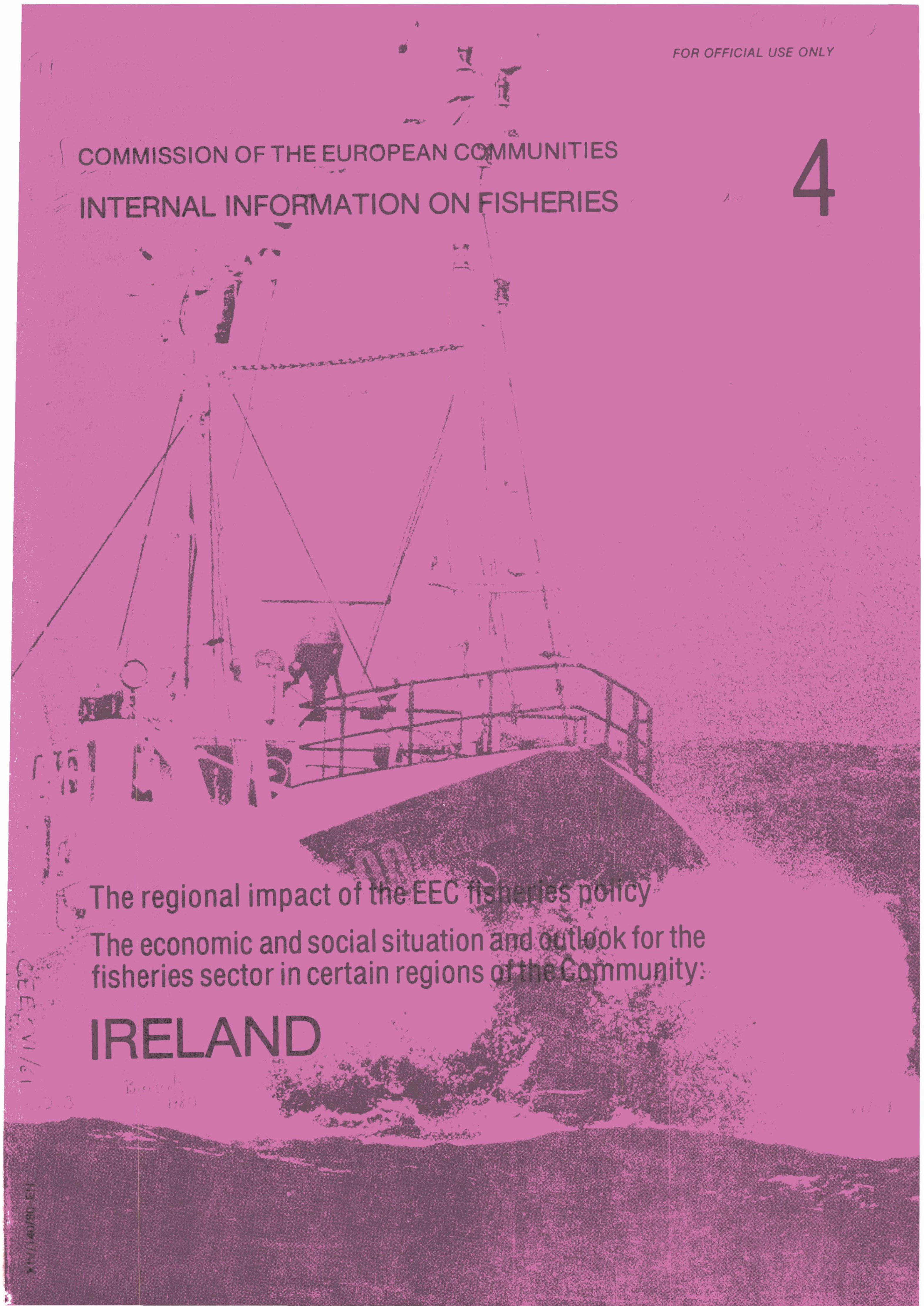
FOR OFFICIAL USE ONLY

COMMISSION OF THE EUROPEAN COMMUNITIES

INTERNAL INFORMATION ON FISHERIES

4



The regional impact of the EEC fisheries policy

The economic and social situation and outlook for the fisheries sector in certain regions of the Community:

IRELAND

XIV/140/80-EN

COMMISSION OF THE EUROPEAN COMMUNITIES

Directorate-General for Fisheries

Directorate for Markets and Structures - Structural Policy Division

FOREWORD

Within the framework of its programme of regional fisheries studies, the Commission of the European Communities has jointly financed with the Irish Government this study by the Economic and Social Research Institute, Dublin.

The "Studies" division of the Directorate General for Regional Policy together with the "Structural policy" division and the specialised service for data processing and internal information of the Directorate General for Fisheries, have participated in the preparation of the study.

Original : English
Manuscript completed in May 1980.

S U M M A R Y

GENERAL SUMMARY

Introduction

Some of the most pressing and difficult questions facing the Irish sea fishing industry relate to the size, location, seasonal availability, and yield potential available to Irish fishermen. There are neither simple answers to these problems nor simple guidelines for future development and management.

All marine fisheries are inherently unstable: they are beset by uncertainties as to catch rates and markets, and they operate without the benefit of property rights which otherwise would set into motion private market forces to determine the efficient allocation of inputs and catch. The situation is further complicated by the fact that the fisheries of the north eastern Atlantic, in general, have for generations been heavily exploited by other nations and Ireland has come very late to the table. If the special social and economic problems in Ireland, particularly in the western counties, are judged by the Community to justify an expansion of the Irish sea fisheries, then any such expansion must come from a shift to new waters and/or underutilised species or through modification of Community country quotas.

The increasing interest of governments in managing all kinds of natural resources reveals that multiple objectives are inevitably sought but are often mutually incompatible and that no single denominator (monetary or physical) can be found for weighing these objectives in a straightforward manner. In this study we have attempted to weave these multiple goals into a definition of the public interest which is an essential first step toward socially efficient formulation of fishery programmes for Ireland in the Community setting.

First, since the fishery cannot exist apart from its resource base, a primary goal of any fishery policy must be to protect and, where necessary, to rebuild the biological productivity of the commercially important stocks. Secondly, other things equal, it makes sense to catch any given quantity of any given fish only at the lowest economic cost possible, given the available human and capital resources and the state of the art. Thirdly, the requirement for economic efficiency must be modified to accommodate Irish and EEC concern for (a) who is employed in the fisheries and (b) how the income derived from them is distributed by economic group and by region. Fourthly, fishery policies must be considered in the context of regional and national planning. Finally, no fishery policies, however well framed, can be considered socially efficient unless they are amenable to implementation and enforcement by government and reasonable enough to win compliance from those who participate in the industry.

No attempt has been made to evaluate individual development recommendations in cost/benefit terms. Givern the existing uncertainties with respect to the condition of stocks in Irish waters, the time period over which benefits will accrue and the interdependence of the policy options considered, such calculations would convey a wholly spurious sense of precision. In addition, some of the most significant gains from improvements in the range and productivity of the Irish sea fisheries will accrue in social stability, safety at sea, and regional income distribution - benefits not captured in the efficiency objectives of conventional cost/benefit analysis.

Chapter 1 -- Primary Production

The contribution of fishing to GDP in all EEC member states is very low; Danish fisheries are the highest contributor with about 0.7 per cent in 1976. However, the magnitude of these contributions tend to be misleading, since they take no account of the importance of the fishing industry to small isolated country regions and port towns. For example, fish landed into Killybegs harbour in 1978 were sold for £4.5 million and, though not all this money was spent in Killybegs, the magnitude of the figure suggests the importance of fishing to an isolated region such as this. Similarly, landings into Galway, Castletownbere, Burtonport, and Clogherhead were worth over £1 million each, while fish to the value of £0.5 million or more were landed into small ports like Fenit, Achill, Dingle and Rosmore/Roscahill.

The quantity of sea fish landed into all Irish ports increased from 25,000 tonnes in 1963 to 87,000 tonnes in 1972, declined somewhat afterwards to 84,000 tonnes in 1977, and increased in 1978 to 98,000 tonnes. Over the 15 year period, there has been an almost fourfold increase in the volume of landings, and values have gone up more than sixteen times, from £1.4 million in 1963 to £23 million in 1978.

With regard to fish prices, those of herring increased by a greater amount than prices of any other species. Between 1968 and 1978, prices of the latter species rose thirteenfold. This rise has been due to general inflationary conditions and to a great scarcity of herring in recent years. Between 1972 and 1978, the herring catch by Irish fishermen declined by over 40 per cent. The pressure on herring is now so great that certain areas, e.g., the Celtic Sea, have had to be closed down to give stocks a chance to recover. Salmon is another species under extensive pressure, particularly by drift net fishermen. Drift net salmon accounted for 23 per cent of the value of all landings by sea fishermen in 1976; and, by 1978, this figure had fallen to 11 per cent. As a result of this decline, very stringent controls were introduced in 1979 in an attempt to preserve salmon stocks.

In the fishing zones around the Irish coast (ICES zones VIa, VIIa, VIIb-c, and VIIg-k), British fishermen took a larger share of the total catch (30 per cent) than fishermen from any other country. French fishermen, with 19 per cent, came next on the list; and Ireland, with 14 per cent, came only third. Ireland, however, was dominant in the zones off her west coast (VIIb-c), though the Netherlands also had a relatively high catch here. As might be expected, UK fishermen were dominant in the Irish Sea (zone VIIa) and the USSR and France were dominant in zone VIIg-k.

Emphasis on inshore fishing is of major significance in Irish sea fishing. Much of the Irish fleet consists of inshore and middle distance trawlers, which rarely stay at sea for more than a few days at a time. The larger boats, capable of fishing far out, continue to exploit the inshore waters. They fish the most profitable grounds available to them, which are usually inshore because they have had difficulty in fishing off shore in competition with the larger foreign boats. The figures show that in 1977 about 72 per cent of the total catch by Irish fishermen was taken within the Irish 12 mile zone. Belgian, Danish and West German fishermen, on the other hand, took only 12-15 per cent of their total catches within their own 12 mile zones. Other countries were intermediate: UK and Netherlands fishermen took about half their catches inshore, and the French took about one-quarter. French and Danish fishermen, however, took practically all the catch within their own 12 mile zones. The Belgians have a poor record in this regard; in 1977, they took only 54 per cent of their own inshore catch. Irish fishermen took 69 per cent of the catch within the Irish 12 mile limit. The bulk of the remainder was taken by French fishermen.

Chapter 2 - Economic Environment of the Fishing Industry

State services to the marine fishing industry are provided by two main organisations: The Department of Fisheries and Bord Iascaigh Mhara (Irish Sea Fisheries Board). The Department is responsible for the formulation of national policy. Its main functions are the preparation and administration of fisheries legislation, the collection of fishery statistics, the licensing of vessels, processors, exporters and fish farmers, the execution of fishery research and the negotiation at EEC level of all matters relating to fishery policy. In all there are 117 people employed in the Sea Fishery Section of the Department of Fisheries, although some of the technical staff are shared with the Inland Fisheries Section. Total costs of salaries and administration in the Section in 1978 was £508,000.

Bord Iascaigh Mhara (BIM) is the development body for the Irish sea fishing industry. It has three main development divisions. The Market Development Division is responsible for providing market research for the industry and developing both the domestic and foreign markets for Irish fish. The Investment Development Division promotes investment in the industry. The Fisheries Development Division provides an advisory and educational service for fishermen through port training courses and the National Fishery Centre in Greencastle. The Board also operates a Marine Credit Plan which assists fishermen in the purchase of new vessels and equipment. There are 148 people employed in BIM: total cost of salaries, administration and current development in 1978 was £3.1 million. Other state and semi-state organisations involved in the sea fishing industry include the National Board for Science and Technology (NBST), The Industrial Development Authority (IDA), Gaeltarra Eireann (now Udaras na Gaeltachta), The Electricity Supply Board (ESB) and An Foras Forbartha.

There are two fish producer organisations presently operating in the country, the Irish Fish Producers' Organisation and the Killybegs Fishermen's Organisation. Both of these help members to improve their incomes by operating a system of withdrawal prices and supporting these minimum prices by indemnatory payments. In addition to these two organisations there is the Irish Fishermen's Organisation which is the political focal point of the catching sector, expressing the interests of Irish fishermen at national and international level.

The Government White Paper of 1962 encouraged fishermen to form co-operatives with the twin objective of increasing fishermen's incomes and improving distribution in the hinterland of the ports. Recent years have seen a significant growth in the importance of co-operatives in the fishing industry and by 1977/78 it was estimated that 75-80 per cent of the first sales of all fish in Ireland was handled by fishing co-operatives. The majority of these co-operatives are concerned only with the selling of their member's fish in fresh or whole form; a small number of societies carry out processing of a relatively simple nature.

Any examination of the Irish sea fishing industry must take into account the fact that Ireland is a member of the European Economic Community. The Common Fisheries Policy of the European Community is contained in two basic regulations 100/76 and

101/76 relating to structures and marketing complemented by a number of subsidary regulations relating to resources. The areas covered by these regulations include: structural policy, the establishment of Producer Organisations, marketing regulations requiring the main varieties of wet fish for human consumption to be graded by size and freshness, the alignment of tariffs on the imports of fish and fish products from third countries, and the availability of Community aid from the different EEC funds.

The basic principle of the original agreement was equal conditions of access for all community fishermen to each member's territorial seas. A five year derogation from this principle was, however, permitted in a three mile zone off coasts where the local population was heavily dependent on inshore fishing for its means of livelihood, but the Council of Ministers was empowered to take the necessary conservation measures to prevent overfishing of any species. This is achieved through the specification of Total Allowable Catches for the different species in the different fishing zones.

In negotiating treaties of accession for the three new members, UK, Ireland and Denmark it was agreed that until the end of 1982 all member states were entitled to reserve fishing in a six mile zone off their coasts exclusively for vessels which traditionally fished in these waters and which operate from ports in that geographical location. Off parts of the coasts of Denmark, Greenland, France, Ireland and the UK this six mile zone was afterwards increased to 12 miles. The Council has yet to determine what regime is to follow at the end of 1982. Until such time as a decision is taken in this regard a certain degree of uncertainty prevails in all member states.

Chapter 3 - Analysis of the Fishing Fleet

The Irish fishing fleet consists mainly of inshore and middle distance vessels which rarely stay at sea for more than a few days at a time. In 1977 there were 2,677 vessels in the fleet of which 899 were wholly engaged in fishing and 1,799 were partially employed. Of the total fleet less than half were motor vessels, the remainder being sail, oar or outboard engine craft.

The results of a survey of over 500 skippers and 400 crewmen showed that, while 12 per cent of the Irish fleet have a home port on the east coast, vessels in this area tend to be bigger than average, about 28 per cent being over 18 metres. This is in contrast to the western area, where 99 per cent of the vessels are under 18 metres. Almost 50 per cent of the boats in the western area are under 6 metres, while medium sized boats of 6-12 metres, predominate in the southern region. The north west area reveals a more even size distribution.

The recent trend towards larger and more sophisticated boats is highlighted by the fact that about two-thirds of the boats over 24 metres are under 6 years old. Also, the larger (and newer) boats tend to have more sophisticated equipment and to employ more than one type of fishing gear. The smaller boats generally use one type of gear only; the most common is the lobster pot, used by over 60 per cent of the boats under 12 metres.

The majority, 86 per cent of the larger boats (24-30 metres) and 64 per cent of the 18-24 metre boats, are repaying loans to BIM, while 100 per cent of the under 6 metre boats and 83 per cent of the 6-9 metre boats are owned outright. The total investment in all boats and equipment is estimated at £58 million: £47 million for boats and £11 million for equipment. For the 24 metre and over boats the average investment is £320,000 for boat and equipment, with the average for small boats under 6 metres being about £1,000.

The majority of the boats under 6 metres fish in one ground only, whereas the larger boats tend to fish in more than one ground. Nearly 87 per cent of the total fleet usually fish within 12 miles of the coast, while over three-quarters of the under 6 metre boats usually fish less than 3 miles from the coast. Some 33 per cent of the 24 metre and over boats usually fish within 12 miles of the shore, while only 52 per cent of these vessels usually fish beyond 20 miles.

There is a heavy dependence, particularly on the part of the small vessels, on the inshore species, especially such high value varieties as salmon and shellfish. As many as 70 per cent of the under 6 metre boats fish for shellfish. The pelagic species (herring and mackerel) are caught by the larger as well as by the smaller vessels. The demersal species are confined almost entirely to the larger boats.

The breakdown of 1978 landings (including salmon) by area shows that fish to the value of approximately £6 million were taken by boats in the east; £9 million, by boats in the south; £3 million, by boats in the west; and £10 million, by boats in the north west. Boats under 6 metres caught £0.9 million worth of fish, those between 6 metres and 18 metres, about £9 million; and those over 18 metres, about £17 million.

The overall average net income per person employed in sea fishing was £2,081, varying from £6,376 on the over 24 metre boats to £518 on the under 6 metre boats. In the north west, the average net income per person was £10,270 on the over 24 metre boats and was £5,859 in the east region on these boats.

With the exception of the west coast over 50 per cent of fishermen believe that herring is overfished. The proportion believing mackerel to be overfished is much lower, averaging 20 per cent for the country as a whole. A large proportion of fishermen in the east and south believe that cod and whiting are overfished. The majority of fishermen in all areas, except the west, believe that salmon is overfished. Lobster is also seen to be heavily exploited, particularly in the east and north where two-thirds of the fishermen believe that it is overfished. Mackerel was the only species listed which was seen as capable of further exploitation.

Chapter 4 - Fishery Harbours

There are over 874 harbours and landing places around the Irish coast. Over half of these are used mainly by part-time fishermen specialising in shellfish and provide only minimal facilities. The remaining ports and landing facilities serve the larger boats, but only 25 ports provide any kind of developed facilities.

Five locations have been designated for development by the Department of Fisheries: Killybegs, Rossaveel, Castletownbere, Dunmore East and Howth which together accounted for over 50 per cent of landings of sea fish in 1977. Between 1966 and 1977, £7.75 million was invested in the development of harbours and landing places. Of that amount £4.56 million was spent in developing four major ports as Fishery Harbour Centres; 72 other harbours and landing places were developed to lesser degrees. Further work, estimated to cost about £16 million (at 1979 prices) is planned for the next three or four years at Greencastle and at four of the five major ports mentioned above (i.e. Killybegs, Castletownbere, Howth and Rossaveel). There are no immediate plans for further developments at Dunmore East.

While some of the harbours may appear adequate for the existing fleet, it is pointed out that any major increase in Irish landings will require a restructuring of the fleet to include larger vessels capable of fishing further afield. Therefore, any discussion of further investment in harbour facilities must be taken in the context of Irish access to the fishery resources of the EEC. Once catch targets are set, it will be possible to determine the required vessel size and geographic location, and only then can a specific programme of long-term harbour enhancement be finalised. Despite the present uncertainty, however, those responsible for harbour development should keep in mind three main points:

(1) Because of the fuel crisis, large foreign boats fishing off the Irish coast may wish to use Irish ports for overland transhipment. A certain number of ports should therefore be developed to handle these ships.

(2) Provision must be made for more shelter along the entire Irish coast. There are long stretches of coastline where medium sized ships cannot dock and, as a result, there are some needless fatalities.

(3) Harbours should, if possible, be developed for multiple uses, such as service to off-shore oil and gas exploration, landing of coal supplies, etc.

In addition to the provision of large harbours there are a number of small to medium landing areas around the coast which are contemplated for further development based on considerations of shelter and concentration of landings. The decisions as to which ports should be selected cannot be made until the level of funding for harbours is known, and until more definite information is available on the future configuration of the fleet.

Chapter 5 - The Labour Force in Fisheries

The total number of fishermen employed in sea fishing in Ireland in 1977 was 8,179, of which 2,662 were full time and the remaining 5,517 part-time. In addition it is estimated that in the same year there were 1,550 people employed in shore processing and 1,000 in other ancillary activities. The numbers employed in the Department of Fisheries and Bord Iascaigh Mhara were about 270. The greatest concentration of employment is in the west and north west areas which together account for 59 per cent of all fishermen, the south coast accounts for 31 per cent and the east coast for the remaining 10 per cent.

The majority of skippers in all regions are in the 30-44 age group while crewmen come predominantly from younger age groups with nearly 60 per cent of them being under 30 years. Crewmen also tend to have considerably more schooling than skippers, reflecting the fact that in recent years there has been a tendency for children to stay longer at school. The average number of dependents on a skipper's income was four, while on average, three were dependent on each crewman.

Nearly all fishermen working on boats over 12 metres stated that fishing was their main occupation, while less than 40 per cent of those working on small boats gave fishing as their main occupation. For the latter group farming was an important alternative occupation; employment in skilled manual jobs was also important, particularly for crewmen. Unemployment payments were a fairly substantial source of income for skippers and crewmen in the under 6 metre boats. The average number of weeks spent fishing by all skippers was 30, but this figure varied from 21 weeks for skippers of boats under 6 metres to 48 weeks for skippers of vessels over 14 metres.

Commencing in October 1979, a full time course of 12 weeks duration for the training of new entrants as fishermen is to be run by BIM at the National Fishery Centre in Greencastle. The course will cover the practical skills and basic knowledge required to work on fishing vessels currently operating in the Irish fleet. A second course directed towards the training of deck-hands in the practical use of fish finding equipment, navigational and communication equipment commenced in April 1980.

For experienced fishermen wishing to obtain certification two courses are to be run in the National Fishery Centre. The first course, leading to qualification as Second-Hand (Special) is necessary for the command of vessels under 50 tons. The second full time course will lead to qualification as Skipper (Limited) and is necessary for the command of vessels over 50 tons. BIM has also decided that in order to encourage attendance at these courses, certification will be an essential requirement for applicants to purchase fishing vessels under the Board's Marine Credit Plan. The additional budgeted capital cost for the new training programme, (at 1979 prices) is estimated at £562,000, while the total running cost per annum is estimated at £140,000 compared with a present annual running cost of £90,000.

Training courses will also be offered to people interested in engaging in marine aquaculture. A degree course in Fisheries Science is under consideration at University College, Galway for management personnel. A National Certificate course is to be offered at the Regional Technical College, Galway to contribute to the overall training situation. Training in the practical problems of aquaculture is to be catered for by short courses and workshops organised at existing farms with the co-operation of BIM. The Board's aquaculture unit will be responsible for providing education, training and extension services to fish farmers.

Chapter 6 - Marine Aquaculture

Development of marine aquaculture, even with native species as a base, must be regarded as a risky financial undertaking which requires long-term continuing applied research and development support. Development of the industry is constrained further by stringent site requirements. Successful aquaculture in Ireland would produce modest quantities of high-valued fish, but it is no substitute for sound management of wild stocks.

Mussels offer a particularly attractive basis for aquaculture in Ireland, since one technique - culture on bottom - is established as an economically viable operation, and raft culture has reached the stage where commercial feasibility can be tested. Some 75 tonnes were produced on rafts in 1978 and the NBST estimate, on the basis of current developments, that about 900 tonnes should be produced by 1983. The achievement of this objective will, however, depend very much on the economics of the operation in future years.

There are two species of oyster suitable for cultivation - the flat oyster (ostrea edulis) and the Pacific oyster (crassostrea gigas). The flat oyster reproduces naturally in many areas in Ireland, and total production is approximately 1,000 tonnes per annum. There is a good European market available because oyster supplies have been reduced throughout Europe in recent years due to high disease mortality. The major limiting factor to artificial oyster cultivation appears to be the availability of good seed at reasonable cost.

The Pacific oyster is much easier to grow under controlled conditions than the flat oyster, and it does well in Ireland. However this oyster is unlikely to reproduce naturally because of the low summer temperatures in Irish bays. The principal obstacles to large-scale cultivation seem to be on the marketing side. Irish and UK acceptance of Pacific oysters has grown only very slowly, though there is a strong market for this species in France. However, bottom and rack culture production to date in Ireland suggest that a modest Irish industry can be established over time. Experiments on the artificial production of escallops have recently been undertaken but the economic viability of this enterprise has yet to be established.

Rainbow trout has been reared successfully in fresh water in Ireland for some time, and small numbers have recently been produced in salt water in floating cages. The technique is now well developed in Norway and could be transplanted to Ireland without major difficulty. The economic viability of the operation depends primarily on market acceptance, but a market might well be created for the product as an item intermediate between fresh water trout and salmon.

The very high prices and steadily shrinking supplies of Atlantic salmon make this species an attractive target for aquaculture. Norwegian growers have been working at the problem for more than a decade and appear to be quite successful economically. Despite the very high prices for wild salmon, there are both technical and market restrictions to be overcome if pen-rearing of salmon is to become a going concern in Ireland. Production costs are very high, and Norwegian experience suggests that pen-reared salmon are significantly less acceptable on European markets, because of difficulties with texture and colour stability. There is also a problem in producing pen-reared salmon of acceptable size. Some 20 tonnes of pen-reared salmon were produced in Ireland in 1978, but much more experience is required before we can make a judgment on commercial viability.

The prospects for mariculture in Ireland range from very good to marginal, and there is guarded optimism for overall development sufficient to make a useful contribution to incomes and employment in the southern and western counties. An expanded programme of research and training in aquaculture is needed.

A draft mariculture development programme is being prepared as a joint effort by the various state agencies and private companies involved in aquaculture with leadership by the National Board for Science and Technology. The NBST estimates that for 1980/81, expenditure by all organisations involved in aquaculture, on the mariculture programme will be approximately £0.5 million in initial capital costs with current expenditure of an additional £0.5 million at 1979 prices.

Both BIM and the Department of Fisheries and Forestry have important roles to play in the future development of aquaculture in Ireland, but it could be argued that the scientific problems might best be dealt with by a separate research organisation concerned with all aspects of man's activities in the marine environment.

Chapter 7 - Consumption of Fish in Ireland and Structure of the Domestic Wholesale and Retail Trade

Up to and including 1974 per capita fish consumption in Ireland was the lowest in the EEC; her relative position in this respect has since improved. In 1976, Italy and West Germany had lower consumption figures than Ireland. Denmark has had the highest level of consumption in recent years with an average of about 28 kg per person (live weight), compared with an Irish figure of about 10 kg.

Over the period 1963 to 1977, consumption of fish per person in Ireland increased by almost 60 per cent and by a greater proportion than any of the meats, except chicken. In the period 1963 to 1977, beef prices rose faster than those of whiting and cod, but, in more recent years, all fish prices have risen at a faster rate than those of both beef and pork.

Despite recent rapid price rises, the price of fish per kg is still much less than that of red meat. Hence, in future years, the poorer sections of the community may be forced to obtain a higher proportion than heretofore of their protein requirements from fish. This price effect, together with improvements in the distribution of fish and in promotion efforts by BIM, could bring about some increase in fish consumption in future years.

A National Prices Commission study reflects the problems of the fish processing industry which faces constant uncertainty because of wide fluctuations in the supply of its raw materials. This variability, resulting from seasonality in weather conditions, availability of fish, conservation measures, and other factors, makes it difficult to achieve or maintain efficient operation. The uncertainty about supplies and prices, for example, inhibits long range planning, reduces customer loyalty because supplies cannot be assured, complicates development of distribution facilities to serve inland towns, and handicaps the export trade. Other difficulties include: a domestic market which formerly was concentrated on one day per week (Friday) and which still is influenced by the penitential connotations of fish; and a fishing fleet which cannot take full advantage of the opportunities off Irish shores because its boats are too small to compete with far ranging vessels of other nations. Hence, the trade lacks a regular supply of white fish is hampered by inadequate facilities at some of the major ports, and faces the ever present problems of a perishable product.

The fish wholesaling sector, centred in the Dublin Market consists of firms with integrated operations; but the number of firms seems too large for the quantities of fish handled. Until the introduction by BIM of a programme to encourage fish auctions at ports around the country, the Dublin Market had a dominant position in the distribution of fish. This market is now losing dominance as a centre of first sale as more and more Dublin wholesalers buy their supplies at portal auctions for re-sale in Dublin.

While it is clear that the influence of the Dublin Market will continue to decline as the other port sales grow it remains the largest single wholesale centre and will continue to be the focal point for market price determination nationwide. Its structure, however, will change with better organisation of outlying port markets and with improved transport and storage facilities. It seems likely that Dublin will become a genuine wholesale market with wholesalers buying their supplies at many portal auctions and reducing their dependence on a small number of vessels. This is likely to result in more stable supplies, a greater variety of fish, and less volatile short term prices.

More than 400 retail merchants compete for the domestic market. Competition appears to be strong, especially in the Dublin area, and there is no clear evidence to indicate any unusual restriction on market entry which would permit excess profits. Retail fish distribution is not in fact a very profitable activity. Most retailers find it necessary to stock other goods to supplement their fish sales, and some supermarket chains offer only a limited number of items, mostly frozen packed fish. One major firm has closed eight retail stores in recent years to concentrate on other sections of the fish distribution industry, chiefly exporting.

Retailing in country areas of the state is still poorly developed, reflecting the traditional lack of consumer interest in these areas, coupled with transport, storage, and other marketing problems that restrict the variety and regularity of wholesale deliveries. There is, therefore, need for a programmed increased in fishing for white fish to ensure regular supplies both in town and country districts.

Chapter 8 - Foreign Trade in Fish and Fish Products

Imports of fish and fish products into Ireland have increased slightly since 1972 and stood at 7,437 tonnes (£10.3 million) in 1978. The largest increase has been in the prepared and preserved fish category. Cod dominates the imports of fresh and frozen fish. Great Britain, Northern Ireland, Canada and Japan, the major suppliers of imports, together accounted for 90 per cent of the total import bill for fish and fish products in 1978. Irish imports from all EEC countries in that year were about 6,000 tonnes valued at about £8 million.

The volume of Irish exports declined between 1973 and 1977 but there was a significant increase in 1978. In that year, exports totalled 43,000 tonnes (£29.7 million) compared with 35,000 tonnes in 1977. Total exports to all EEC countries in 1978 were about 37,000 tonnes valued at over £27 million. A large proportion of Irish exports is made up of fresh, chilled and frozen fish, of which herring, mackerel, and salmon are the main varieties. The next most important category is shellfish, and here lobsters are the single most important species. The Netherlands is Ireland's most important customer in volume terms, importing 12,249 tonnes in 1978, valued at £6.2 million. Great Britain holds second place, followed by Germany and France.

Exports of the three most important species (herring, shellfish, and salmon) have been analysed by country of destination and by degree of processing. The volume of herring exports decreased from 38,000 tonnes in 1973 to 21,000 tonnes in 1978, but the respective values increased from £4.7 to £11.7 million. The Netherlands, West Germany, France, Great Britain, and Northern Ireland are the major importers of Irish herring. Of the total exports of herring in 1978 over 40 per cent was in dried and salted form and the rest was in fresh, chilled, and frozen whole form.

Shellfish exports increased from 5,656 tonnes in 1973 to 7,620 tonnes in 1976 but declined in 1978 to 5,843 tonnes. Nevertheless the value of shellfish exports rose steadily from £2.5 million in 1973 to £7.5 million in 1978. Great Britain, the Netherlands, and France are the principal buyers of shellfish exports. Over 60 per cent of the shellfish exported to Great Britian are prawns/shrimps, and mussels; less than 2 per cent of exports to the Netherlands and 16 per cent of those to France are of these species. The higher priced shellfish, mainly lobsters, go to Great Britain, France, Belgium, and the Netherlands. Lobster exports in 1978 totalled £1.58 million or approximately one-fifth of the value of all shellfish exported that year.

Salmon exports increased from 1,200 tonnes in 1973 to 1,700 tonnes in 1975, then declined to 1,066 tonnes in 1978. The value of salmon exports, rose from £2.0 million in 1972 to £4.6 million in 1976, but then declined to £4.2 million in 1978. Great Britain is by far the leading importer of Irish salmon, taking well over half of total salmon exports in 1978; France, Northern Ireland, and Belgium follow in that order. Virtually all salmon exports are in fresh, chilled, or frozen form.

Chapter 9 - Analysis of Some International Fish Markets

Federal Republic of Germany

A very high proportion of fish consumption in Federal Germany is processed fish of which about two-thirds is based on herring. The most popular fish products are the marinades of which herring is the main ingredient. Canned herring is second in popularity among processed fish products. Herring also accounts for about 10 per cent of deep frozen filleted fish. Demand for shellfish is reported to be on the increase particularly products based on crab, prawn and shrimp. Fresh mussels are also popular but there is little demand for preserved and processed mussels. Smoked fish - herring, saithe, mackerel, and salmon - is increasing in popularity and is likely to increase its share of the market from its present 6 per cent. Fish Salad is the product segment of the market which has achieved the greatest growth in the last decade but remains a relatively small segment accounting for an estimated 8 per cent of consumption in 1977.

A survey of some European fish markets carried out by the Economist Intelligence Unit (EIU) in connection with this study showed that German respondents were not aware of processed fish products of Irish origin with the exception of smoked salmon. They therefore tended to view Ireland solely or mainly as a supplier of semi-processed fish - and of herring in particular - to the German processing industry. Furthermore, Ireland is seen as a marginal supplier. There was general agreement among importers regarding the high quality of herring imported from Ireland, but some criticism of the capability of Irish suppliers who were sometimes compared unfavourably with Danish and Canadian suppliers. The main criticisms were related to the inconsistent quality of Irish fish, long delivery dates and delays in delivery.

Price was a factor which was frequently mentioned when assessing the position of Irish exporters. The price of herring imported from Ireland had risen appreciably in recent years and was now reported to be above the price quoted for fresh and frozen herring imported from Denmark and Canada, the main suppliers to the German market. In 1977 the import price of whole frozen Irish herring in Germany was 1.83 DM/kg compared with a Danish price of 1.04 DM and a Canadian price of 1.54 DM.

Respondents could not foresee fully processed fish products of Irish origin making any appreciable impact on the German market, but it was evident that they had not previously given serious thought to this idea. The EIU say however that the marketing obstacle could be overcome to a great extent by arranging joint ventures between Irish processors and German counterparts. However German processors are reluctant at present to invest in further capacity. The best idea therefore would be to arrange franchising systems whereby Irish processors would enter the market with fish products produced to German specificiations. The German partner would take delivery and provide market services and promotional support. Such ventures could provide the basis for the development and growth of the Irish fish processing industry.

The Netherlands

The volume of landings by the Dutch fleet rose from 300,000 tonnes in 1970 to 351,000 tonnes in 1975 but declined in 1976 to 284,000 tonnes. Imports of fish to the Netherlands in 1976 were 131,000 tonnes of which 69,000 tonnes were fresh, chilled, or frozen. Ireland's main exports to the Netherlands in the latter year were 6,000 tonnes of herring and about 3,000 tonnes of mackerel. Dutch exports of fish and fish products in 1976 were 204,000 tonnes. The Netherlands is a large exporter of herring products particularly cured and salted herring. She also exports relatively large quantities of smoked and canned mackerel, processed shrimps and preserved mussels.

Of the various fish products produced in the Netherlands in 1977 about 44 per cent were deep frozen fish, 24 per cent were smoked fish (herring, mackerel and salmon) 21 per cent were canned fish and the remaining 11 per cent were semi-preserves (marinated herring and mussels).

The most buoyant area of the processed fish market is for deep frozen fish. The market is growing at the rate of 10 per cent per annum. Between 1975 and 1977 the production of canned and bottled fish increased from 9,300 tonnes to 9,900 tonnes, a rise of 6 per cent over the period. This was due to substantial increases in the volumes of mackerel and shellfish utilised. The market for canned mackerel is of the order of 2,000 tonnes a year but demand has been declining.

Semi-preserved fish is a distinct category in the Netherlands. It consists of two products, marinated herring and marinated mussels. It is estimated that production of marinated herring decreased from about 6,600 tonnes in 1975 to roughly 5,300 tonnes in 1977, due to the restriction on herring fishing imposed by the EEC and the Dutch government; production of marinated mussels in 1977 is estimated to be 600 tonnes.

Expenditure on fish in the Netherlands is about 10 per cent of that on meat and is approximately 2 per cent of that on all foodstuffs. The two fish categories which have shown the highest average growth in consumption are shellfish and canned fish. In the case of herring, consumption increased up to 1976 but fell sharply in 1977 because of the shortage of this species and high prices.

Ireland tends to be considered as a supplier of semi-processed fish to Dutch processors and there is very little belief that she could become a significant supplier of processed products. Ireland is mainly to be considered as an alternative supplier of semi-processed herring. But even in this regard the prevailing image of Ireland is still a poor one. There are complaints about delivery delays, supplies not fully in line with requirements and irregularity of supply. However, it is believed that if she put her house in order, Ireland could retain a competitive advantage in the supply of fresh and semi-processed herring and mackerel on Dutch markets. There are also prospects for high quality special product groups such as deep frozen prawns in consumer or catering packs.

France

In 1977 human consumption of fish in France was 1.02 million tonnes. About 300,000 tonnes were imported, of which 4,700 tonnes came from Ireland. About three-quarters of human consumption is wet fish. Roughly two-thirds of this is in an unprocessed form (fresh or chilled), one-fifth is canned and the remaining one-eighth is frozen, salted, dried or smoked. The main canned fish products produced in 1977 were sardines, tuna, mackerel and herring. France imports about 40 per cent of its requirements of canned fish. After tuna and sardines, mackerel is the most popular species of canned fish. Consumption of canned mackerel in 1977 was of the order of

23,300 tonnes. The section of the market for canned mackerel is dominated by mackerel marinated in white wine.

The major species of smoked fish are herring and salmon. The market for smoked mackerel is small and production is marginal. Smoked salmon is produced in France from Pacific salmon imported from North America. After filleting, salting and drying, the salmon is hot smoked. The import price of Irish salmon is about 40 per cent higher than that of Canadian salmon.

Respondents, both processors and distributors, were generally agreed that Ireland would maintain its position as a supplier of semi-processed fish to French processors. Few envisaged her becoming an important supplier of processed fish, apart from smoked salmon. Ireland is at present the main foreign supplier of frozen whole or headless herring and of salted, cured or dried herring. She is also an important supplier of live European lobster and of fresh and frozen scallops and periwinkles. Irish herring was reputed to be of the highest quality but it had become relatively expensive. Canadian herring is about 10 per cent cheaper.

Some processors doubted whether the Irish fish industry was yet in a position to produce processed products of the quality standards required by the French market. French processors did not see great prospects for exports to France of processed products from any foreign origin. They felt that they themselves had the capacity to meet the demand. There is considerable under-utilised capacity in the French fish processing industry, particularly among canners and smokers.

The French processing industry, however, faces two serious constraints on its development - a shortage of raw materials and rising production costs. Many of the persons interviewed by the EIU were aware that production in Ireland offered the great advantage of going a long way to overcoming these obstacles. The greatest interest in commercial links with foreign suppliers of finished products was shown by processors of frozen foods. These are prepared to enter into co-pack agreements and long-term contracts. Medium sized companies are often looking for new frozen fish products to launch into an expanding market and this is an area of the market for processed fish where Irish companies may well find buyers for finished products, and possibly partners for joint ventures.

It is suggested that Irish fish processing firms should make contact with French processors and importers of frozen fish products with a view to sounding out opportunities for supplying frozen fish products for direct consumption and opportunities for investment in Ireland. A condition of any agreement should be that the French party be responsible for supplying the technological know-how required to produce the products to the specifications required. The French party might be prepared to second a production expert to the Irish producer to supervise production in the initial phase.

The United Kingdom

There has been a decline in landings in recent years, particularly of cod and herring, due to the continued closing of distant waters to British fishing vessels. The decline was partly offset, however, by increased mackerel catches much of which is used for fishmeal. Prior to 1974, filleted white fish was the type most commonly consumed in the UK. At that time these fillets were derived mainly from cod, haddock, whiting, saithe, ling and plaice. Since 1974 the main change seems to have been a reduction in the overall importance of cod, reflecting the reduced availability of this fish.

Unfortunately the image of fish as a food had not been very good in the past and according to reports it does not seem to have improved very much recently. The most popular varieties seem to have less flavour than other protein sources and are usually more difficult to prepare. Frozen fish is gradually taking over from fresh fish because it is available in most grocery shops, is clean and easy to cook. The traditional fishmonger is going slowly out of business but the time honoured fish and chip snack, both in diners and as take home foods, continues to remain popular.

In the ten years from 1966 to 1976, carcase meat of all kinds increased in price by an average of 190 per cent. Three categories of fish showed a much greater price increase than this i.e. herring, filleted white fish and processed white fish. Varieties of fish which showed a similar price increase to those of carcase meats over the period were shellfish, unfilleted white fish, and frozen fish of all kinds. The category showing the least price increase was canned fish (other than canned salmon). These figures indicate that prices could have been a deterrent to fish consumption in the past, though the evidence in this regard tends to be conflicting. Income levels are thought to have an important effect on consumption also, the poorer sections of the community tending to eat the most fish.

It is expected that in future cod and plaice supplies will be severely reduced and that the traditional structure of the market can only be maintained by increased imports.

Chapter 10 - Fish Processing - Characteristics of the Industry

The official Irish statistics on sea fish landing list 28 species caught in Irish waters and a number of others not landed in sufficiently large quantities to be noted. Most of these fish look different and taste different and are handled by the processor in a different way. There are also a large number of products which can be manufactured, all of which require different processes.

Unfortunately, for many processors a steady flow of raw material cannot be assured. Because of the small scale of the industry and its seasonal nature, the Irish processor is not sure from day-to-day what his raw material supplies will be. For this reason, he cannot plan production or marketing activities adequately in advance of catch.

For this and various other reasons, the Irish fish processing industry is rather under-developed. In the five years 1970 to 1975, additions to the total fixed asset investment in fish processing amounted to only £4.1 million, compared with an investment in the primary fish catching sector of over £16 million. In 1976 and 1977 fixed asset investment in the processing industry increased by a further £2.6 million compared with an increase of £15.9 million in the fishing fleet over the same period. This situation is now improving and considerable investment is planned for future years. The great strength of the industry lies in its regional distribution. About 40 per cent of employment is located in the western part of the country. This favourable distribution is an important reason why its development should be encouraged.

In 1978 there were 60 firms engaged in fish processing with total employment of [illegible] people. Many of these firms are rather small and the degree of processing is minimal - freezing whole, gutting, or gutting and heading. A survey based on a sample of processing operations carried out by the IDA in 1975 showed that a very large proportion of the output was frozen whole fish. Only about 1,400 tonnes of high value-added product was turned out and this represented almost all such products manufactured in the country in that year. Fourteen of the 29 firms in the sample had professional people employed. These were mainly large firms. The remaining 15 firms were fairly small and did not have the financial resources to carry professional management. In general the study found that operatives in the industry received very little formal training; they were trained mainly on the job.

The volume of white fish landings has remained relatively small over the last few years (18,000 tonnes in 1978) with a high proportion being taken in the February to April period. It is difficult to base a processing industry on this small seasonal catch and if such an industry is to develop it will be necessary to increase substantially the volume of landings throughout the year. To do this the larger boats will have to be used to fish farther out to sea than at present.

Mackerel landings, though relatively large, are also seasonal and the present take cannot be dealt with adequately at the moment. There is serious under-capacity in freezing and storage facilities at the major ports. Freezing space is, however, being expanded both at Killybegs and Castletownbere and arrangements are being made to sell surplus mackerel to eastern European vessels. The latter is currently considered a short term arrangement until sufficient on-shore capacity is provided to handle large volume landings and profitable markets are developed for processed mackerel products.

With regard to transport, shellfish exported live as well as salmon and some other prime fish are exported by air. The remainder is transferred by ship and roll-on roll-off trucks in iced boxes and containers. Despite the distances to be covered, it was found that transport costs were not a critical factor in determining competitiveness, though western processors claimed that they were at a disadvantage relative to those in the eastern part of the country. In general, transport and distribution costs were about 6 per cent of the value of sales.

The IDA survey found that about 10 per cent of the offal produced was dumped with the remaining 90 per cent being turned into fishmeal, together with about 10,000 tonnes of whole fish. The closure of the Mornington plant in 1979 because of shortage of raw material has reduced existing capacity substantially. It is expected that this problem will be solved shortly as a result of increased capacity at Killybegs and the erection of a new plant at Castletownbere.

A financial analysis of the surveyed firms showed that profit as a percentage of sales was 5 per cent, and as a percentage of capital employed about 19 per cent. These figures compare favourably with similar returns for all Irish manufacturing firms in 1974. It was concluded that the sampled companies demonstrated a very strong position with regard to debt/equity ratios. It might appear from this analysis that economic optimal use of Irish fish resources should involve producing more and more secondary products. There are problems however in this regard. The quantity of white fish landed is small and irregular and is not capable at present of supporting a viable processing industry. For this to happen supplies would need to be increased on a regular basis. In addition prices are very high due to competition from home and foreign buyers for the fresh fish market. In the case of herring, the quantities landed are inadequate and the prices which processors have to pay for Irish herring are much higher than those which European processors pay for imports from other countries.

Despite these difficulties considerable development of the fish processing industry is planned for future years. In reply to a question in the Dail in October 1978 the Minister for Fisheries said there were 20 processing proposals on hand at present, comprising expansion schemes by existing firms and the establishment of completely new projects including a large development at Castletownbere. The estimated total capital cost of these projects is £5.7 million with a potential job figure of 610. In order to achieve this job target it is necessary to bring in outside expertise, not alone in processing but also in the fields of catching and marketing.

Chapter 11 - The Withdrawal System

The withdrawal system has been implemented in Ireland as required by the EEC and has been in operation since February 1976. From its inception until the end of 1978 a total of 24,000 tonnes of fish of all kinds have been withdrawn. This quantity is equivalent to 11 per cent of the total wet sea fish (excluding salmon) landings in the same period. Mackerel accounted for over 90 per cent of the withdrawals. A number of factors peculiar to the Irish sea fisheries have raised problems in operating the scheme. The limited development of fishmeal plants, particularly in the south west, makes it difficult to process withdrawals into meal or animal food since transport costs from some ports to the nearest plants are very high. Provision of meal plants solely to handle withdrawal would not meet the problem. This could weaken incentives to develop a marketing channel to use most landings for direct human consumption. These problems are particularly acute with respect to mackerel, since landings fluctuate widely and strong markets for a wider range of processed mackerel products have not yet been developed. The arrangements which have now been made with eastern European vessels to take up surplus mackerel should ease considerably the withdrawal problem but may (in the long run) hinder the development of mackerel processing. These arrangements need, therefore, to be kept under review. If, of course, profitable markets can be obtained for processed mackerel products the best solution would be to increase onshore filleting, freezing and cold storage facilities so as to distribute the heavy seasonal landings over the other months of the year.

Chapter 12 - Biological Constraints on Expansion

Sea fisheries are a common property resource and therefore regarded as a free good by all. Under these conditions fishing effort may be pushed to the point where sustained physical yields are actually reduced. Hence in the absence of regulations the equilibrium level of catch could become so low as to render the fishery completely uneconomic.

At the present time fishing effort directed at most of the valuable north east Atlantic stocks is greater than the ICES scientists feel would provide the greatest yields consistent with safety. Expansion of total landings will come therefore only as a result of the cumulative effect of more vigorous management measures by the Community members as a whole.

A summary of expert opinion on the state of the principal stocks in waters round the Irish coast is as follows:

Herring - These stocks are in a critical condition in most areas but the Celtic Sea is in the worst condition. Unless all herring fishing is prohibited in the latter area in 1980 there is no hope of recovery.

Mackerel - Stocks of this fish are in reasonably good condition but recent levels of effort cannot be continued if the target stock size is to be maintained.

Round Fish (Cod, Haddock, Whiting) - In general round fish stocks should continue to contribute substantially to total community catches but there is no immediate prospect of any major increase, and both safety of the stocks and economic considerations dictate reduction in effort in the short run.

Plaice - Both Celtic Sea and Irish Sea plaice stocks are regarded as over fished and there is little possibility of any expansion in landings if the stocks are to be maintained in a healthy state.

Other Stocks

In the case of lobsters ICES experts indicate that effort in European waters is excessive. It is also generally regarded that little or no expansion of Irish shell-fish landings can be anticipated with increased effort. Salmon are also under severe pressure and despite an occasional large run to certain rivers, total stocks are believed to be well below levels that would permit optimum yield. On the positive side there is great international interest in blue whiting. Huge stocks in north east Atlantic waters are lightly fished at present and there is some evidence that they can be processed to produce acceptable products for direct human consumption. Research on these stocks is incomplete but it is possible that a sustained yield as great as ten times the 1976 catch of 100,000 tonnes could be available. Other species which offer opportunities for increased catches by Irish fishermen are hake and saithe. The reduction in Spanish activities off the west coast of Ireland will leave hake available while in the case of saithe the stocks in area VIa west of Scotland appear to be in good condition.

Appraisal of the stocks, basic to the Irish sea fisheries, yield a mixed assessment of prospects for development, but perhaps most significant it highlights the urgent need for implementation of programmes to provide a data base and a current monitoring system for stock assessment. The analysis also points inexorably to the concurrent need for licensing of all sea fishermen, and the regulation of fisheries. The framework for such a multifaceted programme does not exist at present though the essential elements and skills are there.

Chapter 13 - Economic Constraints

State expenditure in relation to sea fisheries for 1978 has been estimated at £8.0 million, made up of current expenditure totalling £3.8 million and capital expenditure of £4.2 million. Most of the current expenditure is for salaries and administration in the Department of Fisheries and BIM. The capital expenditure is composed of grants for boats and boat building, harbour works, other infrastructure and grants towards fish processing plants. Some questions have been raised from time to time about the grants to skippers for new boats. Because of the high level of such grants the average grant per job in the catching sector is far higher than in manufacturing industry.

It is not within the scope of this study to undertake a detailed study of this question. This in itself would be a major study on its own. Some points relating to it are however raised in the text. All we wish to say here is that the overall evaluation of an activity - be it fisheries, industry, economic research or whatever - and the amount of state subsidy that is justified involves very broad issues, not all of which may be subject to economic calculation. At the end of the day there is always judgment to be made, essentially a political judgment. The role of research is to provide relevant data and analysis that will facilitate such judgment; and, once the objective is set, to propose and evaluate alternative ways of achieving it.

