



European Commission

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Fisheries and aquaculture in Europe

○ **Illegal fishing: keeping illegal fishery products off the market**



○ **Aquaculture:**
a promising start for sole

○ **A maritime policy**
for the European Union

[Calendar

○ Shows and exhibitions

• Med Seafood & Processing, Rimini (Italy), 23-26 February 2008

This trade fair also features conferences and workshops, all focusing on the Italian and Mediterranean fishing sector.

> For more information:

Tel: + 39 0541 744258

E-mail: o.foschi@riminifiera.it

Website: www.medseafood.it

• GFCM, annual meeting, Rome (Italy), 26-29 February 2008

At their yearly meeting, the member countries of the regional fisheries organisation for the Mediterranean will lay down management guidelines for the stocks exploited in this zone, based on recommendations from the Scientific Advisory Committee.

> For more information:

Tel: + 39 0657 056441

E-mail: alain.bonzon@fao.org

Website: www.gfcm.org

• ICCAT/IEO, symposium on bluefin tuna, Santander (Spain), 22-24 April 2008

This scientific congress will review stock fluctuations in bluefin tuna based on historic data.

> For more information:

Tel: + 34 942 291060

E-mail: symposium@st.ieo.es

Website: http://ieo-santander.net

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Note to readers

We welcome your comments or suggestions at the following address:
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or by fax to: (+ 32) 2 299 30 40 with reference to *Fisheries and aquaculture in Europe*. E-mail: fisheries-magazine@ec.europa.eu

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<http://ec.europa.eu/fisheries>

<http://ec.europa.eu/maritimeaffairs>

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Illegal fishing: a major threat to sustainable fishing

It is an established fact that illegal fishing represents a worldwide danger. It causes serious environmental damage, contributes to stock depletion and creates unfair competition for those fishermen who play by the rules. In the longer term, it is a real threat to employment and the economic balance of coastal communities which are dependent on fisheries. And the consequences may be even more tragic in the developing world, where food security can be undermined.

A new approach is needed for the fight against this scourge in order to deal with what are now large-scale international organisations using sophisticated methods. Financial penalties must be in line with the profits made from this illegal activity. States which fail to meet their obligations must also pay the price. The Commission's new proposals are based on the best possible strategy, namely, to deprive the illegal fishing industry of its market. This can be achieved by requiring a high level of transparency on the origin of all fisheries products before their landing or import into Europe is authorised. And this approach must be applied systematically throughout the entire value chain, from net to plate.

The European Union represents the world's third largest fishing power, with 5.7 million tonnes of catches in 2005. It is also the leading importer of fish (17.3 billion euros in 2006) and has the most advanced technologies at its disposal. It therefore has a major responsibility in the fight against illegal fishing.

In fact, for some years now, the Union has been the driving force behind the growing awareness of this issue. It has initiated numerous decisions taken by international organisations such as the FAO (United Nations Food and Agriculture Organisation), as well as in regional fisheries organisations. This international cooperation, including assistance to developing countries, must now be strengthened even further.

If Europe is to remain the pace setter, however, it needs to set an example by sparing no pains in the fight against illegal fishing in its own waters. Monitoring of landings must be rigorous, and any EU nationals caught taking part in illegal fishing activity abroad must be dealt with severely.

Like any other strategy, this approach will only produce results if it has the active support of all stakeholders concerned. Strict application by the Member States of the new regulation proposed by the Commission, in particular the provisions on port state control, will be the key to making the new provisions really effective and barring access to the Community market for illegal fishing products.

The Editor

○ Cutting off outlets for illegal fishing



Illegal fishing accounts for 15 to 20% of catches worldwide, but for certain stocks in high demand on international markets, like tuna, Patagonian toothfish or cod, this can rise to over one third of catches.

Illegal, unreported and unregulated (IUU) fishing is a worldwide phenomenon. Both its huge scale, and the gravity of its environmental, economic and social consequences, are such that it is now a truly international problem. IUU fishing is a significant cause of depletion for fish stocks worldwide and undermines protection and recovery measures put in place to preserve stocks. The European Union is in the forefront of the global fight against this scourge, and wants to step up the means at its disposal to address the problem. Last October, the European Commission proposed new measures that seek to eliminate the main appeal of this activity: profits.

It is extremely difficult to measure the extent of illegal fishing owing to the nature of the activity. The few figures that are available are impressive, however. Serious estimates suggest that this illegal trade is worth somewhere between 3 and 10 billion euros a year globally. By comparison, legal landings by the Community fleet amounted to 6.8 billion euros in 2004. The United Nations Food and Agriculture Organisation (FAO) reports that illegal fishing accounts for up to 30% of total catches in certain important fisheries, and that catches of certain species could amount to three times the authorised quantity.

Serious consequences for the environment...

