

Sustainable Fisheries : Myth or Mirage ?

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1) Introduction

Most fish stocks in Community waters are below their safe biological limits for stock biomass. Stock sizes and landings have declined dramatically in the past 25 years.¹ For many commercially important demersal (bottom-living) stocks such as cod and haddock, the numbers of mature fish are now less than half those of the early 1970s. Without urgent and substantial reform of the CFP, many fish stocks now look likely to collapse. The International Council for the Exploration of the Sea (ICES) suggests that the level of fishing mortality on the most important Community fish stocks needs to be reduced by between one-third and one-half, depending on the species, type of fishery, and fishing area concerned. The fishing capacity of the Community fleet however far exceeds that required to harvest the available fish stocks in a sustainable manner. The economic incentive to use this excessive capacity is considerable, and has hitherto impeded all attempts to reduce fishing effort by the amounts needed to achieve effective conservation. There have moreover been continual improvements in the efficiency (and thus the effective fishing power) of the fleet as a whole (a process known as technology creep), which has further seriously exacerbated this problem.

Most of the Community fisheries sector also suffers from poor financial profitability and steadily declining employment. Over the period 1990-1998, there has been a loss of 66,000 jobs in the catching sector, an overall decrease of 22%. Over the same period employment in the processing sector has decreased by 14%.² Current control and enforcement arrangements have been insufficient to ensure an equitable approach across the Union, undermining the credibility of the CFP and seriously reducing any incentive for individual fishermen to comply with the regulations. Stakeholders have not been sufficiently involved in policy formation. This lack of involvement has undermined support for and compliance with the conservation measures adopted.

To address these problems, in 2001 and 2002 the European Commission introduced proposals which aimed to create a more coherent fisheries management policy, combining traditional fisheries management tools (catch limits, gear restrictions etc) with a more effective fleet management policy to ensure a balance between fishing effort and resource availability. The main instrument for integrating these measures was to be long-term stock management plans. These would secure greater stability for the sector and reduce the risk of stock collapse, while moving away from the highly political yearly negotiations on catch limits. The Commission also emphasised that the CFP would take greater account of the ecosystems of which commercial fish stocks are part.

While the proposals were well received by many stake-holders, and by environmental interests in particular, they were fiercely opposed by others. The six so-called ‘Friends of Fishing’ countries (Spain; France; Italy; Greece; Portugal and Ireland) decried the measures as draconian. Following a five day long meeting of the Council of Ministers serious compromises were made in many areas, including fleet policy, the use of subsidies and the introduction of management planning.

The reformed CFP so produced is the result of over four years of analysis and consultation, but it has in effect been emasculated by the back-sliding compromises made by the Council. This memorandum evaluates whether it has any chance of succeeding where the previous policy has failed, namely in providing a sustainable future both for the fish stocks and the fisheries which depend upon them. It considers the key elements of reform as contained in the new “Basic Regulation” which implements the CFP, and a crucial aspect for the long-term reform of the CFP which has not been adequately addressed in the European context, namely the economic aspects of the management of fisheries.

2) The New CFP Legislation

In January 2003, EU Regulation 3760/92, often referred to as the Basic CFP Regulation, was replaced by a new Regulation on conservation and sustainable exploitation of fisheries resource, Regulation 2371/2002. The new Regulation is more comprehensive than its predecessor, covering a large range of issues dealt with under the CFP and setting broader objectives. In particular, it aims for sustainable use, more long-term resource management and greater coherence with other EU policies.

The main elements of the new basic Regulation are

- A stronger commitment to the protection of the marine environment
- Provision for recovery programmes for stocks falling below safe biological limits, and multi-annual management plans for others.
- A simpler fleet policy that puts responsibility for matching fishing capacity to fishing opportunities with the Member States
- National catch quotas which continue to be shared out according to historic entitlements (this cherished EU principle is known as ‘relative stability’).
- Measures to create more equitable CFP enforcement.
- Provision for the establishment of Regional Advisory Councils (RACs). They will be able to make recommendations to the Commission about the implementation of the CFP in their area.

One of the key changes enshrined in the new Regulation is the adoption of a stronger commitment to the protection of the marine environment as a fundamental objective of the CFP. Application of the ***precautionary approach*** to management is laid down in the objectives, together with sustainable exploitation, minimisation of the impacts of fishing on the marine ecosystem, and a progressive implementation of an ***ecosystem-based approach to management***. The new basic Regulation thus provides a clear legal basis for future measures intended to reduce the negative impacts of fishing on the marine environment.

