

## TRADE IN FISHING SERVICES

*(Paper prepared by Professors S. Cunningham and D. Whitmarsh)*

### **Introduction**

The principal purpose of this report is to assess the extent to which trade in fishing services may be of benefit to coastal States. Prior to addressing this issue directly, a number of factors must be discussed. First, the economic benefits obtainable from a fishery depend crucially on its ownership structure. In the past fisheries resources have often been the property of no one, with the result that few long-term economic benefits have been obtained. The report begins therefore by discussing, in Section II, this issue.

Second, before the gains for the coastal State of trade in fishing services can be estimated, it seems necessary to outline the nature of the economic benefits that such States can expect to derive from their fisheries resources. These benefits are discussed in Section III of the report. It is now generally accepted (by economists at least) that an unmanaged fishery will yield very little in the way of economic benefits. In fact it is more likely to end up a burden on the economy via subsidies that have to be paid to the overcapitalised fishing industry. The fundamental problem afflicting unmanaged fisheries is one of market failure. Various regulatory systems have been designed to correct this failure, and allow the potential economic benefits of fisheries resources to be realised. The nature of these systems is considered in Section IV, with a view to assessing the role of trade in fishing services under each system.

Section V discusses the role of fishing services in fisheries exploitation. The arguments for and against trade in such services are explored, particularly from the viewpoint of the coastal State. Section VI considers the precise form that traded services might take. Finally, Section VII concludes the report.

### **Ownership of resources**

If a coherent fishery management programme is to be developed, the first issue that must be addressed concerns the ownership of the resource. In traditional coastal fisheries, ownership was generally vested in the community and a set of often complex rules governed the exploitation of the resource. With the increasing development of economically-oriented fisheries exploitation coupled with technical progress, these communal-based management systems tended to break down. Unfortunately, institutional progress did not match commercial development with the result that no replacement management systems emerged and fisheries were generally left to be exploited under conditions of free and open access. The resulting over-exploitation and over-capitalisation has been well documented. The lack of a clear ownership structure and the associated lack of a system of exploitation rights made fishery management, in both the national and especially the international context, almost an impossibility. Generally speaking, the management authorities found it difficult to move from the status quo, and where regulation could be introduced it tended to be on a lowest common denominator basis.

The development of extended fisheries jurisdiction (EFJ) in the 1970s and early 1980s represented a watershed in fisheries management for at least two reasons. First, the ownership issue appeared to have been resolved in that coastal States were given responsibility for managing the resources in their zone. Second, EFJ represented a recognition that the era of extensification in fisheries development had come to an end. Previously fisheries management had been circumscribed by the fact that, if pressed, fishing fleets generally were able to switch their attention to other resources and/or other areas. A fisheries management policy was clearly difficult to develop in such circumstances. The case of the collapse of the Californian sardine fishery provides an interesting example of this process. When the fish stock collapsed in the 1960s, the whole fishery (vessels and processing facilities) simply moved south to begin large-scale exploitation of the Peruvian anchovy. However, when this stock in turn collapsed, the fishery was left with nowhere to go. Hopes that production might switch to Antarctic krill or oceanic squid proved groundless: the expansionist era was over and the move to widespread EFJ followed soon after.

EFJ represented a first step in the clarification of the ownership issue. However many coastal States have not made the next step, which is to distinguish between ownership of the resource by the State itself and ownership of the resource by the fishermen of the State. This distinction, which seems crucial for the further development of fishery policy, has generally been addressed vaguely, if at all. In the case of foreign fishermen the position is clear: the coastal State owns the resource which the foreigners may or may not be allowed to exploit. In the case of domestic fishermen the situation is less clear. Tacitly it often seems to be accepted that exploitation by domestic fishermen entails certain rights, some of which seem to be close to the privileges of ownership. For this reason many management schemes have included "grandfather" clauses favouring existing fishermen over both future fishermen and the community generally. At the same time however the rights that domestic fishermen may have been deemed to have acquired are often associated with continuing exploitation of the resource. That is, their ownership benefits last so long as they remain in the fishery whereas if they were truly the resource owner then clearly they might sell or lease their rights. This failure to decide who is the owner of the resource has frequently been a major handicap in the development of fisheries management policy.

One way forward would be to argue that the fishery resource belongs to the coastal State and should therefore be exploited so as to provide the maximum benefit to the community at large. It would have to be recognised that, in practice, the fishermen are likely to be the citizens most affected by management and they are therefore to be expected to constitute a vocal political lobby group. Nonetheless, it would be argued that the mere act of exploitation does not of itself confer ownership. In this way, the fishery would be placed on a par with other industries based on the extraction of natural resources, such as oil. Companies involved in the exploitation of oil reserves operate subject to the approval, and under the control, of the State. The fishing industry would operate in a similar fashion. In this report, for the sake of consistency it is assumed that the coastal State is the owner of the resource.

Alternative models are however possible. From the point of view of maximising economic benefits from the resource, it matters less who is the owner than that the ownership issue be clearly decided. Of course, different ownership patterns will result in different wealth distributions and from this point of view they are of great importance. One alternative model that is quite frequently used is to compare fisheries to the enclosure of the agricultural commons. By and large when the enclosure movements took place, possession determined property. The State did not assume ownership of land which was then to be leased to exploiters. Rather, freehold title was invested in individuals. Subject to finding appropriate means of enforcing title, a similar approach could be adopted in fishing. As is the case with agricultural land, the expected value from exploiting the resource would then accrue to individual property owners rather than to the State. In both cases, however, the owner would be expected to have an interest in the quality of management and the degree of exploitation of his resource.

In the case where the fishery resource is contained wholly within the jurisdiction of the coastal State, it should be possible to reach agreement on an appropriate ownership structure. More complicated is the case where the fish stock straddles the boundaries of two or more coastal States. Such stocks would represent the joint property of either adjacent coastal States if the stock is distributed along the coast or, more rarely, coastal and distant water States if the stock is distributed perpendicularly to the coast. As a general principle, the more owners there are, the less chance there is for successful co-operation. The situation is even worse in the case of highly migratory stocks such as tuna since the exploitation rate of one State is likely to affect the sequential exploitation possibilities of the others. Agreement may be especially difficult to reach in that such stocks are often very variable as well as migratory.

In the case of shared or migratory stocks, international agreement on fisheries management is still going to be required, although the move to EFJ may well have reduced the number of players. However, while such stocks complicate the problem they do not alter the essential point that it is the coastal State that is the owner of the resources found in its jurisdiction. Given this ownership, the next section considers the economic benefits that the State can expect to derive from these resources.

### **The nature of economic benefits**

The potential benefits to the coastal State arising from EFJ derive from two main sources. Firstly, expanded oceanic dominion has increased the production possibilities open to coastal States through greater access to valuable natural resources. Secondly, by annexing a significant area of ocean space and claiming de facto proprietary rights, such States have greatly increased the prospects for more effective resource management.

Coastal States are likely to differ in what they perceive to be the benefits of resource ownership and in the importance they attach to each. Benefits identified with ownership typically include: foreign currency earned from access fees, income and employment generation in coastal communities, and the nutritional and consumer benefits enjoyed from increased food supplies. Indirect benefits may also be seen as important. For example, access to an EEZ may be granted to a foreign State in return for aid and technical assistance, scientific advice on the state of fish stocks, or a deal involving trade concessions. There are specific instances of where a coastal State has foregone one type of benefit in preference to another. Newfoundland, for instance, has tended to pursue a policy which deliberately sacrifices economic efficiency in resource management in favour of employment creation within its fishing communities.