Illegal fishing disregards stock protection measures (fishing licences, closed zones, seasonal closures, total allowable catches, technical rules, restrictions on days at sea, etc.). As a result, it poses a serious threat to the sustainability of fisheries. According to the FAO, 25% of fish stocks are overexploited, a figure that rises to 66% for high seas species and straddling stocks, which are particularly vulnerable to illegal fishing. Certain species like bluefin tuna may even be in danger of extinction if illegal fishing is not brought to a halt. Tuna, cod, Patagonian toothfish, redfish and swordfish are subject to intensive illegal fishing due to their high commercial value.

Illegal fishing also causes damage to marine ecosystems due to its high level of by-catch (other fish, birds, tortoises, etc.). And, of course, illegal activity frequently occurs in zones which are otherwise off limits to fishermen in order to protect coral reefs, for example.

... and for livelihoods

As Manuel Liria-Franch of the FEOPE (1) explains, *'If you have one vessel fishing legally and another fishing illegally, they are competing for the same resources. Afterwards, they end up selling on the same market. And when measures have to be taken to protect resources, the legal operator will have to apply them, but not the illegal operator. So the competition is totally unfair at every step along the way.'*

In the short term, this unfair competition leads to smaller catches, lower income and the loss of jobs. In the long term, the repercussions are likely to be even more serious, as fish stocks are further undermined, or even exhausted.

Coastal communities in developing countries are directly hit by this phenomenon, particularly along the coasts of sub-Saharan Africa, where food security is often directly dependent on fishing.

(1) Federación española de organizaciones pesqueras – Spanish federation of fisheries organisations.

These countries generally do not have the means to patrol their exclusive economic zone (EEZ), and illegal operators are quick to turn this situation to their advantage, (over)exploiting their waters and stripping them of vital resources.

At the same time, operators fishing illegally on the high seas often exploit their fishermen too, making them work for low pay in sub-standard living and working conditions, which sometimes border on slavery.

Years of struggle

The international community and the European Union (EU) have been fighting against such practices for a long time. In 2001, the FAO launched its International Plan of Action against Illegal, Unregulated and Unreported Fisheries. The United Nations General Assembly and the Organisation for Economic Cooperation and Development (OECD) have also addressed this problem.

The European Commission adopted a Community Action Plan for the eradication of IUU fishing in 2002⁽²⁾. The EU's action to date has resulted in stepped-up controls on fishing activity and the strengthening of Community legislation to establish the responsibility of the beneficiaries of illegal operations, notably the liability of Member State nationals, irrespective of the flag flown by the vessel used for their activities. The creation of the Community Fisheries Control Agency has also put new instruments in the hands of the EU.

This fight, however, often has to deal with activities carried out in international waters. Cooperation between the countries concerned is vital, in particular within the Regional Fisheries Management Organisations (RFMOs). That is why the EU has played a leading role in the adoption by RFMOs of measures to combat illegal fishing.

Most RFMOs have devised a whole range of measures in this area, including control and inspection programmes, the adoption of port state control, the mandatory use of satellite-based vessel monitoring systems, systems certifying respect for conservation measures for products placed on the market, black lists of vessels identified as being involved in IUU activities, and so forth.

These rules are then written into the laws of the partner states, and in particular into EU legislation.

A lucrative activity

The fact remains, however, that these measures have so far failed to achieve the objective of eradicating IUU fishing – first and foremost, because the activity is still so lucrative! Operators fishing illegally have lower operating costs. They do not have to comply with obligations relating to resource protection (controls, quotas,

investment in more selective gear, etc.). They are often registered in tax havens and pay only low taxes (or none at all) and minimal social security contributions.

Any penalties incurred, usually fines, are not enough of a deterrent and are often seen by fraudsters as a 'normal' operating cost. Since there is sustained strong demand for the species targeted (especially tuna, cod and Patagonian toothfish), selling prices and profits are high.

In addition, illegal operators have numerous methods for developing their activity, which are hard to combat. The best known method is to register a vessel in a country that cannot or will not exercise real control over the vessel's activities: this phenomenon is known as 'flags of convenience'. Vessels can be registered under such flags in only a few hours and at very little cost. Numerous vessels thus regularly change flags to find the most advantageous conditions – and more especially, to thwart the efforts by RFMOs, EU bodies and states to keep their black lists up to date.

Moreover, controlling such activities is inherently problematic: fraudulent operators carry out their activity in waters where inspections are difficult, such as the high seas or the exclusive economic zones of developing countries. It is impossible to have a network large enough to identify and penalise all pirate vessels.

Due to the large amounts of money at stake, illegal fishing is now a well-organised professional activity. Operators use a number of techniques to conceal the illegal origin of their catches: transshipments to different vessels, landing in ports of convenience or 'bulk' processing in a country that is not scrupulous in applying the relevant rules.

