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Fisheries and aquaculture in Europe

Reducing by-catches and eliminating discards

Aquaculture:
cod in the Shetland Islands

Bluefin tuna:
recovery plan

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Calendar

Shows and exhibitions

- **Annual session of the IOTC, Grand Baie (Mauritius), 13-18 May 2007**
  The annual meeting of the members of the regional Indian Ocean Tuna Commission will focus on management measures affecting different tropical stocks from this part of the world.
  > For more information:
  Tel: +248 225494
  E-mail: iotc.secretary@iotc.org
  Website: www.iotc.org

- **The Tuna Conference, Lake Arrowhead, California (United States), 21-24 May 2007**
  An international meeting of those with a scientific or commercial interest in tuna and tuna like fisheries.
  > For more information:
  Tel: + 1 858 546 71 20
  E-mail: info@tunaconference.org
  Website: www.tunaconference.org

- **International Exhibition & Conference on Fisheries and Aquaculture, Athens (Greece), 8-10 June 2007**
  The exhibition presents the latest technological and commercial developments in the Mediterranean fisheries and aquaculture sector.
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- **Annual meeting of the IATTC and the AIDCP, Cancun (Mexico), 18-19 June 2007**
  Stock management measures for eastern Pacific tuna are decided at this yearly meeting.
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  Tel: +1 858 546 7100
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Note to readers
We welcome your comments or suggestions at the following address: European Commission – Directorate-General for Fisheries and Maritime Affairs – Communication and Information Unit – Rue de la Loi/Wetstraat 200 – B-1049 Brussels or by fax to: (+ 32) 2 299 30 40 with reference to *Fisheries and aquaculture in Europe*. E-mail: fisheries-magazine@ec.europa.eu

For further information on fisheries and maritime affairs, please consult the following sites:

http://ec.europa.eu/commission_barroso/borg/index_en.htm

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Reducing discards: vital for an effective CFP

The catching and discarding at sea of occasionally large volumes (up to 60 % in certain fisheries) of non-target fish, especially juveniles, is a glaring example of the waste and damage caused by overfishing. The experts concur that excess fishing effort is the leading cause of high by-catch rates. Indeed, while limited by-catches are sometimes unavoidable, excessive levels are due to the weakening of stocks and a larger proportion of juveniles compared to adult fish. Many juveniles in turn are decimated by these unwanted catches, a vicious circle that is particularly dangerous for resources and the marine environment.

Another pernicious effect of discards is that they lessen the effectiveness of other resource conservation measures taken under the Common Fisheries Policy (CFP). For example, when by-catches are made up of species covered by TACs and quotas or fishing bans, discards represent a form of exploitation as harmful to stocks as actual landings. Even worse, since discards are often not measured or accounted for, they keep the authorities from judging the real impact of fisheries on the species concerned.

Taking decisive action to curb this phenomenon is consequently essential for an effective CFP, which aims to ensure the exploitation of living aquatic resources under sustainable economic, environmental and social conditions. This must be done in keeping with the main thrusts of conservation policy: reducing fishing effort, limiting catches (TACs and quotas), technical measures and a longer-term approach that involves the implementation of multi-annual recovery plans for stocks that have slipped below safe biological limits and multi-annual management plans for other stocks.

Through their interaction, these different management approaches can gradually transform today's vicious circle into a virtuous circle. Improving the state of resources through adapted management measures will result in fewer by-catches and discards. Similarly, by adapting their practices radically to reduce by-catches, fishermen will help improve the state of stocks. In time, this will lead to more profitable fisheries. The European Commission's communication on discards calls on fishermen and fisheries management officials throughout the European Union to take up this vital challenge for the future.

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The Editor

Reducing by-catches and discards: a priority for European fisheries

Every year, from 10 to 60 % of fish and other live organisms caught in European nets are purely and simply thrown back into the sea. Most of these fish, which are often juveniles, do not survive. This tremendous waste can hamper the stock's subsequent reproduction, and the European Union cannot stand by and let this happen.
A Commission communication lays out proposals to solve this problem, faced by most fisheries to varying degrees.