Discussion of the economic constraints inhibiting the development of the Irish sea fisheries is complicated by their interdependence. Inadequate knowledge of the size and distribution of the stocks available in Irish waters makes it difficult to define the optimal size and vessel configuration for the sea fishing fleet. That definition, in turn, is fundamental to an assessment of harbour facilities, particularly in the major ports that would be expected to handle the bulk of increased landings. The latter two factors - the number and size of fishing vessels and the resulting changes in harbour infrastructure - will impose the need for further changes in marketing and processing facilities and practices. Only at Killybegs could the industry handle the increase in peak landings, imposed by larger boats fishing four to seven days per week.

The resource base available to Irish fishermen has not yet been defined by scientific research; but the commitment by the Community to expansion of the Irish sea fisheries and curtailment of non-Community catches off the west coast will make considerably larger catches possible. To realize this potential the Irish fleet must be augmented by vessels large enough to fish year round in offshore waters off the west coast, while the existing small boat fleet fishing inshore could be refurbished and modernized to provide greater safety and versatility; any resulting increase in fishing capacity would have to be firmly limited.

Development of the fleet along these lines calls, in turn, for removal of bottlenecks in infrastructure. Killybegs and Castletownbere are the logical bases for larger vessels but the latter would need to be modified to accommodate them. In addition, cold storage, service facilities, and primary marketing facilities must be enlarged to handle the much larger catches landed by the offshore vessels. A number of smaller harbours also require investment to match the requirements of a modernized inshore fleet. Access roads to some harbours, are in poor condition, and should be improved.

Marketing and processing sectors do not appear to offer serious barriers to growth in the sea fisheries. Catches will continue to go to a slowly expanding domestic market and a strong Community market in much the same product groups. The obstacles to rapid growth in processing of final products in Ireland are formidable, but there are hopeful signs of mutually advantageous contractual arrangements with large processors and marketers in the Community nations.

Chapter 14 - Development Planning: Major Policy Issues

It is obviously difficult either to define the policy issues facing the Irish government and the projects and programmes to be supported by Ireland and/or the Community without specific details of the common fishery policy which will eventually emerge from the Community. Nevertheless it is necessary to make some general assumptions about the principal elements of such a policy as it will relate to Ireland. Accordingly the discussion of policy options rests on the propositions that the expansion contemplated by the EEC under the Hague Agreement, will be realised within a reasonable period of time and that the possibilities of further increases in Irish quotas will exist.

It is also assumed that some degree of protection of small boat fishermen will be forthcoming - probably in the form of a 12 mile zone for each of the member states. It is assumed, that Community policy, aimed at reduction of excess capacity, is a general policy only; there are cases such as the west of Ireland where restructuring must include some expansion in larger vessels if regionally disadvantaged fishermen are to take full opportunity of the opportunities opened up by the reduction of catches of non-member nations and the re-allocation of quotas within the Community.

With regard to Irish policy issues, the highest priority facing the Irish government is to improve its ability to define and measure quickly the state of the most important stocks in Irish inshore waters. The basic resource situation in Irish waters is not defined adequately for management purposes and this situation must be improved.

The Community commitments to expansion of the Irish fishing industry is an opportunity only. It is incumbent on the Irish government to transform it to jobs and incomes. That in turn calls for an expanded and modernised fleet, capable of exerting the right kind of fishing effort in the right areas. The danger inherent in this situation is that the new large boats will fish in inshore waters at the expense of existing small boat owners. Hence pressure must be exerted on new large vessel owners receiving grants and loans to expand into new areas and new species. This will not be easy to accomplish but it would appear that general subsidisation of boats to fish inshore waters now appear to serve no useful purpose.

The general state of the sea fish stocks calls for a comprehensive licensing programme for sea fishing vessels. This is necessary if economic waste and biological depletion are to be avoided. It is highly desirable therefore that the Irish government initiate a general licencing programme particularly for boats fishing for lobster, crab and crawfish.

It is absolutely essential that quota determinations be speeded up and that these quotas be rigorously enforced. There are problems with enforcement off the west coast of Ireland. The huge expanse of water to be monitored and the prevailing weather conditions make surveillance difficult and expensive. These considerations make it desirable to place observers on the larger vessels of all nations fishing in areas where surveillance is particularly spotty. The cost of such a programme would be far less than equivalent monitoring by sea and air patrols.

On the question of marketing, the analysis suggests that even though there is considerable scope for improvement in the utilisation of the Irish catch, the path to greater numbers of jobs and value added in fish processing is neither simple nor clear-cut. A formidable obstacle to the development of more highly processed sea food lies on the supply side. The quantities of raw material, particularly those of white fish are very often too small and too irregular to permit processors develop an efficient industry. This will need to be changed by the expansion of the fleet into offshore waters. In this case it should also be possible to expand value added through the establishment of joint ventures with large scale marketers in other countries.

There seems little doubt of the need for ongoing and planned improvement in the primary fishing harbours for each region of the country, but the selection of a secondary group should be based on the specific needs of the restructured fleet. However a number of harbours are needed for shelter on the exposed west coast and decisions on these can be taken now. Harbour expansion will require considerable additional investment and will therefore have to be phased over time.

Urgent measures are required to protect salmon stocks. The present and prospective level of catches has reached a point where stocks face depletion or even extinction. A number of policies ranging from modest to severe might be considered. But regardless of the longer term measures proposed it is imperative that a more effective enforcement programme be developed.

The attractiveness of expanded investment in aquaculture in Ireland is enhanced by the substantial ground work already laid. Research and development by the ESB, University College Galway, the Department of Fisheries and Forestry and others have made headway, as evidenced by the existance of some promising aquaculture in Ireland today. The major effort by the National Board for Science and Technology, in its Mariculture Development Programme to define research needs, identify potentially promising sites, and spell out the roles of various agencies, will add an important action orientated element to previous work.

Finally, on the question of marine research, we are of opinion that there is much to be said for the creation of a central marine research institute. A decision of this kind, however, calls for detailed analyses of alternative organisational arrangements that goes far beyond the scope of this study. Nevertheless the urgent needs are clear, continuity in funding to support longer term work and development of groups of researchers who will have both the time and incentive to devote their careers to marine research.

Chapter 15 - Recommended Projects and Programmes

1. It is recommended that a programme be established that will provide "more accurate, consistent and timely recording of catches" in order to tie catch figures to data on effort. This necessitates the introduction of fishing logs to allow accurate collection of data on catches and their location. The estimated extra annual cost of providing an adequate statistical and stock assessment programme is estimated at £63,000 (1979 prices) in addition to £9,000 capital expenditure.

2. Some provision will have to be made to protect the small inshore fishermen - probably in the form of special consideration for coastal fishermen within a 12 mile zone.

3. Restructuring of the Irish fleet is recommended particularly off the west coast where it is necessary to expand into larger vessels. Any restructuring of the fleet cannot be based on the continued exploitation of already heavily overfished inshore species. Efforts must be directed to areas and stocks not previously fished by Irish vessels.

4. A training programme is required to train fishermen in a new type of fishing, and in a new environment offshore. In order to encourage these fishermen to keep out of inshore waters it will be necessary to alter the existing financial incentives. This may take the form of differential payments, e.g. it might be possible to treat these new large vessels as experimental, limiting them to a predetermined schedule of fishing activity.

5. There is a definite need to upgrade the existing vessels in the fleet so as to permit more diversified operations. In the interest of the fishermen this might involve the restructuring and refitting of newer hulls with new construction matched where possible by retirement of older boats. It is in the fishermen's own best interest to do this, particularly, since there are generous grants available (see Appendix 3C to Chapter 3).

6. In order to monitor and control fishing activity a strict licencing system for fishing vessels will have to be introduced and it is also recommended that fishery observation officers be placed aboard a selection of vessels to ensure that quotas are adhered to.

7. There is an immediate need to cut back on drift net capacity to protect the salmon species. This may be achieved by (i) implementing vigorously a recent regulation relating to phasing out the larger boats, most of which have entered the fishery recently and have alternatives to which they can be diverted and (ii) reducing slowly the number of licences by failing to re-issue them as licence holders leave the fishery. Consideration should also be given to a programme requiring the tagging of all salmon when caught. Other measures to protect the salmon stock include water quality control.

8. The general shortage of raw materials in Europe means that Irish processors should be in a position to supply products to the specifications of foreign

marketing firms under joint venture operations. They key here lies in the expansion of total catches and improvement in the regularity and continuity of supplies and provision of cold store facilities. Also greater effort should be put into upgrading quality, reducing delays and adherence to delivery schedules in order to get the most out of exports of raw and semi-processed products.

9. There is a need for a substantial improvement in the major fishery harbours to cater for the larger vessels that will be operating there and to develop a group of secondary harbours and necessary infrastructure facilities.

10. The prospects for aquaculture range from very good to marginal with guarded optimism for overall development sufficient to make a useful contribution to incomes and employment. Development of aquaculture, even with native species as a base, must be regarded as a very risky financial undertaking and requires long term continuing applied research, training in aquaculture techniques and financial aids.

11. The advantages and disadvantages of centralising marine research have been examined. It would appear from a preliminary examination that the advantages of more efficient use of funds, facilities etc. would best be accomplished in a central marine research institute. Before a definite recommendation can be made in this regard, however, a detailed analysis, going far beyond the scope of this study, would need to be undertaken of alternative arrangements.

PREFACE

For the purpose of this study, ports around the Irish coast are referred to as being in the east, south, west or north of the country. These divisions are based on traditional Department of Fishery classifications and are illustrated in Figure 1.*
The boundaries of the divisions are:

East Coast:	**Omeath to Carnsore Point**
South Coast:	Carnsore Point to Loop Head
West Coast:	Loop Head to Erris Head
North Coast:	Erris Head to Moville

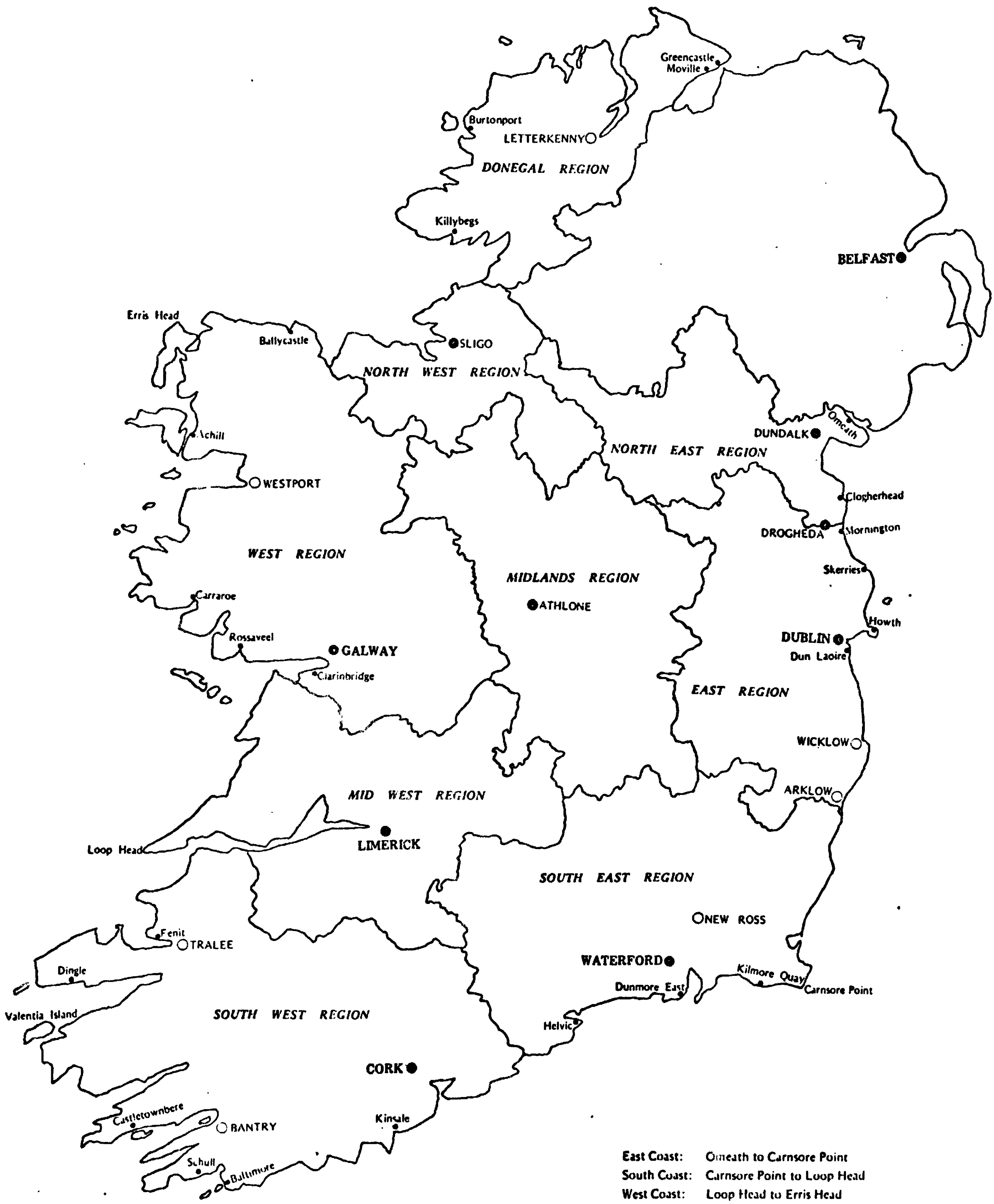
In addition to the coastal divisions, the Industrial Development Authority (IDA) has divided the state into nine planning regions. Except for the midland region, which is landlocked, all the IDA regions join the sea and their coastal boundaries roughly coincide with the Department of Fishery divisions (see Figure 1).

Reference is made to the IDA planning regions in the discussions on processing and distribution of fish, employment in the industry, and the regional implications of the fishing industry.

---

* Since 1979 these divisions have been changed to correspond with ICES (International Council for the Exploration of the Sea) divisions.

Figure 1: Map of Ireland showing Department of Fisheries coastal boundaries and IDA planning regions



East Coast:	Omeath to Carnsore Point
South Coast:	Carnsore Point to Loop Head
West Coast:	Loop Head to Erris Head
North Coast:	Erris Head to Moville

INTRODUCTION

Despite its title, this is essentially a study of people: those who harvest, process, market, and consume the fishery products that Irish waters provide. The fish populations themselves are obviously important. Indeed, some of the most pressing and difficult questions facing the industry relate to the size, location, seasonal availability, and yield potential of the stocks available to Irish fishermen. But these are only means to an end: the use of Ireland's living marine resources for the greatest economic and social benefit to its people and to the people of the European Community of which Ireland is an integral part.

There are neither simple answers to the problems that face the Irish sea fishing industry nor simple guidelines for future development and management. All marine fisheries are inherently unstable: they are beset by uncertainties as to catch rates and markets, and they operate without the benefit of property rights which otherwise would set into motion private market forces to determine the efficient allocation of inputs and catch. In addition, the fisheries of the north eastern Atlantic in general (including Irish waters) have for generations been heavily exploited by other nations and Ireland has come very late to the table. The expansion of international fishing effort, particularly since the late 1960s, has left virtually all major commercial stocks in a state of actual or threatened depletion. Rebuilding of some (herring, for example) clearly calls for a substantial reduction in catch if the resources are to regain their full productive capacity. Other stocks could produce the same physical yield with much lower fishing rates and lower costs. If the special social and economic problems in Ireland, particularly in the western counties, are judged by the Community to justify an expansion of the Irish sea fisheries, then any such expansion must come from a shift to new waters and/or underutilised species or through modification of Community country quotas.

In the analysis that follows, the term "fishery management" is used in the broadest sense of the word. It includes policies designed to stimulate growth of fishing effort on underutilised stocks through improved harvesting methods, better boats and gear, and new products and markets. The term includes regulation as well, where excessive fishing effort threatens to deplete valuable stocks and reduce available yields. In future, the term may also extend to enhancement programmes to supplement natural stocks (e.g., in salmon and shellfish).

In short, a rational policy toward the Irish sea fisheries must balance stimulation against restriction - at the same time and often in the same regions - if the varied marine resources of the nation are to be utilised efficiently and selectively.

There are good reasons for linking firm regulation to fishery management in this broad sense. Both theory and experience point to the inevitability of waste and even destruction if exploitation of fisheries is left to market forces alone, and the common-property nature of the resource tends to ensure that valuable species obtainable at low cost will be overexploited. On the other hand, because the high cost of oceanographic and biological research exceeds the capacity of any one firm, potentially marketable stocks may often go untouched simply for lack of knowledge of when, where, and how they can be harvested. Regardless of its political or economic structure, any society would do well to view the development of its fisheries as a joint effort involving both public agencies and individual participants.

In the case at hand, the necessary efforts toward public management and development will, of course, be shared co-operatively by EEC and the government of Ireland. With respect to fisheries their respective roles are not yet fully determined; it is clearly understood, however, that Irish development and management alternatives are constrained by overall EEC fishery policies agreed to by the member states (and by general membership requirements laid down in the Treaty of Rome).

Objectives

The argument for an active management policy in guiding Irish sea fishery development requires an answer to the crucial question: "Management for what?" The history of marine fisheries throughout the world suggests that surprisingly little orderly analysis of objectives has preceded most management programmes. For the most part, they run to a familiar theme: fish are good, jobs are important, therefore the more of each the better. But reality is much more complex. The increasing interest of governments in managing all kinds of natural resources reveals that multiple objectives are inevitably sought but are often mutually incompatible and that no single common denominator (monetary or physical) can be found for weighing these objectives in a straightforward manner. In this study, many alternative objectives must be woven into a definition of the "public interest", and the public concerned is not only Ireland but the Community. Possible objectives are discussed below, first individually and then in terms of a framework for balancing the inevitable trade-offs.

One of the most common goals of fishery policy in the past has been to maximise the output of each separable stock. "Maximum sustainable yield" (or MSY) has acquired an almost mystical aura, in part because of its apparent simplicity. Unfortunately, it is not at all simple; it can be ambiguous, and in economic terms it is unsound as a sole basis for management. The economic success of a management programme is measured by both the output of useful fishery products and the greater output of other goods that can be produced when the labour and capital employed in the fishery are held to a practical minimum.

It makes a great deal of economic difference whether a given total catch is taken at high or low cost, yet a purely physical objective such as MSY simply ignores that issue. Moreover, the definition of MSY for mixed stocks becomes hopeless. If these populations cannot be harvested selectively, full utilisation of one inevitably requires overutilisation of some and underutilisation of others.

Perhaps the most telling argument against MSY as a target for fishery development and management is the fact that it represents, at most, a kind of moving average of yields that can be taken. But the yields available over any given period are determined by the composite size of the year-classes of fish in the exploitable population at that time. Since the year-to-year recruitment of fish varies widely for all sea fishery stocks, the yield available in any given year will vary substantially from a moving average such as MSY. By monitoring the basic determinants of stock size, management can, at some cost, provide year-to-year forecasts that could lead to substantially larger yields than could be obtained by adhering, year after year, to an averaged estimate of MSY. To the extent that the size and productivity of the stock may reach dangerously low levels during any period of poor recruitment, adherence to MSY also subjects the fishery to grave, long-term risks of depletion. Thus, a more useful statement would be that fishery management strives to protect the basic productivity of valuable stocks, with full recognition of their inherent variability and the need to monitor them continuously.

Since the productivity of any fish stock is finite, while the cost of fishing effort increases in varying degree with rising effort, it is obvious that maximum economic yield (MEY) from a fishery will always be realised at some level of effort below that of MSY. The last few units of output that could be obtained simply cost more than their value in terms of other goods and services forgone.

MEY comes much closer to a concept of optimal social utilisation of a marine fishery resource than does MSY, but it is still far from adequate as a guide to practical policy. Given the tremendous variability from year to year of both biomass and amount available for harvest, an appropriate objective in setting production targets becomes the purely economic one of weighing costs against benefits: the costs resulting from delayed scheduling of production and fleet activity, against the benefits gained by obtaining up-to-date information concerning stock availability.

Several other objectives of public investment in fishery development and management are not, however, economic in nature. That is, they are directed toward social concerns rather than toward the sea fishery's maximum contribution to GNP. For example, fishery policy is of obvious and vital importance to employment, particularly in depressed local areas subject to chronic structural limitations on job opportunities. Economists have insisted, with justification, that the new jobs created in fisheries and in supportive activities such as shipbuilding, provisioning, etc., are properly counted as costs, not benefits, from the national point of view. But this argument rests on the conventional benefit-cost assumption that labour employed in the programme will be drawn from other productive activities. The sea fisherman is subject to a unique economic, social, and cultural immobility that is most difficult to overcome. The west of Ireland presents an almost perfect example of such a situation. Where the "opportunity cost" of unemployed or severely underemployed labour is close to zero, political expediency and common humanity, on the one hand, and sound economics, on the other, may dictate a development programme more labour-intensive and more locally oriented toward production than might be indicated by strict consideration of efficiency. Nonetheless, efficiency may coincidentally be served if both the Community and the Irish government consider minimum living standards to be an overriding objective for depressed communities of this type, and if (as will often be the case) overemployment in the fishery represents the least-cost method of reaching target incomes. However, the setting of such a development policy must be based on a finding to that effect, not on the assumption that any method of fishery management that adds jobs must automatically be good for the Community or the nation.

Fishery programmes may also be viewed as a method of redistributing income toward particular groups or particular geographic areas. Other things being equal, it would be desirable to develop Irish fisheries in a way that provides greater relative benefits to the west and the north west regions. But regions are diverse and, even in the poorer Irish counties, a particular fishery development programme might serve only to substantially increase the incomes of a handful of well-to-do, while leaving the more numerous poor precisely where they were before (or even worse off). If fishery programmes are to be directed toward income distribution, it is crucial to identify the winners and losers as clearly as possible. The income and employment objectives chosen must be a matter of informed and open public decision, rather than a matter of pure chance or political pressure.

Acceptance of social objectives, such as increased employment or income redistribution, carries with it the responsibility for a finding that a particular less efficient fishery policy is in fact the best way of achieving the desired objective. Spreading employment in an isolated fishery may be the most satisfactory way of achieving a given living standard in the area. But it is also plausible that other, non-fishery, programmes might attain the same or better results at lower cost to the nation and the Community as a whole. A fishery programme which deliberately sacrifices economic efficiency must be backed up by open discussion of the alternatives that have been considered in reaching that recommendation.

Another possible objective of Irish fishery policy would be to improve the country's balance of payments. However, this is not as simple a matter as it might appear. Balance of payments impacts require sophisticated forecasts of both foreign and domestic markets over time. Any major fishery expansion programme for Ireland would include a significant import component that would have to be weighed. Also, an assessment of benefits in terms of the net foreign exchange position from a given fishery policy would have to take into consideration that the impacts on derived import demand and on exports would be felt at widely differing times. The import burden occurs "up front", while the export benefits accrue only over time (and with increasing uncertainty as the time horizon is expanded).

Obviously, no clear consensus has been reached as to the weights to be assigned to the various objectives of public development and management of Irish sea fisheries or to the methods to be employed. Each objective mentioned above is defensible; each impinges to some extent on one or more of the others. But fishery management, like government itself, is concerned with the art of the possible. Identification of the multiple goals that might be sought is an essential first step toward socially efficient formulation of fishery programmes for Ireland in the Community setting.

A commonsense summary of the foregoing, couched in terms of the Irish sea fisheries, might run along the following lines. First, since the fishery cannot exist apart from its resource base, a primary goal of any fishery policy must be to protect and, where necessary, to rebuild the biological productivity of the commercially important stocks. Second, other things being equal, it makes sense to catch any given quantity of any given fish only at the lowest economic cost possible, given the available human and capital resources and the state of the art. How many fish one takes is important, of course, but how they are taken is no less important to efficient utilisation. Third, the requirement for economic efficiency must be modified to accommodate Irish and EEC concern for (1) who is employed in the fisheries and (2) how the income derived from them is distributed by economic group and by region. To the extent that fishery policies can be tailored to improve both economic performance and the quality of life in disadvantaged areas of the country, some trade-off in economic output is clearly worthwhile. Fourth, fishery policies must be considered in the context of regional and national planning. Finally, no fishery policies, however well-framed, can be considered socially efficient unless they are amenable to implementation and enforcement by government. And that cannot be achieved unless the policies are reasonable enough to win compliance from those who participate in the industry.

A number of corollaries follow from this practical approach to the objectives of managing the Irish sea fisheries. First corollary: It is highly unlikely that any one optimal set of objectives can be determined. Thus, in choosing among alternative sets of policies which might be considered equally desirable, another criterion appears: political acceptability. Second corollary: The shaping of fishery policy toward political acceptance may be simplified if some secondary objectives are treated as constraints on the primary objectives. For instance, the biological productivity of the stocks and the achievement of the largest possible increments to national income (primary objectives), must take into account the desirability of maintaining or perhaps increasing employment in the fisheries sector. Third corollary: Any rational programme must be based on adequate scientific information and a capability for monitoring short-term changes in the yield capabilities of the stocks. Fishery resources are subject to constantly changing and little understood variables. To frame long-term policies on a "snapshot" of the current resources is an invitation to disaster. Thus the programme must be flexible enough to respond to timely, updated, statistical information on the status of stocks and the economic health of the fishing fleets based on them. Fourth corollary: These objectives demand full and free communication among a diverse group of specialists and decision-makers. To achieve a continuing and successful process of adjustment, fishery scientists, industrial developers, administrators, and government officials must work as a tightly knit and co-operative team.

The development and rationalisation of the Irish sea fisheries relates directly to Community regional development policy in several ways. First, the Irish economy as a whole, in terms of employment, GDP, and per capita incomes, still faces long-run problems that call for continuing Community assistance. Though the sea fisheries are not a major industry in Ireland, they do offer opportunities for employment and diversification in line with long-run structural development plans. Second, marked regional imbalances within Ireland are a matter of both national and Community concern. The sea fisheries offer the prospect of continuing modest expansion in primary and secondary employment in the areas of greatest need - the western and north western counties. Finally, there is a distinct possibility that Community implementation of a common fisheries policy may adversely affect particularly vulnerable groups of small-boat fishermen in the very regions where employment alternatives are most limited. These factors constitute a major reason for the Community to evaluate carefully the possibilities inherent in development of the Irish sea fisheries.

On the basis of facts presented, this study indicates that such development would fit not only into the overall fisheries programme of the Community but, more importantly, that it would advance the wider objective of mitigating regional imbalances and moving underdeveloped regions into more equitable balance with the Community as a whole.

No attempt has been made to evaluate individual development recommendations in cost/benefit terms. Given the existing uncertainties with respect to the condition of stocks in Irish waters, the time period over which benefits will accrue and the interdependence of the policy options considered, such calculations would convey a wholly spurious sense of precision. In addition some of the most significant gains from improvements in the range and productivity of the Irish sea fisheries will accrue in social stability, safety at sea, and regional income distribution - benefits not captured in the efficiency objectives of conventional cost/benefit analysis.

Organisation of the Study

The body of the report is presented in three parts. Part I is devoted to the structure and dimensions of the harvesting sector of the Irish sea fisheries. Chapter 1 analyses production trends since 1963, giving specific attention to landings, fishing methods and gear, and the relation of fisheries to national and regional economic activity. Chapter 2 delineates the economic environment in which sea fishing operates. A description of fishing organisations is followed by a discussion on the management of Irish fisheries, including the legal base and practice. Chapter 3 contains a detailed analysis of the structure of the present Irish fleet and its utilisation and economic performance, based on original survey data. Sources of funds for vessels and gear are also described. Chapter 4 provides an assessment of harbours, and service facilities and indicates the harbours in need of development. This is followed by a description of the labour force in Chapter 5; and, for the first time, data are developed relating to the number of fishermen, socio-economic characteristics, dependence on fisheries, other income sources and conditions of employment. Part I concludes with an assessment in Chapter 6 of the present state and future prospects of mariculture in Ireland.

Part II comprises a parallel description and assessment of the marketing and processing sector of the sea fishing industry. Market changes in the level and composition of fish consumption in Ireland and other European countries are summarised in Chapter 7. This chapter also describes the activities of the wholesale and retail functionaries. The details of Irish exports and imports of fish and fish products are developed in Chapter 8. Chapter 9 examines the prospects for marketing Irish fish and fish products abroad, based on a Consultants report of some major European markets; and Chapter 10 describes the activities of fish processors in Ireland. Chapter 11 details the operations of the EEC withdrawal system in Ireland's fishing ports, and discusses some of the actual and potential problems.

The factual material and data in Parts I and II provide the basis for the policy analyses in Part III. Chapters 12 and 13 bring together the identified constraints inhibiting expansion of the Irish sea fisheries: biological, economic, and organisational. Chapter 14 focuses on major issues raised by alternative EEC and Irish policies - in effect or under consideration - and on the impact of each defined alternative on the growth and prospects, economic performance, and regional contribution of the Irish sea fisheries. Chapter 15 translates the general discussion of Part III into a series of specific project and programme recommendations.

The primary data underlying our analyses are drawn from a detailed survey of Irish fishermen undertaken in 1978 by ESRI; and for the first time, a solid, factual basis is provided for describing the status of the sector. More important, these data enable us to analyse the regional (and in some cases, local) impacts of both EEC and Irish policies, programmes, and projects. Materials from the survey are incorporated in the body of the report where appropriate. The questionnaire used in the survey is given in the Report Appendix.

Additional valuable information was drawn from a survey of sea fish processors conducted by the Industrial Development Authority in 1976 and from a study

of fish wholesalers and retailers conducted in 1975 and updated in 1978 by the Prices Commission. The authors gratefully acknowledge help provided by members of the industry, IDA, and BIM in identifying a few significant changes in the processing-marketing sector since these studies were completed.

PART I

STRUCTURE AND DIMENSIONS OF IRISH SEA FISHERIES

CHAPTER 1

PRIMARY PRODUCTION

Types of Fish and Fishing Methods

The 32 main species of fish found in Irish waters can be divided into four groups: demersal, pelagic, anadromous, and shellfish.

Demersal fish. Species found on or near the sea floor. These include round fish such as cod, haddock, whiting, and pollack, and flatfish such as plaice, sole, brill, turbot, etc.

Pelagic fish. Species living in the surface waters or middle depths of the sea. The main pelagic fish found in Irish waters are herring, mackerel, pilchards, and sprats.

Demersal and pelagic fish are collectively referred to as "wet fish".

Anadromous fish. These fish live in salt water, but spawn in fresh water; salmon and sea trout belong to this group. Salmon are taken both at sea and in estuaries and rivers, and are sometimes included in the wet fish category.

Shellfish (invertebrates). Crustaceans, such as lobsters, crabs, shrimps and prawns, having crusty outer coverings and capable of movement, and molluscs, i.e., oysters, escallops and mussels.

The principal fishing techniques in use along the Irish coast follow:

Drift netting. This method is used primarily in the capture of salmon, and basically consists of setting a straight line fence of netting in the sea, suspended from a row of floats and controlled at one end by the fishing vessel. As vessel and net drift before current and wind, fish become entangled in the meshes. The nets are usually between 45 and 109 metres long, though they can be joined to form chains of up to several miles long.. Drift netting is ordinarily done at night, and mainly on the south and north west coasts.

Bottom trawling. As the name suggests, this method involves towing a cone-shaped net bag along the sea bottom; the mouth of the net is kept open by heavy "otter boards", which are forced apart by the pressure of the water on their surfaces. This type of trawl is used when fishing for demersal species or when fishing for herring in the daytime.

Paired midwater trawl. Midwater trawls enable fishermen to catch stocks inhabiting the "middle" region between sea surface and sea bed, and the gear is used mainly at night when fish tend to rise from the sea bed. Ordinarily, two vessels of roughly equal size tow the trawl. Skilful positioning and accurate control of depth are essential for successful use of this gear.

Ring netting. This method consists of forming a circular net fence around a school of fish, closing the bottom of the net to form a purse to prevent the fish from escaping downwards, and, finally, drawing in the "ring" so the fish can be taken by net scoops. One or two vessels are normally used. This form of netting is suitable only for schools of fish near the surface. It is also called "purse seining".

Pots. Lobsters and crabs are taken in baited pots or traps, most of which are placed from very small boats operating in inshore waters.

Hook and line. Small boat fishermen still take considerable quantities of fish with handlines, but a few Irish fishermen practise long-lining for demersals.

Irish Sea Fisheries in the Regional Setting

The continental shelf of the north east Atlantic, extending from the Brittany Coast to the Barent Sea, is one of the world's richest fishing grounds. Ireland, by virtue of its geographic location, has good access to some of these grounds. To gauge the importance of fishing to the Irish economy, it is worthwhile to compare Irish catches with those of its EEC partners - present and prospective.

The figures in Table 1.1 show wide variations in volume of catches among the member states. For example, in 1978 Denmark's top-ranking catch was more than thirty times that of Belgium, which had the lowest figure. However it should be stated that a high proportion of the Danish catch goes for fish meal. Ireland's catch, as a percentage of total EEC landings, was less than 2 per cent in eight of the nine years shown, and the second lowest in volume of the EEC member states.

Table 1.1 also shows that over the 1970-1978 period the total EEC catch of wet fish and shellfish increased from 4.6 million tonnes to 5.1 million tonnes in 1976 and declined slightly to 4.9 million tonnes in 1978. However, Denmark alone accounted for most of the gain, with landings up from 1.2 million tonnes in 1970 to 1.8 million tonnes in 1978. Catches increased moderately in Italy and the Netherlands, and decreased in West Germany, the United Kingdom and France. The Irish catch increased 37 per cent.

Contribution of Fishing to GDP

Primary fishing is a surprisingly small contributor to GDP in all the EEC countries (see Table 1.2). In none of them does the value of marine fish and shellfish landings exceed one per cent of GDP at market prices.

Denmark, at 0.703 per cent of GDP in 1976, ranked highest in the Community, with Ireland second at 0.294 per cent. Table 1.2 also shows that in the 1973-1976 period Ireland was the only country in the Community in which the value of landings as a percentage of GDP increased (from 0.282 per cent in 1973 to 0.294 per cent in 1976). The proportion for France, West Germany and Italy remained virtually constant in this period. The contribution of Danish fisheries to GDP fell from 0.733 per cent to 0.703 per cent, and the Netherlands and the UK experienced more significant decreases in the same years: from 0.245 per cent to 0.191 per cent for the Netherlands and from 0.215 per cent to 0.175 per cent for the UK.

This tabulation of the value of fish landings as a percentage of GDP does not take into account the value added in processing and distribution, nor do national figures reflect the regional importance of the fishing industry. If the value added from processing and other secondary and tertiary activities are included, the percentage share of GDP increases somewhat.

Table 1.1: Volume of fish landings for all EEC countries and prospective members, 1970-1978 (nominal catch)*

Country	1970	1971	1972	1973	1974	1975	1976	1977	1978
					'000 tonnes				
Belgium	53	60	59	53	46	49	44	45	51
Denmark**	1,227	1,401	1,443	1,465	1,835	1,767	1,912	1,807	1,745
France	783	758	797	814	808	806	806	760	796
West Germany	613	508	419	478	526	442	454	432	412
Ireland	79	74	92	91	90	88	95	94	108
(Irish catch as a percentage of total EEC)	(1.73)	(1.59)	(1.96)	(1.90)	(1.74)	(1.79)	(1.87)	(1.94)	(2.21)
Italy	397.	400	425	401	426	406	420	380	402
Netherlands	301	321	348	344	326	351	285	313	324
United Kingdom	1,114	1,124	1,103	1,154	1,106	996	1,053	1,020	1,054
Total EEC	4,565	4,645	4,686	4,800	5,162	4,904	5,069	4,850	4,893
Greece	99	107	96	96	92	95	106	106	106
Portugal	465	437	445	478	430	375	346	310	255
Spain	1,542	1,501	1,536	1,578	1,510	1,518	1,475	1,394	1,380
Total Prospective EEC	2,106	2,045	2,076	2,152	2,032	1,988	1,927	1,810	1,740
Total Enlarged EEC	6,671	6,690	6,762	6,952	7,194	6,892	6,996	6,661	6,633

* Nominal catch is not necessarily the same as landed catch. Hence the figures for Ireland in this table are not the same as those given in other tables of this report.

** Excludes Greenland whose total catch in 1978 was 68,000 tonnes.

Source: Yearbook of Fisheries Statistics, Vol. 46, Food and Agricultural Organisation of the UN.

Table 1.2: Values of landings of marine fish and shellfish as a percentage of GDP at market prices, 1973 and 1976

Country	GDP million US $*		Value of landings as a percentage of GDP	
	1973	1976	1973	1976
Belgium	45,270	66,900	0.067	0.053
Denmark	27,760	38,100	0.733	0.703
France	255,880	348,300	0.178	0.173
West Germany	347,900	451,200	0.044	0.038
Ireland	6,500	7,900	0.282	0.294
Italy	137,860	164,300	0.228	0.214
Netherlands	59,230	87,200	0.245	0.191
United Kingdom	173,420	216,500	0.215	0.175
Total EEC ≠	1,053,820	1,380,400	0.164	0.145

* Calculated from average daily exchange rates.

≠ Excludes Luxembourg.

Source: Fisheries of the European Economic Community, Edinburgh, Fisheries Economic Research Unit, WFA,1977.

Despite its small contribution to GDP in European countries, fishing remains a politically sensitive issue everywhere. There are two basic reasons for this:

(1) Fishing, like agriculture, is an ancient industry; and strong traditions have been built around it. It is a way of life for many people and a source of national pride.

(2) Though its overall contribution to GDP is small, fishing is an important source of income and employment in some regions - particularly in disadvantaged areas which are physically and economically isolated from the mainstream of national economic activity. In Irish ports such as Killybegs,

Castletownbere, Dunmore East and Galway, fishing contributes substantially to the income of their hinterland areas and provides employment, directly or indirectly, for a relatively large number of people (see Table 1A.9 and Table 5.2 in Chapter 5). In the absence of fishing, these areas would be hard-pressed to provide alternative employment opportunities.

Post-war Development of the Irish Sea Fisheries

The development of the Irish sea fisheries in the post-war period is evident from the figures for landings of wet fish (excluding salmon) which were only 8,700 tonnes in 1938, compared with 20,000 tonnes in 1963, and 87,000 tonnes in 1978. In this period also there was a substantial increase in the landings of shellfish from a value, at constant 1938 prices, of £34,000 in 1938, to £98,800 in 1963 and £452,000 in 1978. In the same period the quantity of all kinds of fish and fish preparations imported declined from 8,800 tonnes to 4,500 tonnes while exports of sea fish (excluding salmon) increased from 3,700 tonnes to 9,200 tonnes. A more detailed breakdown of landings since 1963 is given in Table 1A.1.

Landings by Irish Fishermen, 1963-1978

The quantity and value of Irish landings from 1963 through 1978 are shown in Figures 1.1 and 1.2 and Table 1A.1 of the Appendix to this chapter. Sea fish landings in 1963 totalled 25,176 tonnes. Of this, 10,688 tonnes were accounted for by demersal species, 9,602 tonnes by pelagic, and an estimated 4,886 tonnes by shellfish. The most important single species was herring, which alone accounted for more than 30 per cent of all fish landed in 1963.

The next ten years saw a dramatic expansion in Irish sea fishing. By 1972 total volume of landings had increased to 87,454 tonnes or by 247 per cent. Demersal catches increased by 60 per cent and pelagic by 510 per cent, of which the increase in the volume of herring harvest was about 468 per cent. The volume of shellfish landings also increased by 140 per cent. Herring landings in 1972 were the highest on record and, at 47,861 tonnes, accounted for over half the total catch.

The hectic upward pace could not be sustained, however. Landings steadied and then fell from 87,454 tonnes in 1972 to 82,488 tonnes in 1977. In this period, however, demersal catches increased about 10 per cent, pelagic landings declined 11 per cent, and shellfish harvests remained about the same. The major reason for the decrease in pelagic catches was the sharp drop in herring landings, (from 47,861 tonnes in 1972 to 23,129 tonnes in 1977, about 52 per cent).

There was a rise in total landings from 82,488 tonnes in 1977 to 98,177 tonnes in 1978. The major portion of this increase is due to a large rise in the pelagic catch: herring landings increased from 23,129 tonnes in 1977 to 27,717 tonnes in 1978, and landings of other pelagic fish (mainly mackerel) increased from 28,750 tonnes to 41,113 tonnes. Landings of demersal fish and shellfish decreased slightly in 1978.

Figure 1.1: Quantity of fish landed in Ireland, 1963 to 1978

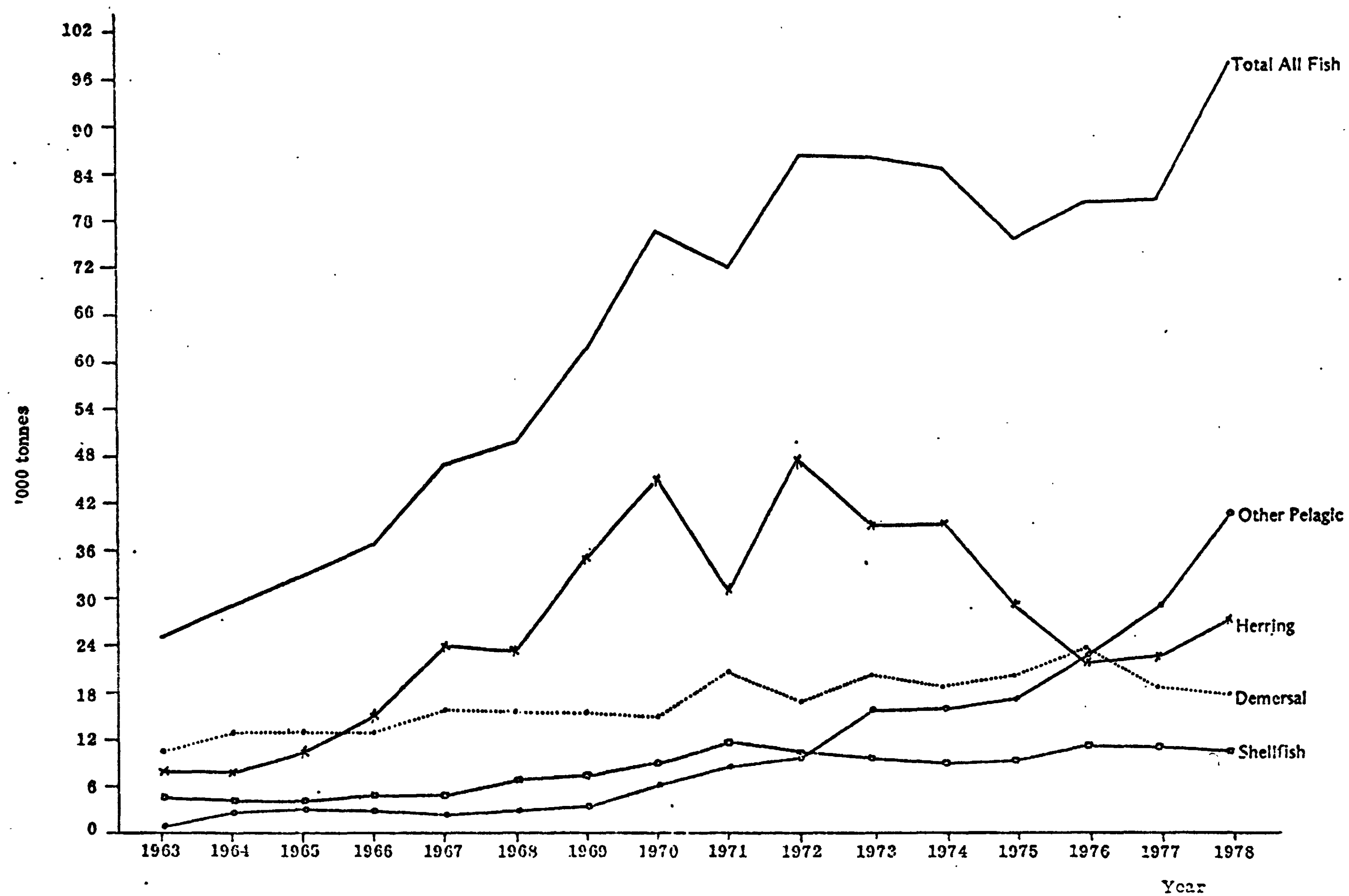
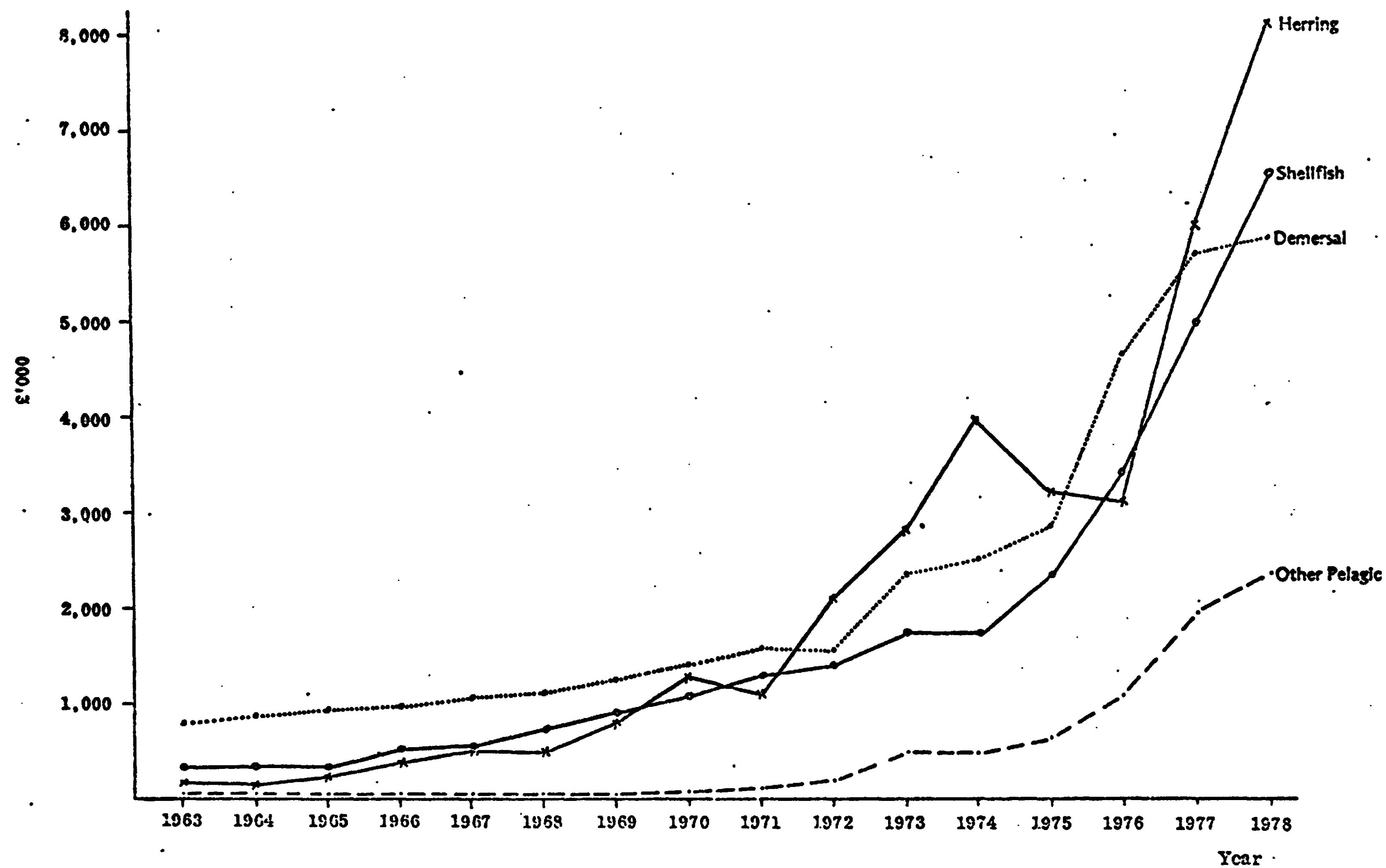


Figure 1.2: Value of fish landed in Ireland, 1963 to 1978



Prices of Fish

Average prices received by fishermen for different species of fish in selected years between 1963 and 1978 are given in Table 1A.2, while prices for some of the more important of these species in recent years are plotted in Figure 1.3. Sole, at £2,093 per tonne in 1978, is the highest priced of the sea fish taken by Irish vessels. The next is plaice (£519 per tonne in 1978), followed by cod, ray/skate, herring, whiting, and mackerel in that order. Mackerel was priced at £64 per tonne in 1978. The greatest increase occurred in the price of herring, largely as a result of the general decline in herring catches in the northeast Atlantic. Herring prices in Ireland rose from £23 per tonne in 1963 to £44 in 1972 and to £295 in 1978 - an increase of 1,183 per cent in fifteen years. The price of hake increased least. In 1963, it was £146 per tonne while by 1978 it had risen to £428 per tonne, an increase of 193 per cent.