A new strategy

As long as illegal fishing remains profitable, and fish caught illegally can be landed and marketed, it will be extremely difficult to halt the phenomenon. That is why the European Commission is determined to put in place a new strategy to tackle the problem more effectively. A communication accompanied by a proposal for a regulation were presented in October 2007 to the Council of Ministers and European Parliament. An extensive public consultation was held during the development phase, so that the sector's comments and proposals could be taken into account.

The proposed new strategy adopts an overarching approach to the problem, and takes into account all the activities that offer an outlet for illegal fishing, whether it be transshipment, landing, processing or marketing. In other words, the idea is to deprive illegal fishing of commercial outlets and thus to hit fraudulent operators it will hurt them most: their purse.

(2) Community Action Plan for the eradication of illegal, unreported and unregulated fishing (COM (2002)180).



New control measures are needed to combat illegal fishing.

As a result, the Commission is proposing that all fishery products (including processed products) exported to the European Union must be certified by the flag state as having been caught legally. Proof of the legality of the catch must be provided by the flag state, and the port state may not authorise the entry of fishery products lacking such certification.

To prevent fraudulent operators from hiding behind flags of convenience, the proposed regulation will enable the EU to adopt retaliation measures against states in breach of international rules. These could be trade sanctions, a ban on access to European ports for vessels flying the flag of the country concerned or other measures.

The proposed measures also include raising the level of financial sanctions. Obviously these must be high enough to be dissuasive, which is not the case at the moment. Fines could also be accompanied by other sanctions, such as the confiscation of catches or vessels and/or the withdrawal of licences.

Other proposals provide for simplification of control and inspection rules, and stronger measures against EU nationals who participate in illegal activity. Further integration should also be pursued for the different facets of the EU's maritime policy: control, police, port surveillance, customs, trade, fisheries, etc.

International cooperation needs to be stepped up to improve the control and surveillance of IUU activities, particularly by improving cooperation between RFMOs. The Commission also proposes to strengthen the EU's partnership agreements with the developing countries to help them improve their infrastructures, monitoring means and the legal framework to combat illegal fishing.

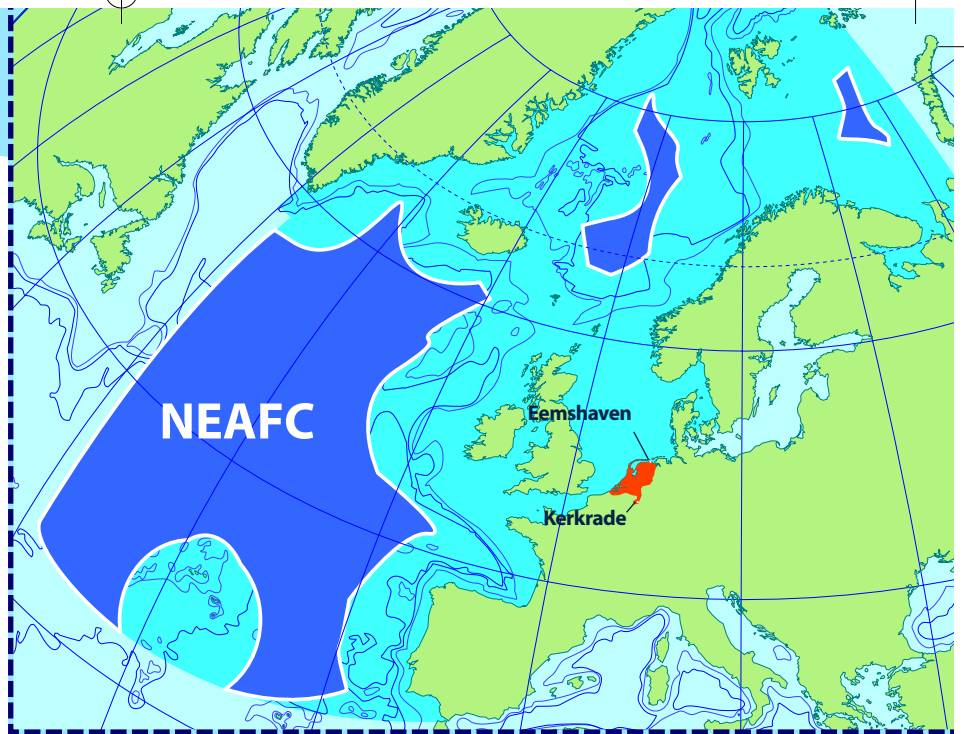
In a context of strong market demand, over-capacity of numerous fleets, and increasingly scarce resources justifying measures by the public authorities to reduce fishing opportunities, illegal fishing represents a real danger. Measures to curb it need now to be taken to a new level, in the interest of honest fishermen, and to ensure the future of sustainable fisheries in our waters and in oceans worldwide.

What is meant by illegal fishing?