The overall impact of the enclosure of the marine commons in the late 1970s was studied by Pontecorvo (1988). Table 1, derived from his work, provides an approximate indication of the potential gains to coastal States from marine enclosure. The nine countries listed accounted for 63 per cent of the world catch of marine fish in the early 1970s and 60 per cent in the mid 1980s. In each case average catches over the years 1970-72 are compared with those in 1983-85, the base period being chosen to represent a level of effort corresponding to open-access. Catches are derived from FAO data, while the imputed values used to estimate revenue are based on US prices. The change in gross revenue from the base period up to the mid-1980s is taken to signify the economic gain to the coastal State. Assuming that this gain is constant for the foreseeable future, the value of assets transferred as a result of marine enclosure can be gauged by calculating the capitalised value of the revenue stream.

There are some fairly obvious methodological weaknesses to this study which Pontecorvo himself points out. On the one hand, the net benefits to the coastal State must presumably have been overestimated to the extent that the direct and indirect costs of fishing have not been accounted for in the

analysis. On the other, the fact that these estimates are based on actual catches probably underestimates the resource potential of the marine enclosures. While we cannot be sure how far these figures accurately reflect the extent to which the various coastal States have been made better or worse off as a result of EFJ, it is clear from the orders of magnitude that the gains and losses are substantial and that the move to EFJ has produced a major international redistribution of ocean resources and the benefits which may be derived from them.

**Table 1. Marine commons enclosure: Gains and losses to coastal States**

Quant. : '000 tons

Val. : US\$ million

State	Average catches		Gain/Loss in:		Capitalised value
	1970/72	1983/85	Quantity	Revenue	
Japan	9.14	11.37	+2.23	-828.7	-5601.2
USSR	6.55	9.43	+2.88	+590.1	+3988.5
United States	2.74	4.54	+1.80	+956.7	+6466.4
China	2.46	3.63	+1.17	+985.4	+6660.3
South Korea	0.96	2.46	+1.50	+1025.1	+6928.7
Norway	3.01	2.47	-0.54	+103.3	+698.2
Chile	1.16i	4.43	+3.27	+711.4	+4808.4
Peru	9.26	3.00	-6.26	-592.9	-4007.4
Thailand	1.46	2.01	+0.55	+283.2	+2590.1

1. Capitalised value is calculated as the net present values (NPV) of the stream of revenues discounted at 10 per cent over a 10 year period. Revenue gained is assumed to occur immediately.

Source: G. Pontecorvo "The Enclosure of the Marine Commons", Marine Policy 1988: 361-372.

### ***Analytical framework***

This section considers how the economic benefits identified above might be quantified. Establishing a methodology for evaluating economic benefits is clearly important for a coastal State wishing to answer questions involving key policy decisions such as changes in access arrangements or the allocation of capital to indigenous fleet development. Even where policy changes are not envisaged, but the coastal State nevertheless wishes to ascribe an economic value to its EEZ, some kind of analytical framework is necessary in order to quantify the supposed benefits.

Essentially there are two approaches which can be used for evaluating economic benefits:

- Social welfare analysis involves estimating the net economic value of the goods and services produced by the fishery, where 'value' refers to the worth placed on the resource by users and non-users. Underlying the analysis are the concepts of consumer surplus and economic rent, the former being defined as the difference between what consumers would be willing to pay for fisheries products and what they actually pay, and the latter being defined as the payments to producers in excess of that required to maintain resources in their current allocation. In

fisheries it useful to think of economic rent as being made up of two components: firstly, those payments which would accrue to the owner of the natural resource (the resource rent); secondly, those which accrue to the suppliers of labour and capital to the extent that their opportunity costs lie below those of the marginal suppliers of these factors (intramarginal rents). The distinctive feature of open-access fisheries is, of course, the tendency for resource rents to be dissipated.

- Economic impact analysis involves estimating the economic activity generated in the economy from the use of the resource. This impact can be thought of as resulting from the whole sequence of events involved in satisfying the final demand for the output of the fishing sector. The components of total economic impact can be studied at three levels. The direct impact refers to the immediate effect of expenditure on the firms responsible for supplying goods and services. This direct impact will in turn cause indirect effects as firms seek to obtain inputs from other suppliers. Such indirect effects may eventually impinge on many sectors of the economy by virtue of the linkages between industries. Finally, induced effects will take place when households whose incomes have altered as a result of a change in expenditure adjust their consumption. This can be expected to bring about further rounds of direct, indirect and induced effects, the intensity of which gradually diminishes. In this way economic impact analysis can be used to study the regional multiplier effects of resource development. In each of the above cases the impacts may be on the national economy and/or on its international trade performance.

It is important to stress that the economic 'benefits' which may be evaluated using each of these approaches are conceptually quite different. The answer to a question such as 'how will the benefits to a coastal State change if conditions of access are altered?' depends on what the coastal State is trying to achieve. Policy measures which are designed to bring about an expansion of the domestic fleet and to increase supplies available to processors may well result in a large harvesting and processing sector supporting many jobs and employing a considerable amount of capital. Multiplier effects may also result in employment creation in other industries. In terms of the scale of impact, therefore, such a policy may well be seen as beneficial. However, since both labour and capital can be assumed to have an opportunity cost, the growth of the fishing sector will necessarily imply a loss of other goods and services. There may, in fact, be little or no gain in overall economic surplus if the resources have been transferred from an efficient to a less efficient use. In a social welfare sense, therefore, the benefits may be small or non-existent.

Many, if not most, economists would argue that social welfare analysis is the correct approach to evaluating economic benefits since it attempts to measure the difference between what society gains from the ownership of a resource and what it has to sacrifice to achieve that. However, political realities are such that economic impact analysis may be seen as the more relevant of these two approaches, given that policy makers are concerned with questions such as 'how many jobs, how much income, how much sales or output'. If that is so, it suggests that economists should try to devise empirical techniques which allow decision makers to use either or both of these approaches. Such techniques exist, but the data requirements are formidable. Our immediate concern, however, is not with empirical estimation but with the concepts which are most relevant to coastal State fisheries management and development. For this reason we consider it appropriate to examine in detail what is arguably the major source of potential economic benefit to the coastal State: the rent which can be earned from the natural resource.

### ***Resource rent: the fundamental economic benefit***

In this section we discuss two related issues. Firstly, we consider what might be involved in a coastal State strategy of rent maximisation and explain why it is necessary for the time dimension to be included in any analysis of resource rent. Secondly, we examine the economic rationale for rent maximisation and the nature of the benefits which such a strategy provides.

The resource rent generated by a fishery can be defined as the difference between the value of the output and the opportunity costs of the inputs needed in production. Whether the output is disposed of in the coastal State itself rather than in a foreign market, or whether the inputs originate from within the coastal State economy as opposed to a distant-water 'guest' supplier, is not relevant at this point in the discussion. All that matters for the moment is that the coastal State, as resource owner, can be assumed to be entitled to any rent which is generated. The capacity of the natural resource to generate an economic rent in theory determines the amount which would be paid for the resource if an efficient market existed. As such the resource takes on the characteristic of a capital asset capable of earning a stream of net benefits to its owner. Because fish stocks are a renewable resource, these benefits (i.e. the resource rent) can be taken in perpetuity. Different exploitation patterns will, however, result in different time paths for the flow of rent. Heavy exploitation in the early development of the fishery may generate a large amount of rent but, because of stock depletion, the rent which can be earned on a sustainable basis will be below its maximum. To pursue such a strategy would not be irrational, however, if the coastal State applied a very high discount rate to the benefits. This would be the case if, for example, the coastal State were a LDC in which the social opportunity cost of capital was high and funds were urgently needed for development projects. If the coastal State did not have an established fleet with the capacity to prosecute the fishery fully, then a distant-water presence might be warranted so long as the coastal State was able to appropriate a significant share of the rent. The optimality of rent maximisation therefore needs to take explicit account of the time profile of benefits and the preference which attaches to receiving these benefits now rather than in the future.

