



# EUROFISH MAGAZINE



## Spain

Research, development, and innovation ensure progress in fisheries and aquaculture



**Bucharest event** urges greater Black Sea regional collaboration



A new generation of **FLAGs** tackles local development



The pleasures of angling in the **Baltic Sea region**





# IT'S ALL ABOUT SALMON! SALMON SHOWHOW 8 FEBRUARY 2017

The logo for Salmon Showhow features a stylized orange fish icon to the left of the text. The word "Salmon" is in a bold, dark blue sans-serif font, and "showhow" is in a lighter blue, lowercase sans-serif font.

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# Trade organisations bring the sector forward



The **fisheries and aquaculture sector in Spain** is among the biggest in the EU by several measures, not least by employment. The number of people who depend on the sector for their livelihoods far exceeds that of any other country in the EU. Many of the branches where they work are organised into trade associations giving the individual a means of representation and interaction with the rest of civil society. The associations advocate on behalf of their members attempting to shape legislation and policies for their benefit, but also assist them to stay competitive and informed about issues that can influence their business. The coverage of Spain in this edition of the Eurofish Magazine features a few of these organisations, their priorities, and how they intend to achieve them. Read more on [page 34](#)



The **Vigo Dialogue**, a discussion among stakeholders on labour issues and working conditions for workers in the fields of fisheries and aquaculture has taken on a degree of urgency as an increasing number of instances of exploitation comes to light. The FAO is pushing stakeholders to do more as much progress could be made if existing commitments were properly implemented and policed. Treating labour badly, in addition to being ethically and socially unacceptable, justifies calls for a level playing field and restrictions on imports that may be produced under abusive conditions. The meeting did establish that some countries were working to improve conditions for their seafood industry workers, and it was apparent that participants were prepared to work together against this problem, which will call for a degree of international collaboration if it is to be eradicated. Read more on [page 16](#)



**Norwegian seafood**, already one of the country's largest exports, is now becoming the source of a new adventure, this time in the area of marine by-products. The leftovers from the fishing and processing industries are a vast resource for high value lipids and proteins. By 2050 Norway has set itself a target of a value of EUR8bn to be achieved from marine ingredients. Helping to realise this ambition is Legasea, a cluster of companies, that will act as a catalyst for the development of internationally marketable products from this resource. Many purposes are being served simultaneously by the cluster, the addition of value, reduction of waste, and the generation of employment, are the most immediately obvious, but more research and greater knowledge about marine ingredients and their uses may well lead to other equally useful developments in the future. Read Dr Manfred Klinkhardt's report from [page 50](#)



The **deep water rose shrimp and giant red shrimp** are among the most valuable species caught by the Italian trawl fisheries and are exported across Europe. The crustaceans are processed at sea often with the use of sulphites to prevent black spotting during storage. Sulphites are a commonly used additive in foodstuffs to prolong shelf life, but they have been associated with health issues such as allergies. Italian researchers have now had encouraging results from a study showing that it may be possible to prevent black spots by using an oxygen free packaging in combination with freezing. Value can thus be added to the product without the use of chemicals, a potentially desirable feature on some markets. Read more on [page 57](#)



The **fishmeal and fish oil** industry must juggle several different factors, including environmental, biological, commercial, and legal, in order to thrive. While the aquaculture sector, the biggest user of fishmeal and fish oil, is growing the proportion of marine ingredients in fish feed is falling. On the other hand more lucrative uses are being found for the raw material that is used for the production of fishmeal and fish oil. A recent conference in Hirtshals, Denmark brought together several participants with an interest in fishmeal and fish oil in an attempt to chart the future course of the industry. Read more on [page 59](#)



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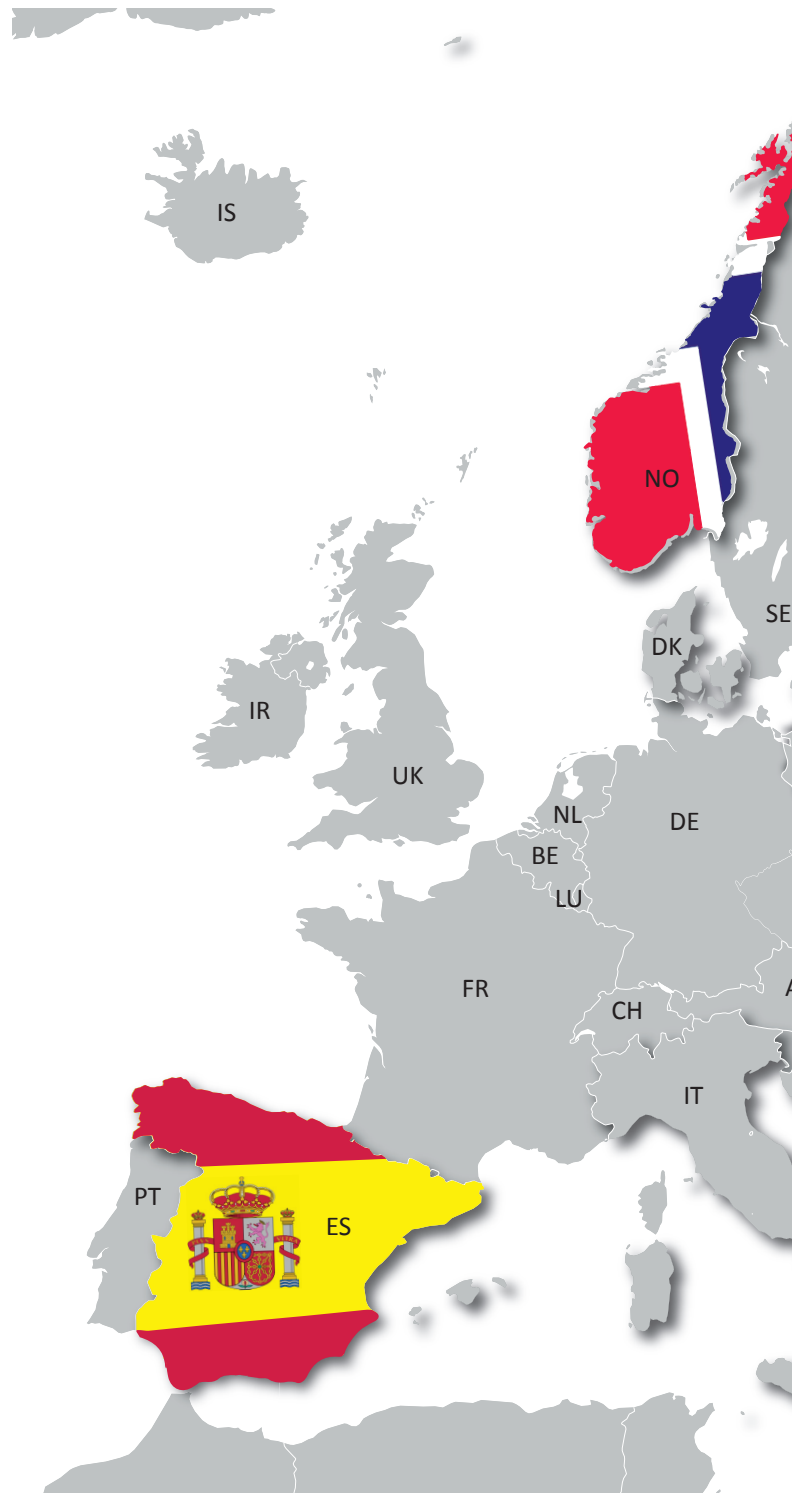
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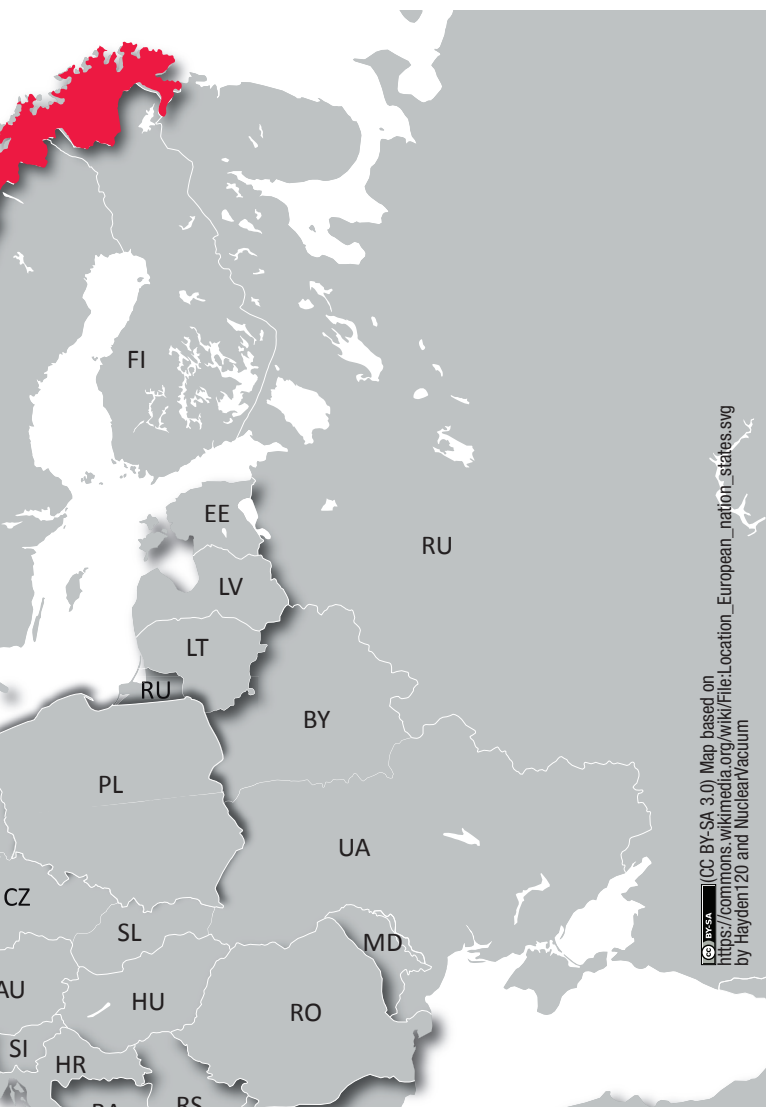
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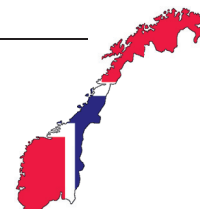
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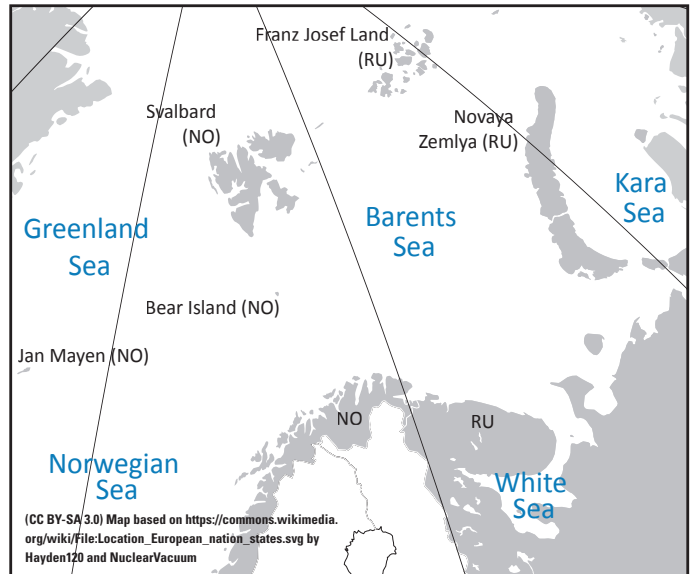


## Norway: Forty years of joint resources management in the Barents Sea

Norway and Russia agreed on Barents Sea groundfish quotas marking forty years of collaboration on resource management in the region. The two nations signed an agreement on an 890,000 tonnes cod quota for the Barents Sea, which gives Norway a quota of around 400,000 tonnes, according to a statement from the Norwegian government. Under the latest agreement, Norway and Russia have agreed on quotas for cod, haddock, capelin, Greenland halibut and deep sea redfish, access to fish for snow crab and conditions for fisheries research activity in each other's zones. "This is a unique collaboration on the management of the main fish resources in the Barents Sea. The agreement ensures that the sustainable harvesting of these resources continues. Under the revised management rules, cod,

haddock and capelin stocks are still well cared for," said Fisheries Minister Per Sandberg.

The haddock quota is set at 233,000 tonnes for 2017. The Norwegian haddock quota will be 113,564 tonnes, which includes a research quota. The total quota for Greenland halibut in 2017 is 24,000 tonnes. This is an increase of 2,000 tonnes over the 2016 quota. The deep sea redfish quota is set at 30,000 tonnes. Norway and Russia confirmed reciprocal access to each other's fishing vessels for fishing snow crab on the Norwegian and Russian continental shelf in the Loophole for the rest of 2016. Fisheries Agreement also contains technical regulations for fishing operations, control and research. There is an extensive research collaboration between Norway and Russia on living marine resources and



**Fish resources in the Barents Sea have been jointly managed by Norway and Russia for the last 40 years.**

ecosystem in the Barents Sea, and the parties agreed on the joint Norwegian-Russian research program for 2017. Both parties agreed on terms for the implementation

of fisheries research cruises in each other's zones. This offers hope that the lack of permits for Norwegian research activities in Russian waters can be resolved.

## Fish market in Romania expanded in 2016

In 2016, Romania's fish sales expanded by 3 percent to a total of €350 million. "There have been some positive developments in Romania's fish and seafood industry. Romania is not as fond of fish and seafood as Spain, France and Italy which are the European leaders," said Cristian Dărmănescu, the chief executive

of local fish and seafood distributor Romfood Trading. "However, we have seen a noticeable growth in the consumption of fish over the past three years, and this is a good sign." Among the reasons for this positive development is the rise in domestic demand and the government's move to reduce the value-added tax (VAT) on fish. As

of June 1, 2015, the VAT on fish and various other food products was reduced from the previous rate of 24 per cent to 9 per cent. According to Dărmănescu, the Romanian government's decision to cut VAT on various food products, including fish, was possibly the single most important factor to contribute to the rise in domestic fish

consumption. The Romanian fish market is dominated by imports. In a recent report on Romania's fish industry the US Department of Agriculture said that domestic fish supply could not meet the consumers' needs and preferences, and covers less than 20 per cent of the total demand. The remainder is covered by imports.

## France: Fighting fish crime through global co-operation

Recent research by D. Miller and others, published in the June 2016 edition of the journal *Frontiers in Ecology and the Environment*, has revealed that IUU fishing vessels operators are able to purchase insurance coverage even for their blacklisted vessels. Illegal and unreported fishing alone costs the global economy up to USD 23 billion each year, a figure which probably underestimates

the full negative impact of these activities. There is a need for governments and international organisations to consider the economic losses faced by legitimate fishers whose catches may dwindle, or the costs associated with the criminality surrounding illegally-caught fish. Lasse Gustavsson from the environmental NGO Oceana says that insurers can play an important role in

helping to combat illegal fishing. At an OECD Conference on combating crime in the fisheries sector in October, Oceana launched a project aimed at mobilizing the global marine insurance industry in taking action against illegal, unreported, and unregulated (IUU) fishing. The conference is recognition that countries and international organisations agree that they cannot work alone. A

complex web of enforcement needs to be built to end criminals' belief that they can conduct illegal operations at sea with impunity. Together countries and organisations can support efforts to fight fisheries related crimes by sharing good practices, collaborating on projects and promoting effective inter-agency co-operation at national, regional and international level.





## Danish anglers urged to help catch 80,000 escaped trout

Danish anglers are rushing to a fjord in western Denmark to catch some of the 80,000 rainbow trout that have been accidentally released from a fish farm. The accident was caused by a cargo vessel crashing into the farm and releasing the fish into the open sea off Assens, 200 kilometres west of Copenhagen in the western Baltic Sea. The farm was estimated to hold 250 tonnes of fish. Authorities fear the fish, which were due for slaughter, will disturb the natural status quo by disturbing the eggs and alevins of wild sea trout. Tim Petersen, the farm owner reported that the trout which weigh 3 kg each had been scheduled to be slaughtered the same week. They were worth up to DKK10 million (EUR1.34 million).

The accident has alarmed environmentalists. Søren Knabe, chair of the environmental group Vandpleje Fyn and member of the Danish Angler's Association said the farmed trout could not have escaped at a worse time because wild sea trout were swimming up the island's streams and inlets to spawn and sea trout eggs are a favorite food for rainbow trout. Andreas Lyngø, an angler, said that the rainbow trout were everywhere. Although some anglers said the escaped fish would take time to adjust to life in the wild, and were unlikely to start taking the bait for four or five days, Mr Lyngø was determined. "These fish have got to die," he said, "They'll destroy the natural population."



Anglers were invited to help catch large trout that escaped following a collision between a vessel and a Danish fish farm.

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## Denmark: Turnkey salmon processing solutions

Equipment manufacturer Marel will once again hold its well-known event, Salmon Showhow, for the salmon processing sector at its dedicated facility Progress Point in Copenhagen on 8 February 2017. The event is an opportunity to view the latest equipment and services from the company, and to listen to respected guest speakers discuss the latest technological developments, as well as other issues such as markets or regulation. In 2015 there were more than 300 visitors representing

150 different companies from 30 countries all around the world. Participants will experience on first-hand, how Marel's process equipment works in a simulated production environment. With the ever-growing needs of salmon producers, to ensure hygienic production, with increased yield and improved utilization of raw materials, the event is a valuable opportunity for manufacturers to experience how Marel's equipment can help meet those needs and demands. The Salmon

Showhow also offers collateral benefits in the form of networking opportunities for people in the salmon and related businesses. Progress Point is minutes away from Copenhagen airport and is the company's dedicated training and demonstration facility. The

event will feature regular live demonstrations of integrated processing lines as well as stand-alone machines with technical experts on hand to answer any questions. For more information visit [marel.com/salmonshowhow](http://marel.com/salmonshowhow) or email [salmonshowhow@marel.com](mailto:salmonshowhow@marel.com).



## Small-scale fishermen lose out in the Baltic Sea

The Council of Ministers reached an agreement on fishing opportunities for 2017 in the Baltic. The ministers agreed on a quota reduction of 56 percent for cod in the Western Baltic Sea, while the quota for cod in the Eastern Baltic Sea was reduced by 25 percent. This means an 88 percent decrease from last year's figures. The cod stocks, and especially the Western stock, are deteriorating fast. Member States therefore agreed to complement quota reductions for Western cod with a comprehensive set of other conservation measures,

such as the extension of the fisheries closure period from 6 to 8 weeks and limitations to daily catches by recreational anglers during the closure. The Commission is satisfied that the reductions agreed are consistent with both scientific advice and the multiannual management plan for the Baltic Sea.

According to Europêche, which represents fishermen across Europe, the problem is not the stock but the way the advice has been assessed - which now includes advice for artisanal

fishermen. The latter, who are not actually regulated by the Common Fisheries Policy, have been offered the lion's share of the quota. According to Javier Garat, the Europêche President, the number of active fishing vessels in the Danish Baltic fleet today number just 200 vessels, the majority belonging to the small-scale fleet. It is these that will feel the biggest impact from these potential cuts, he said. Karmenu Vella, Commissioner for Maritime Affairs and Fisheries was positive about the result, saying that it combined

science with sustainability and socio-economic considerations. He pointed out that the European Maritime and Fisheries Fund was available to national authorities to support the industry, and particularly artisanal fishermen, during this challenging but hopefully short period. Under the new Baltic management plan, Member States also have the possibility to adopt tailored measures through regionalization, like for instance redistributing national quotas to those small fleet segments that are most affected.

## Norway: Record growth in seafood exports

Norway beat all previous records and exported seafood worth NOK 65 billion (EUR 7,2 billion) this year to September. This is an increase of 26 percent compared with the same period last year. The US, Italy and South Korea are examples of strong growth markets, and they demonstrate the breadth of Norwegian seafood exports; Norway now exports a lot of salmon, trout, cod and crab to the US, whilst Italy, long

a stockfish market, has now also developed an appetite for Norwegian salmon.

Norway has exported salmon to a value of NOK 44 billion so far this year. This is an increase of 30 percent or NOK 10.1 billion compared to the same period last year. The export price for fresh whole salmon so far this year has been 41 per cent higher than during the same period last

year. This is due to a combination of reduced export volumes and a strong demand for Norwegian salmon according to Morten Lindrupsen, an analyst with the Norwegian Seafood Council. It is not just the export of salmon which has been good for Norwegian export figures. Fresh cod, including fillets, increased 13% to NOK 1.8 billion; herring was up 45% to NOK 2.1 billion; and mackerel by 13% to

NOK 1.8 billion. Kristin Lien, an analyst with the council attributed the rise in herring exports to strong demand and low quotas on European markets, while mackerel prices increased due to demand on Asian markets. Exports of salted fish increased 8% to NOK 1 billion and crab by 89% to NOK 344 million. Only clipfish exports bucked the trend falling 9% to NOK 252 million.

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## MAIN THEMES 2017

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**CHINA**

## SEMINAR OVERVIEW

### DAY ZERO - MARCH 7th

- IMR/FAO/NIFES OCEAN FISHERIES SEMINAR
- NASF/NCE INNOVATION DAY
- NASF/NCE YOUNG FISH LEADERSHIP

### DAY ONE - MARCH 8th

- OPENING - SEAFOOD POLICY
- NASF RETAIL PANEL
- GLOBAL SALMON SUMMIT
- GLOBAL WHITEFISH SUMMIT

### DAY TWO - MARCH 9th

- PARETO SECURITIES INVESTOR SEMINAR
- NASF/MSC SUSTAINABILITY SEMINAR
- GLOBAL PELAGIC SUMMIT
- NASF/ICWPF SIDE EVENT

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## American lobster not on EU list of alien invasive species

The European Union has decided to reject a Swedish attempt to have the American lobster declared an invasive species. This means that the American lobster has not been included in the European Commission's proposal for a new updated EU list of invasive species, and therefore there is no ban on imports of live American lobster to the EU. Last spring, Sweden submitted a proposal to the European Commission for American lobster (*Homarus americanus*) to be added to the EU list of invasive alien species. The Swedish risk assessment, submitted to the EU's scientific forum for invasive alien species, was approved, which means that it meets the scientific criteria to be listed. The Commission has since been guiding discussions with EU Member States on implementation. At a meeting of the implementation committee, demonstrated that there was no

support among the EU Member States to list American lobster as the consequence, in the form of a ban on imports, was deemed disproportionate at EU level.

Björn Sjöberg from the Swedish Agency for Marine and Water Management said that the suggestion was that less trade restrictive measures should be examined, such as national or regional measures, and coordinating efforts with neighbouring countries, industry and stakeholders. In Sweden, it is forbidden to release live, imported lobsters in the sea, although it is difficult to monitor such a ban. Since 2008, more than 30 specimens of American lobster have been found along the west coast, most in Gullmarsfjorden at Lysekil, including a female carrying hybrid eggs. The researchers believe that there may be many more in Swedish waters.



**Live American lobster will continue to be imported into the EU following a decision against declaring it an invasive species.**

The American lobster can spread disease and form hybrids with the European lobster. There is also a risk that diseases and parasites could be spread to other

seafood than lobster, such as crab and langoustine. American lobsters have also been found in Denmark, Iceland, Norway and the UK.

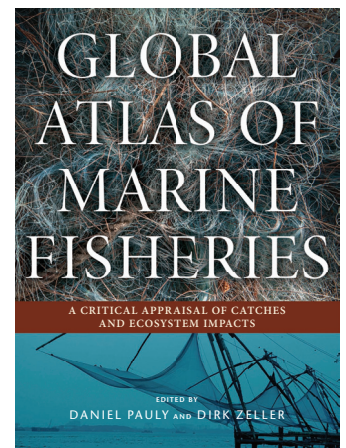
## Canada: New book details and examines impact of global marine catches

The Sea Around Us, a research project at the University of British Columbia to study human impact on marine ecosystems, began with a question: what changes are occurring to the world's oceans, and what are the drivers of these changes? With focused support from some of the largest philanthropic organizations in the world, Daniel Pauly has taken key results from the project to create the *Global Atlas of Marine Fisheries*.