The exact term used by the international institutions is *illegal, unreported and unregulated (IUU) fishing*. This expression covers unauthorised fishing, and all fishing activities that are in breach of national, regional or international rules.

This can include vessels fishing illegally as well as those carrying out a legal activity that do not report all their catches. But it can also concern fishing activities in waters not covered by stock conservation measures due to a failure to lay down a framework by the state concerned (unregulated fishing). In waters where fish stocks are managed by a regional fisheries management organisation, unflagged vessels or those flying the flag of a state not party to the organisation are considered IUU vessels.

Its location in the north of Holland has made Eemshaven a magnet for vessels landing catches from the North Atlantic, especially the NEAFC zone.



Port state control: a system that has proved its worth

The Commission wants to keep products caught illegally off the European Union market. It has therefore proposed to make port state control the rule. This type of control has already been implemented for certain fisheries where it has produced convincing results.

Eemshaven, in the northern part of the Netherlands, is not a fishing port. Its wharves studded with windmills are meant to be used for maritime freight. Thanks to the immense refrigerator warehouses owned by the firm Sealane, however, it has become one of the main European Union ports for the landing of frozen fish. Its location makes Eemshaven a magnet for vessels coming from the North Atlantic and the Arctic.

The other side of the coin, however, is that Eemshaven had also become one of the main ports of entry into Europe for illegally caught fish, particularly from the Barents Sea. There was a very simple reason for this: the Dutch fisheries control authorities had no way to be sure that fish landed from a vessel flying the flag of a non-EU country had been caught legally. They could check whether its sanitary state or size conformed with the regulations, but had no control over whether it had been caught in an authorised zone or whether the vessel had enough quota to catch it. The legality of fishing activities could only be controlled at sea, by the coastal state in the case of an exclusive economic zone, or by the Flag State (state of nationality of the vessel) in the case of the high seas.

Things changed on 1 May 2007, however. On that date, port state control entered into force for all landings of frozen fish from international waters in the North-East Atlantic. As part of its fight against the growth of illegal cod fishing in the Barents Sea, the European Commission had worked within NEAFC (1), the regional fisheries management organisation (RFMO) concerned, to put this measure in place.

Monitoring landings

'For years, everyone's attention was focused on the coastal state's control duties,' explains Jean-François Pulvenis de Séligny, Director

of the Fishery Policy and Planning Division of the United Nations Food and Agriculture Organisation (FAO). *'Or on the flag state's responsibility for controls on the high seas. But around 20 years ago, we realised that there is another key player: the port state. Fishing vessels transit through these states' territory when they go out to sea or return to shore, and that is where the catch is landed.'*

This may seem an obvious point, but it is important to remember that maritime regulations derive from international law, which considers a vessel to be essentially part of the territory of its flag state. The port state's ability to carry out operations aboard a vessel from a third country are therefore extremely limited as long as that principle is respected.

The problem is that fraudulent operators are also aware of this principle and they land their illegal catches far from home, where the authorities don't have the means (nor, sometimes, the will) to check their quotas, the zones where they fished, the licences they hold, and so on. It is therefore very easy for fish caught illegally to make its way onto the legal market.

Given the alarming growth of pirate fishing worldwide, this state of affairs had, up to a point, to be called into question, and port authorities given the means to detect illegal landings. Port state control thus began to be discussed in international circles.

In the early 1990s, the issue came up at the FAO Committee on Fisheries, where it was viewed as a very interesting tool to fight unregulated fishing on the high seas. The concept is mentioned in the 1993 *Implementing Agreement* (2). *'It was then recognised in an extremely important instrument, the International Plan of Action (3) against illegal fisheries, adopted by the FAO in 2001,'* continues Jean-François Pulvenis de Séligny.

At that point, several RFMOs, including CCAMLR (4) in the Antarctic Ocean, ICCAT (5) for bluefin tuna, NEAFC and, more recently, SEAFO (6), decided to implement the principle on a voluntary basis, in each case with support from the European Commission as a member of these RFMOs.

(1) North East Atlantic Fisheries Commission.

(2) *Agreement to promote compliance with international conservation and management measures by fishing vessels on the high seas* (Resolution 15/93).

(3) *International Plan of Action against Illegal, Unregulated and Unreported Fisheries*, 2001.

(4) Convention on the conservation of Antarctic marine living resources.

(5) International Commission for the Conservation of Atlantic Tunas.

(6) South East Atlantic Fisheries Organization.



Port state control is already being applied by certain RFMOs, as here in Eemshaven, Netherlands, for landings of frozen fish from the NEAFC zone.

How do such controls actually work? To find out, *Fishing and Aquaculture in Europe* followed a cargo of frozen fish landed in Eemshaven. And while on location in the Netherlands, we also stopped off in Kerkrade, in Dutch Limburg, home to the nerve centre of the *Algemeen Inspectiedienst* (AID), the general inspectorate of the Agriculture and Fisheries Ministry.