When a vessel raises its nets, they can contain unwanted by-catches, namely fish taken unintentionally by the fishing gear. Generally, these are individuals of one or more non-targeted species, juveniles too small to be landed, crustaceans, molluscs, marine mammals and sea birds. In many cases, the "unwanted" animals are then thrown back into the sea and succumb to the injuries and trauma of being caught.

There are two main reasons why these by-catches have traditionally been thrown back into the sea. The first is economic: their market value is too low or there are not enough market outlets. Even if certain low-value fish caught unintentionally can be sold, fishermen prefer to use the vessel's available hold space for catches with higher market value. The second is legal: either there is a ban on catching the species (e.g. dolphins), or they are subject to quotas or catch restrictions, for instance under a recovery plan (the case for cod), or else the fish are too small to be landed (juveniles) under Community or national regulations meant to protect resources. It is easy to understand that the existence of discards undermines the effectiveness of conservation measures, since even if these fish are not landed, their mortality is a fact and reduces the existing stock and its reproduction capacity.

Huge quantities

Discards are not a marginal phenomenon: in 2005, the FAO estimated their total quantity worldwide at 7.3 million tonnes, or 8 % of the total capture weight. That average figure nevertheless masks important differences between fisheries, due to geographical differences (there are zones where few different species are found and others with a large variety of species) and differences in fishing techniques (some types of gear, such as beam trawls, which catch fish from the sea bed, take more by-catches than others). In a recent report, the Scientific, Technical and Economic Committee for Fisheries (STECF) estimated that cod fisheries in the Baltic have few discards, while in the North Sea, beam trawls reject 40 to 60 % of their catches and bottom trawls around 40 %. In zones to the west of the British Isles, discards by bottom trawling gear are estimated at between 20 and 40 %. In Community Atlantic waters further south, discards by trammel nets and gill nets are said to be below 20 %, while discards by bottom trawls stand at some 30 to 60 %. By definition, though, this phenomenon is hard to evaluate accurately: since the fish are not landed it cannot be known with certainty what volumes are actually thrown back into the sea.

Environmental and economic impacts

The negative impacts of by-catches and their discarding at sea are as much environmental as economic. A large proportion of discards are juveniles, which reduces the future productivity of the fisheries as well as the stock's reproductive capacity. Discards of adults (due to quota overruns, for example) also cut into reproduction capacity. The discard of non-target fish, shellfish, or marine birds and mammals has repercussions on the marine ecosystem and biodiversity. For species that are already vulnerable, unwanted catches, even in limited numbers, can endanger their very survival. And lastly, for fishermen discards are not only a non-productive burden and a waste of time and manpower, but also a practice that adds to the depletion of resources – their livelihood – without any economic benefit.

The reduction of by-catches and of discards is consequently a key aim of the Common Fisheries Policy (CFP), as already made clear in a Commission communication published in 2002[1]. Based on experiences in Europe and other parts of the world, and on scientific studies, the European Commission has issued a new communication proposing possible avenues for a policy that will help limit unwanted catches and discards in European fisheries.

A main cause of discards is commercial value. Species that have no market outlets are thrown back into the sea. Pictured are discards of horse mackerels and blue whiting on a deep-sea trawler.

Reducing fishing pressure

The Commission's text notes that, to control the phenomenon, it is vital to understand the reasons why such large quantities of by-catches end up in fishermen's nets. The experts say the number one reason is the strong fishing pressure on a large number of stocks. This excessive fishing effort reduces the stock's biomass and increases the proportion of unmarketable juveniles and/or non-target species taken. That is why the communication stresses that, first and foremost, fishing effort on these stocks has to be cut and appropriate measures put in place to build up the biomass of reproductive stock. That, moreover, is the aim of numerous measures taken under the CFP, and in particular the proposal for the maximum sustainable yield approach (MSY)[2], which is meant to introduce greater long-term stability of resources[3].

Yet while this policy aims to act upstream by reducing the proportion of juveniles caught unintentionally, on its own it cannot solve all problems of by-catches and discards. Other measures have to be taken, because the causes of the phenomenon and the solutions needed are complex and numerous.

The measures being considered by the Commission include the temporary closure "in real time" of zones where a high proportion of juveniles are observed. Fishermen would be notified immediately when it is established that a zone is producing excessive quantities of by-catches and asked to leave the area, which would then be closed to fishing for a certain time. Another possible measure, in addition to temporary closing "in real time", would be the obligation for vessels to move to another fishing zone when their catches exceed a maximum acceptable limit of by-catches.