Pauly made waves by shining a light on the theory of "shifting baselines", the idea that identifying the correct baseline population size was flawed because of a loss of perception of change. To account for the shifting baseline

and under- (and *over-*) reported fisheries data, instead of introducing new monitoring technologies Pauly proposed a method of *reconstruction*. Reconstructing the past and comparing it to the present could "give a reasonable sense for how marine fisheries have changed over time". The *Global Atlas of Marine Fisheries* is the culmination of years of activity with researchers from around the world to look at the historical data. It includes single-page summaries of marine fisheries in the exclusive economic zones of over 270 countries. In addition, there is a separate chapter on catches of large pelagics (mainly tuna) from the high seas. The data give a picture of the total

catches from the ecosystems including reported landings, catches from artisanal and recreational fishing, unreported landings, and discards, showing that global marine fisheries catches are much higher than officially reported. The implications of this for fisheries management and policy form the basis of one of the chapters; others address questions regarding the impact on other parts of the ecosystem, the biological and economic effects of continuing fishing at this rate, the health of different ecosystems, and the role of large-scale commercial fisheries. With its combination of national reports and studies of cross-cutting topics the book should be prescribed reading



for all those with an interest in fisheries – policy makers, researchers, students, NGOs, and industry professionals. For more information visit <https://islandpress.org/book/global-atlas-of-marine-fisheries>.

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## Spain: Ultimatum on swordfish in the Mediterranean

Oceana, an environmental NGO, has called on the European Union to stop all swordfish fishing in the Mediterranean unless an immediate recovery plan focused on rebuilding stocks is put in place. According to Oceana, Mediterranean swordfish has been assessed as overfished for the last three decades. The stock has declined steeply since the 1980s, falling to levels that are currently 88% lower than what is considered sustainable. Mediterranean swordfish has been reduced to one third of its size in just thirty years, and fresh scientific advice reveals that if no action is taken to stop overfishing, there is no chance that the stock can ever recover by itself. Recent public data has also shown that swordfish fishing fleets and markets are now beginning to suffer the economic impact of this loss.

Scientists at the International Commission for the Conservation of Atlantic Tunas (ICCAT) which presented the new scientific advice pointed out that the state of the swordfish fishery in the region is critical. An immediate recovery plan is necessary to bring stocks back to sustainable levels. Lasse Gustavsson from Oceana said that the sharp decline of Mediterranean swordfish would only get worse without a recovery plan that limits catches through a quota system. "Either the EU fights for a robust recovery plan or it stands to lose swordfish," he warned. Italy, the biggest player in the Mediterranean swordfish fishery, accounts for over 45 percent of Mediterranean swordfish catches, but has to import almost seven times its catches from other countries, including Morocco and Algeria.



The stock of swordfish in the Mediterranean is in urgent need of a recovery plan, says Oceana, if it is to recover from decades of overfishing. Shown here, a swordfish from the Atlantic.

## Canada: Protecting fish stocks in the northwest Atlantic Ocean

Together with international partners, Canada is working to ensure sustainable fisheries in the northwest Atlantic Ocean, to promote economic growth and benefits for those living in coastal communities. At the 38<sup>th</sup> annual meeting of the Northwest Atlantic Fisheries Organization (NAFO) in Varadero, Cuba, Canada expressed its strong support for scientific advice and strict management measures that protect straddling fish stocks in the area. At the meeting, NAFO members discussed progress on protecting vulnerable marine ecosystems (VME) and accepted Canada's proposal, co-sponsored by Iceland, Norway and the United States, to establish an additional closure to protect

an area of sea pens on Flemish Cap. With the addition of this closure (239 square km), NAFO has now protected a total of 380,511 square km in its regulatory area. Canada plays a leadership role in the measures to protect VME species such as cold-water corals, sponges and sea pens from the impact of fishing activities. Dominic LeBlanc, minister of fisheries, oceans and the Canadian coast guard, said his country was committed to working with other NAFO members to promote economic growth and ensure prosperous and sustainable fisheries that benefit Canadians living in Atlantic coastal communities. The proposal was accepted by NAFO members at the meeting.

## "History made" as EU, other major economies create Antarctic marine park

The world's largest marine protected area was created at a meeting of the Commission for the Conservation of Antarctic Marine Living Resources, in Hogarth, Australia. The marine park, measuring some 1.5 square kilometers of the sea, includes an area in the Ross Sea of 1.1 million km (the area of France and Spain combined), in which fishing will be banned.

effort; organizations as varied as Interpol, national governments, and NGOs have long been trying to eliminate such illegal fishing.

Agreement was long in coming, due to objections by China and Russia over proposals to make the ban permanent. Both nations currently have fishing operation in and near the proposed park area. The chief commercial species is toothfish, which is harvested subject to strict international quotas. That fishery will be geographically restricted, as the park closes off part of the current fishing grounds. Toothfish is the target of a large, problematic illegal, unreported, unregulated (IUU) fishing

"CCAMLR has made history by declaring the planet's largest marine protected area in the Ross Sea," said Andrea Kavanagh, the director of Antarctic and Southern Ocean work for the Pew Charitable Trusts, which has been working for years to achieve today's result. The primary objective of the Antarctic marine park is the protection of species of whales and penguins which are listed by CITES and other bodies as endangered. "It is a significant moment," said Evan Bloom, director of the Office of Ocean and Polar Affairs in the US Department of State and the head of the US delegation to the meeting. "We've been working towards this for many years. It's taken time to get consensus but now we have established the world's largest marine protected area."



## Finnish researcher wins award at ICES annual conference

The experimental study was conducted by researchers at the University of Turku, the University of Helsinki, and the Åbo Akademi in Finland in collaboration with scientists from the Leibniz-Institute of Freshwater Ecology and Inland Fisheries in Berlin. The team focused on the effect of size-selective harvesting on body size variation. Zebra fish populations were harvested size-selectively for five generations after which the harvesting was stopped for six generations. The researchers found consistent differences in body size variation among differentially harvested zebrafish populations.

Silva Uusi-Heikkilä, a postdoctoral researcher from the University of Turku said the findings showed

that harvesting large fish led to lower size variation compared to a harvesting strategy where the largest fish were protected. Her research was presented at the ICES annual science conference held in Riga, Latvia this year where it won the best presentation award. As she explained, decreased size variation caused by fishing can have serious consequences for the resilience and recovery of exploited fish stocks. It can negatively affect the population's ability to buffer environmental changes, decrease the rate of evolutionary rebound and, ultimately slow down recovery from overfishing. It is important therefore that sustainable fisheries management not only manages fish stock abundances but also variability within a stock.



Silva Uusi-Heikkilä's study on the impact of size selective harvesting on body size variation won an award at the ICES annual science conference this year. She used zebra fish in her research, but here she holds a perch.



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## Canada: Farmed salmon is the 'greenest' protein

A new study prepared for the British Columbia Salmon Farming Association has examined the evidence from life-cycle analyses on the environmental footprint of B.C. farm-raised salmon compared to the production of other proteins. A detailed assessment of consumers' most common protein choices shows salmon raised in the ocean have the lowest overall cost to the environment. Through a life-cycle analysis (LCA) it has possible to compare different food

systems based on several objective environmental measures. The most common indicators in an ISO standardized method for measuring a cradle-to-farm gate approach across the animal or crop's life are: energy use, greenhouse gas emissions, eutrophication potential, water use and land use.

Based on the valuation of greenhouse gases, land use, water use, and eutrophication, B.C. salmon farming has a lower total

environmental cost than beef, chicken, or pork. Farm-raised salmon is 24% less costly to the environment than chicken, while the costs of beef are 500% greater than salmon raised in an ocean environment. Farm-raised salmon had the lowest impact in GHG emissions, water-usage, land-usage, and eutrophication potential. Furthermore, compared to all other animals used for protein, farm-raised salmon have the best feed conversion ratio of just 1.2:1.

Jeremy Dunn, BC Salmon Farmers Association Executive Director, said that while health professionals agreed that salmon was by far the most healthy protein choice for people, the new study showed that it was also the most healthy protein for the planet. With world population estimated by the United Nations to grow by over two billion by 2050, governments must consider the full environmental costs of the food that is grown and eaten, as both the food supply and the environment are global.

## New EU-Canada trade agreement seeks to reduce consumer prices and boost trade

The EU and Canada signed a long-awaited free trade agreement, the Comprehensive Economic and Trade Agreement, on 30 October 2016, following an 11<sup>th</sup>-hour resolution of concerns raised by farmers and others in the Wallonia region of Belgium. When it is fully implemented, CETA, as the agreement is known, will eliminate virtually all tariffs in imports between the two economies, harmonize and reduce trade regulations and related structural barriers, and provide a mechanism to resolve disputes concerning trade, investment, and other economic matters.

Concerning fish and seafood, CETA will completely eliminate tariffs that on most products are already low (many under 5% ad valorem). However, some important items, such as lobsters from Canada and sardines from the EU, currently face significant import tariffs. When these tariffs are phased down, prices of such products are expected to fall, leading to increased demand and consumption. There is also likely



**The recently concluded trade agreement between Canada and the EU will reduce tariffs on EU imports of lobster and Canadian imports of sardines.**

to be a shift in seafood trade patterns between the EU and its trading partners. Lower-priced Canadian products will tend to replace EU imports from the USA, Asian countries, and other sources, while on the export side, EU exporters will likely see increased opportunities in the Canadian market at the expense of non-North American suppliers (as Canada already has a free trade agreement with the USA and Mexico).

It will take some time for the CETA to be fully implemented, and longer still to know its full effects, but lower consumer prices and increased trade volumes are highly likely to be the general results. Since 2009 Canada has had a free trade agreement, the Canada-EFTA Free Trade Agreement, with Iceland, Norway, Switzerland and Liechtenstein. Canada also has Foreign Investment Promotion and Protection Agreements (which focus

on investment more than trade) with several European countries, including, Ukraine, Poland, Russia, and Croatia, among others, with other agreements signed but not yet implemented. On the EU side, two comprehensive trade agreements with implications for seafood await completion: the T-TIP agreement with the United States and an accord with key Latin American tuna and shrimp exporter Ecuador, both possibly finalising in 2017.

Aquaculture Europe 2016, 20-23 September, Edinburgh

# Copepods, a promising live feed for farmed fish and shrimp larvae

The European Aquaculture Society's conference in Edinburgh, Scotland, 'Food for thought,' hosted a special session, 'Production of copepods as live feeds,' following a proposal from the newly established EAS COPEAT network.

Copepods are defined as mm-sized (or smaller) crustaceans from the copepod order *Calanoida* inhabiting the free water mass in oceans. These creatures are considered the predominant natural feed for altricial fish larvae (fish larvae that require external feed), and are therefore fish larvae's 'natural choice' when it comes to their diet.

## Copepods offer several benefits compared with conventional larval feed

Globally, most of the cultivation of finfish and shrimps is based on a diet of rotifers and brine shrimps (*Artemia*) as live feed during the farmed species' larval phase. This is despite the fact that copepod nauplii (the first six larval stages) followed by copepodites (the next six development stages) are a natural feed. They offer a significantly better biochemical profile, are within a broad and appropriate size range, and exhibit an attractive swimming behavior. As a result, copepods are without question the optimal prey for marine larvae.

However, it has until now not been possible to mass cultivate copepods due to biological, technical and economic challenges. The AES session comprised nine oral and three poster contributions, all focused on copepods in aquaculture. An overview lecture

from a Danish national research program IMProvement of AQUaculture high quality fish fry production (IMPAQ) reported on the status and revealed future challenges to copepod mass production. The talk emphasized that just about all biological obstacles have been overcome or are on track to being solved. Some technical challenges remain to be dealt with, however, before mass cultivation is sustainable in terms of production volume and costs.

## Presentations raise several interesting aspects of copepod production

Copepods cannot be produced without the microalgae on which they feed. Two oral contributions from Danish and Dutch groups about algal physiology and growth focused on the optimization of daily culture practice, light spectrum and intensity besides feed-back biomass monitoring, eventually applied in large photo bio reactors. Three oral contributions from South Africa, Taiwan and USA focused on implementing and optimizing production of copepods belonging to different genera and even different orders. Some obvious highlights were that it appears that some copepods can modify their highly unsaturated fatty acids by performing a so-called trophic upgrade; this makes



Minh Vu Thi Thuy

Copepods, such as this female *Acartia tonsa* (Dana), are in many ways the optimal live feed for the larval stages of farmed fish and shrimp.

them very interesting for live feed even though they are cultured in outdoor ponds characterized by low quality particulate feed. Two of the contributions raised interesting discussions about the relevance of using egg

carrying copepod species vs. the more obvious free spawning species. Moreover, the American contribution described a rearing concept that so far delivered approximately 30 million copepod eggs daily. This represents

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an important step towards mass production of these animals.

### Nauplii can be frozen and revitalized on thawing

A paper presented by a researcher from the company 'Planktonic' revealed live feed copepod nauplii originating for the first time from wild caught material. These nauplii can be stored in a mix of chemicals in liquid nitrogen and are able to re-vitalize within minutes when thawed. Storage time is thereby extended to infinity. This is a completely different strategy from culturing live copepods and makes storing and shipping copepod products much easier. However, this concept cannot at present fully substitute live copepod rearing as hatcheries need specific products depending on the needs of the larvae of the different fish and shrimp species. A Norwegian team presented 'Copeponics', a

multi-trophic aquaponics system with copepods as a key component. The major innovations were that the relatively simple design can save seawater, automatically clean the recirculated seawater, keep the microbial load at a minimum, and at the same time recycle microalgae, while producing copepods.

### Copepod genomics

The final presentation in the oral session emphasized the importance and gave an in-depth status report on how far we are from releasing the first calanoid copepod genome. The genome will have a significant bearing on further understanding physiological responses by copepods in nature and in aquaculture. The three posters presented which microalgae species give the best copepod output, the significance of the fatty acid composition of algal feed for the copepods own biochemical

profile, and a new research topic – 'designer feed' where specific traits (body size and lipid content) can be promoted by classical breeding techniques.

This maiden copepod session at the European Aquaculture Society's annual conference further strengthens the COPEAT network within the European Aquaculture Society. A promising future for COPEAT activities has emerged

for the benefit of future EAS conferences and not least for the end-users, the hatcheries.

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## A big 40<sup>th</sup> birthday bash for the European Aquaculture Society

Aquaculture Europe 2016 was held in Edinburgh on October 21st. The event attracted 1,700 participants



from 65 countries, making it the biggest Aquaculture Europe event to date. The numerous scientific presentations covering all aspects of aquaculture research were split into eight parallel sessions spread over three days and there were 452 posters as well. The event included an industry exhibition with 73 companies and four industry forums – all in all a fitting commemoration of EAS' 40<sup>th</sup> anniversary.

## FAO pushes for more robust efforts by stakeholders to improve labour conditions in fisheries and aquaculture

# “Dialogue is great, but action is better”

In collaboration with Conxemar, an important Spanish seafood industry association, FAO hosted the Vigo Dialogue on Decent Work in Fisheries and Aquaculture at the beginning of October 2016, to discuss labour issues and working conditions of fish workers in capture fisheries, aquaculture, fish processing and distribution.

The issue of decent work in the seafood sector has been receiving increasing media attention in recent years, as more frequent instances of labour abuses in the industry are coming to light. As a result of this attention, the seafood industry and retailers are feeling growing pressure from consumers to not only guarantee the environmental sustainability of products, but also to safeguard the labour

conditions of workers involved in the production, processing and supply of seafood.

### Well-attended meeting to discuss labour issues

There is a strong call for more accountability, but the challenges are numerous for seafood supply chains that involve multiple stakeholders and continue to grow longer, more international

and increasingly complex. Finding sustainable solutions will require a strong commitment by and collaboration between the various players in the sector. Some seventy-five people took part in the one-day Vigo event representing civil society and fish workers' unions, governments, international and intergovernmental organizations (including FAO and the International Labour Organization), certification schemes,

and various initiatives addressing labour issues and due diligence along seafood value chains.

The Vigo Dialogue was opened by FAO's Manuel Barange, Director of the Fisheries and Aquaculture Department, who reminded participants that aspects of decent work in the fisheries and aquaculture sectors are already embedded in a range of international instruments such as the FAO's



**In many countries workers in the seafood industry would benefit from better implementation and enforcement of existing legislation.**

Code of Conduct for Responsible Fisheries, the FAO Voluntary Guidelines for Securing Small-Scale Fisheries, and the International Labour Organization (ILO)'s Work in Fishing Convention and Forced Labour Protocol, which all need to be fully implemented. He noted that the fight against illegal, unreported and unregulated (IUU) fishing is inextricably linked to unfair labour practices, and reminded participants that the FAO Port State Measures Agreement that entered into force in June 2016 is the first international legally-binding treaty designed to eliminate IUU fishing. He concluded his remarks stating "Dialogue is great, but action is better. When it comes to working together to guarantee decent work for all the men and women working at all stages along the seafood supply chain, it's time for action."

### **Exploitative conditions affect workers in both poor and rich countries**

Participants repeated the need for governments to ratify the ILO's Convention 188 that addresses

work in fishing, and urged close collaboration between governments, the ILO and FAO, civil society organizations, unions and the industry and retailers. An issue that emerged frequently is that ensuring decent work and fair employment conditions in the fish business is not only relevant to developing countries. As recent media stories have illustrated, incidences of labour abuse in the seafood value chain occur also in developed countries, and international collaboration will be required to reverse this.

The seafood industry presented initiatives underway to improve social and labour standards along the value chain, but expressed the importance of working closely together for a unified and more effective approach. In addition to a number of industry associations, representatives of the International Coalition of Fisheries Associations (ICFA), *Europêche*, the association of national organizations of fishing enterprises in the European Union, and The Consumer Goods Forum (CGF) presented their views and called for better enforcement of existing

international and national legislation as well as for stronger commitments by all actors in seafood supply chains.

### **Employers and employees need to work together if conditions are to improve**

Fishworkers' unions such as the International Transport Workers Federation (ITF) and the International Union of Food Workers (IUF) presented examples of labour abuses in the seafood industry. They spanned incidents of physical abuse, nonpayment for work, debt bondage, human trafficking, violence, and child labour. Labour union representatives felt they had a key role to play in making the voice of fish workers heard and in collaborating with the industry to help the industry make changes. Representatives felt that things are changing, but not quickly enough. They called among others for more effective and coordinated multi-agency labour inspections on board fishing vessels as well as for the development of an international binding instrument providing for specific labour standards

for the seafood sector, all along the seafood supply chain.

A number of international initiatives active in auditing, certification and labelling, such as the Marine Stewardship Council, GlobalGAP, Sustainable Fisheries Partnership, the Aquaculture Stewardship Council, the Seafood Stewardship Index and the Global Sustainable Seafood Initiative presented ongoing and planned efforts on including or enhancing social and labour criteria and standards in their certification programmes.

### **Countries describe efforts to protect labour**

Representatives from five countries, Senegal, Indonesia, Thailand, UK, and Viet Nam, presented the challenges they face to achieving decent working conditions in the seafood sector, and what is being done to overcoming these challenges. Senegal has not yet adopted ILO Convention 188, but, since 2008, has been working closely with ILO and FAO to devise national Fisheries Plans of Action. As part of this process, the government is working with multiple internal stakeholders to initiate an inclusive dialogue designed to improve fisheries management and associated labour governance measures. In Indonesia, Mr Anang Noegroho, Director of Investment Development in the Ministry of Marine Affairs and Fisheries reported, efforts to combat IUU fishing had resulted in the release of more than 1,000 victims of trafficking from the vessels on which they were forcibly held. In Thailand, where conditions among workers in the seafood industry have been widely publicized and threaten to jeopardise Thai seafood exports to the EU, the government is working to prevent abuses of labour and to



improve fisheries management, said Ms Praulai Nootmorn from Thailand's Department of Fisheries. Ms Helen Duggan, of UK's Seafish, presented the "Responsible Fishing Scheme," which certifies the high standards of crew welfare on board UK fishing

vessels. Finally, in Viet Nam, support for VietGAP applications should improve socio-economic, including labour, conditions in the aquaculture sector.

If the Vigo Dialogue on Decent Work in Fisheries and Aquaculture

is any indication, there is enormous good will from all parties to work productively together. The level of engagement by all concerned parties is encouraging. ILO and FAO will be discussing decent work issues further with interested stakeholders and following up

this event with more dialogue and information sharing.

*Kimberly Sullivan, Uwe Barg, FAO; Mariaeleonora D'Andrea, Decent Work Consultant  
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## Romania hosts high level fisheries and aquaculture conference

# Black Sea countries urged to cooperate more

An international conference on fisheries and aquaculture in Bucharest concluded with a call for all stakeholders to work together towards making the sector sustainable.

The High-Level Conference Towards Enhanced Cooperation on Black Sea Fisheries and Aquaculture, gathered ministers and high-level representatives from the Black Sea region. Achim Irimescu, Minister of Agriculture and Rural Development of Romania, noted that this was an important benchmark "in the process of striking a balance between immediate economic interests and the protection of marine fisheries resources in the Black Sea". Following the declaration from the event Nicolae Dimulescu, President of the National Agency for Fisheries and Aquaculture of Romania commented that the road was being paved towards "a clean sea for happy fishers".

The first day of the event consisted of an expert session with several panels, one of which was on aquaculture. It included experts from many of the countries in the region as well as the GFCM and Eurofish, and the discussions established that sustainable development and growth depends on identifying suitable areas for farming fish and seafood, more research and better

dissemination of knowledge on markets and trends, less red tape, and greater use of technology.

### Challenges exist, but so does potential

Aquaculture represents a huge opportunity to enhance food security, employment and sustainable economic growth in the Black Sea region. While current production includes a wide range of finfish and shellfish species, the full potential of the sector is yet to be realised. Boosting aquaculture development in the Black Sea region calls for a supportive environment, continuous market development, and closer cooperation between the countries in the region.

The panel concluded the discussion saying that aquaculture development in the Black Sea has been constrained by several factors. These include environmental, such as climate change and pollution; governance, such as implementation and coordination of appropriate legislation; economic, such as high initial costs and difficulties in obtaining



**From left, Irina Lomashvili, Ministry of Environment and Natural Resource Protection, Georgia; Irina Yakhontova, Federal Research Institute of Fisheries and Oceanography (VNIRO), Russian Federation; Katia Tribilustova, Eurofish.**

funding; and social, such as the lack of aquaculture farmer organisations. However, the panel also agreed that aquaculture in the Black Sea had vast potential thanks to the presence of different environments and possible species, and due to its probable impact on enhancing food security, employment, and economic opportunities for coastal communities. The panel also highlighted the need to share knowledge on best practices for addressing common challenges within the aquaculture sector, in particular, marine spatial planning activities

and the development of Allocated Zones for Aquaculture (AZA's).

Based on these conclusions the panel formulated several recommendations. Among these was that it was necessary to enact legislation that would facilitate investment, limit conflicts among different users, promote cooperation and coordination among different institutions and stakeholders, and thereby support growth in the sector. Greater coordination among different authorities and users, as well as capacity building, is needed to facilitate the implementation of

AZA – another recommendation from the panel. In addition, the panel recommended that riparian countries should share knowledge and technical expertise to resolve common challenges and support the regional development of aquaculture.

The panel considered the role of the GFCM in this process essential. It highlighted the Aquaculture Task Force recently established by the GFCM that is developing a regional strategy for the sector, which should boost market production and strengthen the contribution of aquaculture to Blue Growth and sustainable development.

### High-level session

The second day of the event was devoted to the main challenges

and future strategies for the Black Sea fisheries and aquaculture by high-level representatives from the riparian countries, international, and regional organisations. All the riparian countries, as well as other important actors in the region, recognised that regional cooperation and synergies were essential for solving the many challenges in the sector. For this reason, initiatives such as the BlackSea4Fish regional project, which aims to facilitate coordination between national administrations in charge of fisheries and the marine environment, were strongly welcomed. The future strategy for sustainable aquaculture development as well as the ongoing mid-term strategy towards the sustainability of Mediterranean and Black Sea fisheries in the region will also be crucial for achieving such goals.

The conference declaration, which aims to enhance cooperation in tackling the most urgent challenges to achieving sustainable fisheries and aquaculture in the Black Sea region, was unanimously adopted. For the first time in the region, this declaration

marks a strong political commitment to adopt a common and collaborative approach to promote the rational exploitation of marine living resources, develop sustainable aquaculture, fight against illegal practices, and mitigate threats to the marine environment.

### Bringing together stakeholders in Black Sea fisheries and aquaculture

The High-Level Conference Towards Enhanced Cooperation on Black Sea Fisheries and Aquaculture was organised by the government of Romania together with the General Fisheries Commission for the Mediterranean (GFCM) of the Food and Agriculture Organisation of the UN (FAO) in cooperation with the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), the Commission on the Protection of the Black Sea Against Pollution, the Organisation of the Black Sea Economic Cooperation and EUROFISH International Organisation. Over one hundred of participants took part in the conference, including top officials and representatives from relevant administrations in the Black Sea region and neighbouring countries, international organisations, universities, government agencies and civil society organisations.