It is however still not at all clear what an ***ecosystem based approach*** to management will involve in practice. Even the proposals made by environmental organisations tend to focus on monitoring and evaluating ecosystem-level impacts (for example by studies of non-target indicator species), and do not address the question of what action should be

taken as a consequence. For the North Sea, for example, we need to understand the ecosystem well enough to predict with reasonable confidence the consequences on the major fish stocks of culling large numbers of seals (or not doing so), and of fishing more or less than 1 million tonnes of sand eels per year. We also need to consider competition between species (for food and habitat) and interactions between juvenile fish as well as predation by adults. In all of this the science is very difficult. Much work has been done, but much further work is still required in understanding marine ecosystems, before it will be possible to make such predictions, or to incorporate them in management advice. Existing international research programmes in this area are coordinated by ICES and need to be enhanced, and such work could and should be given a much higher priority, compared with routine stock assessments. This is long-term research, and while the results may not be available for some time yet, it needs to be carried out with much more urgency than it has hitherto.

Meanwhile, there is an urgent need to incorporate the *precautionary approach* into management procedures much more effectively. Management targets should be set at precautionary levels, allowing for the possibility of stock collapse through recruitment failure. We consider that the precautionary approach means managing European fisheries on the basis of probable outcomes, rather than certainty (which is unattainable). Target levels of fishing mortality should be set on the basis of the balance of probability of potential stock collapse, i.e. using criteria comparable to the levels of proof required in civil law (broadly equivalent to a 50% confidence level), rather than that of ‘beyond reasonable doubt’, the criterion required by criminal law (and broadly equivalent to the 95% confidence level normally required by scientific convention), since by the time such confidence levels are achieved it is usually too late for effective remedial action.

Among the measures adopted in the new Regulation in order to achieve conservation and sustainability are provisions for the adoption of *recovery plans* for stocks which are already over-fished, and *long-term management plans* for other stocks. Both aim to introduce a much needed long-term approach to resource management, even though the final provisions are substantially weaker than the Commission’s original proposals. A good (and very simple) example of this approach is the management procedure for the Icelandic cod stock, which states that the total allowable catch (TAC) each year is just 25% of the assessed spawning stock biomass, which is believed to be a sustainable level of exploitation. This may of course be compared with the recent level of exploitation on North Sea cod (i.e. landings in excess of 150% of SSB since the mid 1970s[†]) The benefits of a low level of exploitation in terms of security of recruitment, and stability of catches, are well-known, and also well exemplified by the major EU pelagic stocks (e.g. North Sea herring and Western mackerel) which are also subject to much lower levels of exploitation.

The objective of recovery plans, such as those adopted, albeit with limited success, for the Irish Sea cod and whiting stocks in recent years, is to increase the likelihood that stocks recover to within safe biological limits within a reasonable time, and a time-frame must be specified as part of the plan. The fatal weakness of the new legislation is that no deadlines are set for when recovery plans must be established. Without firm deadlines, the negotiations could continue for a very long time, as is indeed suggested by the still ongoing negotiations over cod and hake recovery plans, first suggested in the spring of

[†] This is only possible because the exploitable biomass exceeds the SSB, because it includes juvenile fish which are not yet able to spawn. The Icelandic policy is therefore subtly and substantially more restrictive than it sounds

2002. The recently announced indefinite postponement of these recovery plans [insert reference] is outrageous, and may be the last straw that finally drives the cod stock to extinction.

For stocks within safe biological limits, management plans may be set up. The requirements for the use and the content of these plans as adopted are much more vague than the original proposal to introduce multi-annual management plans for all commercial stocks. Management plans are to be adopted to keep stocks within safe biological limits. Like the recovery plans, they are required to take interactions between different stocks and fisheries into account. Examples of excellent practice in establishing long-term approaches to management can be found in Iceland, Australia, New Zealand and South Africa, where simple “control rules” for operational use have been adopted after extensive simulation studies of both the stock dynamics (including the possibility of recruitment failure) and the effects of both natural fluctuations and observational errors on the whole assessment process. The adoption of such procedures in the EU has unfortunately been prevented by the retention of a system in which horse-trading over TACs and catch quotas is an integral part of the process.