More selective gear

Another approach involves the adaptation of fishing gear. Research and technological progress are indeed bringing considerable improvements to gear to help reduce by-catches. This would have to be implemented separately for each fishery, because the situation varies from one to the next. The examples given in the reports of this issue of Fisheries and aquaculture in Europe are clear: in one case, the size and especially the shape of the mesh is changed to prevent catches of small fish; in another, a grate is used to push back into the sea the biggest fish, cod, since this species is protected by a recovery plan. Each situation has its own particular solution. This is why the Regional Advisory Councils (RAC), whose members are thoroughly familiar with the reality of their fisheries, should be involved in developing and implementing the most appropriate solutions.

The adaptation of fishing gear is a long-term action, however, which includes lengthy periods of research before techniques can be used on the ground. This approach also demands a sizeable initial investment for fishermen, even if the reduction of by-catches and the rebuilding of stronger stocks will in time prove to be major benefits.

Banning discards?

According to the communication, these measures should be backed up by an approach consisting of regulating not anymore only through technical measures and fishing zones, but also by imposing the obligation to achieve a given result. It consequently proposes a gradual outlawing of discards and the definition, for each fishery, of a maximum acceptable rate of by-catches of non-marketable or juvenile organisms and those in excess of quotas. These standards would initially be based on a reduction

(1) COM(2002) 656 final. Other communications addressing discards from the environmental standpoint: COM(2002) 186 final and COM(2004) 438 final.
(2) COM(2006) 360 – Implementing sustainability in EU fisheries through maximum sustainable yield.
(3) See *Fisheries and aquaculture in Europe* No 32.

The Commission's aim is to give fishermen an incentive to adopt more selective methods and fishing gear, in order to reduce the proportion of unwanted by-catches.

from the present levels and would then be gradually lowered to encourage technological developments and changes in fishing practices to avoid by-catches.

Such a ban on discards would mean that fishermen would have to bear the costs (transport, handling, etc.) of any by-catches, which would further encourage their reduction. In this approach, regulations would determine a given result to be achieved (the maximum acceptable level of by-catches) and fishermen would be free to use the solutions most compatible with the practices and economic reality of their fishery to achieve that result.

Accompanying measures

A progressive ban would nonetheless require the introduction of major control and observation systems. Indeed, it is difficult to observe discarding at the time it occurs and establish evidence once the fish have been thrown back into the sea.

Similarly, banning discards means finding adequate solutions for the unavoidable by-catches taken which would have to be landed. A particular question is whether such by-catches should be accounted for separately from fishing quotas or whether the quota system should be changed to include by-catches. Likewise, steps would have to be taken to ensure that landings of by-catches do not become an indirect way to allow quota overruns or circumventing of CFP rules.

The experts would also have to look into possible market outlets for landed by-catches. Could they be marketed for human consumption or for processing into feed for fish or oil, or some other type of processing? To what extent should part of the profits from such sales be granted to fishermen to cover handling costs? What measures are needed to keep these sales from disrupting the market?

Helping the sector adapt

The Commission communication also addresses the issue of support for the sector to enable it to cope with this possible development. Indeed, while this policy is likely to improve stocks and consequently the performance of fisheries, a ban on discards could entail additional short-term expenditures in certain fisheries, due for instance to the cost of handling and conserving by-catches or of investing in more selective gear, or even to an increase in fuel costs and time spent at sea as a result of closed fishing zones and the obligation to leave them for other waters.

The communication suggests that the European Fisheries Fund (EFF) could support the development of the changes needed in terms of technology and practices, in particular the adaptation of fishing gear or information systems used to keep fleets informed about the zones with a high risk of unwanted catches.

Aid could also be granted for the introduction of alternative uses for the catches that used to be discarded, in particular the unavoidable by-catches of species with very limited or even no commercial value.

A long-term process

Based on this communication, a wide debate will be initiated with the Member States and stakeholders in the course of 2007. A timetable and implementing plan for the different fisheries could then be framed.