Conxemar, 4-6 October, Vigo

## Success highlights need for expansion

The annual International Frozen Seafood Exhibition, Conxemar, organised by the association of the same name, took place in Vigo, Spain from 4-6 October. The event is the meeting place for seafood traders with a strong focus on Spain, but international exhibitors were also represented with pavilions. For the first time Norway, Croatia,

and Latvia participated in the trade fair with stands. The Spanish government in the form of the Ministry of Agriculture and Fisheries, Food and Environment was represented with a large stand at Conxemar. Events like this are particularly useful for the administration to meet and discuss informally with representatives of the industry. This year attendance



**Andrés Hermida, General Secretary for Fisheries in the Spanish Ministry of Agriculture and Fisheries, Food and Environment, officially opened the event.**



**Sofia Manjon, an intern, and Carmen Rodriguez Muñoz, Head of Area for Fisheries Economics, Directorate General for Fisheries Management.**

reached a milestone surpassing 30,000 visitors from 106 countries, an 11% increase compared to the 2015 event. The number of exhibitors too increased significantly and would have been even higher, but for a lack of exhibition area. About 90 companies, said the organisers, had to be turned down for want of space. Plans are under

development to remedy this and increase the area of the exhibition in time for next year's event. The positive numbers were also boosted by side events, among others, the World Congress on Cephalopods, which was a day prior to the opening on October 3, and an FAO conference on decent work in fisheries and aquaculture.



## Norwegian salmon a household name in Spain

For the first time ever Conxemar featured a Norwegian seafood industry pavilion this year, which was commemorated by a visit from the Norwegian State Secretary for Fisheries and the Norwegian Ambassador to Spain. Organized by Innovation Norway, the stand included 10 companies, among which was the Norwegian Seafood Council. The Spanish market is significant for the Norwegian aquaculture industry because consumption of fish and seafood is the highest in the EU after Portugal, according to Hildegunn Fure Osmundsvåg, director of the Norwegian Seafood Council office in Spain.

In the last three to four years there has been a 30% increase in Norwegian salmon sold to Spain. Data from the European Market Observatory for Fisheries and Aquaculture (EUMOFA) shows

year on year salmon exports to Spain from Norway increased 19% in 2015 to EUR316m. The level has now stabilised as salmon has become an established product that is widely available. More than 80% of the Spanish market now associates salmon with Norway. These are the results of intensive promotion using different media including TV campaigns, online marketing, press trips, and a strong presence on social networks. An example of this is “Mar de Noruega” which has in excess of 80,000 followers on Facebook, moreover many television shows and chefs have showcased Norwegian salmon. A successful TV campaign “Marmacoa” (a play on Barbacoa, the Spanish word for barbecue) ran this spring and promoted salmon as a particularly suitable product to be barbecued. Traditionally Spanish barbecues do not include much



**Hildegunn Fure Osmundsvåg, director of the Norwegian Seafood Council office in Spain.**

fish, but today salmon is a well-recognized choice.

Looking forward, Ms Osmundsvåg will focus on promoting fjord trout, which she believes is another interesting product for the Spanish market with retailers showing a lot of interest. Wild cod, or Bacalhau, is also a

possibility, but perhaps more as a gourmet product. And finally, we will continue to focus on promoting salmon perhaps with greater involvement from the HORECA sector, she adds. Conxemar has been a big success for the Norwegian Seafood Council and participation is expected again next year with even more companies.

## Promoting Latvian fish to new markets

The National Fisheries Producer Organisation was present for the first time with a stand at Conxemar. The organization currently represents 13 companies and 25 vessels of the 58 that are involved in pelagic fishing in the Baltic Sea. The members fish ca. 30,000 tonnes per year (of which 20,000 are Baltic sprat and 10,000 are Baltic Herring) primarily using mid-water trawls. This amounts to about 60% of Latvia's quotas. Seven of the 13 members are vertically integrated and catch, process, distribute, and export their pelagic fish. The main products are sprats and herring in brine, IQF, and blocks of frozen fish.

Markets have changed significantly due to the political situation

that first closed exports to Russia in August 2014. This was followed by a ban on exports to Belarus in January 2016. Other main markets like Denmark, Poland and the other Baltic countries have shown growth as a result, reports Inarijs Voits, the Chairman of the Board. Other initiatives are also being developed like the building of a fishmeal and fish oil factory that should be ready by 2018. Since the ban only covers products for human consumption, the hope is that it will be possible to export fishmeal and fish oil to Belarus and Russia.

Finally, new markets are being explored and that is why we are here at Conxemar, says Inarijs Voits. China also shows growing



**Inarijs Voits of the National Fisheries Producer Organisation represents Latvia's leading fisheries companies.**

potential and the National Fisheries Producer Organisation will be visiting the China International

Fishery and Seafood Expo in Guangzhou, China in August next year.

## Cabomar is gradually conquering the world

**C**abomar, a fish processor located in Marin, just north of Vigo in Spain, was founded in 2006 by the brothers Eduardo and Enrique Freire. Although the company is only 10 years old the brothers have been in the seafood trade for more than 20 years, a wealth of experience that they are putting to good use. This year, Cabomar is expecting to sell roughly 25,000 metric tonnes of finished goods, with a turnover of €75 million. About three fourths of the sales comes from their own processed products that are destined for the retail and food service sector, while the rest is pure trading. The company employs 300 people in its factory where it has lines for its many types of products: battering and breading, seafood mixes, glazing, and fresh products. Seventy percent of the production is exported, mainly to Italy, Germany, France, and

Portugal in Europe, as well as to China, Japan, the US, and South Africa. We are slowly conquering the world, jokes Eduardo Freire.

The primary product is squid, accounting for roughly 65% of Cabomar's business, which is sourced from around the world. Additionally, Cabomar works with cod from the North Atlantic, hake from South Africa, shrimp from Argentina, and other species like clams and flatfish. Currently 95% of all products sold are frozen, but fresh seafood is being seriously considered. It is compatible with what we are already doing and the market is very big. Bigger than that of frozen fish and we see a trend towards fresh products in MAP packaging and value added products, Mr Freire explains. Cabomar has a strong management model, and a professional and committed



**Eduardo Freire (pictured) and his brother Enrique aim to own the best and most efficient processing company in Europe through innovation, automation and flexibility.**

team to develop new projects. According to Eduardo Freire, the Cabomar facility is the most efficient seafood factory in Spain measured in tonnage per square meter and the vision is to be the number one in Europe. The high efficiency is achieved through focus on innovation, continuous

improvements, and reinvesting in automation and flexibility, along with highly skilled employees. An example of the latter is an on-site chef to develop new products. This year he has developed a creole sausage made with octopus and a selection of trays packaging fish with different sauces.

## Arbacommerce supplies small pelagics from the Croatian Adriatic

**F**ounded in 1994 as a company dealing with work safety issues, Arbacommerce ventured into the fish business in 1999. Today the company purchases and processes 4,000 tonnes of fresh small pelagics, mainly sardines and anchovies, on an annual basis. The fish are sourced directly from local fishing boats in the major ports in the Croatian part of the Adriatic, and are transported by truck to its processing facilities. The final products are sold primarily as salted, marinated, and frozen fish in different variations under the "Arba" label or as private label products. The

main markets are today Italy, Spain, and France, says Dolores Paunović, Sales Executive and wife of CEO Nikica Paunović. She thanks a ban on fishing anchovies in Spain between 2005 and 2010 for opening the door for the similar Adriatic anchovy. The company developed the right product and has been selling fish to Spain ever since.

In 2007 Arbacommerce constructed their own modern processing plant in Labin, five km from Plomin, the largest fishing port in the northern part of the Adriatic and in 2012 another production facility was inaugurated.



**Dolores Paunović is happy with what the family owned company selling small pelagics from the Croatian Adriatic has achieved.**



The company employs between 80 and 100 people depending on the season. Next year as their first processing plant will be celebrating its tenth anniversary, a party with prizes for staff is already in preparation. Many have been along for the whole ride. When asked about the future of the company Mrs. Paunović modestly answers, "If your dreams are big you will always be disappointed. If you keep them small they will bring you much joy."

Arbacommerce visited Conxemar as part of the Croatian pavilion organised by the Croatian Chamber of Economy. Zoran Radan from the chamber explains that the Croatian industry had wanted to attend Conxemar for a long time but it was made possible this year with the help of EU funds to cover some of the costs. "This year there are four companies represented and the feedback I get is that they are very satisfied," he says.



**Zoran Radan from the Croatian Chamber of Economy was very satisfied with the results from Croatia's first stand at Conxemar.**

## Rotogal custom-builds plastic containers

Rotogal is the youngest member of the JJ Chicolino group of companies that includes JJ Chicolino, a manufacturer of products primarily for the aquaculture and fishing industry including chains and nets; Egalsa, a producer of shellfish packaging materials like netting and wooden boxes and shellfish processing equipment and supplies; and Iberfios, a producer of beaded and continuous lead lines for fishing, and for the shipbuilding and aquaculture industries. The primary business of Rotogal is producing insulated plastic containers and pallets that are utilised for food processing, storage, and transportation, especially for protein-based foods, like meat, fish, and shellfish. Rotogal also produces other plastic products like barriers, buoys, and floats, to name just a few. Rotogal creates

its products using rotomoulding, a process where moulds are continuously turned on all axes ensuring the highest quality for its finished products with surfaces that are smooth, flat, and easy to clean.

Rotogal has achieved strong growth thanks to a close customer focus. "If there are specific needs from the customers, Rotogal will design and improve their ideas, building solutions that fulfil their requirements," says Jorge Fajardo, Sales Director at Rotogal. This means manufacturing products to accommodate different batch sizes, transportation distances, methods of defrosting and so on. Additional requirements like RFID tagging, color coding, and specific materials that meet detailed temperature requirements are all taken into the design process when

collaborating with customers. The result is a product that is useful and valuable for customers, and that can help streamline different parts of their own operations.

Looking forward, wet storage and live holding equipment, and purification systems will become more important, both in Europe and North America. Health issues, consumer protection, and product quality are driving a demand for products that can keep fish and seafood as fresh as possible. Rotogal is therefore developing these systems including, most recently, a purification and live holding system for crustaceans where water flows from one stacked container to the next. On average four new products are created per year to meet specific needs and to improve processes. This has proven to be a



**Jorge Fajardo, Sales Director at Rotogal, shows off one of their insulated tubs, which sales have helped the company reach double digit growth every year.**

great tactic with positive returns. Growth has been in double digits every year and demand still seems strong. The turnover last year was EUR15 million with products sold in 33 countries of which the biggest markets are Germany, Netherlands, Spain, Portugal, and France.



"Advertising our fish processing machines (FPM Series for smaller fish) in the EUROFISH MAGAZINE has helped position SEAC as a leader with almost 80 brand new machines in operation all over the world."

Mr Ulf Groenqvist, President/CEO, SEAC AB, Sweden



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Tuttofood 2017, 8-11 May, Milan

# Prominent seafood section at major food event

Tuttoseafood, the seafood section at the international food exhibition Tuttofood, is expected to benefit from some of the 75,000 visitors expected at the main event.

According to FAO, in 2015, per capita consumption of seafood will be above 20 kg per year. Fish is the main source of protein for almost 3 billion people. While stocks of fish are decreasing, and almost a third are overfished (32%), increasing supply is from aquaculture, which is growing steadily. And one surprising bit of FAO data is that 15% of marine stocks are actually underfished. Col-diretti Impresapesca, a national industry association, points out that in Europe, an average of 23 kg of fish is consumed per person per year. That figure goes up to 25 kg in Italy. In 2015, domestic purchases went up by an average of just under 5%, though sales of sardines increased by almost 17%. Domestic production accounts for less than 30% of consumption, down from 50% in 1990.

## Health, sustainability are important trends

Healthfulness and sustainability are driving demand for certain products. Salmon, for example, has seen strong growth, increasing by double if not triple digits, according to Antonio Pellin, CEO of Fjord SpA, thanks to its taste but also to the benefits it offers to human health. In the tuna market consumers are concerned about sustainability and there is a preference for premium products and products targeted toward those



Salmon represents taste and health making it a popular product among consumers. Convenience probably also plays a role.

who are watching their diets, says Giacinto Callipo, a manufacturer of canned tuna and other packaged products. Consumers are also more aware of what they buy and are paying increasing attention to labels. They notice, for example, whether a product is glazed or not, says Diego Legnani of Brasmar, a Portuguese seafood processor. Visitors and exhibitors can look for these and other trends at the show to discover what is interesting and why, and to adapt their products and sales strategies accordingly.

## Digitisation and the food industry

Tuttofood will also focus on the opportunities presented by

e-commerce. The Consorzio del Commercio Elettronico will promote the eCommerce Food Lab, a 1,000-square-metre hub that will promote networking among B2B professionals, and hold workshops and events presenting technological innovations. This area is the first in a series of initiatives on digital transformation in the food industry that Tuttofood will carry throughout the year thanks to a partnership with Netcomm. With the objective being to further increase the presence of large international names, Tuttofood has partnered with Daymon Worldwide, a global leader in consulting for the large-scale retail industry. In addition to B2B events with exhibitors and Italian brands,

another more educational aspect of the initiative, the International Retail Academy, will hold workshops featuring real case studies and presentations on themes like store checks, food categories and new trends.

These innovations are already capturing the attention of industry professionals: with just a few months to go for the "cutting of the ribbon" at the show, more than 60% of the exhibition space has already been reserved. Tuttoseafood is sure to benefit from the scale of Tuttofood, where at least 75,000 professional visitors are expected, including 30,000 international buyers from more than 50 countries, and more than 2,000 select hosted buyers.



**Aquafarm**, 26-27 January 2017, Pordenone

# Sustainable aquaculture, algaculture and aquaponics

The new conference and exhibition, Aquafarm, will capitalise on Italian aquaculture expertise to attract participation from Southern and Eastern European and Mediterranean basin markets to Pordenone, a town 80 km from Venice in the Friuli Region, home of some of the largest farmed trout and seafood producers in Italy.

According to a European Union study, by 2030 aquaculture production in Europe will grow 41% for freshwater species and 112% for Mediterranean species, compared to 2010 levels. In both segments, Italy is one of the continent's primary producers. The Italian aquaculture sector is actively working on both public and company-funded research to increase product quantity and quality while reducing environmental impacts. Italian companies and trade associations are also actively partnering with emerging European and Mediterranean countries' farmers and industries. Aquafarm aims to become a meeting point for researchers, industry leaders, public institutions, policy makers and investors, operating in aquaculture and related fields of algaculture, aquaponics, hydroponics and aeroponics.

## Aquaculture comprehensively covered at conference

Aquafarm participants will be industry associations, large and medium fish farmer companies with innovative and sustainable products and processes, and suppliers of fish feed, equipment,

drugs and vaccines. The exhibition area will host booths of fish farmer, suppliers, associations, public institutions, universities and investors. Several sponsorship and exhibition packages are available tailored to the needs of every kind of participant, from fully-fledged corporate booths to contact desks and poster-like presence. Collective booths for country delegations are also available at special conditions. The conference agenda will be structured around fifteen thematic sessions, plus main and closing sessions, covering all aspects of aquaculture and related fields. Examples include tailoring production characteristics for food industry needs, new low-oceanic resources use feeds, genetics and genomics, zero-drugs fish farming, role of micro-algae in next generation fish feed, integrated culture of fish and vegetables in close-loop controlled environments (aquaponics) and many others. Conference sessions will include a balance of speeches and presentations by researchers, fish farmers, suppliers and user communities, such as food industry, packagers, logistics operators, retailers and consumers. For junior researchers and very early stage projects a poster area will be provided on the exhibition floor.

While primarily targeted at the Italian market, Aquafarm will host international speakers and case histories, from Eastern Europe and Mediterranean regions in different vertical sessions. The agenda will include an international session in English with associations and farmers from the entire Adriatic-Ionian Sea basin and representatives from the European Commission. From the research side, Aquafarm will be the scene for the presentations of interesting new results and programs.

Prof. Marco Saroglia, from the University of Insubria, will for example illustrate the early results of the 4F project, a privately funded research program that studies the impacts of more sustainable feed substitution on the farmed fish (initially trout and bass) growth, health and quality, and possible countermeasures based on integrators and induced modifications in the fish gut microbiota.

More information is available on [www.aquafarm.show](http://www.aquafarm.show)

**AQUAFARM**  
26-27 JANUARY 2017

CONFERENCE & EXHIBITION FOR THE SUSTAINABLE  
AQUACULTURE AND FISHING INDUSTRY IN THE MEDITERRANEAN SEA.

PORDENONE EXHIBITION CENTER - (VENICE AREA - ITALY)

[WWW.AQUAFARM.SHOW](http://WWW.AQUAFARM.SHOW)

**FLAGS drive community-led** local development in fisheries areas

# Helping fisheries communities shape the future of their areas

Following the support provided by Axis 4 of the European Fisheries Fund (EFF), a new generation of Fisheries Local Action Groups (FLAGS) are now becoming operational, continuing the work of supporting local development in fisheries areas, which started back in 2007.

Around 300 of these local public private partnerships were established in the seven years between 2007-2013, which coincided with the financing period common to all the European Structural Funds. These partnerships broke new ground in fisheries communities, as they represented a first attempt to devolve decision making power on fisheries subsidies to the local level. For this purpose, FLAGS were to develop and implement strategies to capitalize on local assets and broker new alliances between local stakeholders, finding new opportunities for their area.

## FLAGS contribute significantly to local economic activity

Fishing communities were quick to seize the opportunity, however, and rose to the challenge of driving the development process from the local level. More than 13,000 projects were supported by the end of the 2007-2013 programming period. A survey carried-out by the FARNET Support Unit in 2015 found that, on average, each FLAG active during the 2007-2013 period created around 20 jobs and assisted the development of seven new

businesses<sup>i</sup>. This corresponds to the creation of 6,000 new jobs in local fishing communities, along with 2,000 new businesses. But the impact of the FLAGS goes beyond just economic factors. By bringing together local stakeholders from many different sectors, FLAGS have started a wider process of reflection on how to shape the future of their areas. In some areas, fishing will remain a vital source of jobs and a key asset for other local sectors (such as the tourism industry). In others, new development paths will have to be found.

Building on the successful involvement of local communities in the 2007-2013 period, EU support for local development has been increased for the period 2014-2020, with four European Structural and Investment Funds<sup>ii</sup> now offering the possibility to finance community-led local development (CLLD).

<sup>i</sup> Please note that these figures should be treated with caution as they represent estimates made by FLAG managers collected via a survey of 308 FLAGS, of which around 50% responded.

<sup>ii</sup> European Agricultural Fund for Rural Development (EAFRD), European Social Fund (ESF), European Regional Development Fund (ERDF) and the European Maritime and Fisheries Fund (EMFF).



**Gilles van de Walle heads the FARNET Support Unit, the office that coordinates the implementation of community-led local development in fisheries areas.**

Furthermore, these funds can now also be combined at local level within integrated strategies, ensuring coordinated action, providing a singly entry point for EU financing for local projects, and allowing for synergies and economies of scale in terms of implementation. In practice, however, this coordinated approach is still mostly limited to rural (LEADER LAGs) and fisheries (FLAGS) initiatives, due to stakeholders' extensive experience compared with those of the other funds.

## Activities in the new generation of FLAGS have already taken off

The establishment of a new generation of FLAGS is underway across Europe, with around half the 320 FLAGS foreseen currently operational. This means that FLAGS are starting their activities at least a year earlier than in the previous period, which will give them more time to identify and select quality projects (FLAG will be allowed to support projects up until 2023).





**Fishermen Kevin, Francis and Andrew obtained an entirely new customer base by promoting and auctioning their catch online via a new website and, most successfully, via Twitter (@Drecklyfish) and Facebook.**

Projects selected by FLAGs in the last period focused mostly on adding value to local fisheries products and creating jobs within the supply chain (27% of projects). Promoting social wellbeing and cultural heritage was another important theme for FLAGs, followed by strengthening the role of fisheries communities in local governance and diversification of the local economy. FLAGs were less active in the environmental field. This spread in terms of projects selected suggests that at local level, communities are most preoccupied with socio economic challenges. In the future, FLAGs are likely to remain active in these fields. A needs analysis carried out by the FARNET Support Unit in 2015 confirmed that adding value to local fisheries products, linking in with the tourism industry, and promoting diversification were the areas of greatest interest to FLAGs. In this respect, it is expected that FLAGs will be particularly active in supporting small scale and coastal fisheries,

which are a natural partner of FLAGs. A good example of the kind of project that could be developed in this area is Dreckly fish. With the aid of a small grant of EUR8,000 from the Cornwall FLAG, three local fishermen were able to transform their business by marketing directly their own catch, using Twitter as an online auction.

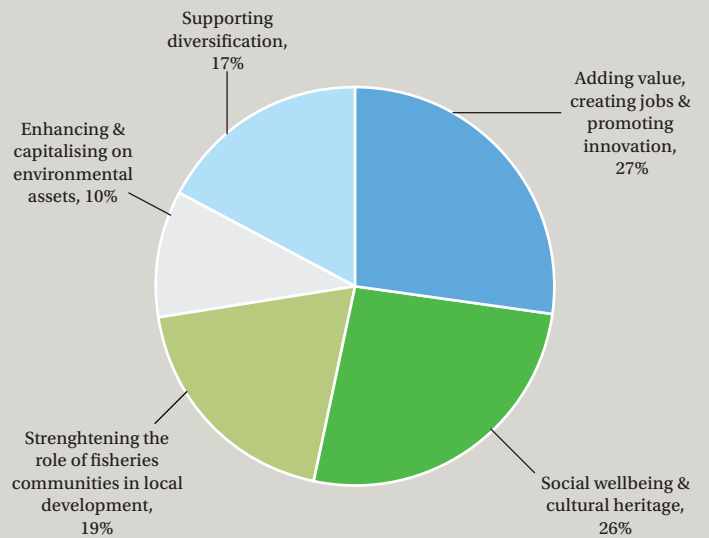
### Spreading blue growth at the local level

FLAGs are also expected to become drivers of blue growth at local level, continuing their work to foster innovation and diversification, both within and outside the sector. Out of the five high potential sectors for blue growth identified by the European Commission, three are of particular interest to FLAGs: aquaculture, marine biotechnology and coastal tourism. Ensuring a better integration of the aquaculture sector is an issue that has already been tackled by FLAGs. A small fish farm in Spain (Salinas

de Astur) has, for example, received backing to produce its own fishmeal using fish discarded from the local auction. This project also included the development of tourist activities, with a children's playground linked to a farm visit. Farm tours are actually becoming increasingly popular in many FLAG areas, helping to create linkages between the

key blue growth areas of aquaculture and coastal tourism. Opportunities in the field of marine biotechnology have also inspired local stakeholders, with one project involving a link-up between local producers and research institutes to investigate the commercial potential of discarded crabs, potentially opening up a new business activity.

Linkages and integration are key words when it comes to CLLD. Integration of different stakeholders at local level through dynamic partnerships or strategies but also through integrated projects, which create linkages between sectors not accustomed to working together. Therefore, beyond the sectors of specific interest for blue growth or other sectoral type supports, CLLD aims to innovate and encourage cross cutting activities. In Denmark, for example, the operator of a local aquarium contributed to diversifying the local tourism sector by joining forces with local fishermen and fishmongers to develop an innovative recreational fishing experience.



**Figure 1: Share of projects supported by FLAG in the period 2007/2013 by categories<sup>iii</sup>**



Navicule Bleue

Injured or disabled fishermen are employed by the Atelier des Gens de Mer in Marennes-Óleron (France) and provide services such as net mending, fishing boat maintenance and other harbour work.

### Projects are typically small but effective

Another characteristic of these projects is that they are small scale. The average size of projects financed by FLAGs in the 2007-2013 period was around EUR30,000, which is relatively small when compared to other types of public support. Despite this, FLAGs managed to fund more than 13,000 projects, using a bottom-up decision making process, where local stakeholders developed and/or selected the projects themselves. At the local level, the size of the projects matters less than their fit and ability to respond to actual needs. This targeted intervention across a large number of areas accounts for the significant impact of FLAGs. This impact should be sustainable since FLAG managers estimated that more than 60% of the

projects should continue after the end of the EFF support.<sup>iii</sup>

This small community-led support scheme also reaches out to parts of the community that do not normally benefit from EU assistance or fall outside the remit of larger schemes. In France, for example, Navicule Bleue is a social enterprise that helps injured fishermen get back to work by using their skills and interest in the marine environment to provide services related to repairing nets, boats or other marine related equipment. Community-led social innovations such as these will be key to meeting pan European societal challenges linked with stagnating economies and migratory

<sup>iii</sup> Cap Gemini, 2014, Study on the implementation of Axis 4 of the European fisheries Fund, MARE/2011/01, final report, p.29.



Salinas de Astur

An aquaculture company in Spain seized the opportunity of utilizing discards and fish waste by turning them into fishmeal. Before, the fish waste produced had no added value and was merely sent for incineration.

### Equipping fisheries communities with the means to navigate an uncertain future

pressures, from which many coastal areas suffer.

FLAGs are not a panacea for all the challenges facing fishing communities, but the experience of the last period has shown that they have a vital role to play, helping to empower local fishing communities to find new pathways for the future. The

second wave of over 320 FLAGs will be able to build on this experience, and connect with and capitalise on the energy of an even greater number of stakeholders in helping to create thriving and resilient fisheries communities by 2020.