Though resource rent is measured in monetary units it is more than a pecuniary concept. This is not to deny that a policy of rent maximisation may be extremely lucrative to the coastal State, which may reap the rewards in a number of ways: access fees charged to foreign fishermen, for instance, may be a direct source of Government revenue as well as an indirect source of foreign exchange earnings. It is reported that in the Pacific Island of Kiribati, for example, revenue from tuna licences was expected to finance some 25 per cent of the Government budget in 1986. Similarly, in Mauritania in 1987 resource rent generated by export taxes on fisheries products represented 20-25 per cent of government revenue. In such countries rents often represent the only way of obtaining the capital required for economic development projects and it is clearly in the interest of the state that such rents should be maximised.

Resource rent should, however, be understood in real rather than monetary terms -- in other words, it should be taken to represent a flow of goods and services of a certain value which can be traded or exchanged. Seen in this light, it is clear that a policy which fails to maximise resource rent, either because some other objective is sought or simply because the management system is ineffective, is actually reducing the stream of goods and services which are potentially available to the citizens of the coastal State. There is no contradiction between this statement and the fact that a rent-maximising strategy will normally imply that the value of gross output from the fishing sector is less than its maximum. While it may be perfectly possible to expand fish production by allocating more resources to harvesting and processing, the opportunity cost of these resources will involve having to forego output from other sectors. This sacrifice will be borne by the coastal State itself if it is from there that the resources are supplied. We are thus brought back to the point made earlier, which is that the 'visible' benefits associated with expanded coastal State fishing activity -- such as greater food production, port

development, employment creation, etc. -- may incur an economic loss in some other form. The divergence between the actual and the potential resource rent from a fishery provides a measure of this economic loss which, we repeat, is a sacrifice to the coastal State in real as well as financial terms.

We would stress that in order to capture the economic benefits of its proprietary rights it does not automatically follow that the coastal State should itself engage in harvesting or processing activity. There is no reason in principle why these functions cannot be undertaken by foreigners operating under access arrangements laid down by the coastal State and framed in such a way that the coastal State appropriates the resource rent in whole or in part. From the coastal State's perspective such a strategy would be perfectly rational so long as the costs of hiring such services were lower than the opportunity cost of employing its own factors of production. If such a course were accepted, however, the crucial issue becomes how to establish an effective mechanism for capturing the benefits. It is this issue which is dealt with in the next section.

### **Realisation of economic benefits**

Accepting that the coastal State is the resource owner, the management authority designated by the state has the responsibility to develop objectives for the exploitation of the resource. Since the coastal State is assumed to own the resource on behalf of its citizens, the general objective follows fairly readily that the state should aim to maximise the benefits of fisheries exploitation taking into account the interests of all its citizens. As the primary economic benefit identified above is the rent that the resource is capable of generating it also follows that the coastal State should adopt as its goal the maximisation of economic rent, capitalised over the appropriate period at a suitable discount rate.

Putting this aim into practice generally proves more problematical, however. Partly the problem arises as indicated above from a failure to distinguish between economic benefits per se and the economic impact of the industry. This difficulty may exist because, almost regardless of who is designated as the management authority, a principal-agent problem is likely to emerge. For example, in many countries responsibility for fisheries management lies with a fisheries ministry. The coastal State as resource owner may have as its aim the maximisation of economic benefits, but the fisheries minister and other ministry officials will have their own goals. A typical goal would be to develop a large domestic fishing industry producing a large quantity of fish -- it is frequent to find annual reports from ministries that detail the fishing industry in these terms and concentrate in particular on the growth of the industry over the previous year. Such growth is generally a bonus for the ministry since it extends its sphere of influence and importance, but it may be of less interest to the country at large. Placing the industry under the control of a different ministry is likely to give different results -- the Finance Ministry for instance is likely to take much more interest in the tax-revenue generating possibilities of the industry than in its size per se. If the fishery is to be exploited for the benefit of all citizens, it is most important to identify precisely what economic benefits are expected to be obtained from the exploitation of the resource so that the economic performance of the management authority can be accurately assessed. In particular it seems necessary to break away from the "agricultural model" when evaluating the performance of fisheries managers. Essentially in agriculture more inputs mean more outputs and a standard criterion of success is (or at least has been until very recently) that the industry produces more from year to year. In fisheries production is naturally limited so that more inputs imply increased costs of production but generally not increased output (at least in the long run). Most of the economic benefits from fishing are therefore to be obtained from input reduction. This may make it appear that the ministry is presiding over the decline of the industry and may make the optimal economic policy politically unattractive. Unless the ministry is judged by the appropriate criterion, economic benefits of management are going to be difficult to achieve.

While in some cases the management authority may not in fact pursue an objective of economic maximisation, frequently it is not the objective that is the problem but the means, especially the institutions, necessary to achieve it. The next section considers management systems that might be used to realise the economic benefits that the fishery is capable of producing.

### *Management systems*

In fisheries management many of the measures that have traditionally been used (e.g. mesh size restrictions) may be useful in that they raise potential economic rents (e.g. because fish price is often an increasing function of size at least over some range). However, it is widely accepted that such measures are inadequate if the goal is to maximise economic benefits. The number of management systems devised so far that enable a management authority to extract economic rent is very limited. This section considers these systems and their implications for domestic and foreign fishermen.

The ability of the coastal State to extract rent depends on a number of factors. Of these the most important are: (i) recognition that the coastal State is indeed the owner and (ii) its ability to enforce its title. In situations where these conditions are not met the State is unlikely to do very well out of its resource. For example, it was estimated that in the early 1980s the Pacific Islands were receiving only about 2 per cent of the value of the fish resources in their fishing zones. This result was attributed to a failure of compliance by foreign fleets, which stemmed from the inability of the coastal States to exercise full control over their fisheries. The management authority has to be able to control not only actual but also potential fishermen. If, for example, it is unable to exclude illegal high seas fishermen then many of the benefits of management may be passed to this group and their activities will influence negatively the attitudes and behaviour of those fishing legally. The coastal State must ensure therefore that it has an adequate enforcement capability. As discussed further below, enforcement services may themselves provide an opportunity for international trade. The cost of such services may be an important element in the determination of the appropriate management system.

Subject to these ownership and enforcement requirements, the type of management system that it is optimal to introduce will depend on a number of factors. First, the management authority must have the ability to determine appropriate management units. This of fisheries may not be easy to achieve however especially where fisheries are multi-species and multi-gear. Second, the kind of exploitation pattern is important. In most cases, it is unlikely to be possible to introduce the same kind of management system into a diffuse artisanal fishery exploiting the fringes of many stocks as it will be in the case of a capitalistic fishery based on one principal target species. Third, the stability of catches over time is important. Where catches per species are very variable, fishermen may well have adopted opportunistic strategies switching from stock to stock. The economic health of the fishery may depend on such an approach which the management system should not undermine. Perhaps the most important factor determining the kind of management system that is introduced, however, is the precise set of objectives being followed by the management authority. In particular their attitude to the way in which the wealth (rent) generated by the fishery should be distributed is likely to decide the choice of system and the way in which it is implemented.

