.

MSC and ASC are the leading certificates in Europe

The ASC celebrated its fifth birthday at Seafood Expo Global. The organisation's progress on the path towards ecological sustainability and social responsibility in aquaculture was much more impressive than had been hoped for at the organisation's start half a decade ago, said Chris Ninnes, CEO of ASC. In this relatively short time over 200 companies had joined the ASC programme and nearly 150 had been certified according to ASC standards. More than 2,500 products bear the ASC label and the certified production volume in the meantime exceeds 500,000 tonnes.

It is also noteworthy that some national certification initiatives seem to be running out of steam. Such separate certificates might be understandable and explicable



Seafood Processing Global presented to visitors powerful processing machines and new technologies, some of which were even demonstrated in action.

but they contribute towards confusing consumers who already now hardly know what the different labels stand for. Already at the beginning of April ten big processing companies in Alaska announced that they will return to the MSC programme which they had left three years ago in favour of their own label Responsible Fishery Management (RFM). Their return to the MSC should not, however, be interpreted as a fundamental departure from the RFM programme, emphasised ASMI, but was due to export problems on account of the strong dollar and the strong sockeye catches that are expected for this year. Without the MSC seal of approval it would probably be difficult to market the fish, particularly in Europe.

Business as usual at the fairs despite local transport strike in Brussels

The growing interest of exhibitors in SEG and SPG puts

pressure on the fair organisers, however, to ensure as high attendance as possible on all three fair days. Because if there are no visitors to the stands the seafood show boom could soon be over. Given that fact, the strike of the Brussels local transport that completely paralysed metro, trams and city buses on the second day of the fair was a real challenge for the organisers. But they passed it with flying colours for in no time they had organised a shuttle system with urban buses that took fair visitors back and forth between six pick up points and the fair between 7:30 and 20:00. This wasn't only a very comfortable alternative – in contrast to the metro every passenger had a seat – but given the congestion of cars in the city it was also amazingly fast. In spite of the strike there was all the usual hubbub in the exhibition halls.

The main task of every exhibition is of course to draw attention to product ranges, arouse interest

in new developments, make contacts, and promote networking. In addition to these aspects, meetings and fringe events in the supporting programme are becoming increasingly important. Quite a lot of exhibitors and countries see the chance to meet their professional colleagues in Brussels as a good opportunity to gain information on their products, projects and production and quality standards. This year there were so many events of this kind that they frequently overlapped. That was a difficult choice for interested parties. Anyone who decided in favour of the Morocco event learnt a lot about the range of fresh and processed fish products that the 35 exhibitors presented at SEG. At the centre of their presentations were canned sardine, for the North African country claims to be the world market leader in the production and export of this speciality. Vietnam's seafood industry also made use of the opportunity to draw attention to their strengths.

In just two decades the country has become the world's most significant pangasius producer and third biggest shrimp exporter. Their seafood exports are rising steadily, not only in relation to the volume and the number of buyer countries but also with regard to product quality and sustainability of production.

Thailand reports success in the fight against IUU but the EU still shows a yellow card

At Chile's pavilion both ministers and other national leaders as well as fishermen and aquaculture producers were available for discussions. Chile's new fishery policy is clearly geared to sustainable development. That is why the fish industry can no longer increase its earnings through higher catch volumes but has to look to further processing, more value-adding, and internationally recognised certificates such as MSC or ASC. One of the countries that was in the past less at the centre of attention in Brussels is undoubtedly South Korea. Wrongly so, as evidence revealed during an event at which 18 typical Korean meals were presented for tasting. Not only exquisite fishes, shellfish and crustaceans but also special recipes with algae. A top Korean cook

demonstrated the correct preparation of the dishes.

In the case of Thailand two contradictory events overlapped. On the morning of the first day of the exhibition the European Commission officially announced that they had shown the country the yellow card because it allegedly had not undertaken enough to control and fight IUU fishing. Thailand now had six months' time to make appropriate improvements, otherwise they would be threatened with a ban on imports of Thai seafood products. Hardly six hours later acknowledged representatives from Thai politics and industry described at a seminar at the edge of the fair the achievements that had been made in recent months to fight IUU fishery and illegal employment in the seafood sector. The basis of this was a detailed roadmap that was being implemented step by step. In the country's 22 coastal provinces 18 MSC centres (Monitoring, Control and Surveillance) as well as 26 port-in-port-out centres are being set up to check all vessels over 30 GT (fishing gear, licences and logbooks) prior to leaving and after entering harbour. Four of these centres have already been in operation since 1 April 2015, the others will go into operation by July when Thailand's new fishery law comes into force. Altogether

the roadmap comprises six core points that aim to control illegal fishery more effectively and enable an efficient traceability system within the fishing sector. Five ministries and government agencies are working together to implement the plan. Although Thailand might not at present have implemented all the EU requirements it is hard to imagine that all other countries in Asia have already reached this level. Will they be shown yellow cards now, too?

Prix d'Elite in crisis?

They are supposed to be the premier league, presenting the latest seafood trends to the industry, indeed, among the most prestigious seafood prizes worldwide. But despite the fair organisers' considerable efforts to exalt their "Seafood Prix d'Elite New Product Awards" – the 15th edition of the ambitious product contest was a flop. On the face of things the balance still looks positive with 37 products being entered in the competition. But under closer inspection it becomes apparent that only 22 companies were interested in the prizes that are awarded in seven categories (2 Grand Awards, 5 Special Awards). Given more than 1,700 exhibiting companies that is rather meagre participation. And Prix d'Elite

could not really be called international this time, either, for only two of the total of 11 competing nations were not from Europe. In terms of figures only about five products competed for each of the prizes. In the category Foodservice there was no Prix d'Elite at all. Allegedly the accompanying information on the submitted products was missing, said the Jury. That is quite possible, but perhaps there were simply too few candidates and products.

The overall impression of a rather weak product competition was then even strengthened by the award ceremony in Auditorium 2000 which took place this time in a rather undignified fashion with people tending to ignore the happenings on stage. This year only salami and cheese bites were served as snacks, but not seafood products. Those responsible for the Prix d'Elite should react quickly and come up with something to counteract the creeping loss of prestige of their prize in order to give the contest the significance it claims to have. They owe that to their own standards and to the competition entrants! For this year, too, the winning products were certainly worth seeing and deserved more attention and acknowledgement than they got. *mk*

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Senior officials visit Brussels seafood show

As the world's biggest seafood show in the world's biggest market for seafood the Brussels Seafood Expo Global is a showcase for all aspects of the fisheries sector. All the latest products, services, and machinery related to fisheries and aquaculture are on display. The presence of so many exhibitors and visitors under one roof means that the show is an effective launching pad for new initiatives, policies, and agreements both private and public. As a result ministers or senior officials from ministries or the European Commission often

spend a few hours at the show, usually for official purposes, but also to mingle and show their support for their industries.

A regular visitor to the show is Lowri Evans, Director-General, DG MARE, who this year spent time at the Latvian pavilion. Latvia currently holds the rotating Presidency of the European Council and one of its priorities in the fisheries sector is to ensure progress on the multi-annual, multi-species management plans to ensure the sustainable management of fish stocks. Among

these, and of particular interest to Latvia, is the Baltic Plan, a long-term management plan which establishes targets and conservation reference points for cod, sprat, and herring stocks and promotes regionalised decision making for fisheries in the Baltic. During her visit Ms Evans met with Didzis Smits, president of the Union of Latvian Fish Processing Industries, the organisation responsible for the pavilion, and with Andris Bite, the CEO of Karavela, a fish canning company. Their discussions centred around a typically Latvian delicacy, sprats

in oil, as well as new products, and the importance of diversifying away from traditional markets on to new ones, especially in light of the Russian ban on imports.

Ms Evans also stopped at the Italian stand, where Ricardo Rigillo, Director General for Fisheries and Aquaculture in the Italian Ministry of Agriculture, Food and Forestry Policies was also visiting. Italy as usual had a strong presence at the show and Mr Rigillo called on several of the exhibiting companies to express his support for the sector.



Andris Bite (left), Karavela, speaking with Lowri Evans, DG MARE, and Didzis Smits, Union of Latvian Fish Processing Industries.



From left, Ricardo Rigillo, Ministry of Agriculture, Food and Forestry Policies, Italy; Pietro Avolio and Pietro Chiaro, Eurofish Napoli srl

Cromaris launches organic seabass and seabream

Cromaris, a Croatian producer of seabass and seabream for the European market launched a new product at the Seafood Expo Global – organic seabass and seabream. Davide Furlan, who runs the company's Italian operations, says that the first batch of fish is available in market sizes of 300/600 and 600/800. Seabass and seabream both cost the same at the retail level and the fish is certified to a plethora of organic standards, BioSwiss, AB, Naturland as well as Global G.A.P. and Friend of the Sea. Germany, Austria and Switzerland

are the main markets for organic fish and Cromaris took the decision to start this organic production because markets in these countries are established and growing. In Italy the market is growing rapidly, says Mr Furlan, but from a tiny base. The demand for organic fish is being driven by the retail sector partly because consumers are demanding it, but also because it is something new. Apart from the environmental benefits of organically farmed fish it is also a very healthful product that comes close to tasting like the wild fish. The organic certification



Davide Furlan leads Cromaris' operations in Italy, where he is trying to increase the popularity of organic seabass and seabream.

prescribes the kind of feed to be used as well as the density of fish in a cage and the use of medicines. All these factors ensure that the fish tastes different from conventionally farmed fish, however it is at a price. At the retail level organic seabass and seabream can cost between 50 and 100% more than conventionally farmed fish, mainly

because the feed is more expensive and the density is a fraction of that used in conventional farming so the costs have to be spread over many fewer fish. Conventionally produced seabass and seabream can be farmed at a density of 70-100 kg per m³, while at Cromaris the organic fish are farmed at less than 10 kg per m³.

The fish are farmed at a site in a protected area in Istria in the north of Croatia. The protection keeps industrial activities away from the area so the water is pure and unpolluted. Today the organic production amounts to about 500 t out of a total of 6,000 t and further growth depends on how sales develop. While organic

products are typically a lifestyle choice, in the case of fish, says Mr Furlan, the taste is also different, perhaps due to the different feed or the greater freedom in the cages due to the lower density, or the stronger currents that the fish have to swim against. Whatever the reason the fish are tastier, with firmer flesh and less fat.

Agromey is looking to the Far East for new markets

Agromey is one of Turkey's prominent producers of seabass and seabream with several sites on the west coast in the Aegean Sea. Tolga Uruk, the sales director, explains that like many of the major producers in Turkey Agromey too is reducing their production to avoid the problem that has regularly plagued the Turkish industry, a glut in production at certain times of the year that has meant reduced prices and decreased profitability. In 2012 Agromey put 50m juveniles into the sea, in 2013 this went down to 40m and last year the number fell further to 35m. Although the production is falling companies are buying up licenses that become available to prevent them from falling into the hands of other

companies that may decide to increase their production. Mr Uruk expects that with an industry-wide reduction in the number of fish put into the sea, not only in Turkey but also in Greece, prices will be generally higher and more stable. This is particularly important in the current economic context because producers have to cope with a weak euro, the currency in which they sell most of their fish, and a strong dollar, the currency in which their main raw materials, fishmeal and fish oil, are priced. Mr Uruk is hoping for the best, yet is preparing for the possibility that the dollar and the euro gain parity at the end of the year. For the moment, however, he says prices are rising as stocks are limited and the company is working on expanding its

market in the US, where it now has two offices, one on the east coast (New York) and the other on the west (Los Angeles). Agromey sales to the US doubled in the last year helped by Turkish Airlines which is opening up more routes there including to San Francisco, Miami, and Atlanta. Agromey sells mostly seabass to the US flying in fresh fish for sale through the retail sector. While initially it was mainly ethnic groups familiar with the fish, who purchased and consumed it, the market is slowly expanding to include other market segments.

The company also sells seabass and seabream to countries in the Middle East and is also exploring the Far East, where Mr Uruk feels there is a lot of potential.

Hong Kong, South Korea, and Japan, are the main countries of interest as they have a strong culture of eating fish and seafood and also enjoy high standards of living. Almost all of Agromey's production is sold as fresh fish. The company invested in a ferry a few years ago which was renovated into a processing factory. This enables the fish to be harvested, processed, and shipped within 24 hours. The Turkish industry is inspired by the success of the Norwegian salmon industry, which sells its products all around the world. Agromey will be attending trade fairs in different parts of the world including Latin America and Canada to promote their products, whole round or gutted fish.

Cruise ships are the new target for Almar

Almar is a shellfish cooperative based in the Friuli Venezia Giulia a region in north eastern Italy. The cooperative produces farmed as well as captured clams, but farmed production is by far the more important at about 80% of the total or 900 tonnes. Aurelio Zentilin, the director of health, expects however this production to increase to between 2,000 and 2,500 tonnes in the coming years. Today the cooperative can offer a number of products including Manila clams farmed in the lagoon, mussels

farmed in the sea near Trieste, on longlines, while Adriatic clams, the smooth clams, and razor clams are farmed in the Adriatic. At the Seafood Expo Global Mr Zentilin is seeking support for a new outlet for the cooperative's products. The idea is to sell frozen clams and other shellfish as a local product to cruise vessels in the Mediterranean. Thus passengers can be offered locally produced items while they are on board to add to the cultural experience of visiting another country. Since the products are frozen they

are easy to handle, have a shelf life of two years, and can quickly be prepared and will add to the authenticity of the voyage, feels Mr Zentilin. If, for example, the cruise organisers would like to hold an Italy-themed party on board the vessel, the food served could be locally produced Italian specialities. Almar is displaying a tray containing a mixture of shellfish, crustaceans and cephalopods that has been frozen. Although, he says, some of the products in the package are not Italian, the quality is very high and

should appeal to the consumers and the chefs aboard a cruise liner. The packages are not prepared at the Almar processing facility but in the factory of one of Almar's partners, and the supplier of the items other than the clams that appear in the package. For the cooperative this would be a new market. But cruises are a popular form of vacation and are likely to get even more popular as European populations age, so Mr Zentilin is optimistic about selling his clams and mussels to this new group of potential consumers.

High quality tuna products based on yellowfin, albacore, and bluefin

Iasa is a family-owned company based in Salerno, Italy, that specialises in tuna, anchovies and also produces small volumes of other products – mackerel, peppers from Campagna, and colatura, a concentrated sauce that is a by-product of the anchovy production. Run by three siblings, a sister and two brothers, Iasa is one of a very few Italian companies that is still producing salted anchovy fillets from scratch at its own facility. Although it used to be produced in Italy, today production of this item, which is popular in Italy, Spain, and France, has shifted to Croatia and Albania. Although jars of salted anchovies are on display at the Iasa stand at Seafood Expo Global, Paolo Ruocco, the sales manager, says that the anchovy production is in fact very small. It is very expensive to produce salted anchovies in Italy as the production is

completely manual and involves a lot of labour to salt the fish, make the fillets, and finally place them in jars with oil. In addition the entire process from raw material to finished product takes a long time as just the salting stage is nine months. The quality of the end product is excellent, says Mr Ruocco, but the cost of production is also very high.

The tuna is also cooked and placed in jars in oil. Most of the tuna is yellowfin that the company sources frozen from the Seychelles and Viet Nam. Smaller quantities of albacore tuna and bluefin are sourced fresh from the Mediterranean. Altogether, yellowfin amounts to about 70% of the total production volume while the other two contribute 15% each. Sales are both within and outside Italy. France and the UK are the company's main



Iasa's product portfolio is dominated by tuna items, but the company also has a small production of salted anchovies, peppers, and colatura.

markets outside Italy, and small quantities also go to the US. The latter is a difficult market and it is necessary to get approvals and certifications that are different from those that are needed elsewhere. Iasa products are also certified Kosher, which is a useful attribute when selling in France as there are a number

of retail outlets that look for this certification. This is the first time that Iasa is exhibiting at the SEG and while there has been interest in the company's products, Mr Ruocco also finds the event somewhat overwhelming as the number of exhibitors, products and countries is bigger than he had envisaged.

Piejura has a new line for the production of frozen fish fingers and burgers

Piejura is a Latvian company that deals with a range of products, which have been organised into three lines – small pelagics, whitefish, and salmon. Since 1995 when the company was established Piejura has regularly upgraded and modernised its processing plant, most recently in 2014, when, with support from the EU, it established a line for the production of frozen fish fingers and fish burgers based on whitefish and on salmon. Renars Indriksons, the export manager, says that the decision to invest in the production of fish fingers was because the Baltic markets

for these products is dominated by just one other producer and Piejura felt that this may work in its favour. The volume of production varies depending on the product, salmon for example, is about 50 tonnes annually, but the company can quickly and easily increase the volumes, when necessary as the processing factory has a capacity of 6-8 tonnes a day. The main production however is of canned items, including the well-known smoked and canned sprats. These are available in traditional as well as "easy open" cans and also cans with transparent plastic lids that can



The frozen fish fingers are made either from cod or salmon and are part of a range of items that includes canned products and cold-smoked salmon.

be peeled off. The latter combine the benefits of cans – sturdiness, long shelf life, stackability – with the transparency of glass jars that allow the product to be displayed. Extra care has to be taken to ensure the product is neatly and attractively placed in the can when using these transparent lids. While canned sprats in oil

are the most popular product the sprats are also available in tomato sauce. Other canned products are based on mackerel, herring and salmon where the fish may be combined with a tomato, chili or teriyaki sauce, be in oil, or in its own juice. Finally, there is also a line of cold-smoked salmon products.

Piejura, like many Latvian processing companies, started by exporting its canned products to Russia, however with the onset of the economic crisis and then the sanctions and counter sanctions, the company began to look for markets in Europe as well as the US and Australia, to spread its risks. Today the

company has moved from having 80% of its sales on one market to a more diversified mix where not more than 25% of the turnover can be attributed to a single market. The production is sold both under private label and under the company's own brand, Amberfish, in the ratio 70:30.

Sea Snacks – a healthier alternative to conventional snacks

For Arne Barrang and Kristian Horgen, partners in a restaurant in Oslo, decided to commercialise one of their ideas after seeing how successfully it was received by their customers. The product is a snack made from salmon skin, which is fried crisp and salted and made into chips. Mr Horgen says that the product, unlike most snacks, is relatively healthful as it still contains some of the nutrients that make fish in general a healthful product. The idea for the snack was born in the restaurant where a similar product proved to be very popular. The difference lies partly in the way the raw material is treated. For the commercial product it is important to remove the skin cleanly from the fillet ensuring that no pieces of flesh remain attached to the skin, says Kristian Horgen, as this can lead to off tastes in the final product.

The partners worked on the skin for a year sorting out the technical issues to get the raw material that they needed to create the chips. There were several issues that needed to be addressed, among them how to ensure that the skin became light and crispy when fried instead of rubbery. The skin is a delicate product and needs to be handled with care to get the right end result, explains Mr Horgen, but we are now expecting to start production by the end of summer this year with the product coming on the market in the last part of 2015. The product is not treated with chemicals or other additives though it is possible to add flavours to the product before it is fried, but the partners are planning to start with sea salt and then add flavours if the market shows an interest. It is also possible to marinate the skin

in, for example, teriyaki sauce, and then fry it, but that will only be considered later. We want to keep the product as natural as possible, says Mr Barrang, and if we add flavours or marinates before the frying stage we would also have to add some preserving agents. For the moment at least Sea Snacks will only be using salmon skin from which the scales have been removed, as, being Norway, it is available in the requisite quantities and sizes.

