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Transforming European Fisheries

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# Fish Dependence – 2011 Update

## The increasing reliance of the EU on fish from elsewhere

**nef** is an independent think-and-do tank that inspires and demonstrates real economic well-being.

We aim to improve quality of life by promoting innovative solutions that challenge mainstream thinking on economic, environmental and social issues. We work in partnership and put people and the planet first.

OCEAN2012 is an alliance of organisations dedicated to transforming European Fisheries Policy to stop overfishing, end destructive fishing practices and deliver fair and equitable use of healthy fish stocks.

OCEAN2012 was initiated, and is co-ordinated, by the Pew Environment Group, the conservation arm of The Pew Charitable Trusts, a non-governmental organisation working to end overfishing in the world´s oceans.

The steering group of OCEAN2012 consists of the Coalition for Fair Fisheries Arrangements, Ecologistas en Acción, The Fisheries Secretariat, **nef** (new economics foundation), the Pew Environment Group and Seas At Risk.

**nef** (the new economics foundation) is a registered charity founded in 1986 by the leaders of The Other Economic Summit (TOES), which forced issues such as international debt onto the agenda of the G8 summit meetings. It has taken a lead in helping establish new coalitions and organisations such as the Jubilee 2000 debt campaign; the Ethical Trading Initiative; the UK Social Investment Forum; and new ways to measure social and economic well-being.

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# Preface

This is an update of the Fish Dependence report published in July 2010. It includes figures for self-sufficiency levels and fish dependence days in 2011 for all EU27 Member States.

This updated report includes:

- a comparison between the 2011 and 2010 results, illustrating the extent to which the EU is becoming ever more dependent on fish from other regions;
- new shares of catch in non-EU waters for the United Kingdom, Denmark, Sweden, Germany and the Netherlands.

All the updated information is explained in the relevant sections.

In the coming years it is our intention to provide an annual update and so we would welcome suggestions on how to improve the content and look of this work.

# Executive summary

European Union (EU) fish stocks are in an unprecedentedly poor state yet fish consumption throughout Europe remains high. The EU has been able to maintain and even expand its levels of consumption by sourcing fish from other regions of the globe, both through the catches of its distant-water fleet and imports. This report highlights Europe's increasing reliance on fish products originating from external waters for its fish supplies, and provides pointers towards a more sustainable future for dwindling global fish stocks.

**nef** (the new economics foundation) has estimated the degree of 'self-sufficiency' in fish consumption achieved by the EU as a whole and for each of its Member States; self-sufficiency is defined as the capacity of EU Member States to meet demand for fish from their own waters. We have expressed the degree of self-sufficiency in the form of a 'fish dependence day'. Based on a Member State's or region's total annual fish consumption, the fish dependency day is the date in the calendar when it would start to depend on fish from elsewhere because its own supplies were depleted.

For the EU as a whole this is now 2 July, indicating that one-half of fish consumed in the EU is sourced from non-EU waters. Last year it was 9 July, which indicates that there has been a further decline of almost 200,000 tonnes of fisheries products over 12 months. Since 2000, the EU's fish dependence day has fallen earlier and earlier in the year and is now more than one month earlier than in 2000, revealing a continuously increasing level of fish dependence.

Of course, Member States with little or no access to EU waters, such as Austria, Slovakia and Slovenia, become fish dependent earlier in the year. Surprisingly, though, this is also the case for some Member States with greater access to EU waters. These include Spain, Portugal, Italy, Germany and France – all of whom source more than one-half of their fish from non-EU waters.

Our calculations include domestic aquaculture (fish farming) in EU countries, a growing enterprise that has served to marginally offset the overexploitation of EU fish stocks but has not halted or reversed the upward trend in fish dependence. If we discount aquaculture, the EU's fish dependence day moves forward to 7 June; for big aquaculture producers such as Spain, France, Italy and Greece, their respective national fish dependence day would occur more than one month earlier.

In a context of finite resources and growing populations, the current EU model is unsustainable. The EU's increasing fish dependence has implications for the sustainability of fish stocks globally, which are also overfished, and for the communities that depend on them.

The main message of this report is that rising fish consumption in a context of declining stocks is environmentally unviable and socially unfair. The EU has highly productive waters that have the potential to sustain a long-term and stable supply of fish, jobs and related social and economic benefits, but only if its fish resources are managed responsibly.

The reform of the EU's Common Fisheries Policy (CFP) offers a perfect opportunity to put the structures in place to turn this situation around. To transform the management of the EU's marine resources, the new CFP needs to provide a policy framework that will restore marine ecosystems to healthy levels and deliver a fair allocation of resources. At a minimum this will require the following actions.

- Reduce capacity in line with the available resources; improve data collection, transparency and reporting; and prioritise scientific advice in determining catch quotas.
- Create a context in which being profitable is aligned with doing the right thing, by making access to resources conditional on social and environmental criteria.
- Promote responsible consumption among all EU consumers, and implement measures that are conducive to more responsible fishing outside EU waters.
- Use public funds to deliver social and environmental goods by investing in environmentally constructive measures, research, and stakeholder involvement, as well as enforcing sustainable quotas and practices.

In order for this to happen, policy-makers need to look beyond the short-term costs that could result from reform and give priority to the long-term benefits that healthy marine resources will provide.

Photo: Corey Arnold

# Introduction

Fisheries play a pivotal role in human health and wellbeing: fish are crucial to the global food supply, providing one-fifth of animal protein consumption worldwide. Indeed, fisheries are likely to become even more important as populations continue to increase and the pressures on scarce land for agriculture continue to grow, pushing more people towards fisheries as a 'last-resort' activity.

There is only so much fishing that our oceans can sustain. For fisheries policies to be sustainable, they need to acknowledge and respect the ecological limits of the marine ecosystems on which they depend. Ultimately, what drives fisheries is fish consumption and that consumption needs to be commensurate with the biocapacity of the oceans.

European Union (EU) waters are potentially rich and productive seas capable of delivering a long-term and stable supply of fish, together with jobs and other benefits for coastal communities. Unfortunately, years of poor fisheries management and overexploitation have reduced the biocapacity of its waters. The EU currently consumes much more than its waters produce and increasingly depends on fish from other countries to satisfy its demand.

In a context of finite resources and a growing population, the EU model is neither sustainable nor replicable on a global scale. Unsustainable levels of fish consumption are putting pressure on EU waters, and beyond. Having overfished its own stocks, the EU is now increasing its dependence on non-EU fish to meet demand, which we term 'fish dependence'. This is reducing the long-term productivity of marine ecosystems elsewhere and is also undermining the potential of poorer regions to meet their own domestic demand.

The main goal of this report is to illustrate the extent to which the EU – despite its potentially abundant and productive seas – is increasingly dependent on fish from elsewhere. We highlight the implications of this trend for the EU and its Member States and make the case for the EU to increase its self-sufficiency (i.e. when domestic supply matches domestic demand) and decrease its fish dependence through the restoration of its own fish stocks and more responsible consumption. While fish dependence is not in itself a measure of sustainable fishing, the reduction of fish dependence implicitly requires moving towards more sustainable fisheries management.

Arguments in favour of self-sufficiency are often misrepresented as arguments against trade and the needs of industry. International trade can be extremely beneficial and has massive potential to improve people's lives across the world. However, it needs to take place both in a fair way and within the limits of the ecosystem. The continuing and increasing reliance of the EU on fish imports is not due to a lack of natural endowment but rather the result of gross mismanagement of its own fish resources.

In the following section we summarise current trends with respect to the state of fish stocks, levels of fish consumption and EU strategies to source fish from abroad. We also assess the contribution that aquaculture makes to national self-sufficiency.

Later in the report we describe our methodology for estimating the degree of fish self-sufficiency in EU countries and share the results of our calculations. We then discuss the implications of our findings and end with a series of conclusions and recommendations.

# Background

## EU fish stocks are unhealthy, producing far less than they could if they were managed in a sustainable way. Indeed, 72 percent of assessed stocks in the EU are estimated to be overexploited and more than 20 percent beyond safe biological limits.[1]

### Declining fish stocks

EU catches have steadily declined since 1993 at an average rate of 2 percent per year; almost all demersal stocks have declined in recent years.[2] The total landings from EU fisheries in the northeast Atlantic Ocean and the Mediterranean Sea have decreased by 30 percent over the past decade.[3]

On a global level, the United Nations Food and Agriculture Organization (FAO) reports that 32 percent of stocks are overexploited or depleted, with another 53 percent fully exploited.[4] Only 15 percent of stocks monitored by FAO are considered able to produce more than the current level of catches; the lowest level since 1970.[5] Around the world 27 percent of fisheries were judged to have collapsed by 2003, meaning that their annual harvests had fallen to less than 90 percent of their historical maximum yields.[6] If the current trend continues, some scientists have predicted that 100 percent of commercial stocks could collapse by 2048.[7]

Overexploitation of natural resources is synonymous with lost 'rents', the maximum economic yield that could be derived from fisheries compared to current revenues.[8] The World Bank has estimated the annual cost of global overfishing at US$50 billion, totalling US$2 trillion over the past three decades.[9]

### Rising levels of consumption

While the productivity of EU fish stocks has decreased, fish consumption in the EU continues to increase and remains at levels beyond what EU waters can produce. In 2007 the total catch in EU waters amounted to more than 4 million tonnes,[10] which is about 38 percent of the total fish consumption (over 10.7 million tonnes).[11] On average, each European citizen consumes 22.1kg of seafood products per year (as of 2007),[12] which is 29.4 percent above the annual global average of 17.1kg per capita. Portugal (with 61.6kg per capita), Spain (44.8kg), Lithuania (37.6kg), France (34.2kg) and Finland (31.70kg) have the highest consumption rates in the EU.[13] Together, these five countries alone account for 37 percent of EU fish consumption.[14] The FAO predicts that per capita fish consumption for EU15 countries will continue to increase by 17 percent from 1989 to 2030, while for EU27 + Norway the FAO predicts it will rise by 9 percent over the same period.[15]

In the EU only two countries maintained their levels of fish consumption from 1961 to 2005: Portugal, which has continued to consume the most fish in the EU27; and the United Kingdom (UK), which ranked 10th in the EU27 in 2005.[16] All other countries increased their consumption. For example, France, Germany, Spain, Finland and the Netherlands among others increased their consumption by between 50 and 100 percent. Others increased their consumption even faster, for example Italy (up to 108 percent), Ireland (217 percent) and Cyprus (304 percent).

