food ethics

The magazine of the Food Ethics Council

Fish

All washed up?

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FOOD ETHICS COUNCIL

Food Ethics, the magazine of the Food Ethics Council, seeks to challenge accepted opinion and spark fruitful debate about key issues and developments in food and farming. Distributed quarterly to subscribers, each issue features independent news, comment and analysis.

The Food Ethics Council challenges government, business and the public to tackle ethical issues in food and farming, providing research, analysis and tools to help. The views of contributors to this magazine are not necessarily those of the Food Ethics Council or its members.

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After the fish rush

Tom MacMillan

The seas we fish are in every sense a frontier. Border zones between dry land and the mind-boggling vastness of the oceans that make up all but three percent of the Earth's biosphere, our expansion into them has the volatile mix of exploration and exploitation, law-making and lawlessness, that has marked historic frontiers like the American West.

Just as historians look West to work out what makes America tick, so contributors to this edition discuss the sea-bound equivalents of current land-use debates: tensions between food and energy production, whether scarcity or injustice drives shortages and hunger, and parallels between aquaculture and industrial livestock farming.

People have fished for millennia, of course. But, in the last 40 years, marine exploitation has exploded. Between 1965 and 1995, the capacity of the world's fishing fleet grew more than ten-fold.

Fish is now the main source of animal protein for over a billion people and provides livelihoods for 200 million. Ninety percent of these livelihoods are in developing countries, which earn more from the fish trade than from coffee, tea, rice and bananas combined.

Like the Klondike, this fish-rush is fragile. While the fleet's capacity keeps growing, the amount it catches has been static for a decade at around 85 million tonnes. This is because 75% of global fish stocks are fully or overexploited. Business as usual could see all global fisheries collapse by 2048, as cod did fifteen years back in the North West Atlantic.

Our ability to catch fish has spectacularly overshot the environment's capacity to provide them, pushed by innovation in fishing gear, boat engines and more. Behind this relentless treadmill is the economic drive to prospect for and profit from poorly governed resources.

History tells us that the wild frontier of one culture is often the inconspicuous homeland of another. Fish are no exception, with the state-sanctioned expansion of industrial fishing trampling artisanal fishing systems that had sometimes proved more sustainable and even more profitable. So poor governance is relative. Yet the facts that fish have a complex ecology, live largely out of sight, and swim in and out of territorial waters, make it especially tough to manage their capture in the common interest.

While regulators and the industry clash publicly, the reality is that we're all in this fix together. Pirate fishing is serious – worth up to $23.5 billion a year – but poor management and legal overfishing is a bigger problem still, with losses worth $50 billion. The losses are fuelled by tax-paid subsidies – around 11% of the European fleet's catch comes from non-EU waters, with governments footing as much as 83% of the licence fees for such expansion.

So, in many ways, fishing tells the same old frontier story – the resource rush, governance struggles and eventual exhaustion. If there's anything final about this frontier, it's that there are no other oceans to prospect and we depend profoundly on their survival.

Yet, for all this doom-saying, contributors to this edition – who include leading world experts on fisheries – are refreshingly upbeat. The problems they see are serious but surmountable, and they have success stories to prove it.

Eddie Allison (p.13), from the WorldFish Centre, tells Namibia's story. Having inherited a heavily exploited fishery on independence in 1990, stocks have now stabilised and employment in fishing more than doubled from 1991 to 1998.

Success in this case, and in many of the other examples described in this magazine, has hinged on directly tackling poverty and insecurity in fishing communities, and involving them in decisions about fisheries management. As the sea defies regulatory enforcement, earning the trust and confidence of the people who fish is key to making fisheries sustainable.

The message from John Lynham's (p.32) research on 'catch shares' is similar. Catch shares are controversial systems that allocate fishermen a percentage of the total catch from a fishery, based often on what they had caught in the past. Lynham and his colleagues looked beyond individual examples of catch shares working – say for Alaskan halibut, which has made the leap from near total closure to being one of the world's first certified sustainable fisheries – to examine data on 11,000 fisheries. They find catch shares make a dramatic difference, generally halting decline and sometimes reversing it.

So involving fishing communities in governance and reinforcing their rights are key ingredients for sustainability. But that doesn't mean that anything goes. Even fishing communities lose, in the long-term, unless catches and fleet capacity are brought in line with levels that the best evidence available suggests are sustainable.

The sea is a global frontier and overfishing is a problem worldwide. One reason we produced this magazine now is that policy makers, businesses and citizens in the UK have three important opportunities to make a difference.

The first is the Marine Bill, expected to become law this year. The groups campaigning for it, which include The Co-op and the Marine Conservation Society, want the bill to be strengthened, including highly-protected no-take zones. The bill is a historic chance to safeguard fishing and marine ecosystems into the future and it must not be compromised. Yet the controversy surrounding it underlines the persistent need to boost the stake fishing communities have in sustainable management. MPs should support both a strong Marine Bill *and* greater economic and political investment in communities that depend on fishing.

The second opportunity is a current review by the Food Standards Agency of its advice to eat more fish. This is first time the agency has considered how to square its nutritional advice with sustainabile development and, we hope, heralds more initiatives of this kind. It is a genuinely knotty problem and the agency needs help. You can contribute to its consultation until the end of March.

Finally, regulators and the fishing industry need clear support from the rest of us, when we buy fish and eat it. We can show such support as individuals, but the retailers who buy for us wield much more clout. Only buying fish from certified sustainable fisheries is the most powerful way to show this support. As Colin Baines (p.34) explains, the Co-op is doing this, and other supermarkets that aren't already should do likewise. Shoppers don't expect to buy fish from threatened stocks, and the sooner that becomes reality the better. ■

The industrial sea

Where have all the fish gone?

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A third of the world's people live within 100 km of the coastline. It is not surprising then, that humans have developed a close dependence upon the sea, for transport, commerce, mineral wealth and food.

The latest figures from the Food and Agriculture Organisation (FAO) indicate that terrestrial production systems (beef, pigs, sheep and poultry) provided approximately 245 million tonnes of protein in 2005. Marine capture fisheries produced approximately 82 million tonnes of protein with a further 31 million tonnes produced by mariculture. Thus the marine environment provides nearly one third of the global demand for animal protein products excluding milk. However, production from capture fisheries has been constant and has slightly declined in recent years, while mariculture has grown at a steady rate since the 1970s.

The beginning of fishing

The earliest humans gathered resources from the shore by hand. This limited the extent of human influence on marine biota to shallow areas and slow moving or static prey such as mussels and seaweeds. Nevertheless, there are accounts of aboriginal humans denuding shorelines to the extent that settlements were abandoned due to lack of food.[1] The innovation of tools such as hooks (8000 BC) gave humans access to fast moving prey such as fish, and this technological advance marks the move from 'gathering' to 'hunting or capture' of prey species. Nets and spears were used by the Egyptians as far back as 2000 BC, and the use of fish traps in Europe dates back to at least 300 AD.[2]

The discovery of the means to preserve fish by wind-drying or salting marked an important shift in patterns of exploitation. Without a means of preservation there was little point catching more fish than could be consumed or traded within a day or two after slaughter. However, preservation meant that large quantities of fish could be caught, stored and traded without the risk of the product degrading.

The start of intense exploitation

Mark Kurlansky's book 'The cod'[3] describes very elegantly the social and historical importance of wind-dried Atlantic cod in the 10th Century expeditions of the Vikings to North America via Greenland. By the 16th Century a vast fleet of ships from the Basque region of Spain, Portugal and England were catching cod with hook and line off the east coast of Canada and selling the dried fish back home. The subsequent recent demise of these particular Atlantic cod stocks is one of the best-documented cases of single-species over-exploitation in the marine environment.

The impact of technology

Until the industrial revolution, vessels were powered by sail, which restricted the power to tow and handle fishing gear such as trawls. In the late 1870s, steam engines increased the towing power of vessels, enabling them to fish with larger nets such as otter trawls. Steam power also increased the safety and speed with which vessels could get to and from fishing grounds. The 1920s saw the advent of new gear designs that enabled fishermen to drag nets over rough ground and begin to catch fish such as cod, haddock and flatfishes. In the 1950s, refrigeration extended the range and duration of fishing trips beyond regional waters.

Other inventions such as echo-sounders, VHF radio, sonar and increasing vessel size have either increased fishing efficiency or safety, enabling new and remote fishing grounds to be exploited. This is known as 'technical creep' in fisheries science jargon, and is a relentless evolutionary process that fishery managers need to account for in their attempt to limit fishing activity to levels that stocks can sustain.[4]

Nets and spears were used by the Egyptians as far back as 2000 BC, and the use of fish traps in Europe dates back to at least 300 AD

The science is all wrong! Isn't it?

Fishery science has a long history. The International Council for the Exploration of the Sea (ICES) was founded back in 1902. This organisation has representatives from Europe, Russia, the USA and Canada and generates scientific advice upon which decisions regarding annual fishing quotas are based in Europe. Up until about 1970, ICES science was focused mainly on answering the questions: 'How many fish are there in the sea; and how many will there be next year and the year after?'

These are difficult questions to address. If fish were like zebra, we could simply count most of them from a small plane with minimal error in our estimate of the population size. But fish live in the sea which makes direct observation almost unfeasible for the questions we need to address. There are two main ways in which fishery scientists get their data. Firstly the fish landed at ports are sampled to estimate how many fish are being killed each year at sea by fishermen. However, market sampling doesn't tell us how many fish were thrown back overboard because they were

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too small or illegal to land when the fishermen had run out of quota for that species. In addition, fishermen are very selective in their choice of fishing spots, so don't 'sample' the entire population. This means that scientists need to do additional surveys that are deliberately designed to include the areas the fishermen don't like. This is why fishermen often complain that the scientific advice is wrong - 'the scientists are fishing in the wrong place'. However, it is easy to understand how this misperception has occurred when you understand the behaviour of fishermen and fish.

Fishermen tend to fish the same grounds year after year, and we know this is the case from satellite tracking devices that are legally required to be fitted to vessels in Europe.[5] There are several obvious reasons why fishermen behave in this manner. Firstly, fishermen return to areas that they know yield consistent catches of high value. Secondly, any fishing activity that involves dragging nets over the seabed runs a risk of the gear becoming snagged and capsizing the vessel. Numerous fishermen have lost their lives in this manner. Not surprisingly fishermen tend to prefer fishing in areas where they have a good knowledge of the seabed. Fishing in new, unknown areas is fraught with risk and danger. Fish tend to aggregate around particular types of seabed or oceanographic features, such as fronts, where their prey occurs in high abundance, or where fish gather for spawning. However, when the population size of those fish is high, the competition for food or mates will cause a proportion of the population to spill out into less favourable areas where there is less competition. So when scientists find fish in a greater proportion than at sample sites, we know that populations are high.

Unlike scientists, fishermen only fish the areas most attractive to the fish. As a result, even when fish population size is low, these attractive areas remain full of fish. This explains the mismatch between the observations of fishermen and scientists. For this very reason, there has been a huge effort to improve the dialogue between both parties so that we can understand each other better and work together.

The inconvenient science

The problem with any population survey is that it is never perfect and there is an associated level of error or uncertainty. In other words at the end of each year we can say that there are 50,000 tonnes of cod of reproductive age in the North Sea plus or minus 10,000 tonnes. In other words there could be as many as 60,000 tonnes of reproductively viable cod, but more importantly there could be as few as 40,000 tonnes. At present, the cod stock in the North Sea is at a very low level. Fish such as cod produce millions of eggs because the odds of survival of the eggs, larvae and juveniles is extremely low due to their numerous predators, and the fluctuations in environmental conditions that have to be just right for

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good survival to occur. When the population level is low the probability of cod surviving to the point where they can be caught and landed by the fishery is low. In these circumstances we should adopt a precautionary approach to quota setting and use the lowest value of our estimate of the population size to base management decisions on. However, in the past, politicians have used this margin of error to either discount the quality of fisheries science or to justify a less precautionary approach that takes into account 'social and economic' conditions. Such an approach merely dilutes politically unpalatable action and compounds the problem for future years. The past misuse of 'scientific uncertainty' was one of the reasons for the infamous cod stock collapse that happened in Canada in the mid 1990s.[6]

Thankfully, politicians in Europe are now adhering more stringently to the scientific advice and this has resulted in a small but positive improvement in the cod stock status in the North Sea. Nevertheless, there is a long way to go before we can rebuild this stock to a level where it is less vulnerable to environmental shocks and recruitment failure. In addition to the fishery failures around the World, there are now increasing numbers of examples of fisheries successes, many of which are accredited by the Marine Stewardship Council as sustainable fisheries.[7]

The sight of a row of dugout canoes with a large European factory trawler in the background is hardly edifying

The wider ecosystem effects of fishing

It would be fair to say that compared to seals and dolphins, worms are unloved by the general public. However, worms, clams, prawns, sea urchins and corals (to name but a few) that live on the seabed play a vital role in the marine ecosystem by capturing food from the water column above, and then processing it into the sediment through defecation. Here the microbial community converts this material back into essential nutrients and other compounds that are cycled back into the water column and thereby maintain primary production by phytoplankton (the base of the food chain).

Back in 1985, Dutch scientists reported that notable seabed communities of reef forming worms had disappeared. They suspected that trawl fisheries were to blame. Since then, the consideration of the wider ecosystem effects of fishing led scientists and conservationists to conclude that we need to adopt an 'ecosystem based approach' to fisheries management. In other words, it is no good simply focusing on the numbers of fish in the sea, we need to consider how fishing activity affects worms and clams on the seabed, as well as birds and mammals like seals.

All fishing activities have some impact on the marine environment; the key issue is understanding whether that activity is sustainable in this context and how we might improve the fishing technique to reduce its environmental footprint. Towed bottom fishing gear used to catch haddock, plaice, scallops and other bottom living fishes, has attracted negative attention because of the disruption it causes to the seabed. However, in some habitats (storm battered shallow sandy seabeds) the additional disturbance created by trawls is relatively minor, whereas in living habitats such as horse mussel reefs, the impact of fishing can last in excess of 5-15 years.[8] The management solution is simple enough, avoid sensitive habitats or use more environmentally friendly gear such as fish traps, or long-lines. However, the majority of the European seabed is not mapped with sufficient detail to inform these simple management measures. Without such a map it is difficult to know just how effective closing areas of the sea to fishing might be. Having access to such basic information has never been more urgent in Europe given the member states' commitment to develop networks of marine conservation zones (marine protected areas) by 2012.

Out of sight, out of mind?

Each maritime nation has legislative responsibility out to 200 nautical miles from its shores. However, beyond this boundary in the centre of the World's oceans is a zone where only international law applies. It is here that much of the worst cases of illegal, unregulated and unreported (IUU) fishing occur. Enforcing the law at sea is logistically difficult, and while the FAO has worked hard to end the market for fish from IUU fisheries, this requires international collaboration and compliance which can be hard to enforce. Perhaps a more thorny issue for Europeans is the activity of our fleets in foreign waters off African states and elsewhere. With fewer fish for our over-capitalised fleet, the EU has paid for concessions to fish the waters of cash-hungry developing countries. However, the sight of a row of dugout canoes with a large European factory trawler in the background is hardly edifying.

Light on the horizon

With world population growth set to demand an additional 40 million tonnes of protein from marine sources by 2030, we must rebuild wild fish stocks, and conserve the biodiversity upon which these depend. Mariculture will have an increasingly important role in this food provision, but only if we can reduce its dependence on fish meal.

Positive signs

While there is much to be concerned about in world fisheries, there are signs that we are beginning to get it right. Years of decommissioning across Europe means that some fleets are now approaching the appropriate levels to permit sustainable harvesting. Fisheries across Europe and elsewhere are lining up to be put through the Marine Stewardship Council assessment for accreditation as sustainable fisheries. Accreditation provides consumers with the confidence that they are buying fish from sustainably harvested fisheries. Fishers' attitudes towards these issues have radically changed for the better over the past five years, prompted by the intervention of multiple retailers. Marks & Spencer, Waitrose, Asda and Carrefour (to name a few), have stated clearly their policy to source as much of their fish as possible from certified sustainable fisheries. This approach has put the responsibility on fishers to meet the required standard if they want to sell into this market. Buying certified sustainable fish and shellfish rewards those fishermen whose behaviour meets these criteria.

At present there are insufficient certified fisheries to meet our demands, so we need better labelling and in-store information to enable consumers to understand who caught their fish and how it was caught, and preferably how fishers are working to reduce their environmental footprint. Everyone can have a role to play in helping to achieve sustainable use of this amazingly healthy source of food and protein, but we need better information on which to make informed decisions. ■

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The ethics of fish and fisheries

Mapping the landscape

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Sustainable management of the oceans and fish stocks has been the subject of increased international attention since the seventies. The concern is not only about breakdown of fish stocks, but about other environmental impacts of overfishing, as well as about social and economic consequences. Since the seventies new worries have been added, for instance about fish farming and its consequences for naturally occurring fish stocks, and about fish welfare.

An academic response to these growing worries and concerns can be found in fishery ethics - a still small, but growing field.

Fishery ethics is a complex field encompassing a great variety of ethical issues that need to be treated systematically and comprehensively. It includes several areas of practical ethics, environmental ethics (for instance related to the issue of sustainable management of aquatic ecosystems[1]), and animal ethics, for instance related to fish welfare consequences of catch methods.[2] It also includes social justice, with regard to the distribution of marine goods across different groups of people.[3] None of these areas of ethics have primacy over the others and debates on ethically acceptable fishing must include consideration of all these.

Moreover, in debates on fisheries, a number of ethical principles are referred to. Some claim that decisions in fisheries must simply be taken on the basis of utility values. Others refer to inherent values, like respect for the

	Justice	Dignity	Wellbeing
Fishermen	Equal right to professional practice for different categories of fishermen	Right to control of their work situation and respect for their occupation	Safe and secure workplace and income, as well as stable social situation
Fishing industry	Equal terms for this industry as for the fisheries and other marine occupations	Acknowledgement for their place in the value chain; being heard in negotiations	Stable deliveries from the fisheries; a part of the welfare goods obtained in the value chain
Other users of the sea and coast	Equal access to the resources	Respect for their needs and their use of the coast and sea	Access to welfare goods directed at marine activities as other users
Society as a whole	Equal living conditions for urban and rural societies	Freedom to manage resources for the best for the society as a whole	Income from marine activities
Consumers	Fish products of good quality available for different consumer groups	Opportunity for the consumer to chose and influence the production of food products	Guaranties for healthy food in adequate amounts
Future generations	The conservation of marine environment and resources so that future generations will have the same opportunities we have	Knowing that earlier generations acted with respect for their welfare	No activities that threaten their health or living conditions
The biosphere	The diffusion to a viable level of environmental burdens over a variety of ecosystems	Harm and abuse of nature as limited as possible	That fish and other animals are not exposed to unnecessary pain

Fig. 1. A generic ethical matrix for fisheries issues[5]

Welfare of farmed fish

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Most fish farming is highly intensive. Large numbers of fish are confined in a small area at high stocking densities. The British aquaculture industry has made some progress in tackling welfare problems but, in Britain and elsewhere, intensive fish farming continues to cause serious welfare problems.