The chips attracted a lot of attention from potential customers at the seafood show, with representatives from over 30 countries evincing an interest in the product. Among them are several Asian countries such as Japan, South Korea, and Hong Kong, which have a long tradition for using all parts of the



The crispy fried salmon skin has attracted interest from several countries in Asia and Europe.

fish, and where consumers are familiar with similar products. But people from the Baltics and Russia have also shown an interest in the product as well as some from France and the UK.

Metalbud has branched into machinery for the fish industry

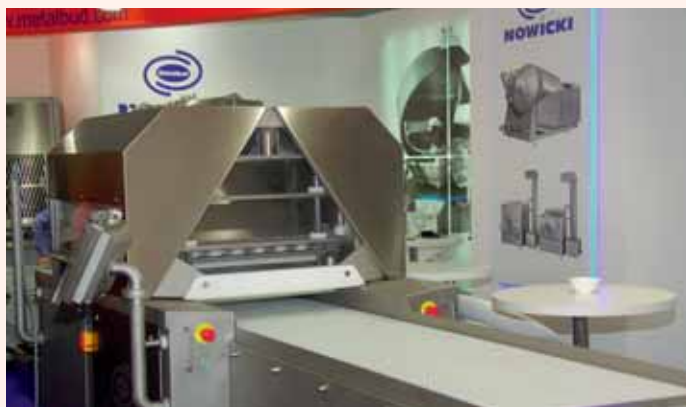
Originally a producer of machinery for the meat industry Metalbud is now also producing equipment for use by fish processors and is using fish fairs such as the Seafood Expo Global to display and

promote these machines. This year the company brought two injectors to the show, which have been specially designed to the requirements of fish processors. The injectors can be used with tuna, salmon, or herring, species,

which are often injected. The special design that the injectors have refers to the stroke, the needles, and the transport of the fish into and out of the machine. The injectors are designed for use with a salt solution but can also be used

to introduce other additives that improve the taste or colour of the product or prolong the shelf life.

According to Robert Kotynia, the sales director, the injectors were developed specifically for these



An injector that has been specially designed for the fish industry and is used to inject salmon, tuna, and herring.

three species based on the interest in these fish shown by some of their customers. Metalbud also produces tumblers for defrosting and cooking seafood, but which can also be used to marinate or cure the product. The tumblers come with different options such as cooling and heating systems,

and/or the ability to massage the raw material. The tumblers have been used in southern Europe for processing octopus, which needs to be cooked thoroughly before it can be eaten. Other items of machinery include grinders and cutters which can use frozen fish and seafood to make pastes that

can even be cooked in the same machine. Ice generators are also part of the Metalbud product portfolio. These can be used with freshwater or salt water and produce ice flakes with a thickness of approximately 1 mm and with a large surface area to maximise the cooling effect. Options with the ice generators include systems to disinfect the water supply by treating it with ultraviolet light, as well as to recover the heat from the compressor, which can then be used as an energy source. All the Metalbud machines are fabricated in stainless steel for durability and hygiene. The machines are also designed in different sizes, small, medium and large, so that irrespective of a company's size, Metalbud is likely to have the machine of the appropriate capacity. Altogether the product portfolio has around 40 products

each of which is produced with different capacities. Although the company has been producing machinery for four decades for the meat industry, since it started supplying fish processors it has discovered that some of the ideas developed for these customers can also be used by meat processors. In other words, there are mutual benefits from expanding into the fish business.

The company has agents in more than 50 countries around the world, but recently it has seen the most growth in Asia – in Japan and Thailand among others, and in South America. Metalbud insists that its agents have the skills and capacity to repair a machine within 24 hours unless it needs a special spare part. Customer care is very important for us, says Mr Kotynia, both before and after a sale.

Sustainability and innovation define Lumar

Lumar, a company that takes sustainability seriously, is also a serial inventor of innovative products. Alberto Romero Bermo, director of sustainability and sourcing, has come to the Seafood Expo Global to launch the company's latest offering. A tuna tenderloin wrapped around a stuffing based on vegetables such as peppers, and mushrooms, combined with herbs and frozen. The product can be removed from the freezer and cooked immediately, either in a frying pan, under a grill, or on the barbecue, for a couple of minutes on each side to give a healthful dish. The product has also won a prize for innovation at a recent frozen seafood event in Paris. A chef was hired to create different stuffings for the loin so there are different versions of the product, most of them using vegetable stuffings, but also one with bacon and dates. The product is

currently being introduced to the retail sector in Spain and Lumar is also showing it to clients in the UK and other markets where they see the greatest potential.

Lumar also has a line of products designed for children that combine fish with child-friendly products like pasta or rice or even vegetables as well as a sauce so that they can slowly get accustomed to eating fish. These too are frozen products, but are very quick and convenient to prepare. Lumar, says Mr Bermo, does not just produce innovative products but also considers itself one of the leaders of sustainability in Spain. We have been supporting the fight against illegal fishing over the years by working with European-flagged vessels that are responsible and well managed and monitored by the authorities. Although, now a processing company, Lumar has a background in



Lumar specialises in innovative frozen products based on tuna and swordfish sourced from sustainable fisheries.

the fishing industry and is familiar with the sector, its players, and the issues. It uses this knowledge to avoid all suppliers and all resources that may even be slightly tainted. Today the company has a roster of suppliers that it has been working with for a number of years and that are as committed to the fight against IUU fishing. Lumar works with its suppliers not only

as a buyer, but also by discussing issues such as MSC or other sustainability certifications. The main source of the raw material, primarily yellowfin tuna and swordfish, is the Spanish long line and purse seine fleets fishing in the Atlantic, and in the Indian Ocean and Mr Bermo is hoping to see some of his suppliers being certified to the MSC standard in the near future.

Iras sells its vacuum pumps around the world

A family owned company based in Esbjerg, Denmark, Iras has specialised in the production of vacuum pumps. These products, however, are used not only to move water, but to transport fish, including live fish, and to do it so gently that the fish are unscathed even though they may be relocated 100s of meters away. Pumps such as these are in demand both on fishing vessels and on land where they are used on fish farms and by the processing industry. Iras has been around for close to 70 years says Peter Rasmussen, the sales manager, who represents the third generation of the family that founded the firm. Vacuum pumps work by creating a vacuum inside a tank which sucks the fish and water in to the tank. When the tank is full, the vacuum changes to a pressure which pushes the fish and water out. To fish farms the company often supplies a combination of pump and grading machine, so the pump delivers the live fish to the grading machine, which sorts them by thickness. The sorted fish

fall into different chambers and are then carried by gravity to different tanks or ponds, while the biggest fish are harvested.

The pumps are generally not species specific as it is the fish size and weight that determine the size of pump to use. However in the case of tilapia even small fish require a relatively large pump to transport them, due to the shape of the body. Børge Rasmussen, the managing director, says Iras can offer 60 different models, so it is generally possible to find the appropriate pump. Another important parameter is the distance or height that the fish need to be pumped. A 3.5 kW motor can pump perhaps to a height of 8 m in total, 4 m of suction and 4 m of discharge, but the company has other machines that can move fish up to 2 km. The technology is essentially the same but the motor is much bigger. The range of pumps that Iras offers has motors that extend from 1.5 kW to 400 kW. Electric motors are the norm, as that is what most customers prefer



Iras' vacuum pumps can be used to transport fish both dead and alive from 8 m to 2 km. Customers include fish farmers, fishing vessels, and processing factories.

today, but the company can also offer diesel-powered and hydraulic solutions. Electric motors are easy to maintain, explains Peter Rasmussen, supply them with power and they run. Diesel engines are more complicated, they need more service, and more space, plus they need to be supplied with diesel, while hydraulic pumps, although we have redesigned the system to make it simpler, are still more demanding than electric motors. Another reason for the popularity of electric

pumps is that today fishing vessels have all the power they need to drive an electric pump, which did not use to be the case.

The durability of Iras pumps can be seen from the way they are used. We have customers who run the pumps for 16 out of 24 hours, says Børge Rasmussen, and some of them even run them continuously. This sturdiness combined with good service has enabled Iras to sell its pumps all over world.

Arba Commerce is increasingly moving from semi-prepared to finished products

Arba Commerce, a Croatian producer of sardines and Adriatic anchovies, traditionally exports its products to other countries around the Mediterranean. Recently however it has expanded its sales to Germany. There we are selling individually frozen sardines and anchovies either in a poly-bag or in trays through the retail chains, says Dolores Paunovic, the sales executive. Nikica Paunovic, the CEO, adds that the buyers are typically from ethnic groups that are familiar with

the product such as Turks and Greeks, but he is hopeful that over time ethnic Germans too will come to realise the health and nutritional benefits of these small pelagics and will start to consume them. Although Arba Commerce does not own fishing vessels it has a very close collaboration with the fishermen that supply it. They work only for us, says Mr Paunovic, so we are assured of a steady supply of fish. On the other hand, we are contracted to buy all the fish they catch, whether we need it or not.



Anchovy fillets produced from fish from the Adriatic. Arba Commerce has also started selling individually frozen sardines and anchovies on the German market.

We are processors and owning and managing fishing vessels is a completely different business. Now that Croatia has joined the EU its fleets are subject to the regulations of the CFP making it a more complicated affair to be a vessel owner. On the other hand acceding to the EU has made life much easier for processors, says

Mr Paunovic, we can buy fish in Italy or Spain, there are no borders, no physical veterinary controls, no demands for hundreds of papers. When we sell to other EU members now the list of documents has shrunk from a huge file full of papers to just a few. According to Mr Paunovic there is a general shortage of

anchovy in the market, which is pushing up prices. This has meant that Arba Commerce's production of finished items is increasing at the cost of the semi-finished products. The more the value addition the greater the return and with raw material prices increasing this is really the only way forward.

The shortage of raw material has also brought new customers from the retail chains knocking on the company's doors and Mr Paunovic is hoping that the quality of their production will encourage these new clients to keep buying even when anchovy is again available in large volumes.

Seagourmet is introducing queen crab to European markets

A Latvian-Norwegian project is exploiting the newly started fishery for queen crab (*Chionoecetes opilio*), also called snow crab, found in the Barents Sea. The fishery is in three areas, American Alaska; Canada and Greenland; and the Russian Far East, according to Sergei Ankipov, the CIO of the Norwegian branch of the project. In the open part of the Barents Sea, which is regulated by the NEAFC convention, vessels from Norway, Russia, and the EU have started to harvest the snow crab. Seagourmet established a collaboration between some Latvian vessels and a Norwegian company to deliver live crab. Currently a number of vessels, from Russia, Spain, and Lithuania, process the crab on board. This restricts the number of products that can be made to one, frozen sections. There is an established market for these frozen sections in the US, Japan, and China. Seagourmet wanted to do things differently and create a market for a new species as well as offer a new product for European markets. The crab would be delivered live from the fishing grounds to the nearest port (which was in Norway) and processed at a facility there, which

would also be used to store the live product, and distribute the production. We wanted to do live crab because it would be something new and different, but also because it would give the most fresh raw material. Queen crab is definitely a luxury, but it is more affordable than, for example, king crab (*Paralithodes camtschaticus*).

The company is also looking at selling frozen sections to other countries (Latvia, Poland, and other EU countries) where they will be further processed. Crab meat can be fresh, frozen or even canned. Snow crab has a delicate and sweet meat and Seagourmet is hoping to start by selling cooked and frozen sections which are essentially ready to eat and can be sold to the retail sector or to HORECA. Live crab on the other hand is aimed at southern Europe, Italy and Spain. But Peteris Pildegovics, the marketing manager, says there have also been enquiries about live crab from the Middle East, as well as Korea, China, and Japan. Live crab can be moved either in an aquarium or in special containers built to transport live crabs. Either way they need to be maintained at the correct temperature if they are to



The Seagourmet stand at the SEG was a popular destination for those seeking to sample queen crab meat in different forms, with an avocado dip or breaded and fried.

survive. At the show, Seagourmet organised a cooking and tasting session at their stand. We wanted to show some of the possibilities that snow crab offers in terms of how it can be prepared, says Mr Pildegovics. A couple of chefs prepare the snow crab in several different ways and serve it to the assembled guests. The response says Mr Ankipov has been very positive. We adapted our recipes to European tastes and have received enquiries not only about the products we are offering, but also about products we have not yet started on such as crab meat.

Other companies have shown an interest in the shells, which can be used to serve the meat.

So far the company has harvested 40-60 tonnes per week using pots on the seabed, which are loaded with bait. The depth of the water is 200-300 m deep. While the fishery is not yet regulated, the fishermen are careful to return small and female crabs back to the water. For the moment however there are Russian, Norwegian, and Latvian scientists researching the stock and a crab stock management regime is likely to be introduced before long.

Norfisk sees a lot of potential in the UK for smoked and fresh salmon products

Suempol, a leading Polish processor of farmed salmon has two daughter companies in Germany, Norkisk Berlin, a production facility, and Norkisk Wismar, a logistics and sales centre. In addition, there are production facilities in France under the Suempol name, and one starting up in the Netherlands. Marcin Wojciuk, managing director of Norkisk Berlin, says that Suempol is a family company, with a cost structure that enables it to compete with big corporates. This is what differentiates us from other salmon smokehouses. By opening production facilities in France, in Germany, and now in the Netherlands, the company is moving closer to its markets. French customers like to know that when they buy up market brands, the product is manufactured in France. Additionally, producing fresh packed salmon locally, gives the advantage of a longer shelf life. Smoked products make up 80% of the company's production, but it is the market for fresh salmon (portions in vacuum-packaging) that is growing most rapidly. Consumers find it convenient to buy a portion that is cleaned, boneless and easy to prepare and therefore demand for these products is

growing, not only in France, but also in Germany. While southern European markets in particular have traditionally showed a preference for whole fish in order to assess its freshness, this is now changing for two main reasons, according to Mr Wojciuk. One is that consumers do not have the time anymore to deal with whole fish, and the other is that they have increasingly come to accept that supermarkets can be relied on to provide high quality products.

Salmon is popular among consumers because it looks good, is tasty, and is easy to prepare. Norkisk is also seeing increasing demand for organic salmon, as some customers want to be able to offer fish that is as close to natural as possible. Although a niche, this too is a growing market. Norkisk sells its smoked fish under its own brand, but the fresh fish is typically under private label. As a producer Norkisk would naturally prefer to sell under its own brand. But there is no denying that under private label there may be several producers putting their fish in to the packaging, which may give somewhat uneven results,



Marcin Wojciuk, managing director of Norkisk Berlin, is seeing increasing demand for fresh salmon portions in modified atmosphere, a product Norkisk is well equipped to supply.

while under a brand there is only one and if the consumer likes it he can easily get the same thing again. Within Poland the market has yet to mature – people like salmon and sales are increasing each year, but the market is still relatively small.

Norkisk has realistic plans for its future. We want to be a bit bigger, with sales in more countries, says Mr Wojciuk, but we want to continue to be family owned, and above all to maintain our good customer relations. We will continue to produce fresh and smoked salmon and we intend to look

for markets outside Europe. In Asia, the company already has some sales of fresh and frozen salmon and it is also looking at the United States, where the exchange rate is favourable for imports from Europe, but mostly we feel that Europe still has a lot of potential, particularly in the UK, but also in France. The company has customers among the retail chains as well as the food service sector and anticipates that the biggest developments will be in the markets for fresh fish. The raw material is sourced internationally from Norway, Scotland, and even from Alaska.

New standards in white fish processing from Baader

Baader has been the market leader in the development and manufacture of processing machines for pelagic and demersal species for nearly a century. During these many years the company constantly set new trends in fish processing and further developed their products which are in operation all over the world. This year white fish

processing was at the centre of Baader's presentation in Brussels. The new powerful white fish filleting machine Baader 582 aroused a lot of interest among fair visitors. It was exhibited in combination with the Baader 59 which represents the state of the art in the field of white fish skinning. Both machines stand out for their high efficiency, perfect results and high material

yield. The computer controls of the Baader 582 constantly adapt all of the machine tools to the body contours of the fish which ensures smooth cuts, excellent yields and top fillet quality. The continuous fine adjustments mean that the effort of subsequent trimming is greatly reduced. Of special mention is the careful cut in the loin area which leaves the protective

membrane intact. Because the machine works without stickle or scraper knives processing is very gentle which is of particular significance in the case of fishes with softer meat. The black belly skin is perfectly removed.

The Baader 582 filleting machine also stands out for its user-friendly controls. Using the touch panel it

is possible to change between different white fish species without time-consuming adjustments or alterations, irrespective of whether it is cod, saithe or haddock. The skinning machine 59 was specially designed for these species. It removes the skin so gently that the exterior side of the fillet remains absolutely smooth. A special cut ensures perfect material-saving skinning results even at the tip of the tail. The fillets leave the machine stretched out and separated from each other which renders subsequent

realignment unnecessary and makes controls easier.

Comparable results and standards are also possible with the new white fish filleting machine Baader 588 which was developed for small and medium-sized white fish. This machine can fillet both fresh and defrosted fishes with soft meat – again with top results. In spite of the difficult raw material, throughput is about 40 fishes per minute. Fillet quality is excellent, with absolutely smooth cuts and no gaping after processing.



Regina Dedow, Marketing Manager. The new Baader 582 convinces users with perfect fillets and hygiene aspects. All relevant parts can be opened or removed for cleaning.

Biolan offers a quick test for histamine and sulphites



Joana Barrutia, Area Manager Europe and Asia. The analysis device costs about 9,000 EUR including the basic equipment. Its operation does not require trained staff.

Some fish and seafood products are subject to specific safety requirements that can only be sufficiently met through regular laboratory testing. However, this is not only time-consuming but also expensive. The Spanish company Biolan presented in Brussels a relatively simple method for detecting and measuring concentrations of histamine and sulphites which takes only a few minutes and is on top of that quite inexpensive. The rapid test that was developed and is produced and marketed by Biolan itself makes use of biosensors that react with high specificity to the two substances. Enzymes with bioelectric effect are used that react in accordance with the histamine or sulphite concentration. Or in short: the more histamine

molecules are present in the sample the more electrons the enzyme releases. This effect is measurable using an analysis device. A simple and substrate-specific measuring technique that stands out for its high sensitivity and speed. That is why the biotechnology company Biolan which was only founded in 2006 as a result of years of scientific research in the meantime does not only market its biosensor rapid test in the food sector but also in the health care and the wine industries.

Histamine detection, which is very important for tuna, mackerel and other fish species can be carried out in raw, frozen, cooked and canned products and even in fishmeal. The same applies for

sulphites that play a certain role especially in shellfish and crustaceans (shrimp).

Histamine testing is available for three measuring ranges (0-50, 0-100 and 0-1.000 ppm), each of which has an accuracy of plus/minus 10%. If the measuring device is calibrated after switching on (this takes about 4 minutes) the measurements themselves take between 2.5 and 3.5 minutes. A single histamine test costs 4 to 5 euros, sulphite testing about one euro less. The costs arise from the need for special chemicals, in particular the biosensor which has to be renewed after about one month. Users can take out a subscription at Biolan and are then supplied regularly.

Will Korean food be the next Asia trend?