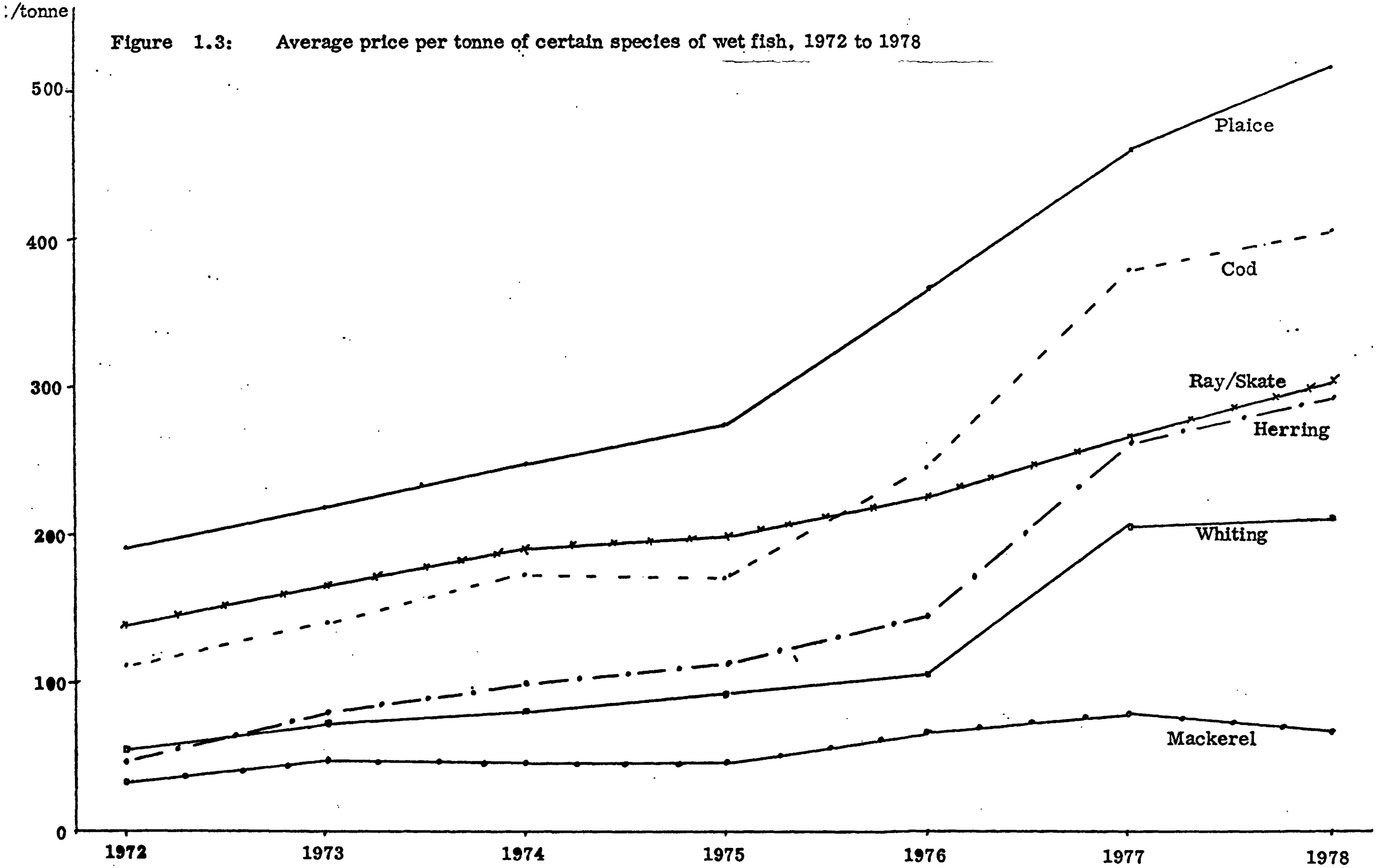
Value of Landings

Prices and quantities are combined in the second part of Table 1A.1 to give the values of the different classes of fish. This section shows that in 1963 the total value of Irish fish landings ex-vessel was only £1.4 million. Demersal species accounted for almost 60 per cent of this amount, pelagic species for about 16 per cent, and shellfish for the remaining 25 per cent. Of the pelagic landings, herring accounted for 84 per cent or for 13.7 per cent of total value.

Between 1963 and 1972, the value of all fish landings increased 276 per cent. The value of demersal catches rose by 89 per cent; pelagic values rose over 900 per cent, and shellfish by 300 per cent. In this period, the value of herring landings increased tenfold.

Between 1972 and 1978, the value of demersal catches rose 274 per cent, pelagic values rose 353 per cent, and shellfish values rose 364 per cent. The value of herring was up 286 per cent, even though the quantity landed had declined by 42 per cent. Percentage changes in the volume and value of the different categories of fish landed between 1963 and 1972 and between 1972 and 1978 are summarised in Table 1.3 below.

Figure 1.3: Average price per tonne of certain species of wet fish, 1972 to 1978



Source: Sea and Inland Fisheries Reports for various years. Dublin: Stationery Office.

Table 1.3: Percentage changes in volume and value of different categories of fish landed between 1963 and 1972 and 1972 and 1978

Period	Quantity					Value				
	Demersal	Pelagic		Shellfish	Total all fish	Demersal	Pelagic		Shellfish	Total all fish
		Herring	Other Pelagic				Herring	Other Pelagic		
	Percentage change									
1963-'72	60	468	807	140	247	89	996	481	300	276
1972-'78	5	-42	283	-3	12	274	286	1,007	364	332
1963-'78	68	229	3,378	133	290	607	4,134	6,330	1,757	1,527

Source: Sea and Inland Fisheries Reports for various years. Dublin: Stationery Office.

The relative volume and value of the different species of fish landed by Irish fishermen between 1963 and 1978 are detailed in Tables 1A.3 and 1A.4. Table 1A.3 shows that up to 1977 herring accounted for the highest proportion of total volume. In the early years, of the period, the volume of whiting landed was second to that of herring; but, in more recent years, mackerel has replaced whiting in importance. Indeed, in 1978, mackerel became the most important species landed in volume terms, accounting for 33 per cent of all fish landed.

Table 1A.4 shows that, in almost all of the 16 years, herring ranked highest in value. In the early years, this species was of little greater value than whiting or plaice; more recently its value has been much greater than that of any other species. For example, in 1974 (the best year recorded) herring accounted for 45 per cent of the value of total landings. The next highest were cod (7.4 per cent) and mackerel (6.7 per cent).

Since 1974, however, the relative value of herring has been decreasing. This species accounted for 35.6 per cent of the total value of landings in 1978, as compared to 45 per cent of the 1974 total. The growing importance of mackerel is indicated by its rise from 2.4 per cent of total value in 1963 to 8.9 per cent in 1978. Cod has remained in the 7 to 10 per cent range, but whiting has dropped from 13 per cent in 1963 to 7.0 per cent in 1978. Plaice has fallen significantly as well, from 11 per cent to 3.5 per cent, and sole has declined from 4.3 per cent to 1.5 per cent. Ray/skate landings have fallen from 7 per cent to to 1.7 per cent of total catch.

Shellfish has fluctuated in total relative value over the 1963-1978 period. In 1963, this category accounted for 25.7 per cent of total value, declined to 20 per cent in 1974, and rose to 28.5 per cent in 1978. Of the shellfish, crabs and lobsters have remained fairly constant over the period, averaging about 8 per cent of total landings. Oysters have more than tripled from 1.6 per cent in 1963 to 5.1 per cent in 1978, and prawns have increased slightly from 7.2 per cent in 1963 to 8.5 per cent in 1978.

Herring

Herring is the most important species taken by Irish fishermen, mainly because it is readily caught, easily marketed, and fairly high-priced, (see Table 1A.2). In fact, the recent expansion of the Irish fleet was based largely on the exploitation of this species, and most of the modern vessels rely on the herring fishery at least part of each year.

There are two main winter fisheries for herring off the Irish coast: one in the Celtic Sea and the other off the north and north west coasts. There also are three other distinct herring fisheries: a summer fishery in the Irish Sea, dependent mainly on juvenile fish which shoal with sprat in inshore waters, and two smaller fisheries off Castletownbere and Galway, both based upon autumn spawning herring. Irish fishermen also participate in the herring fishery off the Isle of Man.

Landings of herring at different ports between 1972 and 1977 are given in Table 1.4 below. This table shows that early in the 1970s the Celtic Sea and north west area were Ireland's most important sources of herring. In 1972, some 21,000 tonnes were landed in Celtic Sea ports (almost entirely in Dunmore East and Cobh) and 18,000 tonnes were landed in the north west ports, mainly in Killybegs. In the same year, only 2,400 tonnes were landed in the Irish Sea ports, 3,700 tonnes in the south west ports, and 2,900 tonnes in the west coast, mainly in Galway.

By 1976, however, the catch landed in the Celtic Sea ports had dropped to 4,000 tonnes and a year later fell to 860 tonnes when the Celtic Sea was closed to herring fishing. Herring landed in the north west ports also declined during those years, but not to the same extent as in the Celtic Sea ports. The catch in Killybegs dropped from 15,300 tonnes in 1972 to 9,800 tonnes in 1977, and that in Burtonport, from 1,600 tonnes to 970 tonnes. Landings in the Irish Sea ports also declined over those years, but increased in the south west and west ports.

Because of its relatively high value, herring has been heavily exploited around the Irish coast, despite warnings by Irish and international scientists that such excessive fishing could not be continued without depleting stocks. The declining catches in recent years indicate that this depletion has become serious. As a result, quota

Table 1.4: Landings of herring in different regions and ports, 1972-1977

Regions and Ports	1972	1973	1974	1975	1976	1977
			Tonnes			
Irish Sea (1)						
Clogherhead	197	1,627	401	199	32	77
Mornington	1,794	762	358	868	78	89
Howth	80	134	3,927	2,247	2,237	1,282
Other	289	582	412	359	149	90
Total	2,360	3,105	5,098	3,673	2,496	1,538
Celtic Sea (2)						
Kilmore Quay	269	124	122	30	11	7
Dunmore East	12,444	9,338	9,715	5,301	2,956	450
Cobh	8,396	1,981	4,732	3,363	1,034	80
Other	74	60	72	196	80	323
Total	21,183	11,503	14,641	8,890	4,081	860
South West (3)						
Bantry	1,506	996	569	587	288	307
Castletownbere	1,547	1,459	1,091	970	860	1,657
Dingle	425	1,588	647	333	753	819
Other	199	435	252	284	406	1,991*
Total	3,677	4,478	2,559	2,174	2,307	4,774
West (4)						
Galway	2,844	4,822	4,152	2,807	2,509	2,444
Westport	-	-	-	101	145	523
Achill	-	-	-	69	89	1,017
Other	54	212	258	121	118	781
Total	2,898	5,034	4,410	3,098	2,861	4,765
North West (5)						
Killybegs	15,357	13,334	11,751	8,059	8,934	9,814
Burtonport	1,559	1,021	813	2,634	1,075	973
Other	827	391	336	280	258	405
Total	17,743	14,746	12,900	10,973	10,267	11,192
Total herring landed at all ports	47,861	38,866	39,608	28,808	22,012	23,129

(1) Irish Sea: Omeath to Carnsore Point.
(2) Celtic Sea: Carnsore Point to Cobh.
(3) South West: Cobh to Loop Head.
(4) West: Loop Head to Erris Head.
(5) North West: Erris Head to Moville.

* Included in other category in South West for 1977 is 821 tonnes for Fenit

Source: Special tabulations obtained from the Department of Fisheries.

systems have been imposed in the main herring fisheries, but at a level which scientists generally have concluded are too liberal. A report in 1976 by the Herring Assessment Working Group of the International Council for the Exploration of the Sea (ICES) warned that if the quota for the Celtic Sea actually was caught, it would be necessary to close the fishery for two years to enable stock to recover. Subsequently, as noted above, the fishery was closed, and remains so.

The Celtic Sea herring stock provides a clear example of the way in which a species reacts to increasing fishing effort. Table 1.5 shows (a) the total catch of herring per season in the Celtic Sea, (b) the total fishing effort exerted (expressed as number of fishing nights by pelagic trawlers), and (c) the catch per unit effort for the period 1963/64 to 1975/76. In the early 1960s, a time when the stock was recovering from an earlier period of heavy fishing, both fishing effort and catch per unit of effort were fairly low. In the middle and late 1960s, fishing effort was increased, resulting in higher catches. The stock, however, was able to withstand this larger catch, partly because of the reduced fishing early in the decade and partly as a result of several unusually successful spawning seasons.

Thus, the total catch and the catch per unit effort increased, peaking in 1970/71. During this season a record 110,816 crans (19,060 tonnes) of herring were caught in 970 fishing nights, averaging 114 crans (19.6 tonnes) per night's fishing. By 1975/76, however, total catch and catch per unit of effort had fallen to less than half the 1970 level - to 38,267 crans (6,582 tonnes) and 36 crans (6.2 tonnes) per night's fishing.

The most alarming aspect of these data is that, in recent years, while total catch and catch per unit of effort have been declining rapidly, fishing effort, i.e. the rate of fishing (which had been producing fewer herring each season), has continued to increase. This is a classic example of overfishing, accentuated by the rapid rise in herring prices. More recent assessments confirm that the stock of herring is seriously depleted and that only stringent conservation measures can restore it (see Chapter 12).

The depletion of stocks in the Celtic Sea simply parallels the pattern of overall decline of fish stocks in the Atlantic and North Sea. Overfishing in these waters has almost wiped out some valuable stocks of fish.

Table 1.5: Total catch, fishing effort exerted and catch per unit effort for herring in the Celtic Sea, 1963/64 to 1975/76

Fishing Season	Total catch (tonnes)	Fishing effort exerted*	Catch per unit effort (tonnes)
1963/64	3,786	502	7.5
1964/65	2,999	318	9.4
1965/66	3,553	389	9.1
1966/67	8,180	515	15.9
1967/68	10,947	643	17.0
1968/69	12,174	646	18.8
1969/70	16,673	867	19.2
1970/71	19,060	970	19.6
1971/72	13,724	1,179	11.6
1972/73	18,800	1,159	16.2
1973/74	10,697	960	11.1
1974/75	11,819	1,062	11.1
1975/76	6,582	1,063	6.2

* Number of fishing nights by pelagic trawlers.

Source: Sea and Inland Fisheries Report, 1975. Dublin: Stationery Office, Prl. 6147.

Scientists are not fully agreed on what causes depletion of herring stocks. Some experts assert that fluctuations in these stocks may be due to marine environmental influences and that depletion is only magnified by man's fishing activities. This group agrees that stocks can be depleted by overfishing, but contends that there is no assurance they will return automatically to former levels if fishing effort is reduced. The situation thus appears more complicated than is commonly imagined. By 1979, virtually all herring stocks in Irish waters were considered to be overexploited in varying degrees

Species Not Fully Exploited by Irish Fishermen

With herring landings diminishing, mackerel is expected to replace them. However, mackerel is not a prime market species like herring, and demand for it will require active promotion. The price per tonne for mackerel in 1978 was only £64, compared with £295 per tonne for herring (see Figure 1.3). The market for mackerel is likely to strengthen if herring supplies continue to be limited throughout Northern Europe.

More than a quarter of all fish caught off the Irish coast are species not taken in commercial quantities by Irish fishermen. These include saithe, ling, megrim, and blue whiting. The failure of Irish vessels to harvest these species is due, no doubt, to marketing problems. These fish are not considered to be "prime" species in Ireland and cannot be sold at prices comparable to those for herring and other popular varieties.

In coming years, however, Irish fishermen may be forced to fish for these lesser known species, if they are to increase their catches. This, in turn, will require expenditures for new catching and processing facilities and for market development. The only other alternative would be increased quotas for Irish fishermen in EEC waters, particularly for species such as hake and horse mackerel.

Landings of Salmon by Irish Fishermen, 1963-1978

Salmon are an anadromous species. They spawn and spend their early life in fresh water before migrating as smolts to the sea for feeding and growth to maturity.

In recent years increasing numbers of salmon approaching Irish shores are being intercepted in their homing run by drift net fishing at sea.

The volume trend in salmon landings and the proportion of the catch taken by different fishing methods are given in Table 1A.5 of the Appendix and shown diagramatically in Figure 1.4. These show a major increase between 1963 and 1975 in the quantity of salmon landed by Irish fishermen. Landings totalled 1,570 tonnes in 1963 and 2,188 tonnes in 1975, an increase of nearly 40 per cent. Since 1975, however, the salmon catch has been declining sharply. 1,172 tonnes taken in 1978 was 25 per cent lower than the catch taken in 1963 and 46 per cent less than that taken in 1975.

The table also reflects the conversion of Irish fishermen to drift netting as the major method of catching salmon. Volume caught by drift nets increased from 390 tonnes in 1963 to 1,482 tonnes in 1975, or by 280 per cent. In 1963, drift net catches accounted for only 25 per cent of total volume. In 1975, the catch increased to 68 per cent. By 1978, however, the quantity taken by drift nets had fallen to 836 tonnes, or by about 44 per cent of the 1975 figure. Despite this decline, the part of the catch taken by drift nets continued to increase and reached 75 per cent in 1977; but it declined to 71 per cent in 1978.

The quantity landed by other commercial methods declined from 1,025 tonnes in 1963 to 527 tonnes in 1973, rose briefly to 793 tonnes in 1974, and then sagged sharply to 304 tonnes in 1978. These methods accounted for 65.3 per cent of total catch in 1963, 29 per cent in 1973, and 26 per cent in 1978.

The volume of rod and line catches remained fairly constant between 1963 and 1966. The volume declined in the following year to 121 tonnes, sank to 61 tonnes in 1971, rose slightly to 94 tonnes in 1973, and then dropped again to 31 tonnes in 1978. In 1963, rod and line catches accounted for 10 per cent of the total volume of salmon landed; but, by 1978, this proportion had fallen to only 2.6 per cent.

The changing pattern of salmon landings over the years has resulted in serious controversy, since it represents a redistribution of a lucrative species between the

Figure 1.4: Volume of salmon landed by the different methods of capture between 1963 and 1978

different categories of fishermen. In 1963 drift net fishermen took only 25 per cent of the total catch, whereas in 1978 they took 71 per cent. It is asserted that operations of the drift net fishermen are endangering salmon stocks and that failure to control them will do irreparable damage to the industry.

The number of drift net licences issued increased substantially in recent years: from 505 in 1968 to 1,156 in 1972. The number declined slightly to 997 in 1977 and increased slightly to 1,007 in 1978 (see Table 1A.6). These figures do not include, of course, an unknown but substantial amount of unlicenced drift netting. The increase in licences, coupled with the use of more sophisticated fishing equipment, indicates a greatly increased fishing effort. The catch per drift net licence, however, has fallen steeply in recent years (see Figure 1.5 and Table 1A.7), implying considerable over-fishing by this method. It appears essential, therefore, that the present system of controlling the use of drift net licences be reconsidered and the activities of the licence holders be closely monitored.

From a social point of view, however, it would be difficult to reduce the number of drift net fishermen. Many are economically disadvantaged - most reside in the poorest regions of the country - and the salmon catches are an important part of their income. In many places, entire communities depend on commercial salmon fishing as a major part of their livelihood. Excessively stringent restrictions would hit these communities hard, but so also would a decline in salmon stocks. Indeed, the figures in Tables 1A.5 and 1A.8 show that to some extent this is in fact happening. As can be seen from Table 1A.5, the volume of drift net salmon declined from 1,482 tonnes in 1975 to 836 tonnes in 1978; Table 1A.8 shows that the value of drift net salmon as a proportion of the total value of sea fish landings fell from 23 per cent in 1976 to 11 per cent in 1978.

When the 1978 figures became available, it was obvious that very stringent controls were needed. Despite the claims of the lower income fishermen, the over-riding consideration of policy-makers had to be the survival of the salmon resource. Accordingly, a number of important regulations were introduced in 1979 to protect the species. These regulations include:

Figure 1.5: Salmon catch per type of commercial licence for the years 1963 to 1978.

(1) A shortening of the salmon fishing season at both ends. The season for commercial fishermen now runs from 15 March to 19 July (for most areas). Previously drift net fishing commenced in some areas as early as 1 January and stretched into October. The rod season was also shortened and now runs from 1 January to 31 August. Previously, the angling season extended to 15 October.

(2) An extension of the week-end close time to three days (compared with two days previously).

(3) No boat over 15 metres is allowed to fish for salmon. Previously, there was no size limitation.

(4) The maximum length of net is set at 730 metres, except in Donegal where the maximum is 1,370 metres. This regulation is the same as in previous years.

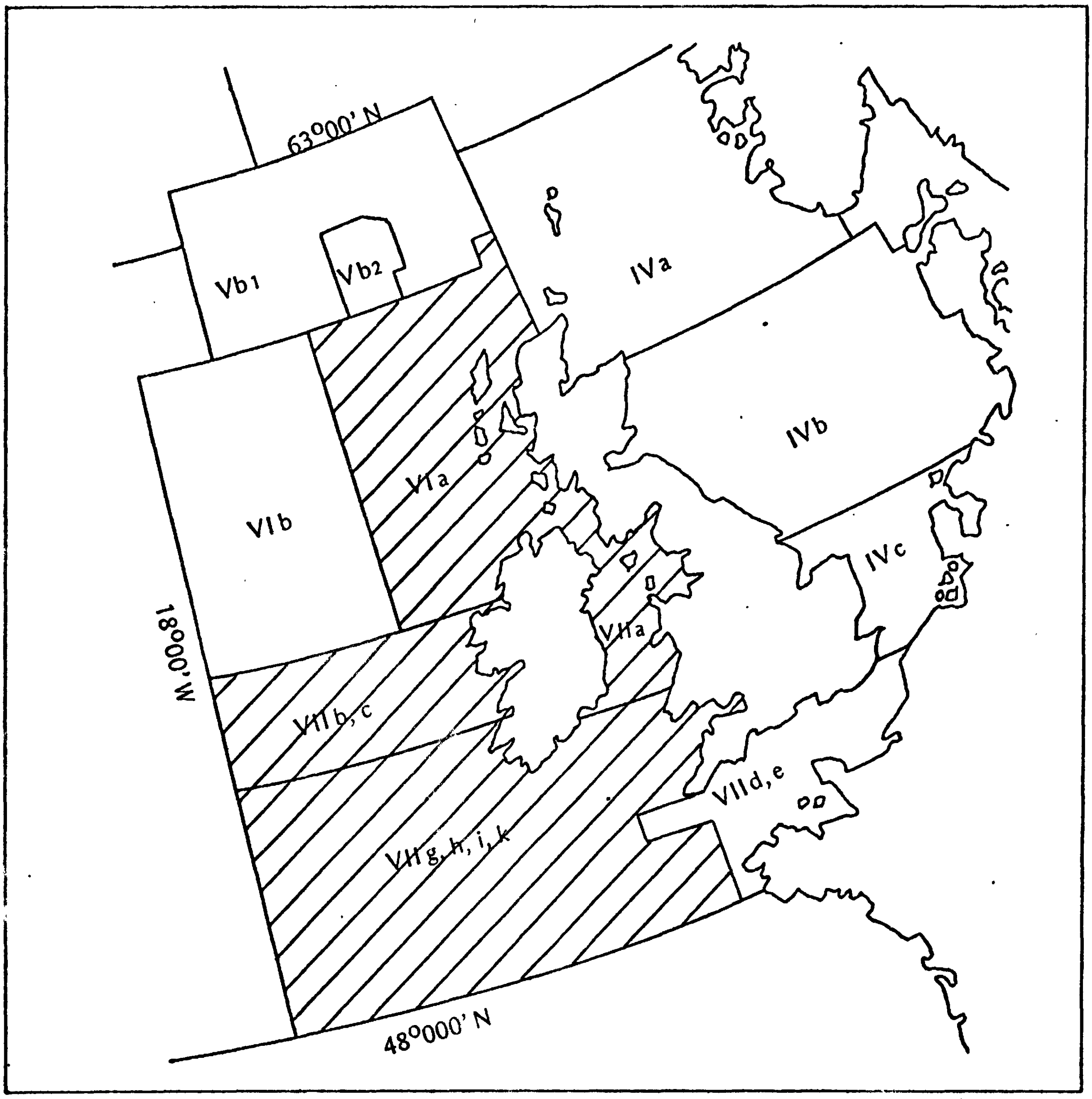
(5) Depth of net cannot exceed 30 meshes. Previously, the Lismore fishery district had a special concession allowing depth of net of up to 45 meshes. This is now revoked.

Geographic Distribution of Irish Catches

The International Council for the Exploration of the Sea (ICES) has subdivided various seas into separate zones for the purpose of recording catch statistics. Ireland's position in the ICES subdivisions in the north east Atlantic is shown in Figure 1.6. The zones surrounding Ireland are VIa, VIIa, VIIb-c, and VIIg-k. Zone VIa lies north of Ireland but is mainly off the west coast of Scotland. Zone VIIa covers the Irish Sea. Zone VIIb-c extends west of Ireland to the 200-mile limit, and Zone VII g-k lies south and south west of Ireland.

Catches of wet fish taken by fishermen of different countries in these four ICES zones, as shown in Table 1.6, have changed considerably since 1974. The proportions of the total catch taken by USSR and Spanish fishermen have declined greatly, while those taken by British, Irish, and Dutch fishermen have increased substantially. The proportions taken by French and Belgian fishermen have remained fairly constant over this period. In 1977, British fishermen took the largest portion of the total catch (30 per cent). French fishermen, with 19 per cent, were second,

Figure 1.6: Ireland's position in respect to ICES sub-divisions of the NE Atlantic



Source: Bulletin Statisques de Peches Maritimes, International Council for the the Exploration of the Sea (ICES), Vol. 60 1975, (April 1978).

Table 1.6 : Quantity and percentage of wet fish taken by different countries in ICES zones[1] adjacent to Ireland, 1974-1977

Country	Quantity				Percentage			
	1974	1975	1976	1977	1974	1975	1976	1977
	Tonnes				%			
Belgium	5,015	3,965	5,170	3,743	0.54	0.44	0.49	0.69
Denmark	-	574	6,057	12,724	-	0.06	0.58	2.33
Faroe Islands	17,190	7,294	18,535	16,043	1.85	0.81	1.77	2.94
Finland	-	1,100	227	-	-	0.12	0.02	-
France	146,936	130,673	142,971	103,591	15.97	14.47	13.66	18.97
Germany, Dem. Rep.	4,964	11,844	9,475	438	0.53	1.31	0.91	0.08
Germany, Fed. Rep.	21,116	19,747	9,792	18,383	2.27	2.19	0.94	3.37
Iceland	6,872	2,681	3,283	-	0.74	0.30	0.31	-
Ireland	79,855	69,081	73,962	75,317	8.58	7.65	7.06	13.79
Netherlands	34,725	49,526	48,383	42,154	3.73	5.48	4.62	7.72
Norway	66,736	15,278	29,654	22,517	7.17	1.69	2.83	4.12
Poland	36,639	32,864	25,405	3,561	3.94	3.64	2.43	0.65
Spain	120,104	122,156	111,673	26,869	12.91	13.52	10.67	4.92
Sweden	739	-	3,859	2,691	0.08	-	0.37	0.49
Great Britain	212,999	198,058	182,470	166,506	22.89	21.93	17.43	30.49
Northern Ireland	14,431	11,312	12,353	9,357	1.55	1.25	1.18	1.71
USSR	162,266	227,062	363,632	42,148	17.44	25.14	34.73	7.72
Total	930,587	903,215	1,046,901	546,042	100.-	100.-	100.-	100.-

(1) Zones VIa, VIIa, VIIb-c, and VIIg-k.

Source: ICES Bulletin Statistiques des Peches Maritimes for various years, (1976-1977 of October 1979).

and Ireland, with 14 per cent, was third. Netherlands and the USSR followed with 7.7 per cent each, and then Spain (5 per cent), Norway (4 per cent) and West Germany (3.4 per cent).

The proportions of fish caught in 1977 by fishermen of different countries, in each of the zones adjacent to Ireland, are shown in Table 1.7. British (including Scottish) fishermen took almost half the total catch in Zone VIa. French fishermen were second with 17.1 per cent, Irish fishermen were third with 8.9 per cent and Norwegian fishermen fourth with 7.1 per cent. The Faroe Islands, Denmark and the Netherlands followed in that order, each with approximately 4 per cent of the catch. All the other countries had relatively small shares; Spain was highest of these with 2.1 per cent.

Ireland took 37.5 per cent, the largest share of the VIIa catch, even though this zone is also adjacent to the British mainland. Great Britain took 29.4 per cent of the catch in VIIa; and, if this is combined with the 15.4 per cent share taken by Northern Ireland fishermen, the total is 44.8 per cent. The French catch in Zone VIIa was 13.0 per cent. The only other countries to fish Zone VIIa were the Belgians and Dutch, who took 2.8 per cent and 1.9 per cent of the catch respectively.

Ireland took the greatest share of the VIIb-c zone catch with 37 per cent, followed closely by the Netherlands at 29.5 per cent. France came third with 14.8 per cent and Spain, fourth with 12.5 per cent. Sweden took 3 per cent and Denmark, 1 per cent.

The USSR and France took the largest shares of Zone VIIg-k catch - 25.7 per cent and 25.6 per cent respectively. They were followed by the Netherlands (13.9 per cent), Spain (11.0 per cent), Ireland (10.9 per cent), West Germany (8.6 per cent), Poland (2.1 per cent), and Belgium (1.4 per cent). Great Britain took only 0.6 per cent of this region's catch.

In summary, UK fishermen were dominant in Zones VIa and VIIa, followed closely by Ireland in the latter area. Ireland was dominant in Zone VIIb-c, which is off her west coast, though the Netherlands also had a relatively large catch there. The USSR and France were dominant in Zone VIIg-k, followed by the Netherlands.

Table 1.7 Proportions of total wet fish taken by different countries in ICES zones adjacent to Ireland in 1977

Country	Zone				
	VIa	VIIa	VIIb-c	VIIg-k	Total
			%		
Belgium	-	2.8	-	1.4	0.7
Denmark	4.0	-	1.0	-	2.3
Faroe Islands	5.2	-	-	-	2.9
France	17.1	13.0	14.8	25.6	19.0
Germany (Dem. Rep.)	-	-	-	0.3	0.1
Germany (Fed. Rep.)	1.7	-	-	8.6	3.4
Ireland	8.9	37.5	37.0	10.9	13.8
Netherlands	3.7	1.9	29.5	13.9	7.7
Norway	7.1	-	1.9	-	4.1
Poland	0.1	-	0.2	2.1	0.7
Spain	2.1	-	12.5	11.0	4.9
Sweden	0.6	-	3.0	-	0.5
Great Britain	48.5	29.4	-	0.6	30.5
Northern Ireland	0.3	15.4	-	-	1.7
USSR	0.7	-	0.0	25.7	7.7
Total (percentage)	100.0	100.0	100.0	100.0	100.0
Total (tonnes)	308,014	55,300	27,597	155,131	546,042

Source: International Council for Exploration of Sea, Advance release of Tables 1 - 5 and K, of Bulletin Statistique, Vol. 62, 1977 (January 1979).

Landings of the main species of fish from each of the four ICES zones in 1977 and the Irish portion, classified by species, are given in Table 1.8 below. As might be expected, herring is the leading species in all zones except VIIg-k. In that area, mackerel is first and herring sixth, trailing horse mackerel, monkfish, megrim and hake. In all areas combined, mackerel (24 per cent) is the most important species followed by herring (16 per cent). Saithe and whiting account for 6 per cent of the total each, followed by horse mackerel and cod (4.3 per cent each), haddock 4.1 per cent, with hake, ling and megrim about 2 per cent each.

Distribution of Catches by Distance from Coast

Inshore fishing is a major and significant element in Irish sea fishing. Much of the Irish fleet (see "Analysis of Fishing Fleet", Chapter 3) consists of inshore and middle distance vessels, which rarely stay at sea for more than a few days at a time. The larger vessels in the fleet (24 - 27 metres) are capable of fishing to at least a 50 mile limit. Nevertheless, these larger boats continue to operate primarily in waters inside the 12 mile zone - waters traditionally fished by the smaller (15 - 21 metre) boats. Two reasons have been put forward for this fishing pattern. First, to the owner of a new vessel it makes no difference that his catches of herring, salmon, or inshore flatfish simply represent a diversion of catch from other vessels. He considers that he can make more income in that fashion, than he can by fishing offshore.

Secondly, it has been stated that, in the mid 1970s, even the newer Irish vessels have had great difficulty establishing themselves in offshore fisheries already heavily exploited by Spanish, French and East European fleets. Congestion of large trawlers on the better grounds, lack of familiarity with seasonal patterns of availability of fish, and the absence of a strong Irish market for some of the major species taken offshore have contributed to the problem.

The estimated quantities of fish of all kinds caught within the 12 mile zones of member states by EEC fishermen in 1975/1977 are shown in Table 1.9 *. The

---

* These figures are very approximate and must be interpreted accordingly. Italy did not supply any figures.

Table 1.8: Total landings and landings by Irish fishermen of main species of sea fish other than shellfish in different zones off the Irish coast in 1977

Species	Zone VIa		Zone VIIa		Zone VII b-c		Zone VII g-k		All zones around the Irish coast	
	Total	Ireland	Total	Ireland	Total	Ireland	Total	Ireland	Total	Ireland
					Tonnes					
Megrim	3,267	52	82	42	846	23	7,217	64	11,412	181
Plaice	1,550	487	2,904	953	139	135	934	139	5,527	1,714
Sole	43	30	1,146	84	18	14	981	126	2,188	254
Cod	12,619	984	8,054	3,862	292	132	2,461	183	23,426	5,161
Haddock	19,301	616	188	78	705	39	2,018	114	22,212	847
Hake	4,740	25	680	96	1,799	6	7,161	15	14,380	142
Ling	7,097	165	206	6	464	10	3,822	20	11,589	201
Norway Pout	5,206	-	48	-	186	-	985	-	6,425	-
Saithe	28,321	240	1,554	570	1,102	141	2,048	366	33,025	1,317
Whiting	17,382	2,752	10,721	4,821	567	465	4,771	736	33,441	8,774
Other Gadiforms	9,910	259	483	13	26	14	477	4	10,896	290
Monk	3,876	44	513	21	399	9	8,204	38	12,992	112
Horse Mackerel	669	-	4	-	295	-	22,329	-	23,297	-
Herring	54,538	8,196	15,456	2,558	12,297	7,758	6,458	4,924	88,749	23,436
Sprat	5,085	282	5,659	5,544	471	21	6,186	213	17,401	6,060
Mackerel	74,825	12,265	983	665	4,323	678	51,707	9,087	131,838	22,695
Ray and Skate	3,154	342	3,099	858	470	265	4,006	158	10,729	1,623
Other	56,431	712	3,520	561	3,198	514	23,366	723	86,515	2,510
Total	308,014	27,451	55,300	20,732	27,597	10,224	155,131	16,910	546,042	75,317

Source: ICES Bulletin Statistique, Vol. 62, (October 1979).

Table 1.9: Fish catches by member states in EEC 0-12 mile zone and other areas, average 1975-1977*

Fishing Zones / Fishing Vessels	Member State's 12 Mile Zone							Total in all 12 mile zones	Total in all other zones	Total catch all zones	Own 12 mile catch as % of total
	Belgium	Denmark	West Germany	France	Ireland	Netherlands	UK				
	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	'000 tonnes		%
Belgium	(5,276)	625	-	164	189	245	7,314	13,813	26	40	12.0
Denmark	-	(280,600)	6,950	-	-	20,860	17,500	325,910	1,470	1,800	15.6
West Germany	-	12,500	(58,300)	-	100	300	1,000	72,200	382	454	12.8
France	2,700	750	-	(213,472)	22,243	2,500	50,487	292,152	514	806	26.5
Ireland	-	-	-	-	(57,537)	-	1,665	59,202	21	80	71.9
Netherlands	1,790	2,744	3,524	968	2,839	(121,110)	5,047	138,022	146	284	42.6
UK	-	350	-	425	1,000	50	(485,000)	486,825	513	1,000	48.5
Italy	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total by Member States	9,766	297,569	68,774	215,029	83,908	145,065	568,013	(1,388,124)	3,080	4,468	31.1
Percentage taken by member state in own 12 mile zone	54.0	94.3	84.8	99.3	68.6	83.5	85.4	-	-	-	-

* These figures are very approximate and must be taken with caution. Italy did not supply any figures.

<u>Source:</u> Department of Fisheries Dublin and EEC Commission

right hand column lists the proportion of each country's catch taken within that country's 12 mile zone. It shows, for instance, that Belgian fishermen took only 12 per cent of their total catch within their own 12 mile limit; West Germany took 12.8 per cent, and Denmark 15.6 per cent. Ireland, on the other hand took 72 per cent of her total catch within her own 12 mile zone, a much higher proportion than that of any other member country. It also reflects the inshore nature of the fleet.

Fishing within the 12 mile zones of other member states is also shown in Table 1.9. The bottom row of this table indicates that Irish fishermen took about 70 per cent of the fish caught by all fishermen of member states within the Irish 12 mile limit. The only country to take less was Belgium, whose fishermen took only 54 per cent of the fish caught within the Belgian 12 mile limit. On the other hand, few member countries fished within the French 12 mile limit, and French fishermen took 99 per cent of the catch there. Danish fishermen were close behind, taking 94 per cent within their own 12 mile limit. The UK, the Netherlands, and West Germany each took about 85 per cent of the catch within their own 12 mile zones.

Distribution of Landings by Port

The quantity and total value of landings, other than salmon, at the major Irish ports for 1978 are given in Table 1A.9 of the Appendix. This table shows that fish landed into Killybegs harbour in that year were valued at £4.5 million. Landings at Howth totalled over £2 million, while those at Galway, Castletownbere, Burtonport and Clogherhead were worth over £1 million each. A more detailed breakdown by volume of the major species of wet fish landed at some of these ports in 1978 is given in Table 1A.10.

The proportions of the total quantities classified by broad category (i.e., demersal, pelagic and shellfish) landed at the more important ports are given in Table 1.10 below. It may be noted from this table that Rosmore/Roscahill, Clogherhead, Fenit, Skerries, and the smaller ports rely heavily on shellfish for a major portion of their volume, ranging from 39 per cent in Skerries (mainly prawns) to 100 per cent in Rosmore/Roscahill (solely oysters and periwinkles). Seven ports

Table 1.10: The proportion of total volume of landings attributable to the three types of fish (excluding salmon) at the most important ports in 1978.

Port	Demersal	Pelagic	Shellfish	Total
		Percentage of volume		
Killybegs	11.4	88.5	0.1	100.0
Howth	65.6	29.1	5.3	100.0
Galway	17.7	80.6	1.7	100.0
Castletownbere	6.8	89.1	4.1	100.0
Burtonport	6.6	93.1	0.3	100.0
Clogherhead	38.0	0.8	61.2	100.0
Dunmore East	16.4	82.8	0.8	100.0
Skerries	58.3	2.6	39.1	100.0
Rosmore/Roscahill	-	-	100.0	100.0
Dingle	17.6	80.0	2.4	100.0
Fenit	5.7	45.7	48.6	100.0
Kilmore Quay	66.1	1.3	32.6	100.0
Carraroe/Rossaveel	0.3	99.4	0.3	100.0
Achill	26.1	71.2	2.7	100.0
Valentia	23.3	69.7	7.0	100.0
Greencastle	88.7	-	11.3	100.0
Others	12.0	55.8	32.2	100.0
Total	18.3	70.1	11.6	100.0

Source: Sea and Inland Fisheries Report

- Carraroe/Rossaveel, Burtonport, Castletownbere, Killybegs, Dunmore East, Galway and Dingle - specialise almost entirely in pelagic fish, while Greencastle, Kilmore Quay and Howth specialise in demersal fishing.

APPENDIX 1A

Table 1A.1: Quantity and value of different classes of fish landed into Irish ports* by Irish fishermen, 1963-1978

Year	Quantity					Value				
	Demersal	Pelagic		Shellfish	Total	Demersal	Pelagic		Shellfish	Total
		Herring	Other pelagic				Herring	Other pelagic		
	Tonnes					£'000				
1963	10,688	8,420	1,182	4,886	25,176	829	193	37	354	1,413
1964	13,576	8,178	3,038	4,347†	29,139	876	155	53	420	1,504
1965	14,340	10,700	3,554	4,180†	32,774	959	251	58	431	1,699
1966	13,847	14,905	3,076	5,176†	37,004	996	399	59	579	2,033
1967	15,928	23,660	2,775	4,962†	47,325	1,080	499	57	517	2,153
1968	15,918	22,977	3,596	7,416†	49,907	1,112	497	60	735	2,404
1969	15,980	34,669	3,975	7,656†	62,280	1,254	784	67	891	2,996
1970	15,345	45,464	6,529	10,058†	77,396	1,428	1,275	105	1,102	3,910
1971	20,667	31,258	8,638	12,061†	72,624	1,590	1,163	178	1,308	4,239
1972	17,126	47,861	10,724	11,743†	87,454	1,568	2,116	215	1,417	5,316
1973	20,378	38,866	15,976	10,505†	85,725	2,374	2,802	514	1,773	7,463
1974	19,537	39,608	15,891	9,670	84,706	2,527	3,950	505	1,754	8,736
1975	20,415	28,808	17,051	9,988	76,262	2,881	3,232	648	2,374	9,135
1976	23,810	22,012	22,970	11,870	80,662	4,652	3,133	1,095	3,886	12,766
1977	18,887	23,129	28,750	11,722	82,488	5,709	6,033	1,946	5,001	18,689
1978	17,940	27,717	41,113	11,407	98,177	5,862	8,171	2,379	6,574	22,986

* Landings into foreign ports by Irish fishermen excluded.

† Volume figures estimated from data on numbers landed.

Source: Sea and Inland Fisheries Reports for various years. Dublin: Stationery Office.

Table 1A.2: Average price per tonne of certain species of wet fish for selected years since 1963 and percentage change

Species	1963	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	Percentage change 1963-1978
							£						%
Sole	350	431	451	509	529	624	931	1,006	1,200	1,486	1,731	2,093	498
Plaice	152	142	156	184	184	192	217	247	276	364	457	519	241
Ray/skate	72	86	90	111	121	138	161	191	200	228	262	305	324
Cod	111	66	86	97	98	116	139	176	173	242	375	406	266
Whiting	40	37	43	50	40	49	68	70	90	109	205	217	443
Herring	23	22	23	28	37	44	72	100	112	142	261	295	1,183
Mackerel	17	22	28	38	38	32	46	43	44	61	77	64	276
Haddock	72	71	70	74	53	63	96	111	181	188	327	365	407
Hake	146	137	137	126	130	125	141	150	176	288	456	428	193
Saithe/Pollack	69	47	46	53	61	64	82	97	118	142	255	301	336
Sprat	9	8	9	12	11	11	17	19	17	25	33	38	322

Source: Sea and Inland Fisheries Reports for various years. Dublin: Stationery Office.

Table 1A.3: Percent of volume accounted for by the different species, 1963-1978

Species	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
								%								
Wet Fish																
Herring	33.0	27.9	32.5	40.1	49.9	45.8	55.4	58.6	42.3	54.7	45.3	46.8	37.9	27.3	28.0	28.3
Mackerel	3.0	4.6	6.2	4.0	4.7	4.3	2.6	1.4	4.2	5.3	9.2	10.1	17.6	17.8	27.5	32.7
Cod	4.0	4.9	5.0	5.3	6.2	6.3	4.3	3.5	4.6	3.2	5.3	4.4	5.7	6.9	5.2	4.0
Whiting	18.5	16.1	16.7	13.6	13.0	10.8	7.9	5.1	6.7	4.5	7.7	8.7	9.8	11.4	9.4	7.1
Plaice	4.1	4.9	3.7	[illegible]	3.1	4.3	3.1	2.1	2.3	1.6	1.8	1.6	1.9	2.1	1.9	1.6
Sole	0.7	0.6	0.6	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2
Ray/skate	5.3	4.5	3.7	3.1	2.5	2.7	2.3	1.9	2.0	1.5	1.5	1.8	2.0	2.1	1.7	1.3
Other wet	12.0	21.6	18.8	15.7	9.7	10.6	11.8	14.2	21.1	15.6	16.7	15.0	11.8	17.4	11.8	13.3
Total wet fish	80.6	85.1	87.2	86.0	89.5	85.1	87.7	87.0	83.4	86.6	87.7	88.6	86.9	85.3	85.8	88.5
Shellfish																
Crabs	0.2	0.2	0.2	0.1	0.1	0.4	1.0	0.8	1.4	1.1	1.1	1.1	0.9	1.4	1.2	0.9
Dublin Bay Prawns	5.9	3.5	2.4	3.4	1.9	3.0	2.2	2.6	2.4	2.1	2.5	1.6	1.3	2.3	3.4	3.4
Lobsters	0.6	0.7	0.6	0.8	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.4	0.5	0.4	0.3
Escallops	1.6	1.0	0.5	0.7	0.4	0.5	0.4	0.4	2.8	1.8	0.5	0.3	0.5	0.5	0.4	0.7
Mussels	3.6	3.1	2.9	2.1	2.5	4.9	4.3	4.4	6.3	4.6	3.5	4.1	4.8	4.9	4.2	3.1
Oysters	0.6	0.4	0.5	0.4	0.3	0.3	0.5	0.2	0.4	0.3	0.5	0.3	0.7	1.1	1.1	0.8
Periwinkles	6.3	5.8	5.1	6.2	4.3	4.6	3.3	2.3	2.5	2.5	3.4	3.3	3.9	3.2	2.7	2.0
Other Shellfish	0.6	0.2	0.6	0.3	0.4	0.6	0.1	1.9	0.4	0.7	0.5	0.4	0.6	0.8	0.8	0.3
Total shellfish	19.4	14.9	12.8	14.0	10.5	14.9	12.3	13.0	16.6	13.4	12.3	11.4	13.1	14.7	14.2	11.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Same as for Table 1A.1

Table 1A.4: Percent of value accounted for by the different species, 1963-1978

Species	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
									%							
Wet Fish																
Herrings	13.7	10.3	14.8	19.6	23.2	20.7	26.2	32.6	27.4	39.8	37.5	45.2	35.5	24.5	32.3	35.6
Mackerel	2.4	2.6	2.7	2.3	2.4	2.0	1.5	1.0	2.8	2.8	5.1	6.7	6.4	6.9	9.4	8.9
Cod	8.0	7.3	7.8	7.5	9.7	8.7	7.7	6.9	7.9	6.1	8.5	7.4	8.2	10.6	8.6	7.0
Whiting	12.9	11.5	12.4	10.6	11.0	8.3	7.1	5.1	4.6	1.2	6.0	5.9	7.4	7.8	8.5	6.6
Plaice	11.2	13.7	10.7	11.0	10.4	12.8	10.1	7.8	7.1	5.1	4.5	4.7	4.5	4.8	3.9	3.5
Sole	4.3	4.6	5.0	3.5	3.3	2.8	2.7	2.3	2.1	2.4	1.9	1.9	2.0	3.1	2.2	1.5
Ray/skate	6.9	6.4	5.8	4.4	4.5	4.9	4.4	4.2	4.2	3.5	2.9	3.3	3.4	3.0	2.0	1.7
Other wet	15.6	15.7	15.5	12.6	11.6	9.2	10.7	12.0	13.0	12.5	9.8	4.9	6.6	8.8	6.2	6.7
Total wet fish	75.0	72.1	74.7	71.5	76.1	69.4	70.4	71.9	69.1	73.4	76.2	80.0	74.0	69.5	73.1	71.5
Shellfish																
Crabs	0.1	0.2	0.1	0.1	0.1	0.4	1.3	1.2	1.5	1.3	1.1	1.0	0.8	1.2	0.9	0.8
Dublin Bay Prawns	7.2	5.3	3.7	4.1	3.3	5.0	4.9	6.4	5.5	6.4	6.6	3.3	2.7	4.6	5.7	8.5
Lobsters	7.5	10.8	8.8	11.4	10.4	12.1	11.2	8.4	8.1	7.0	6.8	6.7	9.2	10.6	7.5	6.3
Escallops	0.6	0.6	0.3	0.5	0.4	0.5	0.4	0.4	2.6	1.5	0.7	1.0	1.1	1.0	0.9	2.0
Mussels	0.7	0.5	0.4	0.4	0.6	1.0	1.1	1.1	1.4	0.9	0.6	0.6	0.8	0.7	0.6	0.5
Oysters	1.6	1.8	1.8	1.5	1.4	1.4	2.5	1.3	1.8	1.1	1.4	0.9	2.7	4.8	4.2	5.1
Periwinkles	3.8	3.7	3.4	4.2	3.4	4.1	3.4	2.4	2.7	2.4	3.0	3.4	3.9	2.9	2.3	1.7
Other Shellfish	3.5	5.0	6.8	6.3	4.3	6.1	4.8	6.9	7.3	6.0	3.6	3.1	4.8	4.7	4.7	3.6
Total Shellfish	25.0	27.9	25.3	28.5	23.9	30.6	29.6	28.1	30.9	26.6	23.8	20.0	26.0	30.5	26.8	28.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Same as for Table 1A.1

Table 1A.5 Estimated total catch of salmon by Irish fishermen between 1963 and 1978

Year	Quantity				Percentage			
	Drift Net	Other Commercial	Rod and Line	Total	Drift Net	Other Commercial	Rod and Line	Total
	Tonnes				%			
1963	390	1,025	155	1,570	24.8	65.3	9.9	100.0
1964	380	929	177	1,486	25.6	62.5	11.9	100.0
1965	406	861	189	1,456	27.9	59.1	13.0	100.0
1966	375	646	137	1,158	32.4	55.8	11.8	100.0
1967	494	699	121	1,314	37.6	53.2	9.2	100.0
1968	545	739	114	1,398	39.0	52.9	8.1	100.0
1969	762	700	83	1,545	49.3	45.3	5.4	100.0
1970	785	745	62	1,592	49.3	46.8	3.9	100.0
1971	749	684	61	1,494	50.1	45.8	4.1	100.0
1972	1,065	524	85	1,674	63.6	31.3	5.1	100.0
1973	1,191	527	94	1,812	65.7	29.1	5.2	100.0
1974	1,140	793	59	1,992	57.2	39.8	3.0	100.0
1975	1,482	654	52	2,188	67.7	29.9	2.4	100.0
1976	1,046	403	43	1,492	70.1	27.0	2.9	100.0
1977	981	285	39	1,305	75.2	21.8	3.0	100.0
1978	836	304	31	1,172	71.3	26.0	2.7	100.0

Source: Sea and Inland Fisheries Reports for years since 1969. Figures for earlier years are taken from O'Connor et. al. op.cit., pp 50-54. Official figures for these years seem to have been understated.