One researcher recently noted: "stocking density is a pivotal factor affecting fish welfare in the aquaculture industry, especially where high densities in confined environments are aimed at high productivity".

The two main species farmed in Europe are Atlantic salmon and rainbow trout. High densities in these species can lead to fin damage, stress, increased susceptibility to disease and a deterioration of water quality.

Intensive aquaculture frequently exposes fish to a range of stressors such as handling (particularly when removed from the water), grading into different sizes, vaccination (with adverse side effects), transport, protracted starvation before slaughter and removal of eggs and sperm from fish for breeding. Although alleviated to some degree by good practice, these stressors are inherent in intensive aquaculture.

Selective breeding for fast growth rates and the use of artificial lighting to enhance productivity boost the intensification of aquaculture. Little research has been undertaken into their welfare implications. Furthermore, these practices have led to health problems in farmed terrestrial species.

Waiting in the wings is another threat: genetic engineering. Serious deformities, breathing difficulties and reduced swimming abilities have been documented in salmon genetically engineered for accelerated growth. At present confined to the laboratory, we may yet face a struggle to prevent transgenic fish being farmed.

Biotechnology is already used in aquaculture. Sexually mature fish undergo changes that can reduce flesh quality, so farmers prevent early sexual maturation in some species through the production of all-female stocks (in several species females mature later than males) or triploid fish.

Triploidy produces sterile fish by subjecting newly-fertilised eggs to heat or pressure shock. These fish are induced to have triploid (three) sets of chromosomes instead of the usual diploid (two). Sex reversal involves feeding the male sex hormone to young female fish. Triploids are susceptible to a range of health problems, including spinal deformities, eye cataracts and lower survival rates. Sex reversal is incompatible with respect for the dignity and integrity of sentient beings. Sex reversal is common in the farming of rainbow trout and a proportion of them are also triploids.

Confining fish in sea cages exposes them to dangers from which, in the wild, they would simply move away. In cages fish are unable to escape hazards. Moreover, salmon are genetically programmed to spend much of their lives swimming great distances at sea. Is it ethically acceptable to constrain this behaviour by confining them in cages?

Given the range and the nature of the welfare problems involved, it is arguable that intensive aquaculture has no place among ethical systems of food production. At the very least, substantial improvements in welfare are needed. ■

inherent value of nature or traditional ways of life. And some propose that the justice principle is the most basic ethical principle and the real question is about the distribution of marine goods and benefits.

The ethics of fisheries is also complex in the sense that there are a number of affected parties. Fish, ecosystems, fishermen, the fishing industry, consumers, the coastal population, even nation states, are affected in fisheries issues. This means that all these should be considered when discussing the ethics of fisheries. But even a single category like 'fishermen' is extremely diverse, ranging from the large industrial fishing vessels in the Antarctic, to small family owned fishing boats along the coast of Newfoundland, Norway or India. Understanding the values and perspectives of the different affected parties can therefore be a challenge that may only be met by involving them in the discussions (at least by proxy). Such involvement may also bring out important facts that otherwise might be neglected.

Finally, fishery ethics is not only about ethical theories or principles, but about facts and science. When making ethical judgements about fishery issues, good factual understanding is required. And as scientific uncertainties about stock sizes abound, and the environmental consequences of different forms of fisheries emerge, practical ethical judgements on real-life cases must involve a broad range of expertise. Making ethically acceptable decisions on, let's say, total allowable catch quotas, catch technology development, exploitation of new kinds of resources in the ecosystem, distribution of quotas and fishing rights, or questions concerning aquaculture, requires the involvement of a wide spectrum of expertise.

The ethics of fish and fisheries

One should also take into account that even experts in the same field may disagree about the facts or the certainty of the facts.

A pluralistic approach is important for many reasons. On one hand, seeing fisheries issues simply from the point of view of, say, animal ethics or social justice, will most likely limit the discussion or the judgement in a way that may have unintended side-effects. On the other, seeing the issues simply as scientific, for instance in terms of marine biology, or in economic terms, will certainly deflate a judgement that is inherently value laden.

Taking into account this comprehensive nature of fishery ethics, it may be useful to structure the debates so that the manifold relevant values and facts are included systematically. In a Norwegian project from 1999/2000, a systematic review of ethical aspects led to the construction of a so-called ethical matrix for fisheries issues.[4] See Fig.1 on p.8 for a generic ethical matrix for fisheries issues.[5]

This ethical matrix was developed in a deliberative process (a value workshop) with representatives of the different affected parties, and a number of other participants. The concerns included in the matrix were those identified as the most important ones. The matrix functioned as a value platform to assess the ethical consequences of introducing a tax on the usage of the ocean and coast (which in principle is a common resource, not only for the privileged few with fishing concessions), and as a starting point for identifying the morally relevant facts. It can also be used for assessing a number of other issues.

Whether or not one uses a systematic tool like an ethical matrix to facilitate the discussions, the important point is that value issues related to oceans, fisheries and fish is addressed in public discussions with a broad range of stakeholders, researchers and interested lay people. The oceans are our common heritage and we all have a responsibility for ensuring that they will be passed on to future generations with at least as many qualities as we enjoy today. This is our duty as citizens, consumers, fishermen, industrial leaders, researchers and political authorities. Decisions that may have such far-reaching consequences as the potential collapse of fish stocks must not be made behind closed doors, but be subject to broad public debate. This is a matter of democracy and justice, because the ethics of fisheries is also an ethics of mankind and its future.

Fish ethics is not an academic discipline with its own conferences and journals. It is a part of food ethics in general, but a part that has been paid scant attention. Perhaps the reason is that people do not live underwater, and do not immediately see the consequences of human activities on marine life. Moreover, while many people live near the sea, most inhabit big cities rather than in the coastal communities that have been entwined with the ocean for centuries. One may still hope that with time and appropriate action fish and fishery ethics will engage more people with the issues, both among researchers and the public. ■

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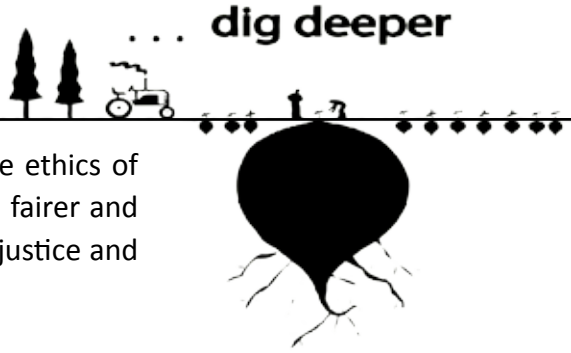
Know enough about the food on your plate? . . .



The Food Ethics Council provides independent advice on the ethics of food and farming. Our aim is to create a food system that is fairer and healthier for people and the environment, and where social justice and ecological sustainability are the norm, not the exception.

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- Help find a way through challenging, controversial issues, using dialogue and research.
- Build tools to put ethics at the heart of decisions about food in business, policy and civil society.

We have worked on issues ranging from the power of supermarkets, food poverty and workers' rights, to air freight, road pricing, meat and climate change, and water scarcity.

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The global fish trade

Re-learning how to fish

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'Give a man a fish; you have fed him for today. Teach a man to fish; and you have fed him for a lifetime.' It is a well known proverb, but the industrialisation of fisheries now means that the ability of wild fisheries resources to feed a man for a lifetime is compromised.

Since fishing fleets were industrialised in the 1970s to the present day, the proportion of overexploited and depleted stocks has increased 2.5 times and the proportion of stocks offering potential for higher catches has declined from 40% to around 23%. This same story can be found around the world; in the Gulf of Thailand, the catch per hour fell from 250kg in 1961 to 18kg in 1999. According to a recent study by the University of British Columbia, fishing activity along the northwest Atlantic African coast has tripled since the mid-1970s, during which time the demersal (bottom living) catch has remained at two million tonnes. By 2002, the biomass of demersal stocks in the region had been reduced to a quarter of 1950 levels. Furthermore, current catch levels have only been maintained by fishing harder and targeting smaller, less-valuable species.

Recent assessments show that the biomass of the oceans' large and valuable predatory fish (such as cod, tuna, grouper and shark) are estimated to be down by 90% compared to 50 years ago. In addition, the ecosystems that support these stocks are becoming increasingly degraded: 88% of coral reefs in Southeast Asia are estimated to be at risk from human damage.

The cause of these alarming trends has been rapidly growing demand for fish fuelled by population and income growth and health concerns that have increased many fish prices and provided economic incentives for fishers to maximise their catches and increase efficiency. Maximum catching capacity, as characterised by the size and power of vessels, selectivity of gear and the navigation technology and skills of skippers, experienced a 9% annual growth rate between 1965 and 1995.

Growing demand has also resulted in an expansion of global fish trade, with over 50% of trade originating in developing countries. Net receipts from fish trade in developing countries are about US $18 billion; greater than the net exports of all other primary commodities together (including coffee, rice, tea and bananas). In West Africa, fisheries exports can represent up to 15-17% of GDP and 25-30% of export revenues. However, such demand also puts increased pressure on wild resources and now threatens the contribution of fisheries to poverty reduction and nutritional security in poor countries.

Overexploitation of local fish stocks threatens the nutritional status of major population groups, particularly the 400 million people from the poorest African and South Asian countries, for whom fish products constitute at least 50% of their essential animal protein and mineral intake. Decreasing catches also reduce critical foreign exchange earnings from fish exports and fisheries agreements, on which the poorest developing countries rely. Small-scale fishing communities are faced with an array of serious problems that compound the effects of a decline in income from fisheries, such as a lack of alternative sources of employment, rapid population growth, migration, displacement from coastal areas, tourism, pollution, environmental degradation and conflict with large commercial fishing operations.

In West Africa, fisheries exports can represent up to 15-17% of GDP and 25-30% of export revenues

The current status of many fish stocks and fishers ultimately reflects the performance of fisheries management institutions, indicating that there are fundamental flaws inherent in the governance of the sector. More than any other cause, poor governance has enabled overfishing to continue by failing to properly address issues of open access, overcapacity, subsidies to the industry, IUU fishing, compliance and enforcement, and small-scale involvement in fisheries. While international instruments have already identified most of the actions required to restore and maintain the health of the world's fisheries, competing interests and a lack of political will at the national level have severely hampered their effectiveness.

Numerous international and domestic fisheries studies indicate that overcapacity and excessive fish harvesting are prevalent in many open access and common property fisheries, regardless of the scale of fishing or type of fishery. Conflicting notions about whom wild stocks belong to has undermined any sense of ownership of the resource by those who fish it, leading to incentives for individual boats to catch the largest possible share of the total stock. Having failed to achieve good fishery governance through strong state control, there is now a move towards privatisation in developed countries and community ownership in developing countries - termed 'rights-based fishing' - thereby

How small-scale fisheries can contribute to sustainable resource management

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Namibia's nutrient-rich fishing grounds guaranteed that when Namibia gained independence from South Africa in 1990, it inherited a heavily exploited fishery. The new government's policy approach that followed ensured the sustainable management of fisheries and maximized the benefits for Namibians. Today, fish stocks have stabilised, the fishing sector has increased its economic contribution to 26% of merchandise exports and fisheries employment more than doubled between 1991 and 1998.

Fisheries reform in Namibia has recaptured a substantial proportion of the economic loss previously associated with industrial fishing and highlights the crucial role of good governance to sustainable development. When well managed, the fisheries sector in developing countries can make an important contribution to poverty reduction, food security and wealth creation. If not, stocks can be depleted and the incomes of those who use the resource are reduced.

Increasing resource-user involvement in managing aquatic resources is critical to fisheries reform. Stakeholder involvement in planning can improve compliance with international regulations and empower socially and politically marginalised small-scale fishing communities. An FAO study in Senegal found that only when stakeholders feel they have influence over and partial responsibility for fisheries management, are they inclined to initiate or conform to management mechanisms.

This assumes that for fisherfolk the future status of fish is one of the most significant threats to their livelihood security, and that they have the organisational capacity and political power to adequately defend their rights. Where fisherfolk are poor, vulnerable and marginalised, these may not be true.

Development programmes like the Sustainable Fisheries Livelihoods Programme (SFLP) – a partnership between FAO, DfID and 25 countries in West Africa - have placed greater emphasis on addressing all forms of poverty found in the sector, believing that to make devolved fisheries management work, the factors that most immediately and directly threaten the sustainability of fisherfolk's livelihoods must be addressed. Often these factors are not related to fishing activities and the status of the resource. So securing access to fish is important but doesn't protect fishers and their families from malaria, HIV/AIDS, waterborne diseases, accidents, theft, pollution or lack of access to alternative livelihoods.

Providing development support to fishing communities in the form of better access to social services can help achieve poverty reduction and facilitate the adoption of responsible fisheries practices.

Many fishing communities lack the power, education and social institutions to self-organise and articulate demands, and weak political representation leads to their marginalisation in traditional development processes.

The SFLP has helped fisheries communities strengthen the capacity of co-management and fishing organisations, define property rights regimes, provide training and support for the diversification of livelihoods, empower women, and strengthen human rights. These include legally-mandated rights to decent working conditions, gender equality, children's rights and the rights of migrants and other potentially vulnerable groups.

Development that addresses the needs of the small-scale fisheries sector, as the people involved perceive those needs, provides an incentive and capacity for true reform, bringing both sustainability and profitability. ■

encouraging the preservation of the stock for the future. However, there is a limit to the extent to which all resources can be privatised in this way.

One of the great challenges to achieving sustainable fisheries involves the management of fishing capacity in such a way that it avoids the economic inefficiency and compromised resources associated with overcapacity. For decades, fisheries policy aimed to expand fishing capacity and only relatively recently have countries acknowledged that a profitable yet sustainable sector requires changes in existing institutional and regulatory frameworks and a more participatory role for the private sector. Traditional governance has focused on the resource rather than on the people such as fishers, other resource stakeholders and the community. Resource managers' actions to deal with excess capacity as a major cause of resource overexploitation and environmental degradation reflects a one-sided policy response to the problem. Instead, an increased focus on people-related initiatives to help them generate new policy options is required, particularly in small-scale fisheries in developing countries where the problem of reducing excess capacity is much more complex than in industrial, developed-country fleets.

A lack of effective sector governance has often been exacerbated by inappropriate policies, such as continuing to subsidise fleets, mostly

The global fish trade

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in industrialised countries. Subsidies to the fisheries sector, estimated by the World Bank to be between US$12-20 billion per year, have been an important driver of the current overcapacity and subsequent overfishing. Industrial countries directed these subsidy-supported fishing fleets to operate in developing countries, often in direct competition with local fisheries. For example, during 1993-1997, the EU fleet caught over 600 000 tonnes of fish per year (11% of their catch) in non-European waters. In 1998, Japan, Korean, Taiwan and the United States caught about 1.8 million tonnes of tuna in the 200-mile Exclusive Economic Zones of the Pacific Island countries. For developing countries, income from access fees for EU countries is low compared to the value of the catch as a result of their weak negotiating position. In addition, many fishing agreements are heavily subsidized by industrial countries. For example, for some EU agreements, the EU paid 83% of the license fee while the vessels themselves paid only 17%.

Where management systems are corrupt or weak, the value of fish is high and where enforcing laws is difficult, such as remote seas or developing countries, illegal, unregulated and unreported (IUU) fishing threatens the sustainability of fish stocks through overexploitation. IUU fishing undermines fisheries science, prevents governments from monitoring catches and developing good management strategies. It also deprives local fishermen of resources and creates conflict between them and those fishing illegally. Illegal boats may ignore safety practices, labour rights and can cause revenue loss to the legitimate industry. A study by the UK Marine Resources Assessment Group in 2005 estimated that the global value of illegal fishing is between US$ 4-9 billion annually. This is significant for developing countries in particular where IUU fishing in sub-Saharan African EEZs (calculated as the first sale value of illegally caught fish) is worth almost US$ 1 billion.

An inability to enforce regulations has been the downfall of many fisheries, and small-scale fisheries with large number of fishers widely dispersed in inaccessible places are particularly resistant to top-down enforcement. Lack of stakeholder dialogue and low levels of education in many fisher communities contribute to conflict and failure to reach stable long-term solutions to the allocation of resources. Certainly in small-scale fisheries, enforcement is often closely linked with issues of rural development and unemployment and therefore needs a radically different approach to enforcement and compliance.

The lack of effective governance of domestic and international fisheries has failed adequately to protect fish stocks from the pressures of increasing demand and resulting investment in the sector. Instead, current benefits have been identified at the expense of future costs, leaving long-term conservation aims sacrificed for short-term gains. This has proven a challenge to existing governance structures, but much depends now on the success of efforts to improve governance. Teaching a man to fish in a well governed sector will ensure that our fisheries last more than just a lifetime ■

Pirate fishing

Stealing from the planet, robbing from the poor

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Throughout the world, illegal, unreported and unregulated fishing operations (IUU) – pirate fishing - are undermining attempts at sustainable fisheries management, causing extensive damage to the marine environment and jeopardising the food security and livelihoods of coastal communities.

The social, economic, and environmental impacts of IUU are huge, with pirate operators stealing from some of the world's poorest people. The countries bearing the greatest economic costs from illegal operations are in the developing world.

The seas off the coast of West Africa are particularly susceptible. These waters support some of the world's most productive marine ecosystems, upon which millions of people depend for food and livelihoods. But with countries lacking the resources to properly police their territorial waters IUU fishermen are quick to exploit the situation.

Vulnerable war-torn or post-conflict nations including Sierra Leone, Angola, Liberia and Somalia are targeted by IUU operations. In 2005 the UK Government estimated that IUU fishing costs countries across Sub-Saharan Africa almost a billion dollars a year in lost revenues[1], equal to 19% of current landed value; this figure is likely to be an underestimate.

In an all too familiar story of global economic forces, it is generally fishing vessels and companies from the developed world that are responsible, and largely to European and the Far Eastern markets that this illegal catch flows.

IUU operators exploit the financial and human misery that prevails in many of these countries to operate at the lowest possible cost. Wages are a high proportion of running costs, so IUU crews are recruited in low-income countries where lack of alternative employment, unregulated labour markets and minimal controls on working conditions exist - ensuring cheap labour. Forced to work in dangerous conditions, they can be subject to a catalogue of abuse, including lack of payment, enforced incarceration, poor food, beatings, and abandonment.