When it comes to seafood and Asia people mostly think of China and Japan. Hardly anyone has South Korea in mind, although it is the third largest and third most important seafood market in the Asia-Pacific region. Average per capita consumption of seafood in South Korea is about 56 kg. With

a total population of nearly 51 million that adds up to just under 3 million tonnes of seafood that are required there every year. Demand for seafood is rising, the economy is booming and grew by 3.5 per cent again in 2014. In the 1960s South Korea was still an agrarian country with agriculture and fishing dominating

the economy. Since then, however, change has been rapid and South Korea is now an industrial country that sets trends with big corporations like Samsung or LG.

This change in the economy was not without consequences, for today South Korea – which was once self-sufficient – has to cover

nearly 70 per cent of its food requirements with imports. The situation in the fish and seafood sector is much the same with Korean production falling well short of demand. South Korea's seafood imports are nearly twice as high as their own exports. The country's demand for fish and various other seafood products



The Korean top chef Rob Park travelled to Brussels for the event to introduce his guests to some of the subtleties of this Asian cuisine.

is covered by imports from more than 90 countries. The chief supplier is China which supplied more than a quarter (27%) in 2013, followed by Russia (16%),

Vietnam (13%), the USA (6%) and Norway (3%). In return South Korea exported a share of its sometimes quite specific seafood products, mainly to countries within Asia. The most important buyer country is Japan which bought nearly 40% of Korean seafood exports in 2013, ahead of China (18%) and Thailand (10%).

Up to now Europe has not been very important for Korean exports. This is firstly due to the high demand of the South Korean population itself which leaves only a few reserves for additional exports, and secondly due to the nature of the products themselves, many of which are sooner tailored to customers in Asia and do not always meet European tastes. However, that might change now for the free trade agreement that was

signed between the EU and South Korea in 2009 creates optimum conditions for business relations, particularly since the EU Commission has lifted the “yellow card” which South Korea had been shown due to insufficient activities to put an end to IUU fishing. Karmenu Vella, the EU Commissioner for the Environment, Maritime Affairs and Fisheries, announced this in Brussels on the first day of the fair.

This opens up additional possibilities for interested importers and exporters for furthering trade relations in both directions, for South Korea's seafood requirements are just as great as the desire to increase its exports to Europe. A problem that exists at present however is the lack of deeper knowledge about product offers,

preparations and preferences on the other side. For this reason the South Korean exhibitors invited guests to a dinner during SEG at which 18 typical national seafood dishes were served for tasting. A lot of them seemed rather familiar and should stand very good chances in Europe, particularly since Asian food is in fashion and is much liked by a lot of consumers. Smoked oysters and algae products in the form of crisps or salads, but also tuna mackerel, bonito and tuna, snow crab meat, hiramé (flatfish) and Pacific herring, some of it suitable for sushi and sashimi. All the South Korean seafood products shown were of high quality, produced in accordance with the applicable international hygiene and safety standards and would likely appeal to a lot of Europeans.

Shellfish products from Linamar range from “natural” to “heat-and-ready”



Gaby Obendorf, Export Manager. Mussel products with a high degree of convenience that only have to be heated for consumption are among the highlights of the range.

Blue mussels, clams and cockles, oysters and goose barnacles constitute the core range of the Spanish supplier Mariscos Linamar. All of them are high-quality products with a high degree of convenience that meet the requirements of demanding

markets. In the case of the mussel products that primarily means that they are purified, free of contaminants, processed according to HACCP standards, and that they have passed stringent laboratory tests and hygiene controls. Mariscos Linamar (that counts

itself among the most innovative companies in the shellfish sector in Spain) fulfils all of these requirements. Their high professional status is confirmed by several certificates that the company acquired in recent years, for example ISO 22 000, ISO 9001 und IFS (high level). The traceability of the products through the supply chain is according to Linamar always ensured.

Originally Mariscos Linamar was founded in 1998 with the aim to trade shellfish in all product forms. However, from being a pure distribution company they over the years developed into a customer-oriented supplier with their own processing facilities and product lines, and today they offer high-quality products and service to their customers with whom they enjoy long-term close and trusting business relations.

Linamar's product portfolio offers nearly everything that is common and market-relevant in the shellfish sector. Additive and preservative-free, the live fresh products have a long shelf-life and are packed hygienically and leak-proof or in the traditional net bags. They are also available for self-service in MAP trays that are suited to preparation in the microwave (“heat and ready”).

Since April 2015 the Linamar team has had a new member: Gaby Obendorf who is probably already well-known to a lot of customers in Germany. She is to look after the German market where Linamar sees great growth potential. The first exhibition with Linamar was a success, reported Gaby Obendorf at the stand in Brussels. A lot of reputed companies from Germany's food

sector had tasted and been convinced by the quality and good flavour of the convenience products. It was sure to be of further advantage that Gaby Obendorf

not only offers products from Linamar but other products, too: "In fact it is almost the same range as before, from salmon to mussels, from shrimps to

surimi. One difference, however, is the higher share of convenience products, including a lot of self-service products." Linamar cooperates closely with Angulas

Aguinaga, one of the leading seafood companies in Spain, in a kind of "strategic alliance" and so also has access to their product range.

Salmco slicers can be cleaned without chemicals

The Hamburg company Salmco Technik produces cold and fresh slicers in numerous versions with a large choice of additional options that are precisely tailored to the wishes and requirements of their customers. So far, Salmco machines have been in operation for slicing 42 different fish species, although with that the range of possibilities is by no means exhausted.

In Brussels the company presented the Salmco SM 6418, a compact double lane fresh salmon slicer that was developed for the special requirements of a big customer in North Carolina. He had required that substantial parts of the machine should be easily removable to enable the cleaning of the complete system with just hot water, i.e. without the need for chemical agents. Salmco

had fulfilled these demands to the satisfaction of their customer, said Company Manager Johann Glösmann. Evidence of this was the large number of ordered machines that had proved themselves in tough work situations.

About ten components of the SM 6418 can be easily removed by hand and after cleaning just as easily reinserted. According to Johann Glösmann the removal and reinsertion of the parts does not take more than 20 minutes once the operator has the appropriate experience. To make it easier to find the individual large and small parts without having to search for long the Salmco designers developed a sort of frame in which every part has its fixed place where it can be hung or attached. The structured order on the cleaning



Company Manager Johann Glösmann. All the parts for cleaning have their fixed place in the cleaning frame of the double lane Salmco SM 6418.

plate facilitates washing and subsequent assembly of even the smallest parts.

Otherwise the SM 6418 meets the already tried and tested criteria of all the Salmco slicers with features like high slicing

performance (160/min), adjustable cutting angle (10° to 40°) and variable slice width (2 to 10 mm), as well as the machine's compact design. The electronic computer controls with their integrated heating system can be set and adjusted via a touchscreen.

Sirane has smart ideas for transporting and cooking seafood

Founded in the UK in 2003 by Simon Balderson and Ian Beardsall, Sirane is specialised in new packaging concepts and liquid absorbers. Their solutions are based on better adaptation of packaging, materials and products to save time, money and effort using materials that meet high hygiene standards and biodegradability requirements.

In accordance with this philosophy Sirane presented a range of packaging and other equipment

at SPE that covers the whole seafood journey 'from sea to plate'. For example, they exhibited two absorbent mats that can improve the transport of fresh fish products in completely different ways. Whilst the absorber Sea-Fresh SP has water binding qualities that enable odour-free, hygienic storage of the catch in fish boxes, the Sea-Fresh Ice Mat is placed over live products, for example crabs or flatfishes. It gradually releases moisture which improves the condition



Véronique Richard. The Sira-Cook Self-Seal bag is heat-stable. It is sealed and used for transport or for cooking in the oven or the microwave.

and freshness of the animals during transport.

A particularly original product presented by Sirane was a combined transport and ready-to-cook packaging. Depending on the chosen version this packaging is suitable for the oven, microwave, grill or for sous-vide cooking. In contrast to the transport packaging used so far in trade it is not welded but glued which is very time-saving and

renders the pack odour and leak proof. The Sira-Cook Supreme Bag is suited for the oven and BBQ for example. All the bags have a clear temperature-stable upper side which enables attractive presentation of the products at the retailer's. Apart from that, the customer can see the progress of the dish during cooking. The transparent bags can be colour printed, for example with logos and seals, additional information or instructions for

preparation. They are available in various sizes right up to a huge bag for whole salmon. The fishmonger can seal fish fillets in suitable spices or sauces in the bag and thus offer the customer a fresh product with high convenience. The two-chamber bags that allow separate packaging of fish and sauce are particularly clever. The separating seam between the chambers opens at a defined temperature so that the two components of the dish are

only combined when the fish is almost cooked.

Sirane's absorbent fat-trap mats keep the grill compartment in the oven clean and fat-free. The absorber, which is embedded between two sheets of aluminium foil, absorbs the fat emerging from the product and thereby supports a fat-free healthy diet. The fat-trap mats are available in the sizes 350 x 250 and 250 x 200 mm.

Karavela, Latvia's exporter of the year, looks south for new markets



Andris Bite, CEO, and Janis Endeles, Marketing Director, has brought a new line of products based on smoked salmon to SEG.

Having received the title "Best exporter 2014 - an export and innovation award" from the Latvian Ministry of Economics along with the Investment and Development Agency of Latvia in December 2014, Karavela Ltd came to the SEG with more than just impressive numbers and products to show off. According to its 2014 figures Karavela can boast of being the largest fish canning company in the Baltics, dealing chiefly with pelagic species like

mackerel and herring, but also salmon products. Last year Karavela produced 47 mio. cans and exported to 42 different countries with roughly 45% of export to western countries, 45% to CIS countries, and the remainder to the Baltic markets. We are currently 240 employees and had a turnover of €32,4 million last year. Karavela sells most of its cans under the Kaija brand in Eastern Europe, while western markets are dominated by private label products.

According to Andris Bite, CEO, and Janis Endeles, Marketing Director, Karavela has been going to the Seafood Show in Brussels for 10 years now. In the beginning it was mostly about looking for new customers and suppliers of raw materials - today the primary purpose for visiting the fair is to meet existing customers and suppliers. This year Karavela has brought a new line of products based on canned smoked salmon that the company hopes will be popular. "We at Karavela

are ambitious. We were the first to turn to the western markets. We believed that we could compete on a larger scale. And we have proved this possible! Now we see that our local competitors are moving in the same direction. That's good and makes Latvian products better known," says Andris Bite. We always try to focus on our strengths, and are very quick to adapt to changes that may happen on the market. For instance, consumption in Eastern markets are changing. Karavela needs to follow it! Our R&D department is working hard to test tastes. That is why 60% of the profits are reinvested to develop the company. Last year €800.000 was invested in reconstruction work and additional equipment. This year we'll invest about the same. But Karavela is also looking at new potential markets in southern Europe. Price there is not a factor. It is taste that is important. Therefore Karavela is collecting information about markets for its existing canned products, but is also considering the potential for tuna, a possible new product line. The big decision will most likely happen this year.

Frime is focused on cephalopods and large pelagics

Frime is a Spanish family owned company that started in 1937 and today specialises exclusively in cephalopods, marlin, swordfish, and tuna. Today the family's third generation has taken over the €65m company. Frime exports around 90% of its production, helped by the fact that it employs 180 persons from 33 countries. Frime has two factories in Barcelona and the annual production exceeds 10.000 tonnes with 90% of this being fresh tuna. As a multinational company fish are sourced from all over the world and exported to many countries. The primary markets are however European - with Italy, France, Belgium, Holland, Germany and the Balkan countries taking up a large share. Products are sold both as wholesale and retail.

In March 2015 Frime was MSC (Marine Stewardship Council) certified. The choice to become MSC certified goes well with the company motto; WE HAVE SOUL. This way we make sure there is enough fish for tomorrow, says Ljiljana Rudez. We have spent many years developing specialised products and as we focus on just a few species we have spent a lot of money on research and testing to ensure a product that is healthy. We also have very close connections with our clients and accommodate their every wish to make sure the quality delivered it as expected.

Frime has visited the Brussels seafood show since the beginning; sometimes with an individual stand and sometimes as part of the

Catalan pavilion. Frime decided to have an individual stand this year as the company has brought a large number of people including a chef to show how some of

its products can be prepared. The SEG is one of many shows that Frime frequents all over the world. Next on the agenda is TuttoFood in Milan in the beginning of May.



Third generation Frime owner, Salvador Ramon, providing service extraordinaire to its customers proving the Frime slogan; We have soul.

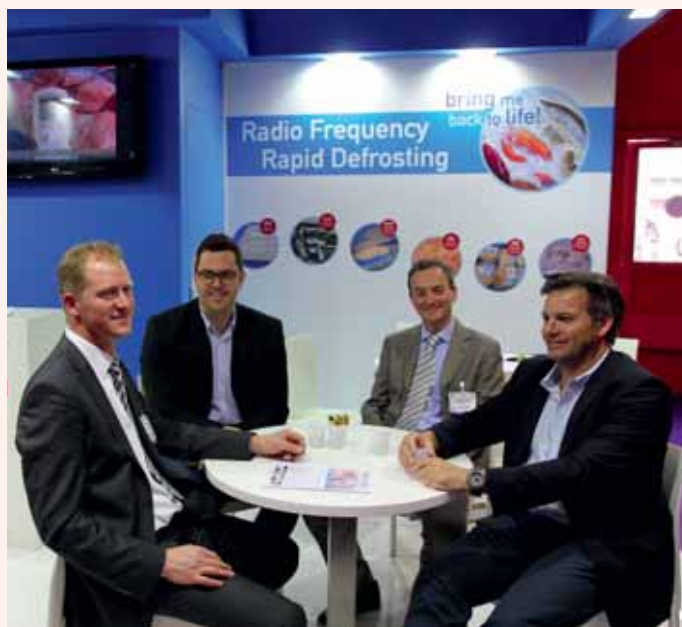
Stalam makes equipment to dry textiles as well as defrost fish

Founded in 1978, Italian Stalam started as a company focused on Radio Frequency (RF) equipment for drying applications in the textile industry. Over the next couple of decades it developed additional applications for its equipment and about 5 years ago introduced equipment specifically designed for tempering and defrosting frozen food including fish.

According to Ugo Nicoletti, Area Sales Manager, RF defrosting can rapidly generate heat within the product by creating intermolecular friction, which will rapidly heat the whole product mass regardless of its size, weight, shape and thermal conductivity. The main advantage is the significant reduction in the

defrosting time from hours/days to minutes. Other advantages are that the defrosting can be done directly inside packaging, product degradation is minimal, there is no drip loss, no deterioration nor bacterial growth, and finally RF defrosting requires much less floor space compared to traditional defrosting rooms.

Although STALAMs equipment for the food and fish industry is still small (ca. 20%) compared to the textile sector, the food sector has shown a steady growth of about 50-60% the last couple of years and thereby helped contribute to Stalam's €17m turnover in 2014. The company employs about 30 people in Vicenza with another 80 at the subsidiary in China.



Stalam's Radio frequency defroster can reduce thawing times from hours/days to minutes.

Akuvatur raises new Mediterranean fish species on a special diet

Turkey is best known for its production of farmed seabass and seabream, volumes of which have gradually increased to rival those of Greece, the other major producer of these two species. Less well known is that the Turkish aquaculture sector has been experimenting with the production of other species to diversify the product range and to try and expand the market.

Among the companies that are successfully producing and selling species other than seabass and seabream, one stands out. This is Akuvatur, a company led by a biologist Haluk Tuncer, that has practically since its inception in 1990 been interested in other species. Today Akuvatur has a commercial production of real dentex (*Dentex dentex*), pink dentex (*Dentex gibbosus*), and red seabream (*Pagrus caeruleostictus*). Akuvatur has two hatcheries, one each in Milas and Adana which supply seabass and seabream fry for sale on the market. Annual production of seabass and seabream fry amounts to some 50-55m of which 99% is sold to other producers. The broodstock for the different species is maintained at another site. In addition, the company has a feed factory, which supplies its own needs. The feed is a critical input to the production process as the formulation is unique. It includes a mixture of anchovies, shrimps, sardines, and squid to give the fish a particularly nutritious diet and one that is designed to mimic the feed the fish would have got in the wild. The feed is pelleted but the pellets are not

dry. The feed is freshly cooked each day and sent to the sites. As a result, Akuvatur's farmed fish taste a little different from those fed on a conventional diet. All the formulations are accomplished keeping the "fish in fish out" (FIFO) ratios within sustainability criteria. The company has fully integrated its production with broodstock, hatchery, on-growing, and packaging. The advantage of being integrated is that it can monitor the production at each stage and thereby ensure the quality of the final product. Akuvatur has two production streams; one is the production of seabass and seabream fry, which are sold to other farms. The other is the production of market-sized fish. The latter comprises only the new species and for these too the company maintains broodstock and hatchery so that it can monitor each step of the production.

Premium fish for discerning customers

The production of seabass and seabream fry is the bigger of the two activities contributing some 70% to the company's turnover, however Dr Tuncer would like to increase the share of the fish production from 30% to 40% of the total turnover in the next year or so. He adds, growing seabass and seabream fry is as profitable as growing the market-sized fish of other species, pink dentex, red seabream, and real dentex. Today the volumes of these other Mediterranean species is not very high, the production of pink dentex, for example, is about 200 tonnes. The



Duygu Tuncer, Administrative Manager, and Dr Haluk Tuncer, President, of Akuvatur, a Turkish company farming Mediterranean species other than seabass and seabream for the domestic and export markets.

company is considering curtailing the production of seabass in order to produce concentrate on the production of what it terms premium seabream. The word premium refers to the feed the fish is given, which comes from the company's own facility, and to the subsequent taste of the fish. About 150 tonnes of this species will be produced. We are the only company that has a commercial production of all three species, pink dentex, common dentex, and red seabream, though some other companies are producing red seabream. In fact, Akuvatur claims to be the only commercial producer of pink dentex in the world. While the fry production is sold to other companies on the domestic market, the market-sized fish is exported to Russia, USA, France, Bulgaria, and Italy. Among the company's customers are the retail chains Carrefour and Metro. Akuvatur

has a company in Thessaloniki, Greece, which is responsible for the sales and distribution to the rest of Europe.

The focus on premium products raised on special feeds has enabled Akuvatur to carve a niche out for itself both in Turkey and its overseas markets. Its fish commands a higher price compared to that from other producers. The fish is individually tagged with the name of the company, something "that takes courage," says Dr Tuncer, as it is a good way to promote the company if all the fish is of the requisite standard, but it can be equally damaging if there is a problem with even a single fish. Although the quantities are still modest, the ability to supply around the year fresh, high quality fish of uncommon species and taste, is what distinguishes Akuvatur from its contemporaries.

North Atlantic Seafood Forum, 3-5 March 2015, Bergen

Salmon underpins seafood export boom from Norway

Organised by Jørgen Lund, Managing Director of the event, Pareto Securities, Marlife and FAO, the conference hosted over 600 delegates from 44 countries and around 300 companies, reinforcing its reputation as the meeting place for senior executives in the seafood business.

Norway is the world's second largest seafood exporter (after China). In 2014 the country exported seafood worth NOK 68 billion, 12% higher compared to 2013. Exports of salmon reached NOK 43.9 billion (11% higher compared to 2013), which was the highest export level ever for salmon. Measured by product weight, Norway exported 999,000 tonnes of salmon in 2014, which was 4% higher than the year before.