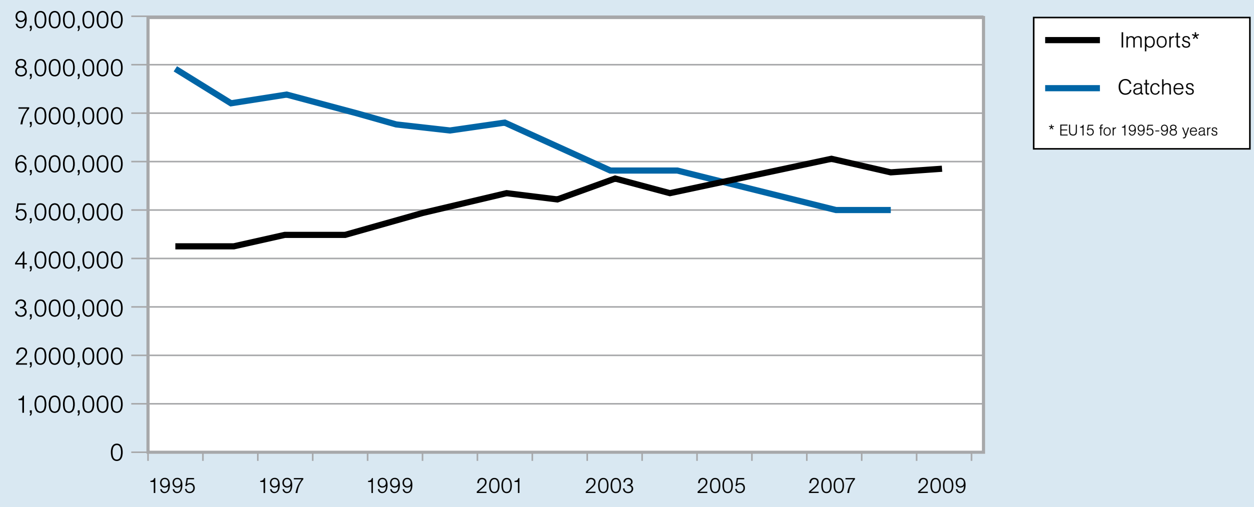
At the global level, fish consumption has grown at a rate of 3.6 percent per year since 1961, rising from 9kg per capita per year half a century ago to 16kg in 1997.[17] Since 1997 this global growth has slowed;[18] however, in 2008 fish consumption reached a record high with 17.1kg per capita, according to FAO estimates.[19] It can be expected that pressures on fish stocks are only likely to

**Table 1: Fish Consumption per capita for EU member states**

| *(kg/capita/year)* | *2007* |
|---|---|
| Portugal | 61.6 |
| Spain | 44.8 |
| Lithuania | 37.6 |
| France | 34.2 |
| Finland | 31.7 |
| Malta | 31.7 |
| Sweden | 28.5 |
| Luxembourg | 28.0 |
| Belgium | 24.2 |
| Denmark | 22.3 |
| Italy | 25.4 |
| Cyprus | 27.3 |
| Ireland | 21.4 |
| Greece | 20.9 |
| United Kingdom | 20.3 |
| Netherlands | 19.0 |
| Estonia | 16.4 |
| Germany | 15.3 |
| Austria | 15.4 |
| Latvia | 12.6 |
| Czech Republic | 9.9 |
| Slovenia | 10.2 |
| Poland | 10.9 |
| Slovakia | 8.1 |
| Romania | 5.3 |
| Hungary | 5.1 |
| Bulgaria | 4.2 |
| **Europe** | **22.1** |
| **World** | **17.1** |

**Source:** Fishery and Aquaculture statistics. FAO yearbook 2008
http://www.fao.org/docrep/013/i1890t/i1890t.pdf

**Figure 1: EU27 catches (landings) vs imports, 1995–2009 (tonnes live weight)**




**Source:** Eurostat external trade database – http://epp.eurostat.ec.europa.eu/portal/page/portal/external_trade/data/database

increase as the global population continues to grow, reaching a projected nine billion people between 2040 and 2050.[20]

### Sourcing from abroad

Due to its heavily overexploited fish stocks, the EU has increased its fish consumption by sourcing more fish from abroad. Fish is caught by the EU's distant-water fleet, which operates in other countries' and international waters; it is also, increasingly, imported.

The distant-water fleet is relatively small compared to the EU's total number of vessels. In 2006 the EU had 718 vessels fishing in non-EU waters, out of a total of 88,000 vessels;[*] yet this small number makes up almost one-quarter of the EU fishing capacity in tonnage. Spain accounted for over one-half of these vessels; most of the others are from France, Portugal, Italy, Latvia and Lithuania.[21] Over the 2001–2005 period estimates of the catch size of the EU distant-water fleet range from 1.06 million to 1.2 million tonnes,[22] equivalent to 19–21 percent of total EU catches.[23] These vessels predominantly operate in third countries' exclusive economic zones (EEZs), under fisheries agreements, and in international waters, yet its catch is classed as EU produce.

The EU is the world's largest market for fish and has become increasingly reliant on imports to meet its needs. In 2006 it imported 4 million tonnes more fisheries products than it exported,[24] a deficit that grew to 4.3 million tonnes in 2007. These imports help meet its demand for human consumption and processing, as well as animal feed and aquaculture. In terms of value, the EU imported US$23 billion worth of fish and fisheries products from non-EU suppliers in 2007, an increase of 11 percent on 2006.[25] Data from the EU indicate that imports in tonnes made up between 59 percent in 2006 and 57 percent in 2007[26] of the EU's apparent consumption[†] (including domestic aquaculture), while if domestic aquaculture is excluded, this figures rises to 67 percent in 2006 and 65 percent the following year.[27]

Compared to 2007 figures, EU imports have actually fallen by almost 100,000 tonnes; export levels have also fallen over this period, but by almost four times as much. Fish production continues to fall (5 percent lower than 2006), mostly due to lower EU catches. This is on top of a 28 percent drop in production in the 12 years from 1995 to 2006 (Appendix: Table A1).[28] The declining catches – rising imports trend is illustrated in Figure 1.

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[*] 84,909 vessels in 2009 (source: CFP facts and figures 2010)

[†] Apparent consumption = catches + imports - exports

**Table 2: EU aquaculture production (2007) in quantity and as EU share**

| | 2007 aquaculture production | |
|---|---|---|
| | Total production (tonnes) | % of EU27 production |
| EU27 | 1,310,000 | 100.00 |
| EU15 | 1,200,000 | 91.60 |
| France | 237,000 | 18.09 |
| Greece | 113,000 | 8.63 |
| Ireland | 53,000 | 4.05 |
| Italy | 181,000 | 13.82 |
| Spain | 285,000 | 21.76 |
| UK | 174,000 | 13.28 |

**Source:** Eurostat Statistics Database.[30] NB. Figures rounded.

### Aquaculture production

Aquaculture is often presented as a solution to overfishing. It has a significant impact on fish consumption patterns, see below. As global fish stocks have declined, aquaculture production has risen. A similar pattern can also be observed in the EU up to 1997; since then, however, aquaculture production has remained stable at around 1.25–1.28 million tonnes.[29] EU aquaculture supplies less than 13 percent of fish consumed in the EU. More than 90 percent of EU27 production takes place in EU15 countries, with five nations (Spain, France, Italy, UK and Greece) supplying 76 percent of production.

It is hoped by the industry and some policy-makers that increases in aquaculture production will compensate for the decline in wild fish catches. But while there is likely to be a constructive role for aquaculture, there are three main reasons why its potential is limited.