The Council regrettably did not even agree to delegate responsibility for annual implementation of the recovery and management plans, including setting the catch limits, to the Commission. This was intended to put an end to the annual horse-trading over fishing quotas, which now looks likely to continue, unless the same effect can be achieved by the changes to the operational process of establishing and updating conservation measures which will be required to incorporate Regional Advisory Committees (see below) into the process.

The development of recovery and management plans, based on the precautionary and ecosystem-based approaches to the maximum extent possible, would represent a major step forward for the management of European fisheries. Such plans involve politically sensitive choices, and will therefore presumably need to be ratified by the Council (or a body reporting directly to it). They should however have continuing validity, and need therefore only be prepared or revised periodically (say every 5 years). They should most certainly not be revisited every year. Such longer-term plans can provide a major tool for depoliticising the routine process of fisheries management, and will moreover set the major constraints within which Regional Advisory Committees will operate to find effective means to implement them.

The Commission’s original proposals envisaged much more extensive use in the future of *direct controls on fishing effort* (e.g. days at sea), rather than catch quotas which have been the most important conservation measures under the CFP until now. It is now widely recognised that there are severe problems with management by TACs and catch quotas, and that there would be substantial advantages in control of fishing effort.³ Briefly, the problems with management by catch quotas (including individual transferable quotas or ITQs) are that they require

- High quality scientific assessments of the state of the stocks, so that TACs can be set accurately allowing for natural fluctuations in recruitment and stock size;
- Excellent monitoring and recording at the ports of the quantities and origin of landings (in effect a complete census of landings is required); and
- High levels of enforcement activity (inspections) at the ports and at sea.

Unless these requirements are met, TACs and quotas will fail to achieve their objective of controlling the level of exploitation, and will be evaded by mis-reporting of the quantities, species or origin of catches, by illegal and unrecorded landings (“black fish”),

and by discarding of over-quota and by-catch species. Regrettably, experience has shown that these conditions are not met sufficiently well in European waters, and all the problems mentioned have become endemic. The problems are especially severe for so-called precautionary TACs, which are set on the basis of recent average catches, in the absence of adequate scientific stock assessments. Their effects are generally counter-productive (because they restrain fishing unnecessarily if and when stock sizes are growing, and fail to restrict fishing and so protect stocks when they are declining). Unfortunately the majority of the TACs set under the CFP are of this nature, because scientific assessments which are accurate enough for effective control by TAC (stock size accurate to within 10%, say) are very difficult and very expensive to carry out.

All of these problems would be considerably reduced if fishing effort were controlled directly, because

- It is much easier (and cheaper) to enforce restrictions on fishing effort (expressed in rough and ready units such as days at sea), especially if there is extensive use of satellite monitoring;
- Controls on fishing effort translate roughly but directly into restrictions on the percentage of the stocks which are caught, and so “track” natural fluctuations of stock size automatically, without the need for precise scientific assessments (see box 1); they also eliminate the problems that apply to precautionary TACs

There is in principle no need for catch controls as well as effort controls, so all fish caught may be landed, eliminating the discard problem.

Against this, it must be admitted that effort controls which can be enforced effectively (i.e. at the levels of days at sea) are rough and ready in terms of the fishing mortality so generated, and they do not permit fine tuning on a stock-by-stock basis, which is in principle possible with TACs. However, if carefully designed, adequately enforced effort limitations, disaggregated by vessel size, fishing gear, fishing area and time of year, would almost certainly be more effective than a widely evaded system of TACs and quotas. Effort limits can also easily be allocated to individual vessels, and so become property rights which establish individual ownership of access to the resource (not ownership of the resource itself), thus capturing most of the economic benefits of ITQs (see below), without the need to maintain the precise stock assessments these would still require.

Effort controls have historically not been used extensively as part of the CFP, because it is difficult to equate effort of different types, and so establish a fair allocation between countries and groups of fishermen. However, once these initial allocations have been established, this is no longer a problem, since any adjustments of allowable effort levels can be made on a *pro rata* basis. In this case the fishing effort allocations of all participants in a given fishery (as defined by fishing area and gear) may be adjusted upwards or (more usually) downwards by the same proportion, thus preserving “relative stability”.⁴

There is a further significant problem insofar as effort restrictions will allow progressively higher fishing mortality over time because of increases in fishing power through improvements in efficiency (“technology creep”), so provision needs to be made at the outset for some form of progressive claw-back of effort in the future, but this need not be a major problem.