The growth in Norwegian seafood exports continued throughout 2014 despite significant changes on the international market place and the closure of the Russian market, one of the main markets for Norwegian seafood. "Norwegian seafood has never enjoyed a stronger position on the world market. Despite the collapse of the Russian export market due to sanctions this year, the Norwegian seafood industry has shown it can adapt to meet the needs of new markets. The result has been record export figures for salmon, cod and mackerel", said Terje E. Martinussen, Chief Executive of the Norwegian Seafood Council.

In a constantly changing world, the seafood industry has to conform not only international competition, but also geopolitical changes that affect market access and trade patterns. This year the North Atlantic Seafood Forum celebrated its 10th anniversary.



NASF

The North Atlantic Seafood Forum celebrated its 10th anniversary with a comprehensive programme that included over 90 speakers.

The jubilee programme included more than 90 speakers across 8 sessions addressing the main theme of the conference "Global seafood trade and market access – Seafood in a new geopolitical role".

Fewer losses lead to increased Chilean production

The final comment from Lars Liabø, Kontali Analyse, at the NASF 2014 was *"The future is bright, especially in Norway, but surprises will always happen"*. His remark was prescient. There were indeed three big surprises last year: the closure of the Russian market, an increase in Chilean productivity and the fall in the

price of crude oil. Despite the food import ban in August 2014, Russia was still the fifth most important market for Norwegian salmon with NOK 2.2 billion (-48% compared to 2013), according to the Norwegian Seafood Council. In terms of volume, exports went down from 117,750 tonnes to 57,240 tonnes. Following the import ban in Russia, the EU's share of Norwegian seafood exports increased significantly. Measured by product weight, Norwegian salmon exports to the EU went up 11% reaching 830,000 tonnes, valued at NOK 30.6 billion, which represents an increase of 16% in value compared to 2013.

Lars Liabø compared his estimate of the 2014 salmon harvest

made at NASF last year, which was 2.14 million tonnes, and the actual one which was 2.23 million tonnes. The global salmon supply to the EU increased 9% to 988,000 tonnes, 6% for the USA to 39,200 tonnes, down 9% for Russia to 146,000 tonnes, up 8% for Japan to 64,000 tonnes and 14% higher for other countries to 618,000 tonnes. Chilean production performed much better than expected for several reasons. The production loss rate decreased from 22.3% to 18.6%, the yield/smolt increased from 3.4 kg to 4 kg and the harvest weight increased from 4.4 kg to 4.9 kg. Therefore, the total harvest was 102,000 tonnes higher than expected reaching 583,000 tonnes. The Russian import ban on salmon from Norway worked

positively for Chile and the Faroe Islands with increasing volumes from those countries. In 2014, the global market growth for salmon was about 180,000 tonnes (+9% to 2013), which was directed to various markets. Chile increased shipments to Russia (93%), Japan (50%) and other Asian countries (62%), while Norway increased to the USA/Canada (48%), the EU (10%) and other Asian countries (13%).

Europe is the world's biggest importer with 24% of the total value. In the last 4 years, there has been a 22% increase in imports reaching EUR 19.2 billion, whereas in terms of volume it reached nearly 8.4 million tonnes.

Increasing seafood exports from Norway to Europe were fueled by declining volumes of trade with Russia. The situation on the Russian market was presented by Børge Prytz Larsen, Severnaya Company, who highlighted the following main market challenges: new countries-suppliers filling the gap for the sanctioned countries, increased emphasis on domestic production, and credit limitations along with higher interest rates. The main change in the supply of fresh salmon was the shift to the Faroe Islands, for value-added salmon to Belarus, domestic salmon production and Chile, and for frozen salmon to Chile. The present state of the Russian salmon market is characterised by a 70% drop in fresh salmon sales volume, a 30% drop in value added salmon sales volume and a 40-60% increase in frozen salmon volume. Mr Larsen expects that sales will pick up going forward and that the fresh and frozen mix will gradually change. If the political climate improves, he said, a lifting of the sanctions cannot be ruled out.

How the Norwegian salmon industry adapted to the challenges

The ability of the Norwegian seafood industry to adapt to market changes, together with the strong global demand for salmon decisively helped Norwegian seafood exporters respond to the shutdown of the Russian market. In the session "The view from the Bridge - Global Seafood Industry Captains", Ole-Eirik Lerøy, the Chairman of "Marine Harvest", analysed the development of the salmon industry. Back in 2005, the industry discussed issues such as the lack of funding, anti-dumping measures, low political stability and the need for growth, he said. Today, the industry has reached a remarkable market development by opening new channels and developing new brands and product innovation. It has been a big step forward with impressive development on many markets, where salmon is often regarded as the main engine in seafood sales. Greater consolidation and more strict regulations characterise the industry today, a part of which is demanding fewer restrictions on growth in production. Currently, Norwegian industry regards environmental sustainability as the key to future progress, employment and profit. "In 2025, when the industry meets again, it may be expected that 100% of the industry is ASC certified, and the sea lice issue is solved," suggested Mr Lerøy.

Increased focus on environmental sustainability

Is the growth of the Norwegian salmon industry going to continue? Will 2015 be the breaking year? What will happen to prices? These were among the questions to which the NASF audience was



Jørgen Lund, managing director of the North Atlantic Seafood Forum

looking for answers from the experts in the industry. In the session "Global salmon supply, markets and prices", the prognosis, presented by Kontali Analyse, showed that in 2015, overall global production is expected to increase by 62,000 tonnes to 2.29 million tonnes. While production in Chile (-22,000 tonnes) and the Faroe Islands (-9,000 tonnes) is forecast to fall, Norway will be responsible for most of the increase (+50,000 tonnes). In addition increases are anticipated in the UK (+7,000 tonnes), North America (+23,000 tonnes), Ireland (+3,000 tonnes), Australia (+2,000 tonnes) and other countries (+7,000 tonnes). The main growth in the market supply is foreseen in Europe with over 1 million tonnes (up 6%), the USA (425,000 tonnes, up 8%) and other markets (678,000 tonnes, up 10%). While the supply to the Japanese market is expected to be stable at 64,000 tonnes in 2015, deliveries to the Russian market are likely to be further down by 44% to 82,000 tonnes, assuming that Russia will be closed to Norwegian salmon throughout 2015. As a consequence of the Russian ban, the growth needed on all markets to absorb this increased production

is estimated at 153,000 tonnes. A possible split could be an increase of 60,000 tonnes in Europe, 33,000 tonnes in the USA and 64,000 tonnes in "all other markets".

The conclusion of the session, global salmon supply, markets and prices, was that 2015 is expected to be a strong year with healthy demand. The industry would continue to focus on consumers emphasising convenience and tasty and healthy products for new markets. However, environmental sustainability will take centre stage as it is key to Norway's vision to "lead the blue revolution," and environmental challenges will require new and lasting solutions. Elisabeth Aspaker, the Minister of Fisheries of Norway, has called the seafood industry "an industry for the future" that can build on its knowledge, experience, expertise and technological solutions. These strengths will contribute to fulfilling the Norwegian vision by developing an industry that creates value in an environmentally responsible way.

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Norway exemplifies the blue economy

Knowledge-based management is key to healthy and sustainable growth

The fisheries and aquaculture sector in Norway is an important and growing part of the country's economy. Highly diversified in terms of types of production, species, products, and above all, markets, yet the sector still has the potential to increase its contribution to the economy several-fold. Steering this development is Elisabeth Aspaker, Minister of Fisheries, who outlines here some of the ways in which this growth will be realised.

Aquaculture and fisheries is expected to increase in importance for the Norwegian economy over the next thirty years in particular in comparison to the oil and gas industry according to a survey of companies carried out in Vestland. What are the factors that will contribute to this development and how can potential negative consequence be averted?

Oil and gas will still be important for Norway for many years, but as the growth in the petroleum sector is declining, other sectors must also contribute with larger shares to finance the welfare state.

A scientific report presented in 2012^[1] points at the potential to sextuple the economic turnover for the fisheries industry within 2050. Most of this potential is within aquaculture, but to be able to reach the potential, the challenges with lice, escapes and feed must be solved.

Within the wild-capture fisheries, the potential lies mostly within exploiting the resources better by developing new products, like for example products for the pharmaceutical industries, chemicals, health food, cosmetics, animal feed and bio energy.

It is also crucial for renewable resources to have good regulations in place, so that resources and environment are managed in a sustainable manner.

Norway is the world's largest producer of salmon, a carnivorous fish that feeds on fish feed made from fish meal and fish oil. The production of these two commodities has stayed broadly stable over the last decade and is unlikely to grow much in the future. Vegetable matter is increasingly replacing fish derivatives in feed, but it has an impact on the healthfulness of the fish. How can these conflicting objectives (increased salmon output, constraints on fish meal and oil production, lower omega-3 levels in fish) be reconciled?

The inclusion of fish meal and fish oil has decreased steadily the last decade, and feed for Norwegian farmed Atlantic salmon contains today approximately 70 % vegetable ingredients. This change of diet had not been possible without a substantial research effort. Such research will be important also in the future to ensure a healthy and sustainable feed for the industry.



Elisabeth Aspaker, Minister of Fisheries, Ministry of Trade, Industry and Fisheries, Norway

Fish oil is the main source of marine omega-3 fatty acids in fish feeds. When inclusion of fish oil decrease this lead to decreased levels of omega-3 in the flesh. However, farmed Atlantic salmon of today is still one of the best sources of marine omega-3 fatty

acids in our diet. (One portion (150g) weekly comprise enough omega-3 fatty acids to cover recommended daily intake for the whole week.) Importantly, as the salmon needs a certain amount of omega-3 in their diet, this secures that farmed Atlantic salmon

[1] <http://www.ntnu.no/documents/15827539/0/verdiskaping-basert-pa-produktive-hav-i-2050.pdf>



will always be a good source for marine omega-3.

The salmon farming industry in Norway, though in general a huge success, is still battling with some issues such as escapes, sea lice, which tend to increase with higher water temperatures, and diseases such as ISA (infectious salmon anaemia). What measures and policy changes are being contemplated to reduce these and other direct and indirect impacts of salmon farming on the environment?

This government has proposed a white paper to the Storting (Parliament) regarding the principles of a predictable and environmentally sustainable growth in the aquaculture sector. This white paper links the growth to environmental indicators in designated production areas. If the indicators show a good environmental status in a production area, the farmers in this area will be given the opportunity to increase their production capacity. If the indicators show a moderate influence from aquaculture on the environment, no growth will be given. Finally, if the indicators show an unacceptable influence on the environment, the farmers in the area will have to reduce their production capacity until corrective measures (new production technology, farming practice etc) has been implemented. Provided the support of the Storting, we will start by using an indicator showing sea lice influence of wild salmonids, and look into the development of an indicator regarding effluents of nutrient salts and organic matter. The system will be module based so that indicators of other influences on the environment can be added if necessary.

This system does not include indicators on escapees. This is because it is more difficult to link the amounts of escapees to the production capacity in a certain area. Escapees are therefore dealt with separately. This government will continue to focus on preventive measures. We have also allocated greater resources to the surveillance program since last year. This will give us a better understanding of how to prevent escapees and where it is necessary to remove escaped fish. A new regulation giving the responsibility to the industry to fund such removal has also been established this year.

Regarding diseases such as ISA, we will continue to battle this stringently. A division of the coast into production areas could also have a good effect on the spreading of disease in general.

While farming in marine cages dominates salmon production in Norway, growing the fish in land-based tanks is an activity that is being actively considered by policy makers and by the industry. What are the advantages and disadvantages of this kind of production as seen from the perspective of the ministry?

The advantage of land-based aquaculture is the ability to control all discharges like faeces and food spill. It is also easier to control the spreading of some diseases in land-based industry. For instance, sea lice will probably not be a problem. Finally, it does not require the use of public coastal areas.

However, land-based aquaculture is expensive to conduct due to the building costs in addition to the need to rent or buy properties to place these facilities. The need of water will also put restrictions on

what locations it is possible to use. All waste must be treated to avoid contamination of surrounding areas. All in all, I can see several advantages with land-based production, but acknowledge that it is a more expensive production than net-based production in the sea. The clear and cold waters of the Norwegian coast will always be our nation's best asset when it comes to the production of good quality Atlantic salmon.

Seafood is currently one of Norway's most successful exports. On some markets, such as the EU, however, Norway exports products with little or no value addition. Given this how can the value of Norwegian exports to the EU continue to rise as they have been in the past?

We are constantly looking for ways to enhance the value of Norwegian seafood exports, not only to the EU, but also globally. The EU is our most important seafood market, covering around 60 % of our total exports. At the same time Norway is by far the biggest seafood supplier to the EU, with a 20 % share of total imports. The EU market will continue to be our most important seafood market, but there is room to improve our trade relations. My objective is to help the Norwegian seafood processing industry's value creation and product development by improving our market access to the EU. We have a complicated and costly trade regime with 50 tariff free quotas, time-limited quotas and numerous tariffs that are virtually irrelevant. By removing these barriers, I am sure operators would find ways to enhance the seafood trade.

Norway continues to face difficulties with access to the Russian and Ukrainian markets

due to the Russian import ban and the persisting tensions in Ukraine. What does the loss of this market mean for the sector and what efforts are being made to compensate for it? As other countries step in to fill the gap are there concerns that this shift may become permanent? And if so, what would be the impact on the Norwegian fishing and farming sector?

Russia has for the past few years been Norway's second most important seafood market after the EU, accounting for about 10 % of the export value in 2013. In particular, Russia has been an important market for salmon, trout and herring, where the herring sector also has been hit hard by the problems in Ukraine.

The Norwegian government took several steps to mitigate the short term effects of the import ban. This included a temporary increase in the maximum allowable biomass for salmon and trout by 6 % and 20 % respectively until April 2015, in addition to increased flexibility of the herring quota from 10 % to 20 % in 2014. Both measures were implemented to give seafood companies more time to find new markets.

There is no doubt that Norwegian seafood exporters have suffered losses due to lower prices after the Russian import ban. Still, the export value of Norwegian seafood actually reached a new record high in 2014 with 68,8 billion NOK despite the Russian import ban, surpassing the previous record from 2013 by 12 percent. Norwegian seafood is exported to more than 140 countries worldwide, and exporters have done a great job of finding new consumers. After the Russian import ban we have seen an increase in exports to the



EU, Asia and North America. Seafood from Norway has a good reputation and I believe we can continue to develop new and existing markets to increase our export value from seafood.

Non-traditional markets such as the US and Asia are playing an increasing role as destinations for Norway's seafood exports. Apart from diversifying markets, what other strategies need to be implemented to grow the value of Norwegian fisheries and aquaculture exports?

There are two main ways in which we can increase the export value of Norwegian seafood: by producing more, and by making consumers willing to pay a premium for our products. As already discussed, we are aiming to produce a lot more seafood in the future. Salmon and trout now make up close to 70 percent of the export value of Norwegian seafood, but there is still a significant potential for growth. In the longer run, we will also look to farm other species in combination with salmon and trout, while continuing to take care of our wild fish stocks so as to utilize them to their full potential.

Marketing, product innovations and branding is up to the industry. It is the seafood exporters themselves that are best placed to know their consumers and how to appeal to their tastes, with the good help of The Norwegian Seafood Council. We as authorities have an important role however in providing a sound basis from which those business strategies can grow, by ensuring that the seafood is safe to eat and by managing our ocean resources in an environmentally sustainable way.

Research and innovation are essential to build knowledge-based industries. What are the main objectives of the master plan for marine research that will be launched in the fall this year? How will the plan encourage the development and commercialisation of ideas that ensure that the riches from the sea continue to be Norway's future?

I fully agree that research and innovation are essential to a knowledge-based industry like the marine sector. Norway therefore places a great importance on marine research, which is also a priority in the Government's long-term plan for research. Around 3.6 billion NOK is spent on marine R&D in 2013, and the Government has strengthened marine research both in this year's and last year's State budget. Even so, large and growing needs for marine knowledge makes it necessary to think through our marine research priorities, and to further develop our marine research policies. This is why my government will launch a master plan for marine research this autumn.

One of the questions we, like the rest of Europe, are grappling with is the question of how to transform more research into innovations. The plan will also point to areas where research and increased knowledge is fundamental to further development and growth. This includes research aimed at the development of existing and new marine industries, increased knowledge of the ecosystems in the oceans and knowledge development that can help solve environmental sustainability challenges in the aquaculture industry. Norway is an important player

in marine research internationally, and we wish to stimulate Norwegian scientific communities in the marine sector to contribute further to the international knowledge development on sustainable use of the oceans. With our strong knowledge base in marine research, we have the possibility to contribute with knowledge that provides opportunities for increased sea-based food production globally. Norway can also play a significant role with respect to knowledge-based management principles.

The Blue Growth Initiative launched by the FAO views marine economic activity as an important source of livelihoods and food particularly in coastal areas. Norway has been practising blue growth for many years now, so what does the Norwegian experience show to be the critical factors to ensure that blue growth is sustainable and inclusive?

Norway has always depended on the values from our seas. Therefore, taking care of nature and its production potential is inherent in our culture.

The consequence of this dependency is that we have always had to view our marine sector as an economic activity where both the caretaking of the productive areas and stocks and the income generating have been at focus for government policies and management measures.

Therefore, we have throughout the years developed a fisheries management model where the basis is management strategies for our major fish stocks, implemented by the advice from ICES on how to meet the goals of the

strategies with complementary national regulations.

In parallel with this quota based fisheries regulatory model we have also permitted the fishing fleet through self-financing schemes to reduce the number of vessels, and by this increase the catching opportunities and the income level for the fishermen. With the strong Norwegian economy and very low unemployment rate, the fisheries sector can only survive as a "backbone industry" in our coastal communities if the economics of the sector provides a competitive alternative to other economic sectors.

Our new industry, aquaculture, has had and still have a steady growth. The sector has from its start been kept under government control through sets of management measures. There are still environmental concerns which unfortunately is unavoidable with food-production in an open nature setting, as is the case with marine cage-based aquaculture. As mentioned before, my government has taken steps to address these concerns. The history of the growth and success of Norwegian aquaculture may be characterized with two words "Controlled Growth".

The common denominator for both fisheries and aquaculture is "knowledge based management". It is implemented through large and scientific leading government financed research institutions, that have the ability to be in the forefront of the sector development, both in fisheries research, population dynamics, aquaculture, fish health as well as food safety.

All this factors together constitutes the basis for Norway as a leading blue economy nation.



Norwegian fishing vessels target a variety of whitefish, pelagic, and crustacean species in the seas surrounding the country.

Committee recommends ways to secure the future of the **fisheries sector**

Greater freedom could give a more competitive industry

The Norwegian seafood sector had another dream year, the second in a row, in terms of its export performance in 2014. Overall, the country's seafood exports at NOK68.8bn (≈EUR8.2bn) represented a 12% increase over 2013 and this despite the sudden closure (for political reasons) of their biggest market, Russia, in August last year.

Exports of Norwegian seafood can broadly be divided into salmon and trout, whitefish (primarily cod), pelagic fish, and crustaceans. Salmon dominates the export figures. Norway produces almost 55% of the Atlantic salmon sold globally, earning it the sobriquet "Norway's Ikea" from the Norwegian prime minister. In 2014 the

export value of salmon increased by 11% to reach NOK43.9bn, a new record. Volumes grew 4% to reach just under 1m tonnes.