Table 1A.6 Number of commercial salmon licences issued, 1963-1978

Year	Type of Licence			
	Drift	Draft	Other	Total
1963	394	672	206	1,272
1964	474	813	234	1,523
1965	488	683	237	1,408
1966	510	742	214	1,466
1967	531	732	223	1,486
1968	505	681	218	1,404
1969	669	664	220	1,553
1970	817	667	241	1,725
1971	916	687	213	1,816
1972	1,156	678	197	2,031
1973	1,112	713	224	2,049
1974	1,048	681	211	1,940
1975	1,046	672	212	1,930
1976	1,047	677	225	1,949
1977	997	650	212	1,859
1978	1,007	608	209	1,824

Source: Sea and Inland Fisheries Reports for various years. Dublin: Stationery Office.

Table 11.7: Salmon catch per licence for the various types of engine (excluding rod and line), 1963-1978

Year	Type of Commercial Licence		
	Drift	Draft	Other
		Kg	
1963	989	1,166	1,134
1964	789	919	779
1965	833	936	937
1966	736	654	753
1967	930	711	798
1968	1,080	815	884
1969	1,138	824	694
1970	961	858	719
1971	818	779	701
1972	921	602	588
1973	1,072	581	506
1974	1,37[illegible]	574	488
1975	1,417	789	582
1976	1,001	450	437
1977	984	348	280
1978	830	420	233

Source: Sea and Inland Fisheries Reports for various year. Dublin: Stationery Office.

Table 1A.8 : Values of the different classes of sea fish (including drift net salmon) caught by Irish fishermen between 1963 and 1978

Year	Value					Percentages				
	Demersal	Pelagic	Shellfish	Drift net salmon	Total	Demersal	Pelagic	Shellfish	Drift net salmon	Total
			£'000					%		
1963	829	230	354	207	1,620	51.2	14.2	21.8	12.8	100.0
1964	876	208	420	213	1,717	51.0	12.1	24.5	12.4	100.0
1965	959	309	431	215	1,914	50.1	16.2	22.5	11.2	100.0
1966	996	458	579	237	2,270	43.9	20.2	25.5	10.4	100.0
1967	1,080	556	517	258	2,411	44.8	23.1	21.4	10.7	100.0
1968	1,112	557	735	303	2,707	41.1	20.6	27.1	11.2	100.0
1969	1,254	851	891	546	3,542	35.4	24.0	25.2	15.4	100.0
1970	1,428	1,380	1,102	606	4,516	31.6	30.6	24.4	13.4	100.0
1971	1,590	1,341	1,308	660	4,899	32.5	27.4	26.7	13.4	100.0
1972	1,568	2,331	1,417	1,361	6,677	23.5	34.9	21.2	20.4	100.0
1973	2,374	3,316	1,773	1,510	8,973	26.5	37.0	19.7	16.8	100.0
1974	2,527	4,455	1,754	1,686	10,422	24.2	42.7	16.8	16.3	100.0
1975	2,881	3,880	2,374	2,048	11,183	25.8	34.7	21.2	18.3	100.0
1976	4,652	4,228	3,886	3,722	16,488	28.2	25.6	23.6	22.6	100.0
1977	5,709	7,979	5,001	3,443	22,132	25.9	36.1	22.4	15.6	100.0
1978	5,362	10,550	6,574	2,831	25,817	22.7	40.9	25.4	11.0	100.0

Source: Sea and Inland Fisheries Reports for various years. Dublin: Stationery Office.

Table 1A.9 : Quantity and value of sea fish, other than salmon, landed at the more important ports* in 1978

Port	Quantity				Value			
	Demersal	Pelagic	Shellfish	Total	Demersal	Pelagic	Shellfish	Total
	Tonnes				£'000			
Killybegs	3,516	27,204	18	30,738	957	3,510	28	4,495
Howth	4,381	1,944	353	6,678	1,242	517	278	2,037
Galway	880	4,001	84	4,965	323	1,098	37	1,458
Castletownbere	490	6,402	295	7,187	234	897	170	1,301
Burtonport	533	7,461	22	8,016	196	812	108	1,116
Clogherhead	815	18	1,310	2,143	241	2	759	1,002
Dunmore East	727	3,675	35	4,437	263	650	37	950
Skerries	1,341	60	901	2,302	368	13	531	912
Rosmore/Roscahill	-	-	497	497	-	-	702	702
Dingle	420	1,905	56	2,381	175	415	47	637
Fenit	36	287	305	628	14	95	461	570
Kilmore Quay	755	15	372	1,142	324	3	220	547
Carraroe/Rossaveel	7	2,056	7	2,070	1	531	12	544
Achill	260	710	27	997	112	207	125	444
Valentia	378	1,128	113	1,619	104	174	156	434
Greencastle	816	-	104	920	348	-	84	432
Others	2,585	11,964	6,908	21,457	960	1,626	2,819	5,405
Total	17,940	68,830	11,407	98,177	5,862	10,550	6,574	22,986

* Ports at which the value of landings exceeded £400,000.

Source: Department of Fisheries, Dublin.

Table 1A. 10: Quantity of the more important species of wet fish (other than salmon) landed at the major ports in 1978

Ports	Herring	Mackerel	Cod	Haddock	Saithe	Whiting	Plaice
				Tonnes			
Killybegs	8,894	17,843	504	310	114	1,553	125
Burtonport	1,966	5,494	260	30	42	111	34
Castletownbere	1,522	4,627	29	14	66	160	35
Dingle	1,203	688	15	11	105	171	35
Kilmore Quay	7	7	73	-	15	69	139
Dunmore East	1,605	110	31	-	234	237	87
Rossaveel/Carraroe	1,740	317	-	-	-	1	-
Galway	3,225	675	127	17	235	279	42
Balbriggan	-	1	51	-	2	152	35
Skerries	53	9	594	-	13	640	78
Howth	1,591	354	1,405	39	223	2,309	236
Dun Laoire	-	20	47	-	10	27	122
Total	21,806	30,145	3,136	421	1,059	5,709	968

Source: Department of Fisheries, Dublin.

CHAPTER 2

ECONOMIC ENVIRONMENT OF THE FISHING INDUSTRY

Organisation of the Fisheries Sector

The major bodies concerned with fisheries development in Ireland are discussed below under three main headings: (a) State and Semi-State Organisations; (b) Industry Organisations and Trade Unions; and (c) Co-operatives.

(a) State Organisations

The State services to the marine fishing industry are provided by two main organisations: The Department of Fisheries and Bord Iascaigh Mhara (BIM). There are, however, a number of other bodies which also contribute in certain ways.

The Department of Fisheries

The Department is responsible for the formulation of national policy. Its principal activities are:

(1) The preparation and administration of fisheries legislation and the making of the various by-laws, orders and regulations for the conservation and development of fisheries.

(2) The collection and compilation of all statistics relating to landings of fish at all Irish ports.

(3) The licensing of fishing vessels, processors, exporters and fish farmers.

(4) The provision of moneys to BIM, both from the Exchequer and from the European Agricultural Guidance and Guarantee Fund (FEOGA). The latter moneys are for the subsidisation of vessels between 12 and 24 metres, equipped for any type of fishing or for vessels between 6 and 12 metres and equipped for a method of fishing other than trawling or purse seining.

(5) The protection, in conjunction with the Naval Service of the Department of Defence, of the fisheries. Prosecutions are made by the Department of Fisheries for non indictable fishing offences, (charges for indictable offences are brought by the Attorney-General.)

(6) The execution of fisheries investigation and research and the administration of programmes for the diagnosing and treatment of fish disease.

(7) The making and administration of regulations in regard to the quality of the main species of fish landed at Irish ports. This function also extends to the export of fish.

(8) The negotiations at EEC level on all matters relating to fishery policy.

(9) The Department is the harbour authority for the five major harbours: Killybegs, Rossaveel, Castletownbere, Dunmore East and Howth; it provides technical advice to local authorities on all other landing places in conjunction with the Office of Public Works.

In all there are 117 people employed in the Sea Fishery Section of the Department of Fisheries, although some of the technical staff are shared with the Inland Fisheries Section of the Department. The breakdown of staff employed is as follows:

Department Headquarters: One Assistant Secretary in charge of all fisheries; 2 Principal Officers, 5 Assistant Principals, and 29 other administrative staff; one Inspector/engineer* and 38 engineers.*

Fisheries Research Centre, Abbotstown: One Inspector/scientific adviser and 40 other staff.

Bord Iascaigh Mhara (BIM)

Following the Government White Paper of 1962, Bord Iascaigh Mhara (The Irish Fisheries Board) was re-organised as a development body to serve the needs of the Irish fishing industry. The Board is divided into three development divisions:

---

* Shared with Inland Fisheries Section.

(1) the Market Development Division, (2) the Fisheries Development Division, and (3) the Investment Development Division. In addition, there are the administrative divisions of the Secretariat and Chief Accountant, as well as a Boat Building Division. There are 148 people employed in Bord Iascaigh Mhara occupying the following positions: one Chief Executive, who is also Chairman of the Board, seven senior managers, 16 executives, 30 administrative personnel, 19 professional, scientific and technical staff, and 75 clerks and typists.

The Market Development Division is responsible for providing market information and research service to the industry and,in particular,to exporters and processors. It plans and operates national advertising campaigns and a consumer education programme on fish,geared at the housewife and the catering industry. It assists and co-ordinates the marketing activities of exporters and participates in specialised food fairs and exhibitions. This division is also responsible for improving the distribution network for Irish fish and fish products, both at home and abroad.

The Fisheries Development Division is divided into four sections: (i) The Resource Development Section engages in exploratory fishing to locate underutilised fish stocks and experimental fishing to introduce new fishing techniques and fishing gear to the fleet. It also provides technical advice and practical assistance to fish farmers. (ii) The Advisory Service Section operates an advisory and educational service for fishermen through port training courses. This section also has responsibility, in co-operation with the Investment Development Division, for providing grant assistance to co-operatives and coastal distribution centres at the fishing ports and for pilot fish farming projects. (iii) The Education and Training Section is responsible for the operation of the National Fishery Centre at Greencastle, Co. Donegal. (iv) Finally, the Marine Technical Section advises the Board's Accounts Department on technical aspects of vessels and equipment which are being considered for grant assistance under the Marine Credit Plan.

The Investment Development Division of BIM is concerned with promoting home and overseas investment in the industry. This involves assisting in the implementation of investment proposals in catching, processing, distribution and fish farming. The division is also concerned with the establishment of requisite infrastructure for the industry through liaison with government departments and other state bodies. It is also concerned (in conjunction with the Market Development

Division) with the development of new sea food products in co-operation with established food and fish processing companies and with the improvement of existing products so that they command a greater share of the consumer market.

The Board's Accounts Department is responsible for the administration of the Marine Credit Plan which helps the financing of new vessels, replacement of engines, hull improvements and the purchase of electronic equipment. All decisions on these matters are taken by the Management Committee which is composed of the senior managers of BIM.

Until 1978 and early 1979 BIM was actively engaged in boatbuilding at three locations: Killybegs, Co. Donegal; Baltimore, Co. Cork; and Dingle, Co. Kerry. Since then, however, it has sold these boatyards and this activity is now transferred to the private sector.

The following were among the most important factors which influenced the decision to dispose of the yards.

1. The Board is the financial institution responsible for the provision of Loan and grant finance for the construction of new fishing vessels. The fact that the Board was also in the boatbuilding business in competition with private sector yards gave rise to a fear, on the part of the private firms, of a clash of interests as between the Board's boatbuilding responsibility and financing responsibility.

2. There were continually increasing losses which had amounted to £1 million in 1978 and were expected to have reached £1.5 million by the end of 1979.

3. If the Board's boatyards were to be in a position to meet a switch in demand from wooden vessels to steel vessels a substantial investment in plant, equipment and financial administration facilities would be required.

4. The private sector boatyards were already extending their facilities to cater for this switch in demand and it was felt that the best prospect for the expansion of the yards and the maintenance of employment therein lay in their sale to the private sector.

Other State and Semi-State Bodies

Other organisations involved in sea fishing include the National Board for Science and Technology (NBST), Gaeltarra Éireann,* the Industrial Development Authority (IDA), and An Foras Forbartha (the National Institute for Physical Planning and Construction Research). The National Board for Science and Technology is the principal source and focus of advice to the Government on policy and planning for science and technology, and is the central organisation for promotion and co-ordination in this area.

Recognising the central role of science and technology in marine resource development the Board operates an extensive programme of support for the marine sciences. This includes the funding and operation of the research vessel "Lough Beltra" on behalf of a variety of State, Semi-State and University users, the development and funding of a hydrographic survey programme and the establishment of a national marine data centre.

A major element of the Board's marine science and technology programme is devoted to mariculture. Research programmes directed towards the cultivation of salmonoids, shellfish and seaweeds, embracing breeding and rearing techniques,

---

* Gaeltarra Éireann has recently been replaced by Údarás na Gaeltachta.

disease and genetic studies and engineering techniques and problems are currently being supported by the Board. In order to facilitate the translation of research into development, a mariculture site survey programme is operated by the Board. A Mariculture Development Programme, presently being completed by the NBST will provide a comprehensive plan for development of the industry and will propose measures to facilitate coastal community participation in this development.

Finally, in order to provide a framework within which many marine activities can develop, the Board is supporting the evolution of a Coastal Zone Management Programme for Ireland.

State grants for capital investment in the fish processing industry are given by the Industrial Development Authority and, in the Gaeltacht areas by Gaeltarra Éireann. All such grants are given only after consultation with BIM and the Department of Fisheries and Forestry. The Electricity Supply Board (ESB), in conjunction with Gaeltarra Éireann, has set up a fish farm for salmon rearing in a sheltered bay at Lettermullen in Co. Galway. The young fish for this farm are reared in a large hatchery at Parteen on the river Shannon. A similar project, in operation at Currane, Co. Mayo, is operated by Currane Fisheries Limited in succession to the Salmon Research Trust Inc. The Department of the Environment, through the aegis of Foras Forbartha, has general responsibility for the protection of rivers, lakes, and estuaries against pollution; and the Local Government (Water Pollution) Act, 1977, is the legal instrument under which the functions are administered. In brief, all discharges of effluent are now required to be licensed and the licensing authorities are the County Councils. The Water Pollution Advisory Council, a statutory body established under the 1977 Act, was set up to advise the Minister for the Environment on water pollution matters generally. Membership of the Council is drawn from a wide range of bodies concerned with water pollution. The Minister for Fisheries and Forestry and the Regional Conservatory Boards share in the enforcement of the water quality provision.

(b) Industry Organisations and Trade Unions

The Irish Fish Producers' Organisation (IFPO) and The Killybegs Fishermen's Organisation (KFO)

In the development of its Common Fishery Policy, the EEC decided that some mechanism should exist through which certain actions agreed on politically, might be implemented. It was also decided that the mechanism adopted should be in the hands of the producers themselves. Towards this end the IFPO was established in May 1975 and the KFO in mid 1979.

These are independent bodies, formed voluntarily from members of the catching sector of the fishing industry in accordance with the requirements laid down by the national government and by the EEC and take their places among 36 other organisations of a similar kind in the fishing industry of different member states.*
The overall purpose is to assist fishermen to improve their incomes by:

(a) Operating a system of withdrawal prices for their members and insuring that these prices are supported by indemnatory payments (a detailed description of the withdrawal system is given in Chapter 11).

(b) Promoting improvement in the quality and grading of fish landed by their members.

(c) Working towards the best possible conditions for the sale of their members' catches.

(d) Encouraging the concentration of supply and the stabilisation of prices.

(e) Ensuring that in the future, fishing is carried out on a rational basis which will allow a fair share for all, in so far as this is possible.

(f) Representing their members on all matters which concern their activities as producers of fish, and

(g) Ensuring that their members' opinion on such matters are given due and adequate consideration by all authorities concerned.

Membership of the organisations is open to owners or part owners of vessels registered as fishing vessels used primarily for fishing. There can, however, be only one member per vessel; hence where there are part owners, they must agree among themselves as to who should represent the boat in the organisation.

---

* The UK has six separate producer organisations, Netherlands two and West Germany thirteen.

The IFPO and the KFO are registered under The Industrial and Provident Societies' Act and are thus co-operative societies. Each member must take up at least 25 shares of £1 each, and membership is conditional upon issuance of the share certificate. There is an upper limit of £10,000 on the number of shares held by one person. The organisations have Boards of Directors elected annually by the members. In this election, and in all others, each member has one vote.

Generally speaking a member is required to do the following:

(1) Sell or offer his fish for sale in a manner approved by the organisations and through such salesmen, agents, or buyers as have agreed to conform to the basic requirements of the organisations. These requirements cover mainly co-operation in implementing the withdrawal price system.

(2) Adhere to the standards laid down by the organisations of sorting, grading and presentation of fish.

(3) Pay an annual subscription to cover the costs of running the organisations.

The Irish Fishermen's Organisation (IFO)

The Irish Fishermen's Organisation was established in 1974 and is the representative body of Irish fishermen in the social, political and economic spheres at both National and International levels. The objectives of the organisation are:

(a) To represent the interests of Irish fishermen at national and international level.

(b) To provide a forum for discussion on fishery matters.

(c) To formulate proposals for fisheries development and to use whatever means are open to the organisation to have such measures implemented.

(d) To promote, assist, and engage in any trade, business, or activity which appears to further the interest of its members.

(e) Generally, to concern itself with any development which the organisation considers to be of interest or benefit to Irish fishermen.

In addition to representation at the highest level the IFO provides a considerable number of other services directly related to the successful operation of the catching sector. These services cover: communications - including the publication of a monthly journal, IFO News, designed to keep fishermen closely informed on all matters related to fishing; a free legal advisory service; a financial advisory service (covering PAYE/PRSI negotiations and advice); interpretation of EEC and National regulations; education and training advice; active and continuous promotion of the Irish fishing industry; public information service; currently establishing a fishermen's group pension and life assurance scheme; provision of other group schemes - VHI and fishermen's building society branch scheme. The IFO represents producers, i.e. boat owners, skippers and crewmen.

Other industry organisations include the Irish Fish Processors and Exporters Association (IFPEA), whose membership is drawn from a number of fish processing plants; the National Salmon and Inshore Fishermen's Association (NSIFA), which represents boats in the 8-16 metre range; and, finally, the Seamen's Branch of the Irish Transport and General Workers' Union. This branch of the ITGWU grew out of an earlier organisation, the Shore Fishermen's Association, which is no longer in existence. The Seamen's Branch was originally formed to make representations to the Department of Fisheries for better conditions for deckhands. The members first operated as a small scale union in their own right but later joined the powerful ITGWU.

(c) Co-operatives

The government White Paper on the fishing industry, published in 1962, encouraged fishermen to form co-operatives with the twofold objective of increasing fishermen's incomes and improving distribution in the hinterland of the ports. However, though there was significant expansion in the industry in general during the following decade, there was little development of fishery co-operatives.

Some reasons for the lack of interest in co-operatives were:

(1) the highly mobile life of the fisherman making it difficult for him to attend meetings and to contribute to discussions.

(2) lack of available capital,

(3) difficulty in obtaining experienced managers to organise and operate the co-operatives,

(4) lack of interest by many fishermen in the disposal of their catches beyond pier level, and

(5) lack of appreciation of the advantages which could accrue from co-operation.

In recent years, there has been an increase in the number of co-operatives formed and in member involvement. The IFPO and KFO which are themselves co-operatives, recognise the importance of the co-operative movement for fishermen and operate the EEC withdrawal system mainly through other co-operatives. This has contributed greatly to acceptance of the co-operatives in the sea fishing ports; it is understood that a number of new ones are now being formed, while some existing co-operatives are adopting a more sophisticated marketing approach.

The Report of the Registrar of Friendly Societies for 1977 shows that there were 20 Co-operative Fishery Societies registered in 1976. A list is given in Table 2A.1 of this chapter. Seventeen of these societies, members of the Federation of Irish Fishing Co-operatives, are affiliated to the Irish Co-operative Organisation Society (ICOS).* A recent Report by this organisation gives the share of Irish landings handled by these co-operatives over the period 1971-1978. These data are shown in Table 2.1 below.

Table 2.1: Estimated co-operative share of Irish landings

Year	Pelagic	Demersal	Shellfish	Total
		%		
1971/72	75	43	40	56
1975/76	-	-	-	62
1977/78 ≠	95	70	50	75-80

≠ Estimated

Source: Framework for Co-operative Development, Irish Agricultural Organisation Society, January 1979, p.54.

* Name changed in 1979 from Irish Agricultural Organisation Society (IAOS).

This table shows that the fishing co-operatives have increased the proportion of landings handled by them from 56 per cent in 1971/72 to nearly 80 per cent in 1977/78. The majority of the co-operatives are concerned only with the selling of their members' fish in fresh or whole form; a small number of societies carry out processing of relatively simple types.

Legislation Governing the Irish Sea Fishing Industry

Many pieces of legislation governing the sea fisheries industry were passed for various purposes since the foundation of the Irish State. The first of these was the Sea Fisheries Act 1931 (No. 4 of 1931) which dealt mainly with fish sales, licences to sell fish and hygiene of fish retail outlets. This was followed by the Fisheries (Revision of Loans) Act 1931 (No. 33 of 1931). This act provided for the newly formed Sea Fisheries Association to issue loans and gear (previously, a service of the Department of Fisheries), in the form of hire purchase transactions. This Act was followed by the Sea Fisheries Protection Act 1933 (No. 53 of 1933), which dealt with restrictions on foreign sea fishing boats entering the fishery limits of the State and the prohibition of certain methods of trawling within these limits. It also provided extensive powers of search, apprehension of offenders, and prosecution.

The protection of undersized and immature sea fish from destruction by ordinary methods of fishing had become increasingly urgent by the mid 1930s and led to the enactment of the Sea Fisheries (Protection of Immature Fish) Act 1937 (No. 33 of 1937). This Act enabled regulations to be made by order, specifying the minimum size below which fish could not be landed and the minimum size of mesh to be permitted in trawl nets. Under the enabling conditions of this Act and the Fisheries (Consolidation) Act 1959 (No. 14 of 1959), orders have been made and updated, as occasion has required, prescribing minimum sizes of wet fish and shellfish permitted to be taken and minimum sizes of nets to be used.

It was felt that an autonomous board could do more to promote the welfare of the fishing industry than a friendly society, and in 1952 BIM was set up under the terms of the Sea Fisheries Act of that year (No. 7 of 1952) to replace the Irish Sea Fisheries Association.

Important sea fisheries legislation is contained in the Fisheries Amendment Act 1962 (No. 31 of 1962). This Act, though mainly concerned with inland fishery problems, contained two provisions important to the regulation of sea fisheries. Section 29 lays down conditions for the control of fishing for salmon at sea and the powers included in this section could serve as useful guidelines for the control of all sea fishing. Section 35 provides for the control by order of fishing in the interests of conservation and rational exploitation, where such measures are shown to be necessary. Some seventeen orders, chiefly to control fishing for herring in specified sea areas, have been made pursuant to the latter provision. The series also includes Order No. 5 of 1978, which includes in its provisions the exclusion of factory ships from the exclusive fishing limits, the order that no salmon be taken outside certain limits, and size limits for mackerel and herring landings.

The Fisheries (Amendment) Act of 1978 (No. 16 of 1978) was introduced for the purpose of consolidating existing legislation and bringing enactments up-to-date. This Act stipulates substantially increased fines for foreign vessels fishing illegally in Irish waters and for all vessels breaking conservation regulations. It also provides a legal basis for the setting of fishing limits.

The Fisheries Act 1980 (No. 1 of 1980), though dealing mainly with inland Fisheries, contains specific arrangements with regard to marine aquaculture. This enactment makes it an offence to engage in aquaculture of any kind save in accordance with a fish culture licence, an oyster bed licence or an oyster fishery order under the Fisheries Consolidation Act 1959. The Act also prescribes fines of up to £500 for engaging in aquaculture without a licence. Section 4 of this Act enables authorised officers to take a boat believed to contain unlawfully captured salmon to port and to detain the boat and its occupants until it is searched. This section also empowers the Minister to prescribe a levy on the first sale of salmon.

Other legislation relevant to sea fisheries is contained in the Maritime Jurisdiction Acts. The Maritime Jurisidiction Act 1959 (No. 22 of 1959) provides for the drawing of base lines and gives authority to extend fishing limits by order. The Maritime Jurisdiction Act 1964 (No. 32 of 1964) specifies a national 12 mile fishing zone from the baselines, while the Maritime Jurisdiction (Exclusive Fishery

Limits) Order 1976 (SI No. 320 of 1976) allows the fishery limit to be extended to 200 miles from the baselines. There is also the Fishery Harbour Centres' Act (No. 18 of 1968) which empowers the Minister for Fisheries to define an area to be designated a Fishery Harbour Centre (see Chapter 4). One further Act should be mentioned, namely The European Communities Act 1972 (No. 27 of 1972). This is an omnibus Act which allows EEC fishery regulations to become law in Ireland and to supersede existing Irish legislation in certain cases.

The European Perspective

Since Ireland's accession to the EEC in January 1973, the Irish sea fishing industry cannot be considered in isolation; it must now be treated in a European perspective. The Common Fisheries Policy (CFP) of the European Community is contained in two basic regulations, 100/76 and 101/76, relating to structures and marketing, complemented by a number of subsidary regulations relating to resources. The areas covered by these regulations include:

(1) Structural policy, in particular, equal access to the shoreline for all vessels belonging to member states.

(2) The establishment of Producers' Organisations with the objective of ensuring rational operation of the fishing industry and of improving selling conditions for the industry's products.

(3) Marketing regulations which require the main varieties of wet fish for human consumption to be graded by size and freshness.

(4) The alignments of tariffs on the imports of fish and fishery products from third countries, and the removal of import duties on intra-Community trade.

(5) The availability of Community aid from the Guidance Section of the European Agricultural Guidance and Guarantee Fund (FEOGA).

The basic principle of the original policy was equal conditions of access, for all Community fishermen, to each member state's territorial sea. A five year derogation from this principle was permitted, however, in a three mile zone off coasts, where the local population was heavily dependent on inshore fishing for its livelihood. In cases where equal access led to overfishing, the Council of Ministers was empowered to adopt the necessary conservation measures. This, it continues to do; and, each year specifies Total Allowable Catches (TACs) for different species in the different fishing zones, and bans fishing for over-exploited species, such as herring, in certain zones.

In negotiating treaties of accession for the three new member states, UK, Denmark and Ireland, a derogation was provided whereby, for a 10 year period until the end of 1982, all member states were entitled to reserve fishing in a six mile zone off their coasts exclusively for vessels which traditionally fish in those waters and which operate from local ports. Off parts of the coasts of Denmark, including Greenland, France, Ireland, and the UK, this six mile zone was later increased to 12 miles. However, the rights which other member states enjoyed in the outer 6 miles of the 12 miles band, by virtue of a 1964 European Fisheries Convention and Bilateral Agreements made thereunder, were preserved. The powers of the Council of Ministers to regulate fishing were also retained from the original policy. It was provided that, from 1978 at the latest, the Council was to determine conditions for fishing with a view to ensuring protection of the fishing grounds and conservation of the biological resources of the sea. These functions were not limited, as they were in the original policy, to member states, territorial seas and exclusive fishing zones, but were intended to include the regulation of fishing on the high seas.

Finally, it has been decided that on the basis of a report from the Commission, to be made before the end of 1982, the Council will determine the regime which should follow the expiry of the 10 year derogation at the end of 1982. This decision has not yet been taken and until such a time as it is, a certain degree of uncertainty prevails within the industry in all member states.

APPENDIX 2A

Table 2A.1: List of fishing co-operatives registered in 1976

Balscadden Bay Fisheries Co-operative Limited, Co. Dublin.

Burtonport Fishermen's Co-operative Society Limited, Co. Donegal.

Carlingford Lough Oyster Co-operative Society Limited, Co. Louth.

Castlemaine Harbour Co-operative Society Limited, Co. Kerry.

Castletownbere Fishermen's Co-operative Society Limited, Co. Cork.

Clarinbridge Oyster Co-operative Society Limited, Co. Galway.

Cleggan Co-operative Agriculture and Fishing Society Limited, Co. Galway.

Clew Bay Oysters Co-operative Society Limited, Co. Mayo.

Comharchumann Iascairi Gaillimh agus Arainn Teoranta, Co. Galway

Comharchumann Iascairi Iarthar Mhuigheo Teoranta, Co. Mayo

Comar Iascairi Iorrais Teo, Co. Mayo.

Donegal Co-operative Fisheries Limited, Co. Donegal.

Dunmore East Fishermen's Co-operative Society Limited, Co. Waterford.

Errigal Co-operative Society Limited, Co. Donegal.

Kilmore Quay Fishermen's Co-operative Society Limited, Co. Wexford.

Porthall Fishermen's Co-operative Limited, Co. Donegal.

South and East Coast Fishermen's Co-operative Society Limited, Co. Waterford

The Greencastle Fishermen's Co-operative Society Limited, Co. Donegal.

Tralee Bay Shellfish Co-operative Society Limited, Co. Kerry.

Youghal Fishermen's Co-operative Society Limited, Co. Cork.

Source: Report of the Registrar of Friendly Societies for the year ended December 31, 1977. Department of Industry, Commerce and Energy (Prl. 7213), Dublin 1978.

CHAPTER 3

ANALYSIS OF THE FISHING FLEET

Trends in the Size of the Fleet

It is usually assumed that Irish fishing vessels are much smaller than those in the fleets of other EEC countries. However, if we look at Table 3.1 we see that on average Irish fishing vessels are larger than those in Italy and France and not a great deal smaller than those in the United Kingdom. This table also shows that a very high proportion of the fleet in most countries is made up of small boats. In six of the countries shown, over 80 per cent of the boats are under 50 gross registered tons (GRT). The exceptions are the Netherlands and Belgium which have much higher proportions of the larger boats than the other countries.

Table 3.1: Number and size of motor vessels in EEC countries in 1977

Country	Weight Class (GRT)				Percentage under 50 GRT	Average Weight (GRT)	
	0-50	50-100	100+	Total		All boats	Boats 50 GRT and over
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Belgium	68	73	78	219	31.1	95.9	122.4
Denmark	6,761	230	349	7,340	92.1	n.a.	n.a.
France	11,940	150	397	12,487	95.6	19.1	267.9
West Germany	1,056	104	134	1,294	81.6	109.3	539.4
Ireland*	1,161	159	38	1,358	85.5	22.0	89.0
Italy	20,926	519	352	21,797	96.0	12.7	160.8
Netherlands	442	183	308	933	47.4	93.5	156.1
United Kingdom	6,242	324	383	6,949	89.8	35.0	246.1
Total EEC	48,596	1,742	2,039	52,377	92.8	n.a.	n.a.

* Includes vessels laid up.

Source: Eurostat, Fisheries - Products and Fleets, 1976-1977. Luxembourg, April 1979.

These average figures, however, tend to conceal more than they reveal. They tell us nothing about the structure of the larger boats. Column 7 of Table 3.1 shows that the average weight of the over 50 GRT Irish vessels is less than 90 tons compared with averages for similar vessels of, 122 tons in Belgium, 268 in France and 539 in West Germany. Hence, both the total number and tonnage of over 50 GRT Irish vessels are very much smaller than those in other EEC countries. In describing the composition of a fishing fleet, therefore, the important factor is not the average weight of the boats but rather the distribution of boats in the different weight classes, particularly in the heavier classes.

A more detailed description of the Irish fleet is given in Table 3.2 which sets out the number of boats used wholly and partially for sea fishing in selected years for the period 1963-1977.

Table 3.2: Number of fishing boats in Ireland classified by engine type and whether wholly or partially engaged in fishing, 1963-1977*

	1963	1965	1969	1973	1975	1977
Motor vessels	584	576	849	1,095	1,098	1,316
Wholly engaged	463	463	640	935	627	735
Partially engaged †	121	113	209	160	471	581
Sail, oar, outboard engine	1,327	1,215	1,056	1,220	1,214	1,361
Wholly engaged	506	479	336	388	134	163
Partially engaged †	821	736	720	832	1,080	1,198
Total Boats	1,911	1,791	1,905	2,315	2,312	2,677
Wholly engaged	969	942	976	1,323	761	898
Partially engaged †	942	849	929	992	1,551	1,779

* Excludes vessels laid up.

† Partially engaged boats are those which engaged in other activities where less than 50 per cent of the income from the boat is derived from fishing.

Source: Department of Fisheries Annual Reports.

In 1963 the total number of boats in the fleet was 1,911, of which 969 were fully engaged in fishing and the remaining 942 were only partially employed. By 1977, the fleet had increased to 2,677 boats; only 898 were wholetime and 1,799 were partially employed.

The 1975 figures for wholly and partially operated boats seem to be out of line with those for previous years. This, we believe, is due to a change in the classification definitions of wholly and partially operated small motor boats about this time, since the trend in total boats appears fairly regular. Examination of the basic data shows that in 1975 there was a very sharp decline in the 0-15 GRT motor vessels wholly operated and a sharp increase in the same category of partially operated boats. The changes in the numbers of all other boats in this year were not very marked.

Table 3.3: Classification of vessels by GRT and length in selected years, 1963 to 1977*

Motor Boats in: Gross Registered Tons	Length	1963	1965	1969	1973	1975	1977
GRT	Metres			Number of Vessels			
0 - 10	0 - 9.5	328	349	583	748	724	908
11 - 15	9.6 - 11.6	39	25	24	38	29	33
16 - 25	11.7 - 15.0	46	30	36	27	35	37
26 - 50	15.1 - 18.3	149	146	137	153	154	158
51 - 74	18.4 - 20.0	19	23	51	88	102	102
75 - 99	20.1 - 24.0	3	3	18	41	54	42
100 +	24.1 +	-	-	-	-	-	36
Total Motor Boats		584	576	849	1,095	1,098	1,316
Sail Boats and Outboard Engines		1,327	1,215	1,056	1,220	1,214	1,361
Total All Boats		1,911	1,791	1,905	2,315	2,312	2,677

* Excludes vessels laid up.

Source: Department of Fisheries Annual Reports.

In order to overcome specification difficulties, e.g., between wholetime and part-time, these two categories are combined in Table 3.3 where the motor boats are classified on the basis of gross registered tons (GRT) and length (metres). There has been a considerable change in the structure of the fleet since 1963. Large increases have taken place in both the smaller and larger motor boats.

The number of 0-10 GRT boats rose from 328 in 1963 to 908 in 1977, the 51-74 GRT boats rose from 19 to 102, and the 75 GRT and over boats went up from 3 to 78 over the same period. The 11-50 GRT boats remained fairly stable in those years.

Survey of the Fishing Fleet

Much of the information required to make a full assessemnt of the sea fishing industry was not available from existing sources. Data on the smaller boats and their operation were particularly difficult to obtain. It was therefore decided to carry out a survey of fishermen to fill the gaps in the available information and to canvass fishermen's opinions about the state of the industry.

A brief description of how the survey was conducted, the sampling method used and the response rate attained is given in the next section. The remainder of this chapter is devoted to a presentation of the results of the survey in relation to the size and composition of the fleet. Results relating to other aspects of the industry are presented in the following chapters.

Conduct and Methodology of the Survey

Fieldwork

A questionnaire was designed and piloted in the summer of 1978. We are grateful to the staff of BIM and the Department of Fisheries for their helpful comments on this questionnaire. On the basis of the experience in the pilot survey the questionnaire was redrafted, and interviewing for the study proper began in September 1978. Interviewers found that fishermen were somewhat elusive respondents because of the nature of their occupation; but by January 1979, over 500 interviews had been obtained with skippers and almost 400 interviews with crewmen. A copy of the final questionnaire is given at the end of this report.

Sample Design

It was desired to interview a skipper and a crewman from a sample of about 500 boats. The crewman was to be selected randomly by the interviewer from a list supplied by each skipper interviewed. Thus, the target population consisted of all

Irish boats which had been fishing between autumn 1977 and autumn 1978. Table 3A.1 in the first Appendix to this chapter shows the numbers of such boats broken down by area, size, type of boat, and whether solely or partly engaged.* This table is derived from counts carried out by the area officers of the Department of Fisheries. A more detailed breakdown by 151 different ports was also available to us.

To allow for non-response and errors in the available sampling frames, it was decided to select an initial sample of 660 boats, stratified by size category as shown in Table 3.4. All boats over 50 GRT were included in the sample, together with half of those 11-50 GRT and 15 per cent of the smaller boats. The sample was selected using proportional stratification across areas. We considered stratifying by whether solely or partly engaged, but decided against this since, as can be seen from Table 3.4, this classification coincides substantially with the classification by size of vessel.

Three partial lists of boats were available:

(i) A list compiled by the Department of Fisheries of the 'larger' boats, i.e. boats of over 25 GRT.

(ii) A list compiled by BIM of boats over 25GRT. This appeared to be less complete than list (i).

(iii) A list compiled by BIM of grant-aided boats of under 26 metres. It comprised only 290 boats and was therefore unlikely to be useful.

There was no complete list available of boats under 25 GRT. Indeed, even for the larger size categories, fewer boats were listed on any of the above lists than were recorded in the counts on which Table 3.4 was based. Thus, the sample was selected in two parts:

(a) A random sample from list (i) of boats over 25 GRT

(b) A quota sample for boats under 25 GRT, the quota controls being based on port and size of boat. Interviewers obtained the assistance of the area officers of the Department of Fisheries and of BIM in contacting their quota of respondents. We would like to express our gratitude to these officers for their courtesy and help.

---

* These figures differ slightly from those given in Tables 3.2 and 3.3 being from a different source.

Table 3.4: Size of population, desired and achieved sampling fractions and sample size, response rate and grossing factors

Size Category (GRT)	Number of boats in population	Desired sampling fraction	Desired sample size	Achieved sample size	Response rate	Achieved sampling fraction	Grossing factor
h	N_h	$\bar{f}_h$	$\bar{n}_h = N_h.\bar{f}_h$	n_h	$X_h = \frac{n_h}{\bar{n}_h}$	$f_h = \frac{n_h}{N_h}$	$g_h = \frac{1}{f_h}$
Motor Vessels							
Over 50 tons (18.4 metres +)	207	1.00	207	114	0.55	0.55	1.82
26-50 tons (15.1-18.3 metres)	158	0.50	79	70	0.89	0.44	2.26
11-25 tons (9.6-15.0 metres)	68	0.50	34	45	1.32	0.66	1.51
0-10 tons (0-9.5 metres)	906	0.15	136	117	0.86	0.13	7.74
Sail and Oar							
Over 5.5 metre keel	1,081	0.15	162	124	0.77	0.11	8.71
Under 5.5 metre keel	279	0.15	42	38	0.91	0.14	7.34
Total	2,699	0.24	660	508	0.77	0.19	5.31

The random sample consisted of a list of boats over 25 GRT together with their home ports. Interviewers were instructed to contact the owners of the selected boats. If a boat was fishing out of port some distance from its home port, it was re-allocated to an interviewer in the area where it was fishing.

For the purposes of the quota sample, the coastline was divided into 23 areas. The interviewers were instructed to contact a specified number of fishermen whose boats fell into certain size groups in each area. It was hoped that the division of the coastline and the classification by size would be sufficiently fine to ensure that a representative cross-section of the smaller boats was included in the sample.

Response Rate

The response rate, classified by size of boat, is also shown in Table 3.4. Some peculiar features of the list of boats used as a sampling frame for our random sample must be borne in mind when interpreting these figures. First, the list accounted for only 150 of the 207 boats recorded by the Department of Fisheries' area officers in the largest size categories. And, of these 150 boats, three had been either sold outside the country or scrapped by the time the interviewers enquired about them. Thus, the apparent response rate of 55 per cent is somewhat misleading; and, under the circumstances, the achievement of 114 interviews out of a possible total of 147 seems a creditable performance.

A second deficiency of the list is the exclusion of newly purchased boats. Of course, those new boats which had been fishing for less than twelve full months prior to interview were not included in our target population. But, at an early stage in the fieldwork, some interviewers came across new boats over 50 GRT that had been fishing for more than 12 months but were not in the sample. We instructed the interviewers to contact these boats when they could; however, some vessels were undoubtedly excluded from the sample if they were not on the list and did not happen to come to an interviewer's attention.

Some comment may be required on the achievement of a 132 per cent response rate in the 11-25 GRT category. As was described above, boats in this category were sampled on the basis of a quota for each part of the coast. Some of the interview schedules were lost in the post, and we instructed the interviewers to replace them with other respondents. However, the missing questionnaires eventually turned up and were included in the analysis. The achievement of a more than 100 per cent response in this category is taken into account in the grossing factors described below.

When the deficiencies of the sampling frame are taken into account, the overall response rate of 77 per cent seems quite satisfactory. This represents interviews with about one-fifth of the Irish skippers, and with more than half of those whose boats are over 10 GRT.

Grossing Factors

Given the fact that the achieved sampling fraction in our sample varied from 11 per cent to 66 per cent, it is clearly necessary to modify, or 're-weight', the data in order to obtain correct estimates of the various parameters in which we were interested. This re-weighting is achieved by means of the grossing factors shown in Table 3.4. All the totals, averages, and percentages given in this report have been calculated using these factors to ensure unbiased results. Some further adjustments, described in detail below, were made to the data on value of catch and operating expenses.

Readers should bear in mind that the results of this enquiry, being based on a sample, are necessarily subject to sampling error. This applies particularly to averages based on small numbers. A fuller discussion of sampling error in the present study is contained in Appendix 3B of this chapter.

Results

Description of the Irish Fishing Fleet

Table 3A.1 shows the official figures for the number of boats in the various areas, classified by length and GRT. Table 3.5 below shows the percentage of boats in the areas, classified by length in metres, as estimated from the survey. Both tables paint the same general picture of the size distribution of the fleet. Although only about one-eighth of the total Irish fleet have a home port on the east coast, vessels in this region tend to be larger than average, about 28 per cent are over 18 metres. In contrast, in the western area only 1 per cent of the vessels are above this size and

Table 3.5: Estimated percentage of boats in each area, classified by length of boat

Length of Boat (metres)	Area				All Areas	
	East	South	West	North West		
			Per cent			
0 - 5.9	15.5	14.0	48.3	20.4	26.5	715
6.0 - 8.9	35.4	52.3	34.6	45.4	43.1	1,162
9.0 - 11.9	5.0	20.0	13.5	18.2	15.8	425
12.0 - 17.9	15.9	3.7	2.3	4.8	5.0	134
18.0 - 23.9	25.3	8.6	1.1	9.2	8.3	225
24.0 - 29.9	2.9	1.5	0.2	2.1	1.4	38
All Lengths	100.0	100.0	100.0	100.0	100.0	-
Number*	312	858	843	687	-	2,699
Per cent	11.6	31.8	31.2	25.4	100.0	-

* The numbers in the different areas in this table are derived from the survey and differ from the area totals in Table 3A.1.

almost half are under 6 metres in length. Medium-sized boats predominate in the southern region, where almost three-quarters of the vessels are between 6 and 12 metres in length. The size distribution of boats in the north western area is somewhat more even. One-fifth of the boats in this area are under 6 metres and about one-tenth are above 18 metres.

The catching power of a vessel is influenced not only by its size, but by its age and by the sophistication of its equipment. Table 3.6 shows the age distribution of the fleet classified both by area and by length. The average ages of the boats in the different areas diverge quite sharply. About 12 per cent of all boats are over 20 years old, while 37 per cent are under 6 years of age. Some 28 per cent of the boats on the east coast are over 20 years compared with only 7 per cent in the north west. The trend towards larger boats in recent years is evident from the fact that about two-thirds of boats in the over 24 metre category are under 6 years old. It is remarkable how few boats in the 12 to 18 metre category are under 6 years old - a mere 10 per cent. Further evidence for the recent increase in the numbers of larger boats is provided by data from the BIM annual report for 1977 which shows that in 1965 there were only 36 boats over 66 feet (20 metres) in length whereas by 1977 this figure had risen to 197, a fivefold increase. Over the same period the number of boats under 66 feet (20 metres) grew from 1,776 to 2,528, an increase of 42 per cent.

Table 3.7 shows the estimated percentage of boats in each size class having different types of equipment. As might be expected, the larger boats tended to have more sophisticated equipment. Practically none of the boats under 6 metres had any of the items listed. The only exception was a manual winch which was installed in about 28 per cent of these boats. Boats in the largest size group tended to be very well equipped; a majority of them had most of the items listed. Radar, echo sounders, VHF radios, and power winches were among the most common items of equipment mentioned. However, only about a quarter (23.8 per cent) of the largest boats and almost none of the others had a refrigerated hold.

Tables 3.8 and 3.9 present data on the types of fishing gear used. Boats in the smallest and largest categories tended to specialise in one type of gear, whereas the majority of the medium-sized boats (i.e. those between 6 and 24 metres) reported more than one type of gear. The single most common type of fishing gear was the lobster pot, reported by 57 per cent of boats. Over 60 per cent of boats under 12 metres reported they had lobster pots. Drift nets were also a common type of gear and were reported by over half the boats between 6 and 18 metres. Trawl nets were confined mainly to the larger boats.

Table 3.6: Estimated percentage of boats in the different age groups, classified by area and length of boat

Area	Age of Boat (years)				All Ages
	Under 6	6-10	11-20	Over 20	
			Per cent		
East	23.0	25.0	23.8	28.2	100.0
South	42.8	22.9	22.0	12.3	100.0
West	32.9	31.2	27.1	8.8	100.0
North West	38.9	29.0	25.2	7.0	100.0
Length of Boat (metres)					
0 - 5.9	32.3	28.6	25.9	13.2	100.0
6.0 - 8.9	38.8	28.1	27.2	5.9	100.0
9.0 - 11.9	44.2	27.7	15.9	12.2	100.0
12.0 - 17.9	9.8	24.8	35.9	29.5	100.0
18.0 - 23.9	34.5	22.2	17.2	26.1	100.0
24.0 - 29.9	65.0	10.0	25.0	0.0	100.0
All Areas/ All Lengths	36.5	27.3	24.6	11.7	100.0

Table 3.7: Estimated percentage of boats having various items of equipment, classified by length of boat

Item of Equipment	Length of Boat (metres)						All Lengths
	0-5.9	6.0-8.9	9.0-11.9	12.0-17.9	18.0-23.9	24.0-29.9	
	Per cent						
Navigational RDF	0.0	1.4	6.0	34.5	43.9	47.6	7.6
Navigational Radar	0.0	0.0	6.2	68.5	93.6	95.2	13.5
Navigational Decca	0.0	1.4	2.5	51.6	87.9	85.7	12.1
Navigational Plotter	0.0	0.0	1.8	10.1	48.3	81.0	6.0
Other Navigational Aid	3.3	11.1	10.9	20.5	16.5	9.5	9.9
Echo sounder	0.0	13.7	63.3	92.7	97.4	100.0	30.0
Sonar	0.0	0.0	0.4	1.7	27.3	76.2	3.5
Net Sounder	0.0	0.0	1.8	1.7	13.1	47.6	2.1
Other Fish-finding Equipment	0.0	0.8	0.0	12.4	15.7	33.3	2.7
Radio (RT)	0.0	0.0	21.8	76.9	94.6	100.0	16.5
Radio (VHF)	0.0	7.6	60.0	34.8	94.8	95.2	26.2
Other Radio	0.0	2.1	1.8	15.2	22.0	9.5	3.9
Power Winch	1.2	17.0	57.5	93.3	91.3	100.0	30.3
Manual Winch	28.1	35.2	6.8	5.1	7.1	0.0	14.3
Power Block	0.0	3.5	6.4	10.1	35.7	57.1	6.8
Refrigerated Hold	0.0	0.0	0.0	1.4	3.4	23.8	0.7

Table 3.8: Estimated percentage of boats having different numbers and types of fishing gear, classified by length of boat

Number of Types of Gear	Length of Boats (metres)						All Lengths
	0-5.9	6.0-8.9	9.0-11.9	12.0-17.9	18.0-23.9	24.0-29.9	
				Per cent			
One type of gear only	59.3	36.7	10.1	37.3	60.4	86.8	41.2
Two types of gear	22.9	27.8	36.0	33.6	30.7	13.2	28.1
Three types of gear	13.4	23.8	27.1	3.7	6.2	-	18.8
Four or more types of gear	4.3	11.6	26.8	25.4	2.7	-	11.9
All above categories	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3.9: Estimated percentage of boats having different types of fishing gear, classified by length of boat

Type of Gear	Length of Boat (Metres)						All Lenghts
	0-5.9	6.0-8.9	9.0-11.9	12.0-17.9	18.0-23.9	24.0-29.9	
	Per cent						
Drift Nets	19.4	53.2	78.0	42.8	19.2	4.8	44.1
Pots for Lobster etc.	63.9	66.2	63.4	21.4	3.3	0.0	56.7
Trawl Nets	0.0	7.5	28.6	87.6	96.5	85.7	21.3
Oyster Dredge	24.5	16.4	15.6	5.1	0.8	0.0	16.3
Draft Nets	16.1	11.0	5.5	0.0	2.4	0.0	10.1
Lines	22.3	27.2	30.7	9.0	2.7	0.0	23.1
Tangle Nets	9.6	15.2	28.1	19.7	2.6	0.0	14.7
Seine Nets	1.2	4.3	2.2	7.9	5.7	0.0	3.4
Other Types of Net	5.7	9.4	18.6	16.2	17.4	23.8	11.1

Note: Percentages in some cases add to more than 100 because some boats have more than one type of gear.