IUU fishing is bad news for legitimate fishermen too, and not just in the developing world. Underreporting of catches by authorised fishers, and unreported illegal catches, means that the catch data collected by fisheries managers is incomplete and gives a more optimistic assessment of the status of fish stocks than is true. Management decisions are therefore likely to be inadequate, and fail to conserve stocks. This can lead to the collapse of a fishery, or serious impairment of efforts to rebuild depleted stocks.

What is IUU fishing?

- Illegal fishing - vessels operating in violation of the laws of a fishery, including fishing out of season; harvesting prohibited species; using banned fishing gear; catching more than the set quota; fishing without a licence.
- Unreported fishing - fishing that has been unreported or misreported to the relevant national authority or regional fisheries management organisation.
- Unregulated fishing - fishing by vessels without nationality, flying a flag of convenience, or flying the flag of a State not party to the regional organisation governing the particular fishing region or species. It is also fishing in areas or for fish stocks with a lack of detailed knowledge and no conservation or management measures in place. ■

Fish caught by IUU and legitimate fishers are sold on the same markets, but legitimate fishers pay higher operating costs. IUU fishers are free riders that benefit from the sacrifices made by others, undermining legitimate fishers and encouraging them to disregard the rules too, creating a destructive downward spiral.

IUU operators notoriously over-fish, use illegal and/or destructive fishing gear that over-fishes target stocks, and can severely damage the wider marine ecosystem. As IUU fishermen flout rules designed to protect the marine environment, including restrictions on the harvest of juveniles, closed spawning grounds, and gear modifications designed to minimise the bycatch of non-target species, they inflict damage on seabirds, marine mammals, sea turtles, and marine biodiversity as a whole.

Quantifying the ecosystem effects of IUU fishing and distinguishing from those of legitimate fishermen can be extremely difficult, because the environmental damage inflicted by some legitimate fishing can also be significant. However, striking example of environmental damage by IUU fishing is the widespread use of bottom trawlers by IUU operators in the inshore waters of many countries. These are areas crucial for the health of fish stocks and the livelihoods of artisanal fisheries. Trawlers cause the destruction of bottom habitats, and are responsible for enormous levels of bycatch, much of which is dumped back over the side.

The scale and significance of IUU fishing led to the adoption of the UN FAO International Plan of Action

Pirate fishing

(IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing in 2012. The response to this was slow, and with a couple of notable exceptions action by the international community has been inadequate.

As the largest fish market in the world and with one of the largest fishing fleets, the EU in late 2008 faced up to its responsibility, approving a Council Regulation on IUU3 to be introduced in 2010. If properly implemented and enforced, this regulation will have an impact on the ability for IUU fishing to be profitable in some areas. However, with the continued growth of seafood markets, particularly in Asia, the fight to end IUU fishing is far from over. There is vital need for support for developing nations in their efforts to combat IUU fishing in their waters, and for international cooperation to address the drivers and shortcomings in international law that allow IUU fishers to continue to successfully operate. ■

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Fisheries management

Where there's a will

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It is widely accepted that food security is a serious challenge facing the world. It is a problem driven by substantial global population growth and changes, particularly in Asia, where the consumption habits of large numbers of people moving out of poverty are rapidly changing.

The estimate of world population demands for food indicates that it is set to increase by 50% by 2030. In this context, marine fisheries are extremely important as they provide a significant proportion of high-quality protein, particularly in the developing world. But as demand for fish protein continues to increase, a large number of the world's fish stocks are already depleted and not producing their maximum sustainable yield. FAO estimates that worldwide about 25% of fish stocks are depleted or recovering,[1] and for some areas and fish groups, such as West African demersal (bottom living) fish this proportion rises as high as 60-80%.[2]

One of principal problems is overcapacity – too many fishing vessels. This was originally caused by subsidies given to build new vessels in the 1960s and 1970s, and in some countries such subsidies persist. Overcapacity means that there is simply too much fishing power in the fleet compared to the quantity of fish.

Attempts to reduce capacity can often be characterised as 'too little too late'. One example is in European fisheries, where over the last 15 years various buyout initiatives, which essentially use public money to remove vessels (fishing capacity) from the fleet, have resulted in an annual average reduction in capacity of 2%. But the European Commission[3] estimates that fishing efficiency has increased by about 3% per year through the introduction of new technologies – better fish finding gear and more efficient engines for instance – which means that total fishing capacity in the EU has actually increased over this time.

Overcapacity leads to fishing vessels operating at less than their economic potential, and it is a sad fact that many fishing fleets in Europe are now operating at a financial loss. They only remain in operation because they provide much-needed employment and the fish they catch feeds the wider economy.

World capture fisheries production reached 95 million tonnes in 2004, with an estimated first-sale value of US$84.9 billion[1]. In a recent report, the World Bank calculates that due to poor management and operating too many vessels on depleted fish stocks (i.e. fish stocks delivering less than the maximum sustainable yield that they could produce), the world's fishing fleet currently suffers lost economic rent in the order of US$50 billion per year. This loss is 60% of the current reported value of capture fisheries.

The cumulative loss to the global economy over the last three decades is estimated as two trillion dollars.[4] It is quite common globally for fishing fleets to be posting operating losses, and be supported simply by subsidies.

The estimate of world population demands for food indicates that it is set to increase by 50% by 2030

When fishstocks decline and fleets remain overcapacity there is a greater incentive to catch more fish than are allocated in a quota. This exacerbates the vicious circle of depleted stocks – overfishing leads to declining stocks which leads to more economic pressure on fishermen and further incentives to overfish.

Other, more blatant illegal, unreported and unregulated (IUU) fishing also occurs, particularly in the waters of developing countries, and very often by fleets of vessels registered in developed countries (so-called distant water fishing nations) which operate without licences in areas that they are not legally allowed to fish in. Such activity creates significant environmental damage through the use of unsustainable fishing practices and has wider consequences for reducing food supply, particularly for coastal communities in developing countries.[5]

In addition to reducing the fish available for the local economy illegal fishing in developing countries often leads to physical conflict with local fishers, since illegal industrial vessels often use small mesh nets and fish close to shore in areas reserved for local (artisanal) fishers, discarding much of the fish that would have been kept by local fishers for food.[6] Illegal fishing vessels do not usually follow standard maritime law, including those relating to safety, employment and social responsibility. The fishermen operating on these vessels are therefore often harshly treated and badly exploited, but are driven to work on such vessel through necessity and poverty.

The level of IUU fishing is far from trivial. In a recent report MRAG, a UK-based fisheries consultancy, and the University of British Columbia estimate that global losses from illegal and unreported fishing are between $10bn and $23.5bn annually, representing between 11 and 26 million tonnes.[7] This is on top of the losses in economic rent estimated by the World Bank that result simply from bad management (above).

Additional, significant losses are incurred through the discarding of unmarketable fish.[8] Overall, one has to conclude that were the current losses

Fisheries management

due to illegal fishing, discarding and inefficient management (lost resource rent) actually recovered, the value of marine capture fisheries would probably double.

As previously mentioned, one of the key drivers for IUU fishing and overexploited stocks is that the world fishing fleet is significantly overcapacity, and has become so largely through the inappropriate use of subsidies. This overcapacity continues to be a problem because management, and particularly the control of fishing (for instance inspections and arrests following the use of illegal fishing practices), is weak. There is a clear relationship between the level of governance of a country and its vulnerability to IUU fishing. But the blame for illegal fishing lies not only with the recipient country – for not implementing strong control of fishing in its waters – but also with the companies and countries to which these vessels are registered, for not controlling their own vessels.

One final important issue is that under international law countries only have legal jurisdiction over the waters up to 200 nautical miles from their coastlines. Waters outside these zones are termed high seas waters, and are governed by international treaty. These so-called Regional Fisheries Management Organisations (RFMOs) are only as effective in managing and controlling fisheries as their members have the political will to create such management. Recently instigated reviews of their performance are showing that while they may be effective under some circumstances, when resources are highly valuable (such as Atlantic blue fin tuna) and fishing pressure is acute they suffer from the same problems as individual country fisheries – overcapacity, illegal/unreported fishing and depleted stocks.[9]

There is some light on the horizon. The gradual introduction of fishing rights, which introduce an incentive for responsible behaviour on the part of fishermen at the same time as driving fleets to become more economically efficient, is helping to control fishing and restore stocks in many of the areas in which they are introduced.

Concerted action is helping to recover fish stocks in many areas from previously depleted levels – the USA, for instance, has managed to reduce the number of its stocks which are overfished (depleted stock size) from 36% to 27% between 2002 and 2008.[10] There has been a significant reduction in illegal and unreported catches of cod from 50% to 20% of the reported catch in the Barents Sea following cooperative port state controls implemented by the States party to the Northeast Atlantic Fisheries Commission (an RFMO).

By and large we have the knowledge and the tools for fishing to make economic sense and be environmentally and socially sustainable; we just have to apply them. ■

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Feed for thought

Revealing the true cost of cheap farmed salmon

Salmon are carnivores, so-called 'tigers of the sea'. For every kilo of sliced salmon sold in a supermarket, around four kilos of wild-caught fish must first be caught, ground into pellets and fed to the farmed fish.

Critics argue that the industrial farming of carnivorous marine species is inherently unsustainable, due to the sheer quantity of wild caught fish that must be fed to salmon in the process.

Despite widespread opposition, however, the industrial farming of carnivorous species is still widely promoted by both the aquaculture industry and conservation groups such as WWF. Those promoting industrial salmon farming suggest that it offers a potential solution for consumers worried about dwindling fish stocks and devastated marine ecosystems.

In the first investigation of its kind, the Ecologist Film Unit visited the frontline of the fishfeed industry in Latin America, to document the unreported costs of this unique industry that supplies food to farmed salmon today.

Far from the glistening packets of smoked salmon on offer in supermarket aisles across Europe, the fish that are caught to feed salmon are often sourced from the other side of the world.

With over 40 fish processing plants and a vast fleet of fishing vessels, coastal towns such as Chimbote, in Northern Peru, supply much of the anchovies used to make fishfeed.

Situated in one of the world's most biologically productive ecosystems, a result of the coastal 'upwelling' that supports the proliferation of phytoplankton, Peru's waters are home to enormous schools of anchovy and other marine animals.

It is a valuable resource - the global fishfeed industry is worth around $2.5 billion dollars each year - but in Chimbote as with elsewhere, campaigners claim that the lucrative export industry comes at an unreported cost to both people and the environment.

In 2008, the Ecologist Film Unit visited Chimbote to investigate. The April 15th district is one of several low-income neighbourhoods that lie alongside the feed processing plants in Chimbote. The residents here claim that the feed plants that loom over their single-story houses are responsible for asthma, bronchial and skin problems, particularly in children, holding out their rash-covered infants to prove the point.

"We know the factories are responsible for these [problems] because when it operates the illnesses gets worse," says one young woman, holding her young child. "When the smoke comes it gets so bad we need a mask." Another says when the plants are operating the pollution is so thick you cannot physically remain on the street.

Footage shot by Chimbote residents graphically illustrates typical conditions when fishmeal plants are operational: billowing black smoke drifts through the streets, obscuring vision and choking passers-by. It looks like the aftermath of a bomb.

What is fishfeed?

Fishmeal is a protein-rich flour produced by cooking, drying and milling raw fish and trimmings. Fishoil is a by-product of fishmeal processing. Both are vital to salmon farming, and are largely derived from oily fish including anchovies, herrings and sardines. With high levels of sought-after Omega-3 fatty acids passed from oily fish to salmon, and then onto consumers, this has led to an insatiable demand from the aquaculture industry. Globally the fishfeed sector is worth almost $2.5 billion, with 400 plants producing around six million tonnes of fishflour and one million tonnes of fishoil annually. Peru is the world's leading exporter, supplying 28% of the UK. ■

Andrew Wasley and Jim Wickens

Co-founders of the Ecologist Film Unit, a unique partnership between the Ecologist magazine and Ecostorm: the award-winning investigation group that specialises in exposing the unreported costs of food production.

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"These people deserve more than to be subjected to this," says Maria Elena Foronda Farro from NGO Natura, campaigning to resolve the problems associated with fishmeal production. "It's even worse because this fishmeal is being processed for salmon that are farmed and consumed abroad."

Pupils at a Chimbote school afflicted by the industry also complain of health problems and environmental damage: "It causes fungal growths, breathlessness, we cannot breath," says one boy. Another says: "As well as making us sick it changes the colour of the ocean... we used to play years back but now it's polluted there is nowhere to play."

During a tour of dilapidated classrooms, teacher Yolanda Lara Cortez claims the industry has proved disruptive and costly. "We had to build walls to keep it [smoke] out; we used to hold classes here but the smoke, noise and pollution was so bad we can no longer use them." According to Cortez, other schools have also suffered, with up to 5,000 pupils affected by the pollution.

Gazing out on the shoreline, Romolo Loayza Aguila, a biologist from the National del Santa university, claims that research carried out clearly shows how untreated effluents from fishmeal plants are contibuting to serious contamination of the Bay of Ferrol off Chimbote's coast. He claims the impacts on the biodiversity of the bay "have been dramatic" as the area was previously "rich in species and also in biomass."

Feed for thought

According to ecological group Mundo Azul, the Bay of Ferrol is amongst the most polluted marine areas of the country, largely due to contamination by the fishmeal industry: "The plants are discharging protein, fat and oil into the bay's water, as well as contaminated marine water used during the process of pumping the fish from the ships hull to the processing plant" the group states.

They claim that this, combined with contaminants deposited by air pollution, raw sewage, and discharge from the steel industry, has led to the accumulation of a toxic layer – up to a metre thick – of un-decomposed, organic material on the bay's seabed, creating a marine 'dead zone'.

Farther out to sea, fishing chiefs and campaigners say that the sheer volume of anchovy taken for fishmeal has had negative impacts on the ocean's wider food chain, fishery spawning grounds and thus the availability of other – previously plentiful – fish species used for human consumption.

Manuel Montesa Arroyo, president of Chimbote's artasinal fishmermen association, says: "Fish is the basic food in Peru, but now there's not enough for local people... we catch less, because there are more fleets. There is [now] more deprivation as we catch less."

Arroyo says that although laws exist to prevent industrial fishing within a five-mile zone of the coast – to protect artisanal food resources – enforcement is weak and breaches frequent. In 2006, local media reportedly filmed up to 50 industrial vessels fishing just metres off the beach. According to eyewitnesses, harbour authorities took no action "because they had no fuel."

Javier Castro, who represents the industrial fishing industry in Chimbote, admits that the sector in Chimbote is "anarchic", and that frequent breaches of the law occur, with regular instances of fishing vessels manipulating satellite positioning technology to mask their positions when operating inside exclusion zones or closed seasons.

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Campaigners cite official research as evidence of the precarious status of anchovy stocks in the South-East Pacific: the Food and Agriculture Organisation is quoted characterising the Peruvian anchovy fishery as "fully fished" – meaning it's exploited to the maximum safe biological limit. In 2006, the FAO noted two main stocks of anchovy in the South East Pacific were "fully exploited and overexploited."

But the fishmeal industry maintains anchovy stocks are carefully monitored and industrial fleets controlled through vigorous enforcement. The International Fishmeal and Fishoil Organisation (IFFO), based in the UK, claims that that Peruvian anchovy fishery is subjected to "comprehensive management controls to protect the stock from over fishing." IFFO says the Peruvian government adopts a "precautionary approach" to regulating catches, with controls including closed seasons, net size restrictions, vessel licensing, catch quotas and restricted fishing areas.

It also points to the satellite tracking system – referred to by fishing chiefs – as further evidence of the framework in place to prevent overfishing, as well as the existence of strict codes of conduct for industrial fishing vessels. IFFO head Jonathan Shepherd says that Peru is an "excellent example of a country which heeded earlier warnings on overfishing, conducted extensive research and introduced controls and third party surveillance."

In Chimbote, Maria Farro acknowledges that some fishmeal processors are taking steps to reduce the negative impacts of pollution by their operations. "Six or seven are leading the way and implementing better, less polluting and wasteful practices," she says. "But plenty of others have so far refused to enter into dialogue."

Natura argues however, that ultimately fishmeal produced primarily to feed salmon and other farm animals can never be truly sustainable, as long as

Feed for thought

there is food insecurity and "human mouths to feed". Although Peruvians do not traditionally eat anchovy in their diet, critics claim that the removal of such vast quantities of biomass is negatively affecting the fish that they do eat, and this is the problem.

Yards away from Chimbote's bustling port, there lies another hidden victim of the fishmeal industry. Lying on the rubbish-strewn beach are the carcasses of six sea lions – a protected species – rotting in the sunshine. The animals are reportedly increasingly being killed by fishermen who see them as competitors for dwindling fish resources.

Sea bird colonies too are reported to be under threat because of excessive anchovy fishing to supply the fish meal industry. Mundo Azul claim that the famed guano population of Peru has dropped from 60 million birds to just to four million, a 90% loss over recent decades that threatens to collapse altogether if the ecosystems they rely upon continue to be targeted.

For John Volpe, Professor of Ecology at the University of Victoria in Canada, such examples are by no means isolated. "Salmon is not cheap. We've created a way for it to be cheap for the consumer by shifting the cost to ecosystems and social communities, who are being degraded in the name of cheap salmon."

Critics in South America claim that free trade agreements have created a system whereby producer countries bear the hidden costs for the feed and farming processes used to grow cheap salmon sold in the West: "The salmon we produce is eaten by the mouths of people in the USA and Europe, but the asshole is here in Latin America," says Jean Carlos Cardenas of NGO Ecoceanos, "the true cost of the cheap salmon you eat is being paid with the blood of our people and the health of our oceans." ■

Fish consumption

Towards fair and sustainable fisheries

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Fish stocks are valuable renewable resources that deliver huge benefits to society. Optimally managed, they provide a long-term and stable source of food, income and employment, contributing to the well-being of many people around the world.

Fisheries contribute about one fifth of the animal protein consumed by humans today and employ about 200 million people globally. According to FAO, more than 60% of global fish production comes from developing countries offering them a great opportunity to increase food security and economic development.

There is a very strong case to manage our fish resources within environmental limits and in a socially just way: But unfortunately we are failing on both fronts. The way we fish today has a negative impact on people, the health of ocean ecosystems, and the global economy. Overfishing and unfair allocation of resources are putting at risk the jobs and livelihoods of millions of people around the world.