Flag state certification

Domenico Vizzari works in the control room, a large office connected to the outside world by every conceivable means of telecommunication. He has just received a landing application form in his mail box. It is from the *Pyotr Gusenkov*, a Russian refrigerated cargo vessel, which is seeking authorisation to land 360 tonnes of cod and haddock in Eemshaven. The fish were transhipped in the Barents Sea from the *Guldrangur* and the *Stakfell*, two trawlers belonging to the same owner based in Murmansk.

Domenico Vizzari first checks whether any of the three vessels has been placed on the NEAFC black list. These lists of vessels found guilty of illegal activity are one of the main instruments developed by the RFMOs to curb illegal fishing. He then sends the form to the Russian inspection authorities in Moscow and Murmansk. They have to check four things: whether the trawlers have enough quota for the fish declared, whether the catches have been recorded in the national quota uptake monitoring system, whether the trawlers have a licence, and whether the catch zone declared is confirmed by the satellite-based vessel monitoring system.

Two days later, Russia replies in the affirmative to all four questions, thus certifying the legality of the fish declared. In Kerkrade, Domenico Vizzari can give the go-ahead and notify his colleagues in Eemshaven. The *Pyotr Gusenkov* berths a few hours later, during the night. The next morning, cranes and lift-trucks set to work landing the packages of headless, gutted and frozen fish under the watchful eye of the AID inspectors.

NEAFC requires on the ground inspection of 15% of frozen fish landings to ensure that the species and quantities landed correspond to the declaration and that the vessel does not

'forget' any packages in its holds in the hope of landing them in another port. In that context, the Dutch authorities have decided to carry out an inspection of the *Pyotr Gusenkov*. The inspectors attentively count the pallets that touch down on the wharf, tear the brown paper off certain packages to check their contents, and examine the holds. Everything is in order.

Fewer landings

This control system has turned out to be highly effective. Since it was introduced, landings of frozen fish from the NEAFC zone in the port of Eemshaven have declined by around 20%. For Harry A. Vonk, AID policy adviser, there is no doubt that this proportion corresponds to the illegally caught fish that used to be landed in Eemshaven. 'For it to be even more effective,' he continues, 'we should receive a follow-up report from the flag state on the infringements we identify. And I would like to have a clearer view, for every vessel, of the quantities caught and the available quotas, so that we can know which vessels we should focus our inspections on.'

The system can obviously be improved. That is why the European Commission wants to extend it to all fishery products entering the EU from third countries, regardless of the means of transport used (fishing vessels, transport ships, air transport, etc.). Flag state certification would then be used to guarantee the legality not only of all fresh and frozen catches, but also of all processed fish and shellfish entering European Union territory.

'In the last few years there has been increasing awareness of the importance of encouraging the port state to act,' explains Jean-François Pulvenis de Séligny. 'And we are going even further, because now we realise that more than mere encouragement, we need to adopt rules that establish an obligation for the port state to take action to combat illegal fishing.'

In fact, negotiations are under way in the FAO to have port state control included in an international treaty that will make it mandatory for all signatories. The European Commission is thus, once again, showing the way for a vast worldwide movement to curb illegal fishing.

In the news

The integrated maritime policy is gradually becoming a reality in the European Union. Portugal has drawn up its National Strategy for the Sea which, following the example of the European Union's Blue Book, proposes an integrated vision of its future national maritime policy.



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Maritime affairs: towards an integrated policy

On 10 October 2007, the Commission adopted a Communication and an Action Plan that lay the foundations for an integrated maritime policy for the European Union. The new policy aims to realise the tremendous potential of the world's oceans while adopting an integrated rather than a sector-specific approach.

Maritime activities represent five million jobs in Europe in the sectors of maritime transport and logistics, fisheries, marine sciences and engineering, offshore energy and tourism. Maritime regions account for around 40% of the European Union's GDP, while some 90% of EU exports are transported by sea. And the sector still has significant growth potential, thanks to increasing demand for energy, expanding international trade, development of tourism, etc.

This growth, however, comes with its share of risks. With mounting pressure on marine ecosystems and growing competition for the use of marine and coastal areas, the different maritime activities can no longer be dealt with in isolation. If the EU is to use its oceans in a sustainable manner, then its maritime policy must be developed using an integrated approach based on collaboration and cooperation.

That is why the European Commission published a Green Paper on this subject over a year ago. During the extensive consultation that followed, stakeholders submitted their ideas to the Commission and voiced broad-based support for its initiative. This process resulted in the adoption, on 10 October, of a Communication from the European Commission known as 'The Blue Book', accompanied by a detailed Action Plan and a report on the stakeholder consultation.