Whitefish exports in 2014 reached their best level ever increasing by a fifth, year on year, to NOK12bn. Exports of cod in various forms, fresh, frozen, and as clipfish, accounted for the bulk of

whitefish exports helped by an increase in cod prices after years of decline, and larger volumes of fish. Clipfish is also produced from whitefish species other than cod including saithe, tusk, and ling, and the combined export of clipfish in 2014 was also at an all-time high at NOK3.7bn, nearly a fifth more than the year before. Exports of dried fish and salted

fish also increased, by 23% to NOK900m in the case of dried fish and by 18% to NOK909m for salted fish. Frozen whitefish exports either whole or as fillets also made substantial gains reaching a value of NOK4.4bn, while fresh whitefish exports increased by 23% to NOK2.4bn. While exports of pelagic fish rose in total by 9% to NOK7.5bn the



FHL/Øyvind A. Haram

Clipfish is typically made from cod, but can also be produced from saithe, tusk, and ling.

growth was mainly attributable to mackerel, which increased 43% to NOK4.1bn. Exports of herring, the other main pelagic species, on the other hand dropped 14% to NOK2.7bn, due to smaller quotas and the loss of the Russian market. Exports of crustaceans, both raw and cooked, climbed by almost a quarter to NOK1bn helped both by a higher unit price and by larger volumes. The latter increased by 25% to reach 38,000 tonnes (Directorate of Customs and Excise; Statistics Norway; all 2014 figures unrevised).

Seafood makes a valuable economic contribution

Norway's coastline is punctuated with fjords, bays and islands giving it a coastline almost 101,000 km long. Fishing is a traditional activity and over the last half century or so Norwegians have discovered that their fjords are the perfect location for fish farms. This bounty from the sea, both wild and farmed, has been well used. In 1990 agriculture and forestry accounted for 2.4% of Norwegian GDP while the share of fishing and fish farming was 0.6%. Today, twenty-four years later, agriculture and forestry account

for 0.6% of GDP, while fishing and fish farming have increased to 0.9% or NOK28bn. As in other coastal nations, most of this activity is in seaside communities, where it has a disproportionate influence being sometimes the only source of livelihoods. Fishing and fish farming directly employ some 14,000 people, but over the years as these two industries have become bigger, more hi-tech, export oriented, and professionalised, a cluster of industries, institutions, and organisations, with strengths in technology, services, logistics, research and development, and finance etc., has evolved to serve the fishing and aquaculture sector. Thus, significant indirect employment can also be attributed to fisheries and fish farming.

Seafood comprises a sizeable chunk of Norway's exports. In 2014 the fisheries and aquaculture sector generated 7.7% of the total value of Norwegian exports, behind fuel (64.5%), machinery and transport equipment (9.6%), and almost level with finished goods (7.9%). The share of seafood exports in the total shows a gradually increasing tendency. This is a trend that needs to be encouraged particularly as

growth in Norway's biggest export earner, fuel and related products and services, is starting to stagnate. Elisabeth Aspaker, Minister for Fisheries, said in a speech at the beginning of the year that falling oil prices are a reminder that Norway faces a restructuring of its economy from one based on oil and natural gas to one that is greener and more knowledge-based. Many of the prerequisites for an expansion in the fisheries and aquaculture sector are in place, such as continued global demand for Norwegian seafood, a highly flexible sector able to respond rapidly to changes, and a reservoir of experience within seafood production, marketing, and sales. However, the seafood industry faces a number of challenges that will need to be addressed if it is to continue to maintain its position as a pillar of the Norwegian economy. Recognising this the government appointed a committee last year to carry out a study of the sector and make policy recommendations that would ensure its future growth and profitability.

Better information on stocks would have a positive impact all along the value chain

The industry is based on fish derived from capture as well as aquaculture. Capture fisheries in Norway can be broadly divided into five groups: groundfish – mainly cod, haddock and saithe; flatfish and other demersal species – primarily Greenland halibut and redfish; pelagic fish for human consumption comprising mostly mackerel and herring; pelagic fish for fishmeal and fish oil; and crustaceans such as deepwater prawn and king crab. The aquaculture industry is based overwhelmingly on the production of salmon. Wild fish

stocks are a national resource that needs to be exploited sustainably. The emphasis on sustainability comes both from the need for stocks to endure so that they are available for future generations of fishers, as well as because supermarkets are increasingly insisting on products from sustainably exploited fisheries. Sustainable harvesting calls for reliable information about the stocks and the ecosystems to which they belong. Generating this information is a difficult as the ecosystems are highly complex and are affected by different factors, many of which are still not well understood. This uncertainty leads to the need for precautionary principles to try and avoid over-exploiting stocks. The lack as yet of precise knowledge about stocks has meant that fish quotas have tended to fluctuate making it more difficult for companies to plan and manage their activities as the volume and quality of the fish can vary significantly.

Fluctuating quantities of fish are a challenge for both the fishing fleet and the processing industry. Stable volumes of fish spread evenly throughout the year would enable the catching and processing sectors to supply their customers regularly, optimise the utilisation of capacity, offer secure employment around the year, and would lead to a higher degree of predictability in the whole supply chain. However, many Norwegian fisheries have catches that vary significantly with the season. In addition, the weather and other natural conditions at sea also have an impact on catches leading to even greater variations. The supply chain builds extra capacity in to the system to take into account periods when there is a lot of fish. The corollary is that the extra capacity lies idle in periods when



there is little fish. However, when exploiting a natural resource like fish it is virtually impossible to prevent these variations in capacity utilisation. There may be biological or other natural reasons for the varying abundance of the fish at different times of the year, but the structure of quotas can also contribute to these variations. For example, vessels with bigger quotas will typically spread their catches over a longer period reducing the variation, while the reverse might be the case for vessels with smaller quotas. Variations in catches can also be attributed to variations in the quotas, which in turn are determined by estimates of stock sizes. A further reason for the irregularity in the supply of fish is that landings in many fisheries are concentrated not just in terms of time but also in geography. Employment is also heavily affected by the seasonality of catches, particularly in the processing industry where spikes in employment and unemployment are common. As the processing industry cannot offer steady employment it sometimes struggles to hire Norwegian staff and therefore hires workers from outside Norway, who work for a season and leave again. Among the challenges is the ability to attract highly educated employees to the often remote areas where the industry has its operations. These employees contribute to the development and implementation of innovative technologies that increase the productivity and efficiency of the industry.

Eliminating unreported fish and excessive bureaucracy will give greater efficiency

Unreported fish, though not a serious problem in Norway, has been shown to exist to some



FHL/Are Kvistad

Salmon farmed in cages in the Norwegian fjords is exported to destinations all around the world.

degree. This naturally is also a challenge for the industry. For both vessels and the processing industry there are financial incentives behind not reporting or under reporting fish. The practise has consequences for the sustainability of fisheries as the data on which quotas and catches are based becomes more unreliable if unknown quantities of fish are not registered. However, it also means that vessels and processing establishments are no longer competing just on prices, quality, marketing, or other legitimate criteria, but that the rules are being twisted so that some companies enjoy an unfair advantage over others. In addition, illegal behaviour by just a few companies can jeopardise the reputation of the entire industry if reports about unreported fish are discussed widely in the press.

Companies in the fisheries sector have to comply with many different regulations that are

policed by different administrative organs. This places a bureaucratic burden on small companies requiring them to set aside scarce resources to complete paperwork and similar tasks. Reducing red tape is thus another of the challenges facing the sector. A greater problem may, however, be the difference in weighing practices for pelagic fish around the North Sea. This can lead to distortions that cause unequal competition between companies from different countries catching the same species. The way forward might be for different countries to harmonise their legislation in this area, so that companies from all countries are working with a common set of rules.

Enabling greater vertical integration could increase productivity in the sector

Effective first-sale markets are an important part of seafood

sales with regard to distribution, control and efficiency. First-sale markets can be organised in different ways. The two extremes are auction based markets with a number of buyers and sellers, while at the other end there are vertically integrated companies, where all the links in the value chain are controlled by a single entity. How the market is organised can have an impact on profitability and value-addition of the companies in the chain. Vertical integration can be an advantage, when there are strict customer requirements or when quality, price or volumes of raw material are uncertain in which case a company might prefer to exercise greater control over the raw material. Companies that have invested heavily in capacity will want to ensure a regular and adequate supply of raw material so that this capacity is not lying idle and therefore may also prefer vertical integration. Further, companies that supply



supermarkets, which have strict quality, delivery, and traceability requirements, may also prefer vertical integration. However, Norwegian legislation distinguishes between vessel owners and processors and the latter may not own a majority stake in the former, though today processors have varying degrees of cooperation with vessel owners. The rules governing vessel quotas also limit the size of the quota, and the portfolio of species that may be caught, as well as the type of gear that can be used, although in recent years these regulations have been relaxed to some degree. In Norway the fish sales organisations are responsible for the first sales of fish. These organisations are also responsible for monitoring the landings when the vessels arrive in port and supplying information on landings to the authorities. There is one organisation for pelagic fish and five others for demersal species covering

different areas of the country. This role played by the sales organisations is laid down by law. These organisations determine the sales conditions, which can include payment terms and sales fees, but can also limit the possibilities for sale by auction or for processing companies to strike deals with vessels. This has an impact on the negotiating power of buyers and sellers, as well as on the competitiveness of processing companies and limits also the possibility for greater vertical integration.

Referring to studies carried out on raw material quality the committee mentions that a significant proportion of the fish is of sub-optimal quality, particularly in the demersal fish segment. However, the way the market is organised today and the minimum price that fishers are guaranteed makes it uncertain as to whether the fishers have the right incentives to improve the quality of

the fish. These factors may also have an impact on the seasonality of fishing so that a different market organisation might give a less seasonal fishery, but one which is more evenly spread out over the year. In general these limitations may result in a less than economically ideal market organisation.

More predictable growth in farmed salmon output should increase value addition

In the aquaculture sector the challenges are somewhat different. Atlantic salmon is the main farmed species with production in 2014 estimated at almost 1.2m tonnes. Exports amounted to almost 1m tonnes of which the majority was fresh or frozen salmon. A modest amount of fish is further processed mainly for domestic consumption. The industry however does not face quite the same challenges of

market organisation as is seen in the capture fisheries. Salmon production is governed by legislation that determines the maximum allowed biomass (MAB) per production license in order to protect the environment. This restriction coupled with swings in the market for salmon, and biological variations has resulted in fluctuations in salmon production from year to year. This has given rise to steep variations in prices that can have negative effects on the whole value chain and can ultimately restrict demand for salmon. Planning production also becomes more difficult as the production process is a long one and changes take time to implement. Thus, fluctuations on the market as opposed to steady growth make it more difficult to adjust the capacity of production and of processing. As in capture fisheries, salmon production is also affected by natural conditions such as water temperature which in turn has an impact on when the fish is harvested and could lead to less than optimal slaughtering and processing. Administrative regimes such as the rules on MAB also determine when the fish is slaughtered and imply that slaughtering and processing capacities may not be used optimally giving rise to additional costs as well as consequences for the workforce.

The sector has abundant advantages...

Seafood is one of the world's most internationally traded commodities, with more than 200 countries reporting exports of fish and seafood. Despite this increasing internationalisation and the resulting competition, a growing population and increasing demand for seafood should generate opportunities for the



Nyhetsfjerner/FHL

As technologies have advanced farming cages have become bigger and more robust, approaching 60 m in diameter and able to withstand the weather conditions in the North Sea.



Norwegian fisheries sector. Global population forecasts estimate the world's population at 8.1bn in 2025 and 9.6bn in 2050. Much of this growth will come from Africa and Asia. Increasing urbanisation, prosperity, and awareness of the benefits of fish consumption are likely to increase demand for seafood. However, international competition is also likely to sharpen, with farmed species like pangasius, tilapia, seabass and seabream produced in higher volumes at lower prices and closer to the market. In fact exports of seafood from the developing world have increased in value from 34% of total seafood exports in 1982 to 54% in 2012. On the other hand developing countries are increasingly absorbing imports from developed nations both because processing work is outsourced, but also for consumption on the local market. The Norwegian seafood industry caters to highly demanding customers that place strict requirements on their suppliers. The widespread use of technology and a workforce that is well educated are among the reasons that Norwegian companies in the seafood sector can produce to high standards.

...including access to deep capital markets

The seafood industry in Norway has traditionally been a family-run affair with many small and medium sized companies, in which family members play a leading role. Being family run has advantages in the form of tight control, the ability to plan and implement for the long term, and the aligning of interests of the owners and the managers as they are usually one and the same. However, being

family run can limit access to the capital necessary for the company to invest and grow. To overcome this some companies have started listing themselves on the Oslo stock exchange. Listing has several advantages. The more seafood companies that list the easier it is for the industry to raise capital as the market becomes more liquid. Companies that list are required to publish information about the company and submit their results on a regular basis. As the market for seafood shares develops it foment an interest from analysts, who analyse the sector as well as individual companies in terms of the underlying economics and profitability, which in turn attracts investors, who can now compare returns from the seafood sector with other sectors. There is thus more transparency in the industry and investment and other decisions companies make, need to stand up to scrutiny. This forces companies to make economically rational decisions and also generates wider interest in the policies and risks that govern the sector as they have an impact on a company's ability to raise money on the market.

Norway also has one of the world's most efficient seafood marketing machines in the Norwegian Seafood Council. Funded by a levy on exports the council studies potential markets and conducts generic marketing campaigns for Norwegian seafood. The benefits of generic campaigns are likely to vary from one company to the next and the overall advantage to the industry needs to be evaluated in terms of costs and benefits. Norway thus has several advantages on which to build that should enable it to retain its position as the

world's second largest exporter (after China) of fish and seafood. These include access to highly productive and unpolluted waters, properly managed resources, a well-trained and efficient workforce, and access to capital markets.

Making the industry more efficient, competitive and profitable

The committee's recommendations were divided into three broad categories. The first of these included education, knowledge-based production, research and development, and marketing and promotion activities. Better data collection and analysis would improve information about fish resources giving rise to more accurate figures for quota distribution. Academic programmes relevant to the seafood sector offered at universities and other academic institutions should be strengthened and degrees offered from undergraduate to doctorate level. Innovation within the different branches of the seafood industry is dependent on the qualifications and experience of the employees. In addition the high cost of labour in Norway means that employees have to be highly productive. A high level of education is one of the ways to improve productivity. Innovation will also benefit from research and development activities where industry collaborates with research bodies to investigate, test, and implement solutions. In addition, the committee opined that the promotion work carried out by the Norwegian Seafood Council probably contributed to maintaining a degree of diversity in the processing industry as its

generic marketing efforts were possibly more beneficial to the small and medium processors.

The second category encompassed the monitoring of the catch and first sale markets, food safety, and working conditions in the industry. Closely monitoring landings and eliminating as far as possible unregistered fish as well as keeping an eye on food safety and working conditions will mean that companies compete on legitimate parameters rather than exploiting unfair advantages. As a result more productive companies will thrive while less effective ones will cease to exist.

The last recommendations relate to the economic organisation of the value chain for seafood and are possibly the most controversial. Within the committee a majority recommended that fishers should have the freedom to choose the gear and vessel type, and that quota ceilings on vessels should be removed. This would lead to reduced costs and a more effective and productive fleet. Another recommendation was to allow the processing industry to own fish quotas to enable better coordination between the fleet and the land industry to give a higher efficiency and profitability. Regarding the first sales market for wild catches the committee was divided on the issue though the majority suggested neutral markets, while the rest advocated continuing with fisher-owned sales organisations, but with some modifications. In sum, the committee's recommendations should simplify the administration of the sector, yet maintain the sustainability of fisheries, and increase the competitiveness of the seafood industry.



Improved transport links will bring fish from the Russian Far East to western Russian consumers

Northern Sea Route a possible solution

Eurofish held a meeting with Ilya Shestakov, Deputy Minister of Agriculture of the Russian Federation and head of the Federal Agency for Fisheries to discuss areas of cooperation both with the administration and the industry. Mr Shestakov also answered several questions about developments and priorities in the Russian fisheries and aquaculture sector.

One of the tasks of a new state programme *Development of the Fishery Complex* for the years 2013-2020 is increasing the level of fish and seafood catches. How can growth in the fishing sector be conditioned? What are the plans to optimize the existing quota distribution mechanism? What are the main elements of this mechanism?

In 2014 and the beginning of 2015 some changes were introduced to the State Programme focusing on developmental support for areas such as resources research, aquaculture, and the development of fisheries infrastructure. The development of commercial fish culture is important as regards import substitution. The programme aims at encouraging private investment in construction of fish farms, fish processing and storage facilities, and fish feed and stock material factories. Sturgeon farming is a national priority and an area of special focus. One of the most important areas is enhancing research in order to increase catches and improve aquaculture.

By 2020 we intend the volume of catches of fish and seafood to grow to 4.46 million tonnes, and aquaculture production to double to 315 thousand tonnes. The volume of fish production will



Ilya Shestakov, Deputy Minister of Agriculture of the Russian Federation and head of the Federal Agency for Fisheries

reach 3.97 million tonnes, and average per capita consumption of fish and fish products in Russia will be above 22.7 kilos a year. According to preliminary estimates, in 2014 it was 22.3 kilos.

In 2008, fishing quota shares were distributed based on historical catches for a term of 10 years. Amendments to the Fishing Law

under preparation now propose to introduce additional requirements for quota holders. The threshold for achieving quotas is planned to be raised from 50% to 70%. Non-compliance with this requirement for two consecutive years will be considered grounds for early termination of contracts. At least 70% of the quota volume will have to be utilised using own

or leased fishing vessels. This will help eliminating 'quota renters'. Besides, starting in 2018 we propose to prohibit fishing on vessels that have not passed customs clearance. However, before it we will complete a tax amnesty programme for such 'port avoiding' vessels.

We are planning to introduce legislative measures facilitating



the development of coastal infrastructure. The main task is to stimulate those who want to land fish on the Russian shore for processing and trading. With this view we propose to give them priority in getting quotas: those who want to bring the catch to our shore will get a bigger volume.

The imposition of a food embargo may be seen as a turning point for the sector optimisation and new opportunities for Russian companies. What are tendencies in the sector? Has a share of domestic raw materials grown in fish processing? What, in your opinion, is a positive effect of the embargo in the fishery sector?

Yes, the current situation has drawn attention to issues of import substitution and food security. Several administrative measures are being considered aimed at lowering logistics costs when fish products are delivered from fishing grounds to central Russia; improvement of the quality of domestic production; popularization and increase in demand for domestic fish products; development of trading infrastructure; and promotion of commercial fish culture.

Russian companies annually harvest 4.2-4.3 million tonnes of fishing resources. Generally, without considering the assortment, it is enough to provide the population. Now with a decrease in imports a process began of refocusing domestic products to the home market. As of year-end 2014, the volume of Russian fish exports decreased by 9.5% compared to 2013 and equalled 1.7 million tonnes. Imports lowered by 12.8% to 885 thousand tonnes. Consequently the share of domestic fish products on the internal market increased to 79.4%. In 2013 the



The recently held *Fish Week* festival in Moscow demonstrated several interesting ways of preparing and serving fish.

indicator was 78.2%. Speaking of this year's trends, for the first three months the volume of fish exports decreased by 10.7%, and the catch volume by Russian fishermen grew by 3.3%.

As for raw material supply to fish processing factories, it was a difficult period when some processors had to quickly look for new procurement sources. The process began at the end of last summer and the share of domestic fish in supplies started growing. Countrywide the volume of fish production grew by almost 14% in January-February.