Our management of fish stocks is framed in absurdity. While major fisheries collapse, fishing effort expands globally. Over the past decade global fish catch has remained stable and the value of our stocks has declined. We are running to stand still. The difference between the fishing operating costs and the catch value obtained has reduced significantly, making many fishing operations financially unviable. Business-as-usual could mean the collapse of all global fisheries by 2048.[1]

Fisheries are possibly the best example of under-performing global assets. The World Bank estimates the difference between potential and actual net economic benefits from fisheries at 50 billion US$/year, similar to the current value of international fish product trade.[2] These costs are not distributed homogeneously and poor nations often bear the greater burden.

Despite higher levels of governance and wealth, developed countries have failed to manage their fish stocks in a sustainable manner, increasing the vulnerability of the fishing sector and in particular fishing communities with no economic alternatives. Overfishing is the result of several failures, including poor use of public funds leading to fleet overcapacity, and decision-making processes by which catch quotas are systematically set above scientific recommendations. Moreover poor enforcement and control render most efforts ineffective, and as a result illegal, unreported and unregulated (IUU) fishing is widespread. Costs from IUU fishing in five major EU fisheries will

Fish consumption

amount to more than €18 billion between now and 2020 with 27,000 jobs lost in the fishing and processing sector in the same period.[3]

In a context of declining fish stocks and stable global fish catch, the EU and other rich nations have managed to maintain – and increase – their levels of fish consumption. This has been achieved through a combination of fish imports; targeting farther and deeper fishing grounds; and further depleting their own fish stocks.

Public funds have contributed to the build up of a fishing sector which increasingly looks ecologically destructive and financially unviable. Subsidies to target new species in high and deep seas have quickly depleted populations of slow-growth species such as sharks and orange roughy. They have also contributed negatively to a fair allocation of resources. Subsidies create uncompetitive markets through the distortion of prices and costs, and because governments in developed countries can provide higher subsidies to their fleets these are the ones that benefit most.

Payments for fishing access provided by the EU, USA, Japan, China, South Korea and Taiwan amount to about 1 billion US$ / year.[4] The EU invests about one third of its European Fisheries Fund to guarantee access in African, Caribbean and Pacific countries, mainly to Spanish, French and Portuguese vessels which account for 60% of total EU value catch in ACP waters.

These payments could be of mutual benefit - satisfying fish demand in the North and contributing to the development of fishing industries in the South - but in practice this has hardly ever been the case. Access agreements lead to excessive fishing capacity with negative impacts on the resource sustainability and on the food security of the locals.[5] Recent EU fishing agreements with West African countries did not include any catch quotas. Overall, the current set up of fisheries agreements supports a net transfer of protein and wealth from poor to richer countries.

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Changing the way we fish towards better management of resources could help capture part of the rent drain and opening the possibility to significant gains in social justice and human well-being. Reforming fisheries requires action at many levels, including active engagement of a wide range of stakeholders.

Fish, as a free food for humankind, should be managed to deliver sustainable and fair economic well-being. Any meaningful transition towards fair and sustainable fisheries will bring a significant reduction in fishing effort and capacity. This might create economic and social costs to some actors in the short term; but failing to act now will result in higher and long-lasting costs. Decision-makers need to start acting as true managers of marine resources, putting forward the long-term interest of the tax-payer versus the short-term interest of a few sectors. The time is ripe for this change of direction. ■

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Fisheries, the environment and offshore wind farms

Location, location, location

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The invisible industry

There is a general misconception that mare liberum (the Freedom of the Seas) applies in particular to fishers working in coastal waters. The common view is that access to the sea is homogenously distributed and all fishers can and do work anywhere and everywhere. So when a new structure or restriction is introduced to the coastal environment, people believe that fishermen can simply fish elsewhere.

This view is not restricted to those that have a remote and often romantic view of the small boat rural fishing industry either. In a desk-based environmental impact assessment carried out prior to the installation of underground gas storage caverns on the Yorkshire coast the consultant remarked:

'No fishing takes place in this area, though one cannot discount some small scale exploitation'.[1]

This observation was made in a region of the coast where there are numerous small inshore fishing boats and one of the biggest crab/lobster fisheries in Europe netting around £4 million a year for a community with few other industries. If the consultant had bothered to look carefully from just about any point along the coast he or she could have counted over 100 buoys, each attached to 20-30 creels on the sea bed.

Fishing occurs everywhere along this coast. But it is transient and the degree of activity is not always immediately obvious, so it can be invisible to planners – unlike the physical structure of an oil rig or sewage outfall that can be marked on a chart.

Under-represented and misunderstood

Coastal or inshore fishers work in a complex environment fraught with hazards, complex regulation, patchy distributions of their target species, exclusion zones and informal territories. These problems are exacerbated by the fact that the distance that an inshore fishing vessel can travel from their home port is limited by the speed, size and capacity of their vessels.

The cumulative impacts of these factors on fishers are often poorly understood by those outside the industry. The regulators and proponents of coastal developments are comfortable in the be-suited, jargonistic and bureaucratic worlds of legal negotiation, planning legislation and public relations.

But it's a world alien to most fishers, who as hunters earn their living by their wits, often at night and in harsh environmental conditions. They are typically highly independent individuals and naturally protective over their way of life. Unused to communicating their opinions and needs to institutions and the public, they do not always represent themselves very well in board rooms, and historically there has been no fishing equivalent of the 'landed gentry' to argue their case in the upper circles of UK society.

This is not an excuse to view them as "poor, backward, marginal and problematic, but as important contributors to the rural economy and potential focal points for market development in areas otherwise remote from the cash economy".[2] A study of rural inshore fishers in Ireland demonstrated that one fisher at sea supports about seven people ashore and that each fisher was worth an aggregated £34 000 per annum to the community.[3]

A rush to renewables

Offshore wind electricity generation is at the forefront of the UK's drive to source 15% of energy supplies from renewables by 2020.[4] As renewables contributed only 1.5% to the UK's energy demands in 2006 the scale of the task is substantial, and is leading to the designation of large areas of the sea for wind farm development.

There has been a lack of precision with regard to how different stakeholders are involved in the process. The greatest challenge for developers is engaging with fishers at the local level who do not have someone in an office with the expertise, time and inclination to review the substantial documentation associated with marine development and construction projects. This is not helped by the fact that regulators such as DEFRA have generally been much more focussed on biology and economics than the most important area of science relevant to engaging and understanding stakeholders – social science.[5]

Early decisions on wind farm locations were made using a broad brush approach and with little stakeholder engagement. The Strategic Environmental Assessment for the second round of planning allowed only four weeks for consultation.[6] And yet location is the key issue that determines impact upon fishing communities, so these time restrictions instantly reduce the scope for useful and positive negotiations with fishers. Environmental Impact Assessments (EIAs) undertaken once the sites are allocated become inherently biased towards justifying the location. This is not helped by the fact that EIAs are carried out by consultants under contract to the developer, who in practice may lack fisheries expertise or the necessary investigative resources.

Fisheries, the environment and offshore wind farms

Consequently, developers face an uphill struggle trying to convince the stakeholders with local ecological knowledge of the validity of their own reports, often based on desk-studies authored by what the fishers regard as pet scientists. Consultation meetings with fishers can often be little more than last minute box ticking exercises where frustrated and poorly informed fishers vent their fury. This allows the developer to adhere only to minimum statutory requirements, citing unreasonable behaviour on the part of fishers.

In fact, fishers are sometimes viewed by developers as little more than obstacles with no real rights of tenure who can be bought off, no matter whether paying compensation is in the interests of the community and environment.

In contrast, developers are often viewed by fishers as arrogant, devious and well connected with the institutions and regulators responsible for control of their resource.[7]

Environmental arguments

In an arena increasingly peppered with constraints and tensions, the development of wind farms will unavoidably result in displacing fishing activity in different ways depending on location. At worst, livelihoods and fishing communities are at stake if fishing opportunities are removed or additional costs are incurred to divert to alternative fishing grounds that undermine the viability of fishing businesses.

Developers sometimes cite declining fish stocks and the potential conservation benefits of exclosures as additional reasons to press ahead with wind farms, whether or not the local community objects. It is easy for developers and those that support wind farms to cite claims by environmental NGOs that all fished stocks are in decline. In reality, there is a recognised lack of data at appropriate scales for inshore fisheries to fully determine impact, and to be effective, restrictions on fishing activity for conservation purposes need to be set within the context of a coherent conservation strategy. Presently there is no such integration between wind farm and conservation planning processes.

The initial disturbance of an area during the construction phase and ensuing noise pollution caused by pile driving are of concern with regard to fish and marine mammal populations.[8] The possibility that shark species may be adversely affected by electromagnetic interference is something that scientists have also been investigating. There are, nevertheless, ways that good wind farm design could mitigate impact upon fisheries. Construction activities can be planned to avoid sensitive migratory or reproductive periods and cables can be buried or shielded to limit exposure to electromagnetic fields. In the right location and with careful design, wind farms may be able to act as artificial reefs or fish aggregation devices.

Consultation meetings with fishers can often be little more than last minute box ticking exercises where frustrated and poorly informed fishers vent their fury

Fisher safety

A wind farm array inevitably poses an increased safety risk to mariners. Fishing among turbines may seem more practical if working a limited number of lobster pots from a small boat, when compared to towing a trawl from a larger one. But there are no hard and fast conclusions on the types of fishing activity that would be compatible from a safety point of view. Sensible safety criteria must, therefore, be agreed on a case by case basis. Outside of any safety exclusion zone that is designated, it is down to skippers to assess their exposure to risk according to the local circumstances, weather conditions and fishing method employed.

Some developers prefer to automatically exclude fishers from wind farms completely on safety grounds. That is understandably not something that fishers favour! However, even when fishing activity is not possible, consideration should be given to assess whether it is safe to allow passage to access fishing grounds that would otherwise be blocked.

Lessons can be learned from the interactions of the fishing and oil and gas industries. Decommissioning (or recommissioning) in particular needs to be carefully considered now rather than in 20 years time. The stakes for the environment and fishing industry are likely to be higher as the direct ecological and spatial footprint of wind farms is so much larger. The key issues for all concerned with wind farms, which were less significant with the oil and gas industry, are location and access, and it is these that require real stakeholder involvement and proactive decision-making which takes effective account of the sensitivities and needs of fishing communities. ■

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The Kashagan oil field

A case for undersea oil exploration?

Darek Urbaniak

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As the era of 'easy oil' - conventionally explored and extracted from onshore fields - comes to an end, energy companies are expanding their operations into ever more extreme geological, climate and environmentally sensitive locations to sustain production.

This issue is slowly climbing the political and environmental agenda, but oil companies have been exploring and developing other undersea (offshore) oil fields for a number of years. One such case is the development of the giant Kashagan oil field in Kazakhstan.

Originally discovered in 2000, the Kashagan field is the world's largest oilfield to be found since the late 1960s. At its peak, it is expected to produce 1.5 million barrels of oil per day - nearly 2% of current world output - and make Kazakhstan one of the world's top oil-producing countries.

The field is located in the shallow waters of the north Caspian Sea where the project has been beset with technical challenges. Years of delay to the start of production, initially planned for 2005, are proof of a lack of available technology and knowledge to meet these challenges, and safely develop oil fields in such offshore conditions, despite the fact the operation is run by the world's largest and most experienced oil companies including Shell, ExxonMobil, Total and ENI.

Besides these engineering problems, the Kashagan crude contains unusually high levels of sulphur (110kg of sulphur per tonne of oil) and around 40 other toxic pollutants such as highly poisonous mercaptans. With these technical, geological and chemical conditions, exploration of the field poses a serious threat to humans and wildlife and is likely to result in catastrophic impacts on the fragile ecosystems of the Caspian Sea as well as on the people living in the entire region.

Fragility of the Caspian Sea environment

The Caspian Sea is a closed aquatic ecosystem with unclear international and legal status. The absence of clear regulation makes it difficult, if not impossible, to identify responsibilities connected to oil-related activities. Such a legal vacuum increases the risk and vulnerability of the local populations and environment in the event of accidents or oil spills in the sea.

Since the development of Kashagan offshore operations started in 1999, and even before the field is fully operational, local communities and non-government observers have registered alarming impacts on the sea biodiversity; a sharp decline in fish stocks and massive deaths of marine mammals and migrating birds.

Villagers report drops in their fish catches and skin diseases on the fish they do catch, making them unmarketable. This results in severe socio-economic impacts for local communities because up to 40 percent of the population of some villages is employed in the fishing industry. A decline in fish stocks has been recorded in several local commercially valuable species but particularly in the endangered Caspian Sturgeon species which, like the Beluga Sturgeon is listed in the IUCN Red Book, and for which the Northern Caspian Sea remains one of the last spawning grounds. In May 2006, on the Kazakh coast alone, over 2,000 of these fish species were found dead.

In 2000, just one year after starting construction of the offshore facilities, over 2,000 Caspian seals were found dead on the shores. This marine mammal species, for which the Caspian Sea serves as a whelping ground, is also protected under the IUCN Red Book. And it's getting worse, with several hundred animals found dead every year.

In 2003, massive bird deaths occurred as they suffered from high concentration of hydrogen sulphide in the air. Hundreds of species of birds forage on the wetlands along the Northern Caspian coast which is major stop-over for millions of migrating birds. According to a study by the Kazakh Oil and Gas Institute, if pollution continues at the same rate the whole Caspian Sea could suffer a biological death in the coming decades.

The social impacts

Due to high levels of toxic pollutants in Kashagan oil, and technical problems associated with its extraction and processing, there is serious risk of a catastrophic accident which could kill tens of thousands of people through exposure to toxic gases. Thousands of people have been relocated in the region because of emissions and workers are already exposed to sulphate and other contaminants which have direct impacts on human neurological systems. Young people are increasingly suffering from cardiovascular and respiratory illnesses. Diarrhoea due to fish consumption, skin diseases from swimming in the sea, headaches, nose bleeds and cases of anaemia and leukaemia have been also reported.

Double standards

Despite being requested by local communities, and required under law, the oil companies have failed to make public key documents, including a full environmental and social impact assessment of their operations in Kashagan. Yet these same oil companies do release the equivalent documents relating to their operations in Europe. With ever more pressure on oil companies to extract oil from sensitive, vulnerable and legally ambiguous sites, Kashagan should serve as an example of how not to do it. ■

the big question
Has fish had its chips?

Caroline Bennett

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The perilous state of global fish stocks is of huge concern, especially for businesses such as Moshi Moshi that rely so heavily on fish. When we opened our first conveyor belt sushi bar in London in 1994 it was standard to have the highly-prized toro, the fatty belly of bluefin tuna, on the menu. By 1998 it was brought to our attention that bluefin was endangered and so we withdrew it. Now, ten years on, even if we wanted to serve it to our customers, we wouldn't be able to: it is thought that within two years bluefin will have completely disappeared from the Mediterranean.

Is there anything that can be done? We believe there is, which is why we've helped set up Responsible Fish Restaurants to try and involve other fish restaurants in a scheme we've piloted at Moshi Moshi. The scheme involves forging direct relationships with local inshore fishers, giving them a dedicated market for their fish in return for an agreement to fish with as little impact on the marine environment as possible. This scheme helps fish stocks because it does away with "by-catch," one of the main reasons for fish stock depletion: as much of 70% of fish caught is either thrown back into the sea or goes to waste once it is landed.

Fish conservation is a complex issue, and involves a deep understanding of how and when specific species of fish should be caught. Consumers can't be expected to know this. Ultimately, it is the responsibility of the fishing industry, shops and restaurants to make the decision for them. If this is done, then there is hope for fish yet.

Kevern Cochrane

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The poor status of many fish stocks and marine ecosystems and the role of fisheries in causing this has been a topic of widespread concern and debate for over a decade. While claims of doom and destruction are frequently exaggerated, there are severe problems in many regions of the world.[1]

Does this mean the imminent end of fish as part of our diets and other cultural activities? The short answer, at least for the privileged in the world's developed countries, is no. The remarkably rapid rise of aquaculture as a source of human food is one reason, and on-going improvements in management and conservation of marine resources and ecosystems in the developed world is another.

Driven by societal pressure and awareness in the fisheries sector of the threat to their own survival, such improvements are taking hold in a number of developed countries, and likely to spread to others. Depending on their broader social and economic environment, some developing nations with well developed commercial fisheries should also make further progress in effective conservation and management in the medium-term.

The answer is far less clear for many other 'have-nots' including the hundreds of millions of people in developing countries dependent on small-scale fisheries for food security and livelihoods. The absence of alternative livelihoods, low political priority and conflicts with more powerful interest groups provide a bleak outlook for many of these people, their cultures and coastal ecosystems, notwithstanding the added threat of climate change.

Contrary to the prevailing attitude in some conservation circles, the means of reducing these risks lies not in top-down, protectionist initiatives, but in full recognition of the inter-dependencies between human and ecosystem well- being, the fundamental human rights to food security, justice and equity, and the value of and need for healthy, productive and diverse ecosystems.

Only by working simultaneously for human and ecosystem well-being in an integrated, committed and effective manner, will the world as a whole be assured of fish for the future, and have the security, peace of mind and clear conscience to be able and entitled to enjoy it.

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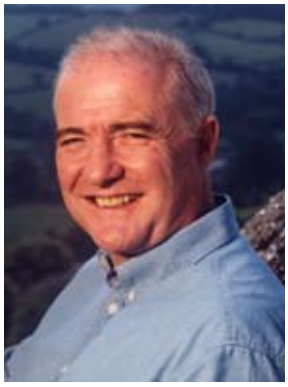
Living now through a serious recession, it is clear that no one knows what is going to happen and predictions from experts are diverting but not worth a lot. It's a bit like that with fishing - there's plenty of evidence that fish stocks globally are decreasing alarmingly; just look at the well documented case history of a whole species being wiped out - cod on the Grand Banks of America.

But it's not all bad, at least in Cornwall. There I do think our children will have fish to eat because there are signs that we are starting to manage our fish stocks better. Catches of some of the fish that I use in my restaurant, monkfish, Dover sole, brill and hake, for example, are improving. It's probably because the conservation efforts that have been made over the last few years are working, particularly the closing off of fishing grounds, the decommissioning of fishing boats and, dare I say it, the quota system.

This is much reviled because of a universal distaste for throwing perfectly edible fish back into the sea when the permitted weight of fish landed has been reached. Everyone thinks there must be a better way, but it's like Churchill saying that democracy was the least bad form of government. Quotas do, in a blunt edged way, maintain a control over the amount of fish caught. It is a very human emotion to see the black side in everything but I've always felt that fish is such an easily renewable natural resource it's not hard to achieve significant improvement. I only speak for one small place but it's not a foregone conclusion that fish will go.



Rick Stein

Owns and runs four restaurants in the small Cornish fishing village of Padstow with his ex-wife, Jill. He has written 11 cookery books, recorded several cookery series and a couple of one off documentaries. His passion is still for seafood.

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Most of the world's fisheries are fully- or over-exploited. So within the next year or two most of the fish on our plates will come from farming rather than wild fisheries.

