COMMISSION OF THE EUROPEAN COMMUNITIES

COM(93) 664 final

Brussels, 15 December 1993

COMMUNICATION FROM THE COMMISSION TO THE COUNCIL
AND THE EUROPEAN PARLIAMENT

THE NEW COMPONENTS OF THE COMMON FISHERIES POLICY AND THEIR PRACTICAL IMPLEMENTATION

(Regulation (EEC) No 3760/92)

THE NEW COMPONENTS OF THE COMMON FISHERIES POLICY AND THEIR PRACTICAL IMPLEMENTATION
(Regulation (EEC) No 3760/92)

Introduction

Following its 1991 report on the common fisheries policy (Anon., 1991a), the Commission put forward a number of proposals which included widening the range of management tools available under the new basic Regulation; they were to be made more multiannual and even multispecies in application. These proposals raised as many hopes as they aroused concern. Some may have seen in them, wrongly, a way of avoiding unpopular decisions such as reducing overcapacity. Others feared that more flexible management would result in making fraud easier or would, in the long term, render the principle of relative stability devoid of substance.

These contradictory expectations and fears did not, however, impede the adoption of Regulation (EEC) No 3760/92, which has opened the way to various innovations. The way forward now depends first of all on clearing up a number of misunderstandings. Accordingly, the first part of this paper attempts to clarify various ideas which are familiar to scientists but which often generate confusion outside scientific circles. There is no question, however, of completely changing the way the CFP is managed. The best approach will be to identify specific fisheries suited to a particular type of management; this is why it is necessary to study the conditions which make a given management tool more useful or less, which is the aim of the second part of this document.

I. AIMS AND STRATEGIES

An idealized approach needs to distinguish between:

1. *defining precise, explicit objectives assigned to the management of each fishery in the long term (e.g. maximizing the value-added provided by fishing activities) or medium term (e.g. allowing sufficient reproductive potential to regenerate);*

2. *choosing the <u>strategy</u> best adapted to the objective selected (e.g. to steadily reduce an exploitation rate by a given percentage over a stipulated period);*

3. *applying the exact <u>management tools</u> which will enable the strategies selected to succeed (e.g. licences specifying the permitted power for each vessel, at the same time as a plan for the progressive buy-back of fishing rights by the public authorities).*

I-1 <u>Intrinsic objectives and their mutual compatibility</u>

Analysts independent of the CFP have stressed many times the absence of explicit and precise objectives. This view is surprising insofar as the basic legislation lists a number of objectives: to ensure stable supplies at the best cost, to secure adequate and lasting earnings for fishermen, to limit the impact of fishing on ecosystems and so on. However, the problem resides precisely in the variety of objectives. Each one taken individually corresponds to a legitimate goal, but it is difficult or even impossible to satisfy them all simultaneously. These incompatibilities have been analysed in several works, most recently by Anon., 1992a, and Horwood and de Griffith, 1992.

The greater the reduction in fishing effort, the more the environmental impact is reduced, giving the best likelihood of abundant stocks and therefore high yields. If the exloitation level selected is very low, however, this choice would be made at the expense of jobs at sea and even of the volume of catches. There are many other examples of incompatible objectives. The Commission's proposals have been decried by some as "biologically based", as opposed to the need for a socio-economic approach. But the problem does not lie there. At a strictly biological level there are two extreme standpoints possible: either abolish fishing altogether and perfectly preserve marine ecosystems or simply avoid reducing breeding-fish numbers to a level that might endanger the survival of a whole stock. Between these two extremes the selection of exploitation level involves arbitrating between the positions of the various actors.

The most classic objective assigned to management of fisheries is probably the maximization of balanced production (maximum sustainable yield) (See Annex I). This was been much more than some "diktat" imposed by the biologists; it offered the possibility of consensus around a simple concept. Some people have felt that this objective has led to over-severe restrictions and hope that a "socio-economic" approach would mean that these restrictions could be avoided. This may be correct if priority is given to safeguarding jobs at sea. It is wrong, in more general terms, if the wider objective is to maximize the earnings from fishing activities. In this latter case, a lower exploitation level even than maximum sustainable yield has to be considered (see Figure 1b in Annex I). This effect is stressed in all the basic works on fishery economics.

It is therefore generally impossible to maximize jobs, profits, output and abundance of resources all at the same time. And a further incompatibility of goals has also attracted the scientists' attention, without consequences necessarily being drawn in terms of management. This is the impossibility of stabilizing year-on-year output and fishing effort, a problem particularly well illustrated by Shepherd (1990), from which Annex I takes its figures and conclusions.

No way of managing stocks will be able to shelter them from the influence of natural variations. Fluctuations in abundance from one year to the next are made more serious by intense exploitation: year-on-year changes in breeding success have a major impact on stocks already reduced to only one age class by very intense utilization. But no management precautions can prevent variations over time in the abundance of fishery resources. Given this fact, if the exploitation rate is stable - making it perhaps possible to stabilize activity levels - production will fluctuate from year to year. If the aim is to avoid year-on-year variations in output it will be necessary to vary the exploitation level. This is not always enough, however, and when a stock collapses it is no longer possible to maintain the level of catches. The more the level of resources varies, the more incompatibility there is between stabilizing output and stabilizing fishing effort levels. On the other hand, reducing the intensity of exploitation can help to contain the problem because the year-on-year variations in the size of a stock will be less. Yet the difficulty cannot be eliminated altogether, particularly since actual variations in stocks are obscured by inaccuracies in the scientists' annual assessments of the status of resources.

Since the various conceivable objectives are incompatible, choices have to be made. At the least they need arranging in hierarchical order, with the necessary arbitrations being made between them, including political choices (one cannot maximize both the return to producers and the return to consumers). As an ideal, it is conceivable to set an overall objective reflecting the weightings of individual objectives. It is difficult under the CFP, however, to achieve a consensus regarding the relative importance to be attached to the profitability of fishing enterprises as against maintaining jobs at sea, or on the relative weight to be given to producers, processors and consumers. Even for a single Member State, priorities are liable to vary over time so that an objective could become obsolete before being attained (cf. Horwood and de Griffith, 1992). It is sometimes easier to obtain agreement on a management strategy than on the composite objective that it seeks to maximize. An example is provided by the use of "F0.1" as a reference point, as long practised in Canada (see Annex I). This option, as compared with exploitation based on "Fmax", i.e. maximizing output, accepts slightly less output in return for higher yields, extra biological security and some reduction of the year-on-year variability in production. But it is pointless to try to identify F0.1 with a precise bio-economic factor.

It remains essential that the main lines of the CFP, probably with flexible variations according to fishery, should be based on full knowledge of the consequences with respect to the objectives that might be chosen. This involves, as a preliminary, the recognition that there are incompatibilities between different goals. For each fishery a clear hierarchy of objectives has to be established, unless these can be individually weighted and combined.

I-2 Medium-term objectives and decision-making procedures

(a) Significance of the current situation

Many fisheries are in a situation of very serious over-exploitation, the problem not being so much to decide if production or value added should be maximized in the long run but to determine for the medium term how to initiate a reduction in fishing effort. An initial definition of over-exploitation was based on the idea that it would be possible to increase production in the long term by reducing effort. Another definition, explicitly integrating economic considerations, regards any stock as over-exploited if one could increase the return from it by reducing exploitation intensity (see Figure 1b, Annex I). For the majority of the stocks in Community waters, at least the demersal and benthic ones[1], the over-exploitation is self-evident whatever the standpoint adopted. In many cases, indeed, the abundance of reproductive fish is reduced to a level where the future of the resource is at risk.
In such circumstances, reducing exploitation would make it possible both to increase the chances of adequte recruitment in the long term (number of fish entering the fisheries annually) and make better use of any recruitment at all, whether at high or low level, by avoiding situations where not enough fish are able to grow to sufficient size before being caught. Arguing over the ideal level of exploitation now is pointless, it being more urgent to set a realistic goal for reducing the exploitation rate in the medium term.

(b) Short term and medium term: need for risk assessment

Two factors combine to increase the difficulties: (1) uncertainties about the current state of resources and the evolution of factors other than fishing (hydroclimate), and (2) the current decision-making process. It is impossible to obtain a perfect picture in real time of the state of resources. More research work would help to reduce uncertainties but not to eliminate them altogether. It is also impossible to guess whether circumstances will be favourable or not to reproduction in years to come. Some progress on this is conceivable but will inevitably be limited. Managers of fisheries have to accept that decision-making in a context of uncertainty is inevitable. Arguing in terms of the burden of proof is pointless: final certainty is out of reach.

---

1 Benthic species live on the seabed. They include in particular the flatfish (plaice, sole, etc.) but also monkfish, crawfish and shellfish.
Demersal species live above the sea floor. Roundfish of the cod family (haddock, coalfish, whiting, hake, etc.) are the main ones. Pelagic species, such as sardines and tuna, live at mid-depth or near the surface.

When scientists recommend a reduction in exploitation to allow the recovery of a stock's reproduction potential, they cannot state for certain that otherwise the stock will collapse or guarantee that, if recovery takes place, there will be good reproduction rates in years to come. Their diagnoses and forecasts have to be assessed in terms of risk (cf. Anon. 1992a; 1993a). The right link between scientific advice and the decision-making bodies is particularly difficult to design. The scientific authorities are currently making a major effort to improve the "convertibility" of their advice. For their part, the decision-makers must be prepared to discuss actions in terms of risks and probabilities. It is not acceptable that decisions involving an immediate sacrifice should be put off because there is a possibility that the situation is less serious than the scientific evaluation suggests.