Fisheries economics, however, has paid relatively little attention to the issue of rent distribution. This is because economists have been concerned more with the resource allocative effects of open access. Provided that exploitation rights can be clearly defined and enforced, and that they are transferable it does not matter for resource allocation how they are distributed. Concentrating on the allocative issue has enabled economists to avoid making an explicit value judgement regarding who should obtain the rent from the fishery. However in so doing economists have stepped away from an issue that is often at the

heart of a practical management plan. Arguably they have also implicitly tended to favour current participants in the fishing industry. In most fisheries the amount of effort required to maximise economic rent is low relative to the number of vessels involved in the free access fishery while the amount of rent earned is high. In the Moroccan cephalopod fishery, for instance, maximum annual rent is estimated to be in the order of \$250 million with only 150 vessels required. Average annual rent per vessel would therefore be \$1.67 million. If vessels were given these rents on a perpetual basis their capitalised value (assuming a 10 per cent interest rate) would be \$16.7 million. It is easy to understand therefore why it is the distribution of rent that is the main concern of fishermen and administrators.

In situations where the coastal State is the recognised owner with an enforcement capability, extraction of an appropriate resource rental from the exploiters of the resource may be fairly easily achieved using a taxation scheme. The kind of scheme that is best used will depend on the particular circumstances. Generally one of landing taxes, effort taxes, or export taxes will be appropriate. The fisheries economics literature has tended to downgrade the use of taxation as a method of extracting resource rents for two major reasons. First, it is argued that taxation systems tend to be inflexible and that they cannot therefore be used for short-term control. This argument, however, is not so much an argument against taxation as an argument in favour of back-up measures such as the ability to close the fishery, if necessary. Second, for political reasons it is often argued that taxation cannot be used to regulate domestic fishermen. This problem may be real but it must be pointed out that by accepting it policy-makers may miss a simple and effective way of collecting resource rents.

There seem to be a number of reasons why the argument that domestic fishermen cannot be taxed is advanced. To begin with, it may be a symptom of the failure referred to above to distinguish clearly between the resource owner and the resource exploiter. Secondly, there may be a failure on the part of policy-makers to identify the correct nature of economic benefits derivable from the fishery. In particular the emphasis on the impact of the fishing activity may be misleading. Thirdly, the argument may be a feature of the principal-agent problem, where the objectives of the agent charged with resource management are not the same as the principal (i.e. the coastal State resource owner).

One practical difficulty with taxation is that there is a complete divorce between ownership and exploitation. Fishermen exploit the resource in competition with one another and they will therefore have little incentive to improve the resource -- e.g. by investing in restocking programmes: the reason being that, since access remains open (but no longer free), individual fishermen have no way of ensuring that they capture the benefits of any investment that they make in the stock. The resource owner, however, has a clear incentive to improve the resource. Sustainable improvements in the fishery will attract more fishermen at the going rental and will thereby increase rental income to the owner. Alternatively, rentals might be raised with the existing level of effort. The owner then faces a standard investment appraisal problem comparing the cost of the improvement with its expected benefits. This close relationship between ownership and enhancement of the resource may be something with which governments are unhappy, preferring a more arms-length approach, although it must be noted that much fisheries research is presently government-funded.

Despite these drawbacks, taxation schemes have a number of advantages that make them a rather attractive method of extracting rentals and would certainly make them worthy of more consideration than they presently receive in the management debate. First, they are general in that they apply to all kinds of fisheries ranging from capitalistic high seas fleets to the artisanal sector. In all cases appropriate taxation policies can be designed so as to capture the rent derived from the resource. The precise nature of the tax system used will depend on the particular circumstances. One attractive option is to use landings taxes since the tax will be directly in proportion to the value extracted from the stock by the exploiter. In some circumstances enforcement may be a problem and some form of input tax may be more appropriate.

Second, the system does not require that precise rules be drawn up concerning exploitation rights. Access to the resource remains open but it is no longer free. The market will decide who is to participate and who not, and in the usual way of things an efficient solution can be expected to emerge. In particular, administrative decisions on participation are not required of the management authority. In the case of the specific problem under consideration in this report, domestic and foreign fishermen may (and in the interest of rent extraction, should) be treated equally. The resource will be exploited at the lowest opportunity cost, subject to participants paying the appropriate rental charge.

In cases where the management authority has decided that taxation cannot be used (at least with the domestic fleet) as a means of extracting rents, other systems have had to be designed. In these cases if the rents are to be generated then clearly-defined exploitation rights are required. Designing such systems has not proven simple and so far no universally-applicable solution has been found. Essentially three options exist for the designation of rights:

- effort-based, e.g. licences to participate in the fishery, or to use some given amount of catching power (expressed for instance in terms of GRT);
- catch-based, e.g. individual quotas to land some given amount of fish;
- region or area-based, e.g. territorial use rights given to fishermen operating in a particular area.

Different fisheries require the use of different systems depending largely on the enforcement possibilities. In the case for example of a diffuse artisanal fishery neither effort nor catch based schemes are likely to be very successful; the scope for evasion is simply too large for the system to be properly policed. As a result many economists have proposed that area based systems be introduced, for instance that waters out to a depth of 3 miles between points A and B be the property of a fisherman's co-operative. Anyone not in the co-operative may not participate (legally) in the fishery. Provided that the co-operative is given a legal title enforceable through the courts then rational management is likely to emerge. The coastal State can collect its rents through such a system in a number of ways. Probably the most cost-effective would be to auction the optimal number of memberships, these to be transferable. Alternatively a rental might be levied. Where a commercial fishery is very well-defined in terms of vessels, ports and species, it is probably easiest to introduce catch-based rights, especially individual quotas. Again the most cost-effective way for the management authority to extract the resource rent is to auction rights. Finally, where catch control is difficult to enforce, effort-based management may be the best alternative. As is well-known such systems run the risk of rent-seeking behaviour on the part of fishermen leading to over-capitalisation. Once more auctioning seems to be the best method of rent extraction. Where, therefore, taxation is not an option, the best approach is to identify the most appropriate support for exploitation rights and then to auction the optimal number. This approach will ensure that the coastal State obtains most of the expected economic rent from the fishery.

By and large however this approach has not been adopted, partly for similar reasons that taxation has generally not been used. However there are also some other factors in the case of exploitation rights. First, it has often been argued that for management to be successful the fishermen must have an interest in the outcome. This argument may or may not be correct. However accepting that it is, it has often been followed by the false premise that in consequence some of the economic rent must be given to the fishing industry, for example in the case of ITQs in New Zealand. Whether the fisherman is given or purchases the right makes no difference operationally provided that it is transferable. In fact it is arguable that the fisherman will have an even greater commitment to good management in cases where he has borrowed to finance his participation in the fishery. In both cases the fisherman must be concerned about the value of

his asset, regardless of how it is financed. A second fallacious argument often advanced in favour of giving away rights is to improve fishermen's incomes. This argument confuses wealth and income. Giving away rights increases the wealth of those fishermen to whom they are given and since this wealth will in turn produce income it increases their income. It does not however increase the income to be obtained from being a fisherman, as is evident in the fact that all future fishermen will not participate in this wealth distribution. This income level is determined largely by alternative employment opportunities open to fishermen; the reason for low fishing incomes being that alternatives are often few and far between. To quote MacKenzie (1983) "Fishermen are not poor because they are fishermen; they are fishermen because they are poor". The way to improve incomes is to give fishermen more alternatives.