The Soil Association is concerned about wild fish stocks, and works closely with (and helped set up) the Marine Stewardship Council (MSC). But over the last decade we've been developing farmed fish standards too, so consumers sensitive to declining wild fish stocks can buy sustainably produced farmed fish.

European aquaculture is intimately linked to wild fisheries because the main input for the one, feed, comes mainly from the other. The main UK farmed species, salmon, has been fed primarily on fishmeal and oil from wild fisheries. That's why we've made sustainability of feeds such a major focus of our work.

Fish feeds certified by the Soil Association contain fish ingredients entirely from the offcuts of fish caught for human consumption. But we want to do better, and ensure that those offcuts are only from fish that are themselves certified by the MSC. We're in a hurry, as our target date to ensure all fish ingredients in Soil Association-certified feeds are MSC-certified is the end of next year.

The quantities available should supply the small but significant organic aquaculture sector. But it will nowhere near satisfy the bulk conventional producers.

Fish feed technologists, aware of the limits on fishmeal and oil availability, have been researching alternatives that give farmed fish the nutrients they need. Recently they've proven that certain vegetable oils can substitute for fish in salmon diets.

In most salmon farming countries, large-scale substitution is well underway. The salmon grow well, and feeding them a vegetarian diet has aroused little controversy.

But the major UK retailers have shied away, mindful of consumer sensitivity here over feeding farm livestock 'unnatural' diets.

Rather than 'has fish had its chips', perhaps we should ask 'which is preferable: feed carnivorous fish a vegetarian diet; or continue to exploit vulnerable wild fish stocks to make fish feed for farmed salmon'?

Has fish had its chips?

Huw Irranca-Davies

Minister for the Natural and Marine Environment, Wildlife and Rural Affairs.

www.defra.gov.uk/corporate/ministers/irranca-davies.htm

I believe that fishermen will be landing and consumers enjoying sustainably caught fish for many years to come. Our fishing industry plays an important role in providing food for the nation, and contributes to local and regional economies and the culture of coastal communities.

The government has set out its long-term vision for sustainable fisheries. Our goal is to secure long-term benefits for the whole of society. We need to take some hard decisions in order to achieve our aims, and we are committed to working with the seafood industry to deliver an economically and environmentally sustainable fleet in the long-term.

We have to balance the need of our fishermen to make a living with the need to protect fish stocks for the future. Fishermen all around our coast are adopting measures designed to avoid overfishing and prevent huge amounts of what they catch being wasted, thrown back into the sea dead.

We will work to move Europe towards a more effective Common Fisheries Policy in future, one in which the industry and consumers can have greater confidence, and one that safeguards fish stocks, maintains a sustainable fishing industry and protects the marine environment.

The government's groundbreaking Marine and Coastal Access Bill, a world first, will introduce measures aimed at delivering a sustainable and profitable fisheries sector. It will mean more effective action can be taken to conserve fish stocks and the habitats on which they depend.

We must think and act long-term, to secure a sustainable, profitable, fisheries sector providing high-quality products. We **all** have a responsibility to manage our seas in a responsible way to get the most for today and for future generations.

The way I see it, there are three main dimensions to a critique of modern, industrialised fishing. First, the staggering impact of over-fishing on marine environments around the world makes the term 'environmentally unsustainable' seem like a complement. Second, the impact of this on our ability to feed the growing human population and especially those in the developing world for whom fish used to be a staple. Third and perhaps least commented on, the barbaric nature of fishing on the fish themselves.

The Medway Report back in 1980 established that fish feel pain. Even vegetarians often make an exception for fish ("they're just silver vegetables" is my favourite rationale) yet trawled fish die slowly through suffocation, a process that takes about four hours, while line caught fish are pulled from the water with their own body weight suspended from a hook in their mouths.

So, will fish be part of our diet in 20 years time? From an environmental perspective, I hope we still have that option, but it will only be there if radical measures are taken to protect remaining fish populations (including limiting climate change), to reduce fishing quotas and to insist that fishermen are not allowed to destroy their own livelihoods.

From a welfare point of view, in my wildest dreams modern societies around the world will have stopped consuming food that cannot be caught or produced without severe and systematic suffering. We'll eat fish very occasionally, as a special treat. It won't be on any red-lists and will have been tickled from a river near you.

Kate Rawles

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Has fish had its chips?

The world of course faces many well-publicized issues in managing its wild fish and marine resources for the long term. But in thinking about this we also have to consider the other side of the coin – aquaculture (or fish farming).

There has been a sustained campaign in recent years by some NGOs against the aquaculture industry. They cite instances of bad practice – environmental damage, illegal chemicals and social injustice – as a way of suggesting that all fish farming is bad. This is most certainly not the case.

Fish farming is not a new industry - in some countries it has been practiced for many thousands of years. But in recent decades it has been the world's fastest expanding food production industry and inevitably this rapid growth has brought challenges.

Nevertheless, by applying minimum standards of behaviour and improving science, it has been proved that fish-farming can be done in an ethical and sustainable way. There is now a strong core of responsible operators around the globe who are playing a positive role in driving industry-wide improvement.

In an era of when we face food security challenges exacerbated by population growth and climate change, aquaculture is in fact a major tool to help feed the global population. It's also a key growth industry in many emerging economies and can be a faster and more efficient means of producing food than growing land-based animals.

But above all, fish is a healthy, nutritious source of protein which should be freely available to all. Given the limited availability of wild seafood, we have no choice but to farm fish if it is not in the future to become a food beyond the reach of all but the very rich. We must all work towards ensuring this happens in a sustainable way.

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Fishing at sea for commercial gain has been a documented activity for millennia. Mankind probably first noticed fish floundering in drying lakes and river beds and in seashore pools and reckoned that, if it was good enough for birds to eat, then it was good enough for us. We've been eating Bird's Eye Fish Fingers ever since!

Every weekend a dedicated minority of the population spends time with bent nails and drowning worms, trying to land a whopper as we mimic those early primitive fishers. The idea of bringing home wild-caught food for the 'Nigella' in our lives, to put a feast on the table, is as strong a primeval urge as it ever was.

However, the majority settle for fish and chips or a scampi dish, washed down with a six-pack in front of match-of-the-day.

And it's a tiny number of men who risk their lives on heaving decks, struggling with bulging nets in the cold and wet of a winter's night, sorting, gutting, cleaning, icing and packing away, fish for the early morning markets in ports with familiar names, like Brixham, Grimsby, Peterhead. These men and their boats are fewer in number now, under the cosh of the Common Fisheries Policy, but their contribution to feeding the nation is as vital today as it was in the darkest days of the Battle of the Atlantic, when we were a nation under siege.

Will there always be a fishing industry? Yes, while there are brave folk willing to risk all in search of the catch-of-the-day and a 'Nigella' in the kitchen, keen to serve up a wholesome treat!

Fishing for solutions

Solving the $50 billion fish puzzle

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Long before the fuel price shock of 2008, the economic health of the world's marine fisheries was in decline. Economic losses in marine fisheries add up to at least US$50 billion per year. Over the last three decades, these losses total over $US2 trillion; a figure roughly equivalent to the GDP of Italy. These are conservative estimates which exclude losses to recreational fisheries and marine tourism as well as losses due to illegal fishing.

A recent World Bank report The Sunken Billions: The Economic Justification for Fisheries Reform, argues that well-managed marine fisheries could turn most of these losses into sustainable economic benefits for millions of fishers and coastal communities.

Sustainable fisheries require political will to replace incentives for overfishing with incentives for responsible stewardship. The Sunken Billions provides decision makers with the economic arguments for the reforms needed. The reforms however are not just about boats and fish but about real change in the political, social and ethical underpinnings of marine resource stewardship.

How the economic losses occur

The bulk of losses occur in two main ways. First, depleted fish stocks mean that there are fewer fish to catch, and therefore the cost of finding and catching them is greater than it might be. Second, massive fleet overcapacity - often described as 'too many fishers chasing too few fish' - means that the economic benefits of fishing are dissipated due to redundant investment and operating costs.

Global marine catches have been stagnant for over a decade, hovering at around 85 million tons per year. According to FAO, over 75 percent of the world's fish stocks are either fully exploited or overexploited and the most valuable fish stocks tend to be the most depleted. The build-up of fishing fleets, deployment of increasingly powerful fishing technologies and increasing pollution and habitat loss has depleted fish stocks worldwide.

But the focus on the state of stocks has tended to obscure the even more critical economic health of the fisheries. When fish stocks are fully exploited, the associated fisheries are almost invariably performing below their economic optimum. In some cases, fisheries may be biologically sustainable but still operate at an economic loss.

Meanwhile fisheries productivity - measured in terms of catch per fisher, or per fishing vessel - has declined, even though fishing technology has advanced and fishing effort increased. The excess fleets competing for limited fish resources result in stagnant productivity and economic inefficiency. If world fish stocks were rebuilt, the current marine fisheries catch could be achieved with approximately half of the current global fishing effort.

Hidden costs

And while many fisheries are profitable, the global picture is that fish catching operations are buoyed up by subsidies. At the global level, each ton of fish caught uses almost half a ton of fuel. Much of this fuel is subsidized and wasted in redundant harvesting effort. Further, the real income levels of fishers are depressed, much of the industry is unprofitable, fish stocks are depleted and other sectors of the economy foot the bill for an ailing fishing industry. Furthermore, the depletion of natural (fish) capital is rarely reflected in national accounts.

Successful reform must move the fishery along three interwoven axes: biological sustainability, social equity, and increased productivity

An ethic of responsible stewardship

Recovery of "the sunken billions" can take place in two main ways: First, a reduction in fishing effort would increase productivity, profitability and net economic benefits. Second, rebuilding fish stocks would lead to increased sustainable yields and lower fishing costs.

Rebuilding stocks and reducing fishing effort, however, involves political, social and economic costs in the short and medium term. The resulting benefits may take many years to flow, so reforms require a broad political consensus on resource stewardship. Consensus means developing a common long term vision of the future shape of fisheries and the key steps along a pathway to sustainability and profitability. Consensus means not only political consensus but building a responsible private sector 'from the net to the plate'.

Successful reform must move the fishery along three interwoven axes: biological sustainability, social equity, and increased productivity. The biological sustainability is underpinned by robust and independent scientific advice both on fisheries and environmental requirements. In an ideal world, the farther the decision-makers stray from the implications and recommendations of the scientific consensus, the greater should be their burden of proof and accountability – not only with respect to determining the allowable catches, but also in addressing pollution and habitat loss which make a large contribution to the crisis in fisheries.

Fishing for solutions

Strengthened, transparent and equitable fisheries tenure can provide fishers and fishing communities with incentives to manage their fisheries for optimal economic and social outcomes.

Effective use, access or ownership rights for fishers or communities are founded on an ethic of responsible stewardship. Fishing rights and fishing obligations can be seen as complementary facets of the same coin, such that a 'fishing license' could be replaced with a 'stewardship obligation'. Marine protected areas (MPAs) can be seen as a special form of tenure which has been used with some success.

A reduction in fishing effort helps rebuild stocks and increases net benefits. It can be driven through a tenure regime that creates and balances public and private benefits. The increased returns from healthy fisheries can create economic opportunities, build the necessary social safety nets and improve the livelihoods of fishers. Phasing out subsidies that enhance redundant fishing capacity and harvesting effort is a major step towards improved efficiency. Public finance may be needed to bridge the period between the reduction of fishing effort and the onset of the flow of increased benefits.

Greater transparency in allocation of fish resources and greater public accountability for fisheries management and health of fish stocks is important. Such a health check needs to take account of subsidies, environmental externalities and depletion of fish capital, and underpins any coherent policy debate on fishery reform. The frequent failure of public accountability for the health of fish stocks largely amounts to an abdication of the responsibility for stewardship. Improved transparency can also help curtail corruption, support initiatives to certify sustainable fisheries and contribute to an institutional foundation to enable small-scale producers to access markets.

Turning the tide

Ideally, improved fisheries management can secure a triple bottom line of environmental, social and economic benefits. The transition to sustainable fisheries can be swift and radical, but more often it will take a generation and requires vigilance, continuity and perseverance even when confronted with political change and short-term expediency.

Governance reforms have turned the tide in some fisheries. In Iceland, New Zealand and Norway the strengthening of the fishing rights systems was fundamental to addressing the problems facing the sector. Countries such as Peru and India are moving from physical fish production targets to social and economic targets, and in small-scale fisheries in Mexico and Philippines fishers are working with local and national authorities and NGOs to build the frameworks for sustainable fisheries, including MPAs and co-management mechanisms.

Strengthened fisheries tenure is supported by a growing number of organizations that see the need to create incentives for responsible stewardship. Promotion of 'rights-based fisheries' is part of an ASEAN resolution on fisheries and food security. In Africa the NEPAD 'fish summit' also endorsed 'rights-based fisheries'. The world's largest fishery, Peru's anchoveta fishery, is also moving towards a rights-based approach, where the fishery would pay for a social safety net for retired fishers.

Benefits for developing countries

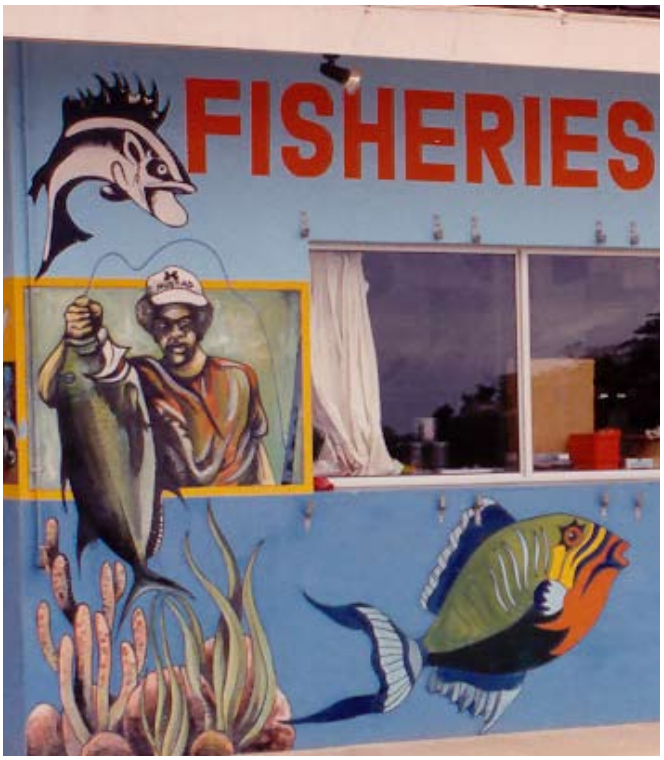
Economically healthy fisheries are fundamental not only to the restoration of fish stocks but improved livelihoods, exports, fish food security and economic growth.

Marine fishing operations are only one part of the $400 billion global seafood industry, but economically healthy catching operations underpin the sustainability of supply and the profitability of processing and distribution activities, which are major sources of employment, particularly in developing countries.

The FAO estimates that for each person employed at sea another three people are employed on shore. Fish is the main animal protein for over one billion people. It provides livelihoods for over 200 million people and 90% of these people are in developing countries.

With political will backed up by sound economic arguments, reforms can ensure responsible stewardship of our marine fisheries, and provide a sustainable livelihood and food source for generations to come. ■

The Sunken Billions: the Economic Justification for Fisheries Reform was supported by PROFISH, a World Bank partnership focused on policy initiatives for sustainable fisheries. www.worldbank.org/sunkenbillions.



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Catch Shares

Can they prevent fisheries collapse?

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Traditional fisheries management in the industrialised world creates incentives for fishermen to catch as many fish as they can, as quickly as they can. This is because fishermen lack rights to the fish that they harvest. A classic example used to be the Alaskan halibut fishery. Before 1995, Alaskan halibut was managed using a seasonal closure system. Fishery scientists and managers would determine the total number of fish that could be caught, based on estimates of what could be replenished through natural growth of the population. It was then up to individual fishermen to catch as much for themselves as they possibly could. Once the total was reached, the fishery was shut down until the following year.

Under this system, fishing for halibut in Alaska quickly turned into a fishing "arms-race". Fishermen bought bigger boats, placed more and more hooks in the water, worked longer hours and crammed their holds full of fish in the hope of getting as much as possible before the total was reached. In the race to get back to port before the market would be flooded with fish, fishermen would discard large quantities of fishing gear in the ocean. This gear would lie abandoned on the ocean floor and continue to injure and kill marine life, a process known as "ghost fishing".

Year after year, the Alaskan halibut season got shorter as fishermen fished faster and harder to get as much as they could before the total was reached. Soon, the entire year's catch was being caught in just two or three days! This created incredibly dangerous working conditions as fishermen had little choice about when to go fishing. And, nearly every year, fishermen would catch more than the total set by managers - on average 106% of the total. And this was despite the fact that the total was 115% of what scientists recommended it should be.

Change came in 1995 when the Alaskan halibut fishery adopted a form of "catch share" system. Instead of having fishermen compete to catch the total, they were each allocated a permanent percentage of the total based on their historical catch. For example, if I had historically caught 1% of the total then I was allocated 1% of the total in perpetuity. This year, next year, and every year thereafter, I am guaranteed the right to catch 1% of the total. I can sell this 1% to someone else or increase my share by buying someone else's percentage, subject to certain conditions.

The response to this change was dramatic. In 1995, the season extended from three days to eight months. Fishermen slowed down their operations drastically and only fished when prices were high and the weather was cooperative. Fishermen made more money and fewer lives were lost. Furthermore, fishermen stopped exceeding the total. Not only did they catch less than the allowed amount, some fishermen actually lobbied for the allowable catch to be reduced. This is in stark contrast to the status quo in most modern fisheries, where fishermen lobby for higher and higher total catches. Finally, ghost fishing dropped by 80% after the switch to catch shares. In 2006, the Alaskan halibut fishery became one of the few fisheries in the world to be certified as "sustainable" by the Marine Stewardship Council (MSC). In fact, according to the Environmental Defense Fund, catch share fisheries are seven times more likely to be rated "well managed" compared to traditional fisheries.

There is no denying that, using the 10% measure, something dramatic happened to catch share fisheries after they switched to this new system

The Alaskan halibut fishery is a story about the success of a catch share system. But there are just as many stories and anecdotes about the harm of catch share systems. Critics point to a variety of negative outcomes such as increased misreporting, increased bycatch, failure to control total catches, "high-grading" (discarding fish of lower market value to maximize returns from the catch share) and the transfer of a public resource to private individuals.