*More information on community-led local development (CLLD) in fisheries and aquaculture areas or on the projects mentioned in this article can be found on the FARNET website ([www.farnet.eu](http://www.farnet.eu)).*

#### Assisting grassroots development



The FARNET Support Unit is a technical assistance team supporting FLAGs, national networks, managing authorities and DG MARE of the European Commission with the implementation of community-led local development in fisheries areas (former Axis 4 of the EFF). Led by Gilles van de Walle, it is made up of a 10 person team based in Brussels and 20 geographic experts based in their respective Member States.



## Recreational fishing in the three Baltic States and Poland

# A paradise for anglers

Europe has several wild and unspoilt areas that are a paradise for nature-lovers. The Baltic states and Poland with their abundant water and forests have among the best examples of such areas, which attract people from near and far. They come to interact with nature, to walk, gather mushrooms, hunt, and above all to fish.

The three Baltic countries, Estonia, Latvia, and Lithuania, are each blessed with a coastline along the Baltic Sea, the Gulf of Riga, or the Gulf of Finland and plentiful inland waters in the form of lakes both natural and artificial, and rivers. Between them the three countries boast almost 10,000 lakes and several hundred kilometers of rivers all of which provide fertile fishing grounds for anglers. Fishing for sport is a well-established pastime in the Baltics. In Estonia, for instance, more than 300,000 people go fishing regularly and for a further 90,000 it is a major recreational activity. Those with an interest in angling thus represent almost a third of Estonia's population of 1.3m.

### Rules and regulations vary slightly from country to country

Despite their similarities and geographic proximity, angling in the three Baltic states is governed by regulations that vary somewhat from country to country. In Estonia everybody has the right to fish with a simple hand line for free. This can be done without a specific fishing permit, but only in public waters (lakes, rivers). Of course, any other regulations in force must be respected, for example, temporal and spatial restrictions. These limits are usually introduced to protect the fish in spawning times, or to regulate the number of specimens of specific species.

Fishing with a simple hand line is easy and at the same time fun. In every water body there are different kinds of fish, which are not only tasty to eat, but offer the thrill of the catch. For more serious fishing, an angler can consider tackle with up to three hooks. For this the fisher must buy a fishing permit, which allows the use of a wide range of fishing tackle. The definition of hook gear includes spinning, handline, troll line, fly rod, hook, bottom line, trimmer, bottom set longline, drifting longline, surface longline, spoon bait, mormyshka, reel, and jig. For underwater fishing an angler may use a harpoon gun or a harpoon. When a fisherman uses some of the fishing tackle mentioned above, he must pay for the fishing rights. Buying a permit is a very easy process which can even be done on-line at [www.pilet.ee](http://www.pilet.ee), or also with a mobile phone linked to the Estonian GSM net. A permit can also be purchased the old-fashioned way from points of sale, such as post offices, which are widely distributed in the country. The sales receipt and a personal ID are needed as proof of purchase. Fishing is free however for certain groups; pre-school age children, students under 16 year of age, pensioners, and the disabled, subject to proof. Fees for fishing are modest: EUR1 per day, EUR3 per week, EUR13 for six months, and EUR20 per year. Fishing in Järvamaa county in central Estonia requires a special license, which costs EUR6 per day. This



Interest in fly fishing especially for carp is increasing.

can be bought at the local environmental administration, which is located in every city.

### Anglers in Estonia can choose from several species

After obtaining a fishing permit, the next question is what to fish? In Estonia this is no problem whatsoever. All the biggest lakes and rivers are full of pike. Pike is one of the biggest predators and can reach weights exceeding 20 kilos. Catching such a fish can be a challenge, but smaller pikes also give lot of satisfaction. Perch in the Gulf of Parnu is also a possibility. A good spot can deliver a very good size specimen, and not just a single individual. Perch usually swim in schools and one never knows how many will take the bait. Other options are roach and bream, which can be caught using ground fishing techniques.

Peipsi lake is a remarkable place for fishing. This lake has abundant fish resources that will delight any fisherman. And in winter it is at its most attractive. When the ice cover is thick enough, fisherman from neighbouring countries come to Peipsi lake to catch perch. Often a day's fishing will yield more than 10 kilos of perch – which are delicious smoked or baked. In the spring, when the ice cover starts to melt, roach can also be fished in the lake.

One of the main targets for anglers in Estonia is brown trout. The main season for brown trout is from early May until 15 September with a peak when the mayfly hatches. During this period trout becomes very active, as the water temperature increases and food becomes more abundant, and they can be caught more easily. The biggest individuals become more indiscriminate, snapping at

anything that resembles prey, in their rush to feed. The fish lives in more than 100 rivers and streams, so fly fishermen and trout anglers can choose from several locations. But of course, to catch brown trout, anglers must be both skilled and patient and they must remember that the fish should be a minimum of 36 cm. Trout are most commonly caught using two techniques, spinning and fly fishing. Spinning generally uses hard baits, spinners, wobblers, etc., but now it is very popular to use soft baits. Short rods are a better idea than long ones as the rivers are not wide. Fly fishing is a more artistic technique, and a wide range of flies is available for trout.

### Simple rules govern angling in Latvia

South of Estonia lies Latvia, where too there are a lot of water bodies and many very keen recreational fishermen. The Latvian system for regulating angling is similar to the Estonian, though perhaps not quite as flexible. To use public waters, anglers need to buy a fishing permit, of which there are two types. A three-month permit for just over EUR7 and an annual permit for a little more than EUR14. Permits are sold at post offices, the biggest fishing shops, and even the biggest supermarket chains. They can also be purchased online at [www.makskeresanaskarte.lv](http://www.makskeresanaskarte.lv). The permit together with a valid ID needs to be shown on demand. Some areas, such as certain stretches of a river, require a special license in addition to the usual permit. These could be areas or times of the year when salmon or sea trout is fished. In Latvia children under 16, adults over 65, and persons with special needs, do not need to buy a fishing permit. However they need to show a valid ID card on request.



Janis Sitkuts

Burtnieka lake (or lake Burtnieks), one of the most productive Latvian lakes, famous for big pike and zander.

With so many different places to fish, anglers can use lot of different fishing techniques. One of the most popular is float fishing. Many beginners and children, but also professionals, employ this technique, which can be used in different types of water. And of course with a float it is possible to catch a wide range of fishes — roach, bream, perch, carp, catfish, etc. It is a simple and enjoyable method of fishing. For bigger specimens some preparation is necessary, like feeding the area to attract the fish. If an angler wants to use a float in a river, he or she can reckon with big rivers with slow flows, deep rivers, as well as smaller streams with stronger currents. The fishing gear needs to be adjusted accordingly. Such places are very good for fishing with a feeder, a popular technique to which a lot of fishermen are attracted nowadays. Latvian rivers are very suitable for feeders. Spinning is a very popular way of fishing not only among sport fishermen, but also beginners. The main target is

predatory fish such as pike, perch and zander. Pike is the biggest predator in Latvian waters with a record specimen of 19.56 kilos caught in Ungurs Lake in 1989. There are no doubt even bigger pike lurking in the water, a prospect that should attract anglers to Latvia. Another exciting fish to catch is perch, which often frequent certain areas in lakes and rivers. When spinning, almost every cast will deliver a perch, often a respectable fish close to a kilo in weight.

### Riga is one of the best places to catch zander

Zander or pike-perch is a truly rewarding catch. Thanks to its location on the coast, Riga, the capital of Latvia, is one of the best spots to catch zander. In late autumn large numbers of the fish enter the Daugava river, which flows through the city, from the Gulf of Riga. The best way to catch zander is either jigging or by using the drop shot method depending on whether the fish is active or

not. The drop shot can be used to catch even the most passive predator. The Daugava is quite a big river by local standards and is also deep with a strong current. Places where the depth exceeds 15 meters are good to catch zander - a fisherman needs to use quite big jig heads, or weights. Fishing here is also very interesting as close to the port there are industrial buildings, big container transport ships, tankers, and other vessels. There is always something happening here, but there are also restrictions which make the port off limits for many casual activities - except fishing.

If a fisherman wants to catch a big specimen that puts up a real fight, then he should target catfish. In the River Daugava downstream from the hydro power plants, there are a lot of big catfish. The place to catch them is in those parts of the river where the depth exceeds 30 meters. The Latvian record for catfish is a little more than 84 kilos. Catfish demand the use of trolling gear





**In recent years feeder fishing has increased in popularity among anglers. Here, a feeder fishing competition in Lithuania.**

or a down rigger, and it is more common and more effective to put the bait in deeper waters. Catfish simply cannot resist a slowly moving bait imitating a dead fish. Catfish can also be caught by jigging, but of course this calls for more luck. Sometimes, when a fisherman is jigging for zander or pike, a catfish strikes the soft bait.

### **Small fast flowing water bodies are good for trout**

Latvia has several small rivers and streams, where one of the most exciting fish to catch is trout. Small rivers have clear and transparent water, in which every rock and dead fallen tree can be seen. In such places a trout can easily conceal itself. For fishermen this can be challenging, as such rivers usually have overgrown banks so casting is not the easiest way to fish. But the prize can be a nice catch of trout, one of the most beautiful fish in Latvian waters. In addition there is the grayling, a majestic fish with a wide and long back fin, and the chub which is also a strong fighter.

In autumn many fishermen go to the sea shore to catch flounder. This is the best time to catch them with a specific ground fishing technique. An angler may use three rods each with three hooks

baited with shrimp or bits of herring. The best place to catch flounders is the coast between the towns of Liepāja and Ventspils. The open sea yields bigger catches of flounder, and it is also possible to catch cod, which sometimes come a bit closer to the coast at night.

### **Fishing is possible in nature reserves in Lithuania**

Lithuania is the biggest of the three Baltic states and also richly endowed with natural beauty in the form of woods, rivers, and lakes. The rules and regulations governing angling in Lithuania are like those in Estonia and Latvia. Here too every fisherman needs to have fishing permit that can be bought at fishing shops or online. And some activities demand an additional license, for example, to fish for salmon or sea trout in the Nemunas or Neris rivers. National parks and nature reserves too have special regulations. In general, a day permit costs EUR3; children under 16, people over 62, and persons with special needs do not need such permits, and can fish for free.

One of the most popular pastimes for anglers is fishing for salmon and sea trout in autumn.

The Nemunas, among the biggest rivers in Lithuania, is one of the best sources of these fish. The river starts in Belarus, and has a total length of 900 km of which 359 km are in Lithuania. The major tributaries are the Neris and the Merkys. The Nemunas is a very wide river with a lot of variation in the current, slower in deeper water and faster in shallow, and hosts many different species of fish. Pike and perch can be caught all around the year and the river is also a good place for float fisherman. The Neris, the second biggest river in Lithuania, also flows at different speeds. Many salmon enter the Neris to spawn and this number is increasing each year, so that fishing, which is only allowed at certain approved spots, can be very satisfying. Nature protection organisations have focused on the salmon population which is not large and the rules are strictly enforced, but fishermen can still look forward to wonderful catches. A license for a day cost EUR3 which entitles a fisherman to keep one fish, a salmon or a sea trout, the rest must be returned to the water. It is best to gather information about the best places before fishing the Neris to improve the chances of a good catch.

### **Grayling, a fighter, can best be caught in the Merkys river**

The Merkys river also starts in Belarus as the Nemunas and flows through the Dzūkijos National Park, which is a special nature zone. It is possible to fish in the Merkys all year around. From early spring to autumn in the first part of the river, where the current is slow, a section that requires a special license. The middle part of the river is best from summer to late autumn. It is characterized by slow-flowing water with some rapids and runs that become more frequent going downstream. The lowest part of the river has an even-flowing current. The river bed is sandy with deep holes which host many large specimens and the best time to fish is from mid-autumn until the beginning of winter. The Merkys has Lithuania's biggest population of graylings, which makes it an interesting river for fly fishermen, but there are also chub, pike and perch. Kayaking is a popular pursuit on the Merkys in summer, so fishermen will not have the river to themselves.

Lithuania also offers many medium and small rivers, where the main target species is chub, a challenging fish to catch as even



**A chub, a catch coveted by anglers.**





Anglers experienced several memorable catches on the Neris river in Lithuania this year, such as this impressive salmon.

small ones are real fighters, and there are some large individuals too. At smaller rivers it is also possible to fly fish, which is not easy, but one gets better with practice.

### The Curonian Spit offers anglers a variety of species

One of the best places to fish in Lithuania, a virtual paradise for anglers, is the area of the Curonian Spit and the Klaipeda Channel. Many species, perch, zander, bream, roach, zaehrte (Vimba bream), can be found in these waters, and several fishing techniques can be used. In spring the Klaipeda Channel is full of Baltic herring, so a fisherman can be sure of catching something. This

is also one of the best places to fish for zander in summer and autumn by jigging or using hard baits. From the spit or the channel it is also possible to rent a boat with a guide and sail into the Baltic Sea after flounder, cod, Baltic herring, and even halibut. The guide will know the best places to fish. There are however special regulations that govern fishing in these areas: to fish in the Curonian Split, less than 500 m from the shore, requires a special permit issued by the Ministry of Environment. However, fishing with float rods from the shore is exempted from this requirement. When it is dark fishing is only allowed from the shore or from the ice. Angling in the Baltic Sea must be approved by the border police and catches



Other countries' anglers too have experienced success on the Neris. This 112 cm, 14 kg salmon was caught by Kaspars Poishis from Latvia.

may not exceed five kg per angler. Another good place for zander is Lake Sartai, a natural reserve close to the Latvian border, where the fish can approach trophy sizes. Here too it is possible to hire a knowledgeable guide, who will know the best places to fish.

### Polish anglers must sit an exam to obtain a license

Angling in Poland is regulated as it is in the three Baltic States with minor variations. A fisherman must have an angling license issued by the Polish Angling Association, which can be obtained from their offices across the country, and a fishing permit from the water authority of the area. Licenses are usually issued after passing an exam in fishing rules and regulations. Foreigners and non-members of the association are exempt from taking the exam, but need to pay a special fee. Children under 14 do not need a license provided they are accompanied by a license-holding adult with a permit.

Poland has several lakes which are inhabited by more than 20 fish species. In the country's north east is the Masurian Lake District, an

area with more than 2,000 lakes that are connected with rivers and channels forming a comprehensive system of waterways. The district was a finalist in the Seven New Wonders of Nature contest. The biggest pike to be caught in the district weighed more than 24 kg, and for fly fishing enthusiasts trout and grayling are also found in the rivers. In the winter ice fishing is a popular activity targeting perch, roach, and bream. In addition to natural lakes, Poland also has man-made lakes, such as Lake Zalew Zegrzyński close to Warsaw. Poland also has a Baltic Sea coast where anglers can rent a boat and fish for cod and flounder. Another possibility is the Lubuskie District in western Poland, an area for carp and catfish, where anglers can find good accommodation as well as large fish.

The Baltic States and Poland are perfect places for recreational fishing offering a variety of species, water bodies, terrains, and opportunities. Every angler will be able to find something that appeals to him or her, and often will return home with an impressive trophy.

Janis Stikuts, [jst@fishing.lv](mailto:jst@fishing.lv), and Martins Babris



Fisheries of the **United States 2015**

# An eagle's eye view of U.S. commercial fisheries production and trade

The U.S. government in October released the latest edition of its annual statistical yearbook on commercial fisheries, *Fisheries of the United States 2015*.

The annual report is the latest in a series going back many decades, and presents statistics on fish and shellfish species landings, production of leading seafood products, production of aquaculture and industrial products, U.S. exports and imports, and national per-capita consumption of major fisheries products. In addition, the report contains information

on global production, trade, and consumption.

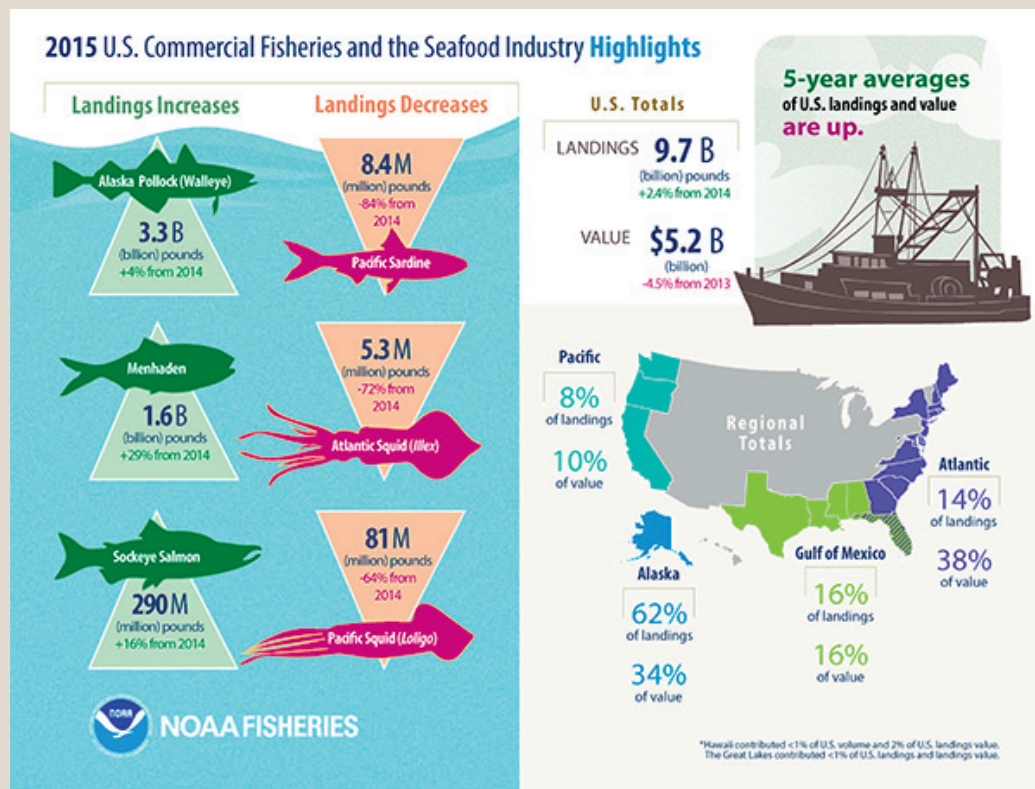
## Landings were up in volume, down in value...

Highlights of the report for 2015 include U.S. fishermen's total landings in U.S. ports of all species (edible and industrial) of 9.7 billion pounds (4.4 million metric tonnes), valued at \$5.2 billion.

This was an increase in volume of 2.4 percent and a decrease in value of 4.5 percent over 2014, and a general continuation of stable trends seen in recent years for U.S. fisheries. Finfish made up 88 percent of total landings volume but only 46 percent of value. In addition, landings by U.S. fishermen in foreign ports (directly or via delivery to off-shore processing ships; includes

landings in Puerto Rico and other U.S. territories) totalled 548 million pounds valued at \$284 million.

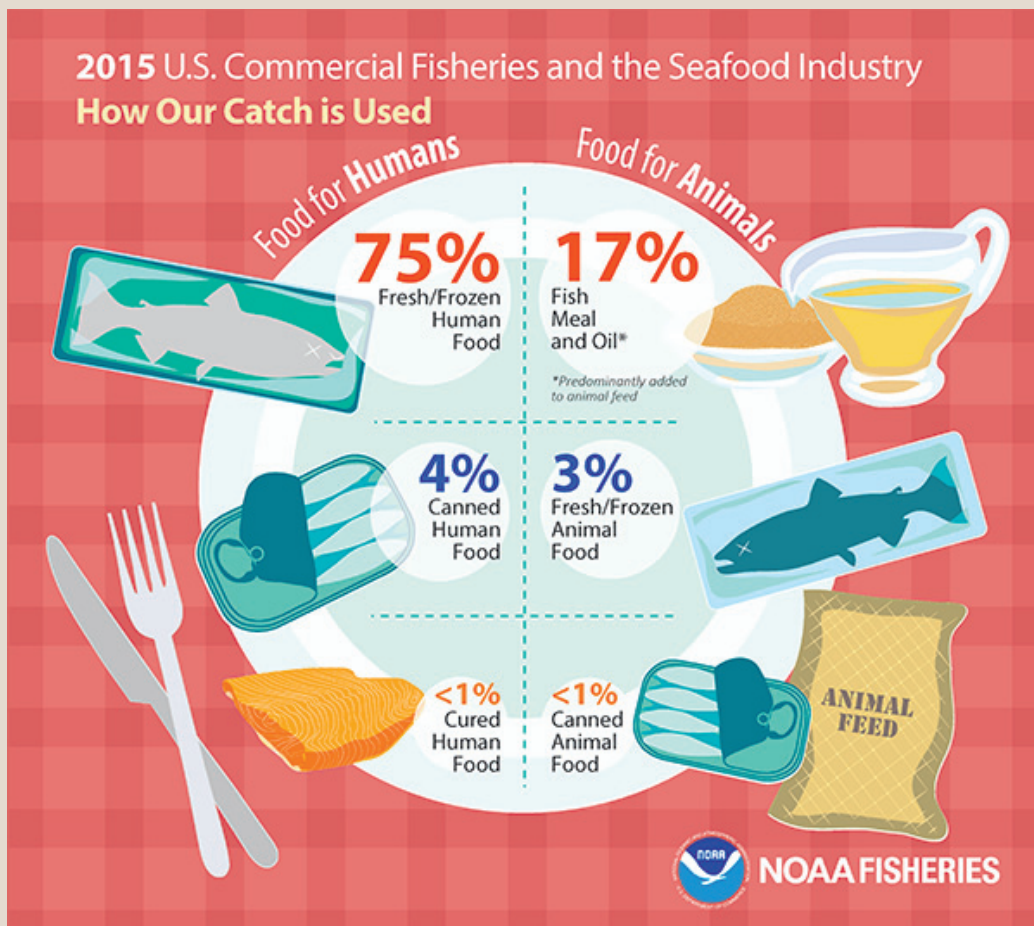
Chief among the species harvested by U.S. fishermen are Alaska pollock, menhaden, and Pacific salmon (which together made up 61 percent of total volume) and lobsters, crabs, shrimp and salmon (which together accounted for 44 percent of total value).



## ... while aquaculture production was down

U.S. aquaculture data are lagged a year. In 2014, total aquaculture production reached 608 million pounds (276 thousand metric tonnes), valued at \$1.3 billion, a decrease in both volume (-2.4%) and value (under -1%) in value from the previous year. The leading finfish in this sector is Atlantic salmon (41.3 million pounds, worth \$76.2 million), while the most important shellfish is oysters (33.3 million pounds, worth \$169 million). Other important species in U.S. aquaculture are catfish, crawfish, and clams.

In addition to commercial harvests and aquaculture production, a share of total U.S. supply is provided by recreational anglers.



landed fish), and tuna, among a wide array of other products. The leading sources of U.S. imports are Canada, China, India, Thailand, Indonesia, Vietnam, and Chile (75.1% of the total). The EU (mainly the UK, Spain and Germany) supplied 2.5% of total U.S. imports.

U.S. exports of edible fishery products totalled \$3.1 billion, down by 7.7% from 2014. As with imports, fresh and frozen products make up the bulk of U.S. exports. Important products include fresh and frozen salmon, surimi, live and frozen lobsters, canned salmon, and roe, among many other fishery products. The single largest market for U.S. exports is the EU (mainly the Netherlands, Germany, the UK, and France), accounting for 21.4% of total U.S. exports. Other leading export markets are Canada, China, Japan, and India.

### Frozen shrimp is America's most favorite product

Americans consumed nearly 5 billion pounds of seafood in 2015, making the U.S. the second leading consumer nation behind China. On a per capita basis, consumers ate 15.5 pounds of fish and shellfish, up by 0.9 pounds from a year earlier. The most popular product is shrimp, followed by tuna and salmon.

Also included in the yearbook is information on sustainable fisheries and the state of U.S. resources. This yearbook and summary factsheets for the entire U.S. fisheries industry are available at: <http://www.st.nmfs.noaa.gov/commercial-fisheries/fus/fus15/materials>

Roger Corey, *roger.corey.1000@gmail.com*

In 2015, an estimated 351 million fish were harvested during 61 million fishing trips. Of this total, an estimated 151 million fish (188 million pounds) were kept (or discarded dead) by anglers, the rest were released alive.

### A vast array of seafood products comes from the U.S. industry

Processed production (edible and nonedible products) in 2015 was \$10.2 billion, down by 9.5% from 2014. Of this, edible fish products totaled \$9.3 billion, down by 11% from 2014. The principal products are fresh or frozen fillets and steaks (including blocks), which totaled 725 million pounds, valued at \$1.8 billion. Alaska pollock, tuna, salmon and tilapia are among the leading species. Fish sticks

and portions added an additional 206 million pounds, valued at \$360 million. Breaded shrimp production reached 107 million pounds, valued at \$376 million.