In this way, necessary decisions are constantly being put back.

(c) Failure to control exploitation rates

Without being an explicit choice, maximization of production is one objective which has underlain the discussions over the CFP. In view of the situation of stocks at the time when the policy was put in place, there should have been a medium-term strategy to reduce exploitation rates. What in fact has happened is that, each year, the reduction needed was not thought immediately essential and was postponed. The guiding principle has been an attempt to stabilize exploitation rates rather than reduce them. But even this modest target has not been met. In many cases TACs have been set at levels much higher than actual catches. Exploitation rates have thus increased unconstrained. This is true, for example, for Atlantic stocks of monkfish. In other cases, because of the attendant uncertainties, the TACs proposed by the Commission on the basis of the scientific advice have been systematically revised upwards. Over one year perhaps such revisions might retrospectively have proved well-founded. But systematic application of this approach, year after year, has led to a worsening of the situation of stocks. In this connection it would be worth examining the evolution over ten years of various round fish fisheries, for example coalfish off Western Scotland.

(d) Need for a multiannual perspective

A better-structured discussion has therefore to be instituted between scientists and decision-makers, the scientists clarifying their firm opinions as well as their doubts and the decision-makers not sheltering behind the uncertainties as an excuse to avoid difficult decisions. Part of the answer is to get away from the narrow framework of annual decision-taking. Strategies have to be designed for the medium term, based on principles which are not put back on the table every year. The "political energy" which has been put into securing the upward revision of various annual quotas as compared with the scientific recommendations would be more usefully invested in analysing the goals set for fisheries management and defining medium-term strategies. It would be better to try to identify the socio-economic measures needed to accompany certain inescapable restrictions than to try to delay the inevitable.

I-3 *Possible medium-term objectives*

What can reasonably be envisaged in the medium term depends first of all on the current situation. For the most seriously over-exploited stocks it is urgent to set goals quantified in terms of reconstituting the reproductive potential of the resource, what the biologists define as the "spawning biomass". There is no prospect of the scientists being able to define different threshold biomasses to separate stocks not at biological risk from those where the risk is inacceptable, but the indications that they provide have to be taken as a basis. The search for better biological security for the most intensely exploited stocks must therefore constitute the priority goal in the medium term. This is perfectly consistent with an increase in (or at least maintenance of) production levels, an increase in the profitability of fishing undertakings, renewed competitiveness of Community products (lower production costs) and reducing the production and/or activity fluctuations from one year to the next. This goal is also in accord with the attempt to reduce the impact of fishing on the marine environment. The price to be paid is a reduction of fishing effort, reductions in capacities and/or lower activity levels. But in the long run, the risks of not taking steps to remedy over-exploitation are such that it is better to accept a reduction of fishing effort than to have one day to resort to moratoriums. The second point is that profits will accrue in the medium and long term, whereas the reduction in effort necessitates an immediate sacrifice. To a very large extent, the choice is not one between biological and commercial considerations but between the short and the longer term.

Once the goal of reconstituting the spawning biomass has been laid down, there are several possible pathways and strategies for achieving it. The speed with which the recovery is to be attained is a first element of choice. The second is connected with the relative importance to be given to a reduction in year-on-year fluctuations in production on the one hand and levels of fishing effort on the other.

Thus it would be possible to set a progressive reduction of exploitation rates in a multiannual plan (see II.2.4). The annual TACs would then be calculated by linking each year the pre-set exploitation rate and the estimated size of a stock. Over the medium term, and regardless of the actual sequence of good and bad years in terms of breeding success, one could hope to see spawning biomass going up. Such a plan would avoid sharp swings in permitted effort from one year to another. On the other hand it might involve major fluctuations in TACs. The approach could fail if, over the period under consideration, the conditions for reproduction were on average too unfavourable. In the long term, strategies focused on the evolution of exploitation rates are in fact often the safest ones but they are not liable to yield rapid solutions to biological emergencies.

Another approach would be to decide directly on annual targets for spawning biomass and to work out TACs in relation to the biomass estimates provided by the scientists. This is in theory the most rapid way of achieving a recovery of stocks. It can lead to wide fluctuations both in annual TACs and in effort and even involve closures of fisheries when the biomass estimate for a given year is very low.

Intermediate strategies between these two are also conceivable and probably necessary.

In many respects the choice of strategies has to be between simple rules which are easily explained and fine-tuning mechanisms whose complexity may cause them to be poorly understood. In the most serious situations, as was the case for Baltic cod, it is best to go for the simplest solutions. Where there is less urgency, the time can be taken for consultations between all the actors, from scientists to fishermen themselves. It is then particularly important to set medium-term strategies because such lengthy consultation procedures cannot be repeated every year.

The need, therefore, is to prepare some medium-term strategies for the round fish fisheries as quickly as possible, even if it means sacrificing some fine-tuning in the interests of urgency. For the flatfish fisheries, where there is generally no biological urgency but where, on most biological and economic criteria, a reduction in exploitation rates is desirable, a more progressive and flexible reduction plan could be adopted.

For a series of pelagic fisheries, the need is more to stabilize the existing situation than to encompass major changes.

II. "NEW TOOLS" OF CFP MANAGEMENT

II-1 Management of effort and 'total allowable effort'

A long-standing issue in fisheries management is the choice between controlling inputs, measured in terms of fishing effort, and controlling production (outputs), by means of TACs. Scientists also frequently refer to fishing mortality, which relates roughly to exploitation rate as the proportion of a stock taken annually.

In an ideal world where the size of stocks is known perfectly and where the efficiency of each vessel is known and stable, these different approaches would be equivalent. An exploitation rate could be converted into either TACs or TAE (total allowable effort). The calculation of TACs would involve finding a simple rule-of-three ratio, and the traditional formulae of population dynamics would make it possible to calculate the corresponding TAE in terms of fishing days needed by a standard vessel to catch the TAC. But this ideal situation has no relation to reality. There is no convenient way of standardizing precisely the catch capacity of a given vessel. Even if we had the knowledge required, it would measure only a potential which would still have to be converted into actual efficiency by factoring in know-how and fishing strategy, as well as changes in the natural environment and thus in the availability of fish.

The reasons for and against management either by inputs or by output change therefore when we look at the real world.

(a) Conditions arguing for management by effort

At the practical level, in cases where it is difficult to monitor catches in real time and stock by stock, direct management by effort is the only way (e.g. in coastal fisheries, with landings over a wide area). Generally speaking, management by effort is more easy to monitor than managing of catches.

Where it is not possible to evaluate the size of a resource with sufficient precision, as in the case of the deep-sea stocks which have only recently started to be exploited (see Anon. 1993c), only a general regulatory framework for fishing effort is possible.

One can compare this situation with stocks managed by precautionary TACs, where it is also not possible in the short run to have a reliable quantitative evaluation, in particular stocks in area 3 and those not subject to limitation of catches such as in the Mediterranean. In fact there are fisheries in the Mediterranean managed de facto by regulating effort: the anchovy fishery in the Golfe du Lion, for instance, where there is an agreement between Spanish, French and Italian fishermen sharing the permitted effort directly between them.

The multispecies character of certain fisheries also makes management by effort attractive, since one can avoid having to prohibit fishing for one species while permitting its continuation for others although both are caught together. This would do away with a series of incentives to discarding, as compared with management by single-species TACs (Anon., 1991b). The pelagic fisheries of the Community are less involved here, but it does apply to a number of demersal fisheries and even more to benthic fisheries. The multispecies character of fisheries is more marked in the south, in particular in the Mediterranean, than in the north.

Clarity and stability of the relationship between the characteristics of vessels and their efficiency in terms of impact on resources is ultimately of crucial importance for management by effort. Again, there is a graduation from benthic to pelagic fisheries. From one year to the next, pelagic fish - in particular small pelagic fish - can be easier or harder to catch while such fluctuations are generally less for stocks fished by dredge or beam trawl. The relationship between engine power and the efficiency of vessels is also more straightforward for bottom-trawling gear, whereas in pelagic fisheries other factors such as capacity to detect fish play a major role. Indeed, know-how is actually the more significant factor in pelagic fisheries.

(b) Conditions militating against management by effort

The relevant factors here are largely the inverse of those which have just been discussed. The relationship between "ostensible" capacity which can be monitored and the real efficiency of vessels is of crucial importance. If in a given year a stock concentrates in shoals which are easily caught, an "averagely good" effort level may - in that year - have a catastrophic effect. In addition, if technological progress is not offset sufficiently quickly by reducing gross capacity, an over-exploitation spiral will set in.

Where fishermen can choose to concentrate their fishing on different target species, some of which are seriously over-exploited and others not, but the former are the most attractive commercially, simple management of overall effort will be insufficient. The effort devoted to the most over-exploited stocks will then have to be limited specifically (cf. "pressure stock licences").

(c) Distribution of effort in space and time

Beyond the question of defining an annual level of permitted effort, it may be useful to distribute this effort in space or even over time. Permanent or temporary reserve boxes are an extreme case, but more differentiated solutions may also be useful. This is particularly true in a multispecies context, with the aim of influencing the composition of catches in the desired direction by concentrating effort on certain sectors.