The Action Plan that accompanies the Communication gives a more precise idea of the range and scope of projects that will be covered by the new integrated maritime policy. It provides for the establishment of a European Space for Maritime Transport without barriers, an integrated network for maritime surveillance, a European strategy for marine research and a European network of maritime clusters.

The Action Plan also includes a strong environmental dimension that will contribute to the European Union's efforts to combat climate change through the reduction of CO₂ emissions and pollution from navigation, for example. It also provides for a strategy to attenuate the impact of climate change on coastal regions.

The CFP concerned first and foremost

The Common Fisheries Policy (CFP) is obviously an integral part of this integrated maritime policy. While it has linkages with the action plan as a whole, there are certain points which concern it more directly, such as the fight against illegal fishing and the ban on destructive fishing practices on the high seas.

Of course, integration cannot be achieved through regulation alone. Integration is a new mindset that must be adopted by all of Europe's maritime stakeholders, in particular the Member States. They will be required to develop national integrated maritime policies putting into practice the European policy guidelines, in particular through coherent maritime spatial planning.

This new integrated approach will change the way the European Union formulates policies and adopts decisions. Henceforth, from the very first reflections on a given policy up to its concrete results on the ground, the focus will be on grasping the interactions between the different sectors concerned so as to ensure they are all taken into consideration. This approach will provide a coherent policy framework that will make possible the optimal and ecologically-viable development of all sea-related activities.

Portugal sets an example

In 2005, Portugal set up an institutional task force charged with developing a maritime strategy. This initiative is an important one, because Portugal is one of the European Union's leading maritime nations. The result of this work is the *National Strategy for the Sea*, unveiled in 2006. It sets out Portuguese maritime policy for the next decade – an integrated policy based on better scientific knowledge of the sea and appropriate maritime spatial planning. This approach is in keeping with the European Union's integrated maritime policy, to which Portugal has lent its wholehearted support.

Out and about

Sole moves to the farm

Belgian and Dutch scientists have fine-tuned a technique for sole farming. This fish is especially popular along the North Sea coast, but wild stocks are diminishing. Fishing and Aquaculture in Europe takes a look at the first steps of this promising experiment in commercial aquaculture.

Sited at the heart of the IJmuiden port on the Dutch coast, the building – an immense fortified naval base from the Second World War – is not what one might expect. *'With three-metre-thick concrete walls, temperature variations don't bother me,'* Andries Kamstra, manager of Solea, observes with a wink. This fish farm has occupied several rooms in this huge bunker which it uses for farming sole – more precisely, the local species of sole (*Solea solea*), which is highly prized in the culinary culture of the countries along the North Sea.

A promising market

'After several attempts beginning in the 1960s, a new opportunity to develop sole farming emerged in the 1990s,' explains Andries Kamstra. *'Sole require water temperatures of between 18 and 20°C, and this used to create technical problems. But then, a technique allowing cost-effective control of water temperature (recirculation) was developed for eel farming. So we thought, why not use it for sole as well? The species is ideal from the marketing perspective. It has high value and a big market, unlike turbot, which has high value but remains a niche product. The potential demand for sole is high.'*

As wild stocks continued to decline, not all of this demand was being met.

The European Commission therefore decided to cofinance two successive research programmes enabling a consortium of European scientists, including researchers from the Netherlands and Belgium, to develop commercial sole farming techniques.

At IMARES (1) in the Netherlands, a small-scale experimental farm was successfully launched, which enabled the whole reproductive cycle to be captured, i.e., eggs and viable young fish were obtained from individuals born in captivity. Researchers at Belgium's Agriculture and Fisheries Research Institute (ILVO (2)) also developed an experimental fish farm in Ostend for North Sea restocking, so as to sustain this resource that is so essential for Flemish fishermen.

In 2001, the Dutch decided to take things further, moving from the experimental phase to the reality of large-scale production. IMARES researcher Andries Kamstra became manager of Solea, a spin-off whose goal was to develop sole farming on a commercial scale. Other private partners from the fisheries sector signed up, making it possible to finance the project.

The start-up phase was mostly spent working out solutions to various problems. With the recirculation system, tank water properties must be determined by establishing an ideal balance of purity, salinity and temperature, which is always a delicate issue for marine species.

Feeding was another issue that had to be resolved. Sole is a difficult fish, in that it doesn't seek food out, but waits for it to appear, recognising it by its sense of smell. A method for distributing feed in the tanks using a centralised forced air system also had to be developed, to adapt to the fact that in the natural world sole feed only at night.