Different management systems and different ways of implementing them have different implications for domestic and foreign fishermen. This section closes by discussing some of these differences.

In the case of a taxation based system, equal treatment can be given to both groups. By determining the appropriate tax level the coastal State can extract approximately the maximum rent. At present where taxation systems are used they tend to apply only to foreign fishermen. The result is that domestic effort is too high a proportion of the total. Ironically however the goal is often to exclude foreigners in the long run. To the extent that this is successful the coastal State makes itself worse off since extracted rents decline. An implicit decision is taken to subsidise the domestic fishing industry by not collecting the resource rents that the fishery could generate.

In the case of exploitation rights, the allocation method is important. If rights are auctioned freely then once again domestic and foreign fishermen are treated equally and the State captures approximately the maximum rent available from the resource (over the time period of the rights).

If rights are auctioned only to the domestic industry then the State loses to the extent that foreigners would have bid more. This rent is simply lost if rights are not transferable to foreigners, although a number of economic effects can be expected to follow depending on the size of the rent potential -- e.g. vessel re-registration or even nationality changes, trade in individual fishing services (see below), illegal foreign fishing. If domestic fishermen are allowed to sell their rights to foreigners then they will capture the economic rent via increased prices for rights -- that is by favouring domestic fishermen in the auction, the management authority gives some rent to them.

In many cases the first round of rights is given to domestic fishermen usually in proportion to their historic fishing performance. The impact on rent distribution depends on what happens afterwards. The price of the right will depend on the expected profits to be earned from operating it. If no charge is levied by the state on rights owners then the price will include the capitalised value of the economic rent expected from the fishery. Where foreign fishermen have lower costs or a better fishing performance than domestic fishermen they will be prepared to pay higher prices for rights. In such circumstances the rights holders are likely to press for transferability to foreigners to be allowed so as to maximise the value of their right. If the state decides however that a resource rental should be charged then the price of the right will be reduced. Presumably, if enough of the rent were taken, the price of rights would drop to zero and the system would approximate to a pure taxation system. In this case it is the State that should be pressing for transferability of rights to foreigners (assuming that they have lower costs) since this will increase the rental charge that can be made. Provided that some charge is made and that the right price does not drop to zero then rents are shared between the state and the fishermen who are given the initial allocation of rights. Future fishermen will earn rent only to the extent that unanticipated rents emerge in the future -- e.g. due to unanticipated fish price increases. However, since fish prices go down as well as up, the effect on rent could also be negative -- i.e. rights prices could drop. There is no law that guarantees that real fish

prices will increase indefinitely. Sharing rents will give both groups (coastal State and domestic fishermen) an interest in allowing transfers to foreigners since this will increase the price of rights.

It would seem therefore that once an economic management system is put into operation, the coastal State itself and probably domestic fishermen would have every incentive to allow the participation of more efficient foreign fishermen. The failure of this outcome to emerge in most practical situations must be attributed to a failure to implement economically oriented management. Reasons suggested above for this failure include a lack of recognised ownership, a lack of enforcement capability, and a misunderstanding of the economic benefits derivable from fishing. As these issues are increasingly resolved around the world, it is to be expected that the degree of trade in fishing services (in the form of access to fishing grounds) will increase.

The following sections discuss in more detail the circumstances under which trade will be beneficial for the coastal State and the precise form that it might take.

### **Role of fishing services**

In order to maximise the economic benefits from the exploitation of the resource, the coastal State faces the strategic question of how to achieve this goal. Fisheries exploitation as an economic activity requires a combination of labour and capital services. The question is: who is to provide these services to the resource owner and under what conditions? Frequently in the past the answer to this question has been that to achieve the economic benefits the coastal State must provide the services to exploit it. However, the justification for this response seems to be based on weak ground in that it depends on the one hand on a confusion between ownership and exploitation, and on the other on a failure to clarify the ownership situation. Once these two issues are resolved then it seems clear that the provision of exploitive services to the owner so as to maximise the economic benefits from the resource should be based on cost (for a given quality). In which case, there is no a-priori reason why coastal State owned fish stocks have to be exploited by coastal State provided fishing services.

It is the purpose of this section to define the nature of services, to consider the conditions under which they might best be provided by coastal and distant water States, and finally to determine the precise form in which such services might be traded.

### ***Nature of fishing services***

The first kind of service required in fishing is that of the harvesting activity itself. This service tends to be the one that attracts the most attention for the good reason that it is in this area that the problem of market failure is to be found. The services of labour and capital might be provided locally or traded.

Harvesting is not the only service of importance however. The provision of the processing and marketing functions must also be decided. Economists have played much less attention to these aspects since once the fish has been landed it is conceptually no different to any other product. The factors that determine the optimal provision of such services will include knowledge of specialised (and perhaps patented) production methods, brand names, and market knowledge.

Finally, policing services must also be provided. Trade in such services might occur in a number of ways. First, the coastal State might import the services of organisations and/or individuals

specialised in such work. Such imports might be on an on-going permanent basis in the case of a specialised surveillance organisation, or temporarily via the use of advisory consultants and training courses. Second, a disguised kind of trade may occur via observer programmes since generally the coastal state requires the distant water vessels to pay for them. Effectively therefore the coastal State exports surveillance services to the distant water country to be used, ironically, to control the activities of its own fleet.

The next section considers the general arguments for the provision of such services by the coastal State itself as against their import from another country.

### *Coastal State versus distant water provision of services*

It seems reasonable to accept the proposition that, other things being equal, the coastal State would prefer to use its domestically-provided services to exploit its resources rather than import such services. Moreover, coastal State fleets might be expected to have a natural advantage in that in many cases they are located closer to the resource, lowering their transport costs and possibly providing them with better and more timely information concerning the state of the resource. This section concentrates therefore on the various reasons why imports may in fact be in the coastal State's interest.

The fundamental explanation of why trade in fishing services may be beneficial to the coastal State is the same as why international trade generally is advantageous -- namely that one or more foreign countries may possess a comparative advantage in the provision of such services. In such cases it will be in the interests of the coastal State to hire such services rather than to provide them for itself. The comparative advantage may come from a number of directions -- e.g. foreign countries may have access to skilled labour or specialised capital, they may have better management, they may simply have lower costs -- but whatever the source, it means that the real cost of resource exploitation will be lower and therefore the benefits (in the form of rent) greater if services are imported. Munro (1985, p.6), for example, suggests that capital-intensive tuna fishing in the South Pacific is more appropriately undertaken by capital-rich distant water nations (such as Japan) rather than the capital-poor coastal States of the region.