In the canned sector, total output reached 879 million pounds, valued at \$1.42 billion. Of this, canned (and pouched) tuna totaled 400 million pounds, valued at \$773 million, followed by salmon, totaling 168 million pounds, valued at \$356 million. Canned clams (in whole, chowder, minced and other forms) totaled 120 million pounds, valued at \$146 million. In the industrial fishery products sector, output of fish meal totaled 610 million pounds, valued at \$396 million. Production of fish oil reached 140 million pounds, valued at \$97 million. Other

products, such as agar-agar, oyster shell products, animal feeds, and kelp products added another \$205 million.

### The U.S. trade deficit in seafood products continues

The U.S. has long been a net importer of fishery products. Total imports in 2015 (edible and industrial) reached \$34.3 billion, down by 4% from a year earlier. Exports in 2015 totaled \$28.4 billion, down by 5% from 2014.

U.S. imports of edible fishery products totaled \$18.8 billion, down by 7.1% from the previous year. Fresh and frozen products make up the vast majority of U.S. imports, and include tropical shrimp, salmon (including re-exports of foreign-processed U.S.





**Aquaculture** activities to receive boost

# More innovation and less red tape

The Spanish operational programme for fisheries and aquaculture envisages a three-fold increase in aquaculture activities by 2023 leading to higher production, but also increased employment and better protection of the environment. Andrés Hermida Trastoy, the General Secretary for Fisheries in the Spanish Ministry of Agriculture and Fisheries, Food and Environment mentions here, among other points, some of the steps the ministry is taking to achieve this.

**Adding value to catches is becoming increasingly important as the volumes delivered by capture fisheries stabilise. What efforts are being made in Spain to increase the value of the catch at all levels of the supply chain from the vessel to the final consumer? What role does innovation play in this process and how is it being fostered in Spain?**

In Spain a lot of research by the processing sector looks at constantly increasing added value. These efforts will be supported by the European Maritime and Fisheries Fund (EMFF) during the next years, and by very significant private contributions. This sector is a pioneer worldwide, with innovation in new products, presentation, uses... as their base line. At this stage, it is necessary to acknowledge the fundamental role played by the Spanish Technology Platform for Fishery and Aquaculture (PTEPA). This non-profit association fosters technological development and innovation within the sector, including processing and marketing, assessing them on these issues, providing vital new information and facilitating integration between all the relevant partners in the fisheries and aquaculture sectors.

**The General Fisheries Commission for the Mediterranean has established an aquaculture task force to develop a strategy for the sustainable development**

**of Mediterranean aquaculture. As a prominent member of the GFCM and the largest producer of farmed fish and seafood in the EU how does Spain view the development of this strategy and how is it likely to influence the Spanish aquaculture sector?**

Spain is actively contributing to the development of the GFCM strategy and we are committed to the sustainability of aquaculture in the Mediterranean and in the other sea basins relevant for Spain, not only by actively participating in this Commission, but as well by implementing all agreed measures.

**The Spanish national strategic plan for aquaculture has set some ambitious targets to produce fish and seafood. What policy changes do you foresee at the federal level and at the level of the autonomous communities will be necessary to implement the plan?**

We are conducting several actions from the central government like the revision of the administrative procedure for the authorization of a fish farm, analysing the bottle necks and proposing improvements. We are also working on maritime spatial planning through the development of a Geographical Information System and we are discussing a draft text for a future law on aquaculture. Moreover, we have foreseen



**Andrés Hermida Trastoy, General Secretary for Fisheries, Spanish Ministry of Agriculture and Fisheries, Food and Environment**

a EUR2 million investment in innovation plans for 2016-2017. The General Secretariat is also coordinating the development of the national plan through an ad hoc committee that includes the regions and other stakeholders. All the stakeholders related to aquaculture are committed to the success and achievement of the national strategic plan goals.

**The global fisheries and aquaculture sector carries a heavy responsibility as it is expected to contribute to achieving the Sustainable Development Goals**

**(SDG's) of the United Nation's 2030 Agenda for Sustainable Development, and the Paris Agreement (on climate change). How do you see the sector in Spain responding to these challenges of rising demand for fish and seafood products, a more sustainable seafood value chain, reduced food loss and waste at all levels, and decent employment particularly in rural and remote areas?**

Spain is highly involved in achieving these Sustainable Development Goals. We share the idea



that oceans, along with coastal and marine resources, play an essential role in human well-being and social and economic development worldwide, bearing in mind that fish stocks must be maintained within biologically sustainable limits. On top of this, biodiverse marine sites require safeguarding to ensure sustainable long-term use of their natural resources. Spain started taking

actions about this issue long time ago. At this time, we have around 100,000 hectares of marine reserves. This is the framework of all our measures and actions must comply with.

To help the fisheries and aquaculture sectors respond to these challenges, we have a very important tool which is the EMFF referred to earlier. With this fund we will be

co-financing actions to achieve a more sustainable seafood value chain, as well as research on new uses for fish products to avoid food losses. Another important pillar I would want to remark is our commitment to job creation. In EMFF priority 4, this is the main objective. We strongly believe that Community Led Local Development, properly managed, can lead to an increase

not only in employment, but as well in creating better jobs in fisheries and aquaculture dependent areas.

The Spanish fisheries and aquaculture sector is strongly involved in achieving these goals, since it is properly organised and invests a significant proportion of net profits in investigation and implementation of new technologies.

Measures against unlawful **catching and trading activities** are a path of no return

# Combating illegal fishing is a priority for the administration

The General Directorate for Fisheries Management in the Spanish Ministry of Agriculture and Fisheries, Food and Environment is responsible among other things for inspection and control, structural, and market policies. Led by Carlos María Larrañaga, the directorate plays a key role in the fight against IUU fishing, the certification of fisheries as well as the organisation of the market.

**The Traceability Observatory was established to, among other things, promote a level playing field in the EU for canned tuna; ensure compliance with regulations governing this product; and to promote the sustainability of tuna and the enforcement of IUU regulations. Now that the observatory has existed for a year, what would you say are its most significant achievements?**

The Ministry of Agriculture and Fisheries, Food and Environment has since the outset supported the Traceability Observatory, as an integral part of its Steering Committee through the Secretary-General for Fisheries. The collaboration between the Spanish private sector and the national administration has been even more successful since the observatory was created as it is a platform to discuss best policies and actions to achieve our shared objectives. As well, it has promoted all these issues in

different international forums, such as Infotech World Tuna Trade Conference & Exhibition in Bangkok this year. We believe international cooperation and dissemination of information about all problems and possible solutions are essential to achieve sustainability of fisheries, a level playing field in tuna sector and improvement of social conditions for workers.

**Earlier this year tuna fishing vessels belonging to the Opagac association were awarded a sustainable fishing certificate. What implications does this have for these vessels, and what repercussions will this have on other segments of the Spanish fleet? Will they also seek certification? Is there increasing demand in Spain for products that have been fished sustainably?**

We congratulate OPAGAC (the association for large tuna freezers) for helping develop the so



**Carlos María Larrañaga, General Director for Fisheries Management, Ministry of Agriculture and Fisheries, Food and Environment, Spain**

called Tuna from Responsible Fishing standard jointly with AENOR (The Spanish Association for Standardisation and Certification). It establishes the conditions for responsible fishing and certifies compliance with “best practices” in three areas: environmental, socioeconomic,

and control systems. This is the first step to achieve more ambitious objectives like Marine Stewardship Council (MSC) certification. At the moment, WWF and OPAGAC have completed the plan of action of its Fishery Improvement Project, which will be implemented over the next





5 years. They agreed the roadmap to achieve certification by MSC of its fleet. This marks the initial step to establish an appropriate management framework and good fishing practices. We all hope and strongly believe that OPAGAC will reach the standard set by MSC within the next five years. This certificate will allow tuna produced by OPAGAC to be placed in a better and more profitable market position. With regards to other fleet segments, it will be more difficult to implement schemes like this, although it would be desirable and will always be supported by the ministry. The reason is that to achieve this sort of certification, proper technical and economic resources are needed. And most of the Spanish fleet lacks this due to low profits in their activity.

Increasing demand in Spain for sustainable certified products, which is a fact nowadays, can help to modify this situation, since it can contribute to increased added value and, therefore, to implement these schemes in other fleet segments.

**Some countries have been developing and promoting labels for their seafood that refer to a certain area or origin (eg. Mejillón de Galicia), or a specific quality or process that distinguishes them from comparable products. How does the ministry regard these developments? Does it consider them as bringing about real improvements in terms of higher quality, bigger sales, and better prices for producers?**

From my point of view, all these quality marks add value to the product and are completely necessary in today's globalised market. As they follow strict standards, consumers can buy a reliable product produced under

quality marks. Not all consumers pay more for quality, but demand for products with these labels is increasing.

**The Common Fisheries Policy emphasises that at the latest by 2020, all stocks should be fished at MSY. The importance being given to sustainability is something that was introduced with the latest reform of the CFP. What impact does this have on the Spanish fishing fleet and Spanish catches, and what changes has it led to on the ground?**

The achievement of the MSY has different impacts depending on the status of the stocks. As an example, northern hake is in MSY since 2014 and the stock keeps growing every year increasing the revenues for the fishermen, but, on the other hand, southern hake is far from reaching the MSY due to a high fishing mortality what means severe reductions of quota every year with a huge socio-economic impact.

**Spain is the biggest market in Europe for fish and seafood and Spaniards are among the most enthusiastic consumers per capita. How do you see the Spanish market evolving in the future? What changes can be noted in terms of tastes, products, packaging, distribution, ways of shopping, and cooking?**

Fish and seafood products are a basic part of Spanish diet, the so called Mediterranean diet. Despite changes in tastes and demands of consumers, they continue being an essential part of this diet, since they are viewed as synonymous with health and with tasty products. The market will have to evolve according to these changes, adapting the supply to what is demanded by consumers.

Increasing demand for quality products, preferably fresh and locally produced, as well as for traditionally produced canned products, has been noticed during the last few years. New presentations, more attractive and better adapted for the needs of some consumers (single consumers, small families, food service, etc.) will be needed as well. Finally, there is also increasing demand for low price products, like some imported species, especially for catering services. About this issue, market transparency and consumer information will be fundamental. This situation represents a big challenge for the Spanish sector, but undoubtedly will be faced properly by all the actors involved.

**Spain has taken a strong stand against illegal fishing by supporting FAO efforts to fight the problem, the incorporation of EU legislation against illegal fishing into Spanish law, and the subsequent launch of proceedings against Spanish companies implicated in IUU fishing. High profile cases and heavy fines will hopefully deter companies and individuals from engaging in illegitimate fishing activities, but are there also other measures that can encourage better behaviour in the first place?**

Spanish Government is deeply committed in combating IUU fishing. We have very strong inspection and control systems (including Vessel Monitoring System, Electronic Reporting System, successful control on imports, license verification system) that have made our country a leader in the fight against IUU fishing. Changes in national legislation and improved cooperation with third countries helped to achieve it.

Most companies in this sector carry out their business complying

with legal requirements. Even though the culprits represent only a small percentage, it is our duty to combat these illegal practices since they jeopardise the sustainability of resources, badly damage the image of the sector, and are unfair to the law-abiding majority. Furthermore, public awareness-raising campaigns can be an additional tool, as well as international cooperation with less developed countries to help them to implement proper control systems and to train their staff properly.

This way we have initiated is a road of no return. Good results obtained during the last four years mean we are rowing in the right direction.

**Public private partnerships are one of the ways to make the implementation of policy more effective. The world congress series of events, which are jointly organised by FAO and the trade association Conxemar, are a good example of this collaboration. How does the ministry view this cooperation? Does it take active measures to encourage the spread of efforts that bring together private bodies with public institutions?**

The current legal framework allows such kind of collaboration in marine reserves for actions such as disclosure and awareness campaigns among civil society, specific research projects or specific actions such as the building renovation to be used as visitor centers. In this sense, the Ministry of Agriculture and Fisheries, Food and Environment, through its General Secretariat, is also exploring the possibility of going further with such kind of public private partnerships, identifying and establishing contact with entities that could be likely to provide funds for such initiatives.



Understanding and reversing the recent fall in **Spanish seafood consumption**

# Challenges facing the seafood products market in Spain

Consumption of fish in Spain continues to decline, as reported by “La Alimentación en España 2015”, a study by the Spanish Ministry of Agriculture and Fisheries, Food and Environment (MAPAMA). A trade association, AECOC/GS 1 Spain, is among those trying to do something about it.

**I**t highlights a 2.4% drop in seafood consumption over the year to 2015 in Spain. According to the data, average consumption of fish and aquaculture products, per person, per year 25.5 kg, representing a drop of more than 4 kg over the last 5 years. And despite Spain being one of Europe’s biggest consumers of fish and aquaculture products, people in Spain consume less than 31 kg per annum recommended by WHO.

## How to get young people to eat more fish?

Socio demographic changes have had an effect on every aspect of people’s buying and eating habits and are also affecting their consumption of fish and shellfish. The consumer is choosing different formats, product types and sources, such that the industry needs to take notice and adapt to consumer needs to slow the downward trend in consumption. According to a recent report by AECOC/GS 1 Spain (a trade association of manufacturers and distributors comprising more than 26,000 companies) for the ministry on young consumers of seafood products, Spain’s young people (20-35) say they eat less fish both at home and when eating out. So, the challenge faced by the industry is attracting younger people, as it is they who decide future consumption trends.

## The reasons and the possible solutions

Their profile can be described as aged between 20 and 35, householders, who eat fish/shellfish at least twice a month. They see this product category as healthy and this is what largely drives them to buy the product. In fact 76% of those interviewed said that they were conscious of the fact that they should eat fish at least twice per week. And it would appear that flavour is a determining factor in repeat purchases. On the other hand, the same young people see the following as disincentives for purchasing fresh or frozen fish:

- Unpleasant flavour or smell.
- Lack of product knowledge such as benefits, preparation, cuts, recipes etc.
- Lack of time due to pace of life not being compatible with buying and preparing fish.
- There is a perception that it is expensive.

Faced with these negative perceptions, possible initiatives to encourage younger people to consume more fish include:

- Product innovations presenting fast, practical and easy solutions for the purchase, storage and preparation of the product. Innovation could include adventurous new dishes that



The association AECOC/GS1 Spain stays abreast of market developments by holding a seafood congress among other activities.

make the best of the flavour and aesthetics, but always with healthy food in mind.

- Make more of the social aspect of eating fish. Eating fish can be social and entertaining.
- Provide more information and transparency regarding the origin and properties of the product. Suggest different preparation techniques and recipes.
- Offer the option of seasonal fish or special offers to keep the price down.

## It’s all about convenience

It is worth noting that generally speaking, in Spain, sales are heavily influenced by convenience when buying, cooking (usually on the grill) and eating. In other words, the consumer seeks out those products that ease the whole process of buying and eating. One

example is sushi, which has seen considerable market penetration in recent years, finding its way into households despite the relatively high cost. This is a highly practical product, easy to prepare, healthy and somewhat fashionable. According to Shopper View, GS1-AECOC’s study into seafood buying trends, 47% of consumers buy fish and shellfish in supermarkets, 38% in traditional fishmongers and 15% in hypermarkets. Also noteworthy is that online sales, although still in their infancy, are fast gaining ground amongst younger consumers.

## Fishmongers lose ground to retail chains

Traditional outlets are losing relevance year after year compared to other sales channels. However, sales by weight in traditional outlets





still exceeds those in supermarket fish counters. Buyers in Spain still see the specialist retailer as the logical place to buy for quality and level of service, but due to time constraints, find themselves shopping more and more often in supermarkets, where they can buy everything under one roof. So, the role of the direct sales person is key. Sales growth depends largely on quality of service, attention at point of sale and a capacity to generate confidence. Excellence in these fields helps to win over consumers and increase sales.

In conclusion, sales strategies must be adapted to consumer motivation and to their perception of seafood products. Efforts must be concentrated on presenting an image of quality to the consumer, taking advantage of the possibilities presented by innovation, convenience, quality of service at point of sale, and health.

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**AECOC/GS1 Spain improves supply chain efficiency**

In the seafood industry, AECOC/GS1 Spain has more than 2,000 corporate members along the whole supply chain. Its mission is to improve efficiency in fishing and aquaculture, by easing the flow of merchandise and information all along the value chain. The association provides training and studies to improve the main aspects of selling seafood products. In addition, it holds the AECOC congress on seafood products to follow the main trends, market data and sales success stories. In Spain the association is encouraging adoption of the GS1 Fish, Seafood and Aquaculture Traceability Implementation. This involves working with distributors and industry (fish markets, first sale establishments, wholesalers and processing plants) in the implementation of GS1 standards for labelling boxes and pallets and electronic delivery notes, to guarantee automatic traceability along the entire supply chain.

**ANFACO** has opened a cutting edge centre for food technologies

# New laboratory develops foods of the future

ANFACO started as the Union of Canning Manufacturers of the Vigo estuary in 1904. It grew to include all canning companies in Galicia some years later and today ANFACO-CECOPECA, as it is officially called following a merger, has 240 members covering fish processors, equipment manufacturers and other suppliers from all over Spain, as well as some international members.

In 1949, a laboratory to support the canning industry was created, which has been periodically upgraded. In 2016 ANFACO inaugurated the Center of Advanced Technologies for the Marine and Food Industry Research and Innovation (CYTMA), a new 8.5 million euro and 6,300 m<sup>2</sup> cutting-edge laboratory. The new facility which has been co-financed by the European Regional Development Fund, the Ministry of Economy and Competitiveness, and the Xunta de Galicia facilitates research in several different areas: health, food safety, preservation technologies, environment, exploitation of byproducts, process engineering (Industry



**From left: Gonzalo Ojea, ANFACO; Jose Estors, FAO; Vanesa Moreno and Roberto Carlos Alonso, ANFACO. The Department of Training and International Cooperation at ANFACO organised a comprehensive tour of the new laboratory, CYTMA.**



4.0), living resources, and aquaculture. The main focus is on fish, but it is used for other food industries as well.

### Three main areas of operation

In connection with the Conxemar trade show in Vigo, Eurofish got a chance to visit the new CYTMA laboratory located at the ANFACO headquarters first hand guided by Gonzalo Ojea and Vanesa Moreno, from the International Cooperation Department at ANFACO. ANFACO currently employs around 100 people, of which 80 work at the technical department which is divided into 3 main areas: Analytical Control; Technical Assistance and Training; and Research, Development and Innovation.

The Analytical Control area covers testing, product analysis,

microbiology and sensory analysis. The equipment is very sensitive and very expensive, says Gonzalo Ojea. CYTMA remains the only Spanish laboratory accredited by ENAC (Entidad Nacional de Acreditación, a body designated by the government to assess technical competence in accordance with international standards) for species identification assays by DNA sequencing and phylogenetic analysis. These cutting-edge technologies require highly specialized technicians to operate the equipment and interpret the data. One example of the new machines is a mass spectrometer that, among other things, can be used to test for residual antibiotics in farmed fish. Getting facts from products helps association members better understand raw materials and communicate clearly with suppliers and customers. More than 18,500 samples were tested in 2015.

### Cooperation with many countries

The Technical Assistance and Training area provides services primarily for private companies who need to improve their processes and develop new products. The laboratory also samples products from companies to ensure that they conform to the relevant legislation and that they comply with what is stated on the label. The work in this area extends internationally, particularly in terms of advice to non-European countries on how to meet requirements so their products can be exported to the European market. Ecuador, Brazil, Morocco, and several countries in Central America are examples. ANFACO is also working with Peru to help increase human consumption of anchoveta within the country. While



**Process Engineer Roberto Carlos Alonso configures the EUR1 million high pressure machine for a test. It can create up to 6000 bars of pressure.**

this species is today primarily used for fishmeal, ANFACO is advising on different ways of utilizing the fish to provide proteins for people in Peru, who in some areas suffer from malnutrition. The logistics for transporting frozen fish, use of canning options, and other alternatives for distributing anchoveta away from the coast will also help local development.

### Using advanced technology to create potential solutions

What happens in the area of Research and Development and Innovation is a small glimpse of the future. There are currently more than 70 ongoing projects at the laboratory in this area using technologies that include microwaves and radio frequency, ultrasound, induction, extrusion, and high pressurisation. Over four fifths of the projects are funded directly by companies. Developing new preservation techniques is an important research area, where a combination of different treatments such as pressure and/or temperatures could

create higher quality products with improved nutrition, flavours, textures, and shelf life, clarifies Roberto Carlos Alonso, a process engineer in the department. Other examples include using ultrasound to improve the quality of, for example, frozen tuna; improving packaging systems for microwave heating; and increasing energy efficiency. "We are trying to anticipate the future," Mr. Alonso adds.

The association is privately held, but is closely engaged with public institutions. The facilities are placed on the campus of the University of Vigo, and offers a master's degree in the preservation of fish products. The laboratory does outreach activities, including cultural events and a museum for the canning industry that is visited by many schools. Much of the Spanish fishing and especially the canning industry is located in Galicia making the location of the new lab ideal for its members whom it has served for over 100 years.

*Thomas Jensen,  
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**Vanesa Losada of the Technical Assistance and Consultancy Department, shows off a petri dish where bacteria have been cultivated as part of an ongoing product test.**





**Canned tuna producers** on the EU market must be subject to the same rules

# Spanish Traceability Observatory demands level playing field

The trade liberalisation undertaken by the European Union in the last years has allowed preferential access to the EU market for major competitors of the European canning industry, whose share of the EU market has been increasing.

The Traceability Observatory, a Spanish advocacy group established by the Foundation of the Seafood Processing Cluster, strongly believes that all the stakeholders should play by the same rules, and therefore it is essential to ensure a verification process and to strictly enforce Community legislation for canned tuna products sold in the EU market. The observatory supports the existence of a true “level playing field” as well as the development of a European canned tuna industry that is competitive and that contributes to employment in Europe.

## Imports of canned tuna exceed domestic production in Europe

The observatory thus has a clear mission focused on promoting fair competition in the EU market and the sustainability of fishery products and marine resources. The European tuna processing industry is strategically important for the supply of the European Union market itself, playing a key role in the social and economic development, the maintenance and even in the creation of jobs, growth and added value in coastal areas in countries such as Spain, Portugal, Italy and France. The EU market is the world’s biggest seafood market

and canned tuna is one of the most sought after products by European consumers. Community production of processed tuna has been affected in recent years by the significant increase in imports from third countries that account for close to 60% of the canned tuna traded on the community market. The European Union has an annual consumption of 722,231 tonnes of canned tuna, according to the latest figures (2014). Taking into account that 341,415 tonnes are produced in the EU and extra-European Union exports amounted to 22,161 tons, extra-European Union imports exceed European Union production reaching 402,977 tonnes and confirming a clear upward trend.

## Fair competition and sustainability must underpin the canned tuna market

To this end, it is essential to ensure fair competition within the EU market, and this implies that all operators, from the EU and from third countries, abide by similar rules relating to traceability, health and hygiene, food safety and employment, bearing in mind the framework established by the international conventions relating to occupational health and safety, the environment, a sustainable fisheries and respect for resources,



**The Spanish Traceability Observatory feels strongly that if imported canned tuna complied with EU standards in all respects, the European sector would continue to contribute to employment.**

traceability or labelling, among other. Therefore, it is necessary to ensure that all processed tuna marketed in the EU complies with EU regulations by means of effective control mechanisms. These would be supported by a digital system based on an EU database to improve the Council Regulation (EC) N° 1005/2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing. The EU illegal fishing regulation is an innovative and pioneering legal tool that has placed the European Union at the forefront of global efforts to address illegal, unreported and unregulated

fishing. To effectively check compliance with IUU regulations new surveillance measures are necessary to monitor imports to ensure that any canned tuna traded in the EU it has not been processed using raw material from IUU fishing.

The observatory is convinced that a true level playing field in the processed tuna market in Europe would have a positive effect on competition in the European processed sector and, as a result, on the creation of jobs in this industry in the EU, thus enabling the development of a competitive and viable community sector in the long term.



**Fish welfare** receives a boost

# Best practice in fish slaughtering

The Spanish aquaculture sector is developing a set of guidelines for best practice during fish slaughter. While fish welfare will be the focal point the document also addresses worker safety, food safety, and final product quality.

To move forward, aquaculture in the European Union must follow the path of sustainability. And this path can only be followed based, first, on appropriate siting of the farms and, second, by applying responsible practices. Improving siting of European fish farms requires streamlining administrative procedures and reducing red tape by public administrations and governments. But implementing best practice is a direct responsibility of the industry. Keeping this in mind, the Spanish marine aquaculture association, APROMAR, is constantly promoting the elaboration and application of guidelines for responsible aquaculture.