The logistic chain to deliver Far Eastern catches to the west of the country is the longest internal supply chain in the world as it corresponds to the size of Russia. Over recent years attempts have been made to optimize the infrastructure,

to improve fish delivery conditions, etc. Which measures, in your opinion, have been most effective and what are the changes in the infrastructure and logistics of the fishery complex? Is it currently possible to create a single transportation chain from the Far East to the central regions of the country?

The first *Fish Week* festival that took place in Moscow in April 2015 showed that the problem to deliver Far Eastern fish to central Russia can be solved – if only there were a demand. Before it fishermen would not even consider western Russia as a sales market, they doubted that fish could be consumed here in volumes that would make transportation cost-efficient. Besides, they could not make their way to retail outlets that got used to working with suppliers of imported products. The festival

demonstrated a different reality – the demand for Russian fish exceeded all possible expectations, retailers and restaurateurs started negotiating direct contracts with fishery companies. It certainly gives ground for optimism and motivates to move further on.

Today we are working in several directions. One of them is levelling railroad tariffs on fish transportation in reefers and general-purpose containers. The quality of fish is best preserved when the fish is transported in reefers. Lowering the tariff to the level of general-purpose containers might raise the competitiveness of the product and ensure high quality at a fair price.

Fish transportation from the Far East to central Russia along the Northern Sea Route could be an alternative to railroad deliveries.



The route could significantly reduce time and cost expenditures. As part of the development of the Arctic regions it is planned to build new icebreakers, then the cost of ice-channelling must decrease. At the same time, it is important to organize interaction within the Arctic regions along the route so that we could provide loading on the way back. The project realization will depend on the regions of the Russian Federation in this area. Now it is often more profitable for fish suppliers to bring their load sailing round Asia and Africa.

Besides, to make the fish logistics more economically viable it is necessary to develop infrastructural centres for product transshipment and storage, both in the Far East and in central Russia where we need large hubs. A project design of a distribution centre like this is being prepared now in Vladimir Oblast. We have also chosen six sites for infrastructural centres on the basis of existing sea fish ports.

Traditionally the aquaculture sector in Russia has had a huge potential in terms of fish culture volumes. As you have mentioned, it is planned to increase the volume of fish culture to minimum 315 thousand tonnes by 2020. What, in your opinion, are the mechanisms to reach the planned figure? Which measures will be taken to consolidate the players in the sector (administration, production companies, research, etc.) in order to raise the performance?

It is true that a great variety of water reservoirs and a favourable environmental situation provide

a good opportunity to culture various fishes and seafood. However, commercial aquaculture has been neglected for quite a period of time and now it only starts developing. The share of commercial aquaculture is about 3.5% in total catches. Now we have a classifier for fish culture and a form to collect statistical data on aquaculture throughout Russia. Meaning that when making economic evaluation we will be able to use comprehensive statistical data.

As I have already mentioned, a new separate sub-programme *Development of Sturgeon Farming* is aimed at increasing volumes of artificial reproduction and commercial aquaculture as well as tightening of control over illegal transactions with sturgeon products. Compared to last year, financing of aquaculture grew by 35%. We have developed a mechanism of subsidizing investment projects in the sphere of aquaculture to the tune of RUB400m in 2015 and 600m in 2016. We are also planning to upgrade processing and storage methods, and to develop pilot farms of a new generation. We intend to establish the lead aquaculture research centre on the premises of one of our research institutes. In universities and colleges within our jurisdiction we are developing special educational programmes on aquaculture. Besides, participants of workshops on aquaculture that we have held suggested establishing a field-specific association. We fully support the proposal and will discuss organizational policies in the near future.

Historically the Russian fishery sector has demonstrated

a high level of research and development. What are the trends in the sphere of international relations? Which, in your opinion, are the most important directions of international cooperation including an exchange of best practices that might be of greatest use to the Russian fishery complex?

Currently Russia has fishing agreements with 52 countries and is a member of 16 principal regional and global organizations relating to fishery. An important trend in international relations is securing sustainable use of commercial fish and seafood resources. It is for this reason that bilateral and regional agreements are concluded. And they are working quite successfully now.

We pay great attention to the control over illegal, unregulated and unreported fishing. Poaching is a threat to international fishing sustainability, consequently the joint international effort to eradicate it is of the most immediate interest. Russia extensively participates in bilateral agreements against IUU fishing and regional forums like APEC to stem and in the long run fully eradicate all kinds of poaching. For example, the agency has completed bilateral agreements to fight against IUU fishing with some countries of the Asia-Pacific region like the Republic of Korea, Japan, the Democratic People's Republic of Korea, and China. Memoranda have been signed with Canada and Cambodia.

And certainly aquaculture is another major field of cooperation. Last year we held several conferences devoted to

aquaculture, we invited our foreign colleagues and discussed many issues. We can see a keen interest in aquaculture proved by information from different regions about ongoing or planned investment projects. And we are ready to further develop international relations in the sphere of aquaculture.

What are your plans for popularising fish products on the domestic and international markets and at forming a positive image of the fishery sector? What new tools may be timely to raise the effectiveness of campaigns? Are you planning to revive specialized fish and seafood exhibitions (like former *Interfish*)?

As for measures to form a positive image of both the sector and the products, first of all it is participation of the agency and fishery companies in international exhibitions. Russian business also takes part in international certification programmes.

Speaking of product popularisation on the domestic market, this year we started a programme to promote Russian fish. The agency initiated the development of a national *Russian Fish* brand. For various reasons domestic fish – a wholesome and high quality product – had not been promoted properly. The *Russian Fish* is not a commercial brand and will not influence the production cost. We expect that focusing consumer preference towards domestic fish will make distributors and restaurateurs work more eagerly with Russian fishermen and will encourage the supply on the home market and fish consumption.



Russia promotes domestic fisheries products

New brand *Russian Fish* launched at Moscow fish festival

Fishermen from more than 30 regions of the country displayed their products at the first All-Russian Festival of Fishery Products in Moscow that lasted for seven days. Besides providing customers with fish products the purpose of the event was to create a nationwide brand *Russian Fish*. The Federal Agency for Fisheries initiated the development of the *Russian Fish* brand to promote domestic fish products on the home market.

Russian Fish is not a commercial brand and will not influence the production cost, nor will it be compulsory to use it, says Kseniya Timakova, head of the Press Service of the Federal Agency for Fisheries. The intention is to encourage distributors and the food service sector to offer consumers more domestically sourced fish. The brand was first introduced in the course of the pilot Fish Week

Festival in Moscow organised by the Federal Agency for Fisheries together with the Moscow Government and fishery companies. The project targets at promoting Russian fish, increasing its availability for the people, and forming healthy dietary habits. During the festival representatives of fishing and fish processing companies could meet and negotiate with Moscow retailers and restaurateurs. Similar

events aimed at promoting Russian fish are planned for various regions of Russia. On the first day of the festival in Moscow about 50 tonnes of domestic fish and seafood products were sold at special sites in the centre of the city, and more than 300 tonnes were sold in markets and fairs over four days.

The programme of marketing Russian fish cannot be

implemented without dealing with logistics and infrastructure problems. One of those is transporting fish from the Russian Far East to the European part of Russia. To solve it Federal Agency for Fisheries suggests that railway rates on transporting fish products in reefers and ordinary containers should be similar. Currently tariffs on reefer transport are 35 to 50% higher while the railroad expenses are the same; however, reefer transporting is the best possible way for preserving the fish quality. Besides, the Northern Sea Route could become an additional fish transportation channel. Another important task is the reconstruction and modernisation of fishing ports built in Soviet days. It should become profitable and convenient for Russian fishermen to land fish in Russian ports instead of going to Korean or Chinese harbours. The fish and seafood harvests in Russia has been demonstrating good results since the beginning of the year. As of March 5, 2015 the total catch in Russia increased by 5% compared to last year and equalled 915 thousand tonnes. In January 2015, the volume of fish production grew by 7.8% to 300 thousand tonnes compared to the same period last year.



A new brand *Russian Fish* promoting domestic seafood was launched at a week-long fish festival in Moscow recently.

High-speed filleting, precise portioning, hygienic packaging

Processing machines from Germany in worldwide demand

Despite its relatively small area and population, Germany is one of the world's most important export nations. It owes its economic success not only to the big stock exchange listed companies but also to numerous small and middle sized enterprises that have often been in the hands of the same family for generations. One of the strengths of German industry is processing machines that set international standards in the seafood sector.

When people think about the strengths of the German economy

what first comes to mind is often the big multinational organisations like Bayer and BASF, Volkswagen or service providers like Allianz. Although that is not wrong it gives a rather distorted picture, for the German economy is in fact mainly shaped by small and medium sized businesses, or SMEs (small and medium-sized enterprises). Many of them are located in rural areas and develop their products without paying much attention to short-term trends that might seem profitable; they work steadily in their various niches and have thus managed to assert themselves over decades. Quite a number of them are even global market leaders in their own particular field. Market analyses confirm that Germany is home to more companies that dominate the global market with their products than any other comparable industrial state. In spite of this, hardly anyone knows them. And that is another German phenomenon – they are “hidden champions”. Hermann Simon, a professor of economics, first introduced this term in 1990 for companies with more than 500 employees, at least 50 million euros turnover per year, that are among the market

leaders in their own field and yet are still relatively unknown.

Of the good 2,700 hidden champions that Simon identified worldwide in his studies 1,300 are based in Germany. Their significance to German industry cannot be regarded highly enough. The 1,000 biggest hidden champions which employ seven million people throughout the world together generated sales of over 1,700 billion euros. A good 90 per cent of these world market leaders are to be found in the production industry, their profit margin is on average 2 to 5 percent points higher than that of other companies in the same sectors. Simon sees one reason for their business success in the ownership conditions, for nearly 70 per cent of the hidden champions are family-owned. Family enterprises with strong leaders often work more continuously, following longer-term goals than big stock exchange listed industrial groups that are mainly committed to their shareholders, investors and fund managers who expect quarterly dividends and often see the companies and their staff as little more than pawns. Family companies don't have to distribute their profits immediately. They can make specific investments and will often manage to survive a lean period

without first having to question their whole corporate strategy.

Their strengths lie in specialisation and continuity, concentration on chosen products, and in closeness to their customers and markets, whose needs they often pick up in advance and

accordingly develop suitable solutions with their know-how. On average, the small hidden champions invest about 10 per cent of their profit in research and development – much more than most big companies. The success of the German export

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industry also doesn't suffer from the fact that a lot of export goods contain an increasing amount of preliminary work stages from low wage countries. Globalisation has in the meantime reached SMEs as well, as a lot of virtual company structures confirm that are sometimes spread over the whole globe. Product development and design in Germany, marketing in Spain or the USA, international buying department in Singapore, and production outsourced to various Asian countries. In spite of all the criticism of such business models it should not be forgotten that it is often this global division of labour that makes it possible to offer German machines and equipment at competitive prices. For where labour costs are concerned German companies cannot compete with

other countries of the world. They are literally damned to the further development of their know-how, maintenance of their position at the forefront of knowledge, while simultaneously looking for ways to reduce unit labour costs. Up to now they have been remarkably successful: nearly 70 per cent of all German exports come from SMEs.

Filleting machine processes 24,000 herring per hour

A perfect example of export oriented SMEs in the seafood sector is Nordische Maschinenbau Rud. Baader which is perhaps the flagship among the manufacturers of high-performance fish processing machinery. Founded in 1919 in Lübeck

Schlutup by Rudolf Baader, an ingenious mechanical engineer, the company is now in its third generation of family ownership and stands for everything that makes Germany's SMEs so strong. With the development of the world's first functioning heading and boning machine for herring that was presented at the Lübeck fisheries exhibition in 1922 Rudolph M. J. Baader revolutionised fish processing. The machine replaced the work of eight women and marked the beginning of mechanization in the fish processing sector which is today in many areas largely marked by automatic processing lines. Modern high-performance machines from Baader make it possible to cut up to 24,000 herring fillets per hour. Over the course of decades many more

state-of-the-art machines were developed by Baader for gutting, heading, filleting, skinning or trimming fishes. The company launched its first fish skinning machine in 1928. In 1930 followed the first stockfish (dried cod) machine and three years later the company presented the first model of a filleting machine that was finally perfected in 1951 under the name Baader 99, a whitefish filleting system. Since 1955 Baader's fish processing machines have also been in operation on board factory vessels.

For processing salmon Baader offers a suitable machine for every single work stage and together they can be combined to complete processing lines. The Baader 434 removes the

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Depending on the size and meat quality of the salmon the Pinbone Remover Baader 867 can remove the pinbones from about 20 fillets per minute.

fish's head with a perfect U-cut before the Baader 581 filleting machine fillets the salmon with a high yield. The pinbone remover, Baader 867, pulls out the pinbones, the skinning machine 54 removes the skin and if required also the grey layer of fat. The subsequent trimming machine, the Baader 988, is fitted with an optical control system that assesses every fillet separately according to individual specifications prior to the cut. And soft separators separate soft leftover meat from solid structures – a process which in the German-speaking world has even been named “baadern”, in English “baadering”.

The medium sized enterprise Baader was included in the Encyclopaedia of German Global Market Leaders because it has for nearly a hundred years stood for consistency, reliability and innovation, because it successfully asserts its market position,

and continuously further develops and expands technology.

Computer controlled smoking technology and efficient salmon slicing

The range of technically sophisticated smoking and air conditioning technology from German SMEs is particularly broad and these companies, too, are mainly family enterprises. Well-known suppliers such as Reich, Ness, Kerres, Fessmann, Maurer-Atmos, Bastra, Smoki or Beelonia, to name just a few of them, have for decades gathered experience in the field of development and production of high-capacity high tech systems for food processing. In addition to hot and cold smoking facilities some of them also offer systems for various different areas such as cooking, frying, baking or cooling. With computer controlled smoking technology, for example, clever air and smoke distribution makes it possible to

not only achieve excellent reproducible results but the systems are also easy to operate and highly efficient in energy consumption. They enable users to realise almost any desired flavour and to meet very different customer product requirements.

A good example of the innovative capacity, market awareness

and perseverance of German technology manufacturers is the Hamburg family business Salmco Technik that was founded by Johann Glösmann in 1984 and today claims to be the world's only producer that manufactures both cold and soft slicers for salmon and other fish species. In its more than 30-year company history Salmco has continuously broadened and diversified its product portfolio which today ranges from simple table models and semi-automatic machines to fully automatic slicing lines. Nearly every machine is available in several types of construction that can be optionally tailored to the particular wishes and requirements of the customers. In this way Salmco can meet the needs both of small and medium sized enterprises and big industrial companies.

Portioning and dosing, moulding and coextrusion

Handtmann Maschinenfabrik can look back on a similarly successful history. The company was founded by Arthur Handtmann in 1954. At that time it had just three employees. Today it is one of the leading technology



Adjustable cutting angle between 15 and 90°, high slicing performance and a clean cut are features of Salmco's vertical slicer SM 5290.



VEMAG's FM 250 produces precisely shaped products from dimensionally stable fish, meat and vegetable materials. Product shapes and sizes can be varied using easily exchangeable nozzles.

suppliers to the food industry worldwide. With its precise, economical and reliable vacuum fillers and portioning systems

Handtmann is in the meantime represented throughout the world in over 100 locations with their own sales branches and

sales partners. The product portfolio includes vacuum fillers for filling, portioning and clipping, continual coextrusion systems, filling mincer technologies, dosing systems and plants for automatic shaping of products. The variety of these systems can also be seen in the fact that they are not only suited to the processing of fish, meat and sausage but also cheese, dough and other pasty consistencies.

VEMAG Maschinenbau supplies systems and services in the same segment. They have developed and produced efficient machinery and equipment for over 70 years. Their product range includes, for example, continuous vacuum filling machines. Originally VEMAG concentrated on traditional craftsmanship

but this was soon extended to cover industrial applications in order to take the increasing concentration and growing company dimensions in the food producing industry better into account. Recently VEMAG has emphasized the system character of their solutions that are conceived as modular systems comprising standard fillers and customized attachments which can be flexibly tailored to meet the needs of the individual user. In this way even highly complex processing stages can be integrated into the production process. At the same time the concept has the advantage that it meets the needs both of small trade and large companies. The capacities of the filling and portioning processes, of forming and mincing applications,

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Multivac's Traysealer T 300 enables smaller enterprises and service companies to start using automatic packaging for fish products in sealed trays.

during separation of dough and mixtures or portion-to-pack solutions can be relatively easily geared to the performance of each company.

Another very impressive success story is that of Multivac, a leading manufacturer of thermoforming packaging solutions. What was once a small "garage company" where the company's founder Sepp Haggenmüller built the first vacuum chamber machine in 1961, is today a multinational company which produces modern thermoform packaging and vacuum chamber machines, tray sealers and labelling systems to customers in over 140 countries. The production programme is very broad. In the meantime Multivac also packages industrial and consumer goods, medical and pharmaceutical products to the highest standards of hygiene, but the food industry remains

an important buyer of the company's packaging machines. The demands placed on packaging in this field are particularly high for the packaging solutions should not only guarantee maximum durability and present the products in an appealing way, but must also be easy to handle and be safe for consumers. Multivac offers a wide range of MAP and vacuum packaging options for catering, retail and wholesale which can be optionally equipped with consumer-friendly opening aids or resealable options. Other helpful features such as Euro standard holes and single- or multi-portion packs can be flexibly integrated into the packaging solutions. This means that there are clean, hygienic self-service packaging solutions for almost all seafood products from fresh and smoked fish products to mussels and shellfish as well as fish ready meals.

Complete systems and turnkey projects from one supplier

German engineering is not limited to the development and production of individual machines and complete processing lines but beyond that also offers customers planning, projecting and constructional realisation of complete plants right up to turnkey processing plants. Founded in 1974 EMF Lebensmittel-Anlagenbau has established itself for example as a producer of complete lines for food technology. Its focus, in addition to fish processing and fish farming including the necessary coldstores and cooling systems, is also on slaughtering for red and white meat and meat processing. Thanks to its own construction department the company can realise international turnkey projects. Through its network of 14 branches EMF is additionally in a position to guarantee

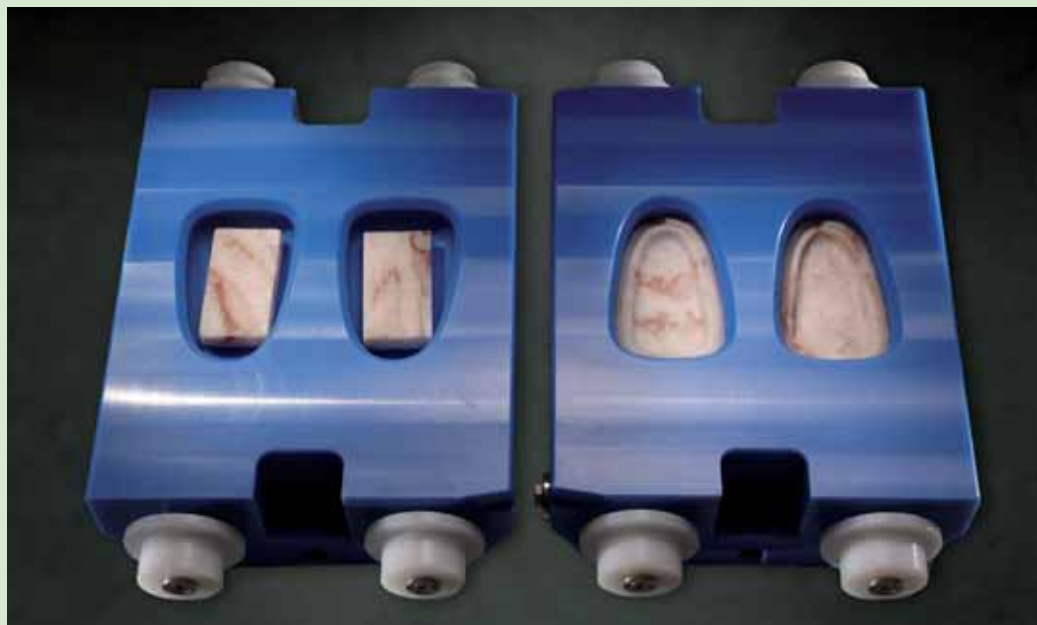
comprehensive service and maintenance even after completion of the projects.