First and foremost among these is that most marine fish aquaculture is dependent on wild fish catches for fish feed. The precise conversion of wild fish to aquaculture in tonne-for-tonne terms depends on the composition of fishmeal and the species being produced. The production of certain species requires large quantities of wild catch as feed, at a conversion rate greater than 1.00.[31,32] Examples include salmon (conversion rate: 3.15); marine finfish (5.16) (species include flounder, halibut, sole, cod, hake, haddock, redfish, sea bass, congers, tuna, bonito and billfish); marine shrimp (2.81); trout (2.46); and tilapia (1.41).[33,34,35]

With current practices, production of these groups puts great pressure on wild fish stocks. Indeed, the Department of Environment, Food and Rural Affairs (Defra[36]), the UK government's agricultural and environmental body, has stated that an increased reliance on these groups of species is unviable and instead points to lower-trophic-level species such as molluscs.[37]

**Table 3: Aquaculture production by the four main EU producers**

| Quantity of production ('000 tonnes) | Spain | France | Italy | UK |
|---|---|---|---|---|
| Mariculture | 29.1 | 7.4 | 29.8 | 134.1 |
| Freshwater | 26.0 | 38.4 | 42.4 | 16.8 |
| Molluscs and crustaceans | 208.0 | 189.2 | 175.0 | 30.5 |
| Hatcheries/nurseries (million juveniles) | 84,380 | 58.0 | 0 | 215.9 |

**Source:** Review of the EU Aquaculture Sector and Results of Costs and Earnings Survey (2009). Definition of data collection needs for aquaculture. Reference no. FISH/2006/15-Lot 6.

If the direction of aquaculture is determined by consumption behaviour, with preference for carnivorous and resource-intensive fish, then aquaculture will drive the depletion of fish stocks even further. Consequently, the only viable means of offsetting depleted fish stocks and maintaining the same quantity of supply is to increase the production of seafood such as molluscs and crustaceans, effectively replacing wild fish with farmed molluscs.

EU aquaculture appears to be following this scenario. With EU waters providing fewer fish, EU aquaculture mainly produces molluscs and crustaceans. The EU produces 152,983 tonnes of marine fish but 4.5 times that amount of shellfish (682,292 tonnes of crustaceans and molluscs). This disparity can be seen clearly in Table B, below, which details EU aquaculture production categorised into mariculture, freshwater and shellfish production. Globally, marine fish contribute less than 2.5 percent of total aquaculture production versus 45 percent freshwater fish (e.g. tilapia) and 24 percent molluscs.[38]

The second reason why aquaculture's potential may be limited is its links to a wide range of environmental impacts.[39,40] These include the introduction of alien species;[41] environmental impacts from genetically modified and escaped fish;[42,43,44] habitat modification and pollution;[45] antibiotic use and other problems with intensive farming practices;[46] and an unsustainable use of resources.[47]

Thirdly, EU aquaculture's prioritisation of more resource-efficient groups, such as molluscs, will do little to satisfy the diversity of fish products often demanded by consumers.

In conclusion, aquaculture, on balance, adds to the global supply of fish. It has a part to play in the move to optimally managed wild fish stocks, but only to a limited extent in the case of carnivorous species. Without an improvement in the abundance of wild fish stocks, aquaculture's potential for growth is predominantly in resource-efficient, non-carnivorous species. This 'business-as-usual' approach will see the continued depletion of wild fish stocks and the eventual replacement for consumption purposes – as is already being seen – of wild fish with farmed molluscs and crustaceans.

The trend for fish dependence, with its reliance on fish stocks from external sources, cannot be replicated and should not continue.

# Methodology

## In order to reveal the EU's dependence on fish from non-EU waters we have estimated self-sufficiency levels for all EU countries. We express these in terms of 'fish dependence days' (see below).

Self-sufficiency levels are calculated as a ratio of domestic supply (production) over domestic demand (consumption):

$$\text{Self-sufficiency} = \frac{\text{domestic supply}}{\text{domestic demand}}$$

A country that is able to produce as much as it consumes will have a ratio of 1.00 or more. A ratio of less than 1.00 means that some consumption depends on non-EU resources, which can be interpreted as an indicator of dependence on the resources of other countries. Taken over several years, such ratios allow us to identify trends in the EU's dependence on other nations' resources. Therefore, both the degree of self-sufficiency and the changes in the ratio over time are important. A decreasing ratio means that more consumption is being supplied from outside the EU; an increasing ratio means the EU is becoming more self-sufficient.

The self-sufficiency of a country (or the EU) increases if production increases and/or if consumption decreases. Increases in production can come from higher catches in national and EU waters and/or from higher aquaculture production.

The degree of self-sufficiency can be represented as a fraction of a year and then converted into a fish dependence day: the day in a year when a country will have consumed its entire annual supply if it uses only production from its own waters. After this date the nation becomes dependent on sourcing its products from elsewhere, hence the date is termed the 'fish dependence day'.

For example, a degree of self-sufficiency of 0.4 means that a Member State's fish resources provide the equivalent of 146 days of consumption in quantitative terms (365 days x 0.4). Counting 146 days from 1 January, we can say that a country with a self-sufficiency rating of 0.4 depends on other countries' resources from 26 May onward for the rest of the year. Therefore, the earlier the date, the more dependent is the Member State.

In order to obtain fish dependence days for all EU Member States, we took the following steps.

- **i.** Domestic supply: calculate domestic supply by gathering data on total catch per nation in EU waters and trade balances.
- **ii.** Domestic demand: calculate domestic demand by gathering data on total catch in all regions and trade balances i.e. exports minus imports.
- **iii.** Self-sufficiency: calculate the degree of self-sufficiency as the ratio of domestic supply over domestic demand.
- **iv.** Fish dependence days: convert the degree of self-sufficiency into calendar days by multiplying by 365 and finding the corresponding fish dependence day in the calendar year.

### i) Domestic supply

Domestic supply is defined as catches in EU waters plus aquaculture production. At a national level this includes catches by the national fleet in its own national waters and in other EU Member States', plus all domestic aquaculture production (mariculture, freshwater aquaculture, and any other form). Catches by EU vessels in non-EU waters are excluded, since these depend on non-EU resources.

In equation form, domestic supply is calculated as:

domestic supply = catches in national and EU waters* + aquaculture production

Data for catches† from the EU and Member States were available through Eurostat[48] (see Appendix: Table 1 for sample statistics). However, it was not possible to obtain data on catches by Member States disaggregated by the source location. That is, whether the fish were sourced from national and EU waters or non-EU fishing grounds. We therefore used an alternative estimate of domestic supply as:

domestic supply = fish production (total catches in all waters + aquaculture) − catches in non-EU waters

In the absence of data on non-EU catches by Member States, the catch by a Member State was estimated using the share of gross tonnage that each nation has in the total EU external fleet[49] and the assumption that the gross tonnage for all Member States translates into proportional shares of catches (Appendix: Table 2 presents data on the tonnage of Member States' external fleets and the EU as a whole). For example, our estimates show that the EU caught 1.2 million tonnes in external waters, so if a Member State had 10 percent of the EU's external fleet capacity in terms of gross tonnage, we assumed that it was responsible for 10 percent of the 1.2 million tonnes caught in non-EU waters (120,000 tonnes).

Therefore, catches in non-EU waters for each Member State (MS) were calculated as:

catches in non-EU waters by MS fleet = catches in non-EU waters by EU fleet X MS share of EU tonnage capacity

Our estimate of 2006 non-EU catch was derived from a simple average of the previous five years' external catch: 1,198,847 tonnes (varying from 1.06–1.30 million tonnes).

Our estimate for the 2007 non-EU catch was taken as a fixed 21 percent of the total EU catch in that year, derived from a conservative estimate from a European Commission report.[50,51] This equals approximately 1.08 million tonnes.

Furthermore, we complemented the 2007 estimates of non-EU catch share with data on catches by fishing area[52] obtained from Eurostat.

This involved extracting data on catches by the EU and its Member States for FAO fishing areas throughout the globe, then looking at which of these areas were outside the EU's EEZ. Where there was not perfect overlap between the EU's EEZ and an FAO sub-division, we conservatively assumed all catches were made in the EU EEZ (conservative, because less external catch means higher self-sufficiency).

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* Figure for total catches in all fishing regions is measured in tonnes, includes aquaculture, and covers the period of one year. It relates only to EU waters, but is not distinguished by Member State EEZs. Ideally, we would have liked to restrict domestic production to fish catches by a country within its own EEZ but under the Common Fisheries Policy, fleets are allowed to fish in other EU States' waters without registering the origin of the catch. The consequences of this will be discussed under 'Caveats with data and methodology'.

† Official data sources on catches represent recorded landings. Since landings do not include bycatch, illegal, unreported or unregulated (IUU) fishing or discards, official catch data is in effect a large underestimation of the 'real catch' that takes place.

This exercise revealed some estimates of external catches that were larger than the non-EU estimates derived using the method described above. These higher values are more directly linked to fishing activity (i.e. they are reported catches in a specific area, rather than a fleet-based estimate calculated using tonnage capacity and total fleet catches in all non-EU areas) but can still be considered conservative as we did not include any catches from regions that overlap EU waters. We used estimates derived from this approach most notably for Denmark, Germany, the Netherlands and the UK.

### ii) Domestic demand

Domestic demand is defined by apparent consumption within a country. It encompasses all demand for fish products by a country, whether these are used for human consumption or animal feed or are wasted. Apparent consumption is measured as total production (catches and aquaculture), plus imports, minus exports. In equation form that is:

$$\text{apparent consumption}^{*} = \text{total production (total catches in EU and non-EU waters + aquaculture)} + \text{imports} - \text{exports}$$

Data for catches for the EU and Member States – the same as was used for domestic production – were taken from Eurostat statistics[53] (see Appendix: Table 1 for sample data). Our trade data were taken from Eurostat pocketbooks[54] (see Appendix: Table 3 for sample data). These trade data cover trade in all fish and aquaculture products.