By-catches and discards are a tremendous waste for society. They diminish resources, threaten the environment and biodiversity, and cause extra work and a waste of time for fishermen. Accordingly, the Commission wishes to put in place a new policy to enable the sector to solve this problem. As is often the case, this will require efforts in the short term. In the medium and longer term, however, economic advantages will be seen: a reduction in catches of juveniles or of quota overruns, and thus bigger and healthier fish stocks, and in the end, an increase in fishing possibilities. The wide consultation planned in 2007 is expected to lead to implementation of the policy while taking on board the particularities of each fishery, and setting up an aid scheme to help the sector adapt.

Better to sort on the sea bottom rather than on deck

To avoid discards, by-catches of unmarketable species or those not meeting legal standards have to be kept to a minimum. One possible solution is to improve the selectivity of gear. This will require the design of gear adapted to the problems of different fisheries… Some fishermen are already working on improving gear selectivity – with interesting results. *Fisheries and aquaculture in Europe* visited two langoustine fisheries, one in the Bay of Biscay and the other in Skagerrak.

There is no single solution to improve the selectivity of fishing gear. Each fishery requires solutions adapted to its particular by-catch problems. Some take too many juvenile fish, while others catch too many unmarketable fish or species protected by recovery plans… The selectivity of gear has to be worked on case-by-case.

Yet some solutions can be put into practice in a large number of fisheries. *"The simplest is to change the shape of the mesh"*, explains Dr Andy Revill, from the CEFAS[1] Technology and Fisheries Management Department, in the United Kingdom. *"Today, most trawls and towed nets have diamond mesh. When the net is placed under tension, the mesh closes and small fish cannot escape. By simply changing the geometry of the mesh from diamonds to squares – without changing its size –, the opening is bigger and smaller species and juveniles can escape easily."*

In addition to this elementary change, there are also more sophisticated solutions that can be used to respond to more specific problems.

Brittany: avoiding catches of juveniles and small fish

The Finistere coast has had its share of bad weather this February, so a relatively calm day between two areas of low pressure in the Atlantic cannot be wasted. At 5 a.m. the skipper Patrice Donnart leaves the port of Guilvinec aboard his coastal trawler to fish for langoustine. Without being stormy, the rough sea still demands the skill and experience of two crew members to safely handle the two twin trawls, immersed after two hours headed west.

Today, a fourth man is aboard. Thierry Guigue is in charge of the Aglia[2] selectivity programme. Since 2002, this grouping of fishermen, fish farmers and regional authorities has steered a programme to improve the selectivity of langoustine fishing, with the scientific collaboration of Ifremer. Langoustine fishing is plagued by a high level of discards, which can reach up to 50 % of catches.

The problem submitted to the Ifremer specialists is complex indeed. On the one hand, the fishermen need to avoid taking small protected fish, such as young hakes (covered by a European stock recovery plan since 2002), or those with limited commercial value like horse mackerels and blue whiting, while continuing to take by-catches of big fish with market value, which make up an important part of the turnover in langoustine fishing. If this were not enough, it is also important not to catch juvenile langoustines, which can be found in large numbers depending on the place and time of year.

Mesh panels and escape grating

"The solution for small hakes is already mandatory on all vessels", explains Thierry Guigue. *"It is a 120 mm square-meshed panel in the upper side of the trawl. For juvenile langoustines, we are testing three different systems: bigger mesh in the lower end of the trawl, an escape grid below the entry to the codend and a 70 mm square-meshed panel in the bottom side of the net."*

Small fish, which swim upwards, can escape through the square mesh of the rear panel. Small langoustines, which tend to crawl towards the bottom, can escape through the bars of the grid or the mesh of the bottom panel. Big fish and adult langoustines will remain trapped in the trawl.

The system is demonstrated after two hours of stormy haul, when the two trawls are raised. On the starboard side is a traditional trawl with diamond-shaped mesh; on the port side, a trawl with selective fittings. The catches – masses of swarming langoustines and different fish – are dumped into two different tubs. The two fishermen, assisted by Thierry Guigue, start sorting. After removing the big and medium-sized langoustines and marketable fish like soles, anglerfish, sea bream and dogfishes, there remain two heaps of discards made up of small langoustines and small fish. The result is visible to the naked eye: the pile on the port side is half the size of the one on the starboard side.

This result is confirmed by the large-scale study conducted by Aglia between Brest and Oléron. By-catches of juvenile hakes and langoustines have been cut by 25 to 30 % and by 20 to 40 % respectively.