A medium sized enterprise that operates as a system supplier for projects in the areas of rationalization and automation is Rosoma which has its own planning and engineering office as well as its own manufacturing and assembly area. The company specializes in complex rationalization and automation projects in the fields machinery and equipment for the food industry, cooling, freezing and fermentation processes as well as cleaning and environmental technology. From consulting and project planning, development and construction to production, assembly and service Rosoma provides all services from one source and is thus a good partner even for complex projects.

Gentle shaping and modern packaging solutions

A leading provider of intelligent sawing and portioning technology for frozen products is the family business Nienstedt that was founded in 1948. Since the 1990s the company's production programme has also included technologies for material-saving shaping of blanks cut from frozen fish blocks. Since then Nienstedt has constantly optimized the Food Shaper which is reflected in the improved product quality, process efficiency and higher material yield. The shaping of pre-sawn portions of frozen fillet blocks has several advantages. Whether portions in fillet form, fish steaks or burgers, realistic or fantasy shapes such as boats or shells of fillet meat - the possible applications of this technology are extremely wide. In addition Nienstedt developed the technology further. Now weight calibrated

trimmings can be shaped leaving out the block freezing stage. The same applies to individually frozen fillets cut to weight. In this area Nienstedt has achieved a technical level that enables users high yields and optimum product quality with high process stability and adherence to the prescribed standards. During shaping the temperature of the input is measured constantly and the machine fine-tuned accordingly. If the frozen fish gets warmer, the applied pressure is reduced. Quality and product homogeneity increase, the reject rate drops, and subsequent manual adjustments are not required. Due to their modular design, the shapers can be combined with sawing systems and packaging machines to make complete processing lines. *mk*



Nienstedt's Food Shaper enables the shaping of frozen trimmings or pre-sawn portions from frozen fillet blocks.

The Smart 500 is a versatile cooker for use in retail or food service

Multipurpose cooking machine from Bastra

Bayha and Strackbein, better known as Bastra, based in Arnsberg, Germany have released a new type of customer-oriented universal installation for fishmongers and delicatessen counters in supermarkets. Bastra has been manufacturing cooking machinery since the 1940s so the Smart 500 has a long tradition to fall back on. Equipped with the company's smoke condensate technology the machine gently yet efficiently smokes fish and fish products. In addition, however, the machine can cook, fry, roast, bake, and steam food, allowing the preparation of a number of different products for immediate consumption.

The compact design enables the machine to be integrated into any store counter or kitchen, and an optional glass door lets customers watch the food as it is prepared. The sensory stimulus of freshly prepared food has been demonstrated to strongly trigger impulse buying. Results at a major German retail chain showed that outlets with these installations had better sales than those which did not have them. Transparency in preparation and production, as well as the freshness, quality and variety of the products were the key factors behind these results. This makes the Smart 500 an obvious choice for hot food counters at delicatessen shops,

but it can also be used by food service or catering companies, and in institutional kitchens.

The Smart 500 has an effective volume of 430 l and can reach a temperature of 180 degrees C or 230 degrees C (optional). It is controlled by a microprocessor with up to 99 programmes each with 30 stages. Standard features include compressed air cleaning, an integrated cooling shower, continuous air circulation, and fully automatic air inlet and outlet valves. Optional extras include a safety glass door, a cooling device that can be connected to a chiller, and a third convactor for the maturing process.



Bastra's Smart 500 can smoke fish, but can also cook, fry, roast, bake, and steam food making it ideal for retail and food service applications.

My “organic” or your “organic”?

Bickering over the best standards holds back the organic market

When asked what organic aquaculture is, consumers usually understand the farming of aquatic organisms without the use of antibiotics or chemicals, whereby attention is also paid to the preservation of biodiversity, and to protection of the ecosystems and human life. Organic certifiers and other professionals in this area set the bar much higher, however. They often only recognize what they themselves have rubber-stamped because it is only with their own “organic labels” that business is worthwhile.

With the increase in consumers’ attention to the way their foods are produced and the resulting desire for them to be produced in an environmentally friendly, sustainable way without unwanted or harmful ingredients a market for organic products has opened up. Although “organic” has long been mainstream and is considered a global trend it is today still little more than a niche market. What is true of organic products in general is particularly true of organic products from aquaculture for growth of the organic seafood segment is lagging well behind the dynamic development of conventional aquaculture. This is often felt and reported very differently by the media and organic fans but the facts are clear: whilst conventional aquaculture production has risen every year by an average 5 to 7 per cent since 1970 and has in the meantime reached nearly 70 million tonnes (without algae and aquatic plants) production from organic farming is still only around 50,000 to 100,000 tonnes per year. Probably no one knows exactly how much organic fish and seafood is produced since statistics in this segment are meagre. The industry is changing all the time, new organic companies are set up, others quietly turn their backs on their organic farming concept and

return to conventional production. And then there are companies that produce to both conventional and organic standards and here the shares of the two fields can vary depending on the market situation. According to the most recent statistically firm estimation, there were just under 250 certified organic aquaculture companies in operation in 2008. Nearly half of them were in Europe.

Europe is the centre of organic aquaculture

There were allegedly 123 certified organic farms in Europe in 2008. Together they accounted for 0.2 per cent of European aquaculture production – which at that time amounted to 2.3 million tons. The “top five” among the organic producer countries were UK, Ireland, Hungary, Greece and France. Together, they were said to have produced between 4,200 and 4,700 tonnes of organic seafood, whereby organic salmon clearly dominated with a share of over 90 per cent of total production. The strong focus on salmon is understandable since the prices paid for organic salmon are 30 to 50 per cent higher on some financially strong European markets. Interest in organic products is highest in France, Germany, Switzerland and UK. In France, organic fish faces



For organic gilt-head sea bream EU regulation 710/2009 allows a maximum stocking density of 15 kg/m³ in net cages in the sea and 4 kg/m³ in earth ponds and marine bays.

tough competition from Label Rouge products that are trusted at least as much as organic products by consumers. Behind the success of the organic segment in Germany are not only specialist organic markets but also discounters, some of whom occasionally or – if the available quantities allow – quite often offer organic fish. A problem of the mostly small-sized organic farms is, however, that the quantities they produce are too low and the processing facilities not sufficient to make the products “attractive” for larger retail chains. Apart from that, the higher cost of organic farming means that the price of the final product is higher, and few retailers want to pay more.

With that, a lot of organic producers have to resort to direct marketing locally, and this can be a problem in rural regions where demand for organic products is often lower and people do not have as much money available as city dwellers.

Basic problems recognized but not solved

The well-intentioned objective of the International Federation of Organic Agriculture Movements (IFOAM) to define a generally binding framework for certifiers that would enable comparison of their labels and thus create prerequisites for their mutual acceptance

looks more like tinkering with the symptoms than actually getting to the root of the problems. The provisional "IFOAM Standards for Organic Aquaculture" that were adopted in the year 2000 have in the meantime gained the status of fully fledged standards but have in no way succeeded in curbing the ever increasing flood of certification programmes. Although the organic concept did not reach aquaculture until relatively late – around the beginning of the 1990s – there are currently at least two dozen certification organisations in this segment. Most of them are financed privately but in some countries there are national organic labels and in the meantime even multinational guidelines, for example in the EU. This fact already reveals a structural problem in that nearly all certification organisations are located in western industrialized countries within Europe, North America and Australia, and together they do not even produce one tenth of world-wide aquaculture production. The organic standards they define differ not only from organisation to organisation and country to country but also from fish species to fish species and between the individual production stages in the value chain from the hatchery to processing. From an international viewpoint, if there is a common element that the numerous certification programmes share it is undoubtedly their inconsistency.

Explaining complicated issues in understandable language

In Europe, for example, private certifiers such as Krav (Sweden), Debio (Norway), Ernte (Austria), Biosuisse (Switzerland), Soil (UK), QCI (Italy) or Tún (Iceland) offer standards for selected aquaculture species. In Germany, several organisations and associations

compete for customers: Bioland, Demeter, Biokreis and Naturland. Since early 2000 there have also been national aquaculture standards in France and the UK. On the other side of the globe the market leaders in the organic business are Biogro (New Zealand), BFA und NASAA (Australia). Since 2001, interested companies in Australia can also have themselves certified according to national organic standards. One of the few providers of organic standards in Asia is the private Organisation ACT (Thailand) that mainly concentrates on shrimp, the most valuable product in international seafood trade. Developments in the organic field in the USA proved particularly difficult. The US National Organic Standards Board (NOSB) which was given responsibility for this segment by the Department of Agriculture (USDA) only managed to present general standards for organic aquaculture in 2008 after eight years of tough and controversial discussions. A central point of contention was the feed used in aquaculture, especially feed for carnivorous fish species. The different stakeholders agreed relatively quickly on binding organic standards for herbivorous species such as tilapia, carp fishes, shellfish and crustaceans. But for all other species whose feed contains a share of fishmeal a relatively complicated regulatory system with seven-year transitional periods to organic or sustainably produced fishmeal, permissible maximum concentrations of fishmeal in feed, and further requirements (e.g. reduction of water pollution during farming in net cages, dioxin and mercury residues through fishmeal feeding) was devised. Whether fish farmers, scientists or responsible politicians, conservationists, animal rights or consumer protection activists, nearly every party involved in the discussion process at the NOSB tried to anchor their

interests and concerns within the organic standards. The final outcome was a highly complex, convoluted legal document that hardly offers any orientation to the man in the street.

The costs behind certifications and private standards

Not only is the existence of multiple certifications and private standards a challenge for organic fish farmers, but so are the costs. Retailers and commercial brand owners are the main drivers of private food standards. As they are the primary distributors of fish and seafood products, most retailers move away from open markets towards contractual supply relationships, which leads to the increased dependence of the fish farmers and processors on the retailers. Consequently, the influence of the supermarket chains on the market results in an unequal distribution of certification costs across the supply chain. The FAO report from 2011, "Private Standards and certification in fisheries and aquaculture – Current practice and emerging issues", states that the compliance with private standards and certification is a large financial expense for fish farmers and they carry the main cost burden. Both producers and processors take a significant share of the costs of certification, whereas the retailers gain the most benefits. For retailers, any costs involved in developing private standards are seen as an investment. The certification requirements for producers and processors are usually used by retailers, for example, as a reputation enhancement or a marketing tool to improve customer confidence in sustainability, traceability, safety, and quality assurance. Moreover, the certifications are used by retailers

as a tool to strengthen the commitment between them and their suppliers.

When it comes to the costs for fish farmers and processors, they can depend on the size of the company, the type of operation, and the differences between the required practices and infrastructures to comply with the standards, compared with the actual status of the company. In fact, most of the main costs for producers and processors emerge from the latter. Despite the financial burden, a trend towards increasingly seeking certification for multiple standards by fish farmers can be observed in recent years. This is due to the fact that both producers and processors acknowledge the benefits of certification and private standards. Seeking certification leads to improved quality of their products. Admittedly, it is not only retailers that benefit from certification but also the fish farmers and processors. Through certification, producers can receive long-term contracts, strengthen their positions on existing markets and gain access to new niche markets.

Broad international range of organic standards

In Canada, the organic standards proposed by the General Standards Board (CGSB) were harshly criticised because they did not explicitly prohibit the use of antibiotics and chemicals and allowed up to 20 per cent non-organic feed and net cages in the open sea. The waves of tension ran high for with these propositions organic aquaculture would contribute to marine pollution and genetic impact on wild stocks through escapes. The very opposite was the case across the Atlantic in Denmark where strict national legislation with rigid rules and regulations make life



Carp (*Cyprinus carpio*) is one of the fish species that are frequently farmed under natural conditions and often fulfil organic standards even without a special seal.

difficult for trout farmers and the further development of organic farming a real challenge. Organic is not always the same, particularly in international comparison.

Already in 2007, so several years previously, the EU had set the goals, principles and general requirements for organic production of agricultural products, for the first time including aquaculture, with regulation (EC) No. 834/2007. Since 2010 EU Regulation 710/2009 has also been in force. This aims at uniting the various organic standards and national certification programmes in Europe under one umbrella. It defines criteria for the separation of organic and non-organic production units, lays down concrete measures for animal protection, and defines maximum stocking densities for important animal species. This EU legislation package is welcomed by many for whom the muddle of organic standards and certificates in Europe had long been a source of annoyance. Perhaps some certification organisations are less happy with it since with the umbrella guidelines and the EU organic seal come fears

of the loss of potential customers and thus earnings. Although on the face of things some welcomed the EU measures, their praise was not quite sincere. They say the EU regulations are good, but don't go far enough, their own are much better. And once again it is the consumer who will have to work out what all this bickering is about. If so many varieties of organic are possible, which is really the best?

Admittedly, definition and laying down of requirements and standards that are necessary for the production of organic products is not easy. Especially in aquaculture where different species are produced using some very different methods. Nevertheless, framework conditions have to be worded in such a way that they are understandable and logical for laymen and less deeply informed consumers. Because only those who understand what a lot of effort goes into farming organic products will ultimately be prepared to pay the correspondingly higher prices. Trust comes with transparency – and that begins with the formulation of standards.

mk

Naturally Atlantico

Organic sea bass for retail and restaurants

Naturally Atlantico, an organic fish farming company from the Canary Islands producing sea bass, is one of the representative of the approximately 125 organic fish farms in Europe. Established in 2011 as a family business, the company is a good example of a successful small-sized farm on the European market, with good perspectives to broaden its market internationally. In 2015 the company expects to produce 200 tonnes organic fish – 80% portion-sized and 20% larger fish of up to 1 kg.

Certified to organic standards, the company focuses on the customer and the customer's expectations. The company adheres to all the EU regulations for organic aquaculture production. As an organic farm, Naturally Atlantico is subject to regular monitoring. Their production is inspected and audited by the Canary Islands Institute of Food Quality (ICCA).

The organic farming based on three main components:

- solely organic feed – the organic feed is based on organic soya and corn;
- low density – located in the middle of the Atlantic Ocean in deep and pollution-free water, the company grows its fish in farms with a density of 6 kg/m³, four times lower than the density on commercial farms (25 kg/m³)
- reduced need to treat the fish – due to the high quality feed and low density cultivation, the fish are less stressed and less susceptible to disease. Naturally Atlantico has reduced the treatment of the fish to minimum and applies only the recommended vaccinations.

According to Rafael Bernardez, the director of Naturally Atlantico, there is no difference in the time it takes for the organic fish to reach market size. Although the company has so far only produced four batches, he thinks that the rearing conditions make the fish grow faster than on conventional farms.

Mr Bernardez works mainly with supermarket retailers specialised in organic food. About a tenth of the production goes to restaurants interested in high quality organic food. Naturally Atlantico's markets are currently mainly in Germany, France, and Mr Bernardez expects to start supplying the UK market in the next couple of months. Although a Spanish company, Mr Bernardez struggles to sell his production in Spain something he attributes to lower awareness about organic food in the country. Outside of Europe, the company exports to Canada and aims to start on the US market before the end of the year.



This organically farmed sea bass is available in portion size as well as in weights of up to 1 kg.

Geothermal energy use in aquaculture

Increasing slowly, but no immediate breakthrough

The rising concern about the environment is encouraging fish farmers to look for sustainable ways of producing fish. Geothermal water is one of them. The use of hot water stored underground enables the farming of fish in colder climates all year round compared to conventional fish farming. Heat from the earth's interior is a limitless resource that can be utilised to farm fish.

Many regions are already employing geothermal energy as an affordable, easily available and sustainable alternative to fossil fuels. Geothermal activity is concentrated around the Pacific Ocean and the Pacific Plate, from Indonesia, the Philippines and Japan, to Alaska, Central America, Mexico, the Andes and on to New Zealand. Europe also has access to geothermal water, from hot water geysers or in the depths of under the earth's surface. Hence, the use of geothermal water in aquaculture depends on the geographical location of the country.

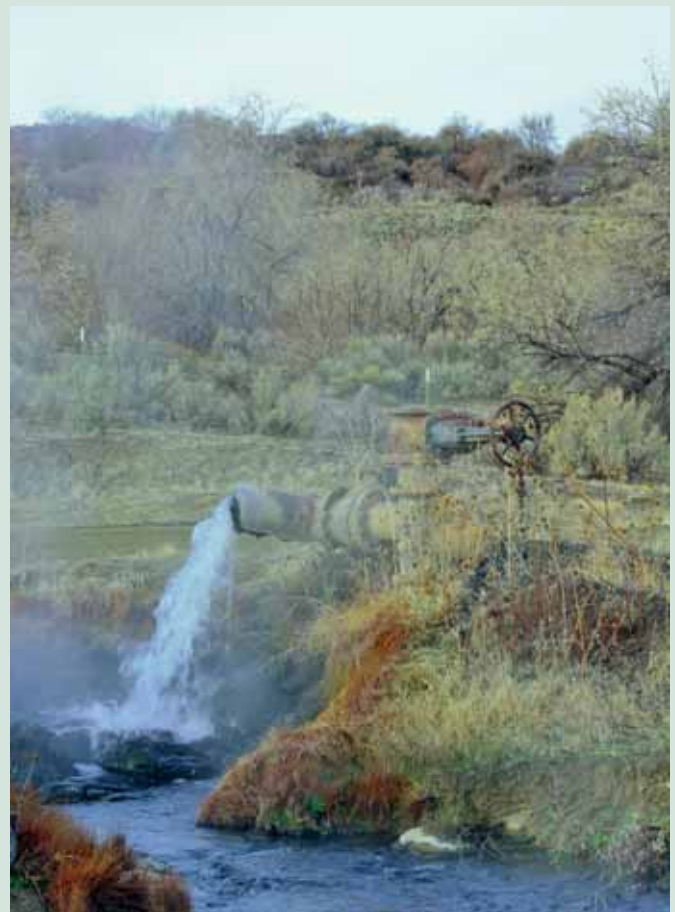
Use of geothermal energy in aquaculture

In aquaculture, geothermal energy is mainly used to heat aquaculture ponds and raceways, but mainly in fish hatcheries. Geothermal water heats the freshwater in heat exchangers or is mixed with fresh water to obtain suitable temperatures for fish farming. There are two options for transferring the heat energy to the fish ponds, a closed system using heat exchangers and direct supply of water to the fish pond. When using a closed system, geothermal water is used for heating the fish pond via a heat exchanger. A heat exchanger allows the flow of thermal energy between two or more water

streams at different temperatures. In conventional heat exchangers, one stream recovers some of the heat of the other stream and the heat transfer takes place through a separating wall. When a direct supply of geothermal water to the fish pond is used for heating, the water is also used to flush the organic matter from the pond contributing to the water quality of the pond. The water treatment facilities typically include high-pressure pumps, a chlorine injection system (or other form of disinfection) and an automatic filtration system. In direct contact, the heat is transferred between cold and hot water through direct contact between the two. After the procedure, the water is heated to the optimum temperature for the farmed aquatic species. The low water temperature (13–30 °C) provides a relatively cheap and pollution-free source of energy for direct aquaculture use.