### iii) Self-sufficiency

The degree of self-sufficiency was calculated by dividing domestic supply by domestic demand. As noted above, this represents the proportion of consumption in a region (the EU) or nation (EU Member State) that is supplied by its own resources. In equation form, this is calculated as:

$$\text{Self-sufficiency} = \frac{\text{domestic supply}}{\text{domestic demand}}$$

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* 'Total catches' includes aquaculture production and wild catches by the EU and all Member States, available through Eurostat. From this figure, for each country, the estimated external catch (derived as above, in section i) is subtracted. Trade data includes aquaculture trade as well as wild catch, and is in all fishery products, regardless of processing method.

This is equivalent to:

$$\text{Self-sufficiency} = \frac{\text{catches in EU waters + aquaculture production}}{\text{apparent consumption}}$$

Net trade (imports minus exports) is included in the domestic demand denominator and not domestic supply because trade is not production. A positive trade balance (i.e. exports larger than imports) increases the degree of self-sufficiency by reducing the proportion of production that is consumed domestically, and therefore should be included in domestic demand.

### iv) Fish dependence days

The final step of the methodology was to convert self-sufficiency ratios into days. This was done simply by multiplying the self-sufficiency fraction by 365 and deriving the corresponding date in the year.

### Caveats with data and methodology

While all data used in our estimates were taken from official sources such as the FAO, Eurostat and the European Commission, the datasets used had several limitations that could have affected our results. A key point to highlight is that while all results are derived from official data sources, our calculations have been restricted at times by the limited quality and availability of data. Additional information on the share of national catches derived from national, EU, international and other non-EU waters, would help strengthen our results, but this information is not available or difficult to access. This is partly due to poor reporting of fisheries data and a lack of transparency among EU Member States. While our results are far from perfect, it is worth pointing out that they are based on the best available information and can be considered as providing the best picture currently available. As explained in the following sections, our estimates are conservative, which means that real levels of self-sufficiency are likely to be lower than the results show.

i) Member State catches in EU waters

The Rule of Origin[55] criteria dictates that fish caught by an EU vessel outside EU waters be classified as EU produce, unlike produce caught in the same location under another vessel's flag. This means that all EU catches by the EU fleet in non-EU waters are classified as EU production, even if they come from other countries' waters. This makes it difficult to distinguish between what is caught in a country's own territorial waters (defined as a country's EEZ) and catches in other Member States' EEZs or EU waters.

The absence of official data that divides catches between national waters, EU waters, international waters and non-EU waters led us to make several assumptions that could affect the results at Member State level.

ii) EU catches in non-EU waters

Catches by the EU's external fishing fleet in our estimates should be considered the minimum amount of fish caught by EU vessels in non-EU waters.

The total non-EU catch by the EU external fleet and its gross tonnage is based on the 718 vessels of the EU external fleet that conduct at least 90 percent of their activity outside EU waters. For example, in the Mediterranean the EEZ only extends to 12 nautical miles from the coast, which means that vessels fishing beyond this limit are fishing in international waters. But it is unlikely that the 718 vessels composing the external fleet include those vessels operating in the Mediterranean, particularly since these 718 vessels must spend at least 90 percent of their activity outside the EU. Where vessels from Mediterranean EU countries operate beyond their EEZ for less than 90 percent of their activity their catch is counted as national catch when it should be regarded as sourced from non-EU waters.

This suggests that the total amount of non-EU catches is much larger than the figures on which we have based our results.


iii) Share of national catch sourced from non-EU waters

Non-EU catches for each Member State were calculated based on the assumption that every country's share of EU external fleet capacity (in gross tonnage) was a reflection of its share of non-EU catches. For example, the UK makes up 2 percent of the EU external fishing fleet tonnage capacity so we assumed that it is responsible for 2 percent of total catches by the EU external fishing fleet (equivalent to 21,293 tonnes). This quantity was then subtracted from total UK catches to obtain UK catches in EU waters.

Using capacity as a proxy for catch-size appropriation is equivalent to assuming that all vessels catch the same amount relative to their tonnage. This could result in underestimated attribution of the share of external catches commanded by countries with low-capacity vessels, relative to the average, as well as overestimates for those countries with above-average capacity vessels.

In order to validate our estimates of share of national catches coming from non-EU waters, we tried to obtain information at the national level for each Member State, but we could only obtain national data for Spain and France. Data from the Spanish Ministry for Fisheries[56] suggested that 54 percent of Spanish catches were made in non-EU waters, matching the estimates derived using our methodology (when including aquaculture production in Spanish catches). That is, the fraction of Spanish catches sourced from outside the EU was 54 percent,[*] which is equivalent to 0.55 million tonnes in 2005 when the entire Spanish fleet caught 0.99 million tonnes. Using our method, where 52 percent of the external fleet's capacity is Spanish and there were 1.06 million tonnes of EU external catches in total, we also arrived at 0.55 million tonnes (for 2005). Likewise, for France the official statistics[57] and our own were similar[†]. For both countries we used the figures from national sources rather than our estimates, although we view the findings as support for our methodology.

iv) Lack of data on catches within the EEZs of Member States

Under the CFP EU waters are regarded as a common resource that can be exploited by any Member State. Without data on catches within a Member State's own waters we cannot comment on how self-sufficient a Member State is within its own EEZ. This means that fishing by Member States in other

* This figure of 54 percent was used time-independently in order to follow Spanish national data as closely as possible.

† We calculated France's figure by summing its national catch using data from the referenced report (from p. 23 onwards: 'État du secteur des pêches français') on catches in different areas, which came to 116,819 tonnes in 2008. For the same reason as for Spain, see previous Footnote above, we used this figure time-independently to represent France's external catch in all years of our analysis.

nations' waters will increase their self-sufficiency as long as these waters are inside the EU. Spain is clearly a significant beneficiary of this since a large part of its fleet operates in waters outside Spanish jurisdiction but still within EU waters. This does not, however, affect the self-sufficiency of the EU as a whole.

v) Illegal, unreported and unregulated (IUU) fishing and bycatch

Our results do not take into account IUU fishing, discards and bycatch. Estimates of the scale of IUU fishing are only available for specific stocks or fleets, making it impossible to include it in this analysis. However, high levels of discards and bycatch should have little impact on the analysis as all discards and most bycatch do not enter the market. Yet, it is worth noting that official data sources on total catches are estimated from recorded landings and, given that landings do not include bycatch or discards, the catch data used in our analysis underestimate the true catch that takes place, further supporting our assertion that our results are conservative.

vi) Trade data

Data on trade are readily available from the Eurostat pocketbook on fisheries statistics 1990–2006,[58] but unfortunately this information is no longer published. Instead, all trade data for 2007 have been extracted from the Eurostat external trade database.[59] Trade codes include all seafood products, including live fish, frozen fish, fishmeal, fish oils and processed fish, and are exactly the same as those used by Eurostat in previous editions of the fisheries statistics pocketbook.

vii) Contemporary data

Finally, it is worth noting that there is a delay of around three years for data reporting. As a consequence, most of our datasets are from 2007/08. We therefore make the assumption in this report that similar conditions hold for 2011. Given that the trend is of increasing dependence year on year, this is likely to make the EU appear less dependent than it may actually be.

viii) Aquaculture trade

When constructing the self-sufficiency dates that exclude aquaculture from the catch data, we were unable to remove trade in aquaculture products. This was because of a lack of trade data sufficiently detailed to distinguish at the 10-digit-code specificity required at the EU level. This is something that could be further explored in future editions of this report, but it would require updating dates for all previous years if we wanted to make them comparable.

ix) Aquaculture

The formula used to estimate self-sufficiency levels includes aquaculture as a measure of domestic production. Higher levels of aquaculture production will increase self-sufficiency if it contributes a net gain in seafood produced. This is limited, however, if aquaculture is dependent on more fish than it produces.

The dependence of aquaculture on wild fish stocks is already captured in the wild catches and trade components of the formula. However, our methodology does not capture the fact that EU aquaculture production is dominated by molluscs and that the current trend is one in which we are replacing wild fish with farmed molluscs. Neither does it capture the diminished choices available to the consumer.

In other words, the depletion and replacement of the diversity of wild fish stocks, with the equivalent quantity of a single species of farmed mollusc would not affect self-sufficiency.

Consequently, we present the results with and without aquaculture production. Removing aquaculture production from the equation results in a decrease in self-sufficiency (i.e. fish dependence will come earlier in the year) as shown in Table E, below. That said, due to the way in which trade data are collected, aquaculture could not be removed from trade data, which means that each tonne of traded fish product is equivalent, regardless of whether it is wild or farmed.

# Results

## When analysing the ratio of domestic supply over domestic demand, we arrived at estimates of the degree of self-sufficiency of the EU and its Member States (Table 4) and their corresponding fish dependence days (Table 5).

Table 4 shows that the EU's degree of self-sufficiency is now 50 percent, and that this ratio has been decreasing consistently since its formation. EU15 has also shown declining self-sufficiency, from just over 67 percent in 1990 to 50 percent in 2007, a 25 percent drop in 17 years.