Within the Community an excellent example is provided by the mechanism set up in the Netherlands to increase the share of effort by beam trawlers in the northern part of the North Sea. The introduction of an automatic system to monitor ship positions is of general relevance to future policy.

Management of the spatial distribution of effort may go as far as the temporary closure of certain areas in real time on the basis of the composition of catches. This is conceivable within the Community framework only if there are flexible and decentralized management procedures. The Community decision-making process is too cumbersome to function as in Iceland or Norway for example. But within the context of subsidiarity, local management structures could be set up along the lines of what Ireland does in its herring fisheries. At Community level, it would be necessary to introduce incentives to encourage the extension of fine-tuning management procedures to the distribution of effort. Here again, there is major scope for reducing discards.

(d) Combined management of effort and catches

The evolution of stocks of round fish is illustrative of the inadequacy of a management policy based only on TACs. If a fishing effort considerably larger than what would be needed to catch the TACs is authorized, it quickly leads to fraud and/or discards. Since 1990 the Advisory Committee for Fisheries Management has been pointing out that complementary measures to manage effort are necessary for round fish in the North Sea. Over the medium term this means reducing overcapacity. In the short run, since the overcapacity is there, it is absolutely imperative to take steps to harmonize effort level with the volume of catches permitted, which means limiting activity. This was attempted in the Commission's TAC proposals for 1991 and 1992 but in practice the results hoped for were not achieved. The TACs recommended by the scientists for these years amounted to a reduction of 30% in the exploitation rate compared with a reference year (1989). The TACs adopted were very close to these recommendations. Since catch capacities had not decreased meanwhile, it was essential to contemplate reducing activity levels. It was not possible to achieve this either. Convincing fishermen of the need to reduce their activity was complicated by the fact that better recruitment rates than in the years immediately previous were likely and the TACs, in particular for haddock, were set higher despite reduced exploitation rates. In practice, the necessary reductions in effort were not applied. What happened in 1992 to the haddock stock in the North Sea is particularly revealing. The quota allocated to the main fishing country was exhausted well before the end of the year, proving the validity of the scientific forecasts. Such situations cause a bad commercial utilization of quotas, bringing low prices at the beginning of the year because of massive landings but closure at the end of the year when the market situation is more favourable. These conditions also constitute a major incentive to fraud.

(e) Priority areas for applying the new tools

The deep-sea fisheries should be the prime subject of direct management by effort, along the lines of the Commission proposals for a NAFO licensing scheme.

It might be useful to choose one or more fisheries in the Mediterranean already managed de facto by controlling effort and to consolidate the existing system.

In the demersal fisheries of area 3, management by effort could be introduced for bottom trawling without necessarily abolishing the existing TAC and quota rules but making them more flexible (cf. II.2 and II.3). The corresponding precautionary TACs could even be maintained at a high level so that the limitation on exploitation rates would result more from management of effort than from closing fisheries after quotas are exhausted.

In areas 2 and 3, the crawfish fisheries would be particularly well-suited to management by effort. Such management should include a degree of geographical distribution of effort, since the scientists rightly stress that each TAC may cover a collection of local stocks in very different biological states. Here too TACs and quotas could be retained as a fall-back to ensure relative stability. The best way would be to keep a close watch on by-catches of round fish by crawfish fishermen.

The beam-trawl flatfish fisheries are also suitable cases for management by effort. But insofar as Member States are already largely engaged in active management of fishing effort at national level, it may not be necessary for decisions to be taken at Community level.

For the other bottom-trawl fisheries, a combination of TACs and TAE is preferable. For all stocks currently managed by precautionary TACs, in particular in the Atlantic and the Skaggerrak/Kattegat, management by effort should play the essential role with TACs and quotas as precautionary back-up. In the North Sea the management of effort should be more at national than Community level, in order to ensure that the effort deployed will not exceed what is needed to catch the quotas allocated.

Whatever the fisheries concerned, the relevant effort levels have to be known beforehand. This would involve identifying type-activities, or "métiers" to use the French word often adopted by scientists, and the quantitification of effort by activity, area and month (or quarter). The Community fishing vessel register would enable full use to be made of log-book entries. Initially the typology of activities could be fairly broad, to be refined at a later date if necessary.

II-2 Multiannual tools

The idea of multiannual management tools has caused concern and led to misconceptions and confusions.

Among the concerns, some people believed that the Council was going to be giving up decision-making powers to the Commission; in fact the possibility of linking all decisions to a multiannual plan would enable the Council to develop its own medium- and long-term policy. Others thought that the multiannual dimension would cause a drift towards laxer rules, undermining the basis of relative stability. Such concerns need to be met by improving monitoring and control and by a cautious approach in setting up those tools which provide increased flexibility.

As for the misconceptions, some believed that it was going to be possible to get away from changes in TACs and effort from one year to another or at least to know what the catch potential would be several years in advance. As was pointed out in Part I, it is impossible to avoid natural fluctuations and, in particular, to stabilize both production and activity at the same time. Section II-2-1 below analyses the constraints due to fluctuations in the abundance of resources. The most serious confusion has arisen over thinking that a multiannual approach is the same thing as setting multiannual TACs. As stated in Part I, the essential aim is that the consequences of decisions be perceived beyond the immediate impact in the following year. The discussion of objectives and strategies must have priority. That being so, there are various management tools available of which multiannual TACs are one. These different tools, their scopes and their limits are analysed in II-2-2 to II-2-5.

II-2-1 The impact of natural fluctuations

The impact of natural fluctuations, which in particular change the year-on-year reproductive success of a stock and therefore recruitment, can vary from one stock to another but is never negligible. In addition, the ability to forecast the development of resources is limited. This is harder where catches are dominated by young individuals, which is the case when exploitation is intense and operates very early in the life cycle of the fish. The size of year-on-year fluctuations in recruitment is another aggravating factor.

The situation is particularly unfavourable for round fish in the North Sea, whereas prospects are better for various stocks of pelagic fish (western mackerel, northern/North Sea/north-west Scotland herring, etc). Conversely, the northern hake stock does not appear to undergo sharp swings in recruitment. The stocks of crawfish are another example of resources with modest fluctuations in abundance. For a collection of stocks, such as sole, the recruitment fluctuations appear to be smaller on the Atlantic coast than in the North Sea or the Baltic.

II-2-2 Anticipatory fixing of TACs

(a) Multiannual TACs

Two meanings can be given to "multiannual TACs": either this involves TACs covering several years, with each Member State able to spread the consumption of its quota over the whole period, or it means keeping annual TACs at a constant level. The first amounts to more flexible use of TACs and quotas, a subject tackled later in this paper. As regards the fixing of TACs that remain constant over several years, it should first of all be pointed out that this is what has occurred for a number of precautionary TACs. Apart from the unavailability of scientific analyses making it impossible to fix more operational TACs, it was not unreasonable on biological grounds for a number of resources since many such stocks were among the least affected by rapid fluctuations in abundance (stocks of crawfish, northern hake stock, etc.). De facto however, the setting of most of these TACs had no operational consequences: few fisheries were eventually closed because of quota exhaustion. As long as the status of these resources requires no intervention, it is possible to keep the same TAC level. But over recent years the exploitation rate of several of these stocks has increased very appreciably (cf. monkfish). It is thus becoming necessary to move to a proactive management phase. This may involve combining TACs and regulation of effort. If effective management of effort can be set up, it may be possible to avoid TACs playing a constraining role and to use them as a safety fall-back. This is quite conceivable for various crawfish fisheries, but for resources whose status has become fragile in recent years there will have to be a better adjustment of TACs to biological realities.

Beyond precautionary TACs, there are also resources with the characteristic of being in a healthy state and not varying much from one year to the next. Here it is perfectly possible to envisage constant-level TACs set in advance for two years. This is primarily the case of the western mackerel stock, where scientists consider that a biennial assessment is adequate.

(b) Anticipated fixing of annual TACs

Where recruitment fluctuations have a considerable affect on the abundance of a stock but it is possible to estimate the volume of the age classes which will enter the fishery in future years, the fixing of TACs can be anticipated so that the industry can plan its activity over several years. This situation remains however largely a theoretical one, at least in Community waters. Generally there are only a few months *between the moment when the scientific assessment campaigns provide information on the level of an age class and the moment when exploitation of these fish begins. The scientists even go to immense trouble to obtain, during the autumn, the information which will serve as a basis for setting TACs for the following year. It is not unusual for the necessary information to arrive during the year.*

It will be impossible to set the level of TACs in advance for all stocks subject to major recruitment fluctuations as long as the combination of high exploitation rates and small mesh-sizes continues. This is particularly true for major stocks of round fish in area 2, with the <u>possible</u> exception only of northern hake.

(c) Adjustments of TACs during the year

In view of the remarks above about information arriving during the fishing season, it has become the practice during the year to undertake a number of revisions. The need for such revisions could be reduced for certain stocks by staggering the twelve months covered by a TAC relative to the calendar year and taking into account the specific biological characteristics of each stock (e.g. herring, where the fishing season falls either side of January the first, Baltic salmon fisheries, and demersal fisheries, where juveniles enter the fishery in the autumn, etc.).