Box 1

The tonnage of fish of any stock caught is approximately proportional to the product of the exploitable stock biomass and the level of exploitation (which is usually expressed as the fishing mortality rate). This last is in turn, for demersal fish, approximately proportional to the total fishing effort (allowing for the fishing power of the vessels involved). Thus levels of fishing effort or mortality can be translated as necessary into catch/biomass ratios, and vice versa. A long-term control rule based on a catch/biomass ratio (such as that used by Iceland) does not therefore require that operational regulation of the fishery must be based on the use of TACs and quotas. In fact, it is the (all roughly equivalent) levels of fishing effort, fishing mortality or catch/biomass ratios which are the usual goal of direct conservation measures, and which have staying power. It is moreover the translation of these into absolute levels of catches, through scientific assessments of the absolute stock biomass (in tonnes), every year, and which is required only for management by TACs and quotas, which is difficult, demanding of scientific manpower, and therefore very expensive. Annual TACs need to track the natural short-term fluctuations of stock size, whereas the other measures do not. Working with management based on TACs and quotas has put the scientists on what has aptly been called the “TAC treadmill”, to the great detriment of the really more important scientific studies of the ecosystem interactions (competitive and predator/prey relationships) and the factors determining recruitment, both the ubiquitous natural fluctuations, and the long-term stock size dependence which can and does lead to stock collapses.

Overall, it is difficult to escape the conclusion that control of fishing effort would be a better blunt instrument for implementation of the CFP than TACs and quotas, and is probably the best such instrument available. It is therefore regrettable that the Council did not agree to implement a properly engineered system of effort controls. Instead an ad hoc system was devised over-hastily, with many damaging and illogical derogations and special exceptions, which seem to have been determined much more by political expediency than by the need to conserve fish stocks. What is more, this system is to be applied as well as (rather than instead of) TACs and quotas, leading to what the fishermen will certainly regard as double jeopardy, and thus probably the worst of all possible worlds. There is indeed a serious risk that the Council’s decisions will serve to discredit effort control as a valid and useful conservation measure rather than contributing to the recovery of the stocks. This would be a serious retrograde step.

Adoption of fishing effort as the primary object of conservation measures would in fact also remove the need to set TACs and quotas annually, eliminating at a stroke the worst problems of what has been described as the “Brussels bottleneck”, i.e. the December Council meeting. It is therefore extremely well adapted to a new regime in which most of the operational management decisions are de facto devolved to Regional Advisory Committees (see below). The target levels of fishing mortality (and thus, by simple arithmetic, the reductions or increases of fishing effort required in the medium term) would of course still need to be decided periodically, but this would be as part of the longer-term strategic planning process, of which Council approval would presumably still be required periodically for the foreseeable future. Direct conservation measures (such as control of fishing effort), coupled with appropriate technical measures (mesh size limits, closed areas, closed seasons etc), are much to be preferred to TACs and quotas. I strongly advocate the implementation as a matter of urgency of a properly designed and well-

considered system of effort control, to replace TACs and quotas wherever possible, but especially where precautionary TACs are in force.

One of the most fundamental and enduring problems of the Common Fisheries Policy has been the chronic overcapacity of the EU fleet. This should have been tackled through successive Multi-Annual Guidance Programmes, but it has not been effectively tackled through these or by any other means. As new technology makes fishing vessels ever more efficient, the capacity of the fleet needs to be reduced to maintain a balance between fishing capacity and the quantities of fish that can safely be taken out of the sea as a sustainable harvest. The failure of the EU institutions to deal effectively with this serious and persistent problem is further evidence of the lack of any real political will to address the real problems of fisheries management in Europe .

The problems associated with the control and enforcement of CFP regulations are two-fold. Firstly, insufficient enforcement activity results in continued high levels of 'black' fish landings. In the case of Scotland, I have been told that at least 10% of the catch continues to be landed illegally. Secondly, fishermen working in European waters face different levels of control and enforcement depending on the national authorities in charge. There is a widespread belief that enforcement standards are variable and often prejudiced in favour of Member States' own nationals. This lack of equity undermines the credibility of the CFP and thus the likelihood of compliance.