An often-cited source of comparative advantage for distant-water countries arises where fisheries are of a seasonal nature. Due to the non-malleability of fishing capital, there may be insufficient activity for the coastal state to justify the necessary investment in the most efficient vessels. This difficulty may give foreigners an advantage in situations where they are able to move from stock to stock and hence spread their fixed costs over a much longer period of the year. Too much should not be made of this advantage however. First, a distinction must be drawn between fisheries that are naturally highly seasonal and those that have become so due to past management measures. It would seem unwise to institutionalise past management errors into the current management system. Many examples might be cited of fisheries where the natural season has contracted due to attempts to cope with over-capacity. A well-known case concerns the Pacific halibut fishery where a natural season in excess of 250 days was reduced in some areas to less than 40. In such cases a form of pulse fishing may become the only viable economic alternative, but this may not represent the best long-run development policy for the coastal State. A second point to bear in mind is that in many cases coastal State fishing vessels can also follow a policy of "stock-hopping" even if it is at a different level to distant water vessels. In many coastal States the trend has been towards versatile vessels capable of exploiting a variety of species using a variety of gears. Since many fish resources are located fairly close to the coast, this development may actually give a comparative advantage to the coastal State companies who may be able to operate smaller, and cheaper, vessels than their distant water rivals. For some resources, most notably highly migratory stocks such as

tuna, developing adequate coastal State capacity may never be a feasible option and continuing reliance may have to be placed on distant water States.

In principle then the coastal State maximises benefits to itself if the provision of fishing services is undertaken by the country (or countries) with the comparative advantage. In practice a number of features of fisheries management and trade may modify the applicability of this principle.

First, many decisions to allow access in the form of fishing services are administrative in nature -- that is, the appropriate management authority of the coastal State decides that distant water fleets may or may not participate in the fishery. Such decisions are rarely made solely on the basis of comparative advantage but even if they were the administrator faces an almost impossible task. The experience of countries that have co-operated with foreign partners in the exploitation and management of the resources within their fishing zones may offer some guidelines to the future, and at the very least may help planners to avoid some of the more obvious pitfalls. Past experience is of limited help, however, when it comes to making *ex ante* decisions on whether the coastal State should develop its domestic fishing sector or rely on foreign partnerships. Such decisions require assumptions to be made about the enforceability of property rights, the sources of comparative advantage, and the market potential of the species it is proposed to exploit. Very comprehensive information is thus required if the coastal State is to come anywhere near extracting the maximum benefit from its marine resources using an administrative approach. It is for this reason that a market solution is to be preferred to an administrative one where it is possible to do so. Rather than try to plan the development of the sector in detail, the management authority should establish the regulatory framework (e.g. landings taxes, export taxes, transferable exploitation rights) and then allow the market to determine the precise identity (local or foreign) of exploiters. In this way the coastal State can expect to maximise its economic return on the fishery. Problems may still arise in the form of market distortion (monopoly, subsidies) but the resolution of these problems is much easier than trying to determine administratively the development of an economic sector. The recent experience of the ex-USSR would seem to underline this point.

The administrative nature of such decisions also gives them an overt political flavour which reliance on the market would remove. Coastal State fishermen tend to be very adept at exploiting this political element, arguing for instance that they will not be regulated until foreigners have been eliminated. In fact, of course, banning foreigners is just an easy way of reducing competition (at least for a while). Foreigners are chosen as the target precisely because they are politically vulnerable. If they could, groups of fishermen would also ban other groups, even from within the same country, for example on grounds of gear, region, season and so on. So long as access decisions remain administrative the management authority will find itself under intense political lobbying which is likely to paralyse the fisheries management process.

A second problem which may militate against the unfettered application of the comparative advantage principle in the provision of fishing services is that many fish commodity markets are protected. The coastal State may be able to offset this distortion via the granting of access rights to distant water States regardless of comparative advantage in return for access to markets. In such situations the coastal State would ironically end up favouring otherwise uncompetitive distant water fishing services over those supplied locally. Canada, for example, in the early days of EFJ followed a policy in which certain EC Member States were given access to its waters in return for favourable trading terms on the import of Canadian fisheries products into the EC. There is, of course, no reason why such reciprocity need be confined to fisheries products -- a coastal State may well find it beneficial to allow distant water access to its fishing zone in return for a trade deal on its non-fisheries exports. The standard international economic argument is likely to hold, however, that both countries would gain from the removal of the distortions in both markets.

An argument frequently proposed to ignore comparative advantage in favour of locally-provided services is the infant industry argument. The domestic industry has, it is argued, a latent comparative advantage which will only become manifest when it has reached maturity. Once achieved, the protection can be withdrawn and the domestic industry should -- in theory at least -- be (more than) able to compete with foreign fleets. The well-known problem with this argument, at least when it has been applied to other economic sectors, is that the industry fails ever to mature and protection is required indefinitely. In the case of extractive resources, where the domestic industry does not in fact turn out to have a comparative advantage, the country is unlikely to derive much benefit. For instance, many oil-producing countries decided in the 1970s that their optimal economic policy was to exclude foreign exploiters. In many cases this policy has failed to bring the anticipated benefits and many oil-producers are turning once more to foreign countries to provide the necessary expertise. While there are some obvious differences between the oil and fishing industries, there are also many similarities. As a general rule it would probably be prudent for the coastal State to look sceptically at the infant industry argument and where it is accepted to try to identify whatever distortions are preventing the private sector from identifying and funding the latent comparative advantage enjoyed by the domestic industry.

A variant of the infant industry argument occurs in situations where opportunity costs in the coastal State are very low. It may be tempting to use the fishing industry, especially in developing countries, as a means of implementing the country's macro-economic and development policies. Resources can be switched from zero or low opportunity cost uses (e.g. unemployment or subsistence agriculture) into fishing. The goods and services that must be foregone are therefore minimal and the element of development is something that the country feels is worth having. A number of points need to be made about this argument. The resources liberated are principally labour. The case is made therefore for a particular kind of fisheries exploitation, namely one that is very labour intensive. Distant water fleets by their nature tend to be just the opposite. For the local fleets to replace the distant water fleet would require that the fishery be susceptible to different exploitation patterns -- in particular, artisanal versus capitalistic. Such resources certainly exist, although if the artisanal fleet has such low costs it may be expected to displace the distant water fleet in any event. In many cases however artisanal and other fleets exploit the fishery sequentially so that the replacement of the distant water fleet by a coastal State fleet would then require similar levels of capital investment. The low labour opportunity costs of the coastal State then become far less relevant.

Much the same argument tends to be put forward in developed economies to protect regions that depend on fishing for their livelihood. One goal often cited in fisheries management is to improve fishermen's incomes. Management measures are frequently implemented to improve the employment prospects in the fishing industry in particular regions. Such measures seem somewhat misguided however. It is true that fishermen's incomes are determined largely by the alternative employment opportunities available to them. The lack of alternatives is the major reason why fishermen are often poor despite the value of resource that they exploit. Hence even if fishing incomes fall to very low levels they have no option but to carry on fishing. The fishery does indeed provide a way of improving their lot, and that is to use the rent available to increase the local opportunity cost for instance via regional economic development packages or fisherman education programmes. The best policy is once again to maximise rent and then to invest this appropriately. Using it to subsidise employment represents a short-cut that seems almost guaranteed to lock fishing communities into low incomes indefinitely.

The argument is sometimes propounded against distant water involvement in situations where the coastal State enjoys a degree of market power in the supply of fishery products. Eliminating foreign fishing activity, it is argued, will reduce supply and increase market price. Given appropriate price elasticities, this policy would be to the advantage of the coastal State. However, if correct, it is clear that this is an argument only in favour of a reduction in fishing effort and not in favour of discrimination

against foreign fishermen. Domestic fishermen generally propose many arguments of this type, e.g. it is almost always foreign fishermen who are held responsible for excess effort, illegal fishing, mesh size infringements etc. The rationale for such arguments is usually the political and administrative nature of much of fisheries management referred to above.