"The advantage is obvious during sorting", notes Patrice Donnart, settled comfortably in his pilots seat. *"We have noticed that sorting is much easier for catches with trawls that have the selective fittings. The langoustines can be collected much more quickly. We save time and we improve quality. In terms of disadvantages, the langoustine grid might cause problems on certain types of vessels and in some fishing sectors… but nothing is set in stone."*

(1) Centre for Environment, Fisheries and Aquaculture Science, www.cefas.co.uk.
(2) Association du Grand Littoral Atlantique – www.aglia.org.

The Risten's fishermen have finished sorting the catch. The discards remain: on the right, the discards from a traditional trawl; on the left, those from the trawl with selective fittings. The effectiveness of the selective gear is obvious, with only an insignificant difference in commercial catches.

Skagerrak: avoiding cod

Another langoustine fishery, but a different setting and temperature await us: on this day in February it is -5°C in the port of Grebbestad on the Swedish coast of Skagerrak. The wind and humidity considerably intensify our perception of the cold. The layer of ice covering the vessel rails suggest just how difficult working conditions can be here.

In Sweden, the coastline along the Skagerrak-Kattegat produces half the country's langoustines. The small ports of this beautiful coast studded with rocky islets all rely on this resource, and on pandalid shrimp. In fact, this activity was nearly doomed because of measures aimed at protecting… cod.

"The problem", explains Mats Ulmestrand, a biologist at the Lysekil-based laboratory of Sweden's Fisheries Directorate[3], *"is that with traditional langoustine trawls, made up of 90 mm diamond-shaped mesh, half the catches were langoustines and the other half protected fish. So it was vital to avoid by-catches."*

To curb the depletion of demersal stocks, Sweden decided in 2004 to ban all trawling activity within four nautical miles of the coast. In addition, by-catches of cod brought shellfish fishermen under the scope of the European recovery plan that limited their number of fishing days to 90.

The fisheries laboratory in Lysekil therefore began studying ways of avoiding by-catches of demersal fish so that coastal fishing could continue. *"We started by considering the use of separator panels in the trawl"*, continues Mats Ulmestrand. *"But that did not work well here. So then we decided to try the Norwegian system that consists of placing a grid in front of the codend entry."*

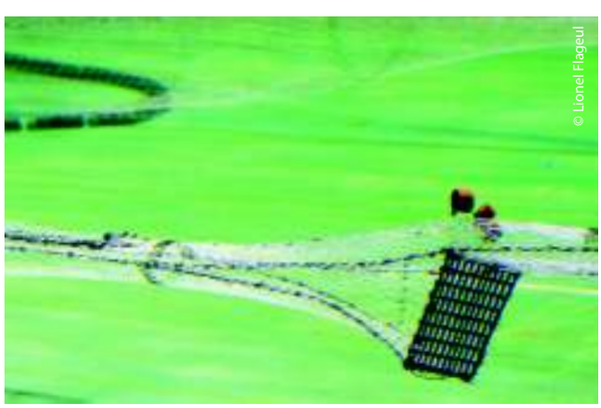
Grids and square mesh

The grid is made of rigid plastic or aluminium and is composed of vertical bars spaced 35 mm apart. The bars let langoustines enter the codend, while cod and other big fish are forced into an escape window. Juvenile langoustines and small fish can escape through the 70 mm square mesh that makes up the entire codend.

From their first year of use in Skagerrak langoustine fishing, the grid and square mesh demonstrated their effectiveness: in 2004, 95 % of the landings by fishermen using this type of trawl were langoustines. The 5 % of by-catches were mostly flat fish (particularly plaice), which slip through vertically between the bars. This selective trawl is now compulsory in Swedish coastal waters.

"It works better than I would have thought", comments Robert Olsson, as he puts away his crates of langoustine in the cold storage room of the port warehouse. *"It's a bit harder to handle and sometimes the grid gets stopped up and we don't catch anything. But it works well in general. And the best thing is that now that all fishermen are using this trawl, no one can accuse us of catching any fish stocks in this zone!"*

Even with the same type of coastal fishing and the same target species, the problems encountered by langoustine fishermen in the Bay of Biscay and Skagerrak are different and require tailor-made solutions. The task involves scientific research, where the collaboration of fishermen is vital because they are the ones who use the gear and are consequently the leading artisans of selectivity in European fishers.