New measures have however been adopted to strengthen satellite vessel monitoring by extending its reach to vessels over 18 metres overall from 1 January 2004 and to vessels over 15 metres from 1 January 2005. Indeed, now that satellite position fixing systems such as GPS are ubiquitous and inexpensive, the pace of adoption is surprisingly slow. There seems to be no substantial reason why satellite monitoring should not be extended to all licensed fishing vessels in the next five years or so. Similarly the technology now exists for direct electronic reporting of the records of fishing activity on board to be made obligatory in the near future. The potential for the elimination of evasion and abuse of the regulations by these means is considerable. The extended use of satellite and electronic tracking provided for in the new Regulation is likely to prove extremely valuable to national enforcement authorities. Its extension to all licensed fishing vessels over 10m in length by 2005 or very soon thereafter should be a high priority.

The new basic Regulation contains some important provisions on governance, notably the concept of Regional Advisory Councils (RACs). A RAC will cover a sea area under the jurisdiction of at least two Member States and provide advice to the Commission and the Member States on fisheries management in a given area, either in response to consultation by the Commission or on an own initiative. It will be composed of representatives of all parties with an interest in fisheries management in a given sea area or fishing zone, including the fishing industry, environmental and consumer interests, regional and national authorities and the Commission itself. Regional management is widely seen as crucial to solving some of the fundamental problems of the CFP, especially by eliminating the "Brussels bottleneck" (especially the yearly horse-trading on catch limits) and by bringing fishermen into the heart of the management system.

It is to be hoped that the establishment of RACs will allow the Council to focus on medium to long-term strategy rather than continue to get bogged down in continual yearly and highly political negotiations over TACs and quotas. The RACs should moreover have a major technical management role, and it is to be hoped that RACs will be the key to establishing an attitude of ownership of and responsibility for the fisheries

among all stakeholders through peer group pressure. Experience in Australia, New Zealand and the US has shown that *depoliticising* fisheries management has been a key factor in achieving more sustainable fishing practices and depoliticising the management system in Europe could similarly be a major step forward.

Key considerations in the successful establishment and operation of the RACs will be:

a) Their “rules of engagement”

It is crucial that the advice of the RACs is accepted and implemented by the Council, except in exceptional circumstances. This means that the RACs have to employ the management tools authorised by the Council, and not attempt to reinvent the CFP. Conversely, the circumstances under which the RACs advice would be rejected by the Council really would have to be exceptional.

b) Their terms of reference

For the moment, it is probably right that the role of the regional councils should be to advise rather than to manage. In a fisheries management system as complicated as that of the EU, it will take time to establish and run these Councils, in the meanwhile overall responsibility may remain with Fisheries Ministers. A possible form of words might be, for example “To advise on the most appropriate management measures needed to achieve the medium and long-term strategic goals set by the Council of Ministers, consistent with the provisions of Council Regulations”

c) Their size and procedures

If all stakeholders are to be represented on the RACs, some of these bodies will be very large indeed. In the case of the North Sea there could be over 100 industry representatives alone. A two tier structure is therefore likely to be necessary. Annual ‘open forums’ of all representatives could meet to debate issues and elect (but not mandate) an Executive Committee of say 9 industry representatives, 6 managers, 3 scientists, 3 economists, 3 environmental and 3 consumer representatives (a total of 27, which is still probably too many). The Executive Committee members could have (say) 3 to 5 year terms of office, to promote a medium-term perspective, and could meet quarterly, preferably under the leadership of an independent chair. Their relationships with local, regional and national government need to be carefully thought out.

3) Economic Aspects of Fisheries Management

Marine fish stocks have traditionally usually been regarded and managed as common property resources. Common property resources, as is well known, are subject to economic problems of over-exploitation and economic waste—the so called “tragedy of the commons”. In fisheries, the tragedy of the commons manifests itself in:

- Excessive fishing fleet capacity and fishing effort
- Depleted fish stocks
- Low profitability (operating surpluses near zero)
- High inter-annual variability of stock size and catches
- Excessive risks of collapse of the fish stocks

The reasons why the common property arrangement is so economically and biologically damaging are not difficult to understand. Under common property management, the fishermen are basically forced to over-exploit the fish stocks, even against their own better judgement. When many fishermen have access to the same fish stock, each has

every reason to grab as large a share of the potential yield as possible lest the other fishermen reap all the benefit. Prudent harvesting by one fisherman in order to maintain the stocks, will mostly only benefit other more aggressive fishermen. Thus, an individual fisherman's best course of action is to try to grab his share as quickly as possible while the resource is large enough to yield some profit. As a result, the fishery virtually expands to an excessive level of fishing effort, leading to reduced or even collapsed fish stocks, and little or no net economic benefit.