For the coastal State to maximise economic benefits as the resource owner seems to require then that access to the resource be determined on the basis of comparative advantage. This approach is likely to involve some trade of fishing services with foreign countries. So far such trade has been discussed only in general terms. The precise form in which such trade occurs may also be important and this issue is discussed next.

### **Form of distant water fishing services**

Much of the literature of fisheries economics discusses distant water states as if these nations actually supplied fishing services. In fact, however, such services are supplied either by companies or by individuals who are nationals of these countries or who are located in these countries. Even services supplied by companies represent in fact bundles of services provided initially by individuals, although the company itself may offer some synergistic or other effects not available from any one individual. One question which arises therefore is: if it is accepted that coastal States may benefit from distant water provided fishing services, precisely what form should such services take?

A range of possibilities exists. At the one extreme coastal State fishing companies might decide to hire some foreign fishing services, either labour or perhaps capital. Joint ventures hold the middle ground where domestic and foreign companies agree to co-operate in some form. At the other end of the spectrum, the coastal state may simply purchase the services of foreign owned and operated companies.

### ***Services supplied by individuals***

There seems already to exist quite a substantial flow of trade in fishing services via coastal State fishing companies. For example, many countries which have developed fishing fleets to exploit resources previously exploited by distant water fleets have hired labour skills from the distant water states. In Morocco, domestically-owned vessels exploiting the economically important cephalopod fishery currently use mostly Korean and Spanish skippers and senior crew. Remittances to Korea and Spain represent an important cost for Moroccan fishing companies. These companies, with the support of the Moroccan government, are attempting to train Moroccan skippers and crew to take advantage of lower Moroccan labour costs. The replacement of foreign crew is a rather slow process however.

Such trade seems to occur independently of the management system in place, although of course the system may influence the quantity of trade insofar as it influences the amount of fishing effort. It is presumably potentially beneficial for the coastal State to engage in such trade since local companies will only hire such services if their profitability is enhanced. However, the realisation of the benefits will require that an economically-oriented management scheme be implemented, otherwise increased profitability will have its usual effect of inducing increased effort. Despite the apparent benefits to be obtained from this kind of trade, many coastal States restrict it, requiring for instance that a certain proportion of the crew must be nationals of the country.

Services might be provided to coastal States in other ways. One example referred to above occurs in the case of enforcement activities. Another may be stock assessment, research cruises, data

analysis etc. Such services might be provided by individuals financed either directly by the coastal State or via aid programmes, e.g. FAO.

Balance of payments data will only measure part of the impact of such trade. In particular, movements of capital and the remittance of salaries and profits will be recorded and provided they can be assigned to the fishing industry will give some guidance as to the value of this source of trade in fishing services. Other flows may be much more difficult to estimate. For instance, foreign-recruited crews are likely to receive and spend some part of their salary locally. Strictly speaking, this transaction represents an import of services and an export of goods and services by the host country but it would go unrecognised in trade statistics. In some cases flows may not be assigned to particular sectors of the economy but simply to general trade categories, such as remittances of labour earnings. Due to these problems, providing a true estimate of the amount of such trade is likely to be especially difficult.

### *Joint ventures*

The late 1970s and early 1980s witnessed the growth in a large number of co-operative fishing arrangements (CFAs) between coastal States, with newly expanded fishing zones, and foreign partners with long-range distant water fleets. The nature of this co-operation has varied in form, ranging from straightforward 'fee' fishing arrangements, under which the host country charged the DWFN for the privilege of having access to the resource, to more complex joint ventures often involving the creation of a commercial company. It is reported that by 1980 there were approximately 500 joint ventures in world fisheries, 287 of which were based in less developed countries.

In this context a joint venture can be defined as 'an association of two or more partners who share the risks and benefits of a joint commercial, and in some cases, non-profit use and development of a marine living resource.' The commonest type of contractual arrangement is where an equity-based company is established, involving private or government interests from the coastal State and a foreign partner. The host partner might be expected to provide access to the resource, land for shore-based facilities, infrastructural support, and willingness of the government to underwrite loans. For its part the foreign partner would normally be required to provide the major share of the capital and technology in the form of vessels and processing plant, as well as the expertise necessary for commercial management and marketing. The agreement may also stipulate that the company should base its operations in a particular region of the coastal State (e.g. where unemployment is high), that part of the catch should be landed in the host country, or that the foreign partner should agree to train the fishermen of the host country in basic fishing skills.

The rationale for joint ventures can be explained in terms of comparative advantage. If the coastal State has a comparative advantage in some aspects of fishing while the distant water nation has a comparative advantage in others, then a partnership between the two is logical response. In more concrete terms there may be specific benefits which a joint venture can supply and which may make it more attractive compared with, say, a 'fee' fishing arrangement. To start with, the very nature of the operations -- typically involving physical investment within the coastal State and an integration of activities between the two participating countries -- is likely to add a degree of stability to the process of fisheries development. By contrast, 'fee' fishing suffers from the drawback that the foreign partner may, if it chooses, withdraw from the arrangement at relatively short notice. The most compelling argument in favour of joint ventures, however, is that they provide a unique opportunity for technology to be transferred from the foreign to the coastal State, either by way of investment or through technical training. Even if the joint venture is itself not permanent, in principle the coastal State may eventually be able to

take on many of the activities once the technology transfer is complete and personnel employed in the host country have acquired the skills necessary to set up and manage a fishing operation.

Most of the arguments against joint ventures derive from what has taken place in practice, where the rewards to one or both partners is often below expectations. Much of the difficulty stems from conflicting objective between the partners, which is more likely to be the case when the host partner is the government of the coastal State. In such situations the host is likely to have broad socio-political objectives, while those of the foreign partner will be more narrowly commercial. Another difficulty is that joint ventures do little to overcome the 'principal-agent' problem lying at the heart of all co-operative fishing arrangements, since it is difficult for the host government to combine the multiple roles of shareholder, tax collector, and resource manager. A less contradictory approach might be to keep these functions quite distinct, with the coastal state (as principal) keeping an 'arms length' relationship with the body permitted to exploit the resource (the agent).

### *Services provided by foreign companies*

Given that locally-owned companies can and do hire foreign labour skills, why should coastal States sometimes decide to purchase services directly from foreign fishing companies? The fundamental response must be that the State gains more by purchasing such services than it could if they were provided locally. The question is: what advantages do foreign companies offer and to what extent will these endure into the long run?

First, foreign companies may be receiving subsidies from governments concerned for example by regional unemployment issues. This kind of subsidy would represent an attempt to export unemployment which was typical of many countries' economic policy during the Great Depression of the 1930s. A coastal State concerned to maximise economic rent from its fisheries might not worry about such subsidies. If the subsidised fleet has lowest costs then it will be prepared to pay the highest rental for access to the resource (in terms for example of the highest landings tax or highest bid price for exploitation rights). However maximising economic rent requires careful consideration of the appropriate management strategy, given that the foreign country might decide to end subsidies some time in the future. For the coastal State presumably the best approach would be to auction perpetual rights. In this way the capitalised value of expected future rents would be received by the coastal State immediately. If in the future subsidies were to end, the impact would be felt by the foreign fishing industry. Since operating costs would increase, profits expected from holding rights would drop and so therefore would the price of rights. If a tax based system were to be used then although foreign fleets would be prepared to pay higher access fees while the subsidy lasted they would be unable to continue paying once the subsidy ended. If the coastal State does not wish subsidised foreign fleets to replace domestic ones or prevent them from developing then it would have to investigate the extent to which differences in fishing costs between nations represent genuine cost differences rather than subsidies, either direct or implicit (in the tax system for instance). In practice, however, identifying genuine cost differences is likely to prove an extremely tricky task, especially as costs change over time.