'If the feed stays in the water too long before being eaten, it will lose its appeal and the sole will not detect it,' explains Andries Kamstra. *'As well as paying attention to food quality, we also have to focus on feeding management, which is extremely complex.'*

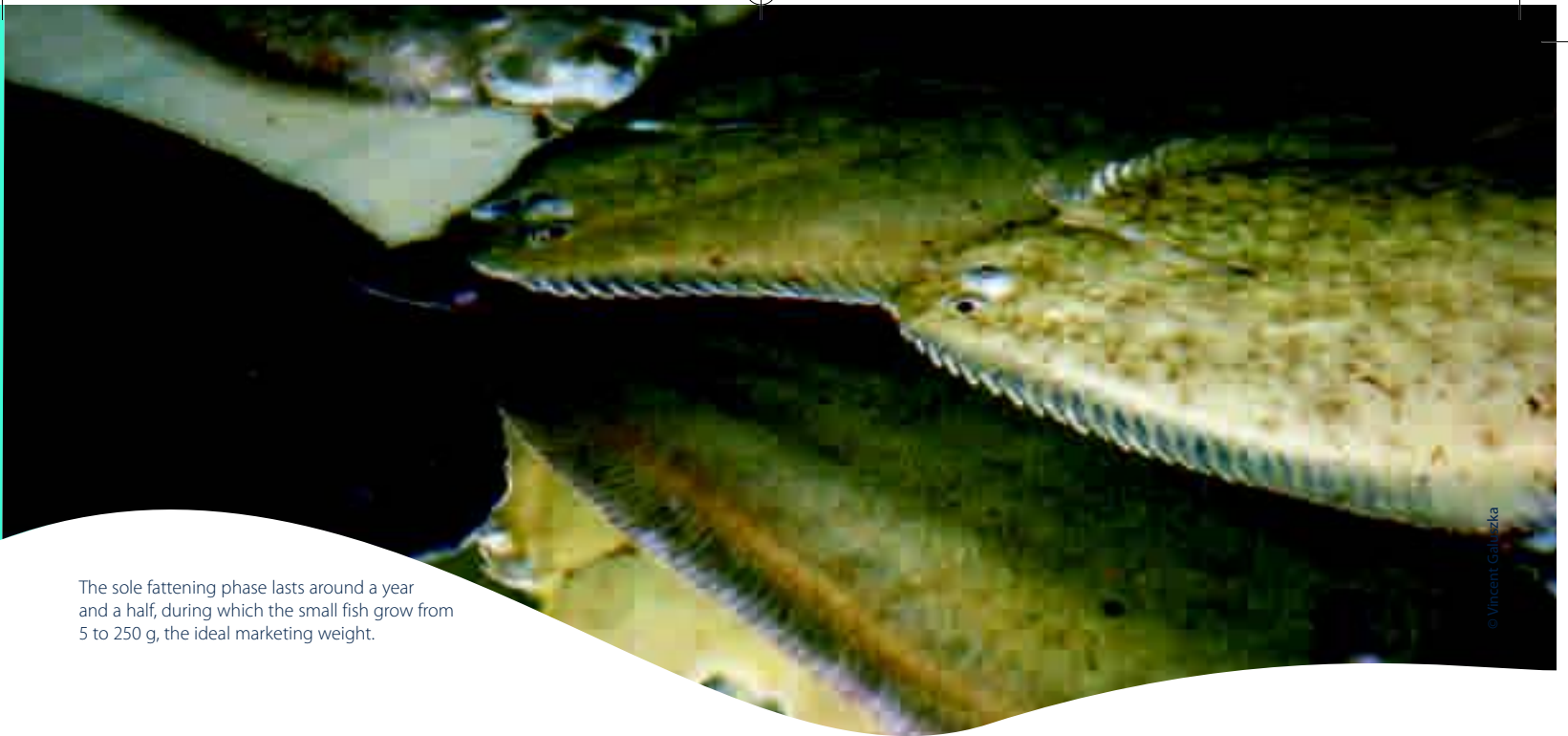
Multi-layer farming

In 2006, the Solea project ended its pilot phase and launched its commercial operations. The different stages of production had been mastered. The installations developed in the bunker in the port of IJmuiden began to produce 20 tonnes of sole a year, selling its production to restaurants and supermarkets. All stages of production, from egg to plate, took place within the company.

The product created a lot of interest among the public. *'You can't tell the difference between farmed sole and wild sole,'* states Andries Kamstra. *'The flesh is even firmer. This is due to the slaughtering method, which is quick in our case.'* Solea's next objective is to produce 100 tonnes by 2009. New tanks are being built.

(1) Institute for Marine Resources and Ecosystem Studies.

(2) Instituut voor Landbouw- en Visserijonderzoek – Institute for Agricultural and Fisheries Research.



The sole fattening phase lasts around a year and a half, during which the small fish grow from 5 to 250 g, the ideal marketing weight.

© Vincent Galuszka

Visitors to the Solea installations discover that farmed sole are apartment dwellers: breeding tanks are arranged in several levels – up to seven in the fattening unit.