**Table 4: Degree of self-sufficiency for the EU and its Member States**

| | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|
| EU27 | | 0.871 | 0.590 | 0.563 | 0.518 | 0.500 |
| EU15 | 0.671 | 0.670 | 0.588 | 0.560 | 0.519 | 0.501 |
| Belgium | | | 0.161 | 0.215 | 0.287 | 0.206 |
| Bulgaria | | | 0.401 | 0.234 | 0.267 | 0.402 |
| Czech Republic | | | 0.314 | 0.313 | 0.353 | 0.326 |
| Denmark | 1.125 | 1.197 | 0.999 | 0.850 | 0.787 | 0.618 |
| Germany | 0.328 | 0.295 | 0.280 | 0.421 | 0.341 | 0.320 |
| Estonia | | | 1.106 | 7.072 | 30.835 | 2.505 |
| Ireland | 2.431 | 2.197 | 1.876 | 1.916 | 1.776 | 1.536 |
| Greece | 0.635 | 0.676 | 0.660 | 0.597 | 0.657 | 0.598 |
| Spain | 0.461 | 0.397 | 0.404 | 0.343 | 0.356 | 0.349 |
| France | 0.679 | 0.565 | 0.564 | 0.466 | 0.468 | 0.449 |
| Italy | 0.491 | 0.472 | 0.393 | 0.340 | 0.343 | 0.329 |
| Cyprus | | | 0.819 | 0.137 | 0.264 | 0.228 |
| Latvia | | | 1.094 | 1.442 | 1.437 | 1.339 |
| Lithuania | | | -0.444 | 0.244 | 0.233 | 0.446 |
| Hungary | | | 0.332 | 0.379 | 0.482 | 0.513 |
| Malta * | | | -1.367 | -1.102 | -0.556 | -0.259 |
| Netherlands | 1.602 | 0.887 | 1.022 | 1.716 | 1.681 | 1.213 |
| Austria | 0.057 | 0.057 | 0.061 | 0.039 | 0.041 | 0.039 |
| Poland | | | 0.529 | 0.494 | 0.467 | 0.545 |
| Portugal | 0.516 | 0.383 | 0.205 | 0.112 | 0.318 | 0.317 |
| Romania | | | 0.237 | 0.122 | 0.138 | 0.160 |
| Slovenia | | | 0.207 | 0.177 | 0.155 | 0.159 |
| Slovakia | | | 0.072 | 0.095 | 0.102 | 0.121 |
| Finland | 0.603 | 0.643 | 0.700 | 0.669 | 0.679 | 0.745 |
| Sweden | 0.862 | 1.053 | 1.402 | 1.096 | 1.350 | 0.995 |
| UK | 0.577 | 0.674 | 0.636 | 0.643 | 0.592 | 0.538 |

* Clearly it is impossible for a Member State to have a negative ratio. This discrepancy arises from estimates of a country's external catch being greater than the country's total catch. This is predominantly a problem for countries with small total catches, such as Malta, which are therefore more sensitive to inconsistencies in the data. In 2007 we have addressed this, assuming that Malta's non-EU catch is 0.

Luxembourg not included because of data limitations

Fish dependence in the EU as a whole shows that its fish stocks support just under one-half of its consumption; its fish dependence day falls on 2 July, one week earlier than in 2009. Member States differ in their levels of self-sufficiency. Unsurprisingly, inland countries or those with little access to the sea (i.e. Austria, Slovenia, Slovakia, Romania and the Czech Republic) become fish dependent much earlier in the year, relative to the EU average. On the other hand, Estonia, Latvia, Ireland and the Netherlands appear to be self-sufficient and are able to produce more fish than they consume.

Others, however, have access to potentially enormously productive waters, yet their dependence does not seem to reflect this, due mostly to the state of their fisheries and their levels of consumption. In fact, many become fish dependent strikingly early in the year: Portugal becomes dependent on 26 April; Spain on 8 May; France on 13 June; the UK on 16 July; Italy on 30 April; and Greece on 7 August.

**Table 5: Fish dependence days for the EU and its Member States**

| | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|
| EU27 | - | - | 4 Aug | 25 July | 9 July | 2 July |
| EU15 | 2 Sep | 2 Sep | 3 Aug | 24 July | 9 July | 3 July |
| Belgium | - | - | 28 Feb | 20 Mar | 15 Apr | 17 Mar |
| Bulgaria | - | - | 27 May | 27 Mar | 08 Apr | 27 May |
| Czech Republic | - | - | 25 Apr | 25 Apr | 09 May | 30 Apr |
| Denmark | >1 year | >1 year | 31 Dec | 7 Nov | 15 Oct | 14 Aug |
| Germany | 30 Apr | 18 Apr | 13 Apr | 3 June | 05 May | 27 Apr |
| Estonia | - | - | >1 year | >1 year | >1 year | >1 year |
| Ireland | >1 year | >1 year | >1 year | >1 year | >1 year | >1 year |
| Greece | 20 Aug | 4 Sep | 29 Aug | 6 Aug | 28 Aug | 7 Aug |
| Spain | 18 June | 26 May | 28 May | 6 May | 10 May | 8 May |
| France | 6 Sep | 26 July | 25 July | 20 June | 20 June | 13 June |
| Italy | 29 June | 22 June | 24 May | 5 May | 6 May | 30 Apr |
| Cyprus | - | - | 27 Oct | 19 Feb | 7 Apr | 25 Mar |
| Latvia | - | - | >1 year | >1 year | >1 year | >1 year |
| Lithuania | - | - | 1 Jan | 30 Mar | 27 Mar | 12 June |
| Hungary | - | - | 2 May | 19 May | 26 June | 7 July |
| Malta | - | - | >1 year | Undefined* | Undefined* | 19 Mar |
| Netherlands | >1 year | 20 Nov | >1 year | >1 year | >1 year | >1 year |
| Austria | 21 Jan | 21 Jan | 23 Jan | 15 Jan | 15 Jan | 15 Jan |
| Poland | - | - | 13 July | 30 June | 20 July | 19 July |
| Portugal | 8 July | 20 May | 16 Mar | 11 Feb | 2 Apr | 26 Apr |
| Romania | - | - | 28 Mar | 14 Feb | 20 Feb | 28 Feb |
| Slovenia | - | - | 17 Mar | 6 Mar | 26 Feb | 27 Feb |
| Slovakia | - | - | 27 Jan | 4 Feb | 7 Feb | 14 Feb |
| Finland | 9 Aug | 23 Aug | 13 Sep | 2 Sep | 5 Sep | 29 Sep |
| Sweden | 11 Nov | >1 year | >1 year | >1 year | >1 year | 30 Dec |
| UK | 30 Jul | 04 Sep | 21 Aug | 23 Aug | 4 Aug | 16 July |

**Notes:**

'-' indicates that estimates could not be made, typically due to lack of data, particularly trade balances.

'*' indicates that estimates were unrealistic due to consumption being greater than catches minus external catches, aquaculture production and imports (data limitation). Aquaculture included in the catch data.

Dates not available for some countries prior to joining the EU.

Luxembourg not included because of data limitations

### Table 6: Fish dependence days for the EU and its Member States, excluding aquaculture from domestic supply

| | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|
| EU27 | - | - | 14 July | 3 July | 14 June | 7 June |
| Belgium | - | - | 25 Feb | 19 Mar | 15 Apr | 16 Mar |
| Bulgaria | - | - | 22 Apr | 1 Mar | 16 Mar | 23 Apr |
| Czech Republic | - | - | 30 Jan | 27 Jan | 3 Feb | 30 Jan |
| Denmark | >1 year | >1 year | 31 Dec | 13 Nov | 13 Oct | 10 Aug |
| Germany | 9 Apr | 31 Mar | 24 Mar | 21 May | 25 Apr | 13 Apr |
| Estonia | - | - | >1 year | >1 year | >1 year | >1 year |
| Ireland | >1 year | >1 year | >1 year | >1 year | >1 year | >1 year |
| Greece | 3 Aug | 18 July | 27 June | 23 May | 15 June | 22 May |
| Spain | 1 May | 27 Apr | 18 Apr | 30 Mar | 25 Mar | 24 Mar |
| France | 22 June | 19 June | 21 June | 14 May | 15 May | 7 May |
| Italy | 3 May | 12 May | 6 Apr | 27 Mar | 30 Mar | 23 Mar |
| Cyprus | - | - | 25 Oct | 24 Jan | 12 Feb | 10 Feb |
| Latvia | - | - | >1 year | >1 year | >1 year | >1 year |
| Lithuania | - | - | 1 Jan | 27 Mar | 23 Mar | 9 June |
| Hungary | - | - | 24 Feb | 7 Mar | 29 Mar | 31 Mar |
| Malta | - | - | >1 year | Undefined* | Undefined* | Undefined* |
| Netherlands | >1 year | 13 Nov | >1 year | >1 year | >1 year | >1 year |
| Austria | 4 Jan | 3 Jan | 4 Jan | 2 Jan | 2 Jan | 2 Jan |
| Poland | - | - | 30 June | 7 June | 27 May | 27 June |
| Portugal | 4 July | 18 May | 22 Mar | 9 Feb | 10 Apr | 23 Apr |
| Romania | - | - | 13 Feb | 22 Jan | 24 Jan | 25 Jan |
| Slovenia | - | - | 20 Feb | 4 Feb | 29 Jan | 29 Jan |
| Slovakia | - | - | 17 Jan | 23 Jan | 23 Jan | 29 Jan |
| Finland | 11 July | 14 Aug | 6 Sep | 24 Aug | 29 Aug | 24 Sep |
| Sweden | 31 Oct | >1 year | >1 year | >1 year | >1 year | 30 Dec |
| UK | 17 Sep | 26 Aug | 5 Aug | 3 Aug | 13 July | 22 June |

**Source:** Data used were Eurostat data, or national data where available, and aquaculture excluded from production but included in the trade data.