Second, foreign-owned and operated fishing companies may be able to provide better management and organisation than locally-owned companies. It is debatable however whether such an advantage could continue into the long run since local companies could copy systems and methods used by foreign companies, for example by employing the services of foreign management consultants. Moreover, in fishing much of the managerial skill is at the level of the skipper and as a matter of fact this kind of service is already being traded.

Third, foreign-owned companies may have access to their home markets that coastal State companies would find difficult to acquire. Preferential access for distant water companies to their home market may occur in a number of ways. To begin with, the government may simply agree to preferential tariff arrangements for its own companies (this being a variant of the access to markets for access to resources argument made above). The foreign company may enjoy a more genuine economic advantage via the twin effects of vertical integration and product differentiation. A vertically-integrated company may be prepared to offer more for fish resources to ensure adequate supplies for the rest of the company. The major advantage to the company compared to purchasing supplies on the open market is presumably one of risk reduction in the sense of not being left short of supply in a tight market and also of being less exposed to price fluctuations. Product differentiation may also enable a foreign company to bid more for rights or pay higher resource rentals. Coastal State companies are likely to find it very difficult and/or expensive to build an image for their product in foreign markets and may have to supply an undifferentiated product, at a lower price, to various purchasers. Foreign companies on the other hand with established brands are likely to be able to command a price premium that coastal State companies cannot match. A related strategic issue that the coastal State must consider is the likely reaction of the foreign company to exclusion from the coastal State fishing grounds. The foreign company seems likely to react in two ways. First, it will attempt to find other sources of supply, perhaps by agreeing to undertake exploratory fishing in other countries' waters, possibly on a joint-venture basis. This reaction is especially likely to occur in the case of high unit-value species, these being of course just the ones that are most likely to interest the coastal State in the development of its fisheries policy. Hence, the exclusion of Japanese and Korean companies from Moroccan waters in the fishery for octopus has encouraged them to undertake exploratory fishing elsewhere, particularly in the Yemeni coastal zone, apparently successfully. Second, where the company is vertically integrated, it is likely to attempt to substitute supplies in the market place. This kind of substitution is likely to occur principally in response to price effects, but access arrangements may also play a role. Substitution may occur in various ways. First, the company may simply attempt to find another source for the same species. Second, it may attempt to change consumer tastes by replacing one species with a similar one. For instance, Japanese companies have attempted to replace the very expensive squid, *Loligo*, with cheaper *Illex* varieties. Third, consumer purchasing patterns may be expected to change anyway in response to price changes and such changes may have rather unpredictable results. For instance, the collapse of salmon prices associated with salmon farming has resulted in salmon being substituted for octopus in the Japanese market with a consequent downwards pressure being exerted on octopus prices.

A fourth advantage, referred to above, is that distant water companies may be more flexible when faced with seasonal fisheries. The non-malleability of capital poses less of a problem to them since they may move from fishery to fishery, ensuring a sufficiently long fishing season for the vessel.

A fifth and potentially the most valuable advantage to the coastal State of using foreign companies is that it is likely to prove much easier to introduce and enforce rational economic management systems with such fleets. Coastal state fisheries ministers are likely to find it relatively simple to refuse requests emanating from foreigners to increase the number of licences, relax technical conservation measures and so on; whereas the same requests from domestic companies may prove politically irresistible, especially at sensitive times like elections or under certain kinds of government. It is difficult to generalise this argument since much will depend on the different political customs and constitutions of the interested parties as well as the actual management systems implemented, in particular regarding how much discretion is given to the fisheries ministry. Under a system for example of non-transferable licences granted to coastal State companies, any attempt to block the number of licences is likely to lead to intense pressure on the Fisheries Ministry to grant more licences which will prove more or less impossible to resist. One important argument in favour of transferability of exploitation rights generally is that this removes politically-sensitive allocative decisions from the political arena and to the market place.

Where complete transferability cannot be achieved (or where it is generally felt that the Ministry might issue more rights if it wanted) it seems likely that better economic results will be achieved via distant water than coastal State companies. This general point is borne out by the experience of fisheries management around the world. In almost all cases where the coastal State has succeeded in generating substantial economic rents, it has been via foreign fleets. In fact as a general principle it might be stated that the replacement of distant water by coastal State fleets results in a worsening of the economic performance of the fishery. This result comes about not because of any inherent inefficiency in the coastal state fleet but because of a general failure to deal with the resource ownership and management objectives issues.

## **Conclusion**

This report has considered the economic benefits to be obtained by the coastal State from allowing access to its fisheries resources in the form of fishing services. It is argued first that maximisation of economic benefits requires that the issue of who owns the resource be clearly established. Although a number of possibilities exist, it is suggested that it is most appropriate to consider the coastal State as owning the resource in trust for all citizens. The economic benefits to be obtained from the fishery are discussed next. It is argued that such benefits are limited mainly to the resource rents that the fishery is capable of generating. Many fishery management schemes confuse the economic benefits of management with its economic impacts. For various reasons (principal-agent problems, partial equilibrium analysis, political pressure groups) management authorities may spend too much time pursuing the impacts and too little the benefits. The opportunity costs of such impacts tend to be ignored or downplayed. For example, developing a port to accommodate the domestic fishing fleet may have various spin-offs, but presumably so would the hospital that might have been built if the same capital had been used in this way. Much emphasis tends to be placed on the low opportunity cost of labour in fisheries communities, but capital presumably never has such a low cost.

Accepting that the coastal State owns the resource and that the principal benefit available is the rent, the report then considers management systems that might be used to realise the benefits. Essentially, two methods are available (possibly used in combination). Either resource rentals in some form (e.g. landings taxes) can be charged, or exploitation rights can be sold or leased. The precise form of the management system will depend on a number of factors (e.g. the type of fishery, the number of landing places etc.). In both cases the management authority must be in a position to enforce any management decisions that it has taken, otherwise there are clearly few benefits that will be realised.

Fishing services to exploit the resource subject to coastal State control might be provided either by the coastal State itself or by one or more foreign partners. It is suggested that in general the coastal State will do best if it allows the identity of providers of services to be determined by cost rather than nationality. Essentially comparative advantage should be allowed to determine participation in the fishery. Due to their locational advantages it might be expected that in many situations coastal State fleets will in fact have the advantage, but there is no a-priori reason why their services must be used by the coastal State. A number of possible distortions in the markets for services and products are identified and their impact on the general principle of comparative advantage is discussed. By and large these distortions tend to argue in favour of increased foreign participation.

Finally in cases where the import of fishing services does seem to be beneficial, the report considers the precise form that such imports might take. Three options are identified. Trade in the form of individuals, trade via joint ventures, and trade in the form of foreign companies. The advantages and disadvantages of each form for the coastal State are discussed.

It should be noted that this report considers only the conceptual problems involved in an assessment of the benefits of trade in fishing services for the coastal State. The logical extension to this work would be to begin by estimating the amount of such trade currently occurring, although such measurement may prove tricky to accomplish. Modelling the impact of such trade on the coastal State might then follow, although as indicated by the range of issues discussed in this report, the data requirements are likely to be heavy.