The key issue for the success of a fisheries resource management system is how to overcome this catch-22 situation, whereby fishermen are in effect forced to over-exploit the resource on which their own long-term future relies. According to many fisheries economists the long-term solution to the tragedy of the commons lies in some form of property (or access) rights based approach (refs).

Approaches based on property rights attempt to eliminate the common property problem by establishing private property rights over the fish stocks. Several types of property rights regimes have been employed across the world's fisheries. These include territorial use rights, individual catch quotas and community fishing rights. Individual catch quotas attempt to solve the common property problem not by defining property in the fish stocks themselves but by allocating individual harvesting rights from these stocks. Thus, individual catch quotas constitute an indirect property right. Transferable or divisible catch quotas are usually referred to as individual transferable quotas or ITQs, and may be denominated as percentages of a Total Allowable Catch (TAC) rather than in tonnes of fish *per se*.

Permanent or tradable catch quota entitlements make it advantageous for the quota holder to preserve and rebuild the marine resources. Larger fish stocks mean more profitable fishing. Since the 1970s there has been a clear trend toward the adoption of ITQ systems. Already several major fishing nations, including New Zealand, Iceland and Australia employ ITQs as their primary fisheries management system.

This does not mean, however, that ITQs are necessarily the best form of management in all fisheries. For instance, a prerequisite for this method is that the individual quota constraints should be enforceable. In addition, since they are really just a way of implementing, albeit much more effectively, the system of management by TACs and quotas, they suffer from all the disadvantages of this system in general. In particular, they still require high levels of investment in scientific research and monitoring, in catch reporting and recording, and in effective enforcement. It is therefore not surprising that they have been applied most successfully by relatively prosperous (and often small) countries, with populations which are conservation-minded and law-abiding... Since these pre-conditions are not uniformly met within the EU, it is likely that some other way of establishing property (or access) rights, such as individual (vessel) effort allocations would achieve most of the economic benefits more effectively.

As a first step towards addressing economic aspects of fisheries management in the EU more effectively, workshops on economic management were held during 2002. These workshops involved representatives of fisheries administrations, the fisheries sector and other interests to discuss the scope for provisions within the CFP or Member States fisheries management on tradable fishing rights (individual or collective). In recognition of the urgent need for the economics of fisheries to be taken as seriously as the biology of the CFP, ICES has been urged to take on an economic advisory role in addition to its

marine scientific role. ICES has however consistently declined to provide economic advice, conscious of the fact that it lacks the expertise to fulfil such a role.

It is vital that the long-term economic management of the fisheries is considered more seriously and effectively than it has hitherto. Conservation measures will not work as long as fishermen's livelihoods depend on the over-exploitation of the fish stocks. Indeed, it is highly unlikely that there will be sustainable fisheries in Europe until fishermen have strong economic incentives to protect the stocks. There is of course a close relationship between levels of catches and fishermen's incomes, although this is modulated by the price of fish, which varies greatly in the short term and more gradually in the long term. However, there is equally a close relationship between catches, stock size and fishing effort (see Box 1), and moreover between fishing effort and the costs of fishing. The profitability of a fishery is in fact sharply reduced by excessive fishing effort (which increases costs, and reduces stocks, catches and earnings). Long-term profitability therefore depends crucially on achieving and maintaining appropriately low levels of fishing effort (even leaving aside the higher risk of stock collapse if exploitation is excessive).

A more fundamental, if more prosaic, issue is how economic information can be generated and used. Economic information is typically limited and difficult to obtain, yet its quality and availability is crucial to the success of fisheries management. It remains difficult to gain access to economic data in the UK and on European level. Fisheries economists, conservationists, and fisheries industry representation are united in their criticism of the lack of economic information collected or made available by the Government. Important decisions on fisheries management and long-term planning are in fact taken in the Council and within the Commission without rigorous economic (as distinct from scientific) advice.