On this model set up in an Ifremer trial tank, we see the selective trawl tested in the Bay of Biscay: the square-mesh dorsal panel that lets small fish escape and the grating through which juvenile langoustines find their way back to freedom.

(3) Fiskeriverket – www.fiskeriverket.se.

Saving bluefin tuna

The eastern stock of bluefin tuna in the Atlantic and Mediterranean are victims of overfishing. Given the risk of collapse of the stock, the ICCAT adopted last November a multiannual recovery plan that will run for 15 years to reverse the situation and save this vital species.

Since the end of the 1980s, following the success of bluefin tuna on Japanese and American markets, the development of this fishery skyrocked in the Mediterranean, an important summer spawning ground for this species. With the tripling of catches in just a decade, ICCAT[1], the organisation that manages tuna fishing in these areas, embarked on a fisheries management process in 1994. First it imposed minimum landing sizes and closure periods, then, from 1998, annual total allowable catches (TACs) and finally, in 2002, a four-year management plan aimed at limiting catches, particularly of juveniles.

Unfortunately, the plan was not enough to end overexploitation.

Sounding the alarm

Last October, the ICCAT Committee on Research and Statistics (SCRS) sounded the alarm over the *"high risk of fisheries and stock collapse"*. The experts recommended a drastic reduction in catches, a ban on fishing during reproduction season, a significant increase in minimum landing sizes and measures to reduce existing overcapacity in the Mediterranean tuna fishing fleet. The committee also called for energetic controls because the main threat to bluefin tuna is illegal fishing, whether practiced by authorised vessels that exceed their quotas or by vessels that have not been issued quotas. According to scientific estimates, real catches amount to some 50.000 tonnes, while TACs are limited to 32.000 tonnes.

A month later, the ICCAT contracting parties met in Dubrovnik, Croatia, to adopt new management measures in the light of those findings. That top-level meeting adopted a *Multi-annual recovery plan*[2] based on a proposal from the European Union. The 15-year plan will be in force up until 2022. It will be revised at regular intervals in the light of scientific findings, to ensure its effectiveness.

Ambitious measures

The measures laid down by the new plan are not lacking in ambition. Their strict implementation is expected to result in a gradual improvement of the situation, while maintaining to a certain extent the economic activity that has developed around this resource in the past two decades.

- TACs will be reduced year by year, from 32.000 tonnes in 2006, to 29.500 today and to 25.500 tonnes in 2010. The EU's quota will drop from 16.780 tonnes in 2007 to 14.504 tonnes in 2010. TACs for the following years will be agreed later in the light of the stock's evolution.
- To reduce fishing effort, closed seasons for bluefin tuna fisheries will be extended: fishing by longline and purse seine vessels will be closed in the summer and fall; fishing by pelagic trawlers and baitboats will be banned in winter and spring.
- To protect juveniles, the minimum weight has been greatly increased, from 10 to 30 kg per fish (except in the Adriatic, where it is 8 kg, but only for tuna caught for farming purposes). Only 8 % of smaller tuna by-catches will be authorised, under certain very specific conditions.
- Different restrictions are set for baitboats and trolling boats: the minimum catch weight is 6.4 kg, the number of authorised vessels is limited to the number already operating in 2006 and a maximum of 10 % of the total quota may be allocated to these vessels, subject to strict control measures.
- The use of aircraft to search for tuna is banned throughout the year (not just in June, as was previously the case). Recreational fishing will also be limited: the marketing of tuna caught by recreational fishermen is prohibited and only one piece may be taken in each sea trip. Measures to limit and control sport fishing are also planned.

More effective control

For the plan to work, it must be fully respected. Because illegal fishing is one of the main causes of overfishing of bluefin tuna, tougher inspection and control measures are essential.

The plan consequently lays down strict control measures based on a simple philosophy: to deprive illegal, unregulated and unreported fishing of all market outlets. To achieve that goal, the ICCAT has developed a system for monitoring catches from the vessel to the auction hall. Only documented tuna may be sold.