My colleagues (Christopher Costello and Steven Gaines) and I wanted to move the debate over catch shares beyond discussing anecdotes and put some facts on the table. We were curious as to whether catch share fisheries were achieving the ecological benefits their proponents claimed or if they were just business-as-usual. We decided to test the performance of catch share fisheries using a famous measure of fishery health: the 10% collapse rate. This measure defines a fishery as collapsed if the catch this year is less than 10% of the highest annual catch in the past. For example, if the catch in 2007 was 100 fish and the catch in 2008 was nine fish then the fishery would be classified as "collapsed" in 2008. This is a very controversial measure because it ignores the fact that there might have been 100 fishermen in 2007 and only nine fishermen in

2008. Unfortunately, many fisheries don't collect accurate data on fishermen and how much effort they exert, only on what they catch.

The 10% measure is used by the UN's Food and Agriculture Organization and was also used in a scientific paper published in 2006. In this paper, a group of scientists calculated the collapse rate for nearly every known fishery in the world (roughly 11,000 different fisheries). What they found caused uproar in the fisheries community and beyond: fisheries have been collapsing at such a fast rate that, if the trend continues, all the fisheries in the world could be collapsed by the year 2048.

What Chris, Steve and I did was to go through this list of 11,000 fisheries and pick out the ones that have experimented with catch shares. How do these fisheries compare to other fisheries? Does switching to a catch share stop the trend towards complete collapse? Or are these fisheries doing well regardless of how they are managed? What we found was pretty striking. The fisheries that are now managed using catch shares were on the same trajectory towards complete collapse before they switched to a catch share system. The only real difference was that the year of complete collapse was a little later than 2048, somewhere around 2056. But once these fisheries switched to catch shares, the trend halted. In fact, in some of our analysis, we found that the trend reversed.

There is no denying that, using the 10% measure, something dramatic happened to catch share fisheries after they switched to this new system. We believe it's because of the change in incentives but we can't be absolutely sure because this wasn't a proper experiment with randomly assigned treatment and control groups. It could be that these fisheries rebounded for some other reason that just happened to occur at the same time as the switch to catch shares. We used a variety of statistical techniques to try to account for this potential bias (such as matching catch share fisheries to similar-looking fisheries) but it remains a possibility.

If catch share systems work, why haven't they been adopted? Part of the reason is that there has been little evidence, until now, of their success. A bigger reason is concern over associated negative impacts. Some environmental groups remain unconvinced of the ecological benefits and are very uneasy about any system that gives fishermen more control over natural resources. Social justice groups are concerned about loss of jobs, consolidation and exclusion of small stakeholder groups. The challenge for advocates of catch share systems is to find solutions that align incentives with long-term sustainability but also address concerns about socio-economic impacts. These solutions may include community-owned catch shares, voluntary catch shares or spatially-based as opposed to species-based shares.

Finally, as the history of catch share adoption has shown, the most important factor is support from fishermen. Fishermen often worry that they will lose out when the rubber hits the road and catch shares are actually allocated. If fishermen aren't willing to support a catch share system, it's very unlikely to get off the ground . ■

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Responsible retailing and public policy intervention

The Co-operative approach

Colin Baines

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The Co-operative Group is one of the world's largest consumer co-operatives, with over 4,000 outlets and an annual turnover in excess of £10 billion. Environmental responsibility is an important part of our approach to sustainability and represents a major element of our brand identity and a key element in justifying customer trust. As a minimum condition for environmental sustainability The Co-operative recognises that nature's productivity should not be diminished in terms of quality (biodiversity) or quantity (biomass). On the contrary, it must be enabled to grow.

The world's seas and oceans are losing their biodiversity and biomass at an accelerating rate. In UK waters there are 22 species of wildlife considered to be facing the threat of global extinction. Once common species such as Atlantic halibut and common skate are now listed as 'critically endangered'. The biomass of cod in the North Sea fell from over 250,000 tonnes in 1970 to just 37,000 tonnes in 2007[1] and 2007 cod and haddock landings were respectively just 26% and 40% of their 1997 levels.[2] Currently, only eight fish stocks of a total of 47 found around the British Isles are known to be in a healthy state.[3]

The sea is subject to a range of impacts from human activities, but no other activity has such a large direct impact on the whole marine ecosystem as fishing. Overfishing of target species, destructive fishing techniques and high rates of by-catch and discard are posing a serious threat to the sustainability of fish stocks and the marine environment. For example, it has been estimated that for every 1kg of North Sea sole caught by beam trawl, up to 14kg of other seabed animals are killed. In the North Sea, only half of the plaice caught by beam trawl are usually retained, decreasing to 20% in shallower inshore grounds. Proportions of discarded cod and haddock are estimated at 50%.[4]

UK fishing fleet catches are regulated and have quotas as part of the EC Total Allowable Catch. On average these are over 30% above the scientifically recommended levels of the International Council for the Exploration of the Seas (ICES).[5] There are also studies which indicate these quotas are being ignored and that illegal, unreported and unregulated (IUU or 'blackfish') catches are common and may exceed 50% of declared catches in EU waters for some species, including cod, whiting and mackerel.[6]

If the marine management system remains as it is, The Co-operative expects marine ecosystems to degrade further and fish catches to continue to decline on the present trajectory. A recent study found that, unless the current situation improves, stocks of all species currently fished for food are predicted to collapse by 2048.[7] Quick and decisive science-led action is required to stop this decline and secure fish stocks as a sustainable resource for the future.

To address this challenge, we broadly support the key recommendations of The Royal Commission on Environmental Pollution's twenty-fifth report "Turning the Tide: addressing the impact of fisheries on the marine

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environment", published in 2004. These include introducing an eco-system approach to fisheries, an extensive network of marine protected areas and no-take reserves closed to commercial fishing, and measures to address issues such as by-catch, discard, gear controls, monitoring and over-capacity.[8]

Marine reserves

In particular, The Co-operative supports the Commission's recommendation that the Government should establish an ecologically coherent network of marine protected areas with 30% of UK waters designated as no-take reserves (i.e. closed to commercial fishing and dredging). In arriving at this figure, the commission cited 39 worldwide scientific studies, which indicate that approximately 20 to 50% of the world's seas need to be protected to maximise catches.

Marine reserves have been shown to be effective in helping ecosystems and fish populations recover from the effects of overfishing and habitat destruction

The key reason for establishing marine reserves is that unlike most other management options they can protect the entire ecosystem, from spawning fish, to the creatures living in the ocean depths, to the seabed itself. Designed in the right way, they can protect commercial fish, non-commercial species and features of the seabed that might be damaged. This makes them one of the most simple and straightforward means for implementing the eco-system approach to fisheries.

Marine reserves have been shown to be effective in helping ecosystems and fish populations recover from the effects of overfishing and habitat destruction. They also increase fish populations outside their boundaries through what are known as 'spillover' effects. For example, as numbers of fish build up within the reserve, some will steadily migrate to fished areas. There is evidence that within a period of 5-10 years, there is likely to be an increase in catches in surrounding fisheries as a result of effectively enforced no take reserves.[9]

The Co-operative recognises that marine reserves could, in the short term, impact upon fishing communities by preventing access to traditional fishing grounds. The UK fishing industry employs almost 13,000 people (down 32% compared to 1997)[10] and often provides valuable employment in remote communities. Clearly the Government will need to assist those communities affected in the short term. The alternative, however, is a much smaller fishing industry as employment in this sector continues to decline along with fish stocks.

The Marine Bill and 'Marine Reserves Now' campaign

In 2008, the Government announced the introduction of a Marine Bill. The bill is both welcome and essential, but does need to be strengthened if the Government is to achieve both its stated vision of productive and biologically diverse oceans and seas, and if potentially irreparable damage to marine ecosystems is to be avoided.

The Co-operative considers urgent action so necessary that we have joined the Marine Conservation Society (MCS) to campaign in partnership for 'Marine Reserves Now' throughout 2009.

During the campaign we are mobilising our customers, members and supporters to take action by calling upon the Government to strengthen the Marine Bill by:

- Including a clear statutory "duty" to designate an "ecologically coherent network" of marine conservation zones in UK waters.
- Including provisions within the bill for highly protected (or no-take) marine reserves to be created.
- Removing the loophole that would allow sea fishing to be used as a defence if damage occurs to protected features of marine conservation zones. If this were allowed to remain, the value of the bill would be very greatly diminished.

Additionally, we will be calling for a policy commitment from all political parties to designate 30% of UK waters as highly protected marine reserves by 2020, with intermediate targets of 10% by 2012 and 15% by 2015. This would make a significant contribution to ensuring 'Good Environmental Status' is achieved for UK waters by 2020, as required by the EU Marine Strategy Directive. It would also go some way to implementing other international obligations, such as the 2002 World Summit on Sustainable Development agreement to develop a coherent network of marine protected areas by 2012.

As part of our campaign, The Co-operative is also funding an MCS study to pinpoint 50 high value sites for possible inclusion within marine reserves. We are also helping to improve the sustainability of the UK fishing industry by providing funding to take four fisheries through Marine Stewardship Council (MSC) certification in 2009/10.

The Co-operative fish sourcing

The Co-operative takes the sustainability of its fish sourcing very seriously and in recent years has delisted or removed from sale huss (dogfish), all skate and ray species, European hake, monkfish, plaice, shark, snapper, eel (Conger and European), Atlantic halibut and wild warm-water prawns. Our goal is to source our fish in line with the aims and objectives of the MSC, of which The Co-operative has been a member and key supporter since 1998.

The Co-operative recognises that there is an ongoing issue with over-fishing, illegal, unreported and unregulated fishing

Responsible retailing and public policy intervention

(IUU or 'blackfish') and fishing methods that are destructive to the seabed and marine habitats. In view of these complex challenges, we introduced a strict responsible fish sourcing policy in 2008 to monitor and control supplies. We will not stock fish listed as 'critically endangered' or 'endangered' by the IUCN, or as a 'fish to avoid' by MCS. We will not source fish where the origin or method of catch is unknown and will never knowingly purchase IUU fish nor deal with suppliers implicated in the practices of exceeding quota limits, fishing outside prescribed areas, using banned fishing methods or the capturing and selling of endangered species.

We specify the use of selective fishing techniques designed to minimise their effect on other species and the marine environment; for example, our cod is only sourced from MSC accredited fisheries in the Bering Sea and Aleutian Islands, or line caught from well-managed Icelandic Atlantic stocks. All of our suppliers are subject to audit and inspection on a regular basis to ensure that the required standards are being met, and we regularly review our fish sourcing policy in view of the latest scientific advice.[11]

The Co-operative's responsible fish sourcing policy covers all own brand fish products, including frozen, chilled, canned and ready meals – in fact, any own brand product that contains fish or seafood. In 2008, The Co-operative delisted its last fish product containing an MCS 'fish to avoid'; a ready meal that was accompanied with prawn crackers derived from unsustainably sourced warm-water prawns.

Many retailers have improved their fish sourcing practices in recent years. However, annual MCS surveys have identified a number of unsustainably fished species still on sale in several major supermarkets, including marlin, Atlantic cod from overfished stocks such as the Eastern Baltic, wild warm-water prawns and Dover sole from the Western Channel.[12] The Co-operative would recommend that those supermarkets that are yet to develop sufficiently robust fish sourcing policies do so as a matter of urgency.

We would also recommend that any food retailer who wants to ensure that the marine environment recovers and flourishes into the future, and who wishes to continue to sell traditional fish species into the medium to long term, supports the radical measures necessary to achieve this. ■

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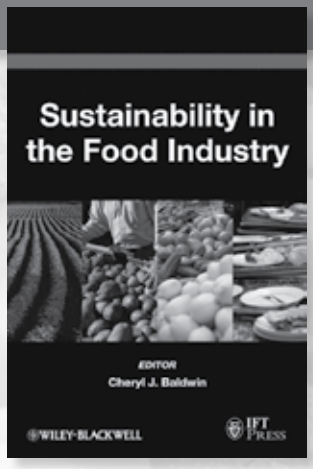

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Good Catch

Cooking for change, serving the future

Emily Howgate
Programme Co-Ordinator for SeaWebs's Seafood Choices Alliance. She manages the Good Catch catering sector project, an initiative run collaboratively with the Marine Conservation Society, Marine Stewardship Council and Sustain.
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The sustainable seafood movement has come a long way in recent years. Once on the fringes of the seafood industry, today sustainability is more closely integrated into the workings of many businesses. On top of increased expectations of corporate responsibility, demand for food from ethical sources has grown as consumers take more interest in social and environmental issues.

To date in the UK, commercial sector leadership in improving seafood sustainability has mostly come from retailers. While the foodservice sector accounts for a notable segment of the seafood market, with seafood in out-of-home consumption accounting for 18% of meals compared to 8% of in-home meals, restaurants and caterers have in general been slower to respond to consumer demands for sustainable seafood.

The catering industry has the potential to exert significant influence up and down the supply chain. The purchasing power of these businesses, which between them serve up around 550 million portions of seafood each year, can affect their suppliers sourcing habits by demonstrating a demand for sustainable seafood. Looking up the chain, restaurants and related businesses can affect the attitudes and shopping habits of consumers. Dining-out experiences and seeing sustainable seafood dishes in restaurants can help create consumer desire for sustainable options in the wider marketplace.

The messages of high profile chefs have a marked effect on public opinion and behaviour too - the 'Delia-effect' is a major trend.

Until now, however, restaurants and caterers using this influence to promote sustainable seafood have been the exception, not the rule. A recent survey, commissioned by foodservice supplier M&J Seafood, shows that many UK chefs, restaurateurs and caterers are still flummoxed by what sustainability really means, some confusing it with issues such as quality. This lack of understanding remains an obstacle for caterers trying to source seafood responsibly. The same survey results, published in the Sea of Change report, also illustrate that despite growing public interest in sustainability, most respondents don't include basic seafood sustainability information on their menus.

Against this background, a group of environmental organisations have come together to improve awareness, sourcing and promotion of sustainable seafood in the catering sector, and tap into the wider influence of chefs in the media.

Good Catch is a joint venture that brings together the work of four organisations: the Marine Conservation Society (MCS), the Marine Stewardship Council (MSC), SeaWeb's Seafood Choices Alliance and Sustain. It emerged after communication with the catering industry revealed a need and desire for clear, consistent information, practical support and training on sustainable seafood. The Good Catch initiative engages chefs, restaurateurs and their teams to help them navigate sustainable seafood information and improve the sustainability of the seafood they buy, serve and promote.

Prior to this collaboration 'environmental organisations' efforts to improve the sustainability of the seafood served in restaurants and catering outlets had been fragmented. The coordinated approach of Good Catch allows the organisations involved to maintain their individual identity while contributing their unique skills to provide information and support to the foodservice sector that is more 'user-friendly', cohesive and comprehensive.

The tools and activities provided through Good Catch focus on enabling foodservice professionals to make responsible decisions regarding the environmental sustainability of their seafood. It has produced 'The Good Catch Manual – a rough guide to seafood sustainability for chefs, restaurateurs and caterers', which brings together a range of practical information for those in the industry wishing to make their seafood more environmentally sustainable. The Manual contains information and recommendations from the Marine Conservation Society on over 50 species consumed in the UK, top tips for making change in foodservice businesses, suggested questions to ask suppliers, and an overview of the Marine Stewardship Council's fisheries certification and eco-labelling program.

Good Catch encourages shared responsibility along the supply chain and some foodservice businesses and chefs are playing an increasingly active and influential role in the UK seafood sustainability movement. "The British chef, as much as the consumer, has a huge role to play in bringing back marine life and promoting both clean seas and healthy fish stocks and biodiversity," said Raymond Blanc of Le Manoir aux Quat' Saisons. "The Good Catch Manual can help us on this path of responsibility and I am proud to be an active ambassador for this cause."

Accessible and clear electronic communications form another aspect of the Good Catch suite of activities. The website, www.goodcatch.org.uk points users to various sustainable seafood information and support. This navigational role means the website can be the first port of call for chefs and restaurateurs who select the information route they wish to take, depending on their interest or query.

Good Catch

The challenge of communicating sustainable fish and fisheries information is that, because advice changes so frequently, keeping up-to-date can be hard for foodservice professionals pressed for time in a busy kitchen. For example, the Marine Conservation Society ratings included in the printed Good Catch Manual, change over time to reflect differences in fish populations, government regulation or industry management. Likewise, the fish species available from Marine Stewardship Council sources are growing as more fisheries achieve accreditation through the eco-labelling scheme, providing restaurants with more choice of certified seafood. So while the printed Manual is a practical reference for chefs to have to hand Fish Flash, a monthly e-bulletin, is also produced. This complements the Good Catch Manual by sharing recent and ongoing developments with readers.

Seafood-themed workshops form another component of Good Catch. They cover topics such as a 'rough guide' to seafood sustainability; engaging front of house staff; communicating a restaurant's responsible seafood efforts to customers; and sourcing, serving and labelling MSC certified seafood.

September 2008 saw the inaugural workshop (at Billingsgate Market in East London) officially launch the Good Catch initiative during Seafood Fortnight. Attended by around 50 people from restaurants and related businesses, the workshop provided participants with presentations, discussions, a kitchen demonstration and market tour. Feedback showed many attendees felt they were highly likely to make sustainability changes in their business having attended this workshop.

Asked why he became involved in the sustainability movement, Peter Weeden of Paternoster Chop House noted: "When I was starting out in this business, sustainability wasn't on the agenda. So much has changed over the last five years, and it's obvious my customers take an active interest in knowing where their fish comes from and how it was caught. For me, it's a real pleasure to be able to communicate my efforts to them, and also to my peers. 'Good Catch' makes it that much easier to make positive seafood choices."

Given the sheer number of restaurants in the capital, and the importance of Billingsgate Market in supplying many of these catering outlets, the London venue for the first Good Catch workshop was a strategic choice. The groups behind Good Catch are now keen to build on the momentum of this initial event and take the workshops and other materials to a wider audience across the UK.

While the e-bulletin, Fish Flash, has a wider reach - over 1,000 foodservice professionals and other individuals signing up in the first few months - it represents just a drop in the ocean. Considering that there are around 250,000 foodservice outlets in the UK there is much work still to be done.

The Good Catch organisations are now taking steps to move beyond the strong group of early supporters. One possibility

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is to increase the reach of seafood sustainability messages through a 'pass it on' push which will capitalise on the existing support for Good Catch and encourage the chefs and restaurateurs currently engaged to spread the word and get their catering sector colleagues involved.

The enthusiasm and innovation of the foodservice individuals involved in the initiative are among its greatest assets, so the 'pass it on' effort hopes to harness this strength to increase the swell of energy behind sustainable seafood.

Good Catch workshops are now being planned at different venues around the UK and will be connected with local restaurants who are already relatively well progressed along the sustainability path. Having restaurants involved in the hosting of the workshops helps create a participatory environment and encourages peer-to-peer learning.