**Notes:**
'-' indicates that estimates could not be made, typically due to lack of data, particularly trade balances.
'*' indicates that estimates were unrealistic due to consumption being greater than catches minus external catches, aquaculture production and imports (data limitation).

Luxembourg not included because of data limitations

While the degree of self-sufficiency is important, because it reflects the current state of affairs, trends are also important because they reflect the longer-term implications We see that most countries and the EU as a whole show a decline in self-sufficiency from 1990 to 2007; that is, the EU and its leading Member States are shown to be increasingly dependent on resources from outside EU waters. The EU15 Member States have reduced their degree of self-sufficiency by 25 percent compared to 1995, while the EU27 has reduced its self-sufficiency by 15 percent compared to the same year.

In other words, in just seven years the EU27 fish dependence day moved forward in the calendar by over one month – from 4 August to 2 July. At current levels of consumption, if EU citizens were to rely solely on fish caught in EU waters, the EU would consume its domestic supply by 2 July. This means that the EU depends on fish from other parts of the world for almost one-half of the year.

There are worrying signs of increasing dependence for several countries. The UK is now dependent 20 days earlier than last year, the Netherlands' self-sufficiency falls by 27.8 percent, and Sweden just becomes fish dependent (on 30 December). For some countries, particularly Germany and Denmark, the increase in dependency can be attributed in some part to the use of data about catches near Greenland (and outside of the EU) that were not contained in the sources we used for last year's estimates. However, if we apply this improved method to last year's data (so that Greenland catch in that time period is non-EU catch), we find that last year Denmark would have been dependent from 7 October (instead of 15 October), and Germany from 30 April (instead of 5 May). In comparable terms, therefore, these two countries still move earlier in the year, to 14 August and 27 April, respectively.

Excluding aquaculture from domestic production further reduces the degree of self-sufficiency, as can be seen in Table E, below. Removing aquaculture from production makes the trend of declining self-sufficiency more apparent, moving the EU fish dependence day forward by a little more than three weeks to 7 June, and by more than one month for the main EU aquaculture producers such as Spain, Italy, France and Greece (more than two months).

# Discussion and implications

Fish dependence is a powerful concept that illustrates how far overconsumption outstrips domestic resources. As we have shown, one way to illustrate this trend is to represent a country's degree of self-sufficiency as a calendar day – the day in the year when a country has consumed its own supply and must begin sourcing its products from elsewhere, hence the term 'fish dependence day'. For the EU this date is currently 2 July, after which the EU depends on foreign resources.

**Interpretation of results**

Many factors affect a country's degree of self-sufficiency. These include the size of the fleet; fish catch; external catch relative to total catch; area and productivity of national waters; fish consumption per capita; the scale of imports and exports; and domestic aquaculture production.

Naturally landlocked countries or those with small fleets (relative to consumption demand) will have a lower degree of self-sufficiency. Those nations with high levels of fish consumption and substantial external fishing, such as Spain and Portugal, reach their fish dependence days earlier in the year. Others with a higher proportion of catches in EU waters and lower levels of consumption, such as Denmark, have a dependence date later in the year. Some EU countries, including Ireland and the Netherlands, are actually self-sufficient.

Aquaculture increases fish production and therefore improves self-sufficiency levels. But this is only the case when it results in a net gain in production, for example, if fish outputs are bigger than fish inputs (i.e. fishmeal). This is not always the case, as we have seen with carnivorous species. Our results show that the inclusion of aquaculture delays the date of fish dependence by slightly more than three weeks. But overall, aquaculture production has not altered the trend of increasing fish dependence.

The EU is naturally endowed with potentially rich and productive seas and it has the capacity to significantly increase its self-sufficiency levels by both managing its marine ecosystems in a sustainable way and changing consumption patterns. It is therefore important to emphasise that the trends found here are not an unavoidable problem, rather the consequence of poor management of EU fish resources and consumption patterns.

**Fish dependence and sustainability**

It is worth highlighting that the degree of self-sufficiency we have calculated is not a direct commentary on the sustainability of fisheries. For example, according to our results the Netherlands is a self-sufficient country, but this does not mean that it fishes sustainably. However, the sustainability of a country's fisheries is not directly investigated in this report. A direct commentary on sustainability requires detailed knowledge of the carrying capacities of all species and stocks, which requires data on breeding rates, population levels and parameters, migratory zones, predation pressures, and so on.

Despite this, we believe there is substantial evidence to suggest that increasing dependence on other countries is a powerful indicator of unsustainable fisheries and overexploitation of EU resources. Our self-sufficiency ratios are an easy-to-understand way of highlighting the impact that the EU's increasing fish dependence is having on other countries.

Ultimately, our results are consistent with other evidence on the effects of unsustainable trends in global fisheries. The EU model is not replicable at a global scale and, given global trends, is unsustainable.

## Implications of the EU's fish dependence

### Food security in developing countries

The interdependence of countries is becoming increasingly complex, not least in the food market.[60,61] A significant proportion of EU fish imports come from developing countries. At a global level more than one-half of the US$57.7 billion worth of fish products traded in 2004 came from developing countries.[62] The fish-product trade is more valuable to developing countries than those of tea, rice, cocoa and coffee combined.[63] It is clear, therefore, that notions of self-sufficiency directly impact on the interdependence and patterns of global trade.

However, while there are potentially large economic benefits to be derived from trade, the current rules of the game are not necessarily working for the poorer countries. It is challenging for developing countries to get good returns on their resources. Trade fuels economic development in the exporting countries and revenues from fish exports may, potentially, help combat hunger in these countries.[64] But trade can lead to problems of food insecurity, largely because fish is a major source of protein in developing countries.[65]

The emergent picture is non-uniform across and within countries. In at least some cases the net effects of the fish trade are completely unclear, showing neither decreased food security nor economic development. That said, there are other cases where the outcomes of trade are clearer. While fish for export are generally different, higher-value species than those consumed locally, there is evidence that in some cases fish supply is being diverted away from vulnerable people in developing countries. For example, in the decade from 1978/80 to 1988/90, per capita fish consumption in developed regions increased (by 27.7 percent in North and Central America and 23 percent in Europe and Asia), while in developing regions it fell (by 2.9 percent in Africa, 7.9 percent in South America, and more than 25 percent in at least 24 countries, including Burundi, Libya, Mali, Costa Rica and Colombia).[66] Moreover, there is worrying evidence that this decline is not being offset by other forms of animal protein,[67] despite the region potentially benefiting economically from trade. How this diversion occurs is not straightforward; it may be due to a combination of local people and exporters targeting the same species, or the knock-on effect of the exploitation of particular but exclusive stocks.

In summary, in order to combat cases of unsustainable trade that unfairly damage developing countries, trade regimes need to be more environmentally and socially responsible.[68,69,70] The positive macroeconomic impact of exporting fish products and natural resources must be used to drive development, yet also weighed against the potential negative consequences for those who depend on those resources in poor communities. Consumption within sustainable limits is an important component of any positive trade. The EU, for the sake of its own food security, employment and ecological health, must replenish its own fish stocks, with any excess demand being satisfied by well-regulated and mutually beneficial trade with developing countries.

### Vulnerability of the EU fishing industry

As EU fish stocks dwindle, the gap between supply and demand within Europe continues to widen. This is putting jobs in the fishing industry at risk and also undermining the processing industry that depends on fisheries. The lower productivity of EU stocks in recent years means that fishing is becoming an increasingly costly enterprise. The amount of effort and fuel needed to land one tonne of fish is higher than it needs to be, and higher than it would be if stocks were at a sustainable level. It is estimated that UK trawlers invest 17 times more effort than they did 118 years ago to land an equivalent catch.[71]

The prospect of further increases in fuel price can only exacerbate this trend. Fuel is currently subsidised in many countries, and this is often essential if fishing operations are to be economically viable. Such subsidies will be more difficult to justify and maintain, however, as climate change and rising oil prices begin to make an impact and the pressure to cut carbon emissions intensifies. For example, the increasing dependence of the EU processing industry on imports is pushing up societal and environmental costs such as climate change impacts and environmental damage.

In order to maintain competitiveness with non-EU producers and processors, the EU fishing industry must use its resources more efficiently. Contrary to the current position, this requires a large reduction in fishing capacity and for the EU to set levels of fish stocks beyond the Maximum Sustainable Yield (MSY) for as long as it takes for them to recover.

Undersupply for the growing European market is not likely to be a problem in the immediate future. The average fish price in European markets is higher than anywhere else in the world except Japan, which makes Europe a lucrative and attractive market for exporters from elsewhere. In the long-term, however, unless we start improving the productivity of EU waters, the prospects for the EU fishing industry look bleak.

Some companies, such as the Spanish-based companies Pescanova and Calvo, have responded to shortages in EU fish stocks by sourcing fish directly through their own fleet or through joint ventures in developing countries.[72] While this is a natural response to a challenging economic environment from a business strategy point of view, it only serves to increase our dependence on fish from elsewhere.

### The way forward and opportunities for change

There are many benefits associated with replenishing fish stocks. A high degree of self-sufficiency helps to deliver increased food security, improved resource management, a healthier environment and long-term employment and social stability for fishing communities. A decrease in the degree of self-sufficiency means the opposite, which is why the EU's fish resources and fisheries sector are both in such a parlous state.