Another possibility would be an automatic review clause when TACs are originally adopted, stipulating that they may be revised in the light of estimates of the size of the stock by scientists. Since bringing in any later reductions is tricky, it may be advisable to fix a "base" TAC initially on the basis of a very conservative estimate of the stock and to set a rule for calculating any possible extra TAC at the time of the scientific assessment. This sort of mechanism is already in place outside the Community for fisheries involving fish with a short life cycle. Its potential usefulness for managing the anchovy stock in the Bay of Biscay has been analysed by ICES (Anon, 1993a). It could be used at the same time to reduce catches of juveniles in this fishery. To be fully effective, this method of management would mean systematically providing the scientists with the means to carry out the necessary assessments each year. However, it would not help to solve the problems that France currently faces as a result of the existing formula for assigning TACs.

II-2-3 Making the consumption of TACs and quotas more flexible

Overshooting a quota, if the overshoot is small and does not lead to year-on-year accumulated overruns, does not necessarily have dramatic biological consequences. Conversely, it can be difficult for a Member States to plan the consumption of its annual quota if there is the threat of a fishery being closed. Where the national quota is distributed between groups of fishermen, one group keeping within its share can find itself penalized in the event of overshooting by other producers. A remedy could be found in the mechanisms specified in the new Regulation on monitoring and control (Council Regulation (EEC) No 2847/93). This mechanism can provide a flexible compromise between the rigidity of strictly annual quotas and the total freedom of allocating catches over a multiannual period. In the event of a quota overrun the Member State concerned would see a deduction from its quota of the following year. A moderate overrun could trigger a simple deduction in proportion to the overrun(s). More sizeable overruns could lead to deductions adjusted by increasing weightings that depend on the scale of the overrun (such as 20% for an overrun of 5% to 10%, 50% above that). This progressive correction could be be made steeper if the overruns recur. Annex II outlines the various possibilities.

Similarly, under-utilization of a quota over a year could lead to an increase in quota in the following year (see Annex II).

The proposed system is more rigid than one consisting of varying the weightings according to the size and population composition of a stock. However, it is not very wise to overload the scientific bodies which are called on to give advice; it is better that they devote themselves to structural analysis rather than becoming involved systematically in cyclical adjustments which are the province of operational management. In addition, the agreement of a fixed rule will avoid too much discussion within the Council over figures of minor importance.

The introduction of this same flexibility for stocks whose biological situation is the most serious must be regarded with extreme caution. This is particularly the case of round fish stocks in the North Sea. At the very least, more substantial weightings would be necessary. Conversely, the flatfish fisheries, in particular in the North Sea where detailed scientific analyses are available, would be suitable for immediate application of this flexibility. Later on the system could also be considered for certain stocks where precautionary TACs are currently fixed at a level much higher than catches, combined with a slow evolution towards TACs adjusted to real catches but maintaining broad flexibility in year-on-year transfers in order to meet unforeseen increases in stock abundance. In this case, any corrections should be more moderate.

It would also be feasible to make it mandatory on Member States to introduce additional controls in the year following an overrun. This could take the form of a timetable for consumption of quotas and/or direct measures to monitor effort. It would then be possible to encourage the Member States to manage the consumption of quotas in a better way. The flexibility would be greater for Member States that have set up the most efficient structures. By contrast, where fisheries are badly monitored statistically and scientifically the penalties could be more severe. At the moment it is generaly speaking not easy to encourge the Member States to take measures that contribute to the general Community interest. A Member State cannot be "rewarded" for catching less juveniles on its quota than another Member State. Overall fishing rights cannot be increased without upsetting relative stability. However, it is possible to imagine allowing greater flexibility in the exercise of fishing rights to those Member States which are better organized and whose behaviour is thus more in line with the conservation of resources.

II-2-4 Rules for multiannual decision-making

While it is difficult to forecast future TACs, the scientists are often able to issue useful recommendations regarding exploitation rates over several years. There is a whole series of stocks for which these rates need to be reduced, and some for which they could be stabilized.

The outline on which the Commission based its proposals during the 1992 discussion of MGPs is still the most useful. Stocks of round fish are in general seriously over-exploited. As underlined earlier, since 1990 scientific opinion has recommended a 30% reduction in exploitation rates in the North Sea. This recommendation is by no means cyclical. The need for a reduction in exploitation rates is structural. From a biological point of view it would be desirable that this be as large and rapid as possible. Taking the economic and social constraints into account, a plan covering three to five years would permit a progressive but real reduction in exploitation rates, unless of course there is immediate attainment of the reduction target recommended by ICES.

Such a strategy would be in full conformity with the new basic Regualation (Council Regulation (EEC) No 3670/92), which envisages harmonizing the evolution of catch capacities with exploitation rates. Within this framework the annual fixing of each TAC would take into account, on the one hand, the exploitation rate stated in the multiannual plan and, on the other, the estimated size of the stock as provided by the scientists. Adjustments would certainly be possible, either to smooth certain TAC fluctuations or to take safeguard measures if adverse recruitment rates worsened the biological situation, but the essential objective would be a gradual reduction of exploitation rates.

While such an ambitious approach is certainly necessary for many stocks of round fish, a reduction in exploitation rate is also desirable for various benthic fisheries. Since there is less biological urgency, it would be possible to be more gradual (smaller reduction rate and/or more spread out in time) and more flexible.

Although on the whole the situation of herring stocks is not alarming, a structural reduction of exploitation rates could still be useful for some of them as well as increases in spawning stock. The biologists recommend various target figures, both in terms of exploitation rate and spawning biomass, the two criteria being biologically convergent in the long term. It would be possible to prepare in the medium term for a stabilization of the exploitation rate below a specified threshold, and of the biomass above a given threshold. In view of the relative non-urgency in biological terms, this approach could remain very flexible, with reductions in the exploitation rate only when favourable recruitment allows an increase in biomass. Such a rule would help channel the evolution of stocks while limiting the risk of sudden catch reductions from one year to the next. In the case of pelagic fish it would in fact be reasonable to try to give priority to stability of output over stability of effort.

II-3 The multispecies dimension

Here, too, there have been over-enthusiastic hopes, unfounded fears and some confusions.

Some people have hoped that multispecies TACs would make it possible to distribute catches freely across a collection of species, thus eliminating the obligatory discarding caused by certain single-species quotas, or even to work round the difficulties connected with certain distribution formulae. The fears have concerned precisely the reverse of this coin: reduction in the protection of resources, undermining of the principle of relative stability.

These fears would be well-founded if it were indeed a question of fixing TACs for several species but without any other measures being taken, so that catches of one species expressed by weight simply added to catches of the others by weight without applying any corrective factor. This is only possible if all the species concerned are lastingly safe from serious over-exploitation. In practice this rules out situations where some resources are commercially much more attractive than others. In such cases, fishing effort is likely to concentrate on the first species and lead quickly to over-exploitation. The various reports drawn up by the scientists have not identified any fisheries where management by multispecies TACs alone is currently recommendable.

A multispecies approach must not in any case be confused with straight multispecies TACs.

More complicated methods are necessary. It is quite possible that direct management by effort, at least in an initial stage, will be the most suitable response to complex multispecies situations, as indicated in II-1.

If the use of TACs has to be envisaged in a multispecies context, it will be necessary to go beyond a simple multispecies TAC and establish additional guarantees. This issue has been widely discussed in the various scientific bodies. The classic proposal is a two-tier system of TACs, with a number of single-species TACs set within an overall TAC as an outer layer of protection (second-tier TACs). This overall TAC has to be smaller than the sum of the component TACs. It provides an additional guarantee and does not in any way replace the single-species TACs.

It is also possible to incorporate increased protection for the most vulnerable stocks in a multispecies context. Fishing could thus be closed down, at least in certain areas, when catches of this precise species exceed a pre-set threshold.

Conversion factors can also offer a way of effective multispecies management by TACs. This approach, mentioned in particular in the 1992 report on Spain and Portugal (Anon., 1992d), consists of multiplying catches of the various species by coefficients designed to prevent a concentration of effort on one or more species. Such a mechanism would make it possible to work round the difficulties caused by the differences in commercial value between the various resources. It would also make for fairer treatment of by-catches in those fisheries where a clear target species can be identified. Over-rigid regulation of these by-catches is likely to result in massive discards when the quota allotted on the by-catch species is exhausted or zero. It would be then possible to deduct the by-catches from the target species quota, with conversion coefficients such that the fishery as a whole can be closed if need be. The by-catch species would be better protected than in a situation where fishing continues as long as the quota for the *target species is not reached. The conversion coefficients could possibly be applied only at Member State level. A Member State would then be encouraged to take the additional measures necessary to avoid inflation of by-catches without forcing individual vessels into discarding. Such complementary measures could take the form of active management of the spatial distribution of effort, taking pressure off areas where the composition of catches is undesirable.*

It would be very imprudent to open the door to a type of multispecies flexibility where a direct biological threat exists to one of the resources concerned, for example round fish in the North Sea. Where relative stability problems could arise, the agreement of the Member States directly concerned would be an absolute necessity.

It is perhaps in the situation referred to in the 1992 report on Spain and Portugal, where a clear target species exists, that the first step could be taken towards more flexible treatment of by-catches.

The benthic fisheries currently managed by precautionary TAC also provide a fruitful area. More particularly, there are the mixed sole and plaice fisheries in area II and the megrim and monkfish fisheries in the Celtic Sea and off the Iberian peninsula. De facto multispecies TACs already exist for megrim and for monkfish, since in each case two species are grouped under the same vernacular name. The case of monkfish is particularly significant because one of the two species is biologically more vulnerable than the other. It would be appropriate, therefore, not to establish a multispecies TAC since one already exists, but to consider how it could be complemented by other measures.