Table 3.10 shows the percentage of boats in each size class on which a loan or mortgage is being repaid and the agency to which it is being repaid. As might be expected, all of the 0-5.9 metre boats and 83 per cent of the 6.0-8.9 metre boats were owned outright. Only 8 per cent of the larger boats were owned outright. Of the larger boats, 86 per cent had BIM loans and 6 per cent had loans from other sources. Appendix 3C contains a note on the current BIM loan and grant scheme together with a table (3C.1) showing capital expenditure by BIM for a number of years in the fish catching sector.

The average and total investment in boats and equipment are given in Tables 3A.2 and 3A.3. The data are given at replacement cost as assessed by the skippers and are classified by area, by length of boat and by GRT. For the bigger boats, the average investment per boat was very substantial, £269,000 for the boat and £320,000 for boat and equipment. But, even for the very small boats, the average investment in boat and gear is around £1,000. The highest average investment is in the east region, where the figure for boat and equipment is £56,000. The lowest investment is in the west, where average investment in boat and equipment is about £7,000. The national total for investment in boats and equipment is estimated at £58 million (Table 3A.3), made up of £47 million for boats and £11 million for equipment. The highest investment, £20 million, is in the north west and the lowest, £6 million, is in the west. The total investment in equipment and boats 24.0 metres and over is £12.2 million, while the investment in 18.0-23.9 metre boats is about £30 million.

Fishing Operations

The characteristics of the fleet as described above - particularly, the small average size of the vessels and their relative lack of sophisticated equipment - determine the type of fishing pattern practised. Table 3.11 shows the extent to which boats fish in different grounds.* The vast majority (86 per cent) of the smaller boats fish in only one ground, whereas the larger boats tend to fish in more than one ground. However, the distances travelled between grounds are generally very short. As can be seen from Table 3.12, only a small minority of boats fish outside their home areas. This is especially true of the southern and western regions.

---

* It was left to the respondent to define the boundaries of a fishing ground; i.e., the distinct areas in which fishing was carried out. These grounds were then identified with the nearest point on the coast for the purposes of analysis.

Table 3.10: Estimated percentage of boats in each size group on which a loan or mortgage is being repaid to BIM, or other bodies, classified by length of boat

	Length of Boat (metres)						All Lengths
	0-5.9	6.0-8.9	9.0-11.9	12.0-17.9	18.0-23.9	24.0-29.9	
	Per cent						
BIM loan being repaid	0.0	15.1	45.0	46.9	63.8	86.1	22.7
Other loan being repaid	0.0	2.2	5.5	6.9	7.7	5.6	2.9
Owned outright	100.0	82.7	49.5	46.2	28.5	8.3	74.4
All Boats	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3.11: Estimated percentage of boats which fished in different numbers of grounds, classified by length of boat

Number of grounds in which fished	Length of Boat (metres)						All Lengths
	0-5.9	6.0-8.9	9.0-11.9	12.0-17.9	18.0-23.9	24.0-29.9	
	Per cent						
One ground only	85.7	77.8	62.9	46.9	30.7	33.3	71.5
Two grounds	13.3	18.8	22.2	31.2	29.9	33.3	19.6
Three grounds	1.0	2.1	11.3	17.4	24.6	4.8	5.9
Four or more grounds	0.0	1.3	3.6	4.5	14.7	28.6	2.9
All numbers of grounds	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3.12: Estimated percentage of boats which fished in various areas[a]

Local Area	Area in which fished				
	East	South	West	North West	Abroad[b]
			Per cent		
East	100.0	5.9	2.6	2.0	9.9
South	4.3	100.0	2.3	0.0	0.0
West	0.7	1.2	100.0	1.1	0.0
North West	0.3	0.0	15.8	100.0	0.0
All Areas	12.9	32.1	36.1	35.8	1.1

<u>Note:</u> (a) Percentages may add to more than 100 per cent because boats fished in more than one area.

(b) The category 'abroad' refers to fishing grounds closer to the coast of Britain than to that of Ireland.

The distance from the coast which boats usually fish is shown in Table 3.13. The last column of this table shows that 87 per cent of the Irish fleet usually fish within a distance of 12 miles from the coast. Only 13 per cent go outside this distance. As might be expected the small boats usually fish closer to the shore than the larger ones. Over three-quarters of the under 6 metre boats usually fish less than 3 miles from the coast. Very few of these, or indeed, of the 6-9 metre boats fish beyond 12 miles.

A fairly high proportion of the larger boats also fish close to the shore. Some 33 per cent of the 24 metre and over boats usually fish within 12 miles of the shore, and only 52 per cent of these vessels usually fish beyond 20 miles. The table shows that the 18-24 metre boats go further afield than the largest category. This anomaly is explained by the regional location of the vessels. On the east coast, where there is a very high proportion of 18-24 metre boats (see Table 3.5), skippers in each size category tend to fish much further afield than those in any of the other regions, in order to reach the most productive grounds. Because of the nature of the sea and of the fishing, even the very large boats on the south and west coasts tend to fish relatively close to shore.

The preponderance of smaller boats in the fleet is again evident in the heavy concentration on species caught inshore, especially high value species such as salmon and shellfish. Table 3A.4 shows that pelagic species (herring and mackerel) are caught by some of the smaller boats, as well as by the larger vessels. Demersal species are confined almost entirely to the larger boats, while salmon and shellfish are taken mainly by the smaller craft.

The regional distribution of species caught, which is also presented in Table 3A.4, shows a somewhat less marked pattern. The main features of note are the concentration on lobster in the south and west and on salmon in the south and north west. Table 3.14 further illustrates the dependence of the smaller boats on salmon/sea trout and shellfish. As many as 70 per cent of the smallest boats fished for shellfish.

Table 3.13: Distances from coast usually fished, by length of boat

Distance from coast (miles)	Length of Boats (metres)						All Lengths
	0-5.9	6-8.9	9-11.9	12-17.9	18-23.9	24-29.9	
				Per cent			
0 - 2.9	76.3	48.0	23.1	3.4	2.7	4.8	45.0
3 - 5.9	15.5	35.2	34.1	11.3	3.7	0.0	25.6
6 - 11.9	5.9	15.4	32.4	36.0	8.6	28.5	16.2
12 - 19.9	2.2	1.3	5.7	22.7	23.0	14.3	5.3
20 and over	0.0	0.0	4.7	26.7	62.0	52.4	7.9
Total	100.-	100.-	100.-	100.-	100.-	100.-	100.-

Table 3.14: Estimated percentage of boats catching (i) salmon (ii) shellfish and (iii) both, classified by length of boat

Length of Boat (metres)	Salmon/sea trout but not shellfish	Shellfish but not salmon	Both salmon and shellfish
0 - 5.9	13.7	70.2	14.9
6.0 - 8.9	27.0	41.2	27.5
9.0 - 11.9	15.6	28.6	54.4
12.0 - 17.9	4.5	44.9	18.6
18.0 - 23.9	5.7	32.3	1.8
24.0 - 29.9	0.0	4.8	0.0
All Lengths	45.7	18.4	25.4

Respondents were asked about the quantity and value of each species caught and about the total annual value of their catch. The response to this question was not entirely satisfactory - as might be expected, some respondents declined to give figures and others could not remember the exact amounts involved. We were also somewhat apprehensive that, for various reasons, some of the owners of the larger boats might have under-stated their catch. It was surprising, therefore, to find that the survey results, when grossed on the basis of number of boats, were somewhat in excess of the official figure. The explanation for this discrepancy lies, we believe, in the likelihood that the sampling design which we used, especially the quota-sampling component, tended to concentrate on the more active boats. This could explain why the average catch per boat as recorded in the survey was in excess of the official figure.

To allow for this difficulty, it was decided to re-scale the catch estimates from the survey so they would add to the official figure. The question then arose whether similar adjustments should be made to the data on expenses and depreciation, in order to arrive at the best possible estimate of net income from sea fishing. Within each size category, operating expenses are likely to vary directly with fishing effort, which, in turn, is likely to be reflected in catch. Depreciation, on the other hand, is a fixed cost and is not likely to vary with catch. Hence, it was decided to re-scale operating expenses on the same basis as catch, but to use the depreciation estimates obtained directly from the survey.

When account is taken of catches of salmon by drift and draft nets, the official estimate of catch in 1978 was about £27.4 million. This is shown in Table 3A.5, broken down by length of boat and area, in the manner indicated by the responses to the survey questions. About £6 million accrues to boats in the east, £9 million to boats in the south, £3 million to boats in the west, and the remaining £10 million to boats in the north west. Boats under 6 metres are estimated to have caught about £900,000 worth of fish, those between 6 and 18 metres about £9 million and those over 18 metres about £17 million.

The estimated total operating expenses in each of the length/area categories are also shown in Table 3A.5. Total expenses are estimated at £7.6 million, more than half of which is incurred by boats over 18 metres. As might be expected, expenses tend to be a lower proportion of the value of catch in the case of smaller boats. Thus, expenses account for about 13 per cent of the value of catch for boats under 6 metres, whereas they represent 32 per cent of the value of catch for boats over 24 metres.

Subtracting operating expenses from value of catch gives gross income arising, the national total for which amounts to about £20 million (see Table 3A.5). About £7 million of this arises in the north west, £6 million in the south, £4 million in the east and £2.5 million in the west. Boats of 18 metres and over account for more than half of gross income.

Table 3A.5 also shows estimated depreciation in each of the length/area categories. Depreciation is an allowance which must be made for the consumption of capital on the principle that the use or consumption of an asset must be included as a charge for running a business. To calculate the depreciation chargeable to a boat, we took one-twelfth of the current selling value of that portion of the vessel and all owned equipment for which no grant was payable. The grant element was excluded because we were concerned with the depreciation which is actually incurred by the fisherman.

Total depreciation estimated on this basis comes to about £3.5 million. About £2.5 million of this is accounted for by boats over 18 metres. Roughly equal amounts (about £0.8 - £1.2 million) are chargeable to boats in the east, south and north west, and boats in the west account for about £370,000.

Subtracting operating expenses and depreciation from the value of catch gives an estimate of net income from fishing in each of the length/area categories. Net income amounted to some £16.3 million, over half of which accrued to boats over 18 metres. Boats in the eastern area earned about £3.2 million, those in the south £5.4 million, those in the west £2.2 million, and those in the north west £5.5 million.

More detailed information regarding operating costs is shown in Tables 3A.6 and 3A.7. The first of these tables shows that, on average, about 13 per cent of expenses is for maintenance and repairs to boats, 8 per cent for repairs to nets, 23 per cent for fuel and oil, and 31 per cent for depreciation. The remaining 25 per cent goes for social welfare, ice, auctioneer's fees, licences, harbour dues, insurance of boat, rental of equipment, etc. The proportion spent on fuel and oil is lowest for boats between 6 and 12 metres and highest for boats 18 - 23.9 metres. It was thought possible that the pattern of expenses might vary substantially with the distance from the coast usually fished, and Table 3A.7 was calculated to test this hypothesis. The table provides little evidence of any substantial or systematic variation by distance fished.

Table 3A.8 shows the average catch, expenses, depreciation, and gross and net income for each size of boat in the four areas. Each of these items varies sharply with size of boat. For instance, boats under 6 metres in the south had an average catch valued at £1,085, while boats in the largest size category in the north west had an average value of catch of nearly £150,000. Gross and net income per boat also varied considerably by size of boat and by region. The overall average gross income per boat was £7,325, but this varied from £1,119 for the under 6 metre boats to £74,033 for the over 24 metre boats. For the latter boats, the highest incomes were recorded in the north west region, where average gross income per boat was about £106,000. When allowance was made for depreciation the resulting net incomes were considerably reduced, particularly for the larger boats.

Average net income per person employed, classified by size of boat and region, is shown in Table 3.15. Again, the variation in income between large and small boats as well as in the different regions is very great. The overall average net income per person (including skipper and crew) was £2,081, varying from £6,736 on the over 24 metre boats to £518 on the under 6 metre vessels. Of course, as shown in Tables 5A.7 and5A.8 a very high proportion of the small boat operators are only part-time fishermen. In the 0-5.9 metre class approximately 60 per cent of the incomes of skippers and crewmen come from sources other than fishing. The average net income per person on the large boats in the north west was £10,270; while, in the east region, it was £5,859. In the other regions, intermediate levels were recorded.

Table 3.15: Net income arising in fishing (average per person engaged), classified by length of boat and area

Length of Boat (metres)	East	South	West	North West	All Areas
			£		
0 - 5.9	*	575	541	592	518
6.0 - 8.9	1,093	730	1,124	711	848
9.0 - 11.9	*	578	1,571	2,017	1,371
12.0 - 17.9	4,380	4,647	2,089	1,783	3,477
18.0 - 23.9	3,425	*	4,177	5,134	5,957
24.0 - 29.9	5,859	*	*	10,270	6,376
All Lengths	2,745	2,447	1,113	2,200	2,081

* Too few skippers responded to give a reliable average in this cell.

Fishermen differ from most other workers in that they are rarely employees. Instead, they work for a share of the value of the catch, and the size of this share varies with the number in the crew, the size and cost of the boat, and the presence or absence of non-fishing share members. The latter are persons outside the crew who provide some (or all) of the finance for the fishing venture. They are usually owners or part-owners of the vessel and sometimes pay the operating costs. Our interviewers tried to obtain details of the share system in operation on each of the vessels contacted. Skippers were asked to specify what proportion of the value of the catch went to each of the following categories: (a) to the boat; (b) to the skipper; (c) to the remainder of the crew; and (d) to non-fishing share members. Sometimes skippers who owned their boats could not break down their shares into the proportions attributable to ownership and the proportions accounted for by their participation in fishing operations. In these cases, all of a skipper's share was attributed to category (b). It turned out that in most cases operating expenses (other than depreciation) were deducted before any allocations were made, hence the data obtained from this question relate to gross income shares.

The average proportion of gross income accruing to various categories is shown in Table 3A.9. The proportion accruing to the boat rose from 15 per cent for the boats under 6 metres to 43 per cent for boats over 24 metres. The skipper's share falls from 44 per cent for the smallest to 12 per cent for the largest. This reflects both the increasing proportion going to the boat as size of boat increases and the fact that crew size rises with size of vessel. The proportion accruing to the crew remains roughly constant, at about 40 per cent, for all the size categories. Of course, it must be borne in mind that both the value being divided and the number in the crew rise with size of boat.

Return on Capital Invested in Boats and Equipment

Figures for the rate of return on capital invested in boats and equipment (defined in a few ways) are given in Table 3.16. The value of catch as a proportion of the capital invested averaged 47.1 per cent, varying from 34.2 per cent for the larger boats to 132.1 per cent for the very small boats. Gross income (i.e. value of catch less operating expenses other than depreciation) averaged 34 per cent, the variation being from 22.8 per cent for the larger boats to 114.9 per cent for the smaller ones. Gross income to boat and skipper averaged 19.9 per cent of capital invested and this varied from 12.5 per cent on the large boats to 68.1 per cent on the small ones. The variation in the proportion of gross income allocated to the boat varied from 9.8 to 18.3 per cent, the overall average being 12.6 per cent.

Table 3.16: Rate of return on capital invested in boats and equipment, by length of boat

Size of Boat (metres)	Values of certain items as a percentage of current selling value of boat and equipment			
	Value of catch	Total gross income *	Gross income to boat and skipper **	Gross income to boat
		%		
0 - 5.9	132.1	114.9	68.1	17.5
6 - 8.9	80.4	66.8	38.5	16.8
9 - 11.9	42.2	33.7	21.2	12.3
12 - 17.9	65.5	45.0	26.9	18.3
18 - 23.9	43.4	30.1	17.7	12.1
24 - 29.9	34.2	22.8	12.5	9.8
All Lengths	47.1	34.0	19.9	12.6

* Gross Income equals value of catch less operating expenses other than depreciation.

** Gross Income to boat and skipper is the amount going to boat and skipper after allowing for operating expenses other than depreciation.

Opinions Regarding State of Fish Stocks

The efficacy of any set of fishery conservation measures depends largely on the extent to which fishermen see them as being necessary and useful. We were therefore very interested in finding out what fishermen thought about the state of the stocks of various species. The following question was asked of both skippers and crewmen:

> "Thinking now about the stocks of various species in the areas you usually fish, could you say whether you think each of the following species is overfished, fully exploited, but not overfished, or capable of further exploitation."

The percentages of skippers and crewmen who thought various species "overfished" are shown in Table 3.17. For all species, there is a fair degree of unanimity between skippers and crewmen within the different areas. However, there appears to be a sharp divergence between the views of both skippers and crewmen in the west and those of all fishermen in other areas. The percentages seeing each species as "overfished" was far lower in the west than elsewhere.

Looking at the table in more detail, we see that, with the exception of those in the west, over 50 per cent of fishermen believe that herring is overfished. The proportion believing mackerel to be overfished is much lower in all districts and averaged about 20 per cent for the country as a whole. A majority of fishermen in the east and south think that cod and whiting are overfished, but the proportion holding this view is much lower in the west and north west. In the case of plaice, sole, ray, and skate, the highest proportions reporting "overfishing" are again in the east and south. Most fishermen in all areas except the west, believe salmon to be overfished. This view is held by about 60 per cent of the fishermen in the east, three-quarters of those in the south and north west, and one-third of those in the west. Lobster is also thought to be heavily exploited, especially in the east and south where about two-thirds of fishermen think it is overfished. Overall, about a quarter of all fishermen believe that prawn is overfished. This proportion varied from one region to another being highest (at about 48 per cent) in the east and lowest (at about 4 per cent) in the west.

Table 3.18 shows the percentages of skippers and crewmen who felt that certain species were capable of further exploitation. In many ways, this table paints a similar picture to that shown in Table 3.17. Mackerel appears to have the most potential for exploitation, while salmon and lobster have the least. It is interesting that the percentages in the west are again <u>lower</u> than elsewhere. This is explained by the fact that the vast majority of fishermen in the west tended to opt for the answer "fully exploited but not overfished" in the case of each species mentioned. (See Chapter 12 for a scientific appraisal of stocks in seas surrounding Ireland.)

Table 3.17: Estimated percentages of skipper and crewmen who believe that various species are "overfished", classified by local area

Species	Area								All Areas	
	East		South		West		North West			
	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman
	Per cent									
Herring	60.8	64.4	65.3	68.3	18.4	19.9	51.6	53.9	46.5	51.0
Mackerel	32.6	51.1	37.7	24.2	3.6	5.2	11.9	20.8	20.0	22.4
Cod	54.8	46.3	57.4	51.5	4.3	3.3	21.7	30.3	30.7	31.3
Whiting	48.9	56.8	57.2	51.5	5.0	4.1	19.2	33.9	29.4	34.5
Plaice	66.0	50.5	59.1	47.7	4.7	6.3	23.5	39.2	32.7	34.3
Sole	53.3	43.1	61.5	41.1	4.6	6.3	26.3	44.6	32.6	32.9
Ray/Skate	51.6	41.3	47.3	40.5	4.1	6.3	19.1	33.4	26.1	29.3
Salmon	59.9	61.9	80.4	71.7	30.7	32.9	79.5	75.3	61.8	60.5
Lobster	63.7	52.8	74.7	75.3	19.1	14.8	42.2	53.1	47.9	49.9
Prawns	48.1	48.6	40.3	34.1	3.4	4.5	18.0	40.0	22.8	29.6

Table 3.18: Estimated percentages of skipper and crewmen who believe that various species are "capable of further exploitation", classified by local area

Species	Area								All Areas	
	East		South		West		North West			
	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman
	Per cent									
Herring	23.4	13.4	7.6	6.6	6.5	4.2	6.4	4.5	8.8	6.6
Mackerel	46.0	29.5	36.8	49.9	13.0	8.7	36.2	38.9	30.1	32.3
Cod	17.8	20.2	12.8	13.1	8.9	7.2	11.0	7.6	11.6	11.1
Whiting	20.1	9.8	11.7	14.2	7.4	8.8	11.4	8.0	11.3	10.2
Plaice	18.9	19.0	7.4	11.4	2.7	5.6	16.1	7.0	9.6	9.7
Sole	29.1	26.6	11.1	17.9	3.7	5.6	16.3	9.2	12.1	13.3
Ray/Skate	22.8	24.4	16.9	18.8	4.7	4.0	20.2	7.6	14.4	12.4
Salmon	30.9	15.5	6.8	7.7	1.1	0.0	0.6	0.0	5.7	4.1
Lobster	26.5	19.2	4.9	6.0	1.5	0.0	8.9	5.0	6.5	5.8
Prawns	17.3	18.8	20.4	23.5	2.2	0.5	18.5	10.3	13.4	12.7

APPENDIX 3A

Table 3A.1: Numbers of boats classified by area, size and whether solely or partly engaged, 1977/78

Size Category Length	GRT	Area 1 East	Area 2 South	Area 3 West	Area 4 North West	All Areas
				Solely engaged		
Motor Vessels						
24. 1+ metres	100+ tons	10	8	0	18	36
20. 1 - 24 metres	75-99 tons	20	10	0	12	42
18. 4 - 20. 0 metres	51-74 tons	57	21	1	49	128
15. 1 - 18. 3 metres	26-50 tons	65	32	12	41	150
11. 7 - 15. 0 metres	16-25 tons	10	6	5	11	32
9. 6 - 11. 6 metres	11-15 tons	10	17	4	1	32
0. 0 - 9. 5 metres	0-10 tons	100	219	8	11	338
Sail and Oar						
5. 5 metre +keel		46	105	0	8	159
Under 5. 5 metre keel		1	2	0	0	3
Total		319	420	30	151	920
				Engaged part-time		
Motor Vessels						
18. 4 - 20. 0 metres	51-74 tons	0	0	0	1	1
15. 1 - 18. 3 metres	26-50 tons	0	1	0	7	8
11. 7 - 15. 0 metres	16-25 tons	0	0	0	3	3
9. 6 - 11. 6 metres	11-15 tons	1	0	0	0	1
0. 0 - 9. 5 metres	0-10 tons	25	55	267	221	568
Sail and Oar						
5. 5 metre + keel		84	318	294	226	922
Under 5. 5 metre keel		30	114	85	47	276
Total All Types		140	488	646	505	1,779
				Engaged either solely or part-time		
Motor Vessels						
24. 1+ metres	100+ tons	10	8	0	18	36
20. 1 - 24 metres	75-99 tons	20	10	0	12	42
18. 4 - 20. 0 metres	51-74 tons	57	21	1	50	129
15. 1 - 18. 3 metres	26-50 tons	65	33	12	48	158
11. 7 - 15. 0 metres	16-25 tons	10	6	5	14	35
9. 6 - 11. 6 metres	11-15 tons	11	17	4	1	33
0. 0 - 9. 5 metres	0-10 tons	125	274	275	232	906
Sail and Oar						
5. 5 metre + keel		130	423	294	234	1,081
Under 5. 5 metre keel		31	116	85	47	279
Total All Types		459	908	676	656	2,699

Source: Counts carried out by area officers of The Department of Fisheries.

Table 3A.2: Average current selling value of boat and other items of capital equipment, classified by area and size of boat (£)

Length of Boat (metres)	(GRT) †	East			South			West			North West			All Areas		
		Boat	Equipment	Total	Boat	Equipment	Total	Boat	Equipment	Total	Boat	Equipment	Total	Boat	Equipment	Total
									£							
0-5.9	0-5	160	206	366	378	775	1,153	278	608	886	458	830	1,288	322	653	975
6.0-8.9	5.1-9.5	2,000	780	2,780	2,697	1,289	3,986	2,822	1,350	4,172	1,845	1,432	3,277	2,431	1,293	3,724
9.0-11.9	9.6-15.5	20,000	1,200	21,200	8,995	3,263	12,258	13,667	2,133	15,800	10,833	3,895	14,728	11,177	3,073	14,250
12.0-17.9	15.6-49.0	39,935	8,397	48,332	29,552	7,276	36,828	14,860	4,983	19,843	29,167	7,917	37,084	30,697	7,402	38,099
18.0-23.9	49.1-99.9	116,033	33,120	149,153	82,854	14,731	97,585	123,333	14,667	138,000	130,000	22,000	152,000	109,323	23,220	132,543
24.0-29.9	100+	*	*	296,450	*	*	212,020	*	*	400,000	*	*	396,250	268,800	*	320,216
All Sizes		44,124	11,996	56,119	14,142	3,437	17,579	5,474	1,424	6,898	23,624	5,178	28,802	17,314	4,241	21,555

† Corresponding GRT categories estimated by authors.

* Too few skippers responded to give reliable averages for these cells.

Table 3A.3: Estimated total current selling value of all boats and other items of capital equipment, classified by area and length of boat

Length of Boat (metres)	East			South			West			North West			All Areas		
	Boat	Equipment	Total	Boat	Equipment	Total	Boat	Equipment	Total	Boat	Equipment	Total	Boat	Equipment	Total
								£'000							
0-5.9	7.7	9.9	17.6	45.4	93.0	138.4	113.1	247.5	360.6	64.1	116.2	180.3	230.3	466.6	696.9
6.0-8.9	220.0	85.8	305.8	1,208.2	577.5	1,785.7	821.2	392.9	1,214.1	575.6	446.8	1,022.4	2,825.1	1,503.0	4,328.0
9.0-11.9	300.0	18.0	318.0	1,538.1	558.0	2,096.1	1,558.0	243.2	1,801.2	1,354.1	486.9	1,841.0	4,750.2	1,306.1	6,056.3
12.0-17.9	1,996.8	419.9	2,416.6	857.0	211.0	1,068.0	297.2	99.7	396.9	962.5	261.3	1,223.7	4,113.5	991.9	5,105.2
18.0-23.9	9,166.6	2,616.5	11,783.1	6,131.1	1,090.1	7,221.2	1,110.0	132.0	1,242.0	8,190.0	1,386.0	9,576.0	24,597.8	5,224.6	29,822.3
24.0-29.9 *	2,075.6	592.5	2,668.1	2,340.3	416.0	2,756.3	715.0	85.0	800.0	5,083.5	860.3	5,943.8	10,214.4	1,953.8	12,168.2
All Lengths	13,766.7	3,742.6	17,509.2	12,120.1	2,945.6	15,065.7	4,614.5	1,200.3	5,814.8	16,229.8	3,557.5	19,787.2	46,731.2	11,445.9	58,177.0

* Too few skippers responded to give a direct estimate of the breakdown as between boat and other equipment for the 24.0-29.9 metre size group. This breakdown was estimated on the assumption that it was proportionally the same for the 24.0 - 29.9 metre size group as for the 18.0 - 23.9 metre group.

Table 3A.4: Estimated percentage of boats catching different species classified by length of boat and local area

Length of Boat (metres)	Herring	Mackerel	Cod	Whiting	Plaice	Sole	Ray/Skate	Salmon Sea Trout	Other Wet Fish	Lobster /Crab	Prawn	Oyster	Other Shellfish
	Species Caught												
	Per cent												
0-5.9	7.8	12.1	1.0	0.0	1.2	0.0	1.0	28.6	6.7	68.2	2.2	24.7	18.8
6.0-8.9	22.3	22.8	6.4	2.8	1.4	1.3	3.5	54.5	4.9	54.4	1.5	13.4	21.7
9.0-11.9	52.5	41.4	8.0	1.8	17.3	7.9	11.5	70.0	7.6	64.7	0.0	11.6	19.3
12.0-17.9	27.8	16.3	58.9	60.6	62.9	34.5	20.8	23.1	17.7	13.2	43.2	5.1	10.7
18.0-23.9	28.9	30.3	44.3	38.0	45.5	29.9	23.1	7.5	11.1	2.6	27.2	0.0	5.0
24.0-29.9	52.4	42.9	33.3	19.0	23.8	23.8	14.3	0.0	9.5	0.0	0.0	4.8	0.0
Local Area													
East	11.1	12.3	31.7	26.4	26.6	12.5	7.7	33.2	13.7	22.0	26.1	0.0	9.4
South	32.3	30.5	14.1	9.1	17.1	9.6	12.1	45.6	12.1	50.9	3.9	15.4	23.8
West	16.7	18.0	5.6	3.2	4.1	3.6	5.0	33.9	1.2	75.2	4.2	28.8	31.0
North West	30.3	26.5	5.8	4.0	4.4	3.0	1.7	58.7	4.8	40.8	0.3	2.3	0.0
All Lengths/Areas	24.4	23.5	11.4	7.9	10.9	6.4	6.7	43.8	7.0	52.6	5.6	14.5	18.3

Note: Percentages may add to more than 100 per cent since boats may catch more than one species.

Table 3A.5: Estimated total value of catch, operating expenses, depreciation and net income arising, classified by length of boat and local area in 1978

Length of Boat (metres)	Local Area East	South	West	North West	All Areas
			Value of Catch (£'000)		
0 - 5.9	*	130.4	536.5	235.8	920.7
6.0 - 8.9	375.5	1,138.8	1,039.2	927.7	3,481.3
9.0 - 11.9	*	636.8	716.0	1,147.2	2,555.5
12.0 - 17.9	1,569.9	854.5	269.6	650.5	3,344.5
18.0 - 23.9	3,146.0	*	370.6	4,405.1	12,945.1
24.0 - 29.9	795.7	*	*	2,229.3	4,156.7
All Lengths	5,960.6	8,662.8	3,184.9	9,595.6	27,403.8
			Operating Expenses (£'000) †		
0 - 5.9	*	17.9	68.8	27.0	119.9
6.0 - 8.9	43.1	253.9	162.9	131.4	591.2
9.0 - 11.9	*	264.7	115.7	116.0	517.4
12.0 - 17.9	441.3	224.5	90.6	291.3	1,047.8
18.0 - 23.9	1,155.2	1,041.4	136.7	1,628.5	3,961.8
24.0 - 29.9	242.2	407.8	*	644.3	1,378.7
All Lengths	1,909.0	2,210.2	659.0	2,838.5	7,616.7
		Gross Income Arising (£'000) = Value of Catch - Expenses			
0 - 5.9	*	112.5	467.7	208.8	800.8
6.0 - 8.9	332.4	884.9	876.3	796.3	2,890.1
9.0 - 11.9	*	372.1	600.3	1,031.2	2,038.2
12.0 - 17.9	1,128.6	630.0	179.0	359.2	2,296.7
18.0 - 23.9	1,990.8	*	233.9	2,776.6	8,983.3
24.0 - 29.9	553.5	*	*	1,585.0	2,778.0
All Lengths	4,051.7	6,452.6	2,525.9	6,757.0	19,787.1
			Depreciation (£'000)		
0 - 5.9	*	10.8	33.8	13.3	60.4
6.0 - 8.9	22.1	130.4	93.7	70.2	316.4
9.0 - 11.9	*	128.1	116.5	85.0	341.5
12.0 - 17.9	99.4	72.4	28.6	93.5	293.9
18.0 - 23.9	559.3	327.3	50.1	523.5	1,460.2
24.0 - 29.9	166.8	*	*	424.5	1,056.6
All Lengths	862.1	1,085.3	371.7	1,210.0	3,529.0
		Net Income Arising (£'000) = Gross Income - Depreciation			
0 - 5.9	*	101.7	433.9	195.5	740.4
6.0 - 8.9	310.3	754.5	782.6	726.1	2,573.7
9.0 - 11.9	*	244.0	483.8	946.2	1,696.7
12.0 - 17.9	1,029.2	557.6	150.4	265.7	2,002.8
18.0 - 23.9	1,431.5	*	183.8	2,253.1	7,523.1
24.0 - 29.9	386.7	*	*	1,160.5	1,721.4
All Lengths	3,189.7	5,367.3	2,154.2	5,547.0	16,258.1

* Too few skippers responded to permit the calculation of valid total for these cells.

† For breakdown of operating expenses see Table 3A.6.

Table 3A.6: Estimated breakdown of average operating costs (including depreciation), expressed in £ and percentage form, classified by length of boat*

Length of Boat (metres)	Item												All Items
	Maintenance /repairs to boats	Repairs to nets	Fuel and oil	Ropes, buoys, etc.	Social Welfare	Ice	Auctioneers' fees, etc.	Salmon or oyster licence	Harbour dues	Insurance on boat	Rental of equipment	Other	Depreciation	
							£							
0 - 5.9	24	30	56	27	0	0	11	8	0	1	4	13	84	258
6.0 - 8.9	108	113	110	58	4	1	26	14	0	26	0	57	273	790
9.0 - 11.9	318	463	271	73	27	9	23	18	1	120	1	112	803	2,240
12.0 - 17.9	1,951	534	2,806	297	394	196	415	10	11	744	465	323	2,186	10,332
18.0 - 23.9	3,453	1,881	6,499	644	680	575	1,143	7	19	2,815	712	1,042	6,524	25,994
24.0 - 29.9	3,386	2,232	11,785	1,647	953	948	3,369	3	21	3,343	854	5,398	26,731	60,670
All Lengths	522	310	942	132	94	71	156	12	2	288	95	223	1,258	4,105
							Per cent							
0 - 5.9	9.3	11.6	21.7	10.5	0.0	0.0	4.3	3.1	0.0	0.4	1.6	5.0	32.6	100.0
6.0 - 8.9	13.7	14.3	13.9	7.3	0.5	0.1	3.3	1.8	0.0	3.3	0.0	7.2	34.6	100.0
9.0 - 11.9	14.2	20.7	12.1	3.3	1.2	0.4	1.0	0.8	0.0	5.4	0.0	5.0	35.8	100.0
12.0 - 17.9	18.9	5.2	27.2	2.9	3.8	1.9	4.0	0.1	0.1	7.2	4.5	3.1	21.2	100.0
18.0 - 23.9	13.3	7.2	25.0	2.5	2.6	2.2	4.4	0.0	0.1	10.8	2.7	4.0	25.1	100.0
24.0 - 29.9	5.6	3.7	19.4	2.7	1.6	1.6	5.6	0.0	0.0	5.5	1.4	8.9	44.1	100.0
All Lengths	12.7	7.6	22.9	3.2	2.3	1.7	3.8	0.3	0.0	7.0	2.3	5.4	30.7	100.0

* The averages shown in this table differ slightly from those in Table 3A.7 because some skippers did not give a detailed breakdown of their costs.

Table 3A.7: **Estimated percentage breakdown of main operating costs (including depreciation) for boats greater than 12 metres, classified by length of boat and distance from coast usually fished**

Length of Boat (metres) and area usually fished	Item: Maintenance /repairs to boats	Repairs to nets	Fuel and oil	Other expenses	Depreciation	Total
	Per cent					
Boats 12.0 - 17.9 metres						
fishing within 10 miles	20.9	5.4	25.2	28.1	20.5	100.0
fishing 10 - 15 miles	16.3	4.6	28.9	24.9	25.3	100.0
fishing over 15 miles	18.2	5.3	29.1	27.3	20.2	100.0
Boats 18.0 - 23.9 metres						
fishing within 10 miles	13.7	8.2	28.5	29.0	20.6	100.0
fishing 10 - 15 miles	25.5	6.7	27.1	12.6	26.2	100.0
fishing over 15 miles	11.7	8.0	24.6	30.7	25.0	100.0
Boats 24.0 - 29.9 metres						
fishing within 10 miles	5.4	4.1	23.9	28.9	37.6	100.0
fishing 10-15 miles	7.2	4.5	20.7	28.9	38.6	100.0
fishing over 15 miles	4.4	2.8	14.8	30.7	47.3	100.0
All Boats over 12.0 metres						
fishing within 10 miles	12.5	5.4	25.8	29.4	26.9	100.0
fishing 10 - 15 miles	17.7	5.6	25.5	22.8	28.5	100.0
fishing over 15 miles	9.5	5.9	22.3	31.0	31.3	100.0

Table 3A.8: Estimated value of catch, operating expenses, depreciation and net income arising (average per boat), classified by length of boat and local area

Length of Boat (metres)	Local Area				All Areas
	East	South	West	North West	
			Value of Catch (£)		
0 - 5. 9	*	1, 085	1, 317	1, 682	1, 286
6. 0 - 8. 9	3, 417	2, 544	3, 574	2, 976	2, 999
9. 0 - 11. 9	*	3, 724	6, 281	9, 179	6, 013
12. 0 - 17. 9	31, 166	26, 506	13, 377	19, 566	24, 774
18. 0 - 23. 9	39, 822	*	41, 172	69, 924	57, 534
24. 0 - 29. 9	88, 405	*	*	148, 619	109, 387
All Lengths	19, 067	10, 101	3, 776	13, 962	10, 145
			Operating Expenses (£)		
0 - 5. 9	*	150	168	193	167
6. 0 - 8. 9	391	567	560	421	509
9. 0 - 11. 9	*	1, 549	1, 015	927	1, 217
12. 0 - 17. 9	8, 826	7, 015	4, 532	8, 827	7, 761
18. 0 - 23. 9	14, 623	14, 074	15, 190	25, 848	17, 608
24. 0 - 29. 9	26, 914	31, 376	*	42, 953	35, 354
All Lengths	6, 118	2, 577	782	4, 126	2, 820
		Gross Income Arising (£) = Value of Catch - Expenses			
0 - 5. 9	*	935	1, 149	1, 489	1, 119
6. 0 - 8. 9	3, 026	1, 977	3, 014	2, 555	2, 490
9. 0 - 11. 9	*	2, 175	5, 266	8, 252	4, 796
12. 0 - 17. 9	22, 340	19, 491	8, 845	10, 739	17, 013
18. 0 - 23. 9	25, 199	*	25, 982	44, 076	39, 926
24. 0 - 29. 9	61, 491	*	*	105, 666	74, 033
All Lengths	12, 949	7, 524	2, 994	9, 836	7, 325
			Depreciation (£)		
0 - 5. 9	*	90	83	95	84
6. 0 - 8. 9	201	291	322	225	273
9. 0 - 11. 9	*	749	1, 022	680	808
12. 0 - 17. 9	1, 987	2, 261	1, 430	2, 832	2, 186
18. 0 - 23. 9	7, 080	4, 423	5, 567	8, 309	6, 524
24. 0 - 29. 9	18, 528	*	*	28, 304	26, 731
All Lengths	2, 763	1, 263	441	1, 761	1, 258
		Net Income Arising (£) = Gross Income - Depreciation			
0 - 5. 9	*	845	1, 066	1, 394	1, 035
6. 0 - 8. 9	2, 825	1, 686	2, 692	2, 330	2, 217
9. 0 - 11. 9	*	1, 426	4, 244	7, 572	3, 993
12. 0 - 17. 9	20, 353	17, 230	7, 415	7, 907	14, 827
18. 0 - 23. 9	18, 119	*	20, 415	35, 767	33, 402
24. 0 - 29. 9	42, 963	*	*	77, 362	47, 302
All Lengths	10, 186	6, 261	2, 553	8, 075	6, 067

* Too few skippers responded to permit the calculation of valid averages for these cells.

Table 3A.9: Average proportion of gross income allotted to boat, skipper, crew and non-fishing share members, classified by length of boat

Length of Boat (metres)	Share allotted to				Total
	Boat	Skipper	Crew	Non-fishing share members	
			Per Cent		
0-5.9	15.2	44.1	40.7	0.0	100.0
6.0-8.9	25.2	32.5	41.9	0.4	100.0
9.0-11.9	36.4	26.5	35.9	1.1	100.0
12.0-17.9	40.7	19.2	38.3	1.7	100.0
18.0-23.9	40.2	18.4	40.2	1.1	100.0
24.0-29.9	43.1	11.8	38.4	6.6	100.0
All Lengths	27.0	32.2	40.2	0.6	100.0

APPENDIX 3B

Appendix 3B: Sampling and Sampling Errors

As was described above, the sample employed in the present study was stratified by size and area, and the sampling fractions in the different strata were variable. In the absence of a sampling frame giving a comprehensive listing of all the smaller boats, a quota sampling approach was used to contact boats in the three smallest size categories. For the purposes of this part of the sample, the coastline was divided into 23 areas and interviewers were instructed to contact a specified number of fishermen whose boats fell into certain size groups in each area. It was hoped that the sample so derived would approximate to a random sample within each of the three strata in question.

Cochran (1963) describes the rationale for the use of stratified samples as follows:

1. If data of known precision are wanted for certain subdivisions of the population, it is advisable to treat each subdivision as a "population" in its own right.

2. Administrative convenience may dictate the use of stratification; for example, the agency conducting the survey may have field offices, each of which can supervise the survey for a part of the population.

3. Sampling problems may differ markedly in different parts of the population. For instance, the present study necessitated the use of a different sampling technique to contact the smaller boats.

4. Stratification may produce a gain in precision in the estimates of characteristics of the whole population. It may be possible to divide a heterogeneous population into subpopulations, each of which is internally homogeneous. This is suggested by the name strata, with its implication of a division into layers. If each stratum is homogeneous, in that the measurements vary little from one unit to another, a precise estimate of any stratum mean can be obtained from a small sample in that stratum. These estimates can then be combined into a precise estimate

for the whole population. In the present survey, many of the variables under study seemed likely to vary closely with size of boat, and this explains why size was chosen as a stratification factor.

Clearly when the stratum sampling fractions vary as substantially as they do in the present sample, it is crucial to adjust or re-weight estimates derived from the sample in order to obtain correct estimates of the population parameters. For instance the population mean per unit in a stratified sample ($\bar{y}_{st}$) is estimated by

$$\bar{y}_{st} = \left(\sum_{h=1}^{L} N_h \bar{y}_h \right) / N$$

where h is the subscript indicating 'stratum'

L is the total number of strata

N_h is the total number of units in stratum h

$\bar{y}_h$ is the mean in stratum h

and $N = \sum_{h=1}^{L} N_h$ is the population size.

The appropriate weights or grossing factors ($g_h = N_h/n_h$) for the present study are shown in Table 3.4. All the means, totals and percentages presented above have been calculated using these grossing factors.

No matter how carefully a sample is selected, any inquiry based on a partial enumeration will be subject to sampling error, i.e. to the possibility that, through purely random factors, the individuals selected in the sample are atypical. One of the great advantages of random methods of sampling is that they allow the probability and magnitude of such errors to be calculated. For instance, when estimating a mean from a stratified sample, it is possible to derive a 95 per cent confidence interval around this mean as follows:

$$\bar{y}_{st} \pm t \sqrt{(1/N^2) \sum_{h=1}^{L} N_h (N_h - n_h) \cdot (s_h^2 / n_h)}$$

where t is an appropriate multiplier read from tables of the normal or Student's - t distribution

n_h is the sample size in stratum h

$s_h^2 = (1 / (n_h - 1)) . \sum_{i=1}^{n_h} (y_{hi} - \bar{y}_h)^2$ is an unbiased estimate of the variance in stratum h

and the other symbols have the meanings assigned to them above. Analogous formulae are available to define confidence intervals around totals, proportions, etc.

In theory, confidence intervals could be calculated for every estimate presented. In practice, the amount of calculation involved could not be justified, since most readers would probably not need to study the estimates in this detail. However, in this Appendix it was thought worthwhile to include some tables which would give the interested reader an indication of the precision of the survey data.

First of all, we present some data on numbers interviewed since it must always be borne in mind that estimates (whether means, proportions or estimated totals) based on small subdivisions of the sample will, in general, be less precise than those based on the full sample. Table 3B.1 therefore shows the numbers of respondents interviewed and the estimated numbers in the population in each area, classified by length of boat. Many of the tables in the report are classified in this way and the relatively small numbers in some of the cells should be borne in mind when interpreting the corresponding estimates.

Table 3B.2 shows standard errors and 95 per cent confidence intervals for a selection of variables. In general, these provide fairly reassuring evidence of the accuracy of the survey results. Of course, the standard errors and confidence intervals based on small subdivisions of the sample will usually be a good deal larger.

Table 3B.1: Numbers of skippers and crewmen interviewed (n) and estimated number in population ($\hat{N}$), classified by length of boat and local area

Length of Boat (metres)		Local Area								All Areas	
		East		South		West		North West			
		n	$\hat{N}$	n	$\hat{N}$	n	$\hat{N}$	n	$\hat{N}$	n	$\hat{N}$
0-5.9 metres	Skippers	6	48	15	120	50	407	17	140	88	715
	Crewmen	4	72	5	57	19	395	8	190	36	714
6.0-8.9 metres	Skippers	13	110	54	448	36	291	38	312	141	1,161
	Crewmen	10	174	33	586	33	405	26	709	102	1,874
9.0-11.9 metres	Skippers	2	15	26	171	21	114	25	125	74	425
	Crewmen	1	24	20	251	17	194	23	344	61	813
12.0-17.9 metres	Skippers	24	50	17	32	10	20	15	33	66	135
	Crewmen	18	185	14	88	10	52	12	116	54	441
18.0-23.9 metres	Skippers	40	79	40	74	5	9	33	63	118	225
	Crewmen	31	339	35	288	5	35	33	376	104	1,038
24.0-29.9 metres	Skippers	5	9	7	13	1	2	8	15	21	39
	Crewmen	1	57	7	65	1	11	8	98	17	231
All Lengths	Skippers	90	311	159	858	123	843	136	688	508	2,700
	Crewmen	65	851	114	1,335	85	1,092	110	1,833	374	5,111

Table 3B.2: Selected estimates from the survey together with their estimated standard errors and 95 per cent confidence intervals

Item	Table number	Unit of measure -ment	Survey estimate	Standard error	95 per cent confidence interval
Percentage of all boats 6 years old or less	3.5	%	36.5	2.3	±4.5
Percentage of all boats having echo sounders	3.6	%	30.0	1.6	±3.1
Percentage of all boats having VHF radio	3.6	%	26.2	1.5	±2.9
Percentage of all boats having drift nets	3.8	%	44.1	2.2	±4.2
Percentage of all boats having lobster pots	3.8	%	56.7	2.3	±4.4
Percentage of all boats catching herring	3A.4	%	24.4	2.4	±4.6
Percentage of all boats catching mackerel	3A.4	%	23.5	2.0	±3.8
Percentage of skippers who think herring overfished	3.15	%	46.5	2.4	±4.6
Percentage of skippers who think mackerel overfished	3.15	%	20.0	2.0	±3.8
Percentage of skippers who think salmon overfished	3.15	%	61.8	2.3	±4.5
Percentage of skippers whose main occupation is fishing	5A.5	%	64.9	2.2	±4.4
Estimated average value of catch per boat	3A.7	£	10,145	173.4	±339.8
Estimated average operating expenses per boat	3A.7	£	2,820	77.4	±151.8
Estimated average depreciation per boat	3A.7	£	1,258	74.4	±145.7
Estimated average annual net income arising per boat	3A.7	£	6,067	178.1	±349.1
Estimated average current selling value of boat	3A.2	£	17,314	1,170.7	±2,294.5
Number of persons dependent on skipper's income	5A.4	Number	3.9	0.12	±0.23
Average number of weeks spent fishing last year	5A.7	Number	29.5	0.66	±1.28

APPENDIX 3C

Appendix 3C: Marine Credit Plan operated by Bord Iascaigh Mhara as at May 1979

New Vessels

Under 15 metres	Deposit	5% minimum
	Grant	25%
	Loan	70% maximum
	Term	15 years maximum (normally 10 years)
	Source of loan	BIM
	Rate of interest	Variable - at present 8%
15 to 20 metres	Deposit	5% minimum
	Grant	25%
	Loan	70% maximum
	Term	12 years maximum
	Source of loan	BIM
	Rate of interest	Variable - at present 8%
20.1 to 27 metres	Deposit	5% minimum*
	Grant	25%
	Loan	70% maximum
	Term	12 years maximum
	Source of loan	Clearing Banks
	Rate of interest	Variable - Bank interest rate may be subvented to a minimum of 8% but subject to a maximum subvention of 5½%
Over 27 metres	Deposit	10% minimum
	Grant	25%
	Loan	60% maximum
	Term	12 years maximum
	Source of loan	Clearing Banks (Irish built vessels)
	Rate of interest	Variable - Bank interest rate may be subvented to a minimum of 8% but subject to a maximum subvention of 5½%

* Subject to review

Note: An additional grant of 25 per cent of the cost of the vessel is available from FEOGA for vessels between 12 and 24 metres. In the case of vessels built abroad the loan finance must be raised in the country where the vessel is built. BIM guarantee, in respect of repayments and foreign loans, is available to approved applicants.

Second Hand Vessels

Deposit	10% minimum
Loan	90% of BIM valuation (maximum)
Source of loan	BIM
Term	Depending on age and condition of vessel
Rate of interest	Variable - at present 8%

Note: Generally additional loan finance is only available for second hand vessels coming on the market as a result of the seller buying a new vessel.

Gear

For new vessel	Deposit	10% minimum
	Grant	25% (maximum value of gear qualifying for grant restricted to 5% of cost of vessel)
	Loan	65% maximum
	Term	8 years maximum
	Rate	Variable - at present 13%
For second hand vessel	Deposit	10% minimum
	Loan	90% maximum
	Term	8 years maximum
	Rate	Variable - at present 13%

Note: Loans are normally only provided in respect of first purchase of gear. In exceptional circumstances 90% loan may be provided for other gear purchases subject to 13% rate of interest and a 3 year maximum term.

Capital Improvements (e.g. Re-Engining)

Deposit	10% minimum
Grant	25%
Loan	65% maximum
Term	10 years maximum
Source of loan	BIM
Rate of interest	Variable - at present 8%

Electronics

Deposit	25% minimum
Grant	25%
Loan	50% maximum
Term	3 years
Source of loan	BIM
Rate of interest	Variable - at present 8%

Table 3C.1: Capital expenditure (by BIM) in the fish catching sector, 1964-1978

(For total state expenditure on sea fishing see Table 13.1)

Year	Grants for fishing vessels	Write off of advances	BIM boatyards *	BIM ice plants	Navigation chain	Other capital expenditure by BIM **	Total
				£			
1964/65	25,000	-	3,000	4,000	-	3,000	35,000
1965/66	28,000			1,000		34,000	63,000
1966/67	103,000		22,000	8,000		7,000	140,000
1967/68	166,000		30,000	88,000		1,000	285,000
1968/69	138,000		54,000	40,000		7,000	239,000
1969/70	190,000	396,000	74,000	5,000		16,000	681,000
1970/71	229,000	71,000	18,000	3,000	8,000	3,000	332,000
1971/72	413,000		8,000	-	27,000	4,000	452,000
1972/73	468,000	300,000	36,000	58,000	137,000	14,000	1,013,000
1973/74	596,000	80,000	70,000	45,000	14,000		805,000
April to December 1974	703,000	70,000	66,000	44,000	11,000	22,000	916,000
1975	1,235,000	25,000	166,000	29,000	3,000	1,000	1,459,000
1976	2,219,000	117,000	70,000	40,000	-	6,000	2,452,000
1977	2,079,000	115,000	120,000	115,000	-	54,000	2,483,000
1978	2,200,000	20,000	136,000	82,000		89,000	2,527,000

* The expenditure on boatyards given in this table is twice the relevant grant as shown in BIMs accounts. Capital expenditure here is financed by a 50 per cent grant and 50 per cent repayable advances. The figures do not include losses on boatbuilding which were about £0.5 million in 1977.