## Guidelines developed with broad stakeholder participation

Fish welfare is an increasingly relevant issue on which Spanish fish farmers work to stay ahead of social expectations. European animal welfare regulations cover farmed fish because they are applied to all vertebrate species, but detailed conditions are not yet developed for fish because of insufficient sound scientific knowledge. However, work can be done on specific production phases. With this objective in mind APROMAR and the Spanish Ministry for Agriculture (MAGRAMA) collaborated to promote guidelines for best practice on farmed fish slaughtering. The Spanish Normalisation and Certification Organisation

(AENOR) was appointed as the secretariat for this task. And stakeholder involvement brought together researchers, university professors, civil servants, trade unions, farmers, animal welfare NGOs, producer organisations and certification companies.

The guideline document was actively worked by stakeholders from May through September 2016 and will be officially completed, including an open public consultation period, by November. It addresses best practices on the slaughtering of the most common farmed fish species in Spain, both marine and freshwater: sea bass, sea bream, rainbow trout, turbot, sturgeon, meagre and sole. It is based on the principle that stunning and slaughtering of fish must be performed to avoid pain and to minimise distress or avoidable suffering for the fish. The guidelines take into consideration the selected species, the size of the slaughtered fish, the physical environment and available technologies. The protocols will be reviewed when new knowledge or technologies offer new procedural opportunities. A key value of this document is that the guidelines, besides fish welfare, also address workers' safety, food safety, and final fish product quality.

## Appropriate training of personnel is critical

All farm personnel involved in fish slaughtering and related operations must be aware of



**Spanish aquaculture farmers have joined hands with researchers, animal welfare groups, fisheries administrations, certification bodies, and other stakeholders to develop protocols for the humane slaughter of farmed fish.**

their responsibility to avoid pain and minimise stress for the fish. Appropriate training has been flagged as a crucial element for appropriate slaughtering and related activities. The guidelines are based on two official documents: The Aquatic Animal Health Code of the World Organisation for Animal Health (OIE) and EU Council Regulation 1099/2009 of 24 September 2009 on the protection of

animals at the time of killing. The final best practice guidelines will be available for use by the industry in January 2017, and fish farming companies will voluntarily apply them either directly or through an audited process that will enable them to certify their fish as correctly slaughtered.

*Javier Ojeda, General Manager, APROMAR, info@apromar.es*





A unique fishmongers network in Europe

# Breathing new life into an old tradition

Nobody doubts that the Spanish fishery and aquaculture sector is at the cutting edge of every part of the value chain. The figures confirm it. Spain is the biggest producer in terms of both capture fisheries and aquaculture in the European Union and is the second biggest European consumer of seafood.

But only few know that the Spanish traditional fish shops network is one of a kind, for many reasons, including the number located in Spain, the great variety of products, and because of its specialisation. This fantastic fish shops network, run by fishmongers, makes it possible to find fisheries products in any corner of the country, strengthening the Spanish population's taste for fishery products. This unique network, through which 45% of the total amount of fresh fish in the country is still distributed, has made the Spanish market the one with the greatest variety of species in the world.

## Traditional fishmongers still have a third of the market

Fedepesca has represented this network of small fishmongers since 1978, but the number of businesses has been reduced, coinciding with the rise of other commercial sales formats, socio-economic changes in society, and the introduction of new technologies. Currently there are 10,000 selling points, and the traditional fish retail sector still has one third of the market. More than 20,000 people work in this sector, almost one fourth of the entire employment in the fishery value chain. They stock up early in the

morning, and they work many hours so they can guarantee the Spanish consumer access to the best fisheries and aquaculture products.

The decrease in market share comes along with a reduction in consumption of fisheries products. Lifestyles have changed and the lack of time in daily life reduces the visits to traditional fish shops. Consequently, there have been changes in the healthy dietary habits related to the Mediterranean Diet, that enabled Spain to be one of the countries with the longest life expectancy. In 2008, household consumption was 27.89 per capita, the latest figures (2015) reveal that this consumption has reduced to 25.86 kg (Magrama). A further fall is expected in household consumption in 2016.

## Product appeal needs to be adapted to young people

Fish is appreciated for its healthful qualities and its taste, but consumers don't feel it is practical to cook. This attitude is hurting the sector, and is especially prevalent among young people. Youngsters nowadays have few cooking skills and they are afraid to go to a fish shop because they don't know what product to choose. Everyone wants a healthy lifestyle, but



Luisa Álvarez Blanco, Deputy Manager, Fedepesca

nobody wants to spend time in grocery shops or cooking. We like cooking, but we need help with it, because more than ever we demand easy-to-cook products, that only need the finishing touch. For this reason, traditional fish shops have widened their selection with ready-to-eat products, or other salted, cured

and smoked products, as well as some complementary products for cooking fish, like rice, wine, salt, broths. They have realized that filleting and gutting alone is not enough to attract consumers.

Tasting the product at the selling point is an important trend that Fedepesca would like to promote.



**Buying from fish retailers is a longstanding tradition in Spain. These seafood shops afford customers all over the country a wide variety of fish and seafood.**

Customers demand it and both European and Spanish regulations allow this activity as an additional service, provided it meets hygiene and food safety requirements. In addition, dealing with take-away products prepared by the fishmonger is easy, as customers can

just select, pay and eat them. The organisation also encourages fish shops to introduce flavours and recipes from other cultures. For example, sushi, other Asian food, and ceviche are attractive especially for young people. With the spread of mobile devices young

consumers now expect to interact whatever the activity, so Fedepesca is looking to boost the use of new technologies and apps in its sector. Social connectivity in real time, multiple sales channels including traditional and online, and the provision of services are all strategies that need to be adapted to the fish retail sector. Another trend that especially benefits fishmongers is interest in the product origin. Fresh, artisanal and local products are of particular interest to consumers and can even change a purchase decision.



**Although threatened by fresh fish counters at supermarkets, traditional fish retailers are still responsible for almost half the sales of fresh fish in Spain.**

### Representation, projects main activity areas

At this juncture, in Fedepesca has two areas of activity. On the one hand, it represents and defends the interests of the sector, including suggesting amendments to regulations. On the other it executes projects that contribute to maintaining competitiveness through training, innovation,

promotion or the use of new knowledge and technologies. Fedepesca also functions as the interface between institutions and its members. It works to publicise the role of the fisheries sector, and in particular of the traditional fish retailer sector. Promoting the consumption of fish and seafood and collaborating on efforts to disseminate information about the value chain, the products, sustainability, and the role of women, are also important activities. Fedepesca has executed projects on dissemination, traceability and labelling, fish quality, and training. The latter is the best way to ensure the future of the sector. Training is extremely important both for fishmongers already working, to maintain their competitiveness and to improve their skills, and for new generations, to ensure the continued existence of traditional retailers. Despite the great need for labour, getting young people to join the sector is extremely difficult even though rates of unemployment among the young are currently unprecedented. This situation may be caused by shortcomings in the Spanish professional training scheme, which does not place value on artisanal professions.

Today, the aphorism, innovate or die, is more true than ever. Fedepesca's challenge is to uphold fish consumption in Spain, and to maintain the status of traditional fish retailers as one of the main outlets for fish sales. Automation, innovation, training, and professionalisation of the entire fisheries and aquaculture value chain, is the way forward. Achieving these ambitions will call for a lot of work, but there is also great determination to reach these goals.

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Strategy to secure Spain's position as a leading fisheries and aquaculture nation

# Innovation in Spanish fisheries

The Spanish fisheries sector is among the most highly advanced in the world with well-developed activities in capture, aquaculture, processing, and trade as well as a sophisticated research and development capability.

About 81,000 people are directly employed in the capture fisheries, aquaculture and processing subsectors. While this represents less than half a percent of the total Spanish workforce, jobs in the fisheries sector are often disproportionately important in many small and remote coastal areas. Turnover in the processing industry amounts to EUR4.1bn, while production from capture fishing and aquaculture is valued at EUR2.8bn and EUR0.05bn respectively.

## Strategy to guide innovation and development

Given the above figures, it is especially important to focus attention on innovation and technological development that has an impact on fishery products and, above all, on the consumer. The Spanish fisheries administration has therefore approved the Strategic Plan for Innovation and Technological Development for fisheries and aquaculture for the period 2014-2020. The aim of the plan is to increase competitiveness and ensure the continued leading position of Spanish fisheries and aquaculture, through innovation and technological development, and by optimising resources considering economic, social, environmental and sanitary requirements. The fisheries sector has great potential for technological development. However, there are certain factors

that hinder the uptake of innovative processes and products.

Technological progress is not easy when small and medium companies dominate the sector. These companies usually do not develop their own technology but they acquire it by purchasing machinery and equipment. Innovation and technological development in these businesses comes up against some barriers such as low awareness of the importance of innovating and incorporating new technologies, the high cost and difficulties in finding financing, and the need for qualified personnel. In addition, the current economic and political situation is slowing the adoption of new technological developments because of the many uncertainties.

## Innovation helps a traditional industry diversify

On the other hand, fisheries products are perceived as healthy products, and if the population grows as forecast, it will be necessary to provide the market with more fish and seafood (complementing fishing with aquaculture). This presents an opportunity to provide new products and new presentations encouraged by research from member institutions in the Spanish Network of Excellence. New activities, products and services provide an opportunity for companies to add value and



An oxygen aerator that has been developed in the project Aquasef uses microbubbles nozzle technology to achieve efficient and low cost aeration.

to diversify in a sector with a long tradition and deep roots in Spanish culture.

Among the main strengths described in the strategic plan are the national and international demand for seafood, the high commercial value of products, a network of diverse institutions and organisations in the sector, and a very strong scientific research capability. On the other hand, the weaknesses include the lack of coordination between administration and science and between science and industry, a low level of private research and development, and the fragmentation of the sector. The perception of seafood as a healthful product, the potential of new species, and the presence of technology platforms were all

considered opportunities, while overfishing, IUU fishing, environmental degradation, and the negative impact of the economic crisis, constitute some of the threats to the sector.

With regard to innovation and technological development certain priorities have been established for the period 2014-2020. These have been broadly categorised into resources, fish farming, fishing technology, processing, and marketing. Measures being considered under resources include diversification of activities and conservation, while for aquaculture the priorities are identifying new species and greater use of biotechnology. Reducing the environmental impact of fishing operations and adapting vessels to utilise discards are major priorities



for the fishing sector, while in the processing industry, better use of by-products and exploiting species that currently have little or no value are among the goals. Finally, developing novel marketing channels, new markets, and innovative sales strategies are all priorities under the marketing category.

The strategic plan also considers the ongoing fourth industrial revolution, also known as Industry

4.0, that is transforming manufacturing to be:

- **Flexible.** Intelligent and flexible automation. It adapts flexibly to the demands of an increasingly diverse and dynamic market.
- **Smart.** It takes advantage of the internally and externally generated information throughout the value chain to enable decision-making in the shortest time in order to achieve the maximum efficiency in each one of its activities.

- **Virtual.** It allows, through simulation tools to optimize the implementation of new production lines and the evaluation of alternatives in real time.
- **Sustainable.** As horizontal axis on which other activities pivot: taking advantages of limited resources, process optimization, minimizing carbon footprint.

This will result in industry that can manufacture small personalised

volumes closely synchronised with suppliers, can avoid waste, simulate scenarios and thereby reduce risk, and can anticipate food safety problems in a product.

These developments are exciting, but also challenging in many ways, not least of which will be funding. Fortunately, the European Maritime and Fisheries Fund and other instruments are available to support these goals until 2020.

**Large tuna purse seiners in Spain** subscribe to new standard that includes social conditions

# Fishing for tuna responsibly

OPAGAC, the Organization of Associated Producers of Large Tuna Freezers, is making changes in its fishing system with the objective of making fishing a responsible, sustainable industry that responds to the market's concerns. The organisation is promoting a standard that fully describes the minimum level needed for a responsible fishery.

The standard "Atún de Pesca Responsable" (APR) or Responsible Tuna Fishing responds to the market's growing demand for certification of good practices by the world fishing industry. Until now good practice certification has focused on the sustainability of the fishery resource alone. This standard primarily addresses the distribution chain, which demands assurance that the product it sells has been fished not only legally (a point that is guaranteed by Spanish fish inspection authorities), but also responsibly and sustainably. The standard includes five main requirements:

- Compliance with good practices in seine fishing for tuna. Good practices guarantee that the impact on the ecosystem is kept as low as possible. Compliance is verified by voluntary on-ship observers on all our vessels, including the use of electronic observers.
- Compliance with the EU's required minimum food sanitary conditions in respect of our tuna catch.
- Maritime safety control, in accordance with the International Maritime Organization (IMO), ship classification systems and protection and indemnity (P&I) insurance.

- Decent, well-paid working conditions for crews. More specifically, the basic conditions stated in International Labour Organization (ILO) Convention 188.
- Fishery control and transparency, with satellite ship-tracking systems and catch reporting.

## A standard with global ambitions

Because of the spirit in which it is created, the APR standard is entirely open to all the world's tuna-fishing fleets, as an endeavour to establish a



**OPAGAC represents eight companies that own 40 tuna purse seine vessels, which catch roughly 300,000 tonnes of tropical tunas per year.**

minimum standard for responsible fishery in all oceans. In fact, OPAGAC has ships that members have registered in the coastal countries where they have invested, and those vessels too will be certified under the APR standard. This shows how open

and international the standard is. In the near future, the organisation will try to have it made into a European standard, and then perhaps even an international ISO standard. although the requirements will be hard for OPAGAC's competitors to live up





The APR standard lays down that working conditions of all crew members must meet the minimum requirements set by ILO Convention 188.

to. The Spanish fleet is the fleet that is already meeting the APR standard's requirements, and it is spearheading efforts to ensure that all can compete under equal conditions in the global tropical tuna market.

OPAGAC comprises eight companies that own 40 tuna purse seine vessels, which catch roughly 300,000 tonnes of tropical tunas per year. This accounts for 6% of the world catch of tuna species, which is upward of five million tonnes a year. OPAGAC sails all three of the world's major oceans. In the Atlantic Ocean the organisation's catch accounts for 19% of the region's total; in the eastern Pacific, 9%; in the Indian Ocean, 6%; and just 3% in the western Pacific. The main species are skipjack tuna (*Katsuwonus pelamis*), which makes up 60% of the catch, yellowfin tuna (*Thunnus albacares*), which accounts for 35%, and bigeye tuna (*Thunnus obesus*), which is 5%. The OPAGAC fleet supplies canneries the world over, since a great deal of the catch is sold at plants sited in coastal countries, where some members have invested heavily in processing plants that employ

many people. The European tuna industry as a whole (that is, the fleet plus the processing industry) is estimated to provide jobs for over 25,000 people all over the world, since the EU market consumes a whopping 500,000 tonnes of canned tuna, making it the world's number-one consumer. Processing factories primarily employ local labour and women form the vast majority of the workers.

### Standard defines conditions for employees

The APR standard is remarkable because it is the first standard in Europe and maybe the world to include a labour component. The OPAGAC fleet employs more than 2,000 seamen, approximately half of whom are from coastal countries. Fishing is under EU fishing agreements and private agreements with third-party countries, which require vessels to take on crew from coastal countries. The working conditions of all crew members, regardless of their nationality, must meet the minimum requirements set by ILO Convention 188. Reports are common nowadays of cases of bad

labour practices and even slavery in the fishing industry throughout the world. The APR standard responds to the concerns that many markets are displaying over this issue. Labour has always been a paramount issue for the organisation, which considers its labour practices a strength, in contrast to the unfair competition of other operators who do not safeguard their crews' working conditions.

OPAGAC would like this standard to be the minimum requirement for all fishing production that at least imports into the EU, because the organisation is keenly aware of the kind of abuse that goes on in many of the fleets that compete with it on the tuna market. They base their competitiveness largely on the fact that they do not have rules such as those in the APR standard. The cost of operating a vessel that meets the standard is much higher, because compliance requires a sizeable investment to guarantee that the very risky business of fishing on the high seas is conducted under minimum safety standards and conditions in accordance with European legislation, the most advanced legislation in the world in terms of guaranteeing all these fundamental elements.

### Market recognition of the standard will help fight illegal fishing

As is well known, the proliferation of illegal fishing is associated with illegal fleets' shocking on-board conditions. Poor on-board conditions contribute to the depreciation of the catch, too, and often lead to overfishing. It is therefore fundamental for the market to recognise the effort made by law-abiding, responsible fishermen to try and close down the sales of illegal fishermen. To do so, the APR standard



establishes minimum requirements, so that tuna fisheries will comply with the kinds of prerequisites that guarantee responsible fishing. Hopefully, the market is capable of acknowledging this effort, because it will be very hard to wipe out the illegal exploitation of seamen and thus fishery resources without the market's help. In addition, the organisation will try to have EU imports held to the same requirements, and, while many controls are already being conducted by law, compliance can be improved.

OPAGAC would like to acknowledge all the members of the technical panel who wrote the APR standard for their participation. It appreciates in particular the Secretariat-General for Fisheries, which has always encouraged the utilisation of the standard to differentiate members of the organisation from their competitors. In fact, the fishery control efforts Spain has been making (Spain has earned ISO 9001:2015 certification for its fishery control system) have been the foundation and inspiration for OPAGAC's effort to highlight the work its fishermen are doing to implement responsible fishing. Spain now leads the responsible management of fishery resources, and the hope is that the APR standard will help spread the good work the organisation's fishermen are doing all over the world.

Julio Morón, Director, OPAGAC



The Spanish Technology Platform for Fisheries and Aquaculture (PTEPA)

# Promoting fisheries research and development

The Spanish Technology Platform for fisheries and aquaculture (PTEPA) is a non-profit association that promotes research, development and innovation in the Spanish fisheries and aquaculture sector.

PTEPA was (and still is) the only technological initiative at the national level that includes the entire value chain of the sector. Today PTEPA comprises more than 290 organisations representing over 750 experts, with new members constantly being added. The membership covers 95% of the sector giving PTEPA an important role in ensuring the coherence and coordination of research and development at the national level.

## A platform for defining industry's research needs

Together with representatives from the sector PTEPA defines the technological priorities within fisheries and aquaculture. These priorities then form the basis of projects that respond to commercial and social needs. PTEPA collaborates actively with Spanish ministries to ensure that the needs and interests of the sector in terms of research and development (R&D) are considered in the publication of R&D calls and when formulating national strategic plans like the strategic plan for innovation and technological development of the fisheries and aquaculture sector, developed jointly by PTEPA and the Spanish Ministry of Agriculture and Fisheries, Food and Environment. PTEPA also has a leading role in the implementation of EFTP (European Technology Platform for Fisheries) and

works to optimise the Hispanic-European collaboration on fisheries issues under the Horizon 2020 programme. PTEPA has therefore become a key figure to increase the competitiveness and leadership of the Spanish fishing and aquaculture sector in the European Union.

The platform together with other stakeholders – research, industry, and the administration – ensures the smooth coordination with other regional and national actors as well as international organizations. PTEPA is a forum where the public administration can discuss R&D issues with the sector. Thus, with innovation and technological progress it seeks to modernise this very traditional sector in Spain. To achieve this PTEPA also defines short and long term research priorities; coordinates actions and national, public and private investment in R&D; and collaborates internationally to share Spanish R&D and to benefit from technological developments in other countries.

## Wide range of activities

PTEPA develops R&D activities in the fisheries and aquaculture sector in Spanish and European R&D programs. It promotes networking opportunities between its members to identify R&D priorities which are then transmitted to the administration. The platform promotes events and



One of PTEPA's functions is to disseminate information. Here, a conference organized by PTEPA's Products Processing Working Group in January 2016.

conferences at different levels (national and international), in different formats (open, designed for specific members), and in collaboration with different partners. It organises meetings with the media, and workshops, seminars, etc. for its members. PTEPA also offers a consultancy service that provides advice on the most strategic funding calls, and on how to prepare a successful proposal, and that facilitates the search for partners and the creation of R&D consortiums.

For projects already approved, PTEPA develops activities related to dissemination, networks with other organisations in the sector (at the national or

the international level, due to its collaboration with European mirror platforms), and approaches the end users. The platform also has years of experience in the preparation of documents reflecting the needs and priorities of the Spanish fisheries and aquaculture sector, including the processing and distributing of its products, in terms of R&D. In this respect, the Platform has published more than 15 studies, all available at the website [www.ptepa.org](http://www.ptepa.org). PTEPA maintains and updates its website and publishes two newsletters. It also publishes news and events on its social media pages. It prepares and disseminates materials and advice, and informs the public where to go for information





about R&D in the Spanish fisheries and aquaculture sector.

**A busy two years to 2016**

In the period 2014-2016 more than 1,000 R&D initiatives have been channelled through PTEPA. The platform has supported 13 projects, conducted more than 600

partner searches and has advised more than 100 organisations about their proposals. Additionally, the platform has disseminated information about more than 170 successful R&D cases. Among these initiatives is an integrated innovation project, Aquasef, which endeavours to improve energy and environmental sustainability

in aquaculture. PTEPA has been closely involved in the project in terms of organising technical visits and networking events, and putting together a panel external experts. Aquasef will use renewable energy (solar and wind) to reduce the emission of greenhouse gases from an aquaculture facility.

For more information: Spanish Technology Platform for Fisheries and Aquaculture (PTEPA)

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**Long overdue recognition of women's contribution** to Spanish fisheries must not lead to complacency

# Substantial female employment in fisheries

The fisheries sector in Spain has a deep-rooted tradition of women being present in every one of the areas and subsectors of activity, making an essential contribution to the economic and social development of the sector.

They work at most of the ports and shores along the coast, but until recently, they have been barely visible and their work hardly recognized. Their work was considered supplementary to that done by men, as they were the ones who were out at sea and remained for long periods away from home, while women took care of the family and were responsible for the domestic economy, contributing with their labour to trades also linked to the sector.

(where women net makers represent 89% of the workforce), fish offloading, sorting of catches and ship provisioning. In the aquaculture sector, women are strongly represented in the marine aquaculture subsector (where they represent 29% of workers), mainly on mussels platforms, and they also participate prominently in inland aquaculture, where they represent 19.5% of the total workforce. The fish processing industry has historically been a field dominated by women (it is estimated they represent 74% of employment) particularly in the canning industry, in anchovy cleaning, and in smoking and salting factories. They also play an important role in sales, especially in the fish retail industry and related trades (53%). There are also women engaged in the wholesale trade (28%), in other sales outlets, and in online sales channels.

However, in the case of sea fishing, female employment has been - and continues to be - very low



**The manual collection of shellfish is an activity that in Spain is traditionally carried out by women**

(around 5%) due to structural barriers, such as the unsuitability of vessels for mixed crews. This greatly limits the access of women to activity on board, especially in high-sea fishing. In total, the significance of women in the Spanish fishing sector is today undeniable, as it is estimated they represent 36% of the employment in all extractive activities and subsectors using seafood as raw material. However, although these workers have come a long

way to make themselves visible and professionally recognized, there is still a long way to go.

## Organisation and professionalisation leads to improvements in labour conditions

At the beginning of the last decade, women in the fishing sector understood that to claim their space in a traditionally male-dominated sector, it was necessary to unite and

### Important women's presence in Spanish fisheries sector

There are some activities that even today are mainly carried out by women, such as gathering seafood by hand, where women represent 68%, with a particularly significant presence in the region of Galicia (82%). Women also dominate several activities directly related to fishing, such as manufacture and repair of nets



Participants at a congress of the Spanish Women's Network in the fisheries sector in Santander in 2015

work together to defend their rights and interests. With this in mind, the different groups of workers began to form their own associations, initially in the local and trade union sphere, through which they could improve their capacity of representation and salary. Over the years and with the support of the government, different groups of women in the extractive primary sector (shellfish gatherers, net makers, and subsequently *neskatillas* and women involved in packing) are getting professional certificates.

As the movement to organise women matured it brought about improvements in working conditions. Among other achievements, women were included in the special social security system for sea workers, changes were made to the retirement age (in the case of shellfish gatherers), studies were sponsored on labour-related illnesses among women and on the implementation of mechanisms for their prevention, and facilities and workplaces were adapted appropriately.

### Spanish Women's Network in the fisheries sector launched

To contribute to the visibility of these groups of women, in 2010

the Ministry of Agriculture, Food and Environment, launched the Spanish Women's Network in the fisheries sector: a platform on the EU level, together with the AKTEA European Network, which is already working with more than 90 organizations in the Spanish fisheries sector. Since the beginning, the Spanish Women's Network in the fisheries sector has worked to promote and to support the role of female workers, fostering their partnership and entrepreneurship, and encouraging the communication and exchange of initiatives and good practices. For this purpose, visibility and dissemination actions such as organizing national conferences, preparing newsletters, studies, reports and other publications on gender, establishing an online presence through a website and social networks, have been carried out.

In 2014 the General Secretariat of Fisheries introduced the principle of equality of treatment and opportunity through a law 33/2014 (26 December). This was a milestone in the fight for gender equality, as it established the regulatory framework at a national level to fight all forms of discrimination in the fisheries sector and contributed to improve the situation of women working there.