Main countries and species

Among the leading countries are Iceland, China, USA, Italy, and Israel, yet the use of geothermal energy in fish farming is expanding rapidly in other countries, too, for example, in France, Greece, Hungary and New Zealand. In the approximately 70 Icelandic fish farms



Fish breeders of Idaho

Geothermal energy can be used to farm fish species that require water of a higher temperature. Iceland, China, USA, Italy, and Israel are among the countries that use this sustainable energy source to cultivate fish.

of which 15–20 use geothermal water, tilapia, Arctic char, turbot and Atlantic halibut are farmed. A number of such fish farms operate in Romania, too. In Greece, there are also some

farms, where geothermal water at a temperature of 51°C and a flow of 10 kg/second is used to heat the water to 33–36 °C for spirulina cultivation. Other species raised in geothermal water

aquaculture include carp, catfish, frogs, mullet, eels, salmon, sturgeon, shrimps, lobsters, crayfish, crabs, oysters, clams, scallops, alligators, mussels and abalone. For example, tilapia can be reared intensively in mono and in polyculture systems with other compatible and commercial species such as carps and mullets. They are a group of fish that can be farmed in a wide range of salinities with relatively short production cycle (6 to 8 months to market size). In USA, tilapia is raised in raceways using geothermal water at 35 °C. Genetically improved Nile tilapia (*Oreochromis niloticus*) is farmed in tanks situated under a greenhouse roof to protect it from weather conditions, natural predators such as birds and from pathogens. Domesticated varieties of the common carp (*Cyprinus carpio*) are raised in cascades that are downstream from geothermal greenhouses. Other raised species in USA include catfish, hybrid striped bass and largemouth black bass (*Micropterus salmoides*). Around 11 commercial facilities operate in the desert and arid region of Arizona, 12 facilities in Idaho and there are also some operations in New Mexico, Nevada and Texas. Being among the most common species grown in geothermal aquaculture, tilapia is also grown in Israel. The country has 15 commercial fish farms currently operating in the Negev Desert where tilapia common carp are the most common species, accounting for about 75% of Israeli inland aquaculture. These species in terms of popularity in Israel are followed by silver carp, grass carp, grey mullet, North African catfish and gilthead sea bream. Of five model pilot-scale farms established during the 1980s and 1990s, two were expanded to a

full commercial scale of 200–400 tons/year of aquaculture production.

Prospects and opportunities of geothermal aquaculture

Compared to regular fish farming, using geothermal water in fish farming is an affordable and sustainable solution to reduce dependence on fossil fuels. As farming of freshwater or marine organisms in a controlled environment enhances the production rates by 50 to 100% thus increasing the number of harvests per year, the availability of cheap geothermal water makes breeding and production of different species of fish cheap all year round. However, unlike fossil fuels, geothermal resources are not available everywhere, so that even though geothermal energy has the potential to provide long-term and secure base-load energy for the aquaculture sector, the prospects for its use are limited to areas around the Pacific Ocean and the Pacific Plate as well as some European countries and the deserts of North America and the Middle East.

Despite access to geothermal water some countries still do not employ it in fish farming. For example, in Lithuania, the use of geothermal water in aquaculture is still under consideration. The country has access to hot underground water in its western part a kilometer below the surface, however, currently it is only used to produce energy for heating. These facilities are labour intensive and require well-trained personnel, which are often hard to justify economically, thus, growth in the geothermal aquaculture is slow. The number of small-scale ground-source heat pumps in the country is growing. The natural springs and

deep wells in Albania produce geothermal water up to 65.5 °C, therefore the country is also considering using the geothermal heat for aquaculture. Albania already utilizes it in spas, bathing and swimming pools, and uses geothermal heat pumps for heating and cooling. Like Albania, Croatia also utilises geothermal energy in spas and recreation centers, and for space heating. However, the country currently does not have any plans to employ it for fish farming. This situation is similar in Poland. Although it has access to geothermal water, the country does not utilise it in aquaculture. During 2010–2014 geothermal energy was used for several purposes, mainly for heating, bathing and swimming. Over the past five years the total installed geothermal capacity and heat sales have increased, however, utilisation of geothermal water in fish farming remains to be developed.

Barriers for geothermal aquaculture development

Geothermal energy is already used in many countries, but geothermal development has been slow in most. The main constraints and challenges impeding the use of geothermal energy are policy, regulatory, technical and financial barriers. The initial high investment costs of geothermal projects reduce the appeal of geothermal water in fish farming and is one of the main barriers to geothermal energy development in resource-constrained economies. As fossil fuels are a major competitor to renewable resources, the development of geothermal aquaculture has been slow in most countries. However, numerous countries have been doing the necessary groundwork, conducting inventories and quantifying their resources

in preparation for development when the economic situation is better and governments and private investors see the benefits of developing a domestic renewable energy source. Hence, financing plays an important role in geothermal programmes. Government policies and legislation are important factors in creating an enabling environment for geothermal investment and resource mobilization and in encouraging investments from the domestic and foreign private sector. However, few governments have clear policies that promote the use of geothermal energy, especially for geothermal aquaculture, and budgetary allocations to geothermal energy research and development tend to be low. Regulations aiming to preserve and improve the environment also affect the development of geothermal systems. The main EU environmental regulations affecting the geothermal sector are the regulations on water and environmental assessment. Thanks to this legislation the development of geothermal is compatible with other environment objectives.

The use of geothermal energy is slowly increasing worldwide. Some countries with access to this renewable resource employ geothermal water in many areas. Despite being a sustainable method of farming fish, geothermal water is penetrating the aquaculture sector with difficulty. Some countries in Europe with access to geothermal resources do not utilise it in aquaculture although some of them anticipate its use in fish farming in the future.

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Convenience food from carp may help reverse the decline of the carp farming sector

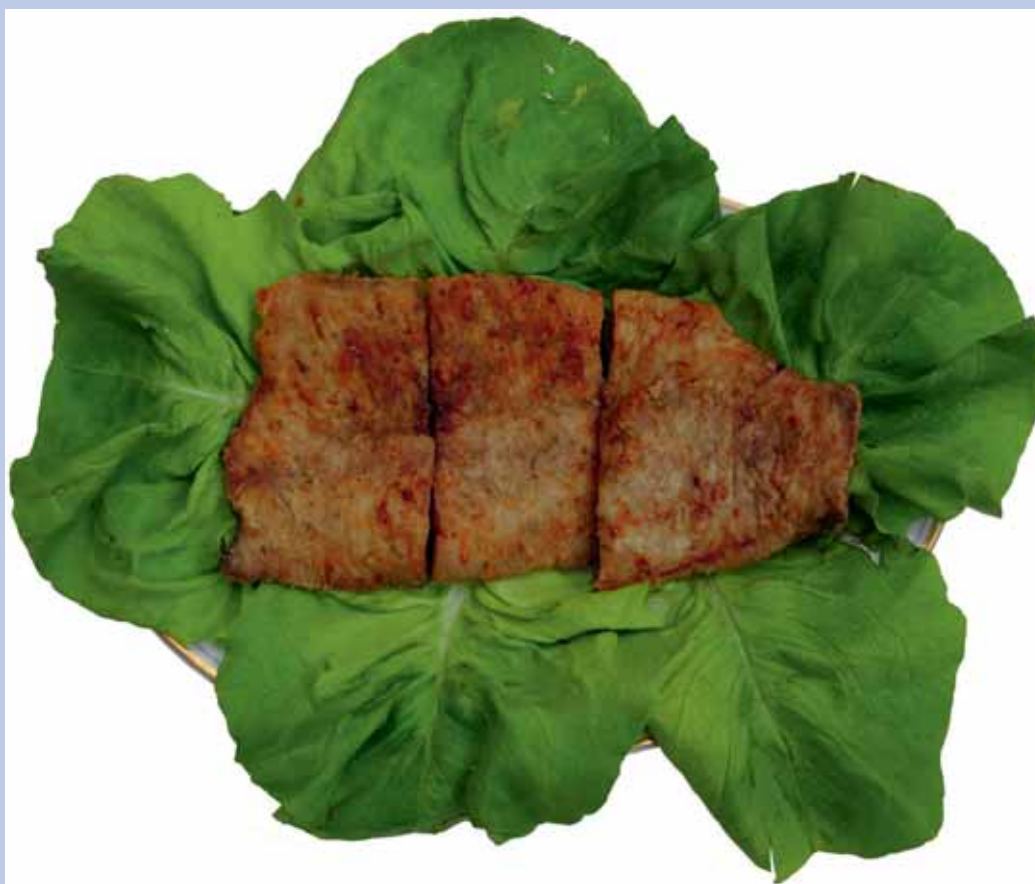
Polish project develops range of value added carp products

Between 2010 and 2013 a team of specialists from the National Marine Fisheries Research Institute and Koszalin University of Technology developed a pilot project that sought ways of using carp that would improve the economics of carp farming.

The need to add value to carp was an issue raised by carp farmers in the first decade of 2000, and was related to the deteriorating economy of pond farming in Poland. Carp producers considered that a major cause for this deterioration was a decline in the market demand for carp, with lower sales prices, reduced profitability of carp production and, consequently, a decrease in the size of the sector.

Live carp is cumbersome to deal with

The current method of marketing and sales of carp in Poland is based on a centuries-old tradition, whereby carp, after harvesting, was stored, transported and sold as a whole live fish, thus ensuring its freshness at the time of sale. Until relatively recently consumers treated buying a whole carp and the need to gut it and prepare it for eating on their own as normal. Today, however, with modern supermarkets, the traditional way of selling carp as a whole fresh fish is considered a barrier to the growth of its sales, because the product does not meet the expectations and needs of consumers. Today's consumers look for food products which are easy and convenient to prepare for eating and are reluctant to buy



Although carp is a bony fish it is possible to get boneless fillets with the right technology.

a whole carp, which is a difficult product, burdensome to process at home.

The project partners assumed that in order to slow the downward trend in market demand for carp and stimulate its growth in the future, it was necessary

to create a permanent presence on the market of a variety of semi-finished and finished food products from carp, in forms acceptable to and demanded by today's consumers. This was to be accompanied by developing new products for human consumption, as well as methods

and technologies for using post-processing leftovers, previously treated as waste, for consumption and feed purposes. Thus, the aim of the project was to improve the technologies used in the processing of fish and process Polish farmed carp into contemporary food and feed products.



Stuffing made from carp meat and formed into balls can be canned in a sauce.

Research indicates the way forward

The project consisted of four lines of research and development covering the processing and the use of carp as a raw material in the production of value-added products, and using the waste for the production of feed. Based on the research results, it was possible to develop:

- “Boneless” carp fillets by cutting fillets mechanically, and then enzymatically reconstructing them;
- A stuffing from the meat separated from the bone waste after slicing or filleting and using it for the production of multi-component fish, and fish and vegetable dishes for immediate

consumption, such as burgers, sticks, canned fish, canned fish and vegetable, and fish and vegetable salads;

- The technology to process carp waste into fish meal and oil;
- And equipment for processing carp, including a pressure gutter, a de-heading machine that makes a cut around the gills, and a table-top machine for cutting bones in fillets.

The project was designed to appeal to the needs of medium-sized processing facilities, where the fish could be mechanically processed into semi-finished products in the form of carcasses, steaks, slices, fillets, and, above all, enzymatically reconstructed “boneless” carp fillets. The plant

would also be able to produce a fish stuffing from the leftovers of the mechanical processing and use it to create a variety of fish, or fish and vegetable products. Finally the waste from the processing would go in to the production of fish or animal feed.

Small farms or processing plants can also benefit

However, individual elements of the system can also be successfully used in small fish processing plants, and even directly by pond farmers. In this case, the range of products may be limited, for example, to whole fresh fish or portions (steaks or fillets), while the fish waste would be

processed into a bone and meat mix intended for the production of feed and/or animal food. Producing value added products from carp, such as whole fish fillets without perceptible bones, in the form of individually packaged semi-finished, fresh or frozen products in blister packs would qualify as convenience food and should be attractive to large retail chains.

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Globus uses certification to differentiate products

Prices rather than labels determine customers' choices

Although not as big as some German retail chains, family-owned Globus has 46 stores in Germany and a further 25 in Russia and the Czech Republic, employing altogether some 37,000 people. The company has existed for over 180 years and last year was crowned Germany's favourite retail chain in a study carried out by a Düsseldorf consulting company. Jürgen Pauly, Category Manager, Fresh Fish, speaks with Eurofish about fish retailing in Germany, one of Europe's largest markets for fish and seafood.

What trends have you seen over the last three or four years in fish consumption habits among your customers? How have your customers changed since then? Have they become more knowledgeable? Do you get the impression that your customers are getting younger? How do you expect consumption patterns to develop in the future?

Consumers are asking for more convenient products. We need to offer different choices at the counter including oven-ready and barbeque-ready products. Spiced and marinated fish and seafood have become a real alternative during the summer. The former "summer whole" is chance and opportunity now. Consumers are more aware about environmental and sustainable issues concerning wild catch and aquaculture. But too often the media and NGO's present the information in a simplistic and unbalanced way.

Generally, we do not see our customers becoming younger. But due to a lot of cooking shows on television, more people are interested in fish. We certainly sell larger volumes of certain species after prominent TV-shows with these products on the menu.

In 2013 fish consumption in Germany was the lowest in years



Jürgen Pauly, Category Manager, Fresh Fish, Delikatessen, Cheese, Globus

and we have not been able to explain this yet.

It is often said that the customer is the one that drives change. How does a retailer like Globus keep track of and accommodate consumer wishes, in terms of the type of fish products and the species in your assortment?

Consumers do not really drive change. Globus has to inspire

them with ideas, promotions, tasting sessions and advice. This calls for investments in time and a consistent and active customer engagement strategy from our side. We have to remember to take regional preferences into account, when developing our own recipes for prepared products.

Do you get the feeling that demand for sustainably caught and sustainably farmed fish

is driven by consumers or is it more by the NGO's pushing the retailers to stock fish with these labels? Which certification labels are the most popular in your chain?

The strongest driver for sustainably caught or farmed fish is the NGO's. Consumers believe in the necessity of sustainable fish, when asked independent of the buying situation. But when

actually buying fish, they seldom seek sustainable alternatives. This is not just a feeling, but what we hear from our customers at the counter. NGO'S have the power when telling simple or simplified stories. These stories are suitable for the media. Some retailers are driven by NGO's or cooperate with NGO's. Our sourcing is based on scientific data only.

At Globus we stock products certified to the MSC standard, Germany's most popular label, while the ASC is slowly becoming better known.

The German market is the biggest in Europe as far as the number of MSC certified products is concerned. What explains this interest in certified products, and can you draw any conclusion about the market for seafood in Germany compared with other European countries, such as France or the UK?

We cannot prove that the market for MSC certified products is driven by consumers. While the industry enables these products, the retail sector has recognised the chance for differentiation. Yet at the same time we are selling the same quantities of, for example, smoked mackerel with and without the MSC-label; MSC-labelled fish-fingers under promotion are being sold at the lowest prices in the retail sector. Consumers are deciding by price not by label, which may be different in France or the UK.

What role does organically farmed fish play in German supermarkets in general and in Globus in particular? Does Globus actively encourage the development of the organic fish market? How do you see this market developing in the future?

Organic fish is a niche in general and at Globus. We are working on

this assortment, some of our stores offer organic products daily. To explain differences and high prices is difficult. The market depends on customers who are convinced of organic products. It is the consumer's attitude rather than taste and quality that determine the popularity of these products. So we do not expect much more development.

Illegal unreported and unregulated (IUU) fishing is a major threat to global fisheries production. How can the retail sector contribute to the fight against IUU fishing, and what measures can retailers take to ensure that IUU fish does not end up on their shelves?

Suppliers should be obliged by contract to only deliver fish with 100% traceable origin. Even if this is a "normal" and legal obligation for all members of the trade, it is not easy for retailers to double-check the chain down to the origin. Buying fish closer to the origin (the fishery) makes the source more transparent. It is also necessary to monitor this strictly, if risks are to be avoided.

An Oceana (an environmental NGO) report from 2013 found that one third of over 1,200 retail (restaurants, supermarkets, sushi bars) samples was mislabelled in one way or another in the US. In the EU too seafood fraud is common in certain countries. How does Globus make sure that the fish at its fish counters is actually what is stated on the label?

To have specifications of all products is the first step, even if it calls for a lot of paperwork. Having qualified and well-trained staff is the only way to detect and expose mislabelling. Consistently double-checking incoming goods every day without exception is a must

and rigorous penalties must be enforced against erring suppliers.

The FAO and other UN agencies have initiated a campaign to reduce food waste and food loss at all levels of the production chain. A report co-authored by the FAO in 2011 estimated waste of fish and seafood at the retail level at 9% (meat was 4%). What role do supermarkets have to play in the reduction of seafood waste and loss?

Retailers have to dispose of food daily, and supply their shelves as often as possible to ensure the maximum freshness. The product assortment has to be adjusted to the market, and to seasonal and regional demand. Despite this, the biggest proportion of food is wasted in households. Giving customers ideas and advice about preparing simple fish dishes may contribute to a reduction in waste. Knowing how to prepare a tasty meal is probably the best remedy against waste.

How important are trade fairs such as the Seafood Expo Global in Brussels in determining the assortment of products on supermarket shelves? What are the most important criteria a product must meet to be placed on Globus' shelves?

At seafood shows we can find new ideas (for example, products shortlisted for the Prix d'Elite at the Brussels show). Finding raw or ready products or new suppliers can be helpful, but they have to prove themselves on the national market. In general Globus looks for products that are of good quality, traceable, sustainable, with assured deliveries, and that meet the taste of the market.

Fish is typically eaten by a certain consumer segment older,

wealthier, and better educated, yet it is important to get younger people and in particular children to eat and enjoy fish. How can supermarkets play a role in attracting younger users to eat more fish?

Supermarkets have to promote fish and seafood by offering more convenient products. Simplifying the process of preparing food at home, for example, by offering products in cooking bags that can go in the oven, or products that can be microwaved or barbecued, is important to generate new customers. Safety is a key attribute, but products that evoke feelings are important too. On the other hand health aspects are not the most critical, when deciding to buy fish.

Are there regular promotion campaigns to increase fish consumption in Germany? Have they achieved their purpose? Do the retail chains contribute to these campaigns? How have they changed over the years and what direction do you think they will take in the future? On a more personal note, what are your favourite seafood species and types of preparation? Do you cook them yourself?

We do not have national promotion campaigns in Germany. Promotions are done by retail chains as a means to sell more fish, though not necessarily with the strategic objective of increasing consumption. Promoting low prices is not the best way to increase sales, but it is the most common. In Germany it is only the Norwegian Seafood Council that campaigns for more fish consumption.

I like cooking fish by myself as often as possible and in different ways. Fresh marine fish from the cold waters of northern Europe are my favourite!

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Imprint

Publisher EUROFISH International Organisation
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Frequency 6 issues per year

Circulation 3000 copies + 5000 online readers

Subscription details Price: EUR 100,-
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