** Includes the cost of gear purchased for exploratory and experimental fishing in 1977 and 1978.

Source: BIM

CHAPTER 4

FISHERY HARBOURS

The Irish coastline is richly endowed with natural inlets which have been utilised as fishing harbours by the local fishing communities. In surveys carried out by a team set up in 1967 by the Minister for Agriculture and Fisheries, 874 such harbours and landing places were listed in the coastal counties of Ireland as follows:

Donegal	:	123
Sligo	:	17
Mayo	:	64
Galway	:	189
Clare	:	59
Kerry	:	58
Cork	:	250
Waterford	:	47
Wexford	:	40
Wicklow	:	4
Dublin	:	11
Louth	:	12
Total	:	874

The main proliferation of these harbours and landing places is on the west and south coasts. Their size and the facilities provided vary enormously. These harbours and landing places can be divided into two groups. The first group, consisting of approximately 678 harbours and landing places (78 per cent), provide minimal facilities of a pier and/or a slipway and very little else. They are, in fact, landing places utilised by the local people involved in small scale fishing operations. The fishermen using these landing places are usually part-time, specialising in shellfish - lobster, crawfish, escallops, etc. with some seasonal salmon, herring, and mackeral fishing. Expenditure on the development of these harbours has been minimal over the years. Any expenditure incurred has been aimed at improving to a limited extent the existing facilities to accommodate, and facilitate the handling of the larger boats now employed in the fleet.

The second and most important group consists of approximately 197 harbours and landing places which can handle boats of 8 metres and over. Table 4.1 sets out the number of such harbours and landing places, by county, suitable for boats 8 metres and over. The population of the District Electoral Divisions, in which the harbours are located, and the number of fishermen, either part-time or full time, utilising these local facilities are also included. These harbours cater for about 5,000 out of a total of about 7,000 fishermen in Ireland, and the number of boats involved is about 1,100 in the under 8 metre class and 940 in the 8 metres and over class.

Within the group of harbours suitable for boats 8 metres and over, there are approximately 25 spread around the coast which provide much more developed facilities - both harbour and on-shore. The harbours in this group are shown in Table 4.2 and Figure 4.1. These harbours, at which landings of sea fish (excluding salmon) exceeded £150,000 in 1977, served 90 per cent of the motor vessels of 26 gross registered tons and over (15.1 + metres in length) in the Irish fleet and were responsible for 89 per cent of all landings of sea fish (excluding salmon) in 1977. For these larger fishing vessels, certain shore facilities are essential. These include docking and mooring facilities in protected waters, adequate space for convenient unloading, and facilities for servicing and repairs. In addition such fishing ports, handling the bulk of landings by Irish fishermen, must have reasonably good access to markets, adequate transport facilities, a labour force to meet the needs of the industry and opportunities for an acceptable social life for fishermen and their families.

Planned development of fishery harbours to meet the needs of the Irish fishing industry has been of recent origin. S. Ó Mealláin, in a report dated 6 April 1957, refers to a proposal made in 1952 to develop a number of major fishery stations. In the same report, however, he stated that there was no real fishing harbour along the whole length of the Irish coast.

In 1960, a harbour development plan was drawn up, based on the recommendations of Carl G. Bjuke, a Swedish harbour consultant, in his report titled "The Project of Improvement of Fishing Harbour Facilities in Ireland." The main feature of this plan was the centralisation of fisheries on a regional basis by the provision of large scale facilities at a number of locations around the coast (a concept as valid today as it was then), while at the same time it was emphasised that the development of smaller ports to meet the local needs was to continue unabated.

Mr Bjuke listed eight ports for development, which he recommended as the nucleus for the development of the Irish fishing industry. The eight ports listed were Howth, Co. Dublin; Passage East, Co. Waterford; Kinsale and Castletownbere, Co. Cork; Valencia Harbour, Co. Kerry; Galway, Co. Galway; Killybegs and Greencastle, Co. Donegal. A phased programme of development was recommended for these harbours. Subsequently, five locations were chosen:-Killybegs, Galway, Castletownbere, Passage East, and Howth. When assessing the suitability of various sites and evaluating the requirements which they should possess for selection for development as major harbour centres, the following criteria were used:

(1) Convenient distance to fishing grounds.

(2) Good location in regard to existing or planned communication to a potential fish market.

(3) Adequate and suitable space, both on the sea side and the land side, for development of an efficient fishing station. This should include suitable areas for fish processing and auxiliary industries, boat building and repair, office and shops, traffic and parking space for lorries and other vehicles, garages, etc.

(4) Attractive residential location for the fishermen and their families and for fish traders and other groups engaged in the fishery and ancillary industrial enterprises.

(5) Safe access from the open sea in all weather and at all stages of the tide.

(6) Safe natural or artificial shelter in the harbour at all times for all the vessels likely to use the harbour.

Table 4.1: Harbours capable of catering for boats 8 metres and over

County	Number of Harbours	Population(a)	Number of Fishermen[(a)]	Number of Boats	
				Under 8 metres	8 metres and over
Donegal	33	23,649	1,312	117	286
Sligo	6	16,231	85	6	20
Mayo	23	12,925	405	76	80
Galway	33	40,157	496	166	84
Clare	6	2,076	64	35	20
Kerry	17	1,475	867	184	111
Cork	37	25,143	511	145	125
Waterford	10	9,566	280	78	47
Wexford	13	7,398	262	71	61
Wicklow	4	28,043	214	72	17
Dublin	9	67,718	342	95	69
Louth	6	6,668	141	21	22
Total[(1)]	197	241,049	4,979	1,066	942

(a) Population of District Electoral Districts in which habours are located and number of fishermen in these District Electoral Divisions, 1971.

(1) <u>Source</u>: Survey Team set up by the Minister for Agriculture and Fisheries. 1967.

Table 4.2: Number of fishermen employed and number of boats registered in 25 harbours[(1)] at which the landings of sea fish (excluding salmon) exceeded £150,000 in 1977

Port	Number of fishermen		Motor vessels (Length in metres)				Boats propelled by outboard motors, sails or oars	
	Full time	Part-time	Over 18.3	15.1 - 18.3	9.6 - 15.0	9.5 and under	5.5 metre keel and upwards	Under 5.5 metre keel
Killybegs	280	64	37	4	2	7	8	-
Howth	185	6	27	8	-	3	2	-
Castletownbere	100	10	11	1	-	10	-	-
Galway	27	30	2	3	-	1	8	-
Fenit	64	69	2	2	5	23	-	-
Clogherhead	72	2	5	12	-	1	1	-
Burtonport	140	252	12	15	3	38	20	10
Skerries	133	3	17	9	-	2	-	28
Greencastle	102	152	4	20	-	35	10	-
Dingle	105	18	8	6	3	11	-	-
Dunmore East	70	30	9	3	8	4	7	-
Valentia	14	35	1	-	-	12	-	-
Kilmore Quay	111	18	16	4	6	4	-	-
Achill	61	113	1	9	2	19	20	8
Clarinbridge	-	172	-	-	-	11	3	1
Kinsale	10	16	-	-	1	3	2	1
Baltimore	24	28	-	-	-	11	7	-
Helvick	13	37	1	2	-	10	3	3
Rosmore/Roscahill	-	78	-	-	-	2	10	6
Bantry	10	18	-	-	-	5	3	-
Mornington	13	30	-	-	-	-	22	-
Schull	56	22	4	1	1	9	6	-
Dun Laoire	35	4	2	4	1	2	-	-
Westport	-	68	-	-	-	4	14	-
Rossaveel	4	44	-	1	-	2	10	2
Total	1,629	1,319	159	104	32	229	156	59

(1) Landings at Rossaveel did not exceed £150,000 in 1977. This port is included as it is one of the Fishery Harbour Centres.

Source: Department of Fisheries and Forestry.

(7) Reasonable initial cost of obtaining adequate depth of water in the harbour approach and at the quays.

(8) Low cost of maintaining adequate depth of water in the approach and at the quays.

(9) Suitable ground conditions at the site for adequate arrangements of breakwaters, basins, quays and shore facilities, etc., to be constructed in one unit or in stages according to a general plan.

(10) The site should be unrestricted for acquisition of the land required for the fishing port project.

(11) The presence of other branches of industry in the vicinity might also be to the advantage of the fishing, because the fish processing industry during peak periods has use for a great number of workers.

(12) Adequate fresh water, sewerage and drainage facilities.

(13) Power supplies.

(14) Shops and other service amenities.

(15) Educational facilities, hospitals and churches.

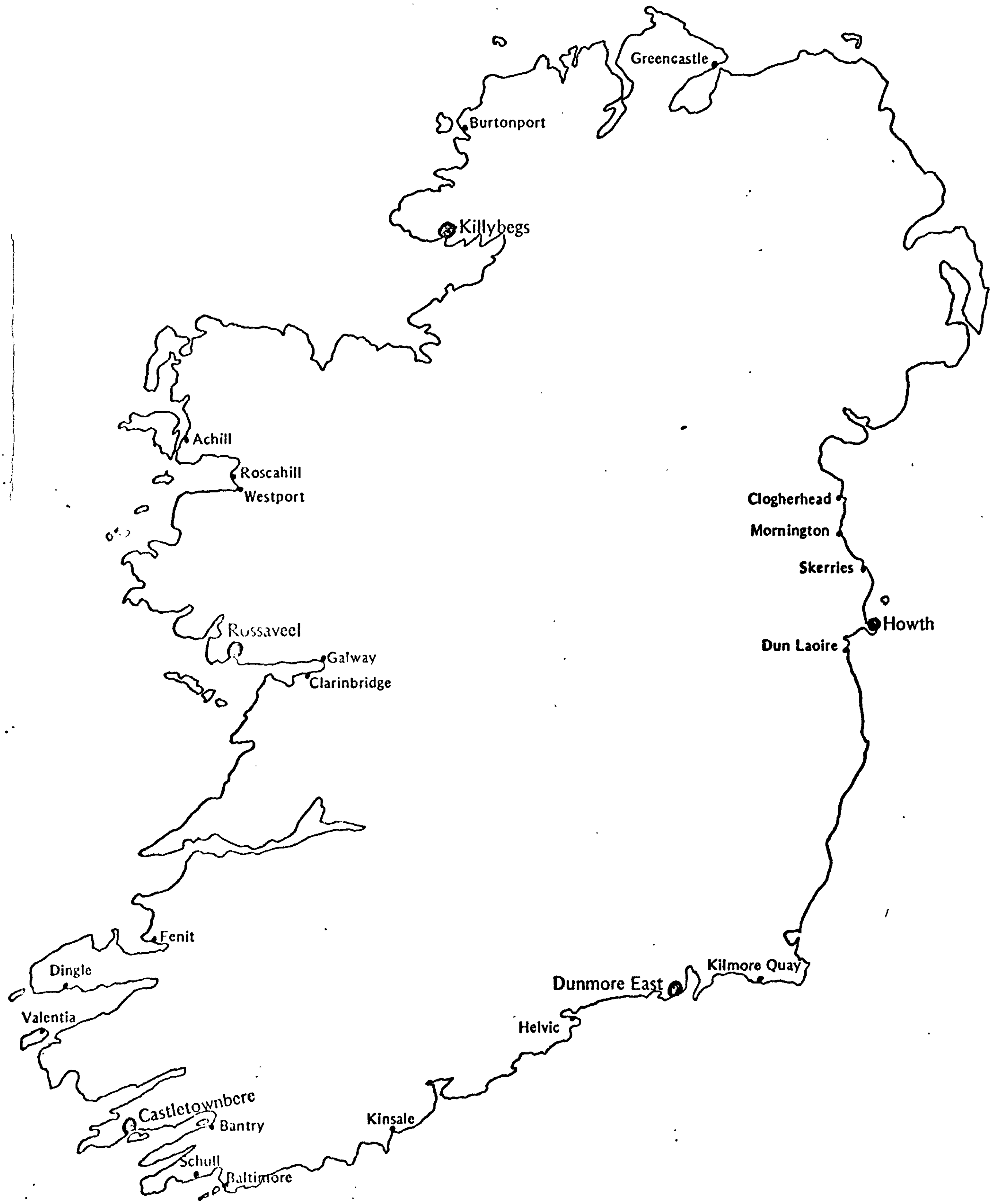
Other considerations taken into account were the restraints on fishing activity at various sized landing places by lack of reasonable facilities involving:

(i) Loss of time in getting boats to and from the ports and fishing grounds and the hazards to fishing craft;

(ii) Discouragement of adoption of modern craft, both big and small, and modern fishing gear.

Dunmore East was later substituted for Passage East as a major fishery harbour and was scheduled for development. Plans for the development of a major fishery harbour at Galway were subsequently deferred. Large scale improvements were undertaken at Rossaveel harbour to meet the needs of the Galway region, since access to Rossaveel would not be restricted at low tide. The location of the five Fishery Harbour Centres are shown in the outline map on page 4.7 (Figure 4.1).

Figure 4.1: Map of Ireland showing the ports where landings of sea fish (excluding salmon), exceeded £150,000 in 1977.*



* ⬭ Denotes major Fishery Harbour Centre.

In 1963, a co-operative fisheries project for analysis of the potential for improvement of Irish commercial fisheries and for an appraisal of Irish fishery development plans was established by the USA and Ireland. This analysis and appraisal was undertaken by an American survey team, which reported in 1964. The team endorsed the plan to develop the major ports recommended by Bjuke, with particular reference to Galway or Killybegs as the choice for initial harbour development. It also recommended that minor harbour facilities should not be overlooked. The survey team felt that there were areas around the coast where a relatively minor expenditure might be of great benefit to local fishermen. The report cited places, such as Kilmore Quay harbour and Kilkieran Bay, where the return for the funds expended might, in some cases, be greater than from major development work.

In 1968, the Fishery Harbour Centres Act was enacted empowering the Minister in Charge of Fisheries to define an area to be designated a Fishery Harbour Centre, for which the Minister would have responsibility for development, management, control, and maintenance. The Act also invested the Minister with powers to acquire, by agreement or by compulsion, any land or a right over land or water he may think proper for the purpose of the Act. The asset formation in the Major Fishery Harbour Centres is vested in the Minister for Fisheries, who is responsible for their funding, management, operation, and maintenance. The Minister is responsible for collecting landing dues and appointing a harbour master and maintenance staff. For smaller harbours, management, maintenance, and development work is carried out by the relevant local authority with the aid of grants from the Department of Fisheries and Forestry and Roinn na Gaeltachta.

Since 1960, the implementation of the development plan affecting the five Fishery Harbour Centres has progressed. In the early stages, progress was much slower than planned. In the first four years (1960-'64), the proportion of the amount spent on harbour development never exceeded 33 per cent of the amount allocated annually by the Department. The impetus in recent years has been much greater, with expenditure around 85 per cent of the amounts allocated. Shortage of specialist personnel and property acquisition were the major difficulties encountered.

Over the years the original proposals, formulated following Mr Bjuke's report, have been revised and up-dated by the Department to take account of the increase in numbers, size, and degree of sophistication of the vessels which have been entering the Irish fishing fleet. In line with this continuous reappraisal, the Department of Fisheries and Forestry has planned major developments for Greencastle, although this harbour is not classed as one of the five major fishery centres financed solely by the Department.

Table 4.3 details the amounts spent on fishery harbours and landing places by the Department of Fisheries between 1966/67 and 1977. Financial assistance provided by Roinn na Gaeltachta and local authorities is also included.

In the period 1966 to 1977, £7.75 million has been invested in harbours and landing places: £5.2 million by the Department of Fisheries, £2.13 million by Roinn na Gaeltachta, and £0.41 million by local authorities. Of the total amount contributed by the Department of Fisheries and Roinn na Gaeltachta, £4.56 million was spent in developing Fishery Harbour Centres in Killybegs, Rossaveel, Castletownbere, and Dunmore East. The emphasis on development has been accelerated in the 1970s. Over 70 per cent of the funds made available for fishery harbours and landing places has been expended in the six years 1972 to 1977. During this period, apart from the developments carried out in four of the five Fishery Harbour Centres, schemes for the improvement and development of 72 other harbours and landing places were commenced and completed. Ten additional projects were in progress at the end of 1977.

The present position in regard to the Fishery Harbour Centres is as follows:*

Development work which commenced at Dunmore East in 1963 was completed in 1967. Work began at Castletownbere in 1964 has continued on a phased basis up to the present. A development programme initiated at Killybegs in 1964 has also continued up to the present. As already stated, a substantial fishery harbour

* We are grateful to Mr C.J. McGrath of the Department of Fisheries and Forestry for supplying the basic material from which this chapter was prepared.

development scheme was initiated at Rossaveel, instead of the development scheme proposed for Galway, the improvements at Rossaveel were completed in 1978. Major works have started at Howth. Although Greencastle was not included initially in the proposals for the development of Fishery Harbour Centres, a development programme was undertaken in 1960 to deepen the entrance to the harbour and to provide berthing facilities for the local fleet. This work was completed in 1965.

It should be emphasised that the apparently near-adequate capacity of the major harbours holds true only for the present size-distribution of fishing vessels. There is simply no way in which total landings can be increased, except by restructuring the fleet to include some larger vessels capable of fishing further afield and in more difficult weather. Thus, the level and composition of necessary further investment in harbour facilities cannot be assessed until the more fundamental issues relating to Irish access to the fishery resources of the "EEC pond" are resolved. Once catch targets are defined realistically, it becomes possible to design appropriate vessel sizes and geographic distribution of the fleet - only then can a specific programme of harbour enhancement be finalised.

In the present climate of uncertainty, the future development of the major harbours around the coast must take account of the following factors:

(i) <u>The Fuel Crisis</u>

This crisis, which is likely to continue, will place a very severe economic strain on middle and long distance fishermen, who may be forced, by necessity, to land into the nearest available port. Hence, foreign boats fishing off the Irish coast may have to land into suitable Irish harbours, thus necessitating some expansion of harbour facilities.

(ii) <u>Provision of Shelter</u>

There are still long stretches of the Irish coast where medium sized boats cannot shelter from a storm. This is a serious drawback, particularly in the rough western seas. There is need, therefore, for the provision of some deep harbours where ships can tie up in bad weather.

Table 4.3: Expenditure on fishery harbours and landing places, 1966/67-1977

	Department of Fisheries		Expenditure by Roinn na Gaeltachta	Local Authority Contributions	Total Expenditure
	Fishery Harbour Centres	Other Fishery Harbours			
	£	£	£	£	£
1966/67	122,620	20,000	43,170	5,000	190,790
1967/68	169,130	56,626	40,113	14,156	280,025
1968/69	167,616	154,070	135,790	38,517	495,993
1969/70	178,814	259,591	35,000	64,898	538,303
1970/71	201,190	141,890	91,409	35,472	469,961
1971/72	145,068	60,970	119,569	15,242	340,849
1972/73	364,000	196,500	82,796	49,125	692,421
1973/74	341,000	124,000	177,415	31,000	673,415
1974 (9 months)	378,000	177,250	376,898	44,312	976,460
1975	591,600	90,400	299,305	22,600	1,003,905
1976	494,202	242,750	355,520	60,687	1,153,159
1977	406,000	120,000	375,258	30,000	931,258
Total	3,559,240	1,644,047	2,132,243	411,009	7,746,539

Source: Department of Fisheries 1978.

(iii) Non-Fishery Enterprises

The development of harbours by the Department of Fisheries, with assistance from Roinn na Gaeltachta and local authorities, has been directed solely towards fishery enterprises. Harbour development and services to cater for other industries are also required. Such developments have taken place in a number of harbours to cater for offshore oil exploration: Dublin, Cork, Fenit, Foynes, Galway and to a lesser extent, Rathmullan. Harbour development not justifiable solely by fishery requirements, could well be justified by the needs of the economy as a whole.

Planned Future Development

In connection with this study, discussions were held with the Department of Fisheries, BIM, representatives of fishermen's organisations, and fishermen in order to ascertain their views on harbour capacity, which harbours should be developed in future years, the type of development work which should be undertaken, and the cost of this work. The fishermen's views, which were ascertained in the survey described in Chapter 3, are shown in Table 4.4. As can be seen, about 60 per cent of those fishermen interviewed were dissatisfied with the capacities of the harbours they use. The main complaints were that the harbours were too small and that they needed dredging. The authors can sympathise with these views; on our travels in connection with the study, we saw boats tied up three abreast at several harbours; and at others, boats were sitting high and dry at low tide. The discussions with the official and representative groups indicated that (as might be expected) all the harbours in the State (large and small) could benefit from some reconstruction work and that some such work was planned for a large number of harbours. Some of the works planned are, however, rather small and need not be discussed here; others are of a more significant size, requiring substantial funding, which, in our opinion, should be given high priority at a national level. Most of these harbours are listed in Table 4.2. If all the suggested developments were carried out on these harbours the total cost of the operations, at 1978 prices, would be in the region of £40 million. Clearly, therefore, a phased programme of development will have to be undertaken.

Further Development of Major Fishery Centres

Further work, estimated to cost about IR£16 million (at 1979 prices) is planned for the next three or four years on Greencastle and on four of the other five major ports mentioned above, i.e., Killybegs, Castletownbere, Howth, and Rossaveel. There are no immediate plans for further developments at Dunmore East.

Details of the planned developments are as follows:

Killybegs Fishery Harbour Centre, Co. Donegal

Killybegs is the premier fishing harbour in Ireland in terms of both the quantity of fish landed and the number and size of fishing vessels permanently and temporarily based there.

The total value of fish landed at Killybegs in 1978 was £4.5 million and 69 fishing vessels of 12 metres and over operated from this harbour. There are six processing plants and one fishmeal plant based at Killybegs. These plants have a combined production output in excess of £6 million and provide on-shore employment for 400 persons. This figure is expected to rise to 650 persons in future years. Apart from these plants, there is a net making factory and a boat building yard. Other services and facilities for the maintenance of the fishing fleet are also available.

Since 1952, development works to the value of approximately £1.12 million have been completed at Killybegs. These improvements provided 531 metres of berthage, 9,537 square metres of deck space, and 616 metres of approach causeway and service quay. Dredging of the harbour was carried out in 1964.

In 1978, work commenced on the provision of a boat lift, employing the "Syncrolift" system, capable of removing boats up to 36.36 metres in length and up to 580 tons in weight from the water and transferring them to an ancillary boat yard, which is also under construction. When completed, this yard will provide 5 parking bays, each 4,725 square metres. The design of these facilities is such that they may be extended to cater for boats up to 45.45 metres in length. The total estimated cost of the project is £780,000 which will be expended in the five years 1978 to 1982.

Table 4.4: Estimated percentage of skippers and crewmen who were dissatisfied with the capacities of the harbours they use, and percentage distribution of the complaints mentioned by those who were dissatisfied, classified by local area

Question: Are you satisfied with the capacities of the harbours which you use?	AREA								All Areas	
	East		South		West		North West			
	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman
	Per cent									
Satisfied	29.1	36.9	28.4	23.7	49.6	55.2	51.3	43.5	40.8	39.6
Dissatisfied	70.9	63.1	71.6	76.3	50.4	44.8	48.7	56.5	59.1	60.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Complaints made by those who were dissatisfied										
Harbours too small	53.4	39.0	48.0	39.5	41.4	52.9	41.5	47.1	45.4	44.1
Needs dredging	18.3	13.2	26.2	39.7	13.5	9.7	34.4	34.8	23.5	28.1
Needs lights	1.8	9.9	3.2	1.5	5.6	6.3	5.5	4.0	4.3	4.5
Needs fresh water	2.2	0.0	0.0	0.0	2.5	1.8	1.1	2.7	1.3	1.1
Needs power points	0.9	0.0	1.4	0.0	0.0	0.0	0.7	1.4	0.8	0.4
Needs lifting gear	1.1	0.0	1.3	1.5	0.0	2.8	4.9	2.5	1.7	1.8
Ice plant required	4.7	4.4	1.3	1.5	0.8	0.0	0.0	1.8	1.3	1.8
Needs boat repair facilities	3.6	2.3	7.2	6.4	9.7	3.4	1.1	0.5	6.1	3.5
Needs other facilities	14.0	31.3	11.4	10.0	26.6	23.1	10.8	5.1	15.7	14.8
All Complaints	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The construction of an auction hall (842 square metres area) and harbour administration buildings (197 square metres of floor area) commenced in 1979. Total estimated cost of this project is IR£270,000.

In addition to the above and in order to meet the current and anticipated needs of the expanded fishing fleet operating from Killybegs, the following developments are considered necessary by the Department of Fisheries:

	Details	Estimated Cost IR£m
(i)	Dredging of the harbour	.55
(ii)	The construction of a new roadway from the main landing pier and the auction hall to the existing boatyard	.15
(iii)	Two new berthage piers to provide 329 metres of berthage and 1,858 square metres of deck space to relieve present congestion and to free the existing major landing pier and services' quay for their main purposes	1.136
(iv)	Incidental reclamation work connected with (iii) above on landward and seaward side of the new roadway and to provide sites for a new net factory and other shore based operations	0.321
(v)	Construction of new slipway to replace the existing slipway, which will be eliminated as part of the improvement proposals	0.094
(vi)	Provision of a special pier (with approach causeway) for landing of industrial fish, used for the production of fishmeal and oil, providing 511 square metres of deck space, 34 metres of landing quay, and 61 metres of approach causeway	.45
(vii)	Future provision for a second fish landing pier for prime fish providing 253 metres of landing quay and 1,347 square metres of deck space	.60
	Total	3.301

The total estimated cost of development works in progress or planned at Killybegs is IR£4.351 million. In addition to the port development, sites for processing industries are also being zoned by the County Council in Killybegs.

Castletownbere Fishery Harbour Centre, Co. Cork

Castletownbere was included by Mr B.G. Bjuke, the Swedish consultant, in his recommendations for development, because of its proximity to valuable fishing grounds, its natural protection, and the extensive land space available for ancillary shore-based facilities. Development of Castletownbere as a fishery harbour centre was commenced in 1964 and has continued on a phased basis up to the present. However, the development of the sea fishing industry in this area has not been as rapid as elsewhere. This was due mainly to the considerable distance between the harbour and the principal outlet for the fish landed, (the Dublin Market,) and the difficulties in communication between the two places. With the advent of refrigerated truck transport and the car ferry services from Ireland to the Continent, the situation has improved considerably. Construction of a major fish processing plant in Castletownbere has commenced. This plant is being operated by Erinova Ltd. (a joint Irish/Spanish enterprise), which is providing an integrated catching, processing, and marketing operation, including necessary freezing and cold storage facilities for the export of fishery products to the Continent. Negotiations are also under way with other companies to provide additional processing, freezing and cold storage plants on the adjacent Dinish Island.

In 1970, Castletownbere was declared a Fishery Harbour Centre by the Minister in charge of Fisheries. Since then the growth of fishing activities, particularly from 1974 onward, has been considerable. The number of full-time and part-time fishermen has increased from 92 in 1974 to 117 in 1978. In the same period, the number of boats increased from 15 in 1974 to 24 in 1978, with the greatest increase in the category 100 gross registered tons and over (24.1 + metres and over).

The following development works have already been completed at Castletownbere:

(i) The original timber pier was replaced by the construction of the mainland wharf. This provides 198 metres of berthage.

(ii) The adjoining sea bed area together with the site for a wharf on Dinish Island were dredged to provide the required depth of water for berthage.

(iii) In 1971, an auction hall (360 square metres) and a harbour administrative building (190 square metres) were constructed and an oil bunkering installation with a capacity of 164 cubic metres was provided.

(iv) An access bridge (244 metres) to Dinish Island was completed in 1973.

(v) The wharf on Dinish Island, providing a concrete deck area of 264 square metres, was completed in 1978.

(vi) A 2,236 square metre deck area adjoining the Dinish Island wharf was surfaced in tarmacadam in 1979.

Development projects under construction or planned are as follows:

(i) Work on the construction of a Syncrolift was commenced in 1978 and will be completed in 1980.

(ii) A boatyard area of 2,685 square metres is being provided to accommodate vessels making use of the Syncrolift.

(iii) Provision has been made for the extension of the Dinish Island wharf by 120 metres, when the need arises.

(iv) The existing ice plant on the mainland is being replaced by a larger plant with a capacity of 30 tonnes of ice per day and a storage capacity of 80 tonnes.

In addition to the above, thirteen sites with a total area of 7.87 hectares for industrial development have already been provided, and services, such as lighting, etc., are being provided. An effluent disposal system has also been designed and will be completed by 1980.

The full programme of development, as outlined above, will be completed by the end of 1980. The total estimated cost of the development programme for Castletownbere is IR£3.50 million.

Howth Fishery Harbour Centre, Co. Dublin

Apart from Dun Laoire, Howth is the only enclosed area of significant size along the east coast of Ireland protected by substantial breakwaters. The cost of providing a harbour area of comparable size elsewhere along the east coast would be prohibitive. The various landing places along the east coast now in use by fishing vessels consist mainly of small harbours which are lacking in water depth and adequate shelter and deficient in shore-based facilities.

With the increase in the number and size of vessels along the east coast, the congestion at Howth reaches massive proportions when the need to seek refuge arises. The length of berthage with reasonable water depth is restricted to approximately 170 metres.

Howth is also the premier fishing harbour along the east coast and is second in importance to Killybegs in value of fish landed. The total value of fish landed at Howth in 1978 was approximately £2.0 million. Despite this level of activity, there is a lack of facilities at Howth which are essential to the efficient operation of a modern fishing fleet. The area available for landing fish along the west pier is very narrow, and severe congestion can occur on shore as well as in the berthage area, whenever substantial landings of fish take place. The increase in the number of larger and more expensive boats in the fishing fleet in recent years has compounded these difficulties.

Thirty seven boats, 9 metres and over, were permanently based in Howth in 1978. In addition, 63 boats, 15 metres and over, were based in Howth at some time during 1978 and landed their fish there.

It is now essential to provide proper facilities to accommodate, service, and protect the fleet, and a detailed development scheme for Howth has been prepared. Work on the first stage is underway and a decision on the execution of the second stage will be made in the light of developments after the completion of stage 1. Details of the two stages are as follows:

Stage 1

	Details	Estimated Cost IR£m
(i)	Dredging of the approach channel and the fishery harbour basin to provide the required depth of water in a channel, averaging 71 metres in width and 900 metres in length, commencing outside the harbour, and continuing through the harbour entrance and the fishery harbour basin. The channel will also extend for 131 metres along the site of the auction hall and include part of the adjoining servicing quay.	.800
(ii)	Provision of a new concrete quay wall which will run for 250 metres along the western side of the fishery harbour and which will extend further from the old quay wall. Available deck space will be increased substantially as a result, but it will involve considerable reclamation.	.800
(iii)	Provision of a Syncrolift System tobe incorporated into the new quay wall.	.209
(iv)	Provision of a breakwater, approximately 447 metres in length, within the main harbour. Subsequently, an additional quay wall, along the face of the breakwater, is proposed in order to provide an additional 338 metres of berthage and extra deck space. A spur breakwater, an 85 metre extension to the east pier, is proposed as protection for boats; and, in addition, a 47 metre, short-spur breakwater is proposed at the back of the west pier.	.892
(v)	The reclamation and servicing of 2.342 hectares of shore area for relocation of existing enterprises, including the provision of services	.766
(vi)	Purchase of Snycrolift machinery	.180
(vii)	Provision of Syncrolift platform, carriages, etc.	.090
(viii)	Syncrolift boatyard development	.008
(ix)	Auction hall and administrative buildings	.165
(x)	Replacement of yacht mooring area (provisional).	.250
	Total estimated cost - Stage I	4.160

Stage 2

Details

(i) Provision of second quay, 325 metres in length, and 6,500 square metres of deck area.

		Estimated Cost IR£m
(ii)	Demolition and reconstruction of buildings and reconstruction of new buildings.	
(iii)	Surfacing all new areas and provision of lighting, etc.	
	Total estimated cost - Stage 2	1.241

The actual number of fishing vessels to be accommodated in Howth on completion of the proposed development of the new fishery harbour will depend on the number and size of vessels in the various gross tonnage categories, present at the same time. It is estimated that the number of vessels of about 15 metres which can be accommodated will be as follows:

	Stage 1	Stage 2	Total
Normal conditions	47	38	85
Emergency conditions	83	40	123

Shore-based facilities proposed at the harbour will be directed towards the provision of services for the maintenance, etc. of the fishing fleet and auctioning of fish landed. Fish landed will be transported to fish processing plants removed from the fishery harbour. There are 11 fish processing plants in Dublin city and in the general catchment area likely to be supplied with the bulk of their fish from Howth.

Rossaveel Harbour Centre, Co. Galway

There has been a marked increase in the value of landings of fish caught off the west coast and landed in Galway in recent years (£1 million in 1977). The accommodation available at Galway is inadequate to cope with the number of vessels wishing to base themselves there at various times of the year. In 1978 the number of vessels fishing out of Galway harbour was 52 of which 21 were owned by skippers from the Aran Islands and the balance by skippers from elsewhere around the coast.

At present the landing of fish and the berthing of fishing vessels is being carried out at Galway under great difficulties and in a very undesirable manner due to the nature of the site and the limited facilities available. There is also severe congestion which is giving rise to hazardous conditions both for vessels and for crews. In all the circumstances everything points to the urgency and desirability of providing at Rossaveel the facilities essential to satisfy the immediate needs of the existing fleet and to make provision for further development expected in future years in the west of Ireland.

There is already a major fish processing establishment in existence adjacent to the Rossaveel pier and other essential facilities such as water and electricity are already available at the site. The immediate need is to provide additional berthage space for fishing vessels to relieve the congestion which at times exists there despite the fact that the quay is larger than that available at Galway. It is also essential that an auction hall and oil bunkering installation be provided as quickly as possible.

It is possible, within a period of two years, to bring about a substantial improvement in the position at Rossaveel by constructing a new berthage quay of 170 metres parallel to the completed quay, by the construction of an auction hall, 420 square meters and by the erection of oil bunkering facilities. To meet the immediate needs would entail an estimated expenditure of IR£1.1 million. A further investment of IR£3 million may be found necessary in future years.

<u>Greencastle Fishery Harbour, Co. Donegal</u>

Greencastle, situated on the western shore of Lough Foyle, is the only fishery harbour of significant importance along the northern coast. Along this coastline there is a need for a well developed and safe fishery harbour, not only in the interest of fishermen based in the Republic of Ireland but also in the interest of fishermen from Northern Ireland. The general terrain, although not ideal, lends itself to the construction of reasonably sized fishery harbour installations which can provide safe anchorage for fishing vessels at a tolerable cost. The port is at present restricted by a shallow harbour to small vessels; and, although the local fishing fleet has expanded considerably in recent years, the full scope of the port has not been realised. In addition, the National Fishery Centre was built there in 1974, with the aim of providing a corps of trained personnel to man the expanded Irish fishing fleet. A large training boat is needed for the courses provided in the Centre, and the harbour must be able to accommodate such a boat.

The total value of fish landed at Greencastle in 1977 was £563,791, compared with £16,741 in 1961. The number of men engaged in fishing full time and part-time, increased from 58 in 1961 to 254 in 1977, while the number of boats operating out of Greencastle increased from 17 in 1961 to 69 in 1977. As a result of this considerable growth rate, there is severe congestion, and fishermen from the area who own, or wish to purchase larger vessels are forced to base their boats elsewhere.

Greencastle was one of the original eight ports recommended for development by the Swedish consultant, Mr C. G. Bjuke. However, the port was not included in the original selection for development as a fishery harbour centre by the Department of Fisheries and Forestry. Nevertheless, a development programme was initiated to deepen the entrance to the harbour and to provide berthing facilities for the local fishing fleet. At the same time, the deck of the quay was widened and improved, providing 1,830 square metres of deck space. Subsequently, an ice plant was provided. These improvements were undertaken in 1960 and completed in 1965 at a cost of £117,000.

To meet the current and anticipated needs of the expanded fishing fleet operating from Greencastle, the following developments have been proposed by the Department of Fisheries and Forestry at an estimated cost of IR£1.77 million.

(i) Deepening of the berthage at the existing quay.

(ii) The existing quay to be extended to provide an additional 122 metres and the required depth of water at the new berthage: this depth to be continued to the entrance to the harbour.

(iii) An additional quay and breakwater, 61 metres in length, to be provided at the entrance opposite the extended quay to assist in protecting the entrance to the harbour.

(iv) The reclamation of an area of foreshore to provide 6,897 square metres of deck space.

(v) The provision of a 625 square metre auction hall, including office accommodation and improved lighting, fuel, and water supply facilities. All new areas to be surfaced.

(vi) At a later stage the provision of a syncrolift installation to facilitate the removal of boats from the water for renovations may become necessary.

As a result of these developments, it is expected that the number and size of boats at Greencastle will increase considerably, which in turn will result in doubling the quantity of fish landed. At present, there is one small fish processing plant, employing nine persons operating at Greencastle. On completion of the development programme, further processing plants are expected to be provided to deal with the increased landings.

Other Ports

There are other ports throughout the country which are contemplated for further development, based on considerations of shelter and concentration of landings. The decision as to which of these ports should be selected cannot be made until the level of funding for harbours is known, and until more definitive information is available on the future configuration of the Irish fleet.

CHAPTER 5

THE LABOUR FORCE IN FISHERIES

Relative Importance of Employment in Fishing for Selected Countries

The numbers of men employed full and part-time in sea fishing in selected countries during 1978, in comparison with the total male labour force of each country, are given in Table 5.1. The totals employed in sea fishing from this table are displayed in Figure 5.1.

Table 5.1: Numbers employed in fishing in selected countries compared with total male employment in these countries, 1978

Country	Total active male labour force	Total engaged in sea fishing			(d) as a percent of (a)
		Regular	Occasional*	Total	
	(a)	(b)	(c)	(d)	(e)
	('000)		Number		%
Iceland	65	4,200	1,119	5,319	8.21
Norway	1,108	17,827	14,765	32,592	3.00
Sweden †	2,231	4,226	2,473	6,699	0.30
Finland	1,179	2,100	5,500	7,600	0.64
Denmark ‡	1,490	10,938	3,971	14,909	1.00
Netherlands	3,657	n.a.	n.a.	3,604	0.10
Belgium	2,612	914	-	914	0.03
West Germany	16,949	4,576	268	4,844	0.03
France	14,146	n.a.	n.a.	22,456	0.16
United Kingdom	16,188	16,449	5,719	22,168	0.14
Ireland	831	2,881	5,665	8,546	1.03

* In Ireland occasional or part-time fishermen are defined as those who receive at least 30 per cent but less than 60 per cent of their income from fishing or who spend at least 30 per cent but less than 60 per cent of their working time in that occupation.

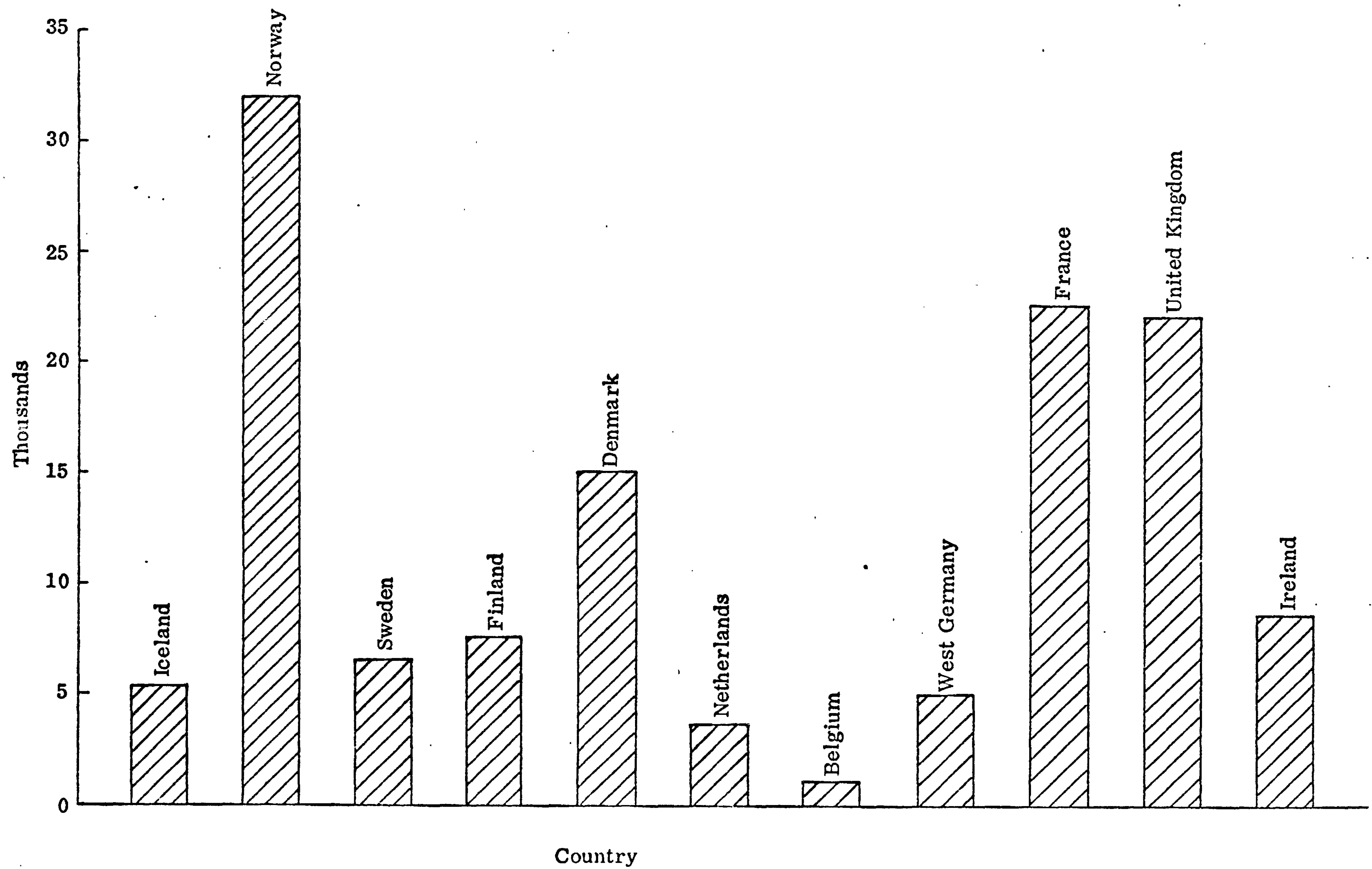
† 1976 figures.

‡ 1977 figures.

Source: OECD Review of Fisheries 1977 and 1978 and 1978 Yearbook of Labour Statistics, International Labour Office.

Of all the countries shown in this table, Iceland has the highest proportion (8.2 per cent) of its male labour force engaged in fishing. Norway is second with

Figure 5.1: Total numbers employed in sea fishing in selected countries in 1978 (based on Table 5.1)



3.0 per cent. Ireland, with 1.03 per cent, is third highest on the list, and Denmark is fourth with 1.00 per cent. Belgium and West Germany have the lowest proportion (0.03 per cent) of males engaged in fishing. The largest absolute number of fishermen is in Norway (32,592), followed by France (22,456) and by the UK (22,168). Belgium (914) has the lowest number of fishermen of all countries shown.

Trends in Employment in the Irish Sea Fishing Industry

Table 5A.1 (see the Appendix to this chapter) shows the number of persons in Ireland directly employed in sea fishing, either full time or part-time,* from 1963 to 1977, and their distribution regionally. In 1963, 5,588 people were employed: 1,666 (30 per cent) were engaged wholly in sea fishing and 3,922 (70 per cent) were engaged part-time. By 1969, the number of full time sea fishermen had increased by 9 per cent to 1,821, and the number of part-time fishermen had declined by about 3 per cent to 3,810. By 1977, full time fishermen had increased by nearly 60 per cent over the 1963 level, compared with an increase of 40 per cent in the numbers of part-time fishermen. Of the total number of persons employed in sea fishing in Ireland in 1977, two-thirds were employed part-time or occasionally and the remaining third, full time.

In addition to the direct employment in fish catching, there is also a considerable amount of indirect employment in shore operations, distribution, processing, etc. This employment is difficult to measure. At our request, BIM supplied the following numbers on employment in fish processing in 1977: 1,550 in shore processing and 1,010 in other ancillary activities (excluding distribution). This compares with 540 in shore processing and 240 in other ancillary activities in 1965. The increase in employment in both these activities between 1965 and 1977 was 228 per cent. However, despite this growth, the total number employed in the fish industry (excluding distribution) - 10,739 in 1977 (see Table 5.2) - is still very small in terms of total national employment. Its importance lies in its regional distribution.

Regional Importance of Sea Fishing

The greatest concentration of employment in sea fishing is in the west and north west coastal areas, which together account for nearly 60 per cent of the total

---

* For definition of part-time fishermen, see footnote to Table 5.1.

Table 5.2: Direct and indirect employment in the fishing industry, selected years 1965 - 1977

	1965	1969	1975	1977	Percentage change 1965-1977
Fishermen full time	1,593	1,821	2,274	2,662	67.1
Fishermen part-time	3,760	3,810	4,356	5,517	46.7
Total fishermen	5,353	5,631	6,630	8,179	52.8
Shore processing	540	880	1,500	1,550	187.0
Other ancilliary activities excluding distribution	240	330	1,150	1,010	320.8
Total employment (excluding distribution)	6,133	6,841	9,280	10,739	75.2

Source: BIM Annual Report 1975 and Sea and Inland Fisheries Reports of the Department of Fisheries.

employment in the industry. The west coast has 25 per cent of all fishermen in the State, the north west coast 35 per cent, the south coast 31 per cent; the east coast has only 10 per cent of the total. The following figures summarise these proportions on a full and part-time basis for 1977.

	Full time %	Part-time %	Percentage of total sea fishing employment %
North West Coast	24.4	39.4	34.5
West Coast	9.5	32.0	24.6
South Coast	44.5	24.1	30.8
East Coast	21.6	4.5	10.1
Total	100.-	100.-	100.-

Fishermen form a relatively high proportion of the gainfully occupied in their respective regions, though they form only a small proportion of the total labour force. Table 5.3 (derived from the 1971 Census of Population and from Department of Fisheries and Forestry figures) shows that in 1971 there were 5,688 fishermen (wholetime and part-time) located in 214 District Electoral Divisions (DEDs) in the State (other than municipal Boroughs). Fishermen were located in 11 per cent of the DEDs in the counties having fishermen. Looking at the individual counties, we see that almost 20 per cent of the DEDs in Donegal and Kerry had fishermen, compared with 16-17 per cent for Louth and Wexford, 13 per cent for Mayo, and less than 3 per cent for Dublin.

The number gainfully occupied in 1971 in the counties having fishermen was 752,000, out of a total labour force in the State in that year of 1,120,000. The total labour force in the DEDs with fishermen was 71,000, or 9.4 per cent of the labour force in the counties in which these DEDs were located. Fishermen (5,688) accounted for 8.0 per cent of the labour force in the DEDs having fishermen, but this percentage varied from 19 per cent in Donegal, to 14 per cent in Galway, 8 per cent in Waterford, and 2 per cent in Dublin and Wicklow. It can be seen therefore that fishing is an important occupation in some of the more remote counties, and anything which stimulates this industry will have an important regional effect in areas of particular need.

Table 5.3: Total population, numbers employed and number of fishermen, classified by region, 1971

Region	DEDs		(2) as percentage of (1)	Population of		Gainfully employed		† * Number of fishermen	Fishermen as percentage of	
	Total in county or region	Number with * fishermen		County or region	DEDs with fishermen	In county or region	In DEDs with fishermen		Population (8)/(5)	Gainfully employed (8)/(7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Donegal	149	29	19.5	108,344	28,271	40,830	10,407	1,962	6.9	18.8
Sligo	82	7	8.5	50,275	4,816	18,990	1,892	145	3.0	7.7
North west region	231	36	15.6	158,619	33,087	59,820	12,299	2,107	6.4	17.1
Mayo	154	20	13.0	109,525	15,123	40,472	5,382	457	3.0	8.5
Galway	220	24	10.9	149,223	17,683	54,803	6,301	907	5.1	14.4
Clare	155	13	8.4	75,008	8,601	28,031	2,998	133	1.6	4.4
West region	529	57	10.8	333,756	41,407	123,306	14,681	1,497	1.2	3.4
Kerry	166	31	18.7	112,772	23,326	41,451	8,762	651	2.8	7.4
Cork	399	40	10.0	352,883	28,512	83,844	10,785	531	1.9	4.9
Waterford	117	13	11.1	77,315	6,068	28,870	2,235	180	3.0	8.1
South region	682	84	12.3	542,970	57,906	154,165	21,782	1,362	2.4	6.2
Wexford	124	20	16.1	83,351	16,754	31,024	6,091	314	1.9	5.2
Wicklow	82	4	4.9	66,295	14,083	24,354	4,796	117	0.7	2.4
Dublin	221	6	2.7	852,219	23,404	330,387	8,601	202	0.9	2.4
Louth	42	7	16.7	74,951	7,124	28,887	2,589	89	1.2	3.4
East region	469	37	7.9	1,076,816	61,365	414,652	22,077	722	1.2	3.3
All Regions	1,911	214	11.2	2,112,161	193,765	751,943	70,839	5,688	2.9	8.0

† Department of Fisheries' figures.