Before envisaging operational proposals for all the fisheries mentioned, it will be desirable to work out precise scenarios so that the scientists can analyse the advantages and disadvantages.

A certain boldness of approach is needed all the same. The size of the discard problem is sufficient justification in itself for action in this area. The Commission's report on discarding (Anon., 1991b), a summary of which is attached to this communication as Annex III, stresses the difficulties caused by single-species TACs. A change to a multispecies approach is part of the possible solutions.

Here again, the degree of flexibility could take into account how far each Member State can guarantee proper controls and statistical and administrative monitoring of the fisheries concerned, as well as the effort made to encourage selective fishing.

CONCLUSIONS

The implementation of the provisions contained in Regulation (EEC) No 3760/92 will not resolve all the problems of the CFP. The capacity of available stocks to recover will remain limited. As very clearly underlined by the Scientific and Technical Committee on Fisheries, the fundamental problem of overcapacity will continue to weigh heavily. The natural fluctuations in stocks will always cause variations from one year to the next in fishing activities. A number of Member States will continue to be the "poor relations" in certain distribution formulae.

Yet, one year on from the adoption of the new basic Regulation, its implementation is a pressing need.

The preliminaries to this have been provided by the adoption of the Regulations on control and monitoring, the creation of financial instruments for pursuing structural policy, and the definition - in a Regulation on licences - of a framework for regulating fishing effort. The next important step is to gradually start applying the basic Regulation on the basis of available knowledge.

Stocks for which analytic assessments are available

Medium-term goals can be set for stocks in region 2 for which detailed scientific analyses are available, combining the two compatible targets of an increase in spawning biomass and a reduction in exploitation rate. These goals will require different degrees of adjustment depending on the starting position. In the case of cod, coalfish and haddock stocks, there has to be a major boost in spawning biomass together with a marked reduction in exploitation rates. In the case of plaice and sole, the changes required are similar but smaller, with some variation across different areas. The goals for pelagic fish could range from stabilization of the current position to a slight reduction in exploitation rates together with a modest increase in spawning biomass. The strategies to be employed for round fish would have to bring about a gradual and planned decrease in exploitation rates from present levels in the direction of the target rates. To supplement this, if there is a good recruitment year which allows a higher TAC as well as a lower exploitation rate, a limited TAC increase could be agreed. This would help to speed up the recovery of the spawning biomass. However, it should always remain possible to take emergency measures if there is a succession of bad recruitment years. In the case of those flatfish and pelagic fish where it is planned to reduce exploitation rates, the relevant rate would be rolled forward automatically from one year to the next unless the prospect of a good recruitment year makes it possible to reduce the exploitation rate without reducing the TAC.

Turning to the other management tools, it will be necessary to prepare a system of anticipatory fixing of TACs for the western mackerel stock. Some flexibility in the carryover of catches from one year to the next could be envisaged for pelagic stocks and flatfish, and perhaps also - but in a very controlled way - for haddock and coalfish.

Stocks managed by precautionary TACs

It is not sensible to fixed quantified medium-term goals without laying down the necessary foundations for practical management. Except in individual cases, however, it is important not to intensify exploitation, and in many cases the taking of juveniles has to be reduced.

The management of these stocks needs to combine the gradual trimming of TACs to more realistic levels with regulation of fishing effort. TACs should be based on catches recorded in previous years with a sufficient safety margin to avoid triggering closures of fisheries that are not justified biologically. Risks should be minimized by a liberal attitude to carryovers of catches from one year to the next. In conjunction with this, accurate data need to be collected on fishing effort. This would be made easier by adaptations to the log-book and the use of data relating to existing or future licensing systems. Once the necessary data have been collected and analysed (over a period of three to five years), appropriate goals can be defined. It will then become possible to combine TACs and TAEs in a variety of ways, together with carryovers from one year to the next and/or from one species to another.

What has been said above leads on to the following practical consequences:

(1) The Commission transmits two immediate proposals to the Council:

1. Medium-term goals and strategies for specified fisheries and groups of fisheries over the period 1994-97 (end-1993)
2. Rules for the carryover of catches from year to year (early 1994)

(2) Consultation of scientific bodies on other aspects, especially multispecies settings. The Commission will have to develop precise scenarios so that the scientists can study the pros and cons (first half of 1994). Later, further proposals to the Council based on policy choices validated by scientific analyses and simulations.

(3) The need to speed up the gathering of relevant data: adaptations to the log-book, data from licensing systems, concentration of scientific and technical databases. For the Commission this means preparing regulations implementing the control and monitoring Regulation (first half of 1994), follow-up to the Regulations on the fishing vessel register and on the licensing scheme, and making proposals for financing scientific databases (first quarter 1994).

For the CFP to progress, it will be necessary also to deepen the dialogue between all the parties involved, fishermen, decision-makers, government bodies and scientists. The consultations that are organized must be both wide and focused. They could be based on this communication on the two proposals referred to above. Action should be taken to encourage a general discussion of the guidelines for implementing the new basic Regulation, together with concrete discussion of detailed issues relating, say, to a given fishery or a given geographical area.

ANNEX I

BASIC PROCESS FOR ARRIVING AT SCIENTIFIC ADVICE

I. Recruitment and yield per recruit

I-1 Definition of recruitment

A fish sufficiently mature to be present on the fishing grounds and which can be caught using normal gear is a recruit. The term 'recruitment' is used to designate the number reaching this age each year. It thus measures the size of an age class.

Recruitment can often be very variable from one year to the next, as the example of haddock in the North Sea illustrates as shown in figure 2.c (taken from Shepherd, 1990). A large amount of marine research has been devoted to analysing how to make the most from a given recruitment, regardless of whether it is large or small. This approach arises from the fact that recruitment is to a large extent unpredictable and impossible to monitor.

I-2 Yield per recruit; Fmax; F0.1

To rationalize fishing, it is first necessary to try to exploit each recruitment, whether large or small, as much as possible. This has led to the concept of yield per recruit (yield per recruit = Y(r)). This takes a year class and adds up the weighted catches that it will yield over the ensuing years, combining the consequences of mortality from fishing, natural mortality and growth at various ages. This total production is then divided by the number of original new recruits. Figure 1.a shows how the yield per recruit can vary according to the annual fishing effort level. It grows almost in line with effort at low levels of exploitation but then growth falls off. There is normally an intermediate level at which the yield per recruit is greatest. After that, the yield per recruit decreases as effort increases. This paradox is connected with the reduction in the average weight of the individual fish caught: all fishermen observe that the number of large specimens falls when fishing is intensified. The level of exploitation consistent with maximum recruitment is designated Fmax. For a given recruitment class this is the maximum sustainable yield (MSY).

Reference is also frequently made to an effort corresponding to F0.1. The precise mathematical definition is of lesser importance.[1] What is important is that by comparison with Fmax, F0.1 keeps stocks at a higher level, providing greater biological security and higher yields per vessel. On the other hand, production is slightly lower. But an economist will note that from Fopt to Fmax production increases only marginally for a considerable increase in effort, and hence in cost.

---

1 *F0.1 is the situation in which the marginal increase in production achieved by effort is no greater than one-tenth of that figure at the lowest level of fishing effort.*

I-3 Economic considerations: Fopt

Weighted catches can be converted into value, if necessary by taking into account the different prices secured for fish depending on their size, and neglecting the problems of price elasticity, which in any case seldom affect a stock in isolation because of competition from other products. An average recruitment will therefore yield an average value of production for which the variation by effort can be studied (Figure 1.b). On this curve can be superimposed the relation between production costs and fishing effort, represented in the figure by a straight line. Economic surveys generally modulate this approach by including or excluding opportunity costs, distinguishing between dynamic and static balance.[1] But this does not affect the basic logic. It demonstrates that the discrepancy between values and costs of production is greatest not at Fmax, but at another point usually designated Fopt. On the graph this point is on the right of F0.1, though this is not necessarily always the case.

II. Impact of the annual variations in recruitment.

If recruitment were constant from one year to another, the points set out above would cover the essence of the problem of stock management.

Such is not the case. The size of annual recruitment depends on:

1. *the size of the spawning biomass at the time of spawning, which has a direct influence on the number of eggs laid. This issue involves so-called stock:recruitment ratios, which will be considered in section III;*

2. *the survival rate between spawning and recruitment.*

   The survival rate is extremely variable, and very slight changes in the environment are sufficient to cause changes of one order of magnitude from one year to another. Most of the relevant mechanisms have so far resisted the efforts of scientists. The considerable variations in recruitment from one year to another constitute an unavoidable constraint. Their consequences will be more or less serious depending on the level of exploitation of stocks: the higher it is, the more the fluctuationsin recruitment will directly influence the size of the stock and annual catches. Where the stock is heavily exploited, each year's catch depends primarily on the age group which has just been recruited. Where exploitation is moderate, several age groups live together, so smoothing variations. This is very clearly demonstrated by a comparison of Figures 2.d and 2.e, which are also taken from Shepherd (1990) and show stocks of haddock in the North Sea. Figure 2.d reflects a high exploitation rate (70%) and Figure 2.e a very moderate exploitation rate (30%). The variations from one year to another in the second case are low, without being negligible. The variations from one decade to another remain virtually the same. Lower exploitation constitutes a filter permitting a reduction in the most frequent variations, but not in the major trends. To reduce variations in production from one year

---

1 *Reference may be made here to specialist works and, for example, the articles by Panaoyotou and Galles in Troadec ed. (1989).*

to another requires compensatory variations in the rate of exploitation. This demonstrates the need to make a choice between the stabilization of production and fishing activity.