This situation is reversible, however. The current state of EU fisheries must be set against a backdrop of once rich and productive EU waters of considerable economic and cultural significance.[73,74,75] We need to moderate current levels of fish consumption and restore EU fish stocks, both of which would reverse our increasing levels of fish dependence. The current reform of the CFP offers a unique opportunity to do just that.

To transform the management of our marine resources we need the new CFP to provide a policy framework that will restore marine ecosystems to healthy levels and deliver a fair allocation of resources within the EU and internationally. As a minimum this will require the following actions.

- Reduce capacity to reconcile it with available resources; improve data collection, transparency and reporting; and prioritise scientific advice in determining catch quotas.

- Create a context in which being profitable is aligned with doing the right thing, by making access to resources conditional on social and environmental criteria.

- Promote responsible consumption among all EU consumers, and implement measures that are conducive to more responsible fishing outside EU waters.

- Use public funds to deliver social and environmental goods by investing in environmental measures, research, stakeholder involvement and control and enforcement, rather than the current situation of funding the overcapacity of the fishing fleet through modernising vessels and failing to control overfishing i.e. access to fisheries stocks.

In order for this to happen, policy-makers need to look beyond the short-term costs that could result from reform and instead give priority to the medium- and long-term benefits that healthy marine resources will provide. But action will also be required at other levels. Businesses need to respond to the current challenges by adopting business models that secure their viability in the future and protect the scarce resources on which they depend. EU citizens, meanwhile, need to exercise their consumer power to move towards patterns of consumption that match what our oceans are able to produce.

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# Conclusions

The EU and many of its leading Member States are becoming increasingly dependent on fish resources from other countries. This is down to two main driving factors: EU stocks are in poor health and EU demand for fish continues to increase as EU citizens eat more fish than their waters produce.

We have seen that the EU now relies on foreign resources for almost one-half of its consumption, that this dependence has been increasing, and that the impact of aquaculture in reducing this trend is limited. The EU's fish dependence day is 2 July. Certain Member States, such as Spain, France, Italy and Portugal, reach their fish dependence days much earlier, despite their access to productive EU waters.

In the context of a steadily growing population, the trend towards the fishing of stocks to depletion before moving on to another resource (either through targeting distant-water fishing grounds or importing produce) is unsustainable, environmentally ruinous and potentially damaging for poorer countries and their development. Many of the costs of EU fish mismanagement are being exported, with direct consequences on the fish stocks of non-EU countries, simply to meet EU demand. Change is desperately needed if we are to break this pattern – the EU needs to focus efforts on restoring its own marine ecosystems and to move towards consumption levels that are commensurate with ecosystem capacity.

The imminent CFP reform is an ideal opportunity to create a robust policy framework that restores the EU's marine resources and protects them for future generations. To this end, **nef** is an active member of the OCEAN2012 coalition, which is dedicated to transforming European fisheries policy, to stop overfishing, end destructive fishing practices, and deliver fair and equitable use of healthy fish stocks.

If we are to get this reform of the CFP right, the EU needs to champion the goals of sustainable fishing inside and outside the EU, end destructive fishing practices and deliver fair and equitable use of healthy fish stocks. All of these policies are consistent with reversing the EU's trend towards increased dependence on other countries' resources.

# Appendix

This section includes supporting tables and data that were used in the text or calculations.

**Table A1: Total fisheries production in the EU (catch + aquaculture) in tonnes live weight**

| *Member state* | *1995* | *2000* | *2005* | *2006* | *2007* |
|---|---|---|---|---|---|
| EU27 | 9,275,222 | 8,192,623 | 6,895,356 | 6,689,494 | 6,443,127 |
| EU15 | 8,336,744 | 7,458,504 | 6,229,710 | 6,035,648 | 5,716,488 |
| Austria | 3,322 | 3,286 | 2,790 | 2,863 | 2,889 |
| Belgium | 36,477 | 31,678 | 24,983 | 23,143 | 24,667 |
| Bulgaria | 12,627 | 10,652 | 8,578 | 10,803 | 13,307 |
| Cyprus | 9,772 | 69,360 | 4,267 | 5,725 | 5,425 |
| Czech Republic | 22,608 | 24,129 | 24,697 | 25,077 | 24,723 |
| Denmark | 2,043,638 | 1,577,683 | 949,648 | 895,752 | 684,181 |
| Estonia | 132,345 | 113,585 | 100,136 | 87,584 | 100,225 |
| Finland | 171,874 | 171,822 | 146,092 | 162,334 | 177,404 |
| France | 955,920 | 970,241 | 840,349 | 830,597 | 795,313 |
| Germany | 302,925 | 271,585 | 330,352 | 335,521 | 293,758 |
| Greece | 184,361 | 194,762 | 198,461 | 211,286 | 208,266 |
| Hungary | 16,674 | 19,987 | 21,270 | 22,229 | 22,946 |
| Ireland | 417,012 | 327,484 | 322,547 | 264,235 | 279,650 |
| Italy | 611,522 | 518,680 | 479,000 | 489,540 | 467,631 |
| Latvia | 149,719 | 136,728 | 151,160 | 140,955 | 156,001 |
| Lithuania | 59,082 | 80,985 | 141,726 | 156,775 | 190,874 |
| Malta | 5,539 | 2,820 | 2,072 | 8,513 | 9,834 |
| Netherlands | 522,048 | 571,005 | 622,636 | 478,327 | 467,011 |
| Poland | 454,483 | 253,481 | 193,166 | 174,933 | 180,271 |
| Portugal | 268,852 | 198,656 | 218,463 | 236,990 | 260,504 |
| Romania | 69,105 | 17,099 | 13,352 | 15,773 | 16,497 |
| Slovakia | 3,567 | 2,255 | 2,648 | 2,980 | 4,071 |
| Slovenia | 2,956 | 3,037 | 2,573 | 2,500 | 2,465 |
| Spain | 1,402,906 | 1,378,193 | 990,579 | 1,035,762 | 1,020,908 |
| Sweden | 412,145 | 343,374 | 262,236 | 276,804 | 243,619 |
| UK | 1,003,742 | 900,055 | 841,574 | 792,492 | 790,687 |
| Croatia | 20,275 | 27,944 | 45,787 | 51,432 | 53,089 |
| Turkey | 652,585 | 582,386 | 546,063 | 662,073 | 772,471 |
| Iceland | 1,627,585 | 2,003,603 | 1,669,464 | 1,353,317 | 1,425,413 |
| Norway | 2,801,970 | 3,190,864 | 3,054,339 | 2,965,221 | 3,208,595 |

**Source:** Eurostat, European Commission. Fishery Statistics 1995-2008. Eurostat Pocketbooks. 2009 Edition

**Table A2: EU external fleet in number of vessels, gross tonnage (GT) and power (kW)**

| Member state | Number of vessels | % of total number | Gross Tonnage (GT) | % of total GT | kW | % of total kW |
|---|---|---|---|---|---|---|
| Spain | 424 | 59 | 241,534 | 52 | 331,459 | 49 |
| France | 100 | 14 | 51,435 | 11 | 104,874 | 16 |
| Portugal | 73 | 10 | 39,445 | 8 | 58,640 | 9 |
| Italy | 52 | 7 | 14,833 | 3 | 39,393 | 6 |
| Greece | 18 | 3 | 3,119 | 1 | 6,835 | 1 |
| Lithuania | 12 | 2 | 45,078 | 10 | 42,269 | 6 |
| Estonia | 10 | 1 | 12,215 | 3 | 19,923 | 3 |
| UK | 9 | 1 | 9,989 | 2 | 16,306 | 2 |
| Latvia | 7 | 1 | 18,089 | 4 | 18,066 | 3 |
| Germany | 5 | 1 | 10,342 | 2 | 13,271 | 2 |
| Poland | 4 | 1 | 9,978 | 2 | 12,606 | 2 |
| Malta | 2 | 0 | 7,569 | 2 | 8,245 | 1 |
| Denmark | 1 | 0 | 2,223 | 0 | 3,961 | 1 |
| Cyprus | 1 | 0 | 51 | 0 | 270 | 0 |
| **Total** | **718** | **100** | **465,900** | **100** | **676,568** | **100** |