* Other than municipal boroughs

Source: Census of Population 1971 and Department of Fisheries.

Description of Fishing Operation

Among fishermen three groups are distinguishable. The first group consists of very small-scale operators who fish with small boats. These fishermen are engaged almost exclusively in catching shellfish, mackerel, and pollack close to shore. The second group uses boats 8-15 metres in length, and many of them fish on a part-time basis. These fishermen are scattered widely along the coast; and, though they are engaged primarily in catching shellfish, they carry out some drift netting for salmon, herring, and mackerel. The third group of fishermen are those who use the larger, multipurpose boats, which operate out of the major ports around the coast. Because of comparatively high capital investment and maintenance costs, this group must fish continuously throughout the year and in as many fisheries as possible.

In the survey discussed in Chapter 3, fishermen were asked a number of questions relating to their backgrounds and their fishing activities. The answers to these questions are discussed in some detail below.

Demographic Characteristics of Fishermen

Table 5A.2 of the appendix shows the age structure of skippers and crewmen, together with that of all gainfully occupied males in 1977. A comparison of the age structure of skippers with that of the labour force as a whole, shows that substantially fewer skippers are under 25 and substantially more are in the 30-44 age group. Crewmen, on the other hand, come predominantly from the younger age groups; nearly 60 per cent of them are under 30. This difference in age structures of skippers and crewmen probably reflects the fact that most skippers begin as crewmen and eventually acquire their own boat; and we might safely say that many crewmen aspire to become skippers.

The highest educational level attained by skippers and crewmen is shown in Table 5A.3. In general, crewmen appear to have considerably more schooling than skippers. Except in the south, about three-quarters of the skippers had only primary education, whereas the corresponding proportion for crewmen in all areas was about a half. This pattern is probably attributable to the lower average age of crewmen and the fact that, in recent years, there has been a tendency for children to stay on longer at school.

About 70 per cent of skippers and about 44 per cent of crewmen were married. Table 5A.4 shows average number of persons dependent on skippers and crewmen. On average, about four persons were mainly dependent on each skipper's income, while about three were dependent on each crewman. These figures did not vary greatly from one region to another, but there was some tendency for those working on the larger boats (probably older fishermen) to have larger numbers of dependents.

Degree of Dependence on Fishing

A crucial factor in assessing the viability of fishing as a livelihood is the extent to which it is combined with other sources of income. Tables 5A.5 and 5A.6 show the percentages of skippers and crewmen with different main occupations. "Main occupation" was defined as 'the occupation from which the respondent derived the greater part of his livelihood during the past twelve months'. Reliance on fishing as a main occupation is closely related to size of boat. Practically all those working on boats over 12 metres stated that fishing was their main occupation. On the other hand, less than 40 per cent of those working on the very small boats gave this answer. Farming was the most important alternative occupation for these respondents, with over one-fifth giving this as their main occupation. Employment in manual jobs was also important, especially for crewmen. In the 0-5.9 metre boat category about 16 per cent of skippers and 8 per cent of crewmen described 'unemployment payments' as their main source of income. Indeed about 6-7 per cent of all respondents mentioned unemployment payments in this context.

The regional breakdown in Table 5A.6 shows that none of the respondents from the eastern area mentioned farming as a main occupation, and the proportion mentioning it in the south was less than 5 per cent. Subsidiary employment in manual occupations, other than farming, appears more prevalent in the east and north west than in the other areas.

Table 5A.7, which shows the average number of weeks spent in various occupations, again emphasises the part-time nature of the fishing carried out by the smaller boats. Those working on boats of less than 9 metres spent less than 30 weeks fishing in the year prior to interview. This includes any time spent on maintenance of boat, repairs to nets, etc.

As might be expected from the data on weeks engaged, fishing accounts for a much lower proportion of total income for those working on smaller boats than for those working on larger vessels. For instance, Table 5A.8 shows that only 45 per cent of the total annual income for skippers of boats under 6 metres was derived from fishing. In the case of skippers of boats over 24 metres, almost all their income, 99.6 per cent, was attributable to fishing. In general, skippers earned more than crewmen, the gap being particularly marked in the case of the larger boats.

The Training of Fishermen

The Merchant Shipping Act 1894, operated by the Department of Transport and Power requires that:

(a) For boats between 25 and 50 GRT, the skipper must have a certificate of competancy as Second-Hand (Special).

(b) For boats over 50 GRT, the skipper must have a certificate of competancy as Skipper (Limited) and the Second Officer must have a Second-Hand certificate.

When data on the number of boats over 25GRT and on the number of fishermen with the requisite qualifications were examined, it was found that the numbers of fishermen available with the necessary certificates were far short of the numbers required. In 1975, 28 certified skippers were available, whereas 159 were needed. and the number of second-hand certificated fishermen available was 275, whereas 312 were required.

These figures reveal a disturbing situation which needs rectification. Boats costing £0.75 million and more are being operated by fishermen who do not have the required qualifications. When this question was raised with the Department of Transport and Power a few years ago, a spokesman said that they did not have the staff to enforce the law and that, if they did enforce it, a high proportion of the boats would be tied up. (Wright, 1978).

Recently, however, steps are being taken to remedy the situation. Responsibility for all aspects of training, which heretofore had been shared by the Department of Fisheries and BIM, has now been passed entirely to BIM, which has prepared a comprehensive training plan on the basis of a Consultancy Report commissioned from the White Fish Authority. The new training courses commenced in Autumn 1979, but, before discussing these, we outline briefly the courses already in existence.

Existing Fishery Training Courses

Up to 1979 the main training programmes were operated by the Department of Fisheries at its Fishery Training Centre in Greencastle, Co. Donegal. Full-time courses were provided at the centre for:

(a) Young boys aged 16-19 years who wished to become fishermen and

(b) Experienced fishermen over 21 years of age who wished to acquire qualifications as Second-Hand (Special) and Skipper (Limited).

Boys Training Course

This course extended over a period of 12 months; five months were spent on theoretical and practical training in the centre and seven months, aboard selected fishing vessels. During the course, both in the school and aboard ship, the boys received free board and accommodation and sums of £6 - 8 per week towards expenses.

Two courses were run in the fishery centre each year, one commencing in February and the other in September. The centre has accommodation for 30 boys at any one time, but all the available places were seldom taken up. The numbers of boys commencing the courses in the years 1970 to 1977 are shown below.

	Course 1 Commencing February	Course 2 Commencing September	Total
1970	22	27	49
1971	21	17	38
1972	30	23	53
1973	29	27	56
1974	27	29	56
1975	21	21	42
1976	24	28	52
1977	30	26	56

On completion of the course, a boy, who had to be between 16 and 21 years at commencement, was eligible to work as a crew member on a boat of his choice and was entitled to receive a share of the boat's earnings. During this time, he could train to be a skipper, or if technically minded, concentrate on being a marine engineer or an electronics expert.

For a boy who wished to command a fishing vessel, four years apprenticeship at sea entitled him to attend further training courses at the National Fishery Centre, leading to examinations at the Department of Tourism and Transport for Certificates of Competency (i.e., Skipper or Second-Hand Certificate).

Courses for Experienced Fishermen

Two courses were run in the National Fishery Centre each year to enable experienced fishermen qualify for certificates of competency, either as Second-Hands or as Skippers. These were full-time courses, extending over periods of 10-12 weeks. To be eligible for the Second-Hand Course, fishermen had to be 19 years of age or over and have had four years sea service in deck capacity, of which at least two years must have been aboard deep sea fishing boats. Alternatively, they could have served four years as an indentured apprentice on a sea fishing boat. To be eligible for the skippers course, the entrant had to be 21 years of age or over and have spent at least five years at sea in a deck capacity, of which one year must have been as second or third hand on fishing vessels of 25 tons and upwards, while holding a Certificate as

Second-Hand. Alternatively, the entrant could have spent at least five years at sea in a deck capacity of which one year must have been as skipper of a fishing boat, for which a Second-Hand (Special) certificate is required, and two years must have previously been served on deep sea fishing boats.

During the period of the course, fishermen received (in recent years) £18 per week plus £1.50 per dependent. Out of this, they had to pay for their board and lodgings; they were not accommodated in the school.

In addition to the Department's adult courses, BIM also ran courses at selected centres for fishermen who were not in a position to attend the National Fishery Centre. These courses, held in the evenings after boats had unloaded their catches and at week-ends, were more popular with fishermen than the residential courses; the fishermen were reluctant to give up earnings for 10-12 weeks in order to attend the Department's school. The number of Certificates of Competancy issued in the years 1970 to 1977 by the National Fishery Centre and through BIM portal courses are as follows:

Year	National Fishery Centre	BIM Port Courses	Total
1970	5	11	16
1971	6	31	37
1972	11	31	42
1973	10	19	29
1974	1	55	56
1975	2	8	10
1976	9	4	13
1977	11	n.a.	-

New Training Scheme Proposed by BIM

Following the transfer of responsibility for education and training to BIM, a consultancy study of the existing education and training facilities was carried out. As a direct result of this study, BIM is now planning a radical re-organisation of educational services, aimed at providing a higher level of technical competence for Irish fishermen and a career structure for new entrants to the industry.

The National Fishery Centre at Greencastle will remain the centre of fisheries education and training, both from a career structure and trainee viewpoint. The role of the National Fishery Centre will be enlarged through the provision of external courses incorporating a mobile training unit. A training vessel will also be provided at the centre for instruction in fishing techniques, navigation, and deck safety. Training for fishermen who are currently uncertified will receive top priority through the expansion of the existing BIM port courses. All courses will emphasise the practical involvement of the student.

Training of New Entrants and Experienced Fishermen

The Consultancy Study stressed the necessity of concentrating on subjects which are particularly relevant at the beginning of a young fisherman's career, such as fishing operations in simulated conditions and deck working safety. The new scheme provides the young fisherman with the prospect of a rewarding career where certificates and qualifications will guarantee him recognition within the industry. Fishermen will be encouraged to join the education and training scheme in Greencastle at an appropriate point in their careers. In this way, both practising fishermen and new entrants will be able to continue with their training and attain proficiency in varied aspects of modern fishing techniques. Discharge books containing the sea-going record of a fisherman will be introduced. An outline of the proposed training courses to be offered by BIM at the National Fishery Centre is given in Appendix 5B.

Training in New Technology

Training in new technology is considered of prime importance, particularly in view of the widening gap between the development of new equipment and the training of fishermen in its use. Previously, there was no effective school-structured training in the operation and interpretation of acoustic instruments, in the care and maintenance engine rooms, and in hydraulics and fishing gear technology. This need is to be satisfied both at the Fishery Centre and by the use of the Mobile Training Unit, which will run short, intensive courses in port areas. The Mobile Training Unit will use modern educational techniques, such as electronic fishing aids of the types currently fitted on modern fishing vessels. In addition to technology training, the mobile unit will offer small vessel operators courses in coastal navigation, pilotage, the use of echo sounders and electronics. Courses will be no more than one week in length.

The additional budgeted capital costs for the new BIM training programme, (at 1979 prices), is estimated at IR£562,000, while the total running cost per annum is estimated at IR£140,000, compared with a present annual running cost of IR£90,000.

Training for Marine Aquaculture

Considerable interest has recently been focused on marine aquaculture development in Ireland, i.e., the artificial cultivation of shellfish, salmon, trout, etc. As these are very skillful operations (see Chapter 6), education and training are clearly going to be a crucial determinant of the success of such ventures in Ireland. It has been decided therefore, that various aspects of training should be catered for by courses which will be initiated in the near future. The programmes contemplated are as follows:

(a) A course leading to a degree in Fisheries Science at University College Galway for management personnel is under consideration.

(b) A National Certificate Course in Aquaculture will be run by the Regional Technical College Galway to contribute to the overall training situation. The course to start in February 1980 and will run for fourteen weeks per year over three years. Sponsorship by an existing fish farm is a pre-requisite for eligibility.

(c) The major gap in training is at the operator level, where there is a need for short courses and workshops dealing with the practical problems in aquaculture. It is envisaged that training courses and workshops will be organised in existing firms, and it is hoped that these firms, in co-operation with BIM will fulfil the training needs for those wishing to enter fish farming initially on a pilot scale.

BIM has already established an aquaculture unit to deal with education, training and extension services in phase with the Board's market development policy for these fishery products. Short courses in aquaculture are being prepared by BIM but the exact content of these courses has not yet been finalised.

APPENDIX 5A

Table 5A.1: Regional distribution of personnel engaged in sea fishing, 1963-1977

Area	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977*
East Coast															
- wholly	396	401	398	420	452	456	495	533	565	556	587	566	581	591	575
- part-time	236	218	205	227	252	249	223	217	215	248	280	300	337	343	248
Total	632	619	603	647	704	705	718	750	780	804	867	866	918	934	823
South Coast															
- wholly	643	625	560	516	534	493	509	526	568	582	720	802	895	1,039	1,185
- part-time	954	919	872	847	808	809	816	778	816	988	1,095	1,089	956	1,020	1,331
Total	1,597	1,544	1,432	1,363	1,342	1,302	1,325	1,304	1,384	1,570	1,815	1,891	1,851	2,059	2,516
West Coast															
- wholly	226	232	227	234	241	239	259	276	249	280	316	309	232	242	252
- part-time	1,446	1,409	1,407	1,311	1,344	1,344	1,386	1,453	1,271	1,246	1,281	1,303	1,305	1,410	1,764
Total	1,672	1,641	1,634	1,545	1,585	1,583	1,645	1,729	1,520	1,526	1,597	1,612	1,537	1,652	2,016
North West Coast															
- wholly	401	392	408	464	494	499	558	629	712	756	801	833	566	623	650
- part-time	1,286	1,295	1,276	1,242	1,251	1,354	1,385	1,449	1,405	1,486	1,495	1,494	1,758	2,125	2,174
Total	1,687	1,687	1,684	1,706	1,745	1,853	1,943	2,078	2,117	2,242	2,296	2,327	2,324	2,748	2,824
All Regions															
- wholly	1,666	1,650	1,593	1,634	1,721	1,687	1,821	1,964	2,094	2,174	2,424	2,510	2,274	2,495	2,662
- part-time	3,922	3,841	3,760	3,627	3,655	3,756	3,810	3,897	3,707	3,968	4,151	4,186	4,356	4,898	5,517
Total	5,588	5,491	5,353	5,261	5,376	5,443	5,631	5,861	5,801	6,142	6,575	6,696	6,630	7,393	8,179

* Derived from individual portal figures.

Source: Sea and Inland Fisheries Reports of the Department of Fisheries for various years.

Table 5A.2: Age structure of skippers and crewmen, classified by area

Age Group	Area								All Areas		All gainfully occupied males *
	East		South		West		North West				
	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	
	Per cent										
Under 20	1.4	15.3	1.9	17.1	0.2	7.9	0.0	20.0	0.8	15.3	8.0
20 - 24	0.7	15.4	8.6	24.0	3.1	28.2	3.5	19.8	4.7	22.5	13.5
25 - 29	6.7	27.2	21.1	15.3	10.7	20.4	10.2	16.2	13.4	18.8	12.9
30 - 44	49.1	33.9	41.0	29.9	41.8	33.8	45.4	30.4	43.3	31.7	30.8
45 - 59	31.3	5.7	18.3	9.3	29.7	7.2	33.3	8.2	27.2	7.8	24.3
60 and over	10.8	2.4	9.1	4.5	14.6	2.6	7.5	5.4	10.6	3.9	10.5
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Last column derived from Labour Force Survey 1977, published by the Central Statistics Office.

Table 5A.3: Highest type of education attained by skippers and crewmen, classified by area

Type of education	Area								All Areas	
	East		South		West		North West			
	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen
	Per cent									
Primary	77.0	54.1	58.1	41.0	75.0	54.9	75.9	51.2	70.1	49.6
Vocational	12.0	19.3	20.2	29.4	16.5	35.4	13.6	29.9	16.4	29.4
Secondary	10.5	23.8	17.9	26.7	8.2	9.7	9.9	17.5	12.0	19.2
Third level	0.5	2.8	3.7	2.9	0.3	0.0	0.6	1.3	1.5	1.7
All types	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 5A.4: Average number of persons dependent on skipper and crewman, classified by length of boat and area

Length of boat (metres)	Area								All Areas	
	East		South		West		North West			
	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman	Skipper	Crewman
	Number of Persons									
0 - 5.9	3.7	2.2	2.5	1.6	3.9	2.5	3.3	2.1	3.6	2.2
6.0 - 8.9	3.7	3.7	3.7	2.2	4.4	3.0	3.6	2.0	3.8	2.6
9.0 - 11.9	*	*	3.5	2.6	4.1	2.0	4.3	2.2	4.0	2.3
12.0 - 17.9	4.4	3.2	3.8	2.8	4.8	2.8	4.1	3.6	4.2	3.2
18.0 - 23.9	4.7	2.9	4.7	3.2	6.4	3.0	5.5	3.5	5.0	3.2
24.0 - 29.9	5.6	*	4.6	5.1	2.0	*	6.4	3.4	5.4	4.1
All lengths	4.2	3.1	3.6	2.7	4.2	2.7	3.9	2.7	3.9	2.8

* There were too few valid responses in these cells to permit the calculation of reliable figures.

Table 5A.5: Percentages of skippers and crewmen with different main occupations, classified by length of boat

Main Occupation	Length of Boat (metres)												All Lengths	
	0 - 5.9		6.0 - 8.9		9.0 - 11.9		12.0 - 17.9		18.0 - 23.9		24.0 - 29.9			
	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen
	Per cent													
Fishing	39.8	30.7	60.7	61.6	85.8	78.8	100.0	97.4	100.0	96.7	100.0	94.1	64.9	72.0
Farming own farm	23.0	22.3	12.7	7.0	5.8	2.3	0.0	0.9	0.0	0.0	0.0	0.0	12.5	6.1
Relative assisting	4.5	11.1	1.5	6.6	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	1.9	4.1
Self-employed*	3.5	0.0	2.0	2.7	2.2	0.0	0.0	0.9	0.0	0.4	0.0	0.0	2.1	1.1
Professional/clerical	2.2	0.0	1.5	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2
Skilled manual	6.7	10.9	8.6	0.9	1.8	2.3	0.0	0.0	0.0	0.0	0.0	0.0	5.8	2.2
Unskilled manual	4.3	16.6	6.7	8.1	1.8	9.7	0.0	0.0	0.0	1.0	0.0	0.0	4.3	6.9
Unemployment payments	15.9	8.4	6.4	9.7	2.5	6.3	0.0	0.9	0.0	2.0	0.0	5.9	7.4	6.4
All occupations	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Non-farm/fishery work

Table 5A.6: Percentage of skippers and crewmen with different main occupations, classified by local area

Main Occupation	Area								All Areas	
	East		South		West		North West			
	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen
	Per cent									
Fishing	70.1	81.4	84.8	80.9	64.1	61.7	38.6	66.6	64.9	72.0
Farming own farm	0.0	0.0	4.8	3.0	19.4	13.2	19.2	6.6	12.5	6.1
Relative assisting	0.0	0.0	1.0	1.1	3.8	13.3	1.3	1.1	1.9	4.1
Self-employed*	2.8	0.5	1.8	0.3	0.0	2.5	4.8	1.1	2.1	1.1
Professional/clerical	2.8	2.4	1.9	0.0	0.0	0.0	1.3	2.8	1.2	1.2
Skilled manual	5.6	4.7	2.0	1.1	1.0	1.5	16.3	2.5	5.8	2.2
Unskilled manual	13.5	4.8	1.8	6.9	2.9	6.1	4.9	8.8	4.3	6.9
Unemployment payments	5.2	6.2	1.9	6.7	8.7	1.6	13.6	10.4	7.4	6.4
All Occupations	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Non-farm/fishery work

Table 5A.7: Average number of weeks* spent in various occupations by skippers and crewmen, classified by length of boat

Main Occupation	Length of Boat (metres) 0 - 5.9		6.0 - 8.9		9.0 - 11.9		12.0 - 17.9		18.0 - 23.9		24.0 - 29.9		All Lengths	
	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen
	Weeks Engaged													
Fishing	21.1	16.1	27.1	25.2	35.3	31.1	41.9	38.2	47.2	42.4	47.9	44.5	29.5	30.5
Farming own farm	15.5	11.2	15.2	4.6	9.3	4.2	0.0	1.4	0.1	0.0	0.0	0.0	12.1	4.0
Relative assisting	4.1	5.8	3.2	5.6	2.4	5.3	0.9	0.7	0.0	0.7	0.0	0.0	2.9	3.8
Self-employed †	1.7	1.1	1.9	1.6	2.3	0.2	0.1	1.7	0.9	0.2	0.0	0.0	1.7	1.0
Professional/clerical	1.2	0.0	0.8	1.3	0.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.8	0.5
Skilled manual	3.1	3.9	3.7	0.4	1.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.9
Unskilled manual	2.8	9.0	4.6	4.6	2.2	3.0	0.2	0.0	0.0	0.1	0.0	0.0	3.1	3.4
Unemployment payments	15.7	7.6	10.9	11.3	8.6	12.5	1.1	1.6	0.1	3.1	0.6	2.2	10.3	7.9

* The total number of weeks may add to more than 52 since an individual may carry out more than one occupation in a particular week.

† Non-farm/fishery work.

Table 5A.8: Average annual income from various occupations accruing to skippers and crewmen as a percentage of total income, classified by length of boat ≠

Main Occupation	Length of Boat (metres) 0 - 5.9		6.0 - 8.9		9.0 - 11.9		12.0 - 17.9		18.0 - 23.9		24.0 - 29.9		All Lengths	
	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen	Skippers	Crewmen
	Per cent													
Fishing	45.2	37.2	61.4	63.4	83.2	73.6	93.5	89.3	97.8	92.7	99.6	97.6	69.7	74.1
Farming own farm	22.1	20.4	9.1	5.4	3.9	2.8	0.1	2.7	0.3	0.0	0.0	0.0	9.5	5.0
Relative assisting	3.1	5.4	1.3	3.2	0.6	2.9	0.0	2.8	0.0	0.2	0.0	0.0	1.2	2.4
Self-employed ✝	1.7	*	3.5	2.9	2.5	0.2	0.2	0.8	1.9	0.3	0.0	0.0	2.4	1.1
Professional/clerical	2.6	0.0	2.0	2.2	0.8	0.0	0.0	0.0	0.0	2.2	0.0	0.0	1.4	1.2
Skilled manual	6.7	13.4	7.8	1.3	1.7	2.4	0.0	0.0	0.0	0.0	0.0	0.0	4.7	2.4
Unskilled manual	4.2	17.0	6.9	12.4	1.7	7.0	0.2	0.0	0.0	0.5	0.0	0.0	3.8	7.0
Unemployment payments	14.3	6.5	8.0	9.3	5.5	11.2	5.9	4.4	0.1	4.1	0.4	2.4	7.3	6.9
All Occupations	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

≠ The percentages in this table must be taken with a certain amount of caution as they are based solely on estimates by the respondents. In this connection the proportion of income arising in farming is particularly difficult to estimate.

✝ Non-farm/fishery work.

* Too few respondents gave information to permit the calculation of a valid average for this cell.

APPENDIX 5B

Appendix 5B

OUTLINE OF THE PROPOSED TRAINING COURSES AVAILABLE FOR SEA FISHERMEN

Fishing Deckhand Basic (Commencing October 1979 and January 1980)

Full time course of 12 weeks duration directed towards the practical skills and basic knowledge required to work with safety on the deck of a fishing vessel currently operating in the Irish fleet. A BIM discharge book will be issued on the successful completion of the course and assessment exercises.

Fishing Deckhand Advanced - (Commencing June 1980)

Full time course of 12 weeks duration directed towards the training of a deckhand in the practical use of the fish finding, navigational, and communication equipment currently used in the Irish fishing vessels. The course is designed to enable the deckhand to progress to the level of assisting with fishing operations in the wheelhouse as well as on the deck. The BIM discharge book will be endorsed on the successful completion of the course and assessment exercises.

Second Hand (Special) - (Commencing March 1980)

Full time, 10-week course leading to qualification for the Certificate of Second Hand (Special) of the Department of Tourism and Transport necessary for the command of vessels of less than 50 tons.

Skipper Limited - (Commencing March 1980)

Full time, 12-week course leading to qualification for the Certificate of Skipper (Limited) of the Department of Tourism and Transport necessary for the command of vessels in excess of 50 tons.

In-Service Training Courses

Depending on demand, in-service training courses will be organised at the school for active fishermen. These courses will be arranged to accommodate fishermen during slack periods in their fishing seasons and will cover the following areas:

Diesel Machinery Operation and Management

Full time three week course in the on-board management of fishing vessel propulsion machinery, including day-to-day servicing and maintenance. The BIM discharge book will be endorsed on successful completion of the course and assessment exercises.

Acoustic Fish Finding Techniques

Full time three week course in the practical,on-board operation of acoustic fish detecting equipment,including sounders, fish loop, and sonars. The BIM discharge book will be endorsed on successful completion of the course and assessment exercises.

CHAPTER 6

MARINE AQUACULTURE

Because sea fishing must be undertaken in all kinds of weather, and at various distances from the shore, it is a hazardous, capital intensive and sometimes unreliable operation. Boats may become wrecked in storms, fish may not be found where expected, grounds may become over-fished and fishermen may be forced to travel further out to sea or to fish for less remunerative species. To cope with these hunting problems, and in efforts to provide markets with steady supplies, man has over the years attempted to rear fish artificially in accessible places both at sea and in inland waters. Artificial rearing of certain valuable inland species like trout is a well established practice and indeed this form of culture is essential if regular supplies of such fish are to be available for consumption. A hotel could hardly offer wild trout on the menu if it had to be caught by rod and line or even in nets in inland waters (provided nets were allowed in such waters).

The artificial rearing of fish is known as aquaculture or more commonly as fish farming, and when the rearing takes place in the sea the operation is called marine aquaculture or mariculture. Aquaculture is a skillful and very often an expensive, capital intensive operation. Young fish have to be bred in special hatcheries or sometimes dredged from the sea. They have to be reared in some accessible confined space from which they cannot escape, such as in cages, nets, rafts, or enclosed lakes, ponds, etc. Some species also (e.g. trout and salmon) must be fed liberally on specially prepared fish food which is very expensive compared with ordinary animal meals. Also in most cases large quantities of moving water are required to supply oxygen and remove excreta, and like all animals reared together in large numbers, artificially reared fish are very subject to disease. Outbreaks destroying a whole stock are not uncommon and there must be constant vigilance on the part of the fish farmer to detect and treat disease before too much damage is done.

The above description indicates that aquaculture, while having many advantages in the regulation of supplies, also has its problems, not least of which is the quality of the fish produced. For some shellfish there is no difference in taste between artificial and wild stocks but for species like trout and salmon it is claimed that this is not so. The wild stocks are supposed to have a much better flavour than the others and usually command higher prices. However in the case of trout, at any rate, the advantage of continuity of supplies with artificial rearing outweighs other considerations.

An analysis of the prospects and problems of aquaculture in the marine environment in Ireland was recently undertaken by J. Glude, (1979) one of the world's authorities on the subject. In his report aquaculture is seen as a method of increasing production and as an alternative employment opportunity for some displaced inshore fishermen. Although freshwater fish such as trout, catfish, and various species of carp have been raised successfully in aquaculture systems, culture of marine species such as oysters and mussels is a relatively new technology. A sound scientific basis for marine aquaculture is available for a few species only and there are few examples of commercially successful operations. Indeed there are few instances where culture systems have been tested at pilot or commercial scale with analysis to determine economic viability. The intense interest in aquaculture has led to premature investments with high failure rates, although possibly no higher than for other new technology fields.

Even for oysters and mussels which have been raised artificially for many years, the application of new culture systems or attempts to culture these species in new areas requires a period of testing and evaluation before success can be assured. In addition large increases in production of any species can create questions concerning markets for the products.

Much interest has developed in marine aquaculture in Ireland and a number of new ventures have been started or proposed. Financial assistance for projects is available through BIM, EEC, and in certain areas from Gaeltarra Éireann. However there are uncertainties concerning the probability of economic success of various ventures.

A mariculture plan entitled "Draft Mariculture Development Programme" is being prepared as a joint effort of the various state agencies and private companies involved in aquaculture with leadership by the National Board for Science and Technology

(NBST). This programme will take account of the investment necessary in vital facilities and other support measures for the industry (Investment and National Development 1979-1983). Also a study of European markets for aquaculture products produced in Ireland has been commissioned by BIM. Estimates for 1980/81 expenditure on the mariculture programme are approximately IR£0.5 million in initial capital outlay with an additional IR£0.5 million for current expenditure. These figures incorporate the outlay from all agencies presently involved in mariculture and include programmes that are recommended for initiation in 1980/81.

Status of Aquaculture in Ireland

Legal Base

The Fisheries Act 1980 (No. 1 of 1980) provides that aquaculture can only be conducted under and in accordance with a fish culture licence, an oyster bed licence, a licence granted by the Minister under Section 4 of this Act, or an oyster fishery order. Oyster and trout culture have been well established activities for many years in Ireland but aquaculture has now been broadened under this to include the culture of any species of fish, aquatic invertebrate animals of whatever habitat or aquatic form, or any food which is suitable for the nutrition of fish. The Act provides for penalties where "a person by trespass, fishing or otherwise interferes with anything done pursuant to an aquaculture licence".

Research and Development Activities

Activities related to aquaculture are included in the programmes of several agencies, boards, semi-State bodies and universities. Details of the responsibilities need not be spelled out completely for this report. A brief summary is as follows:

(1) Department of Fisheries and Forestry. The activities of the Department with respect to aquaculture tie into its general responsibility for management of aquatic resources and policy generally. It is empowered to license fish and shellfish farms, to ensure that these activities are consistent with other uses of the aquatic environment, to provide technical assistance in the areas of biology, ecology, and engineering to potential fish farmers, and to provide a sound scientific basis for culture of various species.

The Department is expected to designate areas for coastal aquaculture and to assess all applications for aquaculture licences from technical, legal and administrative viewpoints. The Department's staff has biological knowledge of the various species grown in or proposed for aquaculture. Its specialists have responsibility for solving specific problems limiting aquaculture such as mortality control, early maturation of salmon reared in cages, determining nutritional requirements and evaluating feeds. The staff also includes engineers with competence in design of fish farms.

(2) Bord Iascaigh Mhara. Distinctions between the functions of BIM and the Department of Fisheries and Forestry with respect to aquaculture are not as clear-cut as one might wish. Nevertheless, some specific functions are clearly reserved to BIM. These include:

(a) Training potential aquatic farmers. During the pilot development stage an individual, who has obtained the necessary licences, will receive training and experience in culture of the selected species and in marketing and business aspects of aquaculture.

(b) Providing technical assistance to aquatic farmers. After a licencee begins a full commercial scale project BIM will provide technical assistance or extension services concerning design and operating of culture systems, processing and marketing the product.

(c) Providing financial assistance to aquatic farmers. BIM, as the national grant giving body, will evaluate licensed projects and provide or assist in obtaining financial aid for those that are approved. Proposed grants for capital expenditure from BIM and EEC can range from 30 to 60 per cent, with a maximum of IR£175,000 from BIM. The Board will also provide limited financial assistance for the purchase of seed, construction of pilot scale culture facilities, and for training courses or study tours of successful aquatic farms in Ireland or elsewhere.

(d) Providing for market development. BIM has commissioned a study of the market for those species currently proposed for aquaculture development and the results of this analysis will be used to assess the economic viability of these different varieties.

(3) Gaeltarra Éireann (now Udarás na Gaeltachta). Gaeltarra Éireann's functions in promoting aquaculture appear to parallel those of both BIM and the Department, but they are limited to ventures in the Gaeltacht areas. The main thrust of their activity to date has been to undertake aquaculture ventures themselves rather than promote the efforts of others. This may change, however, and they may in future devote more resources to assisting in the formation of aquaculture ventures by individuals and groups. One of the best known fish farming organisations in the state is Beirtreacht Teo, a wholly owned subsidiary company of Gaeltarra Éireann. It was established in 1975 to engage in research and development of commercial shellfish farming in the Gaeltacht. A year later Gaeltarra, in participation with the ESB, established a second fish farming subsidiary, Bradán Mara Teo, to research and develop salmon and trout farming in the sea. Both companies have had a reasonable amount of success to date.

Beirtreach Teo began trials on the growth of oysters in unpolluted and sheltered harbours along the western coastline from Donegal to Kerry. Later the company undertook the culture of mussels by a series of ropes suspended from rafts and in 1978 experiments on the production of seed clams were commenced. The Beirtreach shellfish hatchery, which is located at Carna Co. Galway, is the first commercial hatchery of its kind in Ireland and employs 45-50 people.

The joint project of Gaeltarra and ESB (Bradán Mara) has been reasonably successful also, despite some initial setbacks at the development stage. Up to 1979 two major problems interfered with the faster growth of the salmon - disease and precocious maturation. During 1979 the disease problem was lessened through use of vacines and antibiotics developed by Dr P. Smith of UCG, while the precocious maturation problems is being overcome by the selection of eggs from slow maturing fish.

(4) The Universities. Primary academic interest and competence in aquaculture research are centred in University College, Galway. The faculty group concerned is interested in providing a sound scientific basis for aquaculture and the corollary research in genetics, pathology, nutrition, etc. which will be required as aquaculture grows to commercial status. Its shellfish research laboratory at Carna Co. Galway has a staff of about 30 people and provides technical advice of all kinds for commercial operators. A degree in Fishery Sciences, suitable for management personnel at UCG is under consideration, while a training course leading to a national certificate in aquaculture has been developed by Galway Regional Technical College.

It cannot be emphasised too strongly that in this, as in many other areas of resource development, basic and applied research must go hand in hand. The biological and technical problems that have hindered the growth of aquaculture throughout the world are numerous and complex. They cannot be solved on a piecemeal basis, since many involve highly complicated issues that are best addressed within the broader scientific universe of the academic community. Obviously, a country the size of Ireland cannot support a full-blown university programme in all scientific aspects of aquaculture. It can, however, support and expand the excellent start that has been made at University College, Galway to enable Ireland to keep abreast of aquaculture related developments in the university and scientific communities in general, and to assist in the adaptation of that knowledge to Irish conditions. It should also be emphasised that university work of this type requires development of a transfer mechanism to make the work of the laboratory and the university research accessible to the practising fish farmer in the field.

(5) National Board for Science and Technology. The prime responsibility of NBST is the co-ordination of scientific and technological work in Ireland and the commission and funding of research for pilot schemes where necessary. Obviously, there is real need for these functions. NBST has taken the major role in the development of a draft mariculture development programme intended to define the scope of the effort required to meet development goals and to identify and co-ordinate the appropriate roles of other state and state-supported agencies in achieving those goals. It has also commissioned a number of research projects in this area. For example, it initiated a site selection study in 1978 to assemble data in respect to areas of the Irish coastline with mariculture possibilities. The NBST is empowered to take interim actions in areas not covered by other agencies, such as providing regional site survey officers to assist potential aquatic farmers to select appropriate locations.

Commercial Ventures

A number of individual companies, organisations and semi-State bodies have begun aquaculture ventures in Ireland in recent years. Although most of these projects have been designed as commercial ventures, many are in the early stages and have not reached commercial profitability. According to the draft Mariculture Development Programme, which describes the present status of aquaculture in Ireland, there are seven farms growing trout in freshwater, six growing trout in seawater, three growing salmon in seawater, five main producers growing the native flat oyster, four growing the Pacific oyster, one growing mussels on bottom and one raising mussels suspended below rafts. In addition there are natural fisheries for oysters in several locations. Also a number of additional aquaculture ventures are in the planning stages.

Commercial profitability has been achieved for freshwater trout farming, for mussel culture on bottom using seed transplanted from other areas, and for culture of the flat oyster on bottom using natural seed or seed transplanted from other areas. The profitability of cage culture of trout or salmon in the sea, off bottom culture of the flat oyster or the Pacific oyster or raft culture of mussels in Ireland has not been determined. Although some of these types of aquaculture appear to have a high probability of becoming successful, most have begun recently, and it is too early to determine their economic viability.

In the following pages we turn to a species-by-species appraisal with emphasis on technical advantages and problems and market prospects.

Mussels

Mussels are grown by two general systems in Ireland (1) culture on bottom and (2) culture suspended below rafts. Culture on bottom, as is done at Wexford, consists of dredging seed mussels, usually from offshore beds, and transplanting the seed to shallow areas within a harbour. This increases the growth rate and fattening, and provides an acceptable mussel for processing at minimum production cost.

In raft culture seed mussels are collected usually on ropes in settling areas and grown to market size in other areas especially along the west coast. This produces a thin shelled mussel with high meat yield which is especially desirable for export to France at certain times of the year.

Mussel culture on bottom, as in Wexford, produces large mussels with good meat yield acceptable for processing as frozen, pickled or canned mussels or for marketing in competition with mussels grown on bottom in UK or in the Netherlands. Since large quantities of seed are available at low cost by dredging from offshore beds and since the on-growing phase is conducted on bottom in shallow water, these mussels can be processed at a very low cost. Also the shells can be sold for use as cultch for collecting seed oysters. The economics of on bottom culture of mussels have been analysed and the process is commercially viable.

The advantages of suspended culture of mussels is that seed collected in places such as inner Killary Harbour on polypropylene ropes can be grown to market size in two growing seasons. If the seed is grown in protected locations where rafts can be maintained and where fouling by barnacles and other forms is minimal, a highly acceptable product can be produced. After the market size mussels have been 'trained' by placing them in the intertidal zone for a few days, they can remain alive for ten days which permits export to France. Because of the rapid growth the shells are thin and the meat yield may exceed 30 per cent.

The two major problems of raft culture of mussels are markets and production costs. At the present time the mussels produced by Gaeltarra Éireann are sold in France during the winter when the French supply of high quality mussels is exhausted. Because of this speciality market it is possible to sell the mussels at about IR£250 per tonne compared to around IR£50 per tonne for mussels produced on bottom in Wexford Harbour. Since the market for mussels in Ireland is limited, the raft culture system with its high production costs can only succeed if the high-priced French market continues and if it will accept the larger quantities scheduled for production in the near future. Irish production must compete with raft cultured mussels from Spain estimated at 160,000 - 200,000 tonnes per year, and rack ("vivae") cultured mussels from Italy unofficially estimated at 35,000 - 60,000 tonnes per year.

Production costs of rearing mussels suspended from rafts along the western coast of Ireland have not been analysed. Culture methods are still being modified and production has not reached levels which would permit a sound economic analysis.

Suspended culture in the western part of Ireland is attractive because of the excellent setting in Killary Harbour and elsewhere which provides dependable sources of seed and the many protected bays which provide excellent locations for anchoring rafts. Perhaps the greatest benefit of the Gaeltarra Éireann project would be the analysis of production costs of a commercial scale project to provide guidance for the development of private industry. Further, this analysis would indicate the high cost components of production and this should lead to the development of more efficient production systems. Figures for the production of cultured mussels in Ireland (quantities and values) since 1977 and projections to 1983 are given in Table 6.1.

<u>Oysters</u>

The flat oyster, <u>ostrea edulis</u>, is a choice market item both in Ireland and on the Continent. Supplies have been reduced in recent years because of high disease mortalities in European operations. The flat oyster reproduces naturally in some areas in Ireland (including Tralee, Clarinbridge, and Kilkieran, Bertraghbuoy, and Aughinish Bays). Total production of these natural oysters was 875 tonnes in 1976, 1,070 tonnes in 1977, and 770 tonnes in 1978. Seed can also be obtained from

Table 6.1: Production of cultured mussels and projections for 1983

Year	Raft Cultured		Dredged		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tonnes	£	Tonnes	£	Tonnes	£
1977	10	2,500	2,162	108,100	2,172	110,600
1978	75	18,750	2,170	108,500	2,245	127,250
1979	124	31,000	3,170	158,500	3,294	189,500
1980	196	49,000*	3,000	150,000*	3,216	199,000
1981	327	81,750*	3,000	150,000*	3,327	231,750
1982	610	152,500*	3,000	150,000*	3,610	302,500
1983	870	217,500*	3,000	150,000*	3,870	367,500

* Projected values for 1980-1983 based on 1979 prices, i.e. IR£250 per tonne for raft cultured mussels and IR£50 per tonne for dredged

Source: National Board for Science and Technology, (NBST), 1979.

hatcheries abroad, and a new hatchery (described above) has recently been built at Carna. The relative availability of both natural and artificial seed stock, good growing conditions in a number of Irish sites, the apparent freedom of Irish oysters from Aber disease, and the very attractive market prices available now and in the foreseeable future, make the flat oyster a highly attractive prospect for culture in Ireland. The major limiting factor appears to be the availability of seed on a dependable basis at reasonable cost. The only existing Irish hatchery is still in a developmental phase, and imported seed from the UK or the US is expensive and frequently unreliable.

Capital investment in flat oyster culture is moderately high, since the oysters grow slowly, reaching market size only after four years or more. Raft culture may be helpful in reducing growing time and the cost of predator control, but it requires additional capital investment in racks and trays.

On balance, culture of flat oysters appears to warrant a substantial effort on the part of both government and private industry. Success will come only with continuing efforts to provide a stable supply of seed at reasonable prices and to control oyster mortality, which continues to plague growers in every country. It should be stressed that these research and development costs are likely to continue over a long period of time; on the other hand, the size and strength of the market for this excellent product may make such expenditures worthwhile, particularly since Ireland can monitor and borrow from extensive work on flat oysters in other countries.

The Pacific oyster, *crassostrea gigas*, is much easier to grow under controlled conditions, reaching market size in two growing seasons or less. The species does well in Ireland, although it is unlikely that it can reproduce naturally because of low summer temperatures in Irish bays. While this imposes the necessity for finding hatchery sources for spat, it eliminates the threat of displacement of the native flat oyster by the lower priced Pacific.

The principal obstacles seem to lie on the market side, since Pacific oysters are much less attractive in the shell than flat oysters. Domestic and UK acceptance of Pacific oysters has grown only very slowly, though there is a strong market for this species in France. Prices are fairly low at present, mainly because of rapid expansion of cultured Pacific oysters on the Continent. There remains, therefore, some doubt whether the Pacific oyster can be cultured on a profitable basis. The key question is whether European demand, including the UK, can be developed to the level reached in France, and whether the tendency to overproduction on the Continent can be averted. The availability of seed from hatcheries controlled to avoid introduction of predators or diseases and the possibility of using both bottom and rack culture techniques in many Irish waters suggest that a modest Irish industry can be established over time. As with flat oysters, disease and other mortality factors continue to plague producers of Pacific oysters, and some effort will be needed to adapt developing scientific knowledge on the subject to Irish conditions. Figures for production (quantities and values) of cultured oysters in Ireland for the years 1976 to 1978 and projections to 1983 are given in Table 6.2. These figures exclude production from traditional operations in Clarinbridge, Tralee and Clew Bay which accounted for 670 tonnes in 1978, valued at about £1 million.

Escallops (pecten maximus)

Experiments on the artificial production of escallops have recently been undertaken by the Department of Fisheries and 143 tonnes were produced in Mulroy Bay off Co. Donegal in 1979. The economic viability of this enterprise has however not yet been established but the prospects appear promising in certain sites off Donegal and south Wexford. As in all aquaculture undertakings, marketing considerations need to be carefully taken into account since Irish exports have to compete on the European market, particularly in France, with low priced cultivated escallops imported from Japan.

Trout (salmo gairdnerii)

Rainbow trout have been grown in fresh water farms in Ireland for many years and currently seven are in production. A new scheme of rearing trout from a size of about 80 grams to a market size of 250 grams in floating cages in salt water has been developed in Norway and applied experimentally in Ireland. Rainbow trout can be raised in freshwater hatcheries to about 80 grams between April, when the eggs hatch, and October or November of that year. When transplanted to floating cages in salt water the trout will grow to a "portion" size of 250 grams by May of the following year or to a size of 1-2 kilograms a year later.

Table 6.2: Production of cultivated oysters, 1976-1978 and projections to 1983

Year	Pacific Oyster		Flat Oyster		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tonnes	£	Tonnes	£	Tonnes	£
1976	6	7,500	10	8,750	16	16,250
1977	9	13,980	5	6,500	14	202,300
1978	14	26,250	10	22,500	24	48,750
1979	23	46,960	12	34,500	35	81,460
1980	65+	129,360*	13+	32,500	78+	161,860*
1981	81+	162,640*	20+	50,000	101+	212,640*
1982	123+	246,560*	227+	567,500	350+	814,060*
1983	124+	248,800*	296+	740,000	420+	988,800*

+ Based on 12,500 oysters to a tonne.

* Proposed values for 1980 to 1983 based on 1979 prices.

Source: National Board for Science and Technology (NBST), 1979.

Pink flesh, a characteristic of salmon or of trout grown in salt water, can be produced by adding canthoxanthine to the commercial pellet foods during the latter half of the growing period. This reportedly results in a good coloration which is not destroyed by cooking. Other substances such as shrimp or Dublin Bay prawn shells can be used to produce a pink coloration in the flesh of trout or salmon.

A major advantage of growing rainbow trout in sea water is the good supply of eggs from private sources and the availability of 40-80 gram juveniles from Irish hatcheries at a relatively low price compared with young salmon. These juveniles can be transferred directly into salt water although preferably the rearing area should have a salinity below that of the open ocean. They will grow in the sea during the winter reaching "portion" size by May and will accept commercially available pellet foods.

There is a well established market for fresh water trout, 70,000 tonnes per year, in Europe and trout produced in salt water are considered to be a superior product. Moderate supplies of trout are reared in salt water in Norway (1,800 tonnes in 1976). About 31 tonnes were reared experimentally in Ireland during 1978 and were well accepted by the market. Over 150 tonnes were expected in 1979, most of which were produced on the west coast. Larger trout reared in salt water may be an alternative to salmon and might be produced at a lower price than salmon.

Good survival of trout in salt water has been recorded so far. Disease control methods are also well established although furunculosis and kidney disease continue to cause mortalities. A relatively small area is needed for rearing trout in floating cages. With the good circulation of clean cool water along the coast of Ireland, densities up to 16 kg/cu.m. (1 lb/cu.ft.) should be possible. In cages three metres (9.84 feet) deep the yield would be up to 480 tonnes/ha. (214 tonnes/acre).

The economics of rearing trout in sea water in Ireland needs to be compared with salmon. In Norway far more salmon than trout are reared in cages, largely because the price of salmon is higher and import duties of other European countries are lower for salmon than for trout.

There has been some market resistance in Europe to farmed trout and salmon from Norway on the basis that the pink colour of the flesh fades when the fish is cooked and that the flesh is softer than that of a wild fish. Reportedly this resistance has not been met with trout reared in sea water.

It is recommended that production costs of a commercial scale salt water trout farm be analysed in relation to the selling price to determine the economic viability. This analysis should identify those components contributing most heavily to the cost of production and lead to efforts to reduce these costs. The need for economic nutritionally acceptable feeds for salmonoids is discussed in the section on salmon.

If socially desirable, certain areas could be zoned for small scale farms in which surface area or cage volume was limited. This would encourage formation of co-operatives for purchasing of supplies and for processing and marketing of the product. These concepts have been applied in Norway for cage culture of salmonoids and in Japan for yellowtail (seriola sp.) farms.

Salmon

The very high prices and steadily shrinking supplies of Atlantic salmon make this species an attractive target for aquaculture. Norwegian growers have been working at the problem for more than a decade, and they are apparently quite successful economically; about 2,000 tonnes were produced in 1976, which was nearly twice the production of wild salmon in Ireland in 1978.

For many years the rearing of salmon smolts for restocking purposes has been carried out by the Electricity Supply Board (ESB) at their Parteen and Carrigadronid hatcheries and by the Salmon Research Trust in Co. Mayo but it was not until 1974 that trials were conducted on rearing salmon to market size. Following sea cage trials at a number of locations by BIM, ESB, and the Salmon Research Trust, commercial operations were established.

Bradán Mara Teo, established jointly by the ESB and Gaeltarra Éireann in 1976, produced its first commercial crop of 13 tonnes in 1978. Curraun Fisheries, financed by Arthur Guinness Son and Co. Ltd., produced 7 tonnes in that year also, and estimate a production of 10 tonnes in 1979. Both of these concerns are also rearing trout in the sea. All cultivation in Ireland has been carried out using floating cages which are less costly than other methods of cultivation, such as onshore ponds or closed off sea locks.

Total production of farmed salmon in Ireland for 1977 and 1978 with projections to 1983 are given in Table 6.3.

Table 6.3: Production of farmed salmon in Ireland, 1977-1978 and projections to 1983

Year	Tonnes	£ value
1977	10	33,000
1978	20	75,000
1979	25	93,000
1980	75	281,000*
1981	90	337,500*
1982	113	423,750*
1983	200	750,000*

* Projected values based on 1979 price of IR£3.75 per kg.

Note: Projections are based on production to date and on individual plans ascertained from interviews with all fish farmers in July 1979.

Source: National Board for Science and Technology (NBST), 1979.

The technique of cultivating salmon involves transferring smolts to floating net cages in salt water and feeding them for about two years to reach a weight of one to three kilograms, round weight.