Moreover, the development of a *Plan for Gender Equality in the fisheries and aquaculture sector* for the period 2015-2020, gave a new boost to equal opportunities.

Because of these and other actions, today women's participation is considered not only beneficial to the fisheries sector, but fundamental to its proper development. However, female participation should be not only in terms of labour, but at all levels, including representative, decision-making, and advisory.

### A need to consolidate the gains of the last years

The next step for further progress towards full and effective equality of opportunity in the fisheries sector is to ensure the balance of power between the genders. In addition, even if nowadays there are already women in prominent positions in the management and government bodies of the sector (associations, local fishery action groups, producer organisations and other sectoral entities), this emerging female leadership must still be consolidated. With this in mind, a National Association of Women in Fisheries (ANMUPESCA) has been created, which

brings together different women's groups working in fisheries-related fields.

Women in fisheries have displayed an admirable ability to face the challenges, to adapt themselves to different contexts, and to embrace emerging changes and opportunities. A clear example of this is their entrepreneurial spirit, which they have demonstrated in recent years, leading a large number of successful business projects, which have helped to generate wealth and jobs in their communities and fishing areas. In addition, women have been the first to see that diversification is a way to complement incomes and make their activity more profitable, and therefore they are involved in initiatives related with fishing or sailing tourism (fishing tourism, fishing craft, guided routes in gathering seafood areas, ports or other facilities where they work to publicise their profession, etc.). There are many projects in this sense promoted by women, some of which have received international recognition, as is the case of the awarded by the European Fisheries Areas Network (FARNET) as an example of good practices in sustainable development of coastal territories.

Women are a part of a tradition in fisheries, but they are also the present and obviously the future of the fisheries industry, which cannot ignore women if it is looking to progress, modernise and become more competitive, as they represent about half the talent in this country.

For further information about Spanish Women's Network in the fisheries sector, visit: <http://www.mapama.gob.es/es/pesca/temas/red-mujeres/>





Legasea develops uses for fish waste

# Marine ingredients have huge growth potential

Norway is busy preparing itself for the end of the oil and gas era and is focusing strongly on biological marine resources. The commercially utilizable marine area is six times larger than the country's land area, and the fish stocks are among the world's best managed resources. A significant reserve is, however, also to be found in marine by-products that have up to now not been sufficiently used.

The fossil fuel reserves off the Norwegian coast are running out and their extraction is becoming increasingly expensive with the result that profit margins are shrinking. In the search for economic alternatives Norway is now looking closely at the bio-economy which offers considerable potential for value adding. Sustainable management of the fish and seafood stocks sets very narrow limits on the fishing sector, however, and catch volume cannot be increased indefinitely. That is why Norway wants to push forward the development of aquaculture. "Bio-marine resources" (these include slaughter waste, trimmings, fish heads and guts) are a source of great hopes. About 850,000 tonnes of such products are produced every year but are currently hardly or insufficiently utilized. Even processing to fishmeal is not really an optimal solution for there is indeed market demand for a lot of the ingredients contained in the raw materials - ingredients that have a much higher potential value. With regard to cod and other whitefish species already 63% of the raw material is not used sufficiently. On average over the past few years the total value of Norwegian seafood production amounted to nearly

10 billion euros. Of that, a good three billion came from fishing and more than four billion from aquaculture, but only just under half a billion from "marine ingredients", which mainly consisted of lipids (omega-3 fatty acids) and proteins that were extracted from the supposed waste. This is now to change, however, for Norway has set itself ambitious goals. By the year 2050 production from the fishing sector is to increase by 85% to six billion euros, from aquaculture by 600% to 28 billion euros, and the share of marine ingredients is to increase by 1,300% to 8 billion euros.

The implementation of this strategic plan has already begun: in Møre & Romsdal, one of the world's most important seafood regions in which about 500 companies process 650,000 t of marine raw materials per year. Blue Legasea is a long-term project that was set up in the harbour town of Ålesund in 2009. Its aim is to coordinate and accelerate the sustainable, eco-friendly and value-added production of healthy products from wild caught marine biomass. Legasea is a kind of cluster that brings together about two dozen companies. It acts like a catalyst, supporting the different partners



**Project Manager Wenche Uksnøy Gabor. Norway's marine ingredients industry is expected to grow by 7% annually and reach sales of nearly 8 billion euros by 2050.**

within this professional network and pushing forward the use of marine resources. Legasea's main aim is to make better use of the marine resources than was previously the case, to increase value adding, and to develop internationally marketable products. At the centre of this interest are in particular marine lipids and proteins which are said to prevent or reduce the consequences of some lifestyle- and age related diseases.

Wenche Uksnøy Gabor, the Project Manager at Legasea, draws attention in this connection to the omega-3 fatty acids DHA and EPA whose health value has been confirmed in more than 24,000 scientific publications. "The prevention and combating of the consequences of poor or incorrect nutrition costs the health service in western countries a lot of money. Marine ingredients such as omega-3 fatty acids, marine



**Lena Brungot, Senior Adviser at the Norwegian Ministry of Trade, Industry and Fisheries. The number of fishermen fell by over half from nearly 23,000 in 1985 to less than 10,000 in 2015.**

proteins and peptides are, however, real alternatives that can contribute towards solving these problems. They are playing an increasingly important role as food supplements, as additives in functional foods, and in pharmaceuticals." Given this spectrum of benefits the name Legasea was well chosen for it sounds like "legacy".

### **Thorough documentation of health claims**

Legasea promotes the development and commercial use of such products, supports knowledge and technology transfer between the participating companies and hopes thereby to contribute towards the expansion of this industrial sector in Norway. "Normally it takes three to five years for a product idea to mature and reach the stage of commercial usage. We want to shorten this time. It would generate additional jobs in this area, enable enhanced value adding, and last but not

least also contribute towards more raw materials - which are today still seen as waste - being used to good purpose.

But the time frame for developing new products cannot be shortened at will. The biochemical profiles of different raw materials have to be analysed and tested in research and development projects to define the substances that they contain. Special techniques are required to isolate the substances, and their bioactivity has to be demonstrated in clinical tests as a basis for sound health claims. And then, of course, suitable markets have to be found for the products. All of this takes time, costs money, and demands commitment and a certain staying power from the researchers. The prerequisites for this are particularly favourable in the Møre & Romsdal region because the companies based there can draw on considerable amounts of slaughter waste: damaged

animals, fish heads and backbones, guts, livers, roe, belly flaps, swim bladders, and trimmings. Nearly all of this is fresh and of high quality because most of it comes from cod and other whitefish species that are caught for human consumption and so handled with care.

### **Efficiency of Norwegian fisheries has risen substantially**

Norwegian fisheries policy is geared equally to sustainability and profitability, resulting in healthy stocks which constitute a solid basis for increased use of biological marine resources. The common fisheries management with Russia in the region of the Barents Sea has led to a clear increase in demersal fish stocks, says Senior Adviser Lena Brungot. They have been at record levels for several years which has enabled an economically lucrative fishing sector. The number of full-time fishermen fell by half from nearly 23,000 in 1985 to less than 10,000 in 2015, and the number of fishing vessels under 15m length fell during the same period from 25,000 to 5,000. Although the government has rarely granted financial aid since the mid-1990s the fishing industry has consolidated its structures and is today highly profitable. Processing companies in the north of the country mainly received support to maintain jobs there and promote regional municipalities. An important measure in this connection was the relocation of on-board fish processing to land-based companies. In the meantime, however, it was possible to loosen this strategy somewhat again: partly because frozen-at-sea whitefish fillets are particularly popular on the markets and get higher prices, and partly

because the utilization of marine by-products, whose value chain begins at sea, poses a real alternative which opens up new economic possibilities for the companies involved.

### **On-board fish hydrolysis instead of fishmeal production**

Another technology manufacturer in the Legasea group is OptimarStette which offers customized machine solutions for fish processing on board and on shore. The spectrum ranges from machines for the stunning and humane killing of fish, freezing or palletising pre-packed products to fully automated production lines, partially with the integration of robot technology. Although as a specialist in complete factory design Optimar has a lot of experience in fish processing, fitting the production lines into the confined spaces on board a fishing vessel is always a challenge, especially since the operation on a rolling ship requires specialized knowledge. However, the Optimar developers have great experience in this field and have already equipped several fishing vessels with equipment for the processing of demersal fish, pelagic fish, squid and shrimp. Unlike in the past, when after the catch the cod lay iced in boxes up to the time of processing the fishes are now often kept alive for several hours on modern trawlers, which has a particularly advantageous effect on the quality of the fillets. Sales Manager Geir Espen Otlo stated that about 95% of the captured white fish are still alive when they are taken on board. Dead fishes are of course processed immediately, the others are put into tanks where they can reduce stress. The Optimar tanks can hold about 40 t of fish on board





**Despite automation, fish processing at sea remains a challenge because work operations on a rolling vessel require special knowledge**

for intermediary storage. This is usually sufficient for processing the fishes one by one before the net is hauled in again with the next catch.

It is carried out with enzymes at low temperatures, and is thus energy saving and gentle on the raw material. The hydrolysate can be put to various further

uses as a liquid protein concentrate. In early March 2016 Nordic Wildfish – another player in the Legasea group – presented the F/T “Molnes”, the world’s first

white fish factory trawler with its own hydrolysis plant for liquefying fish trimmings on board. The ship had been converted at the Vard Søviknes shipyard and equipped with Optimar technology.

The fact that hydrolysates open up the possibility of using marine fats and proteins more effectively was emphasized by Robert Wolff from SINTEF, the largest independent research organization in Scandinavia, which employs 2,100 people in over 70 countries. In addition to departments such as Ocean Space, Health and Welfare, Sea Technologies, Oil and Gas and Renewable Energies, fishing and aquaculture are also of great importance for SINTEF. The researchers are already now cooperating in individual projects at Legasea and soon SINTEF will even open its own branch in Ålesund to increase its presence in this important centre of the Norwegian fishing and fish processing sector.

Keeping fish alive under adequate conditions for a short time on board the fishing vessel means that they can be processed largely stress-free. On the Optimar processing line they are first stunned electrically, individually killed, gutted and can then bleed for about 20 minutes before being frosted, packed and palletized. And the increased use of marine by-products leads to additional economic opportunities for Optimar. If the raw material can be processed fresh on board, the quality and yield is noticeably higher. Optimar favours hydrolysis techniques for the treatment of slaughter waste because they offer several advantages. Hydrolysis is not as technically complex and therefore less expensive than the traditional fishmeal production on board.

### **Fish hydrolysate**

## **Versatile raw material for feed and food**

During hydrolysis of fish, mostly offal, trimmings and other fresh by-products from fish processing, muscle fibres and other tissues are decomposed without heat exposure (“cold process”) by the fish’s own or added microbial enzymes and “liquefied”. The resulting product (hydrolysate) thus belongs to the group of enzymatically produced fish products. The processes involved in hydrolysis correspond chemically to the cooking and maturing of salt fish and marinades. Hydrolysates can be used as animal feed or processed into food supplements, pharmaceuticals and the like.

The processes involved in hydrolysis are relatively simple. The raw material is broken down mechanically and enzyme preparations (only necessary if the raw material contains no viscera) and acid (sulfuric acid, hydrochloric acid or formic acid) are added to the resulting fish mash to lower the pH value. After a certain time the hydrolysis is stopped by inactivation of the enzymes. After that, the liquid protein-fat solution is often treated further in a tricanter to separate any solids that it contains (bones, scales, skin debris). The liquid phase is preserved by pasteurization or the addition of preservatives (for example, sulphites). Hydrolysate keeps for about six months if stored in the dark at 20° C. The raw protein content is between 12 and 15%, but it can be higher if water is removed in the course of the production process.

The term “fish silage” which is sometimes used for fish hydrolysate is incorrect because silage is a vegetable product of lactic acid fermentation during which carbohydrates under absence of air are converted to lactic acid, carbon dioxide and other components.



## Eurofins

# Quality inspection of biological marine products in just minutes

**E**urofins is one of the world leaders in the field of bio-analytical services for animal feed and food. With more than 200 laboratory branches in 39 countries which analyse, inspect and monitor a large number of raw materials and finished products for authorities, organizations and business customers Eurofins aims this year to achieve a total turnover of 2.5 billion euros. A very ambitious goal, but one which Thommy R. Holmvåg, Business Unit Manager Aqua at Eurofins Food & Feed Testing Norway, considers to be realistic: "Although there have been improvements in the international field of bio-analytics in recent years many companies today still do not have regular access to laboratory and testing capacities. We want to tap these growth opportunities and expand our service offerings."

Thommy R. Holmvåg does not base Eurofins' claim to market leadership solely on the company's global market presence but also on the high level and scope of services provided: "We offer our customers an extremely broad spectrum of test and analysis methods from biotechnology to analytical chemistry. Some methods that today determine the state of the art in the analytical field were even developed by Eurofins specialists themselves". In the area of marine industries Eurofins' offer includes species determination of fish and

seafood, composition of fish feed in aquaculture, fishmeal and fish oil as well as analysis of carcasses and processed products. This means that the company covers practically the whole range of requirements from aquaculture and fisheries, through the different processing stages to the wholesale and retail trade. The company offers everything that leads to information on the composition, origin and quality of products: pollutants and residue analysis, DNA sequencing, microbiological testing, and more besides.

Seafood is today traded worldwide in ever increasing quantities – and unfortunately not always honestly. Anyone who wants to be absolutely sure that they are getting what it says on the label cannot get around laboratory testing. With modern analytical techniques it is possible to examine production methods (for example, expensive organic products) and origins and to recognize whether fish from aquaculture are declared as wild caught or whether cheaper shrimps or fish species might have been mixed in with the ordered product. With the help of DNA fingerprinting it is possible to detect even minute traces of *Listeria* and analyze exactly at which point in the value chain the contamination occurs.

Eurofins' ultrafast QTA quality testing method is particularly attractive: it enables users to



**Thommy R. Holmvåg, Unit Manager Aqua: Eurofins supplies reliable products together with fast, competent professional customer service whenever you need it.**

test biological marine products such as fishmeal and fish oil, fish hydrolysates, marine proteins and many other substances without having to have their own laboratory or qualified personnel – and without having to wait long for the results. NIR analysis (Near Infrared Spectroscopy) is based on reflection and absorption measurements of infrared radiation. All the user needs is an approximately fish crate sized measuring device that is connected to the Eurofins headquarters via the Internet. For analysis the product simply has

to be placed on the sensor. The measured data are sent via the Internet to the control centre at headquarters, compared with databases and already one or two minutes later the results appear on the computer screen. It is possible, for example in the case of fishmeal, to measure the water and protein content, the fat and ash contents. In the case of fish oil, the NIR analysis provides information about the concentration of omega-3 fatty acids such as EPA and DHA, as well as glycerides, ethyl esters and antioxidants.



**Firmenich** Bjørge Biomarin

# Seafood-based flavour concentrates and aromas

**F**irmenich Bjørge Biomarin has specialised in the production of aromas, concentrates and odorants on the basis of fish and seafood. They are used as aroma and flavour components in a wide range of foods and are to be found as additives in soups, sauces and snack products, in convenience products and surimi. “Because some of our products are no longer reminiscent of fish they can also be used in foods in which one would not expect to find them, for example in cereal bars. And because the company manager knows that aromas, additives or E-numbers are not popular with a lot of consumers he immediately offers an explanation: “We are not a chemical factory. We get our concentrates from purely natural raw materials. Nearly 80 per cent of the fishes, crustaceans and other seafood species that we use come from Norwegian waters, many of them are MSC-certified. Because they are natural concentrates they do not

have to be declared as aroma or flavour additives on the product label. In the case of cod concentrate, for example, the information “contains cod” is quite enough.”

Just a few millilitres of anchovy concentrate are sufficient to transform a neutral tasting stock into an aromatic fish soup. “For a shrimp or anchovy stock the share of concentrate should be about 0.2%. The intense flavour of smoked herring can even be achieved by adding only 0.1% of the concentrate”, Tormod Thomsen, CEO of Firmenich Bjørge Biomarin, informed us.

Nearly 2,000 tonnes of finished products leave the company every year. The products are highly concentrated and thus give a full flavour with just a tiny amount. In order to protect the sensitive flavour-enhancing substances against harmful impacts, particularly against oxidation,

the microscopically small aroma particles are encapsulated in an elaborate process. “That preserves their typical original taste – even under extreme conditions, for example when they are frozen in a food and then boiled during preparation.” They are available for use in various formats: powder or paste, liquid, or as a dry spray.

The development team at Firmenich Bjørge Biomarin under the leadership of Karl Inge Slotsvik is constantly searching for new product ideas and application areas. A lot of tests have shown that the natural concentrates don’t only make foods more enjoyable but also have a special health benefit. “Clinical studies have confirmed that marine peptides and other flavour active substances have a positive influence on blood and insulin values, digestion, body weight and muscle functions”, explains Slotsvik. Consumers are changing their consumption

habits. Some people avoid certain foods in order to follow a healthier diet. On the other hand others use additional means such as omega-3 preparations to achieve the same goal. “Our seafood concentrates don’t demand any abstinence, so “Eat less” or “Eat healthier foods” doesn’t have to apply here.”

Bjørge Biomarin has belonged to Firmenich since 2002. Firmenich was founded in Geneva (Switzerland) in 1895 and with an annual turnover of 3 billion Swiss francs is today considered to be the world’s largest private company for fragrances and aromas. The company produces in 28 locations and markets its products in over 100 countries. In 2015 Firmenich decided to make the Norwegian branch Bjørge Biomarin the driver in the growing health and wellness market. Since then the company has invested considerable sums in the production of hydrolysed proteins and peptides.



The flavour of a lot of foods and dishes, for example cream cheese, can easily be enhanced by the addition of just a few drops of the right seafood concentrates.



CEO Jan Bjørge and Karl Inge Slotsvik. Firmenich is a purely B2B enterprise which only delivers to other processors but not to retailers and end-users.



# Omega-3 oil concentrates for the booming healthcare market



Marine Ingredients' processing plant in Brattvaag currently employs nearly 50 people.

Marine Ingredients is a recognized specialist in the field of biological marine substances, and has produced omega-3 fish oil supplements/preparations of the highest quality for health and organic food stores, industrial processors and the non-prescription pharmaceuticals market since 1984. The range of omega-3 products from Marine Ingredients ranges from small soft gel fish oil capsules that are taken daily as a dietary supplement, through bottled fish oils to large batches in 190 kg drums. As a vertically integrated company Marine Ingredients has direct access to specially equipped local fishing vessels and can rely on wild-caught ingredients in high quality from Norwegian waters. Particularly important are cod, saithe and haddock, whose MSC certified catches are used almost 100 per cent for this sector. Already on board the ships high quality raw oils and hydrolysates are recovered from fish waste. Modern technology and enzymes are used

to achieve this without the need for heat which ensures the highest quality and greatest possible care of the ingredients. To meet the growing demand, raw oils are additionally purchased from other regions of the world, especially omega 3-rich anchovy oil from the Southeast Pacific.

The operation in Brattvaag is equipped with the latest technology for concentration and purification of the raw oils. The facilities are licensed by the Norwegian Medicines Agency and are subject to constant controls. Originally, the company for natural fish oils, medium concentrated omega-3 fatty acid and finished fish oil preparations belonged to the BASF Group. In November 2014 it was then, however, sold to Marine Ingredients in the course of a strategic reorientation which with this acquisition significantly expanded its expertise in the omega-3 range which is considered the company's core business. The acquisition meant

that Marine Ingredients can serve customers throughout the world even better with customized omega-3 products. Through specific cooperations within the Legasea project the company wants to strengthen its expertise and market presence further.

Marine Ingredients' omega-3 fish oils, which are sold under the brand name BioMarine, are free of the unpleasant tastes and odours that prevent many consumers from taking such preparations. CEO Sveinung Hellem assured us that every single batch is tested organoleptically before delivery

by a professionally trained expert panel: "The unpleasant taste and bad smell of some fish oils puts a lot of consumers off. So we eliminate the responsible substances to attract more people and improve access to healthy fish oil". Fresh fish oil is almost odourless and tasteless. However it oxidizes and tastes rancid when it comes into contact with oxygen and light or is heated. The extent of oxidation is visible in the so-called "totox-value" (anisidines & peroxides). As from values over 10, fish oil tastes increasingly unpleasant, it is absorbed less well by the body (reflux), and may even be harmful.

A wide range of measures from the selection of the raw materials through processing under nitrogen to prevent contact with atmospheric oxygen, to thorough controls ensures at Marine Ingredients that the fish oil products are of the highest purity and free from contaminants and pollutants from industry and agriculture. Each batch is tested for more than 400 environmental pollutants (pesticides, heavy metals, PCBs, dioxins and furans).



Every single production batch is tested for more than 400 environmental contaminants and impurities.



# Applied research for industry

The fact that researchers are not only to be found in the proverbial ivory tower has been demonstrated by Møreforskning for 30 years with its various studies and projects. The group currently includes more than 50 scientists who carry out research and development projects in all areas of the value chain, i.e. from catch to plate, as required and commissioned by industry. Møreforskning sees its role as a service provider whose help is needed when a company is facing important decisions, has to clarify critical questions, or is asked to solve a particular problem. However, the researchers do not only work on behalf of their customers, but also initiate research projects themselves if they recognize the social need or economic benefits of the results. Møreforskning is well connected nationally and internationally and also works with the Marine Ingredients cluster Legasea. The Group's headquarters is the Norwegian Maritime Competence Center within the Ålesund university campus, and this location

opens up additional opportunities for interdisciplinary collaboration.

Agnes C. Gundersen, Managing Director, highlights certain points from the group's service spectrum: "We carry out, for example, scientific studies commissioned by authorities, companies or private customers, create research-based analyses and reports, organize seminars, workshops and conferences on certain topics or give lectures on the results of our investigations." This means that Møreforskning is not only a driver behind the development of the seafood industry and maritime economy in Norway, but the organisation also supports the search for new investment opportunities.

Projects on climate research are at present particularly in high demand. The focus here is almost always on the question of how climate changes will affect fisheries in the future. Another project is examining whether it is possible to promote regional tourism through the targeted marketing of



**Agnes C. Gundersen, Managing Director. Through its involvement in the Legasea project Møreforskning has very good opportunities for cooperation with industry.**

seafood products. Møreforskning is also developing proposals for modern bacalao products which meet today's consumer demands. Instead of having to soak the fish for two to four days before cooking, the idea is to win more consumers with ready-to-cook products. The researchers are looking for ways to

prevent fat oxidation in mackerel fillets, they want to develop high-quality fishmeal as a direct source of protein for human consumption and develop new product ideas for raw materials which have up to now hardly been used. One proposal has already been successful: belly flaps from herring, wrapped in a tempura batter and crisply baked are a popular convenience product.

A major focus of research at Møreforskning is currently the PROMAC project (short for Processing of Macroalgae), says Agnes C. Gundersen. This project is concerned with the commercial exploitation of macroalgae as an animal feed additive in agriculture. "This is an excellent opportunity to link aquaculture and agriculture closer together. Macroalgae, which were up to now considered waste, are now becoming a usable resource".



**The Maritime Competence Centre Ålesund provides Møreforskning scientists the ideal environment for cross-disciplinary cooperation.**

Italian researchers test benefits of oxygen-free packaging techniques on board **shrimp trawler**

# Towards crustaceans without chemicals

Deep water rose shrimp (*Parapenaeus longirostris*) and giant red shrimp (*Aristaomorpha foliacea*) are the most valuable demersal species caught by the Italian trawl fisheries and are widely appreciated across Europe.

The national production of both these species in 2015 was about 12,000 tonnes with a value of EUR200 million. Almost 80% of the catch comes from Sicilian fleets. Despite their economic importance and the fact that they are a high value product, there is still a widespread tendency to use chemical additives, particularly sulphiting agents, that are necessary to inhibit post-mortem melanosis (blackspots) of external tissues during storage.

## Advantages of avoiding the use of sulphiting agents

Sulphites are increasingly used in a number of beverages and foods including wine, beer, salads, and other prepared foods. As a result of their prevalence in foodstuffs, they could accumulate in the body above recommended limits and potentially pose a health risk for consumers. Furthermore, although other “sulphite-free” antioxidants have been developed in recent years to prevent discoloration in shrimp (for example, 4-hexylresorcinol), great caution should be exercised in the use of these new substances due their possible links with hormonal disorders.

Another important international issue is the decline of demersal fishery resources throughout the Mediterranean region. Among the solutions to this challenge are the



**Trials to add greater value to two varieties of shrimp were carried out on board this commercial bottom trawler by Italian scientists.**

use of more sustainable fishing practises that include, for instance, a reduction in fishing effort. This in turn could be balanced by an improvement in the quality and safety of seafood to give a higher value product.