Unfortunately the Commission and the Member States may not have the option of a gradual introduction of market conditions to provide for sustainable fisheries. In October 2002 ICES recommended a moratorium on cod fishing in the North Sea—other fish stocks may follow shortly to the brink of collapse. To many the ICES recommendation for the North Sea in 2002 was all too similar to the moratorium the Canadian government was forced to impose in 1992 on its cod fisheries. The failure to act earlier cost the Canadian government dearly, and forced many Atlantic fishermen out of their jobs. In the event, the December Council failed to impose a moratorium on the North Sea. It remains to be seen whether the 65% cut in fishing effort that was agreed to will be enough to allow the stocks to recover.

If the EU institutions are not prepared in the short term to accept the employment implications of an access or property based management system, some other economic measure is likely to be required to allow the most vulnerable stocks to recover. In the UK, a powerful lobby of the fishing industry, environmentalists and academics has emerged arguing for large sums of 'transitional aid' as part of recovery programmes. The argument is that transitional aid would allow the industry to accept the short term losses associated with any meaningful conservation measures.

These arise because the only way to conserve fish is to kill fewer of them, at least as a proportion of the stock size. Thus any conservation measure which has any chance of working *must* involve significant reductions of catches, and therefore of earnings, in the short term. In the long term, after stock sizes have recovered, but still fishing at the same lower level of exploitation (expressed as a catch/biomass ratio, say), catches and earnings

should recover, leading to longer term gains (especially of profitability, since the aggregate costs of fishing have been reduced). However, in the short term, if it doesn't hurt, it won't work. ‡

Transitional aid is could only be justified to assist an industry to make a well-defined transition, from one state to another. In the case of fishing this invariably means a transition to a future state with permanently reduced fishing effort and capacity. Given technological advance in particular, reduced fishing effort and capacity means reducing the number of fishermen. For this purpose exit payments in the form of decommissioning grants, and payments for permanent buy-back of any licenses or individual access rights would be appropriate.

In some cases, however, more drastic action than reduction to some future sustainable level is required. This is, for example, the case of a temporary but total closure of a fishery to allow for a greater chance of recovery of a stock from a state of actual or imminent collapse. This is also the case for the North Sea cod at present, where the agreed TAC corresponds to a 65 % reduction in effort, which is more than the circa 50% reduction which is believed to be necessary in the long term. In such cases, additional temporary tie-up compensation payments (somewhat analogous to set-aside payments to farmers) could be justified. These would provide time-limited compensation for those fishermen who are forced not to exercise their access rights. For example, compensation for temporary suspension of entitlements might be set at (say) 10 per cent of past average daily earnings per day's suspension (to allow for the reduction of short-run operating costs as well as of earnings). Such tie-up compensation should be available only for the duration of the exceptional conservation measures, and would cease as and when the normal long-term conservation measures were restored. Such transitional aid would go some way towards reducing the violent opposition to complete closure experienced in December 2002 in relation to North Sea cod fisheries, on the grounds that the industry could not survive a complete cessation of a major part of its income for one year. A possible model is set out in Box 2

Transitional aid is however problematic for several reasons. As the Canadian experience has shown, it can take a very long time for stocks to recover, if at all. Thus, estimates of the time needed for the cod stocks to recover range from 3 to 4 years to ten or more years. It is, however, not unheard of for fish stocks to recover. North Sea herring was fished out but did recover after a fishing moratorium in the mid-1970s, and now appears to be exploited on a sustainable footing.

Another problem is how to ensure that transitional aid does not end up contributing to maintained or even increased capacity of the fleet at a time when it is vital to reduce capacity. The problem of 'technology creep' is all too familiar. It would be manifestly absurd to allow stocks to recover only to over fish them again with an ever more powerful fleet financed by transitional aid.

‡ Note that this also applies to closed areas (aka "no take zones") since if these merely displace effort elsewhere (in space or time), they will have little beneficial effect. Only if they are large enough to cause a significant reduction of catches, say in the order of 30% or more, can they be expected to be effective.

2.