While professionals in the foodservice sector were the initial target audience of Good Catch, catering colleges are now part of the progress too. Teaming up with colleges looking to present sustainability within the curriculum gives the Good Catch organisations a notable opportunity to influence and engage the next generation of chefs who will be leading the nation's future eating habits.

As one Good Catch workshop attendee noted "… it was great learning about how we can do things better" – and put simply that is what it is all about, helping people do things better. It is early days for Good Catch but by working with the industry and listening to the challenges they are facing this initiative stands a chance of making a sea change. ■

Asian aquaculture

Supplying the shortfall in global fish demand

Dave Little

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Aquaculture's ancient Asian beginnings are only now coming of age in terms of global food supply, as production edges towards supplying half of the total fish consumed worldwide.

With natural stocks coming under increasing pressure, demand continues to grow rapidly, resulting in a 'supply crunch' as competition intensifies for limited amounts of fish. This competition sees fish processed into ingredients (fishmeal and oils) for livestock and cultured fish diets as well as for direct human consumption.

While the economic drivers towards intensification of aquaculture that demand such high quality feed ingredients are common to other forms of food production - a desire for greater productivity and returns - a range of factors are shaping the speed and form of aquaculture development.

Traditional aquaculture evolved in areas with a high dependence of fish and limited wild stocks. Inland, such systems tended to be closely integrated in terms of water, land and nutrient use with other forms of food production. Various carp species raised together in the same system (polyculture) on fertilisers and supplementary feeds continue to constitute the backbone of Asian aquaculture by volume, and these remain appropriate for relatively low input systems.

But domestic demand for fish has soared with the trend to urbanisation and this has stimulated more intensive and diversified production of a range of cultured fish.

Often located in peri-urban areas, aquaculture has emerged as a common form of diversification from rice production in many SE Asian countries. The popularity of fresh and live fish has encouraged the industry to grow, giving benefits to producers and consumers alike. Aquaculture of both vegetables and fish has often developed as a de facto treatment system for wastes and byproducts around cities such as Kolkata, Ha Noi and Phnom Phen.

Both small scale and industrial aquaculture can provide many benefits to poor people, through employment and access to healthy food. A crucial challenge is maintaining the diverse values that such systems afford as demand changes and cities grow.

It is the global demand for white fish products that is now driving wholesale change in aquaculture in some parts of Asia, with subsequent environmental and social implications.

Pangasius, a type of Asian river catfish, has proved to be one such catalyst. From serving local markets, this fish is now exported large-scale from Vietnam. In common with carp, it has no absolute requirement for fishmeal, and the market for fillets allows producers to make fishmeal from the processing waste – resulting in net fishmeal production.

However, the global implications for this growth in intensive aquaculture in Asia, has impacts on other key feed ingredients such as soybean products. Alternatives to further stimulating the production of Latin American soy, that has its own environmental and social issues, are urgently required.

Other fundamental issues for industrial aquaculture in Asia include reducing environmental impacts from polluting effluents and strengthening of benefits to local communities. Intensive production tends to cluster in areas of relative water abundance but actions to reduce polluting effluents and improve health management are urgent.

Thresholds of intensification and improved application of technology that encourage local water and nutrient reuse are urgently required. For these to work, however, action by the majority of producers rather than a few is necessary. Decline in margins received by producers and the attraction of immediate returns by ignoring sustainable practice can defeat the development of common action.

These pressures also tend to drive consolidation to larger, vertically integrated units of production, sometimes resulting in household enterprises being pushed out of the market.

However, sector expansion almost certainly benefits more people through various service roles, particularly processing, than direct production. Thus the recent trends towards value addition away from whole fish towards ready-to-eat forms are likely to benefit much larger numbers of people through more employment opportunities. Market information that allows producers and processors to respond to changes in demand are critical and these industries are in general well served by entrepreneurs locally and in their emerging markets.

Standards developed by organisations that support best practice and reward producers through the market are emerging as important forces for stimulating change. But potential for confusion and overlap is great, which risks undermining the whole purpose.

There is criticism of the increasing dominance of exports from Asia and other tropical regions entering the European and North American markets. This can be motivated by competition with a home grown industry (the 'catfish' wars in which the US domestic catfish industry fought to reduce imports of Vietnamese catfish for instance).

European and North American reliance on imports of 'seafood' from aquaculture production in developing countries has led to new concerns. For some, the reliance on global supply chains and requirements for management and traceability are seen as being onerous and liable to subversion.

Others question such trade from the perspectives of impacts on climate change, negative social and environmental impacts in both producer and consumer countries or because of a desire for 'local food'. Future analysis of these impacts will inform this debate and contribute to developing ethical standards of production and processing that, in turn, can inform consumers. ■

Technological changes

The fishing industry gears up for the future

John Rutherford

Chief Executive of Seafish, a Non Departmental Public Body that works across all sectors of the industry to promote good quality, sustainable seafood.

www.seafish.org

Fisheries are a vital source of food, employment, recreation, trade and economic well-being, and fishermen have a crucial role in the stewardship of the marine environment.

Fishermen understand very well that they have to be part of the movement to manage marine resources better. They adhere to a whole host of management measures designed to control fishing effort, such as limits on how much fish can be landed and the number of days that boats can spend at sea, as well as closed areas and closed seasons.

Fishing gear falls into several broad categories, with the type of gear used determined by the fish species being targeted. Active gears, also known as towed gears, are used to chase and often concentrate the fish and are typified by bottom trawls, beam trawls and dredges. These trawls generally work on specific areas of the seabed. For instance, beam trawls are designed to catch flatfish that usually found on sandy ground. Dredges are used to collect bivalve shellfish like scallops and mussels on the seabed.

These days, there is much more focus on the modification of fishing gear to minimise the environmental impact of fishing on marine life, improve efficiency and reduce the level of discards or bycatch, which wastes valuable resources.

Minimum mesh sizes and minimum landing size regulations and some zoning of fishing areas has been used for many years to manage fisheries. Increasingly, technology is being applied to modify fishing gear to be more selective so that bycatch and discards are reduced, either by avoiding the capture of certain species or helping unwanted fish to escape alive. Fishermen believe that reducing wastage can compensate for the impact of declining quotas and other management measures – in other words, fishermen want to make the most of what they are allowed to catch.

Many fisheries are based on a mixture of species and fish that are not wanted can be caught inadvertently. Some selectivity problems can be solved relatively easily by the use of a sorting grid which separates species according to their size, such as prawns and fish. However it is more difficult when there is a mix of species that are fairly similar in size such as cod, haddock, whiting, plaice, sole and monkfish.

Seafish offers advice to fishermen so that they can find the right technology solution for fishing targeted at a specific species. Options being trialled by gear technologists include using behavioural differences between species to guide them to different parts of the gear, as in a separator trawl; inserting 'windows' of 'square mesh' or other devices at strategic points in the gear; using flexible grids in large pelagic trawls to allow the release of small fish; using a large mesh eliminator trawl to allow cod to escape, and using an inclined grid for size selection of langoustines.

There is also a resurgence in interest in seine netting (the seabed version of a purse seine) as an economical, more environmentally friendly, highly adaptable and flexible method of fishing

Research has also focused on the development of more fuel efficient trawl designs with less twine surface area and hence less drag. T90 or turned mesh netting is a relatively recent development used for whole trawl construction which needs 30-40% less netting material to produce a trawl, compared to the equivalent sized conventional net. Coverless trawls are being developed as a means of reducing non-target bycatches of finfish species in targeted Nephrops fisheries.

Work is also underway looking at new materials for scallop dredge construction to reduce benthic impact and construction costs; fitting specific-sized escape panels in traps to allow undersized fish to escape, as well as installing pingers (an acoustic deterrent device fitted onto a fishing net) on gill nets to keep cetaceans clear of the nets.

There is also a resurgence in interest in seine netting (the seabed version of a purse seine) as an economical, more environmentally friendly, highly adaptable and flexible method of fishing. The catch quality is very good because the fish are only in the seine nets for under an hour, the nets have low bottom impact and it is a fuel efficient method, using less than 50% of the fuel consumption of a similar sized trawler.

New technology is the future but sometimes it is necessary to look back to go forward. Seine netting has been a proven fishing method for over a century. The MFV Radiant Star - the first new seine netter in Shetland in over 20 years— is testimony to the fact that revisiting older technology can also provide benefits. ■

The efficiency trap

Profit or need?

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Dr. John Volpe

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The Victorian Era economist William Stanley Jevons made the counterintuitive observation that as an industrial process becomes more efficient, the rate of consumption of raw materials by that industry increases. The 'Jevons Paradox' first described the rapid rise of English coal consumption driven by the introduction of increasingly efficient steam engines. Intuitively one would expect coal consumption to drop as engine efficiency grew. However, more efficient engines meant cheaper energy. As a result, steam power became an economically attractive option for a myriad of new uses. Steam engine efficiency and coal consumption increased in lock step, driving the Industrial Revolution.

Today we face a Jevons Paradox in food production. The so called Green Revolution of post-WWII saw the amalgamation of a suite of technologies (synthetic fertilizers, pesticides, farm mechanization, large scale irrigation, hybrid varietals) that together dramatically increased the productivity of an acre of land. Over the decades we have become very efficient at producing food. However, it is still not enough. More than 80,000 people die daily as a result of food deficiency.
But, with the conventional technologies of the Green Revolution exhausted – impassioned pleas for a Green Revolution II (utilizing new technologies such genetic engineering) are now the norm, as well as calls for a Blue Revolution (a recapitulation on the seas). With these revolutionary tactics we will defeat global hunger, so the argument goes.

Approximately 1.3 billion people could be fed with the grain and soy fed to US livestock each year

But examining the numbers dramatically changes the context of the argument. Approximately 1.3 billion people could be fed with the grain and soy fed to US livestock each year. A typical acre of farm land will produce 20,000 lbs of potatoes or 165 lbs of beef. If US meat intake were cut by 10% (yielding its own health benefits), just the grain and soy not consumed by cows could feed 60 million people (and thus eliminate the crisis).

The global food crisis is an issue of food access, not food production, of social justice, not agriculture. More than enough food is produced globally to provide every citizen with a culturally and nutritionally appropriate diet of 2,500 calories per day. Producing more food that is inaccessible to those who need it most is of no benefit.

This brings us back to coal, Jevons and efficiencies. Efficient steam engines increased coal consumption. In a similar vein, efficiency of food production today is of a scale only dreamed of a generation ago. But "Efficiency" is a double edged sword. The success of the Green Revolution was in redefining the productive capacity of the farm. There is limited profitability in feeding the world's disenfranchised populations, but there is money to be made in converting abundant, cheap grain to relatively expensive protein. Approximately 80% of grain produced in the USA is fed to livestock, not people. Beef cattle consume 7lbs of grain per pound of live weight – a 14% conversion. The market price of beef is high enough relative to grain so that a loss of 86% (by food weight) remains more profitable than selling the grain. The Green Revolution has by and large led to cheap protein for the developed world, not more food globally. Likewise, efficient auto / plane / ship engines cover more miles for the same cost – giving birth to suburbs and "jet fresh" fruit and produce.

The lesson here is that efficiency only yields benefit if consumption or use remain constant. Current energy rated appliances (that is refrigerators, freezers, washers, dryers) are more efficient than ever. They are also far larger than ever. The net change in energy consumption is modest at best. And here lies the rub with efficiency as it relates to sustainability. We as a society have two options in how we process surpluses yielded by efficiency. We can maintain the status quo of consumption / use of the product, in which case efficiency manifests as reduced consumption of inputs. Or we can apply the benefit of efficiency so as to reduce the cost of increased consumption. There are few arenas where this trade-off is made more clear than that of seafood.

Though it did not garner the status as of a 'revolution', tremendous technological advances in commercial fisheries occurred as the Green Revolution reached apogee: the rise to dominance of the diesel engine, onboard freezers, the perfection of long-lines and draggers, and the seemingly limitless sophistication of instrumentation in the wheel house.

In total, we became as efficient at removing fish from the ocean as we did coaxing crops from the earth. So efficient in fact that we removed fish faster than they could replace themselves. This was particularly true for those species in possession of the unfortunate combination of low reproduction rates and high market value like tuna,

The efficiency trap

swordfish, grouper and snapper. Indeed fundamental economics of supply and demand ensures the former begets the latter. High value species attract the prices they do because their production is ecologically expensive and so nature produces relatively few. Tremendous ecological capital is invested in a tuna or swordfish, which by the time it is an adult will have consumed hundreds of pounds smaller fish, which themselves will have collectively consumed thousands of pounds of yet smaller fish who in turn will have consumed millions of pounds of plankton and the like. It is therefore not surprising that the oceans support only a limited supply of such creatures. Nature is inefficient by design. With precipitous decline of the ocean's predators, the world's fishing fleets have increasingly turned their attention to the dwindling predator's prey, which are now harvested with the same cold efficiency. The only difference being that these fish are not destined for the fishmonger.

Of the ten largest fisheries in the world (measured by biomass harvested), currently only three species are harvested for direct human consumption. The other seven are so-called "reduction fisheries" where the catch is reduced to its protein and lipid components (everything else discarded) which are in turn processed into livestock feeds – the fastest growing and dominant user of which is the aquaculture industry. Like grain and cows, it takes a lot of small fish to make one large fish – representing a significant net loss of food. But, there is greater profit in converting vast quantities of small fish into relatively few, valuable fish destined for the affluent world than there is selling the smaller fish directly for human consumption. Like the Green Revolution, the Blue Revolution owes its existence to the technological advances that enable efficient (read: cheap) acquisition of vast quantities of raw materials (smaller edible fish) to be consumed in the production of ecologically inefficient but profitable products (which are for sale at your local fishmonger).

Currently every major aquaculture research programme in the developed world (the global incubator of technological innovation) is focused on high trophic level (aka carnivorous) species. Why? Because modern large scale aquaculture is driven by profit, not need. And who could blame an industry for seeking maximum profitability? However it is important to be clear: modern industrial scale aquaculture has very little to do with satisfying human need; it has everything to do with satisfying material desire. Again, hardly a sin but that truth does undermine the argument that the Blue Revolution is in any way an answer to the global food crisis. Indeed the Blue Revolution is a solution in search of a problem.

A good amount of willful ignorance would be required to overlook the fact that the perceived global food deficit in terms of high quality marine protein would be solved overnight if we chose to feed people instead of farmed salmon, shrimp and the like. But for the sake of argument, let's let the Blue Revolution argument play out a little longer and take a closer look at farmed salmon.

Farmed salmon is the poster child of the aquaculture industry. Where I live, in British Columbia, Canada, three farm salmon are brought to market for every one wild-caught salmon. This is big business even in a wild salmon capital like BC. The result of all this salmon on the market is depressed prices and a concomitant increase in salmon consumption. Salmon is no longer a celebration food. Perhaps the greatest insult the industry has committed against wild salmon is the devaluation of all salmon. Indeed the globalization of salmon has transformed this fish from a seasonal, high-value delicacy to a low-value commodity available year-round. Not so long ago, salmon was a miracle of nature, a product of woodland streams and vast productive oceans, each population evolutionarily and ecologically distinct from its neighbour the next river over. On the whole, irreplaceable. Today, to most consumers salmon simply means a cheap slab of artificially fed and pigmented flesh stripped of its identity, place of origin and inherent value leaving only the material value of its homogenous and deeply unremarkable biochemical construction. How far we have come.

Perhaps the greatest insult the industry has committed against wild salmon is the devaluation of all salmon

Just as organic agriculture is as much about celebrating the human-nature enterprise as it is flavour and health, so too could aquaculture. However, organic agriculture is inefficient by nature. No one would consider farming organically if the sole objective was maximizing output and profit. However, if the goal is superior quality food, nourishing the land and the people that work it as well as consumers, then there are few better options. In food production systems, creative inefficiency is the root of not only sustainability but also flavour. While inefficiency should not be universally sought, it does has its virtues. We have been farming the seas, lakes and rivers for literally thousands of years and sustainable aquaculture practices remain common throughout the world where social, ecological and economic sustainability are created and protected. However in none of these scenarios is production efficiency maximized.

If you run the numbers – and I have – you see in stark terms that maximum efficiency in any seafood production system is neither sustainable nor resilient. ■

Artisanal fishing

Paving the way to a sustainable future

Last year, 12 million artisanal fishers caught 30 million tons of fish for human consumption, providing jobs for about 200 million men and women in fishing communities. To catch this fish, they used five million tons of fuel - each ton of fuel catching eight tons of fish. By comparison, the industrial fishing sector, employing half a million fishers, uses one ton of fuel to catch two tons of fish, and, although they provide the same quantity of fish for human consumption as the artisanal sector, they are also responsible for up to 20 million tons of fish discards.

Although these figures[1] do not reflect individual situations,, they clearly show that by providing food and jobs whilst using low amounts of fuel, artisanal fishing is the best model to face the challenges of the new millennium. Far from the miserable images often portrayed, artisanal fishing represents a dynamic sector, capable of innovation and, if given appropriate attention and support, could represent the best option for the future as much in the North as in the South.

Nowadays, in world fisheries, the main limiting factor is the general over-exploitation of fish. This has an impact on the way the artisanal fishing sector needs to develop. In West Africa, for example, decreasing fish resources and swelling populations mean that for coastal communities to continue making a living from fishing, each fisherman must fish less, but earn more by improving the quality and adding value to his product, taking account of the fact that women from the fishing communities are key in these value-adding operations.

This link between product quality and the value of the landings of the artisanal fleet has also been studied in other countries like Canada. Studies showed that the value of fish landings had increased considerably following the collapse of demersal fish stocks in 1992 because the industry focused on fresh (such as fillets and crab), and live products (like lobster). “We had moved from a situation of high volume/low value, associated with industrial production, to a situation of low volume/high value associated with artisanal fishing”, says Marc Allain, a fisheries expert from Canada.

The same goes for exports from the artisanal sector in Mauritanian fisheries, where the superior quality and good potential for value addition is an intrinsic characteristic of artisanal fishing. In 2005, artisanal octopus sold for 200 dollars/tonne more than the product caught by the freezer trawlers. As regards the valuable demersal species, only the artisanally caught products meet the quality conditions required for export to European markets, attracting average prices of 4.5 Euros/kg, whilst the same fish in frozen form caught by the industrial fleet gets less than 2 Euros/kg. The volume of fresh fish exports from artisanal landings reaches 6,000 tonnes per year.

It can often be misleading to talk about the ‘value added’ of fish processing because in most cases processing adds no real value to the product. As soon as it comes out of the water, fish begins to lose value. If we really want to optimise the value of the landings, we must keep the fish alive or chilled for as long as possible to ‘preserve its value’.