Concretely, only vessels and tuna traps duly registered with the ICCAT will be allowed to catch bluefin tuna. The most important innovation of this plan, however, is the obligation for vessel skippers and heads of farm sites to quickly declare quantities handled. Landing, transhipment and caging operations must be scrupulously registered and forwarded to the authorities and may only take place after prior notification to the port state and with the authorisation of the flag state (which can order the seizure of catches in case of quota overruns).

To ensure compliance with these measures, the ICCAT States have agreed to develop an observer programme aboard vessels. They adopted in Dubrovnik a "scheme of joint international inspection" enabling each country to carry out controls on the high sea on vessels flying a flag of another country.

These measures were adopted in January 2007 by the GFCM[3], the competent fisheries organisation in the Mediterranean, thus enlarging their impact to all fleets operating in these waters.

(1) International Commission for the Conservation of Atlantic Tunas.
(2) www.iccat.int – Recommendation 2006/05.
(3) General Fisheries Commission for the Mediterranean.

Out and about

Cod farming in the Shetland Islands

Johnson Sustainable Seafoods, based in the Shetland Islands, has taken up the challenge to develop cod farming.

The man behind the story is Gibby Johnson. This is not the first time Gibby has launched himself in a new venture. After making a fortune in lobster, he went on to become a pioneer in Atlantic salmon farming in the Shetlands in the 1990s. That was a golden age: from 1.600 tonnes in 1992, Johnson Sea Farm's intensive production topped 10.000 tonnes in 2000. But the aquaculture industry experienced a major downturn from 2001: salmon prices fell as certain consumers turned away from farmed salmon and a number of Scottish fish farmers were forced out of business. A new activity had to be found.

Combining business sense with ecology

So in 2002, the Johnsons, father and son, recruited Karol Rzepkowski. Born in Edinburgh of Polish immigrant parents, he was back in his wife's native region, the Shetlands, after managing a diving complex for tourists in the Caribbean and making a fortune in trade with the Eastern European countries. Karol has both the flair of a businessman and the heart of an ecologist. He took a direct interest in the 10.000 juvenile codfish supplied to Johnson by the experimental hatchery of the North Atlantic Fisheries College in Scalloway. An initial spawning by brood stock in captivity had taken place a year earlier, in March 2001.

After feeding generations of Europeans and Americans, cod is today one of the most endangered demersal species. Landings of wild cod have collapsed in European waters. This species is covered by recovery plans and fishing restrictions. So Karol and the Johnsons decided to try their hand at farming cod on a sustainable basis.

The task was more than a simple diversification towards a promising species. New aquaculture techniques had to be invented. The animals' welfare and the marine environment had to be taken into account to win back consumers' confidence and thus ensure the economic prosperity of Johnson Sustainable Seafoods (JSS). The fish would thus be raised according to the highest British organic standards, a world premier. This new direction for aquaculture was in perfect keeping with the strategy set out in the European Commission's communication entitled "A strategy for the sustainable development of European aquaculture", published on 19 September 2002[1].

The Johnsons' new line of business received a financial boost from Europe in the form of an FIFG grant of around € 300.000 in 2004, the equivalent of the purchase price of some 40.000 juveniles.

The company also sought funding from the private sector: in late 2003, London City investors put up enough to cover the acquisition of 700.000 juveniles (over € 5 million). The first cod were sold in 2003 on the American organic market. The reaction was very encouraging: American "ethically aware" consumers were won over by the organically farmed cod. Another € 52 million were raised in early 2005, with the arrival of a venture capital firm.

The firm's 23 production sites are expected to produce 5.000 tonnes of cod in 2007. The objective for 2010 is 16.000 tonnes.

(1) COM(2002) 511.

JSS has opted for insemination in free-water tanks and has developed specific hatchery techniques. Feeding the larvae is a critical phase that is monitored closely.

JSS went on to buy the Nufish hatchery in Sandwick in 2005, to ensure a supply of juvenile codfish. It also used its capital to put together a team of marine biologists and other highly qualified technicians.

In terms of reproduction techniques, the company opted for insemination in free-water tanks. New hatchery techniques also had to be worked out, along with techniques for the very tricky phase of feeding the larvae. Indeed, during the critical phase of the first weeks of life, the larvae require specially adapted and progressive feeding (with certain very specific types of algae grown on site). One million 6 months old juveniles were transferred to marine nurseries in 2006, and twice that number will likely be raised in 2008.