III. Preserving the chances of a good recruitment level

The impact of environmental factors in variations in recruitment makes it very difficult to assess the effect of the number of parents on the volume of recruitment. This corresponds to the very difficult question of the relationship between breeding stocks and recruitment. What is generally known may be summarized in the following two points:

1. *recruitment is not proportional to the spawning biomass. Besides environmental factors, mechanisms decrease the average survival rates of the eggs and/or larvae when they are very abundant. That makes it possible to compensate to a large extent for the lack of breeding stock. This is why the relationship between stock and recruitment is often neglected as long as the spawning biomass is reduced only to a moderate extent;*

2. *this capacity for compensation is necessarily limited: when the breeding stock is very low, it is no longer possible to obtain good recruitment. At least at the lowest level of spawning biomass, the relationship between stock and recruitment cannot be ignored.*

However, these factors do not clearly define the circumstances in which recruitment is threatened. The overall picture has to be seen in terms of risk. The more the spawning biomass is reduced, the lower the chances of obtaining good recruitment. Scientists therefore seek to identify ranges of biomasses which have historically yielded more or less satisfactory recruitment levels. Environmental changes make definitive conclusions very difficult because of the dispersion of observable annual recruitment for similar breeding stocks. From an operational point of view, however, exact certainties are not required to devise the best medium-term strategies. A very high exploitation rate will result in a lower yield per recruit, while reducing the spawning biomass to a level where the risk of a fall in recruitment is high. If one remembers that total production is given by recruitment multiplied by yield per recruit, it is obvious that where exploitation is very intense some slackening would yield gains on both fronts.

An acquaintance with the concept of spawning biomass by recruit may also be useful. In the case of females, it is the average number of eggs that a female recruit will be able to lay throughout its life. Since absolute figures are of no immediate use, those obtained are compared to those for an unexploited stock, where the average number of eggs laid by each recruit is highest. Any exploitation reduces this number, as is shown by Figure 2.b, also taken from Shepherd (1990) and concerns haddock in the North Sea. It shows the point to which the spawning biomass per recruit has now been reduced. In the long term, it may be feared that, apart from chance factors which mean that good recruitments can occur, each generation may not be able to make a sufficient contribution to the perpetuation of the stock. Taking point B as representing Fmax in the yield per recruit, a movement from A to B would both increase production by recruit and provide an additional safety margin by increasing the spawning biomass.

ANNEX 2

ILLUSTRATION OF POSSIBLE CARRYOVER RULES

A. Quota overruns

	Year n	Year n+1			
		Scenario 1		Scenario 2	
		Mechanism 1	Mechanism 2	Mechanism 1	Mechanism 2
TAC	1000 t	500 - 5 = 495	500 - 2.5 = 497.5	2000 - 5 = 1995	2000 - 10 = 1990
Total catch	1005 t	495	497.5	1995	1990
Quota MS 'X'	100 t	50 - 5 = 45	50 - 2.5 = 47.5	200 - 5 = 195	200 - 10 = 190
Catch MS 'X'	105 t	45	47.5	195	190

Scenario 1 represents a reduction in abundance, scenario 2 an increase. Mechanism 1 compensates in absolute terms (5 tonnes), mechanism 2 in percentage terms (5%). In all the cases it is supposed that in year 'n' the fisheries were not closed, the overrun having occurred to the detriment of the stock and not (directly) of the other Member States. The correction is thus to the benefit of the stock, with the deduction from the quota of Member State X not being redistributed between the other Member States. Mechanism 1 is more severe in the event of a drop in the stock, less severe in the event of an increase. It would be possible to choose in each case the strictest rule, as Parliament has wished to see. If a simple rule is needed, this would be mechanism 1 which protects the stock better in the circumstances where it is particularly necessary (reduction).

B. *Under-consumption of quota*

	Year n	Year n+1			
		Scenario 1		Scenario 2	
		Mechanism 1	Mechanism 2	Mechanism 1	Mechanism 2
TAC	1000 t	500 + 5 = 505	500 + 2.5 = 502.5	2000 + 5 = 2005	2000 + 10 = 2010
Total catch	995 t	505	502.5	2005	2010
Quota MS 'X'	100 t	50 + 5 = 55	50 + 2.5 = 52.5	200 + 5 = 205	200 + 10 = 210
Catch MS 'X'	95 t	55	52.5	205	210

This time it is mechanism 2 which protects more in the event of a reduction in the stock. It is a priori preferable. However, it would also be possible not to permit carryovers of unused quota when a stock sees its abundance decrease to a considerable extent from one year to the next.

ANNEX III
(taken from SEC(92) 423 final)

SUMMARY

SCALE AND COMPLEXITY OF THE PROBLEM

A common feature of fisheries is the discarding at sea of creatures which have little or no prospect of surviving. The species discarded include those not marketed at all, some of which (mammals, birds, turtles, etc.) enjoy considerable public sympathy although the environmental drawbacks are not confined to them alone (cf. sharks, brittle stars, sea urchins, etc.). Species normally marketed are discarded, too, for example when a particular regulation applies or marketing problems arise. As a rule, the whole animal is discarded but processing at sea can mean that not only the viscera and/or head are thrown back, but sometimes the major part of a fish or shellfish, with only the high-value portion being retained (e.g. white muscle meat of scallops, crab claws, etc.).

Discards are a feature of fisheries worldwide, the outstanding example being tropical shrimp fisheries which, all told, each year dump a total estimated by the FAO at 5 million tonnes of fish.

In Community fisheries, too, discards are common although varying from case to case. Accurate figures are rarely available, but two examples will set the scene:

- *In the North Sea haddock fisheries, discards quite often exceed what is kept from each haul. Discards have been estimated overall for 1985 at 460 million individuals compared with landings of 500 million.*
- *In the Bay of Biscay/Celtic Sea area, hake discards in 1985 were estimated to be 130 million as against landings of 110 million.*

The problem is not confined to one region. The two examples above concern regions 2 and 3, while shrimp fisheries involve Community fleets in various parts of the world. The Mediterranean too is affected, even though in that region the rules do not make discards mandatory and the high prices obtaining there reduce marketing problems: discard rates of 10% are common.

Virtually no fishery is free of discarding, with the exception perhaps of pots. Some fishing techniques present a greater threat (towed gear: trawls and dredges), but even the longline takes unwanted species (turtles, rays, etc.). Catches in purse seines can be damaged by the presence of "rough" fish (horse mackerel), and it is not always possible to ensure the survival of fish surrounded by a seine which are intended to be released. Gillnets create problems of a different order altogether from those created by driftnets.

It would be incorrect also to say that small-scale or industrial fisheries, or inshore or distant-water fisheries are responsible for most discards. Problems vary from one sector to another but occur in all. Distant-water fisheries have their own problems, linked with keeping on board, especially from the early part of a sea voyage, those species of low commercial value. They generally operate in deep-sea waters, however, while inshore fisheries operate in sectors which frequently comprise concentrations of small fish, various mammals and sea birds. Discards by large distant-water vessels can reach spectacular proportions, but those of inshore trawlers, often fishing under special exemptions or even unlawfully, are frequently appalling in terms of the number of juveniles. Nets set close to the seashore can take catches of sensitive species, especially birds, that can be significant.

REASONS FOR DISCARDS

There are two immediate reasons why discards take place, the first as a result of obligations contained in regulations, and the second on grounds of commercial expediency. Community rules require certain species that can be marketed to be discarded. These include undersized fish, or catches that would lead to an overrun either of the percentage by-catch allowed for "protected" species or of the quota for the target species concerned. Such losses are regarded as just tolerable in order to make commercially unattractive certain fishing practices whose uncontrolled expansion would have even more serious repercussions.

Apart from mandatory discards, there are the many which are at the discretion of skippers, who see no reason to burden themselves with catches offering little prospect of an adequate financial return. This is true of species with no commercial value, such as brittle stars and a whole range of invertebrates, but also where there is no regular commercial outlet for a fleet (e.g. the grey gurnard fisheries in the North Sea). It is true also where the particular circumstances of a fishery mean that the costs of packaging, preservation and landing far exceed the likely sales price, or where room must be made for higher-value products. The targeting of very high-value products leads generally to an increase in discards, as is illustrated by some freezer vessels. We must not forget either the problems created by fish which are damaged while being caught.

It should be pointed out, lastly, that there would be no discards if fishermen were able to make the required selection before the catch is taken. There is no perfectly selective technique however. Advances in this direction are slow, while progress in on-board sorting is generally better and can much reduce the drudgery of selection for crews. This development is dangerous too, however, because it becomes possible to make an automatic selection within catches which themselves are not highly selective with a view to keeping certain fish only, of the "right species", right size, and even sex and degree of maturity. This situation, which can be seen in certain herring and mackerel fisheries, opens the way to the threat of a great surge in discards.