‘Focusing on live or chilled products favours artisanal fishery for several reasons’, explains Dr. Ahmed Mahmoud Cherif, a fisheries expert from Mauritania. Firstly, artisanal fishing trips are short in time and close to the landing centres, allowing products to be kept chilled or alive with minimal investment (in ice and insulated boxes). Secondly, the gears used in artisanal fisheries (long lines, traps etc) allow fish to be caught alive and in a very good condition. Finally lower catch rates allow for improved handling on-board, which preserves the value of the product. But the trend towards fresh or live products may also have serious adverse knock-on effects for employment. Loss of shore jobs, particularly amongst women, have not been fully compensated for by the increasing crew sizes needed for better on board handling.

Béatrice Gorez

Coordinator of the Coalition for Fair Fishseries Arrangements, a Brussels based organisation that supplies information to coastal fishing communities to promote their participation in decision making processes affecting their livelihood, particularly fisheries relations between the European Union and ACP countries.

www.cape-cffa.org

However, in other fisheries, the link between value added and artisanal processing is very clear. This is the case in the grey mullet fishery in West Africa. One ton of mullet landed by the artisanal fleet and processed for the extraction of poutargue (dried and salted fish eggs) can yield, on average, close to US$ 4,500, providing 91% of the value added on turnover. One ton of the same mullet from the industrial fishery, in frozen form and not suitable for the production of poutargue, when exported for the African market attracts a price well below US$ 300!

Another important issue for the future of artisanal fishing is the fact that wild fish will become an increasingly rare commodity. Fresh wild fish of excellent quality will become a luxury product. It is questionable whether artisanal fishing communities will benefit from this trend or be marginalized by the processes associated with privatisation of resource access. This also will have consequences for the poorest sectors, which currently depend on wild caught fish for their own consumption. “Hence the importance of fisheries policies and the provisions made for the artisanal fishing fleet, which can use economic arguments to support their demands for special protection”, concludes Marc Allain. ■

1 Figures from Conservation Biology Magazine, Le Monde (October 2008)

What is the Council of Food Policy Advisers?

The food policy challenges for the last generation have concerned food safety rather than food security. Agricultural production has been taken for granted; we haven't worried about levels of self sufficiency; the food retail sector has delivered a cornucopia of choice at ever more competitive prices. The proportion of our income spent on food has decreased and the amount of time we spend preparing our meals has dropped. For the majority of consumers our food lives have never been so easy.

But things are changing fast – and with it the food policy challenges. The international food price increases of last year, the food demands of a rapidly increasing world population and the cataclysm of climate change now stretches food policy concerns far beyond food safety. In this changed, new, world the aim must be to ensure that all the concerns of food policy - food safety, nutrition and health, the impact of food production and consumption on the environment, affordability and social justice - are foregrounded, balanced and made to have greater salience.

To help ensure that these issues get the attention they require, Hilary Benn has set up a Council of Food Policy Advisers. Covering food production, supplies, prices, distribution, consumption and related aspects of food policy, the Council is made up of 15 individuals who have a rich and wide expertise in the food system, from farming and the farming community, sustainable production and sourcing, food businesses, retailing, public and private sector catering, regulation, science, the third sector and the consumer.

The Council needs to move beyond further description of the problems – enough good work on that has been done already - into practical solutions. Deciding the right policy aims, taking into account the various conflicting pressures and goals; identifying the right levers for change (fiscal, price, education, training, regulation and others) and the most appropriate level of action (local, national, EU and international) are early requirements.

Working through these issues will present significant challenges. Certainly, it is not easy. But it is necessary. And if we get it right now then we will be several steps nearer to achieving a sustainable, secure and safe food supply for the British population for a world very different from the one we have taken for granted for so long. ■

Dame Suzi Leather

Chair of the Council of Food Policy Advisers and of Charity Commission. Previously was Chair of the Human Fertilisation and Embryology Authority and the School Food Trust.

Priorities for the Council of Food Policy Advisers

Identifying a healthy sustainable (low GHG) diet.

- What are the food consumption patterns which the new world requires?
- Do we have the right knowledge and skills in place to achieve it?
- Working out how a healthy sustainable (low GHG) diet can be sourced at a national level, once a 2-50C rise in temperature, a reduction in water and less productive land are factored in.
- What changes must we make to domestic production and imports?

Identifying ways to facilitate adoption of a healthy sustainable (low GHG) diet.

- What are the barriers to its common adoption by consumers?
- Developing a model to allow individuals to make informed choices at the point of sale, helping them navigate through complex and conflicting issues
- How accessible and affordable is it likely to be?

Identifying ways to facilitate adoption of a healthy, sustainable (low GHG) diet in public procurement.

- Engaging government with the model
- Public provision based on the model.
- decision on compulsory, rather than voluntary, models of procurement ■

STOP PRESS...STOP PRESS...STOP PRESS

Sustainable fish advice – FSA consultation

The Food Standards Agency is conducting a public consultation on proposals to review its advice to consumers on eating fish in the light of sustainability issues. The Agency is committed to taking wider sustainability issues into account in its advice on nutrition and food safety.

Current advice is that we should eat at least two portions of fish a week, one of which should be oily. The evidence regarding the health benefits and safety of eating fish is firmly established and is not being re-examined. The consultation addresses concerns over fish stocks and in relation to other environmental impacts of fishing.

The Agency's commitment to incorporate sustainability into its policy making is part of a Government-wide strategy on sustainable development. Much is being done by other Government departments as well as non-Government organisations and the industry to improve the sustainability of fish stocks and it is the Agency's intention to support and draw on this by ensuring consumers have the information they need to make informed choices.

Views and comments on several issues relating to how the FSA can best provide access to information for consumers on these issues are requested by 31 March 2009. The full consultation package and other information is available at www.food.gov.uk/news/newsarchive/2009/jan/fish ■

Certified sustainable fishing

A buoyant industry

When the world economy started on its current downward trajectory, there were dire warnings from many of the more sceptical commentators that this would be the end of ethical foods. Consumers would switch to looking after their own, abandoning their principles and ditching Marine Stewardship Council (MSC) ecolabelled fish for something cheaper with no label. They would swap Fairtrade coffee for the unlabelled house brand and switch organic for 'regular' vegetables. It's true that supermarkets are reporting a drop in sales of organic vegetables but Fairtrade and MSC labelled products are still going strong with both showing an increase in sales, rather than a drop, as consumers stick to their ethical guns.

Since 2006, the number of MSC-labelled products available worldwide has quadrupled. It took seven years to reach the 500th product but, in January this year we announced the 2,000th. Three hundred of those products are available in the UK's supermarkets, restaurants and cafeterias. That growth shows no signs of slowing, in fact, it may be increasing as worldwide sales of MSC labelled seafood passes the $1billion mark.

MSC labelled products are now available in 36 countries around the world and every ocean has at - least one fishery either in assessment or certified. The MSC itself is growing into a global entity with offices in London, Edinburgh, Seattle, The Hague, Berlin, Sydney and Tokyo. Today, MSC certification is increasingly integrated with national policies and markets as retailers and governments – particularly in Northern Europe – build MSC certification into their policies and long-term strategies. In 2007, the Dutch retail sector committed to selling only fish that had been MSC-certified by 2011. In the same year, the whole Dutch fishing fleet – working with the Dutch government – committed to achieving certification by 2012. Denmark has made a similar commitment and the French government has already agreed to pay for the assessments of the first 10 French fisheries to enter the programme. But these assessments aren't guarantees of certification. Neither are they easy. The MSC assessment process involves a team of independent scientists assessing the fishery against a stringent standard established over a two-year consultation with some of the world's best fisheries experts. The assessments are stakeholder and peer-reviewed making it the best science available. Reports run to hundreds of pages and frequently include certain conditions that they need to fulfil in order to maintain their certificates. Some of these are simple – improving records, observers on boats – but some are more involved, reducing the bycatch of sea-birds or managing the fishery to improve the fish stocks up to a sustainable level. Many of the fisheries that enter assessment also make changes during the process in order to get certified. One example is the Dutch brown shrimp fishery which started its assessment in 2007. In order to pass their assessment, they have committed to modifying their fishing gear to avoid a wasteful plaice bycatch. The individual changes are small but together they are adding up to make a difference building a growing ecological case for certification.

Traceability in seafood is vital and can prevent illegal, unregulated or unreported 'pirate-fished' seafood from entering the supply chain

Traceability in seafood is vital and can prevent illegal, unregulated or unreported 'pirate-fished' seafood from entering the supply chain. In June, last year, EU fisheries commissioner Joe Borg recognised the power of traceability when the Council adopted his proposal on traceability: "By making traceability throughout the market chain the norm for all fish and fish products entering the EU market, we have taken a major step towards depriving these criminals of their profits."

Any fish bearing the MSC eco-label has to be fully traceable which means certifying every link in the supply chain under the MSC's traceability standard. In a restaurant setting we call it 'Ocean-to-plate' traceability.

With the reported cost of certification typically between $20,000 and $200,000 for larger, more complicated fisheries, mandatory traceability and the need for changes in the way people catch fish you might expect that fisheries would want to avoid certification. Yet in the past two years, matching the growth in the number of MSC products, the number of fisheries in the MSC programme has quadrupled. Between 8% and 10% of the world's wild-caught seafood is now at some stage in assessment or already certified. As consumers drive the change by increasingly demanding provably sustainable fish and genuine traceability, a credible and robust assessment and certification programme like the MSC certification programme can make a real contribution to shifting the entire seafood industry on to a more sustainable fish. Help to be part of the change – demand certified sustainable seafood! ■

Rupert Howes

Chief Executive of the Marine Stewardship Council, the world's leading marine eco-labelling and certification programme for wild capture fisheries. Prior to joining the MSC, Rupert was Director of the Sustainable Economy Programme at Forum for the Future. Previously Rupert was a Senior Research Fellow at the Science Policy Research Unit, Sussex University and a Research Officer at the International Institute for Environment and Development (IIED).

www.msc.org

books

reviews

Can we afford the future? The economics of a warming world

Frank Ackerman | 2009 | Zed Books | ISBN 978-1-84813-038-8

Conventional economic thinking on climate change puts at risk our much needed response to global disaster. Cost-benefit analyses are intrinsically biased, favouring 'business as usual' practices. Ackerman argues that solutions to climate change are indeed affordable and that the alternative is irreversible and unacceptable. Isn't our future worth it? SR

Ten technologies to save the planet

Chris Goodall | 2008 | GreenProfile | ISBN 978-1846688683

Reviewing 10 existing technologies that address climate change, Chris Goodall takes us on a whistle-stop tour of renewable energies, electric cars and carbon offsetting that can safely deliver the transition to a low-carbon economy. This optimistic book calls for public and private support for research and development on energy and a commitment by richer countries to make the transition possible. SR

Making poverty: A history

Thomas Lines | 2008 | Zedbooks | ISBN 978-1-84277-942-2

Shining a spotlight on the effects of international trade and globalisation on rural communities around the world, Tom Lines asks whether we can make poverty history without understanding the history of poverty. The book focuses on commodity markets and agricultural prices, arguing that rising prices can only make a difference to poor farmers if we reform international trade to favour the farmer, not the financier. EB

Sustainable farmland management: Transdisciplinary approaches

Fish, Seymour, Watkins & Steven eds. | 2008 | CABI | ISBN 978-1-84593-351-7

Bringing together experts from a wide range of disciplinary backgrounds, this book attempts to map a path through the complex issues around sustainable farmland management. Its editors argue that new ways of valuing farmland, including social, economic and cultural impacts, require a transdisciplinary approach to developing a 21st century strategy for the future of agriculture. EB

Innovation Africa

Sanginga et al eds. | 2008 | Earthscan | ISBN 978-1-84407-672-7

Combining the experiences of organisations and individuals, Innovation Africa brings together a vast collection of papers that seek to understand current innovation processes and advise for future sustainability and development. Comprehensive and diverse, it is recommended for anyone looking for a detailed overview of the subject. SAR

The rough guide to food

George Miller & Katharine Reeve | 2009 | Rough Guides ISBN 978-1-84836-001-3

Covering a wide range of major global issues including GM, climate change and fair trade, as well as explaining food origins and consumption habits, The Rough Guide succeeds in provoking the reader to question what they eat. Complex debates are nicely compressed into accessible, bite-sized chunks with references for further reading. SAR

Sustainable agriculture and food security in an era of oil scarcity

Julia Wright | 2009 | Earthscan | ISBN 978-1844075720

Forged out of challenging circumstances, Cuba's post industrial agricultural system has for many years been held up as an alternative to conventional agriculture. With current debates focusing on food security and self reliance, and the Transition Town movement investigating how to live in a post oil society, this is a timely book providing an in depth and well researched look at Cuba's aspiration to develop high input production systems despite lack of availability of agrochemicals and fuel. CD

Book reviews by: Liz Barling, Clare Devereux, Sam Richards and Santi Ripoll

restaurant review

© Jeremy Phillipson

Kristian's Fish and Chip Restaurant

North Shields Centre, North East England

Jeremy Phillipson
Assistant Director of the UK Research Councils' Rural Economy and Land Use Programme. He is based at Newcastle University.

How I rate it
Overall: ****
Fairness: ***
Health: ****
Animals: ***
Environment: **
Taste: ****
Ambience: *****
Value for Money: ****

(maximum five stars)

A haddock the size of a whale, a field of chips with mushy peas on the side and enough batter and salt to send my cholesterol levels into outer space – this is speciality cuisine, a food institution, nutritious meal for the masses.

Snow falls outside Kristians, a traditional quayside fish and chip restaurant in North Shields. Twenty metres away is the fish market, flanked by fishing boats, large and small, antennae twitching. The friendly waitress doesn't know where my haddock was landed, though I'm told it probably wasn't across the road. She had recommended cod, origin also unknown.

But among the clinking tea pots, stretching stomachs and motherly waitresses busying themselves with trays and tea cups, conversation is about the weather and the challenge of eating the vast fish basking on every plate. This is basic and comforting cuisine that warms the cockles, an eating experience repeated thousands of times over at this very moment in towns and cities throughout Britain.

Old photographs of the fishing community decorate the walls. North Shields, like many fishing communities throughout Europe, has undergone major changes over recent decades. Policy-induced restructuring, together with modernisation and technological developments, have shrunk the fishing industry. The social costs are reduced fishing employment, fewer viable fishing enterprises and community structures being undermined. Where once the community was bound together by dependence on fishing, it is now dominated by commuters who work in Newcastle. This spells trouble for the renewal of social capital in the industry and the transfer of ecological knowledge from father to son.

The social objectives of fisheries policy have all but disappeared from view - either handled in an ad hoc way and late in the policy process, or falling between the gaps in a complex multi-level management system. Unsurprisingly, the priority has been to stop the chronic decline in fish stocks. But as policy looks ahead to concerns of future generations, it is in danger of missing the dilemmas facing the fishing industry today.

Thinking about the sons and daughters of the characters in the sepia photographs, the challenge to me seems to be how do we balance these priorities?

To do this we must elaborate what the social objectives of fisheries policy should be and how they might best be pursued. Fisheries policy affects so many aspects of people's lives - from security of employment and income and concerns about fishing rights and the structure of communities - to those broader public concerns about the health of human beings, the marine environment and sustainability of living resources.

Consumers seem less concerned with the food miles and carbon footprints involved in bringing fish to the table, than they are with most agriculturally produced foods. People like the commuters moving into North Shields are, however, beginning to exert an influence on fishing. They want to know where their fish comes from, and whether it was caught using ecologically friendly methods. As I finish my chips, I ponder this potential marketing opportunity for the fishing industry and food businesses like Kristians.

But trudging back to my car through the snow and biting northeast wind, my thoughts turn to the fishers, risking their lives at sea, facing the elements on slippery, heaving decks to put food on our tables. ■

forthcoming events

1st - 2nd Mar '07	USDA Outlook - Agriculture at the Crossroads: Energy, Farm & Rural Policy USDA | www.usda.gov/oce/forum/ | Arlington VA, USA
3rd Mar '09	Martin Radcliffe Fellowship Lecture 2009: Madhur Jaffrey Reflects on Food & Culture Oxford Brookes University | www.brookesalumni.co.uk | Oxford, UK
5th - 8th Mar '09	18th Annual Meeting: Association for Practical and Professional Ethics APPE | www.indiana.edu.ac/~appe | Cincinnatti, Ohio, USA
8th Mar '09	Exploring Food, Connecting Communities Royal Anthropological Institute | www.therai.org.uk/education/ | London, UK
10th - 12th Mar '09	3rd International Energy Farming Conference 3N Kompetenzzentrum Nachwachsende Rohstoffe | www.3-n.info | Germany
12th Mar '09	Rural Land Use in the North: Future Challenges Northern Rural Network | nrn.ncl.ac.uk/ | York, UK
13th Mar '09	Food for the Future - What is the Role of Oorganics? SPRU - University of Sussex | www.sussex.ac.uk/spru | Brighton, UK
15th - 19th Mar '09	International Food and Drink Event Fresh RM | www.ife.co.uk | London, UK
24th Mar '09	An Evening with Sir Don Curry SCI Horticulture Group | www.soci.org | London, UK
26th - 27th Mar '09	56th BCCC Technology Conference: Drivers for Success Food and Drink Federation | www.fdf.org.uk/events.aspx | Stratford-upon-Avon
26th Mar '09	Tackling Obesity Conference 2009: Healthy Weight, Healthy Lives Govnet Communications | www.govnet.co.uk/obesity/ | London, UK
26th Mar '09	Forests and Climate Change Earthwatch Institute | www.earthwatch.org/europe | London, UK
2nd Apr '09	Future Leaders in the Biotech Industry BioCentury | www.biocentury.com | New York City, USA
7th Apr '09	Hunger and Climate Change: Some Practical Answers Practical Action | www.practicalaction.org | London, UK
22nd Apr '09	The Green Agenda: Are we Engaging Consumers? Kingston University | www.kingston.ac.uk/green | London, UK
29th - 30th Apr '09	CIWEM's Annual Conference 2009: Water and the Global Environment CIWEM | www.ciwem.org.uk | London, UK
29th Apr - 1st May '09	Valuing our Life Support Systems Natural Capital Initiative | www.naturalcapitalinitiative.org.uk | London, UK
8th - 10th May '09	Real Food Festival London | www.realfoodfestival.co.uk | London, UK
18th - 20th May '09	1st Nordic Organic Conference: Towards increased sustainability in the food chain www.nordicorganic.org/ | Gothenburg, Sweden
18th May '09	Bio International Convention: Heal, Fuel, Feed the World Biotechnology Industry Organization | convention.bio.org | Georgia, USA
27th May '09	Climate Change: Farmers' Solutions IFAP | www.ifap.org/en/newsroom/events.html | Copenhagen, Denmark