The reason for this is simple. The problem with sole is that they grow slowly. It takes two and a half years from incubation for a sole to reach a market weight of 250 grams. This is as long as it takes for a turbot to mature, but sole are four or five times smaller. *'The cost of the farm's surface area has to be optimised,'* explains Andries Kamstra, *'especially along the coast where industrial land is very expensive.'* The most profitable solution is therefore to take advantage of the sole's morphology and to breed it in flat tanks (about twenty centimetres deep) in layers.

This multi-layer system is also the future approach being pursued by the ILVO researchers in Belgium.

The Belgian researchers have recently suspended their experimental farming activities, but only temporarily. *'Our restocking operations were a success, achieving an excellent survival rate and a recapture rate of 30%, which is very high,'* explains Daan Delbare, head of research at ILVO. *'The problem is that the dispersal area of sole in the North Sea is so vast that our releases mostly benefited Dutch and English fishermen, which is not really an ideal outcome for a national programme...'*

The scientific success of this experiment nevertheless caught the attention of a Flemish investor, who wishes to remain anonymous. His project aims to serve the consumer market, with estimated production of 75 tonnes in 2010 but with an infrastructure capable in time of producing 600 tonnes a year. ILVO will provide scientific follow-up for this new company, which is not likely to go unnoticed in a country where *sole meunière* is a national dish and where marine aquaculture is not well developed due to the lack of available land along the coast.

The Solea experiment in the Netherlands will not remain one of a kind for long. The potential demand for farmed sole is such that the Dutch government has decided to earmark 7.5 million euros, cofinanced by the European Commission's European Fisheries Fund, for the development of sole farming in the province of Zeeland (southwest Netherlands). That should whet many an appetite.

Five stages over two and a half years

Sole farming takes place entirely on land, often in covered infrastructures, to avoid temperature variations and to increase the periods of darkness during which the sole feed.

- **Reproduction** is to the responsibility of a few vigorous individuals brought from the sea. They live in tanks in a darkroom. Light and water temperature are controlled, thus sidestepping the cyclical nature of reproduction in order to obtain eggs throughout the year.
- Once harvested, the eggs are placed in **incubators** for five days while the embryos develop.
- The eggs are then transferred to small **rearing tanks** where they hatch. The larvae – which at first are invisible to the naked eye – spend three weeks in these tanks, where they acquire all the characteristics of flatfish.
- The alevins are transferred to **larger tanks** where they grow until they reach a weight of five grams.
- At this point, the small sole are **fattened** for about a year and a half until they have reached the standard portion size of 250 grams.

[In brief

> Baltic Sea: TACs and quotas 2008

The Fisheries Ministers set fishing opportunities for 2008 in the Baltic Sea at the Council meeting in October. The trickiest discussions concerned cod. The experts had voiced concerns, and recommended closing the fishery on the Eastern Baltic stock unless a recovery plan was in place. The multiannual plan adopted recently will enter into force in 2008 and includes a recovery phase. The Commission's proposal for a sharp reduction in TACs was only partially followed by ministers, who approved a 5% reduction for the eastern stock and a 28% reduction for the western stock. The Commission nevertheless obtained an important cut in the number of days at sea, 10% for the western stock and 20% for the eastern stock. To ensure compliance with these measures, the Community Fisheries Control Agency will put in place joint inspection activities for all the states involved. For other key stocks, the Council reduced the TAC for salmon by 15%, left unchanged the TAC for sprat, increased the TAC for herring in the central basin by 15% due to the stock's sound biological condition, and cut other TACs for herring due to poor rates of reproduction.

> Bluefin tuna: stepped-up controls

Bluefin tuna was the focus of discussions last November at the annual meeting of the International Commission for the Conservation of Atlantic Tuna (ICCAT), the organisation that manages this important Mediterranean resource. The delegates decided to continue to apply the 15-year recovery plan agreed

last year, but which, for administrative reasons, did not enter into force until June. Unreported and unregulated (over)fishing is the main cause of the stock's precarious state, and the delegates therefore decided to bolster the traceability system for bluefin tuna by introducing a new catch document. The European Union also presented its own overfishing problem to ICCAT. The European Commission had to close the 2007 bluefin tuna season on 19 September having established that the quota of 16 780 tonnes allocated to the European Union had been exceeded by over 4 000 tonnes, due to the Member States' slow reporting of catch data. ICCAT decided that the European Union would have to reimburse 100% of this overshoot starting in 2009, in three instalments deducted from its annual quotas.

> NAFO: a new start

At the latest meeting of the Northwest Atlantic Fisheries Organisation (NAFO), which is in charge of managing the international waters situated between Greenland and Canada, its members adopted a modernised Convention that consolidates all the reforms introduced in recent years. With a new organisational structure, new legal provisions, and basing its decisions on scientific advice, NAFO will pursue a precautionary approach, ensure ecosystem protection and prevent destructive practices. Fishing opportunities were also set at this meeting, generally on a multiannual basis, and a sector close to Canadian waters was closed to protect coral reefs.

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