THE REPERCUSSIONS OF DISCARDS

The discarding of any fish or sea creature represents an unnecessary loss in absolute terms. This moralising statement is not sufficient, however, to justify criticism of "waste". Yet discards present many more obvious drawbacks, justifying rejection of the current situation.

Where they concern species of commercial value, discards constitute an undoubted loss to the stocks from which fishermen derive their livelihood. They are especially serious where they consist of fish with valuable commercial potential, such as young sole, haddock or hake. This situation has become even more untenable at a time when Community fisheries are short of stocks.

Discards also undermine the very foundations of the common fisheries policy, since limiting the size of landings alone is ineffectual when actual catches at sea surpass them by a wide margin. The introduction of minimum sizes also becomes meaningless when only white scallop meat or crab claws are landed, unless ratios are laid down that would quickly become ludicrous.

Discards associated with the capture of sensitive species (mammals, turtles) can pose a threat to the future of the most vulnerable populations, and seriously undermine in all ways the image of fisheries in the eyes of the public. Apart from the sensitive species, unnecessary fishing alters ecosystems without offering any apparent offsetting advantage, although discards do provide feeding for scavenger species, some of which, it is reported, have been proliferating. In fairness, however, it must be said that mandatory discarding does contribute to discouraging certain unwelcome practices.

POSSIBLE SOLUTIONS

Clearly, the most direct method of controlling discards is the one applied by Norway, which has simply banned them. To incorporate this approach into the common fisheries policy would entail a complicated but feasible revision of a series of legislative texts based on mandatory discards. In some cases it would involve reviewing relatively stable rules, since account would have to be taken in quotas of the proportion of catches actually dumped. Arrangements would have to be made also for the disposal of catches which are not marketed. Finally, and above all, the monitoring of actual compliance with bans on discards would prove very difficult.

If, instead of a ban on discards, the rules on mandatory discards were relaxed, other rules would have to adopted at the same time to prevent a proliferation of harmful practices. If no minimum size rule *were applied, the market in small hake could lead to a catastrophic deterioration of the situation of specialized fisheries. Any relaxation of the rules in force in the event of an overrun of a quota would have to be offset by a system of penalties sufficiently dissuasive not to make the quotas meaningless, otherwise the TACs policy could be abandoned altogether. Derogatory mesh sizes justified by the target species cannot be allowed as "pretext" fisheries.*

In the control of discards, the reduction of unnecessary catches remains a sensible weapon. Encouragement should therefore be given to developing increasingly selective methods of fishing, including means of detection for evaluating the composition of shoals before irrevocable damage is done to them. It is necessary also to secure the maximum result from simple increases in mesh sizes. In many cases, just simple compliance with the existing rules would be very effective. The rules need to be modified to make them more easily applied and to limit the exceptions to what is strictly unavoidable. In many cases, too, the basic mesh sizes need to be increased. The example of the haddock fisheries shows that firm action is the only way of being effective.

A further possibility would be to establish new permanent or seasonal boxes in sensitive areas. Lastly, these fixed bans on fishing could be accompanied by operational procedures closing an area where the composition of the catches within them is unsatisfactory. This is what occurs in Iceland and Norway and in some Community fisheries (herring). Obviously it would involve wide-ranging delegation of decisions to appropriate management structures.

Lastly, it is worth creating outlets whenever possible to capitalize on the potential of catches which at present are discarded, at least in some fisheries.

CONCLUSIONS

The problem of discards is of such importance and its repercussions of such gravity that drastic solutions must be sought now, at a time when the increasing scarcity of stocks is of great concern to Community fisheries and when the ecological damage, true or imagined, caused by fishing is raising more and more questions. The Commission acknowledges that some of the existing Community rules contain drawbacks. The search for solutions will only be possible, however, if all the forms of and reasons for discards are considered.

Imagination will be required in finding remedies, and perhaps combining different ones. The Commission is eager to apply measures other than the usual coercive ones. In return, however, the fishing industry must be prepared to accept the need for restrictions. To ensure that the alternatives for relaxing the rules do not lead to the disappearance of the last restraints on practices more serious still than the present situation, various protections will have to be built in. Although not much liked, increased mesh sizes clearly remain an essential instrument.

- B I B L I O G R A P H Y -

Anon. (1991a) Report (1991) from the Commission to the Council and the European parliament on the common fisheries policy (SEC(91) 2288 final)

Anon. (1991b) Report from the Commission to the Council on the discarding of fish in Community fisheries: causes, impact, solutions (SEC(92) 423 final)

Anon. (1992a) Techniques for Biological Assessment in Fisheries Management - Report of the Workshop - Berichte aus der ökologischen Forschung Band 9/1992, Forschungszentrum Jülich Deutschland, pp.63.

Anon. (1992b) Report of the Advisory Committee on Fishery Management - ICES/Copenhagen - Denmark.

Anon. (1992c) 22th report of the Scientific and Technical Committee for Fisheries - Commission staff working paper SEC(92) 2347.

Anon. (1992d) Report (1992) by the Commission to the Council and Parliament on the application of the Act of Accession of Spain and Portugal in the fisheries sector (SEC(92) 2340 final)

Anon. (1993a) Report of the working group on long-term management measures. C.M. 1993/Assess 7 - ICES - Copenhagen - Denmark - pp.46.

Anon. (1993b) Report of the working group on methods of fish stock assessment. C.M. 1993/Assess 12 - ICES - Copenhagen - Denmark - pp.86.

Anon. (1993c) Report on deep-water species (SEC(93) 1791)

Horwood J. and D. de Griffith ed. (1992) Privately published, pp.38.

Shepherd J.G. (1990) Stability and the objectives of fisheries management: the scientific background. MAFF Laboratory leaflet Number 64 - Lowestoft - U.K.

Troadec J.P. ed. (1989) L'homme et les ressources halieutiques - S.D.P. IFREMER - Brest - France - pp.817.

°

° °

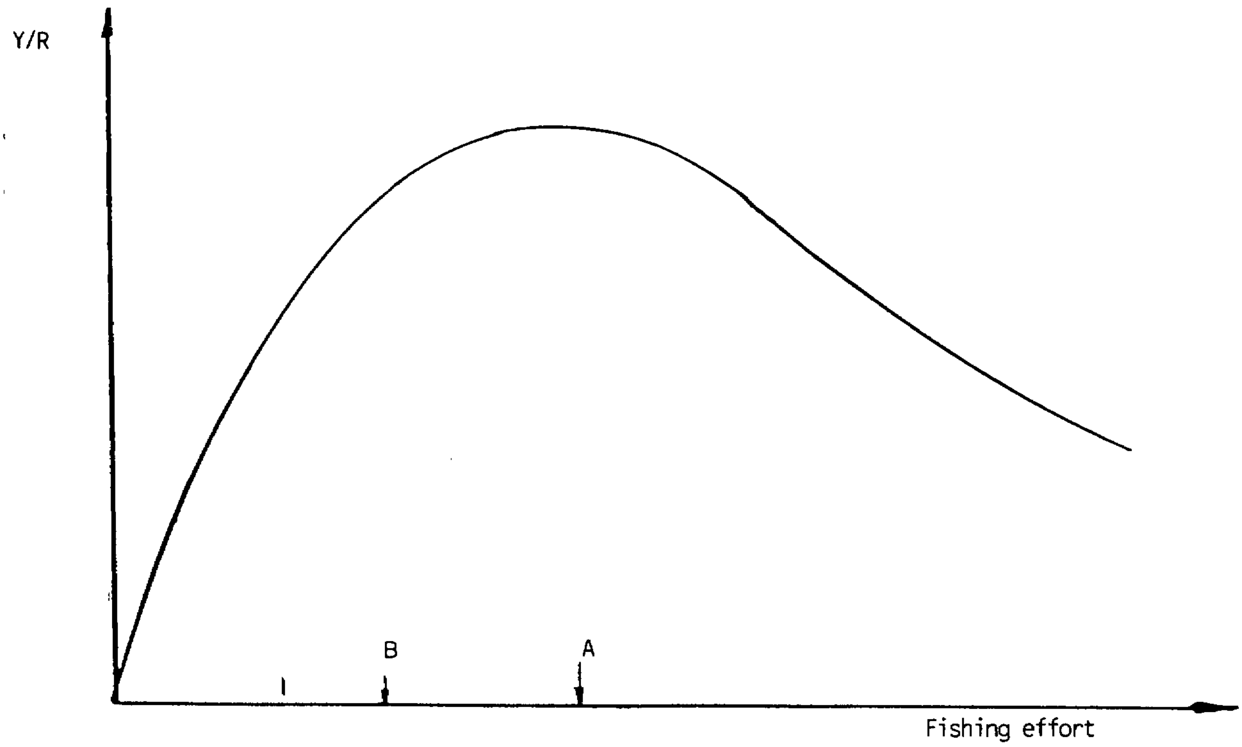

Fig. 1.a

Production per recruit Y/R $A = F_{max}$
depending on fishing effort $B = F_{0.1}$