**Source:** Study on the European External Fleet (2008) (Contract FISH/2006/02) © European Communities.

**Table A3: Trade balance (exports minus imports) in tonnes product weight (1990–2007)**

| Member state | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|
| EU-27* | – | – | -3,395,321 | -3,455,598 | -3,907,940 | -4,275,958 |
| EU-15* | -3,064,433 | -2,698,679 | -3,139,874 | -3,393,246 | -3,767,721 | -4,146,290 |
| Austria | -68,450 | -55,048 | -50,896 | -68,639 | -67,318 | -72,135 |
| Belgium | – | – | -164,870 | -91,389 | -57,525 | -95,076 |
| Bulgaria | -209,856 | -227,867 | – | – | – | -19,821 |
| Cyprus | – | – | -15,309 | -26,934 | -15,965 | -18,364 |
| Czech Republic | – | – | -52,691 | -54,098 | -45,032 | -51,020 |
| Denmark | 126,568 | 336,026 | -1,178 | -167,686 | -241,938 | -385,273 |
| Estonia | – | – | 47,779 | 90,493 | 85,910 | 73,120 |
| Finland | -111,706 | -95,418 | -73,669 | -72,295 | -76,910 | -60,918 |
| France | -531,132 | -528,131 | -543,131 | -711,651 | -694,961 | -715,732 |
| Germany | -790,976 | -642,276 | -601,522 | -403,100 | -578,925 | -510,195 |
| Greece | -72,220 | -70,757 | -79,850 | -116,066 | -92,090 | -121,799 |
| Hungary | – | – | -40,137 | -34,859 | -23,864 | -21,768 |
| Ireland | 115,887 | 227,208 | 152,964 | 154,195 | 115,425 | 96,702 |
| Italy | -625,928 | -607,538 | -696,826 | -834,104 | -834,603 | -856,909 |
| Latvia | – | – | 61,472 | 75,854 | 76,244 | 71,708 |
| Lithuania | – | – | -43.215 | -2,953 | -1,581 | 4,553 |
| Luxembourg | – | – | -8,929 | -7,047 | -7,609 | – |
| Malta | – | – | -15,029 | -15,363 | -19,276 | -35,484 |
| Netherlands | 89,166 | -66,446 | 12,427 | 259,871 | 193,745 | 103,116 |
| Norway | 638,183 | 1,058,941 | 1,202,659 | 1,405,249 | 1,295,630 | – |
| Poland | – | – | -174,198 | -154,792 | -148,081 | -116,188 |
| Portugal | -128,622 | -182,805 | -239,920 | -966,388 | -260,984 | -289,964 |
| Romania | – | – | -55,123 | -96,241 | -98,565 | -86,334 |
| Slovakia | – | – | -29,283 | -25,359 | -26,297 | -23,184 |
| Slovenia | – | – | -11,603 | -11,931 | -13,634 | -13,073 |
| Spain | -439,092 | -525,095 | -602,475 | -683,718 | -751,947 | -764,351 |
| Sweden | -50,821 | 20,870 | 98,479 | 23,004 | 71,798 | 1,879 |
| UK | -607,411 | -448,919 | -472,032 | -433,771 | -506,180 | -629,868 |

**Source:** Eurostat, European Commission. Fishery Statistics 1990-2006. Eurostat Pocketbooks. 2007 Edition. 2007 figures extracted from Eurostat external trade database.

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# Fish dependence day calendar 2011

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| FEB |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | **14** SLOVAKIA | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | **27** SLOVENIA | **28** ROMANIA | | | |
| MAR |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | **17** BELGIUM | 18 | **19** MALTA | 20 | 21 | 22 | 23 | 24 | **25** CYPRUS | 26 | 27 | 28 | 29 | 30 | 31 |
| APR |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | **26** PORTUGAL | **27** GERMANY | 28 | 29 | **30** CZECH REPUBLIC, ITALY | |
| MAY |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | **8** SPAIN | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | **27** BULGARIA | 28 | 29 | 30 | 31 |
| JUN |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | **12** LITHUANIA | **13** FRANCE | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
| JUL |  | 1 | **2** EU27 | 3 | 4 | 5 | 6 | **7** HUNGARY | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | **16** UK | 17 | 18 | **19** POLAND | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| AUG |  | 1 | 2 | 3 | 4 | 5 | 6 | **7** GREECE | 8 | 9 | 10 | 11 | 12 | 13 | **14** DENMARK | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| SEP |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | **29** FINLAND | 30 | |
| OCT |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| NOV |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
| DEC |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | **30** SWEDEN | 31 |

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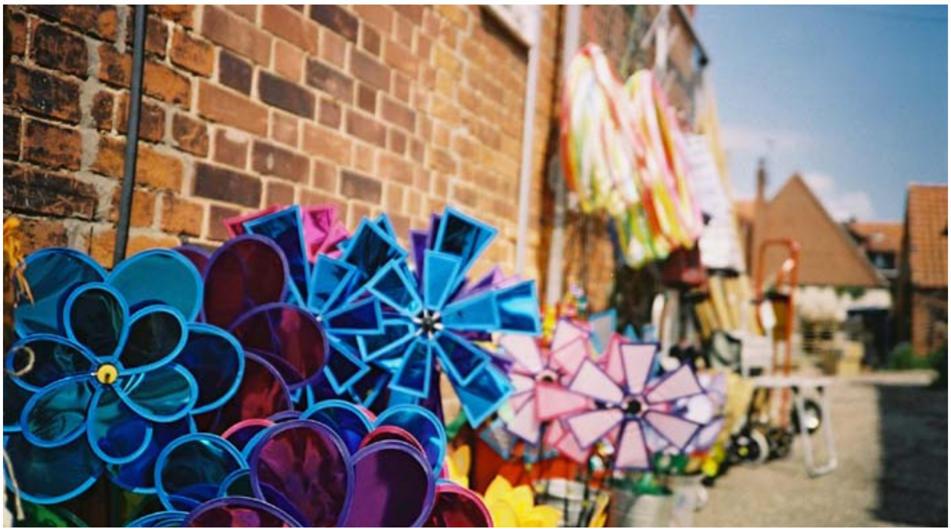

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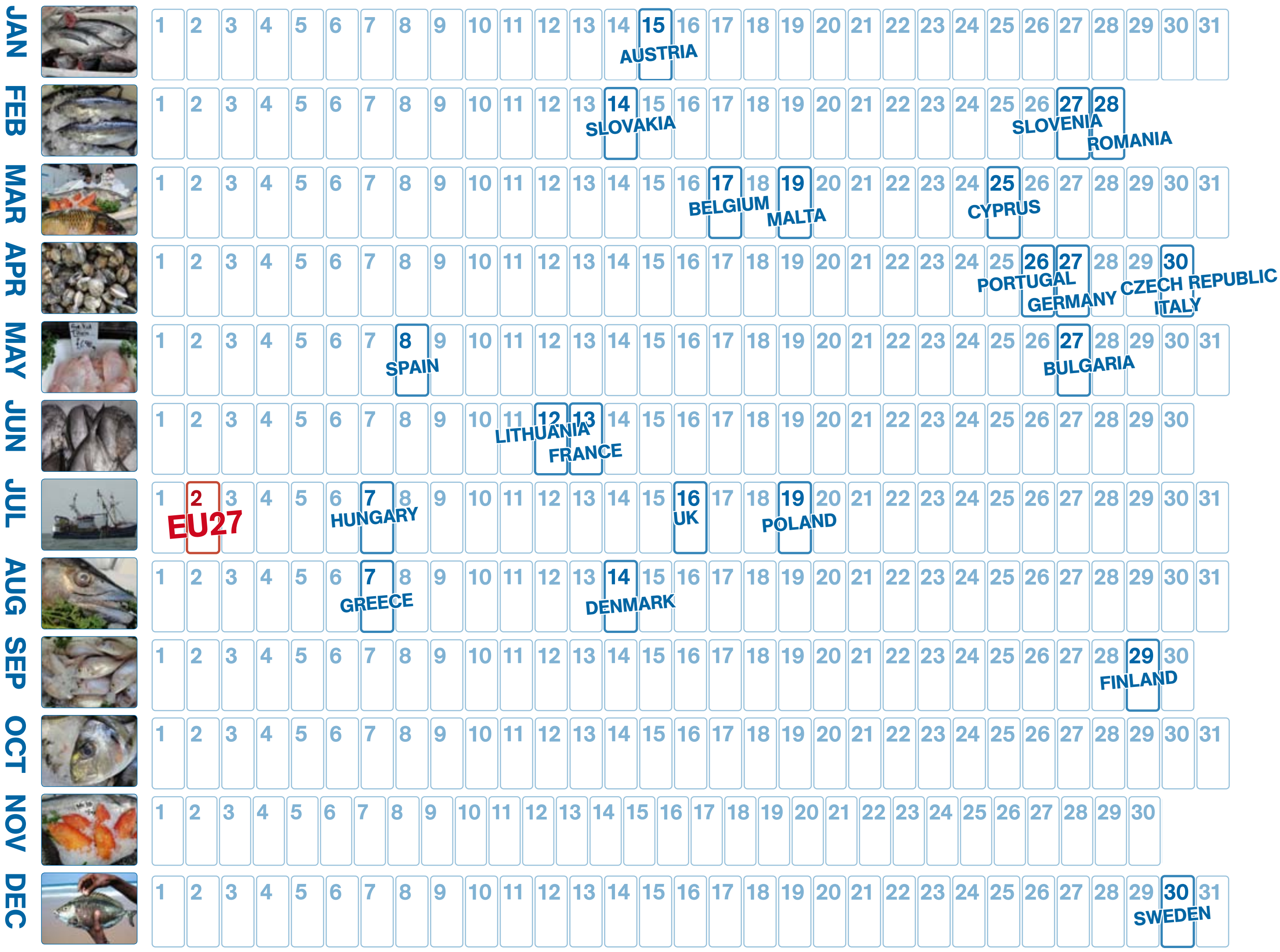



**Written by:** Aniol Esteban and Rupert Crilly

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If you have any feedback, comments or suggestions to improve this report we would love to hear from you.
E-mail: info@neweconomics.org


**new economics foundation**
3 Jonathan Street
London SE11 5NH
United Kingdom
Telephone: +44 (0)20 7820 6300
Facsimile: +44 (0)20 7820 6301
E-mail: info@neweconomics.org
Website: www.neweconomics.org

**OCEAN2012**
c/o Pew Environment Group
Square du Bastion 1A
1050 Brussels
Belgium
www.OCEAN2012.eu
Telephone: +32 2 274 1620
e-mail: info@OCEAN2012.eu



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