First commercial successes

The year 2006 saw production of 560 tonnes of cod sold in the United Kingdom under the "No Catch, just Cod" brand name (cod fillets in biodegradable plastic containers, packed in a controlled atmosphere). New fish consumption trends contributed to that result. The Shetland farmed cod is certified by the Organic Food Federation, one of the recognised certification bodies in the United Kingdom. The organic farmed cod proved to be a tremendous success with young urban dwellers keen on environmental ethics. The product has been given considerable media coverage and is endorsed by NGOs like Greenpeace, Friends of the Sea and the RSPCA (Royal Society for the Prevention of Cruelty to Animals). A standard for AB (organic) certification of cod, turbot and snails was introduced in France in February 2007, adding to the existing list which includes farmed salmon, pond fish, shrimp, bass and sea bream.

JSS plans to produce 16.000 tonnes by 2010. In 2007, the year it will first turn a profit, 5.000 tonnes are set to be harvested on 23 sites, with a workforce of over 100. The challenge still ahead is to stay the course and ensure the firm's commercial growth by expanding to the continental European market (France, Benelux, Switzerland, etc.). JSS also intends to expand its range to sea trout, haddock and mussels.

Meanwhile, aged 75, Gibby Johnson still goes to sea, although he does not brave the storms of the northeast Atlantic as he did in his youthful fishing days. His coaster casts off from the port of Vidlin, in the bay ("voe") of this town on the Shetland Mainland, to fish for cod with a line. But the honourable angler of Vidlin brings his adult cod home alive: he is the main supplier of brood stock for the Sandwick hatchery.

The company has its own processing plant in Scalloway, where the cod is filleted and packaged in biodegradable plastic containers.

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[In brief

> Tuna: worldwide coordination for better resource management

The five regional fisheries organisations (RFOs)[1] charged with managing tuna stocks in the Atlantic, Indian and Pacific Oceans have decided to coordinate their efforts to improve management of this intensively exploited resource, such as Atlantic bluefin tuna (see article p. 9). They met in January 2007 in Kobe, Japan, to present their strategies to one another and to identify areas of action where coordination could help improve management of tuna fisheries. This extraordinary meeting concluded with the adoption of an action plan whereby the five tuna RFOs agreed to coordinate their efforts in various areas, including the standardisation of statistics, allocation of fishing possibilities, the relevance and proportionality of penalties, development of ecosystem-based management, reducing by-catches and the fight against illegal fishing, which is considered the leading cause of overfishing of tuna worldwide. In this context, the RFOs also agreed to coordinate the development of certain means to fight this illegal trade, such as joint lists of registered vessels and vessels known for illegal practices, development of a catch monitoring system, strengthening of regulations on transhipment at sea, etc. Members of the RFOs will be monitoring the coordination next year, together with independent experts. Another meeting is scheduled for January 2009 in Spain. As a member of most of these RFOs, the European Union is committed to promoting early implementation of the different measures.
For more information, see: http://www.tuna-org.org

(1) The International Commission for the Conservation of Atlantic Tunas, the Inter-American Tropical Tuna Commission, the Indian Ocean Tuna Commission, the Western and Central Pacific Fisheries Commission and the Commission for the Conservation of Southern Bluefin Tuna.

> Partnership agreement with Mozambique

The European Union and Mozambique have initialled a fisheries partnership agreement valid for five years (from 1 January 2007 to 31 December 2011). It entails major changes from the previous agreement. First, fishing possibilities for deep sea shrimp are abolished, due to European operators' lack of interest in exploiting this resource under the conditions of the previous agreement. The new agreement covers only tuna and related species, for which the EU quota, in accordance with scientific findings, is raised from 8.000 to 10.000 tonnes for 44 seining vessels and 45 longliners. The European Union's financial contribution will be € 900.000 a year, which Mozambique will use in full to finance a multi-annual programme for the development of sustainable fisheries. Programme implementation will be supervised by a joint Mozambique-EU Committee. Lastly, vessel owners will be taking on a larger share of the financial contribution: their part has been raised from € 25 to 35/tonne, while the European Union's share drops from € 75 to 65. The agreement still has to be ratified by both parties to take effect.

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