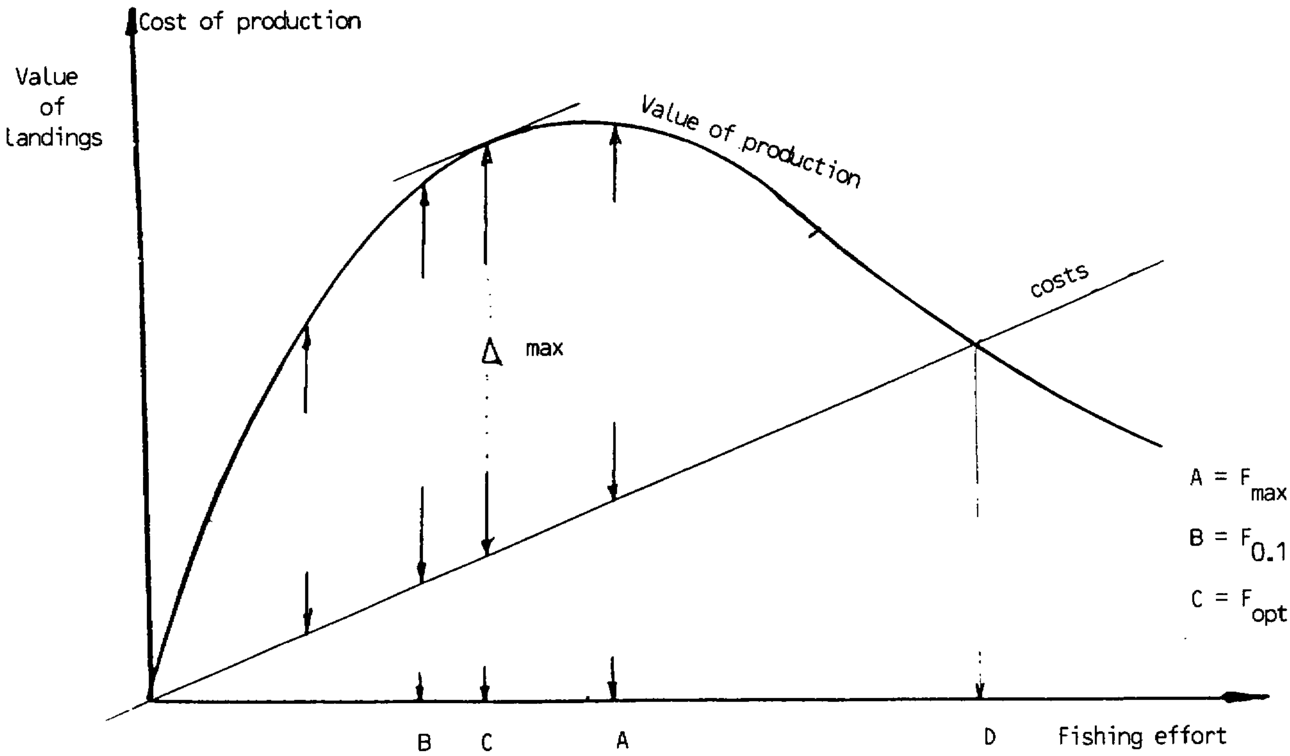

Fig. 1.b

Average value of landings and corresponding costs of production depending on fishing effort.

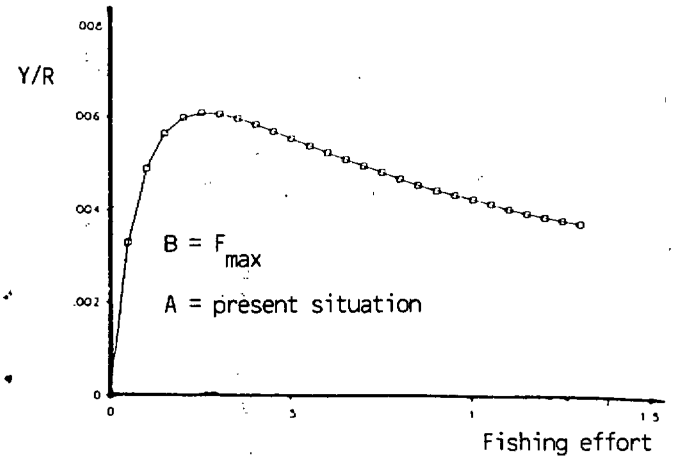

Fig. 2.a

Production per recruit

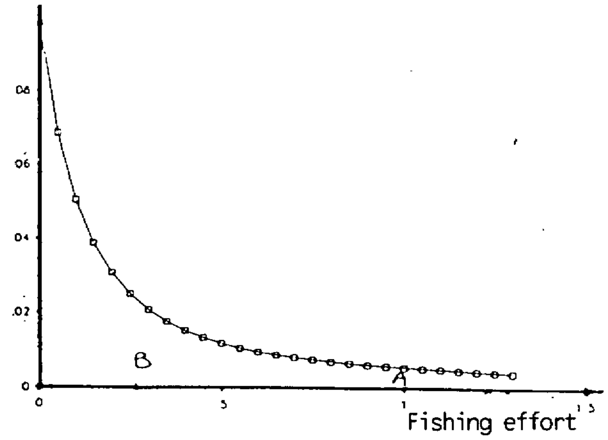

Fig. 2.b

Fertile biomass per recruit

FIG. 2: THE NORTH SEA HADDOCK STOCK. Analysis and simulation (Shepherd, 1990).

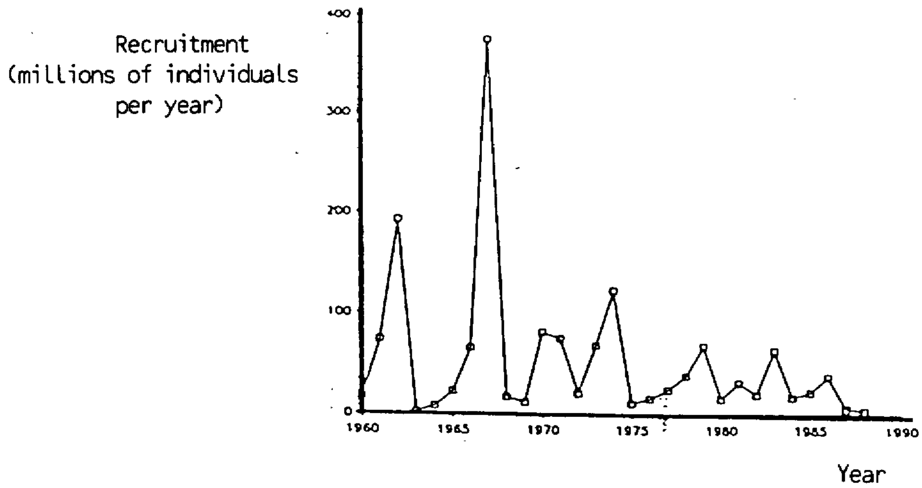

Fig. 2.c

Recruitment trend

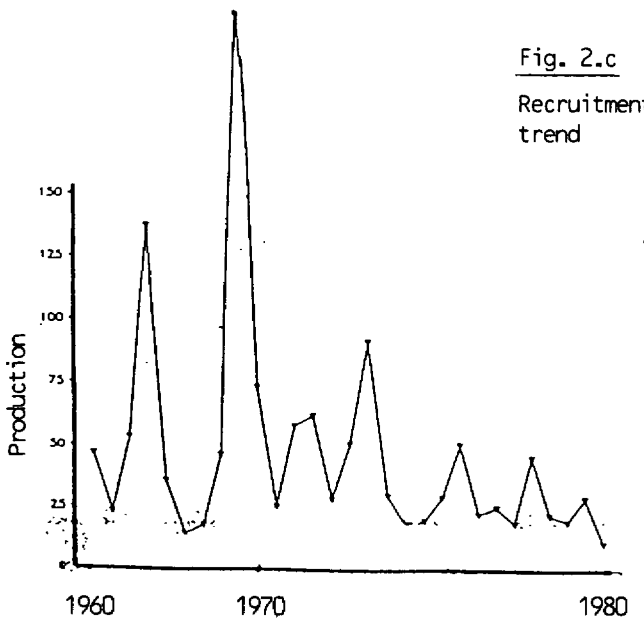

Fig. 2.d

Retrospective simulation of the production trend assuming a high exploitation rate (70%).

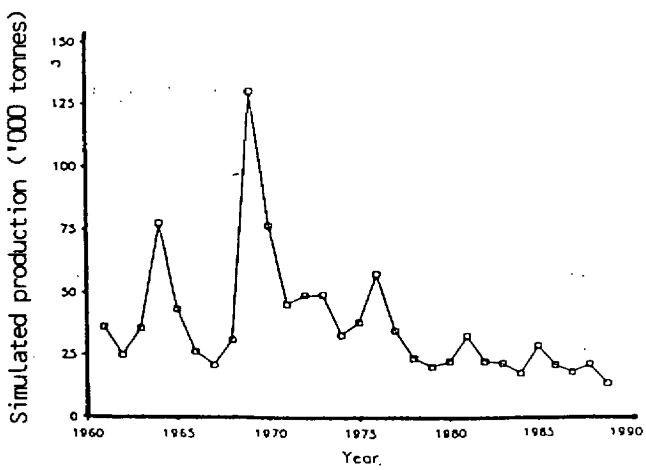

Fig. 2.e

Retrospective simulation of the production trend assuming a moderate exploitation rate (30%).

- 34 -

ISSN 0254-1475

COM(93) 664 final

DOCUMENTS

EN 03

Catalogue number : CB-CO-93-725-EN-C

ISBN 92-77-62887-1

Office for Official Publications of the European Communities
L-2985 Luxembourg