## Can oxygen-free packaging prevent melanosis?

The growing interest in new and more effective packaging methods, which could reduce or eliminate the use of chemical additives, combined with the need to encourage more sustainable fishing practises has resulted in novel food packaging techniques being tested in

many parts of the world. Among this research is a recent study carried out at IAMC CNR (Istituto per l' Ambiente Marino Costiero, Consiglio Nazionale delle Ricerche) in Mazara del Vallo, Sicily. The study, part of the Ritmare Project, was carried out on board a bottom trawler, and was designed to combine freezing and oxygen-free packaging methods to inhibit melanosis in the two most important shrimp species caught in the Mediterranean basin. The results from the trials were compared with conventional shrimp products using sulphiting agents.

The commercial bottom trawler was equipped with an automatic

skin/modified atmosphere packaging system. Samples of both species, deep water rose shrimp and giant red shrimp, were washed in flowing seawater and quickly pre-chilled by dipping them in a 1:1 mixture of seawater and ice. The shrimp were drip dried, packaged in special oxygen barrier bags (approximately 400 g), and frozen in a blast freezer at  $-35^{\circ}\text{C}$ . Roughly eight hours after being caught, the shrimp bags were thermo-sealed in an oxygen-free environment by a heat-seal plastic film. To compare results, a second batch of shrimp was processed using the preservation techniques and materials usually employed by Mediterranean fleet crews. This





The shrimp samples being processed by the skin packaging machine (a) and the final products (b) ready to be labelled and stored at  $-18^{\circ}\text{C}$ .

batch was dipped in a seawater solution (4% w/v) of commercial anhydrous sodium sulphite (the shrimp to dipping solution ratio was 1:4). Finally, all the samples were stored at  $-18^{\circ}\text{C}$  and delivered to the CNR laboratory for sensorial and biochemical analysis.

After four months of storage at  $-18^{\circ}\text{C}$  inspection of the bags showed that the giant red shrimp specimens were perfectly preserved in an oxygen free environment with no signs of dark discoloration detectable through the skin plastic film. After five months of storage the exoskeleton (cephalothorax) and the tail of a single specimen were subjected to a detailed investigation. This clearly showed that there

were no signs of blackspot and that the muscle tissue remained bright, without signs of dehydration and/or yellowing due to lipid oxidation.

### Encouraging results from several indicators

The overall quality characteristics of shrimp without chemical preservative treatments and simply frozen and oxygen-free packaged were also tested using international scientific protocols for seafood control. These include measuring the changes in the melanosis score, pH, total volatile basic-nitrogen (TVB-N, a freshness indicator) as well as thiobarbituric acid (TBA, a measure of lipid oxidation) between time zero (after the catch)

and six months of storage time at  $-18^{\circ}\text{C}$ . These tests revealed that pH in skin packed shrimp remained close to that of fresh shrimp after six months of storage time. On the contrary, a significant increase in pH (up to 7,6) was detected in the samples treated with sulphiting agents. This is due to the high alkalinity (pH 8,5) of the sodium sulphite solution used for traditional sulphiting treatment, which directly affects the shrimp meat.

In the case of TVB-N no significant differences were detected between the two treatments (oxygen-free packaging vs sulphiting). More specifically, sulphited samples showed a rapid increase of TVB-N immediately after the sulphiting treatment, which could be the outcome of high pH in turn induced by sodium sulphite. During the frozen storage of both shrimp species, lipid oxidation (here measured by TBA) remained constant and well below the threshold limit for this kind of product. Furthermore, no significant differences were detected between the oxygen-free packed samples and the sulphited ones. With regard to the melanosis score, after six months of storage, the sample packed

under skin did not show any sign of the classic black spotting. This result confirms that melanosis is induced by oxygen, and therefore any oxygen-free packaging method combined with freezing could be used to delay the post mortem blackening of shrimp.

### A potential alternative to the use of sulphites

The results of this study reveal that early application of oxygen-free packaging techniques, especially skin and/or modified atmosphere packaging using nitrogen (100%) as compensating gas, in combination with freezing and frozen storage, should be considered for preventing melanosis and other chemical deterioration induced by oxygen. This packaging technique may promote the safety and quality of marine crustaceans as well as maximize their economic value.

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Giant red shrimp specimen without any chemical treatment, skin packaged, and stored for five months at  $-18^{\circ}\text{C}$ .

Symposium on fishmeal and fish oil, 29-30 August, Hirtshals

# Mapping the future of marine ingredients

A recent seminar to discuss the perspectives of the fishmeal and fish oil industry organised by the Nordic Marine Think Tank and EUFishmeal with support from the Nordic Council of Ministers showed that the sector faced both challenges and opportunities.

Today the environment in which fishmeal and oil manufacturers operate is in a state of flux. On the one hand aquaculture production is expanding globally, on the other fish feed manufacturers are using less and less fishmeal and fish oil in their products as alternatives become available. New markets for fish oil and fishmeal are opening up in the cosmetic, pharmaceutical, nutraceutical and other specialised industries, yet at the same time the supply and prices of fishmeal and fish oil fluctuate. The regulatory framework, issues of food security, climate change, technological development, and stakeholder views, none of which is static, contribute to the constantly changing circumstances which the industry must negotiate.

## Trimmings and off-cuts increasingly used as raw material for fishmeal and fish oil

Fishmeal is used to produce fodder for terrestrial farmed animals such as pigs and chickens, but its main use is as an ingredient in fish feed. Over the last 10 years the use of fishmeal in poultry and pork feeds has declined as a proportion of the total production, while its use in fish feed has been steady. However, proportionately, the use of fishmeal and fish oil in fish feeds has been diminishing. They are still, however, important components



Supported by the Nordic Council of Ministers, the Nordic Marine Think Tank and EUFishmeal, an association of European producers, organised a seminar on fishmeal and fish oil in Hirtshals, Denmark.

of fish fodder, ultimately responsible for the presence of the healthy omega-3 fatty acids in the fish itself and thus also in the final product. Europe is a significant producer of these ingredients accounting for 10% of the world's fishmeal and 20% of its fish oil production, according to Johannes Palsson, President of EUfishmeal, an association of European producers. One source of the raw material is the trimmings and other waste products generated by the fish processing sector. Roughly 35% of the raw material used to produce

fishmeal and fish oil in Europe is from the processing industry. The remaining 65% of the raw material comes from catches of different species of small oily fish such as sandeel, Norway pout, capelin, sprat, sardines, anchovies, and blue whiting.

What makes these species particularly suitable for reduction? Primarily the price. According to Hans Lassen, a member of the Nordic Marine Think Tank and former head of science at the International Council for the

Exploration of the Sea (ICES), fish that is easy to find and is available in large quantities and at high concentrations can be delivered at low cost. In addition, the use of manpower for catching and handling must be kept to a minimum. These species meet these criteria, but other factors also play a role. Some of these species are not suitable for direct human consumption because of their taste, the presence of bones or due to the lack of a culture of eating them, e.g. sandeel. Others are edible, but for reasons of logistics,





Marine Ingredients Denmark

**Europe produces 10% of the world's fishmeal and 20% of its fish oil. Here, the production plant of FF Skagen in Denmark.**

or insufficient market value it is more efficient to use them for the production of fishmeal or fish oil. Yet others, such as sprats, anchovies, and sardines, for which there is a market, may be converted to fishmeal and fish oil, if the quality is poor or a temporary glut of fish has depressed prices to the point where it is more profitable to sell the fish to a fishmeal or oil factory.

### **Small pelagics are a critical part of the food chain**

Catching these fish can have a bearing on the environment because many of these species have an important role to play in the marine ecosystem. Sandeel, sprats, capelin, and Norway pout among others are known as forage fish. They feed on plankton and in turn are preyed on by larger fish, birds, and mammals thereby transferring energy from lower to higher trophic levels in marine ecosystems.

The biology of small pelagic fish, says Mr Lassen, also makes them vulnerable to changes in their surroundings. Characterised by small size, fast growth, early maturity, high fecundity, and short lifespan their populations are highly

influenced by the environment, which can trigger changes in distribution, and rapid expansions and reductions in numbers. Forage fish stocks in the North Atlantic are managed within safe biological boundaries. However, yields from fisheries that supply the raw materials for the fishmeal and fish oil industry have been decreasing over the last decades. This decline is being compensated for by the increased use of waste from the processing industry.

### **Production of carnivorous fish species is growing most rapidly**

The global production of fishmeal has declined in the decade to 2014 from roughly 7m tonnes to about 4.5m tonnes. This, according to Frank Asche from the University of Stavanger, is partly because fish from reduction fisheries started going for human consumption instead. Over this period the volume used in the production of fish feed has stayed more or less stable at about 3m tonnes. Production of fish oil has hovered around 1m tonnes over the ten years. The volume being used in fish feed shows a slightly declining trend, while the amount being used for direct human consumption, though

small, has been steadily increasing. Fishmeal is used in aquaculture feeds for many different fish species, but it is feeds for crustaceans, marine fish and salmonids that are the biggest users, Tilapia, eel, cyprinid, and other species' feeds use the rest. FAO reports that in the decade to 2014, globally, production of fed species increased from approximately 28m tonnes to about 50m tonnes. It is expected to remain one of the fastest growing sectors for animal food production although growth will slow from 5.4% to 3.0% in the decade to 2025.

Andrew Jackson from IFFO, the marine ingredients organisation, confirmed that growth is strongest in species requiring feed. Production is also becoming more intensive so there is less reliance on the natural productivity of the water and more on feed. Demand for feed is in turn increasing the demand for fishmeal and fish oil, as producers know that these ingredients have specific properties that make them particularly useful in aquatic feeds and they cannot freely be substituted by vegetable ingredients. However, feed manufacturers have gradually been reducing the amount of fishmeal and fish oil used in salmonid diets. On average, noted Mr Jackson, the proportion of marine ingredients in fish feed has declined from 43% to 24% in the decade to 2014.

### **Mesopelagic species – a potential new source of raw material?**

The increase in aquaculture production coupled with the decline in yields from reduction fisheries has prompted a search for new sources of raw material that can be used to produce fishmeal and fish oil. Offcuts, trimmings, and offal from the processing industry are already being used and today contribute about a third of all the raw material

used in the production of fishmeal and fish oil. Another potential source, as presented by Michael St. John from DTU Aqua, is mesopelagic fish. These fish, which are distributed globally, typically live from 200 to 1,000 m down in the water column, but come each day to the upper 150 m to feed before returning to the depths they frequent. Recent studies suggest a biomass in the range of 10bn tonnes comprising fish, crustaceans, and cephalopods. A rough calculation shows that less than 3% of the mesopelagic biomass would have supplied enough feed for global aquaculture production in 2014. However, Dr St. John cautions that harvesting these species bears several risks: among others they play a role in carbon sequestration and thereby climate regulation, and are also prey for many higher trophic level species and thus important for maintaining biodiversity. Much more detailed information is needed about the mesopelagic community before sustainable harvesting plans can be devised and they can be used to produce fishmeal and fish oil.

The symposium threw up several issues relevant to the fishmeal and fish oil sector. Among the tentative conclusions were that demand for marine ingredients will continue to grow as the global aquaculture industry expands. Increasingly fishmeal and fish oil will be substituted with other ingredients in fish feeds, as other industries such as nutraceuticals and pharmaceuticals offer more attractive markets. Other sources of raw material for fishmeal and fish oil production will gradually come on stream. Forage fisheries will increasingly take measures to improve the quality of the catch to cash in on the premium it triggers, and the links between fish feed manufacturers, fishmeal and fish oil producers, and forage fishers may get closer. *bt*

**Conxemar benefits** from being based in Vigo, a city whose DNA is fishing

# Keeping the seafood industry competitive

The association Conxemar is internationally known for a highly successful trade fair for frozen seafood that it organises each year in Vigo, and for a conference that is co-organised with FAO. As an association Conxemar represents the interests of its members who are primarily manufacturers and traders of seafood. Jose Luis Freire Freire, the President of Conxemar speaks about some the association's activities within the wider context of the Spanish seafood sector.

**Conxemar represents the interests of Spanish wholesalers, importers, manufacturers and exporters of fish and aquaculture products. Are the member companies spread across the country or are they concentrated in and around Galicia?**

Conxemar represents the interests of 205 companies throughout Spain, with a joint turnover of EUR6.8 billion, employing 18,178 people and with annual exports valued at EUR1.4 billion. Over 40% of our associate members are based in Galicia, an important hub of the processing industry, with imports of over 680,000 mt annually and EUR2.04 billion (43% in volume and 36% in value of the national total). Exports from Galicia's processing industry amounted to over 567,000 mt in 2015 (56% of the national total) for a value of EUR 1.7 billion euros (53% of the national total).

**What is the focus of the association's efforts to service its members, and how have these efforts been evolving over the years?**

The Association has two main objectives: to represent and defend the interests of the sector at public or private bodies, both at EU and national level, and to contribute to improving the competitiveness of its associate members. To achieve

the first of these objectives, Conxemar has offices and staff in Vigo and Brussels, besides external collaborators, particularly in the legal field.

As far as the second objective is concerned, Conxemar has its own staff in technical, communications and commercial fields to assist its associate members in being more competitive. For that purpose, Conxemar acts as a consultancy for its associate members, organizes seminars and other activities, of which the most well known internationally are the annual congress co-organized with the FAO and the international exhibition. Both events are held in October, in Vigo. All the members of the Board of Directors collaborate in organizing these events, as well as top executives of important associated companies, out of their own good will.

**The Conxemar trade fair with its focus on frozen seafood has been a feature of the international seafood trade show calendar for several years. While other seafood shows that have tried to establish themselves in Spain have had to give up, Conxemar has not only maintained its position, but has also developed. What is the secret of this success?**

In my opinion, this is because the exhibition is organized by its own



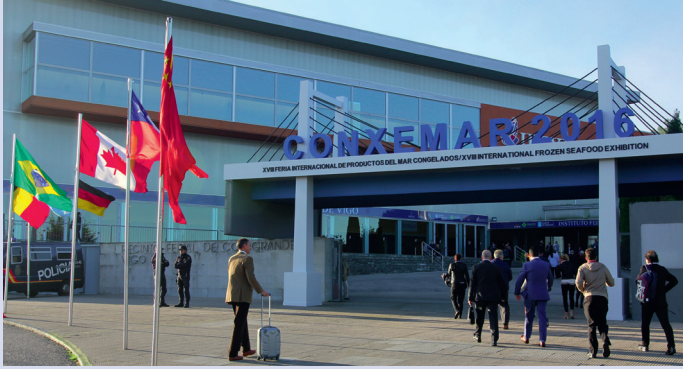
**Jose Luis Freire Freire, President, Conxemar**

association for its associate members, with the selfless collaboration of the members of its Board of Directors and of the Exhibition Committee, both made up of top level professionals. This is also due to being in Vigo, a town whose DNA is fishing, with a leading importance worldwide in terms

of shipbuilding industry, fisheries, processing industries, fisheries institutions, and academia.

**How would you describe the main trends in frozen seafood in terms of trade flows, product evolution, and consumer preferences? What do these trends**





**Conxemar, the association, represents the interests of Spanish processors, wholesalers, and traders of seafood. Each year the association organises a seafood show in Vigo.**

**reveal about future developments in the frozen seafood sector?**

According to the FAO's 2016 SOFIA report on the State of World Fisheries and Aquaculture, exports of the 10 main world exporter countries (China, Norway, Vietnam, Thailand, U.S.A., Chile, India, Denmark, the Netherlands and Canada) account for 52.5% of the world total, which increased by 8.5% annually between 2004 and 2014, rising to USD 77.8 billion, whereas the rest of the countries rose by 6.5%. In terms of imports, the top 10 (U.S.A., Japan, China, Spain, France, Germany, Italy, Sweden, United Kingdom and the Republic of Korea) increased their imports by 4.8% in the decade of 2004-2014, as opposed to the 9.3% growth in the rest of the countries around the world.

As far as consumer preferences are concerned, there is a trend towards healthy products, a fact that goes in favour of frozen fish due to its nutritional properties and the benefits for health, as the "Dietary Guidelines for Americans", by the USDA (United States Department of Agriculture) highlight.

**Conxemar successfully partners with the FAO to organise the annual World Congress, a**

**forum to strengthen the dialogue between the administration and industry. What advantages does the Conxemar association derive from this collaboration?**

We consider that the collaboration with the FAO is extremely important and allows both FAO and Conxemar to have better

information, since the Congress is also attended by authorities at EU, national and regional level, as well as by all the important countries in the fisheries sector, which facilitates better decision making.

We give great importance to debates in the Congress as they allow an exchange of information and opinion between the public sector and all the industry stakeholders.

**The fishing sector and the processing sector in Spain are both well developed. Sometimes their interests coincide, at other times they conflict. What would you say are the most serious differences between these two sectors of the seafood industry and how can**

**they be bridged in a way that keeps both parties reasonably content?**

We have numerous interests in common. In fact, some of our associate members are also ship owners. The bringing together of both sectors gives us a stronger position, when defending common interests at the institutions, especially at EU level.

**Per capita fish consumption in Spain has shown a slight downward trend over the last decade. What do you attribute this to and what can the seafood industry (as represented by Conxemar) do to reverse this, particularly considering that seafood is a healthful source of animal protein and other nutrients?**

The crisis has probably been the main cause of this downward trend

*"...as the Spanish economy improves, fish consumption should pick up..."*

in view of the fact that consumers have looked for more affordable alternatives. So, fish consumption in Spain should pick up as the economic indicators improve, since fish is a part of our diet.

*"...excessive regulations at European level are very costly, especially for SMEs..."*

However, more support for promotion campaigns to encourage fish consumption from the Spanish administration would help, as occurred in the past with European funds via FROM, an official body under the Spanish Ministry of Agriculture, Food and Environment, which, in our opinion, should not have been closed.

**Galicia is an important player in the Spanish fisheries, aquaculture, processing, and distribution chain. Maintaining this role calls for a concerted strategy that will ensure the sustainability and continued development of these industries in this autonomous community. What is Galicia's vision for the sector by, say, 2025?**

Although I am a Galician, it is not my position to talk as representative of Galicia. My own personal view and as a representative of Conxemar is that if we manage to keep the supply of raw materials at reasonable prices Galicia's future in terms of the industrial fishing sector is highly favourable since these are very competitive industries, as long as the single market is simply applied in all the sectors of the economy.

In our opinion, it is important to reduce excessive regulations at European level, which are very costly, especially for SMEs, and that the single market for energy operates with competitive fuel and electricity prices. Also, it is important to harmonise legislation at EU level and apply it correctly to avoid unnecessary costs, as occurs with the monopolies in stevedoring in Spanish ports. To date, the sentence of the Court of Justice in Luxembourg given in December

2014, which makes it compulsory to eliminate them, has still not been applied.

**Spain has a significant trade in seafood with exports of roughly EUR3bn and imports of EUR5bn (2015). What are the main trends that can be identified in this trade in terms of species, product**



The Conxemar frozen seafood show is also an opportunity for representatives from national and regional administrations to mingle with members of the industry.

**forms, and partner countries? As increasing volumes of fish and seafood come from aquaculture rather than capture, what impact do you expect this to have on the Spanish trade?**

As far as the trade balance is concerned, this year has been damaged by the high import prices due to the very low catches worldwide caused by El Niño, which will not

Shrimps are the second most imported product (EUR841 million in 2015), with two predominant species: wild Argentinean shrimp (EUR310 million) and farmed *Penaeus* species (EUR396 million), mainly *P. vannamei*.

In whitefish, the most imported, all of them from capture, are: fillets of *Capensis* hake from Namibia and South Africa (EUR124 mil-

“...import prices have been high this year as a consequence of El Niño...”

happen next year. In the case of imports, the highest value is not from aquaculture but rather from capture. The most imported seafood products by Spain in value are the cephalopods, with EUR891 million in 2015, according to data from the Spanish customs, of which EUR288 million corresponds to squid (*Loligo*), EUR279 million to octopus, EUR158 million to cuttlefish, EUR84 million to jumbo squid and EUR82 million to squid-pota (mainly *Illex argentinus*).

lion in 2015), fillets of *hubbsi* hake from Argentina (EUR31 million) and Atlantic cod fillets (*Gadus morhua*) with EUR75 million last year.

**You have been associated with the Spanish seafood sector in one capacity or another for decades. Now your sons too have established themselves in the field. On a more personal note, are there ways of ensuring one's passion is inherited by the next**

**generations? If you could distill your experience into words of advice, what would they be?**

My grandfather and my father were ship owners, and I used to go along with my parents when I was a kid to see the ships arriving from Grand Sole and fishing was the essence of the village of Bouzas (now a part of Vigo), where I was born.

Personally, after college, I had to start from zero because of life's

The sea has conditioned my life and that of my sons, who sail with me in competitions since they were little boys.

What piece of advice could I give the new generations? Love the sea, go out sailing from childhood, get used to competing, try to be the best by learning from your rivals who beat you following the rules of play and earning their respect and be ready for the worst while expecting the best, which is how it should be when navigating on

“...the seafood industry is like sailing – you have to be ready for the best while expecting the worst...”

circumstances, but I managed to establish a company after a few years with two partners. Fortunately, today my two sons continue in the sector as the fourth generation of the family and they own a seafood processing company, which, in 2016, will have a turnover of over 70 million euros, having only been established just 10 years ago.

the high seas. This will lead you to love working in the fishing industry, where, to survive, it is necessary to be creative and innovative, to compete worldwide, to visit numerous countries, get to know different cultures and people... You will enjoy many friends and all that will make your work something fascinating you will never get bored of.



**News**

**Eurofish meeting with Romanian National Agency for Fisheries and Aquaculture**

A delegation from Eurofish, Aina Afanasjeva, Director, Anca Sfetco-vici, Head of Project Unit and Ekaterina Tribilustova, Market Specialist, met with representatives of the Romanian National Agency for Fisheries and Aquaculture (ANPA): Nicolae Dimulescu, President, Ancuta Kazimirovicz, Public Manager, and Constantin Stroe, Counsellor. The meeting was held in connection with the High-level Conference towards Enhanced Cooperation on Black Sea Fisheries and Aquaculture, held in Bucharest on 24-25 October 2016.

The discussion covered a range of topics including the joint

organisation of workshops and conferences on trade and markets, B2B meetings, as well as the translation of the new guide to recirculation aquaculture technologies into Romanian. Both sides agreed to deepen Eurofish's cooperation with ANPA and Romanian stakeholders, especially regarding the transfer of knowledge concerning good aquaculture practices. Moreover, the two sides discussed promoting the Romanian fisheries and aquaculture sector and its products at international trade fairs and events as well as through the Eurofish Magazine. Another issue to be discussed in detail was fisheries data collection, which both sides consider highly important.



**Nicolae Dimulescu, President of ANPA, the Romanian National Agency for Fisheries and Aquaculture, met with Aina Afanasjeva, Director, Eurofish, to discuss ways of furthering cooperation between the two organisations.**

**Events**

**Fish Info Network Directors meet in Conxemar, Vigo**

In October each year the Spanish Association of Wholesalers, Importers, Manufacturers and Exporters of Fish products and Aquaculture (Conxemar) organises the International Frozen Seafood Exhibition in Vigo, Spain. Back to back with this event Conxemar jointly holds an international conference together with FAO. This year the conference was dedicated to cephalopods, a group of molluscs that includes squids, cuttlefishes, and octopus. The conference also provides the backdrop for various side events such as the Vigo dialogue on decent work in fisheries and aquaculture, and the meeting of the Fish Info Network (FIN). The directors from Eurofish, Infofish, Infopeche, Infopesca, Infosamak, and Infoyu met together with Manuel Barange, the new FAO Director of the Fisheries and Aquaculture Policy and Resources Division, his deputy Audun Lem, and Nianjun Shen from Globefish. Each of the FIN directors gave a brief presentation of work in progress and issues that were of importance

before the FAO representatives described some of the changes that have been taking place at FAO. One of the main issues mentioned was that the FAO Fisheries and Aquaculture department, like all other departments, now also has to incorporate FAO's strategic objectives into its work. These are:

- Help eliminate hunger, food insecurity and malnutrition
- Make agriculture, forestry and fisheries more productive and sustainable
- Reduce rural poverty
- Enable inclusive and efficient agricultural and food systems
- Increase the resilience of livelihoods to threats and crises

Programmes and policies launched by the department have to clearly contribute to achieving these overall goals. The impact of these changes on the relationship between FAO's Fisheries and Aquaculture Department and the members of the Fish Info Network remains to be seen.



**From right: Graciella Pereira, Infopesca; ShirleneMaria Anthonyamy, Infofish; Abdellatif Belkouch, Infosamak; Aina Afanasjeva, Eurofish; Chen Shuping, Infoyu; Soro Pagadi, Infopeche; Audun Lem, FAO; Manuel Barange, FAO; Nianjun Shen, FAO; Erik Hempel, FAO consultant.**



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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,-  
To subscribe visit [www.eurofishmagazine.com](http://www.eurofishmagazine.com)  
or send an email to [info@eurofish.dk](mailto:info@eurofish.dk)

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