Box 2

Short-term and long-term aid to fisheries: a possible package of buy-out payments and resource rentals

1. 1. Compensation for *permanent* suspension of entitlements (effort reduction), at circa the net present value of expected “rent” (operating surplus) i.e. (say) 200% ($20 \times 10\%$) of past average daily gross earnings (per day of effort bought out).
2. 2. Phased introduction of significant *resource rentals* for entitlements (e.g. charges at level of circa 10% to 30% of gross earnings, as either charges for licensed or utilised entitlements (days at sea) or as a levy on landed value)
3. 3. For the North Sea in 2003 a 65% reduction of effort is implied by agreed TACs. A reduction of about 50% is believed to be desirable in the long-term (so a permanent buy-back is needed) and thus only 15% would be eligible for *transitional aid*.
4. 4. This means that in future the potential for recovery of fishing effort (as distinct from catches and earnings, which will recover by a larger amount if and when the stocks are rebuilt) is probably only from about 35% of former levels to 50% of former levels.(i.e. about a future 45 % increase above this year’s low level).
5. 5. In bald terms this means that (ideally) 50% of the current capacity should be decommissioned, and a further 15% (temporarily) tied up. Anything beyond a 33%: 33% split would be highly undesirable for the future (a hostage to fortune).

Transitional aid is however problematic for several reasons. As the Canadian experience has shown, it can take a very long time for stocks to recover, if at all. Thus, estimates of the time needed for the cod stocks to recover range from 3 to 4 years to ten or more years. It is, however, not unheard of for fish stocks to recover. North Sea herring was fished out but did recover after a fishing moratorium in the mid-1970s, and now appears to be exploited on a sustainable footing.

Another problem is how to ensure that transitional aid does not end up contributing to maintained or even increased capacity of the fleet at a time when it is vital to reduce capacity. The problem of ‘technology creep’ is all too familiar. It would be manifestly absurd to allow stocks to recover only to over fish them again with an ever more powerful fleet financed by transitional aid.

It is clear that if governments are to be expected to finance tie-ups to increase the likelihood of compliance with conservation measures, several conditions will have to be met. Transitional aid needs to be linked to a recovery plan with a clearly stated time-table for stock recovery. If stocks fail to recover within that period further, permanent, decommissioning will become necessary. Recovery plans will first need to be agreed. Transitional aid would need to be monitored closely, since it must not be allowed to contribute to increased capacity.

Transitional aid may be advisable in the temporary closure of an entire fishery but coastal communities still need to face up to the fact that the fisheries will provide less and less

employment as technology continues to improve. It is extremely important to find ways of supporting the development of alternative employment opportunities in areas affected by long-term decline of the fishing industry. Preferably, for reasons of social cohesion, these should be in the marine or marine-related sectors.

4) *Synthesis*

It is regrettable that the generally excellent and widely supported proposals made by the European Commission to reform the Common Fisheries Policy have been emasculated by the Council of Ministers, which has been held hostage by some Member States acting in the perceived (but misconceived) short term interests of their fishing constituencies, rather than for the long term common good, or in the interests of the conservation of the marine resources of the Community.

The persistent problems of fisheries management around the world are largely due to a vicious interaction between biological and economic factors involved, leading to the well known failure of the free markets to deliver an acceptable outcome, appropriately known as the “tragedy of the commons”. These problems have only been overcome when fishermen have been given a long term interest in the health of the fish stocks (and the ecosystem) on which they depend, by the allocation of some form of property rights. Some form of economic intervention in fisheries management is not only necessary but desirable.

Existing tools for fisheries management are excessively reliant on TACs` and quotas which have demonstrably been ineffective in the European context. Greater use could and should be made of alternative direct conservation measures, such as control of fishing effort, as well as appropriate technical conservation measures, in future.

Fisheries management in Europe has become excessively politicised, largely because of the annual renegotiation of TACs by the Council of Ministers (the “Brussels bottleneck”). Only long term strategic plans need to be ratified (from time to time) at a political level. Once these are agreed, operational management could and should be devolved to appropriately constituted non-political Regional Advisory Committees.

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¹ See <http://www.ices.dk> for the official ICES scientific assessments and advice

² Commission figures available at http://www.europa.eu.int/comm/fisheries/policy_en.htm

³ See e.g. Shepherd, J. G. (1997). "Quota-hopping mad." *Science and Public Affairs* (Summer 1997): 9-10; Shepherd, J. G. (2001). “Fisheries Management: Breaking the Deadlock”, in *Sea-power at the Millennium*. G. Till (editor), Sutton Publishing Co. (for Royal Naval Museum Publications): 233-235 (also available at <http://www.jgshepherd.com>).

⁴ See e.g. “Fishing Effort Control : Could it work under the Common Fisheries Policy ?” by J G Shepherd, submitted to Fisheries Research, 2003, also available at <http://www.jgshepherd.com>.