Despite the very high prices of salmon (from IR£6 to IR£8 per kg for wild fish in Dublin, summer 1979), there are both technical and market restrictions to be overcome if artificially reared salmon is to become a going industry in Ireland. First, production costs are very high - particularly the cost of smolts - and the cost of providing adequate feed is even higher (standard pellet feeds can be used, but are less desirable than special feeds involving higher priced ingredients). On the market side, Norwegian experience suggests than pen-reared salmon are significantly less acceptable on European markets than wild fish, largely because of difficulties with texture and colour stability. Of these difficulties, the egg and smolt problem appears most serious, since the only supplies available in Ireland at the moment are largely dedicated to restocking Irish streams. If each producer must maintain brood stock as well as market fish, production costs go up rapidly. There are also difficulties in getting pen-reared salmon to reach acceptable weights. Salmon reared in captivity tend to reach sexual maturity at an early age and to cease growing at this stage. This difficulty seems to have been overcome by the Norwegians through rigorous selection of breeding stock, and as stated above it is also being resolved in Ireland by Bradán Mara.

It is unlikely that Ireland could or should take the risk of pen-rearing Pacific salmon from US or Canadian sources. Although these fish, particularly Coho and Chinook, are easier to raise in captivity than Atlantic salmon, they command lower prices on European markets and might pose serious dangers to native stocks if they should escape and become established in Irish streams.

It should also be stressed that cage-culture of salmon is most demanding in terms of the characteristics of a production site. Water quality, temperature and current flow requirements are severe and the operation requires a good deal of physical space. Consequently, even in the indented coast of Ireland, it would be unlikely that very many suitable sites could be found.

A commercial salmon rearing industry would require more than the usual amount of research and development backup from government and university sources. Much work is needed to determine the causes of inferior quality of reared salmon flesh, and of disease under pen-rearing conditions, and to find sources of acceptable feeds at reasonable prices. While not insoluable, these are long term problems, and they might be site-specific to some extent. Excellent research on salmon rearing has been done in Ireland, but at a very modest level.

Glude makes brief reference to a number of other species that might be considered for aquaculture in the more distant future. These include clams, flatfish, and abalone. It does not seem worthwhile to consider these as targets for high priority action. The limited funds and manpower that may be available certainly should be concentrated on the more immediately promising species discussed above.

Economic Analysis of Production Systems

Except for trout culture in fresh water and culture of oysters and mussels on bottom, the economic viability of aquaculture in Ireland has not been generally established. In most cases culture technologies are just being developed and even though some commercial ventures have begun they have not reached commercial viability. In most cases full scale tests of new culture systems, with analysis to determine economic viability, are needed before commercial application can be encouraged. This generally requires State expenditures through government agencies or semi-State bodies.

The current efforts of Gaeltarra Éireann in the aquaculture of salmon, trout, oysters and mussels provide an excellent opportunity for evaluation of production costs of commercial scale ventures. The results of economic analysis of these ventures should provide a good basis for determining the major components of production costs and lead to improved efficiency of production systems.

Pilot or commercial scale testing of new or improved culture systems, not of specific interest in the Gaeltacht area probably is beyond the authority of Gaeltarra Éireann and should be the responsibility of BIM. If the proposed Fisheries and Mariculture Institute is established (see page 14.20), it could provide facilities for production system development and testing.

Conclusions

In broad summary, aquaculture, in making further use of the marine environment, appears to have modest potential for expansion of output, foreign exchange earnings, and employment. It is impossible at the present level of knowledge to estimate the additional employment that might be generated. Aquaculture can be carried on with a moderately labour intensive type of structure, and the jobs would largely centre in areas where the need is most urgent. The technical requirements for successful aquaculture at the managerial level are demanding, but the actual labour can be performed without extensive specialised training.

The products of Irish aquaculture that appear technically feasible are also highly valued on both domestic and export markets. With few exceptions, future market prospects are encouraging. Thus, even though aquaculture costs remain quite high at present levels of knowledge, the prospects of future improvement, coupled with the very high present and potential value of the products, suggests that an industry of reasonable size and continuing economic viability can be developed. Some aquaculture programmes might produce results in a relatively short period of time (e.g., mussel and oyster culture), since they can be built on both local knowledge and experience, as well as a broad range of scientific and technical information concerning the culture of these species in other countries with marine environment generally similar to Ireland.

There are, however, a number of disadvantages to be considered. While some types of aquaculture can be made reasonably labour intensive, experience in other countries suggests that most economically successful operations require a considerable amount of capital. The operation is inherently risky, and operators must be financially prepared to stand occasional drastic losses. In addition, most types of aquaculture that show technical promise in Ireland would require from two to five years before marketable output would become available.

The public cost to the Irish economy is likely to be substantial. As emphasised above, it is difficult to start private aquaculture operations in Ireland at this point in time with any real hope of continuing success or growth (with the exception of mussels and oysters). A great deal of financial assistance, market research and development, scientific and technological work, and training programmes must be undertaken. And many of these will have to be carried on over decades if the industry is to reach its full potential. This is not to say, by any means, that the investment is not worthwhile, particularly since the benefits will be measured not only in net economic returns but in employment in areas of particular need. Nevertheless, from the standpoint of the nation as a whole, a heavy initial outlay and a long term financial commitment must be anticipated.

Finally, aquaculture in the marine environment requires effective control of the coastal environment in and around the areas to be farmed. Since most of the shellfish and finfish concerned require water of excellent quality, development of other uses of the foreshore must be tightly controlled. A considerable portion of the inshore waters in the vicinity of aquaculture centres would have to be almost completely denied to other users for an indefinite period of time. In one respect, this has its advantages. Aquaculture and preservation of the remarkably beautiful areas of coastal Ireland are completely compatible, and the latter is a major factor in the continuing flow of tourist expenditures. On the other hand, there will inevitably arise circumstances in which users of land upstream from aquaculture operations, fresh water users in the area, or users of adjoining coastal lands will come in conflict with aquaculture, and one or the other must be excluded. Fortunately, the development of many of the areas best suited to aquaculture is so limited at the present time that sensible coastal zone management now could easily avert serious conflicts.

Additional Comments

Aquacultural activities fall into two main groups - on the one hand we have fairly simple shellfish production on the bottom which though labour intensive does not require a great deal of capital. This type of activity is particularly suitable for small scale operators around the coast. Pen-rearing or closed-system production of salmon or trout on the other hand, requires substantially larger investment in both capital and technical knowledge. Control of disease, maintenance of necessary water quality and temperature, establishment of optimal feeds, development of sources of supply of smolts - all require a high level of managerial skill and can only be done effectively in relatively high volume operations. The concern must also be able to withstand periodic heavy loses of fish which characterize virtually all finfish rearing schemes. Eventually, even these more demanding types of aquaculture may become available to small enterprises, and in the interim the larger firms will provide a useful number of jobs.

The need for expanded well-coordinated marine research in Ireland is discussed in Chapter 15. Aquaculture research of good quality is now being carried out by a group at University College, Galway. These investigations, though limited in scope, could serve as a nucleus for an expanded research programme in the academic realm. Economic analysis to assess financial viability of projects would, however, require more emphasis than at present. For the rest, activity in aquaculture is distributed (on a rather unclear basis) among BIM, the Department of Fisheries and Forestry, and the National Board for Science and Technology. Both BIM and the Department of Fisheries and Forestry have important roles in the future development of aquaculture in Ireland, but it could be argued that the scientific problems might best be dealt with by a separate research organisation concerned with <u>all</u> aspects of man's activities in the marine environment. This would leave BIM with prime responsibility for market research, for product and process development, financing, education and advisory services. The Department's administrative responsibilities, as spelled out above, would also continue largely unchanged.

PART II

MARKETING AND PROCESSING SECTORS

CHAPTER 7

CONSUMPTION OF FISH AND STRUCTURE OF DOMESTIC WHOLESALE AND RETAIL TRADE

Figures for per capita fish and meat consumption in Ireland for selected years since 1963 are given in Table 7.1. This table shows that over the period 1963-1977 fish consumption per person increased by almost 60 per cent. Per capita consumption of poultry meat, however, increased by over 108 per cent and that of beef and veal by about 40 per cent over the period. Consumption of mutton and lamb actually fell between 1972 and 1977, while consumption of pigmeat, though varying a good deal from year to year, showed a small overall increase over the period.

Even though fish consumption has increased over the years, Ireland is still one of the lowest fish consuming nations in the EEC. This can be seen from Table 7.2, which shows total fish consumption in the different European countries since 1962/63. In the period 1962/63, Ireland had a per capita consumption figure for fish of only 5.3 kg (live weight); the next lowest consumer was the Netherlands, where consumption was 10.1 kg per head. The country with the largest consumption of fish in 1962/63 was Denmark, which stood at 28 kg per person. By 1976, Ireland had increased its consumption of fish to 12.4 kg per capita. Only three other countries, the Netherlands, France and Luxembourg/Belgium, experienced any sustained increase in consumption between 1962 and 1976. In the latter year, Denmark was still top of the league, though consumption had dropped from 37.8 kg in 1971 to 26.0 kg. Between 1962/63 and 1976, consumption per capita in Germany fell from 10.9 kg to 10.2 kg, and it was the lowest per capita fish consuming country in the EEC in 1976. Consumption of fish in Italy remained more or less constant over the period at 11.7 kg, and, in the United Kingdom, per capita consumption fell from 18.4 kg in 1972 to 18.1 kg in 1976.

The pattern of consumption of fresh, frozen processed, etc., wet fish and shellfish in EEC countries in recent years is shown in Table 7.3. The average total consumption of fish in the nine countries for the years 1972 to 1976 was 15 kg per person. Of this amount, approximately 12 kg were wet fish and 3 kg shellfish.

Table 7.1: *Per capita* domestic consumption of fish and different meats in Ireland, 1963-1977

Year	Fish (edible weight)	Meat				Total meat
		Beef and veal	Mutton and lamb	Pigmeat	Poultry	
			Kg per person			
1963	3.4	17.1	11.3	23.7	6.1	58.2
1964	3.8	16.6	11.1	25.6	6.8	60.1
1965	4.4	15.8	10.6	28.3	7.3	62.0
1966	4.6	16.6	10.8	27.3	8.5	63.2
1967	5.1	17.6	11.0	25.6	8.3	62.5
1968	4.6	17.8	10.8	26.0	9.6	64.2
1969	4.8	18.3	11.1	28.4	10.3	68.1
1970	4.6	19.1	10.8	30.6	10.1	70.6
1971	4.7	19.3	11.2	30.2	11.3	72.0
1972	4.8	19.7	11.0	30.5	11.9	73.1
1973	4.9	18.8	10.3	31.0	13.2	73.3
1974	5.1	22.7	11.0	30.7	11.3	75.7
1975	5.2	28.9	11.1	26.5	10.6	77.1
1976	5.3	25.0	10.3	28.5	12.3	76.1
1977	5.4 (est.)	23.8	10.3	27.1	12.7	73.9
Percentage increase 1963-1977	58.8	39.2	-8.8	14.3	108.2	27.0

Source: Various issues of the Irish Statistical Bulletin and Central Statistics Office information.

Table 7.2: Per capita consumption of wet fish and shellfish in EEC countries, 1962-1976 (live weight)

Year	West Germany	France	Netherlands	Italy	Luxembourg /Belgium	UK	Ireland	Denmark
				Kg per person				
1962/63	10.9	18.5	10.1	11.4	13.2	19.1	5.3	28.0
1963/64	10.0	19.6	11.7	10.7	13.6	20.0	7.0	34.6
1964/65	10.5	19.6	11.4	11.7	14.3	20.0	7.8	40.6
1965/66	10.9	19.6	11.4	12.0	15.4	18.6	5.8	41.6
1966/67	9.9	20.4	11.7	13.1	15.8	19.5	5.8	45.2
1967/68	10.6	20.3	11.4	12.0	14.8	19.8	5.3	37.0
1968/69	10.5	19.3	12.5	12.3	15.4	19.2	5.3	28.8
1969/70	10.2	20.3	11.8	12.9	14.8	18.8	6.0	29.8
1970/71	11.2	20.4	11.3	12.4	14.8	17.8	5.3	28.7
1971/72	9.7	20.0	11.8	12.7	14.5	18.9	9.1	37.8
1972/73	9.3	20.0	10.9	12.9	13.0	18.4	8.1	36.3
1974	11.1	20.5	14.3	11.6	13.7	16.8	8.4	26.8
1975	9.1	20.2	13.3	10.5	11.3	17.1	10.5	23.5
1976	10.2	21.1	12.7	11.7	18.0	18.1	12.4	26.0

Source: Eurostat: Fisheries, fishery products and fishing fleet, 1976-1977. Statistical Office of the European Communities, 1979.

Table 7.3: Average distribution of fish consumption as between fresh, processed and shellfish in EEC countries, 1972-1976

Method of processing	West Germany	France	Netherlands	Italy	Luxembourg /Belgium	United Kingdom	Ireland	Denmark	All Countries
					Kg per person				
Fresh and frozen	4.1	10.1	5.6	6.2	4.9	12.6	6.3	15.7	8.1
Salted, dried, smoked	1.5	1.3	1.8	2.0	1.8	1.0	0.8	1.2	1.4
Other fish products	3.7	3.2	1.8	1.9	2.8	2.2	0.9	6.8	2.8
Total wet fish	9.3	14.6	9.2	10.1	9.5	15.8	8.0	23.7	12.3
Shellfish	0.6	5.9	3.4	2.0	4.4	1.9	1.9	4.6	2.7
Total all fish	9.9	20.5	12.6	12.1	13.9	17.7	9.9	28.3	15.0
					Percentage				
Fresh and frozen	41.4	49.3	44.4	51.2	35.3	71.2	63.6	55.5	54.0
Salted, dried, smoked	15.2	6.3	14.3	16.5	12.9	5.7	8.1	4.2	9.3
Other fish products	37.4	15.6	14.3	15.7	20.1	12.4	9.1	24.0	18.7
Total wet fish	94.0	71.2	73.0	83.4	68.3	89.3	80.8	83.7	82.0
Shellfish	6.0	28.8	27.0	16.6	31.7	10.7	19.2	16.3	18.0
Total all fish	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Eurostat: Fisheries, fishery products and fishing fleet 1976-1977. Statistical Office of the European Communities, 1979.

France, Denmark, Belgium/Luxembourg, and the Netherlands consumed the most shellfish, Italy, UK, and Ireland followed with about 2.0 kg per person, and Germany consumed the least amount (0.6 kg). In the nine countries, fresh and frozen fish accounted for almost 54 per cent of total consumption, other fish preparations made up almost 19 per cent, and salted, dried, and smoked fish products accounted for less than 10 per cent. The UK and Ireland consumed the highest proportion of fresh and frozen fish, and Belgium/Luxembourg consumed the lowest. Germany had the highest proportional consumption (over 37 per cent) of other fish products, and Ireland had the lowest (9.1 per cent).

Domestic Consumption - Price and Other Factors

Selected figures for retail prices of fish and certain meats during the years 1963 to 1977 are given in Table 7.4, the relationship between price changes, and consumption of meat and fish over the same period are given in Table 7.5, while Figure 7.1 outlines trends in quarterly retail prices of fish, beef and pork for the years 1973 to 1978. Table 7.5 shows that over the period 1963 to 1977 the price of whiting rose by 468 per cent and that of cod by 317 per cent in comparison to rises of 549 per cent and 416 per cent in the prices of beef and pork respectively. Both beef and pork prices rose faster than the prices of whiting and cod in the years between 1963 and 1973; but, between 1973 and 1977, all fish prices rose faster than the prices of beef and pork (see Figure 7.1). Because data are not available on the consumption of individual fish varieties, it is difficult to relate changes in consumption to price changes. However, the figures in Table 7.5 give some idea of this relationship.

Between 1963 and 1973, beef prices rose faster than fish prices, and, the consumption of fish increased at a greater rate than that of beef. From 1973 to 1977, the price of beef rose more slowly than the prices of most varieties of fish, and consumption of beef rose faster than that of fish. In the case of pork, the relationship between consumption and price is not so clearcut, particularly over the entire 15-year period, 1963-1977. During those years, the price of pork rose at a slower rate than that of whiting and at a faster rate than that of cod. In the period 1973-77, however, when pork prices rose at a slower rate than those of all fish, pork consumption *per capita* fell by 12.6 per cent.

Table 7.4: Retail fish and meat prices in selected years, 1963-1977

Year	Variety of fish				Meats	
	Whiting	Cod	Plaice	Kippers	Beef	Pork
			p/kg			
1963	22.4	37.6	-	-	33.5	41.7
1965	24.8	37.3	-	-	43.9	46.2
1967	27.8	39.1	-	-	42.4	49.2
1969	32.8	44.8	66.5	29.2	61.0	65.9
1970	38.3	51.5	76.3	33.5	68.5	73.7
1971	42.3	55.0	80.0	37.7	78.6	80.3
1972	48.2	60.2	87.8	44.7	92.2	90.8
1973	60.6	73.2	100.1	53.7	119.9	116.4
1974	70.6	90.7	121.3	58.9	115.0	127.8
1975	81.5	102.0	137.0	79.2	121.0	153.0
1976	87.2	114.3	149.3	90.0	168.0	184.5
1977	127.2	156.8	185.4	116.0	217.4	215.4

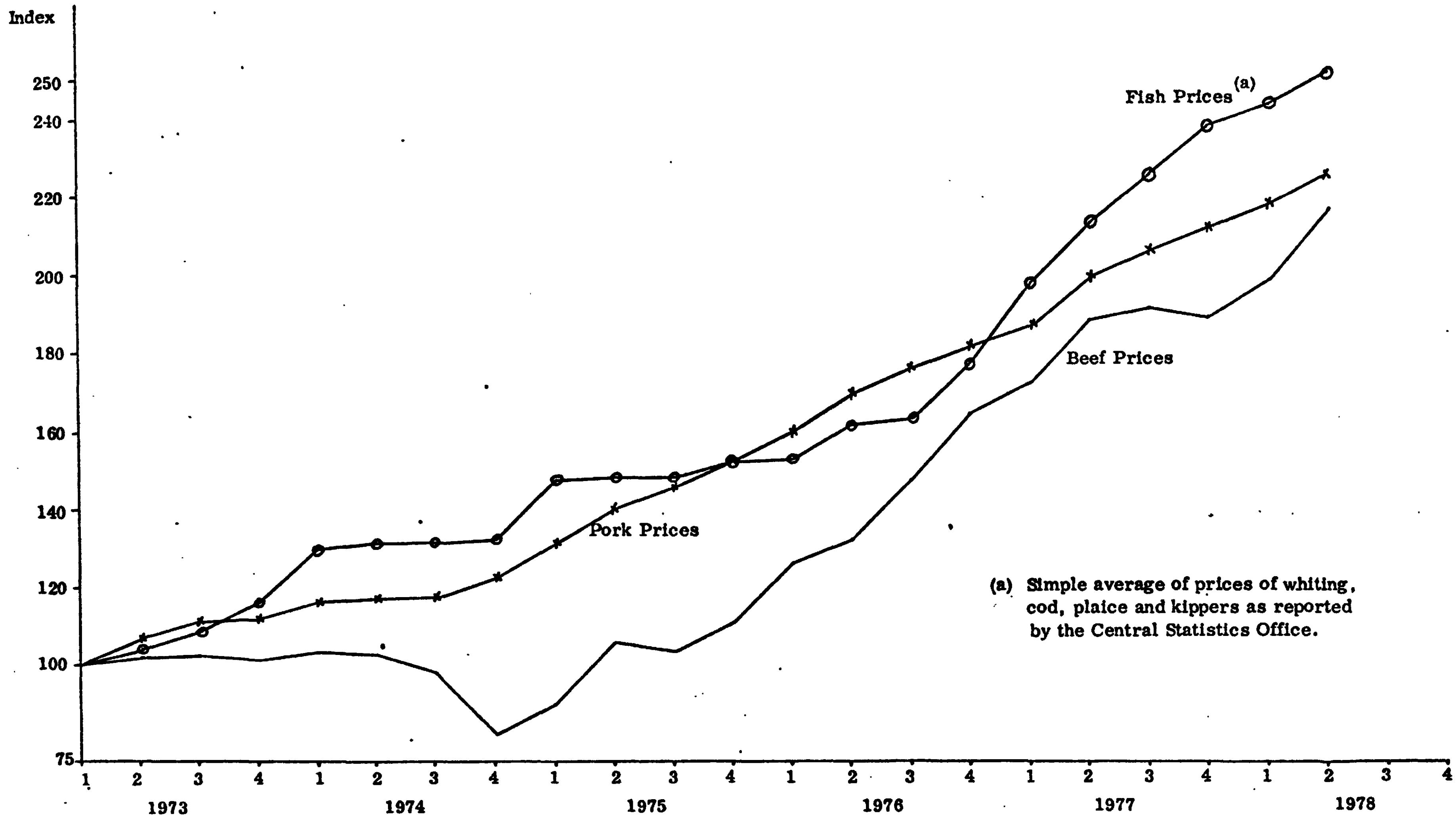
Source: Various issues of the Irish Statistical Bulletin, Central Statistics Office, Dublin

Table 7.5: Relationship between prices and consumption of fish and meat, 1963-1977

Period	Price change						Changes in consumption		
	Whiting	Cod	Plaice	Kipper	Beef	Pork	Fish	Beef	Pork
					Percentage				
1963-'73	170.5	94.7	n.a.	n.a.	257.9	179.1	44.1	9.9	30.8
1973-'77	109.9	114.2	85.2	116.0	81.3	85.1	10.2	26.6	-12.6
1963-'77	467.9	317.0	n.a.	n.a.	549.0	416.5	58.8	39.2	14.3

Source: Tables 7.1 and 7.4.

Figure 7.1: Trends in quarterly retail prices of beef, pork and fish, 1973-1978



(a) Simple average of prices of whiting, cod, plaice and kippers as reported by the Central Statistics Office.

Too much must not be read into these relationships. There are many other factors involved, such as the change in real income, the absolute level of fish compared with meat prices, the effect which the latter might have on people in different income groups, and the effect of BIM's fish promotional schemes over the years.

With regard to income effects, studies based on Household Budget Surveys (Leser 1964 and Pratschke 1969) show that in Ireland carcase meats generally have a higher income elasticity of demand than fish. Hence, as real incomes increase (as happened between 1963 and 1973), other things being equal, meat consumption would tend to increase relative to that of fish. On the other hand, between 1973 and 1977, when real incomes were rising fairly slowly, one would have expected to see the growth in fish consumption outpace that of meat. This did not happen, however, because fish prices rose much faster than meat prices in these years.

Contrary to the situation in Britain, there is no evidence that the poorer sections of the Irish population spend a higher proportion of their food bill on fish than the more well-off members of the community. Household budget results show that consumption is about the same among all income groups (see Table 7.6). There are some indications, however, that this pattern could change over the coming years. Despite recent rapid rises in fish prices, a kilo of most fish varieties is still much cheaper than a kilo of most meats (see Table 7.4). Hence, in the future, the poorer sections of the population may be forced to obtain more of their protein requirements from fish. This will happen if distribution methods improve in rural areas and the smaller towns, thus making fish of all kinds more freely available than at present.

BIMs promotional efforts will, no doubt, also have an effect on patterns of fish consumption. The Board operates a home market promotion campaign designed to stimulate consumer demand for fish, particularly for the less popular species such as mackerel. It is also concerned with improving fish sales in rural areas and is actively involved in improving fish distribution through the co-operative organisations. The Home Marketing division of BIM assists the industry in designing national and individual advertising and promotion campaigns. It provides point-of-sale and merchandising aids, as well as special training courses for the distributive trade. This division also operates a retail advisory service, which includes a shop improvement and design service.

Table 7.6: Household expenditure on meat and fish as a proportion of total food expenditure in Ireland for selected years, 1965/66 to 1976

Gross weekly household income groups*	Meat					Fish				
	1965/66	1973	1974	1975	1976	1965/66	1973	1974	1975	1976
	Percentage of total food expenditure									
Very low	25.9	30.3	32.3	31.5	29.1	2.12	1.39	1.76	1.48	1.86
Low	26.8	30.0	30.1	31.3	30.3	2.04	1.32	1.81	1.75	1.93
Medium	26.0	27.4	29.5	27.6	28.4	1.86	1.39	1.47	1.60	1.89
Upper	26.1	29.0	27.0	26.6	28.9	2.02	1.49	1.54	1.56	1.84
High	26.1		26.2	24.9	27.2	2.28		2.26	1.88	1.91
All households	26.2	29.5	28.3	26.9	28.1	1.95	1.41	1.68	1.67	1.86

* Based on 1973 prices, the groupings are:

Very low = £15; Low = £15 - under £30; Medium = £30 - under £60; Upper = £60 - under £100; High = £100 and over

Source: Household Budget Surveys for various years, Central Statistics Office, Dublin

In addition to the above, BIM offers a consumer education service, which presents product demonstrations and special fish cookery promotions to schools and organised groups, and a fish cookery advisory and menu planning service for housewives, caterers and function organisers. It is also responsible for running the National Fish Cookery Competition for post primary schools in association with the Department of Education.

Wholesaling Operations

At any given point of landing, there are two alternatives for the disposal of fish in Ireland: to sell the catch locally, or to send it to Dublin. The choice hinges on a number of factors, the prime one being the price the fisherman is likely to receive. This in turn depends on the local supply and an estimate of the supply situation in the Dublin Market. A key factor is the cost of transporting the fish. Shipment from Killybegs, Co. Donegal, to Dublin, for example, may cost as much as £1 per 44.5 kg box, not including other charges for boxes, porterage, commission, etc.

Fish are sold to first receivers by auction or by private sale. The method employed varies from port to port, and in some ports both are used. At most, however, a single method is used almost exclusively. In Dingle, for example, all fish are marketed by private sale and, in Killybegs and Galway, the auction method predominates.

The Dublin Fish Market

The heavy concentration of population makes the Dublin Fish Market the main wholesale market in Ireland. Its owner and operator, the Dublin Corporation, charges a rent to the auctioneers and also levies a toll on all fish entering the market.

Fish come to this market from all parts of the country, but most abundantly from Howth and Skerries. Mainly a market for whitefish, the Dublin Market often receives catches which cannot be marketed at satisfactory prices at the port of landing. The importance of this market has been steadily declining (see Table 7.7); and between 1968 and 1974, the throughput fell by 21 per cent - from 290,167 boxes to 230,648 boxes. Between 1974 and 1978, this downward trend continued, and the throughput was only 197,093 boxes in 1978, a decline of 14.5 per cent from the 1974 level. The diminishing importance of the Dublin Fish Market has resulted in part from deliberate policy decisions of BIM and the co-operatives and in part from the growth and diversity of landings and facilities at the larger ports. Although many retailers believe that a still greater variety is needed if consumption of fish is to increase in the metropolitan areas, the Dublin Market offers wholesalers and retailers the greatest variety of fish presently available and, in a real sense, serves to balance the national supply and demand for fish.

Table 7.7: Quantity of fish going through the Dublin Fish Market, 1968-1978

Year	Boxes	Year	Boxes
1968	290,167	1976	252,660
1972	235,011	1977	213,629
1973	271,933	1978	197,093
1974	230,648		
1975	240,729	Change 1968-1978	-32%

Source: Bord Iascaigh Mhara.

Ten auctioneers operate in the Dublin Market, each charging a commission of 7.5 per cent. Auctioneers act to some degree as wholesalers and processors, supplying marked boxes so their fish can be identified as it comes into the market. Although each auctioneer tries to ensure a supply of fish by making arrangements with certain boats, no contracts are signed and a skipper who feels he is not getting a fair deal from one auctioneer can readily shift to another. In this sense, the auctioneers compete for available fish.

For a variety of reasons, auctioneers have diversified into processing and exporting. As indicated above, the Dublin Fish Market is becoming too small for the numbers involved, so auctioneers there must expand into other functions. Also, an auctioneer is customarily obliged to take all the fish from the boats to which he has given boxes, and market tradition dictates that fish must not be returned unsold nor be sold at an unacceptably low price. Hence, if the market is slow, the auctioneer must set a reserve price, below which he will not sell; but if he has his own processing and export outlets he can use the surplus fish himself. On the other hand, when fish are scarce he may have to bid for fish to meet his own requirements. This peculiar mix of marketing functions and operations is not characteristic of a true auction.

Fish are sold on the Dublin Market in a variety of ways. First, there is the pure auction in which fish are offered openly on behalf of the auctioneer's client (the fisherman) and goes to the highest bidder. This method is successful only when fish of a certain species or in general are in short supply. When fish are plentiful, the market soon collapses and a second approach is used. The auctioneer then usually establishes a reserve, or minimum, price below which he is unwilling to sell. As bidding progresses, the initial reserve may be lowered; but once a reserve has been set by one auctioneer, others tend to follow suit. This probably accounts for the frequent charge that the Dublin Market is operated by a "ring" of price fixers, but no evidence supports this contention. In fact, since the introduction of the withdrawal price system, the reserve price set in the Dublin Market for members of the IFPO and KFO is usually identical to the withdrawal price. Non-members of the producer organisations will accept a lower price, since they cannot expect compensation from the withdrawal fund.

A third practice prevalent on the market is the making of private deals during auctions, particularly if trade is slow. For example, a buyer may offer 26p per kilo for a total of 50 boxes when the going price on a per-box basis is 33p per kilo, and the auctioneer may accept that offer while continuing the auction at the higher price per box. Deals of this type are sometimes made before the auction begins. Finally, if supplies are plentiful and the buyer is in a hurry to take delivery, he may agree to take a consignment at the market price to be later established at the auction. By reducing both the number of bidders and the apparent supply, this practice may distort the auction price to some extent. In general, however, such side transactions appear to give added flexibility to the transfer price and to speed up the establishment of market-clearing prices.

For fish sold on the Dublin Market, the fisherman receives the sum paid by the successful purchaser, less the following deductions: an auctioneer's commission of 7.5 per cent; carriage, which varies from about 20p per box from Howth to £1 per box from Killybegs; porterage for the loading and unloading of boxes (at present about 12p per box); cartage when fish are picked up at a rail head; tolls - a Corporation charge of 8p per box on all boxes entering the market; boxes - a charge to the fisherman of 20 to 30p per box for the use of the auctioneer's boxes.

From his 7.5 per cent commission, the auctioneer must pay rent to Dublin Corporation, office expenses, labour plus overtime charges for night or early morning work, and financial charges. Rent for an auction bank is 22p per square metre per week. Office rent costs from £6 to £35 per week depending on the area. The fishermen are paid weekly, but up to three weeks' credit is given to buyers.

A number of people interviewed expressed the view that throughput of all kinds of fish in the Dublin Market will decline further as large supermarkets increase their purchase of supplies directly at portal auctions. The introduction of an auction at Howth during 1979 added to this trend. The auctioneers, however, do not expect the Dublin Market to disappear. They believe that smaller retailers will always provide sufficient demand to make it economically viable. In time, the Dublin Market may well become a genuine wholesale market, drawing supplies from all ports of the country. Dublin wholesalers will buy their supplies at portal auctions and will become less and less dependent on supplies from individual skippers. While the auction system may continue in larger ports where competition is vigorous, it probably will give way at other ports to direct sales to wholesalers at agreed prices. The resulting increase in portal sales will enable wholesalers to establish more stable sources of supplies, which will reduce the wide daily price fluctuations and provide greater variety of fish for an increasingly competitive Dublin Market. The trend also may lead to an increase in total consumption, since regular supplies and more stable prices will encourage use of more fish and shellfish.

The Cork Fish Market

The Cork Fish Market operates in a manner generally similar to the Dublin Market, and the rate of commission on sales, 7.5 per cent, is the same. The market is supplied mainly from the ports of Dingle, Castletownbere, Union Hall, Kilsale, Cobh, Blackrock, Ballycotton, and Helvic, with additional amounts from ports as distant as Dunmore East, Kilmore Quay, Killybegs, and Galway. The only auctioneer now operating in the Cork Fish Market took over the business of BIM, when this development body ceased its trading functions in 1963. A second auctioneer then in the market ceased operations in November, 1974.

As at Dublin, auctions in the Cork Market are held every day, except Sunday, commencing at 8.00 a.m. The auctioneer is also a wholesaler and processor. In addition to selling fish on behalf of fishermen, he may sometimes auction his own fish, purchased at the coast ports or even in the Dublin Market.

Wholesale Margins

The National Prices Commission gives the following data for costs and returns for the firms concerned at Dublin and Cork.

Table 7.8: Costs and returns in fish wholesaling in Dublin and Cork.

	Accounting year ending in:		
	1975	1976	1977
Number of firms in sample	3	3	4
Costs		Per cent	
Raw materials (fish)	74.8	74.3	76.0
Salaries and wages	7.0	9.1	8.3
Directors' fees and salaries	2.4	1.4	1.5
Transportation	2.5	3.2	2.2
Depreciation	1.5	1.3	1.2
Interest	0.9	1.6	1.6
Other expenses	8.6	7.8	7.6
Net profit	2.3	1.3	1.6
Total receipts	100.-	100.-	100.-
Average return on capital* (%)	12.7	8.7	13.1

* Return on capital = $\frac{\text{net profit before interest and tax}}{\text{shareholders' funds and borrowings}}$

Source: Consultancy study undertaken on behalf of the National Prices Commission, October 1978.

Raw materials (i.e., fish) accounted for three quarters of total costs, and salaries and wages accounted for 7 to 9 per cent. Net profit fluctuated from 1.3 to 2.3 per cent of revenue, and the average return on capital ranged between 8.7 and 13.1 per cent. These are considered modest returns on capital, since premises and equipment are valued at historical rather than current costs.

Other Wholesale Markets

Dunmore East

Until the Celtic Sea was closed for herring fishing in 1977, Dunmore East was one of Ireland's main herring ports, particularly between November and early February. All the herring landed in Dunmore East and Cobh were auctioned by the South and East Coast Fishermen's Association. Three per cent of the 5 per cent auction fee went to the South and East Coast Fishermen's Association, and 2 per cent went to the home co-operative of the fishing vessel. Since the closure of the herring fishery, whitefish catches have been increasing at Dunmore East and a nightly white fish auction is now held there.

Howth

Howth is primarily a whitefish port, operating the year round, and supplies white fish mainly to the Dublin Market. Until February, 1979, there was no auction in Howth for whitefish. In winter, about 50 per cent of the fish were sold directly to merchants at the port; the remainder went to the Dublin Market. In summer, up to 80 per cent of landings were sold at the port.

There is a growing interest in herring fishing off the east coast. Landings at Howth totalled 2,237 tonnes in 1976 and 1,282 tonnes in 1977. This "summer herring" has a high oil content (up to 30 per cent) and must be salted and boxed quickly. Herring is auctioned at Howth by the South and East Coast Fishermen's Association at a 3 per cent fee.

Killybegs and Burtonport

The Killybegs wholesale market serves the local port and Burtonport, for fish other than salmon (salmon are auctioned at Burtonport during the salmon season). Fish, other than salmon, landed at these ports are auctioned in Killybegs and withdrawn if they do not reach the EEC withdrawal price. The auctioneer's commission is 5 per cent for herring and 7.5 per cent for whitefish and salmon.

Other Auctions

Auctions for whitefish are held daily at Galway and twice weekly at Castletownbere. During periods of herring landings, auctions for these fish are held at ports such as Galway, Rossaveel, Castletownbere, Fenit, Ballyglass, etc.

Retail Distribution of Fish

According to BIM, 439 firms were engaged in fish retailing in 1974; of these, 104 were in the Dublin area. Many of these firms, however, were involved in fish retailing only to a minor extent. In a 1974 survey by the National Prices Commission, 45 retailers (30 in Dublin and 15 in the country areas) were interviewed; only one was engaged exclusively in fish retailing. All the others retailed additional products such as poultry, fruit and vegetables, general groceries, or speciality foods such as cold meats, cheese, and delicatessen items.

Weekly sales of the 45 retailers averaged 1,700 kg. Those specialising in fish retailing sold 2,110 kg per week on average. Shops in which fish was less than 20 per cent of turnover sold an average of 350 kg of fish per week.

Retailers in Leinster and the Midlands have three principal sources of supply: directly from the Dublin Fish Market, from a locally based distributor, or from a general distributor engaged mainly in fruit, vegetable, and fish trading. The latter normally buys the fish in the Dublin Market. Most retailers outside Dublin sell one or two varieties, including smoked fish, but some handle a wider range of products. In the southern and western regions, supplies come directly from ports such as Kilmore Quay, Dungarvan, Dingle, Galway, and Killybegs. Retailers arrange their own transportation or rely on distributors for supplies.

The principal varieties handled by retail fish outlets include whiting, haddock, cod, and plaice. The more general grocery outlets concentrate mainly on whiting, cod, and sometimes plaice. Herring is sold by all stores when available. The speciality fish stores handle a number of other species, the most common of which are mackerel, ray wings, and prawns. Brill, sole, and black pollack are sold by only a few stores.

In the National Prices Commission survey, retailers asserted unanimously that the cost of fish to them and the price of fish to the consumer is determined almost entirely by the supply situation. The retailers also noted short quantities and a lack of variety at times on the Dublin Market.

Supplies of fish vary widely. In a typical period late in 1978, the daily supply of cod reached a high of 190 boxes on November 10 and a low of 5 boxes on November 15. Supplies of round whiting dropped to 40 boxes on November 16 from 480 boxes a week earlier, and the supply of plaice fell in five days from 110 boxes to 2 boxes per day. Mackerel supplies ranged from 10 boxes to 280 boxes per day in a seven week period.

Prices varied correspondingly within this period. The price of cod ranged from 44 p to £1.06 per kilo, and of round whiting, from 15 p to 63 p per kilo; the greatest fluctuation was for plaice, from 11 p to £1.48 per kilo. The price spread for mackerel was much less, from 14 p to 18 p per kilo.

Under such supply conditions, it is difficult to conduct an efficient system for marketing fish at retail level and all but impossible to realise full sales potential. Retailers must, on occasion, buy more than their daily requirements to guard against low supplies at other times. And this means, in turn, that consumers can be offered only frozen or preserved fish, instead of fresh or chilled supplies.

Retailers try to set prices and to leave them unchanged for some time, seeking to maintain stable prices for the consumer. However, when large fluctuations occur at the wholesale level, the cost variations tend to be passed on immediately at the retail level. Since retailers now are able to store fish, it is difficult to monitor the speed with which price variations are passed on to the final customer. However, retailers are unanimous in declaring that it is almost impossible to keep prices fixed much longer than a week, because of the supply situation. Large price increases at the wholesale level generally are passed on to the consumer in small increments until the extra cost has been recouped, and it may take up to four weeks to pass on the total cost. Retail fish pricing practices are, of course, influenced by demand factors, particularly at times when meat prices are declining. In recent years, however, retail fish prices have been remarkably strong, reflecting the general tightness of supplies in the EEC region (see Table 7.4 and Figure 7.1).

Retail Margins

Retailers generally are influenced by three major factors in setting margins and the resulting retail prices. These are pricing based on costs, pricing to meet competition at the retail level, and pricing in response to demand. Long experience in the trade, of course, proves actual pricing to be a blend of all three. When little information is available on demand elasticities, retailers tend to rely on the first two approaches; cost information is readily available, and retailers know prices being charged by competitors. If there is a price leader in the market area, this problem is simplified. The greater the distance from direct competition, the more advantage there is in setting prices based on costs. Normally, there is less uncertainty about costs than about either demand or competitive behaviour. The survey noted that retailers set a higher percentage margin on lower priced fish, such as whiting, and a lower margin on the more expensive varieties, such as plaice. Retail margins are higher in the Dublin area than in the country areas for haddock, plaice, and cod. The opposite is true for herring and whiting.

The National Prices Commission survey calculated the average margin added by the retailers for five main varieties of fish, as well as for pork products, beef, fruit, and vegetables. These margins vary widely. Except for filleted herring, the margins on fish are less than those on loose bacon, fresh pork, and beef, but higher than those on prepacked bacon, potatoes, and tomatoes. Comparison of these margins is difficult, because the amount of processing by retailers varies widely.

Table 7.9: Retail fish margins compared with margins on other food products

Products	Margin (percentage on cost)	Degree of processing at retail
Fish		
Herring, filleted	121	Relatively high
Whiting	34	Relatively high
Haddock	42	Relatively high
Plaice	26	Relatively high
Cod	38	Relatively high
Pigmeat		
Prepacked bacon	17	Very low
Loose bacon	66	Relatively high
Fresh pork	38	Relatively high
Beef	51	Relatively high
Fruit and Vegetables		
Potatoes	24	Very low
Carrots	27	Very low
Tomatoes	22	Very low
Apples	26	Very low
Bananas	37	Very low

Source: National Prices Commission, Monthly Report No. 39, April 1975. Dublin: Stationery Office, Prl. 4496, p.30.

Productivity in Retailing

Fish normally are sold to the housewife either whole or filleted. Filleting results in approximately 50 per cent loss of gutted weight. Processing loss ranges from 90 per cent in weight for oysters to 30 per cent for eels. The large fish retailers assign workers specifically to filleting. They do not charge directly for this, even though it adds materially to the retail cost. Instead, the cost is spread over all fish, whether filleted or not. The Survey found that an operator can fillet, in one hour, an average of 1.7 boxes of whiting, 1.8 boxes of haddock, 1.4 boxes of medium plaice, 1.9 boxes of cod, 2 boxes of herring/mackerel, and 0.5 boxes of ray, Thus, at 44.5 kg per box (and allowing for the weight loss) an operator can produce in an hour about 37.2 kg of filleted whiting, haddock, or cod, compared with 46.3 kg of filleted herring or mackerel, 29.5 kg of medium plaice, and only 9.5 kg of filleted ray.

Some retail firms arrange for filleting by outside firms, believing that this kind of service can best be performed at a central location; others say that such services are too expensive and that the quality of the work is not acceptable. Table 7.10 compares labour costs of filleting on the premises with charges made by specialised firms.

Table 7.10: Labour costs of filleting by retailers compared with charges made by specialised filleting firms; boxes filleted per operator hour

Location of filleting	Species of fish					
	Whiting	Haddock	Plaice	Cod	Herring/ mackerel	Ray
	p/kg edible weight					
Survey firms	2.20	2.20	2.82	2.20	1.79	8.82
Specialised firms	8.27	8.49	8.27	8.71	7.52	22.04
	Number of boxes					
Boxes filleted per operator hour	1.7	1.8	1.4	1.9	2.0	0.5

Source: National Prices Commission, Monthly Report No. 39, April 1975. Dublin: Stationery Office, Prl. 4496, p.43.

Retailers noted that, if they included in their costs charges for use of premises and other expenses, the cost of filleting on their own premises would be near the commercial rates given in Table 7.10, which include charges for premises, transport, and packaging.

CHAPTER 8

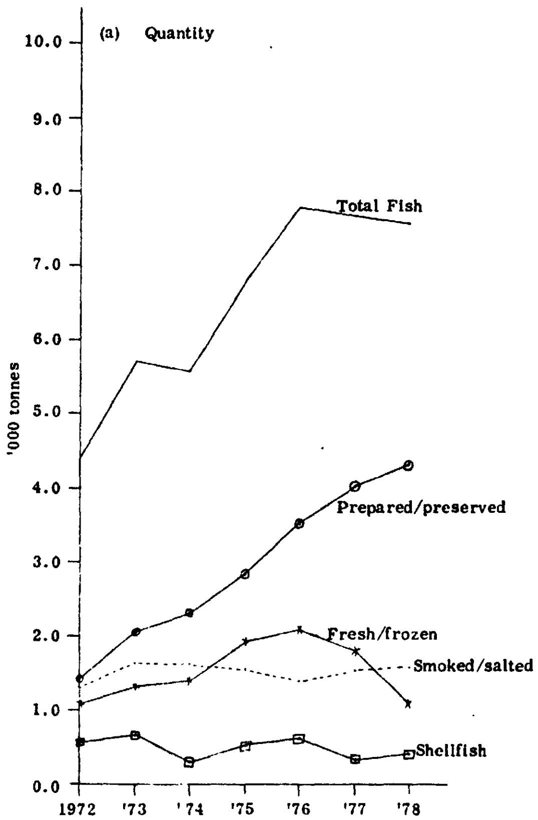
FOREIGN TRADE IN FISH AND FISH PRODUCTS

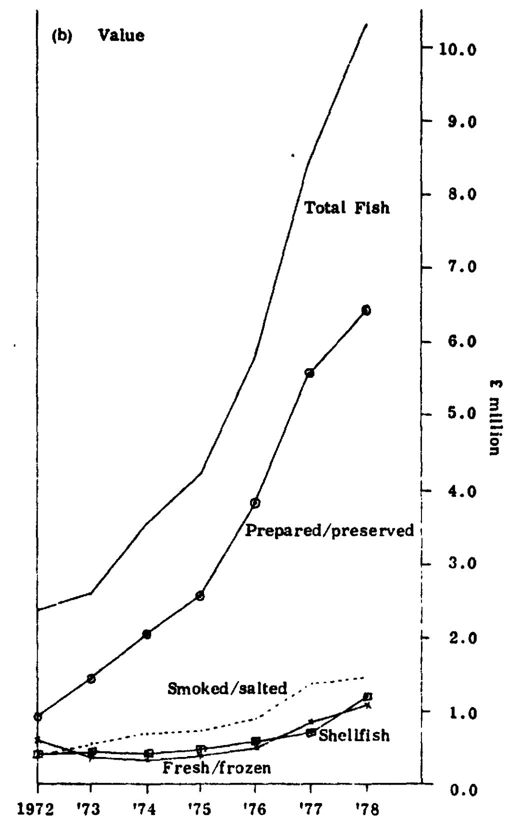
Of all fish landed at Irish ports, approximately 70 per cent is exported, 16 per cent is consumed domestically, and the remaining 14 per cent is either converted into fishmeal or used for mink and trout feed. In addition to Irish landings consumed, a similar landed weight of fish is imported for local consumption. Figures for the quantity and value of the imports and exports of fish and fish products for the years 1972 to 1978 are shown in graph form in Figures 8.1 and 8.2 and as Table 8A.1 of the Appendix to this chapter. The quantities shown apply to imported and exported weight, not landed weight.

As shown in Figure 8.1, the total volume of imports rose from 4,500 tonnes in 1972 to 7,400 tonnes in 1978, or by about 65 per cent. All of the listed items showed an increase in volume except shellfish (fresh, chilled, or frozen), which declined over the period. Prepared and preserved fish increased most in volume, from 1,403 tonnes in 1972 to 4,313 tonnes in 1978, a rise of 207 per cent. The value of total imports rose from £2.3 million in 1972 to £10.3 million in 1978, and the value of prepared and preserved fish increased sharply from £936,000 to £6.4 million in the same period. The total import value of £10.3 million represents approximately 0.28 per cent of total national imports in 1978.

Total exports dropped sharply during the early part of the period, 1972 to 1978. After rising from 47,000 tonnes in 1972 to 50,000 tonnes in 1973, volume declined to 35,000 tonnes in 1977, but rose to 43,000 tonnes in 1978. Most of the decline was in the category of salted, dried, and smoked fish products; these exports fell from 18,300 tonnes in 1972 to only 10,300 tonnes in 1978, a drop of 44 per cent. A large part of this decline was in exports of salted, dried, and smoked herring, which dropped from 17,860 tonnes in 1972 to only 8,389 tonnes in 1978. In the same period, exports of fresh and dried shellfish increased approximately 30 per cent and exports of prepared and preserved shellfish increased approximately 20 per cent.

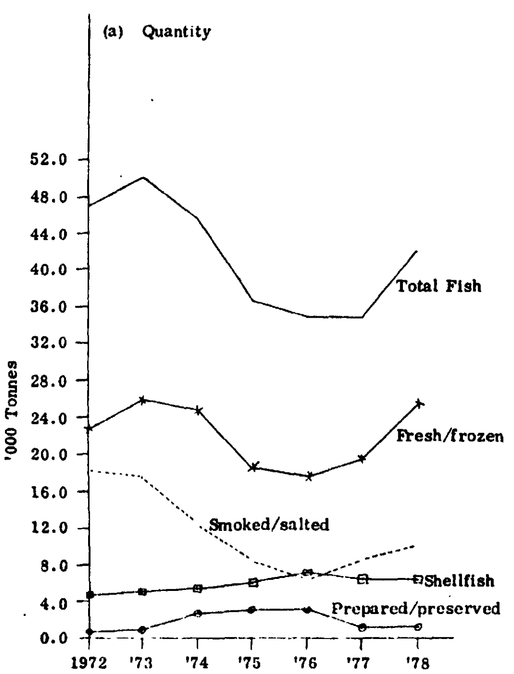
Figure 8.1: Quantity and value of Irish fish imports, 1972-1978

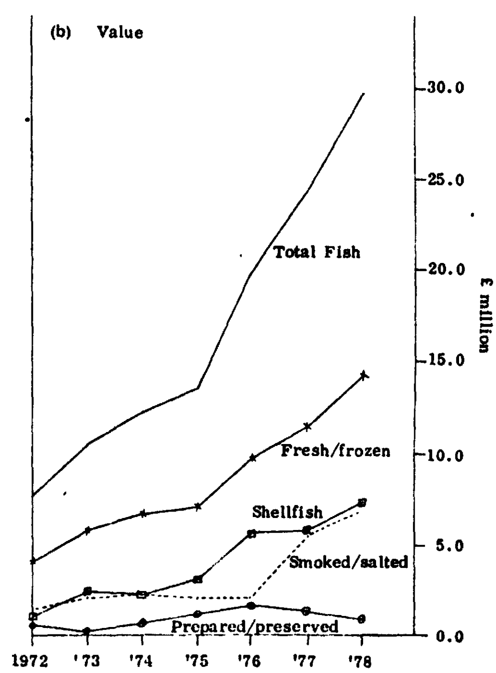




Source: BIM Annual Reports

Figure 8.2: Quantity and value of Irish fish exports, 1972-1978





Source: BIM Annual Reports

Despite the decline in tonnage of exports, the total value increased from £7.76 million in 1972 to £29.7 million in 1978. Herring and salmon accounted for most of the increase in unit value, but all other items also rose in value, even those which declined in quantity. For example, although the quantity exported of dried, salted, and smoked fish dropped by nearly half in this period, its value more than quadrupled. The total value of fresh fish exports more then trebled, although the quantity increased by only 10 per cent between 1972 and 1978.

In contrast with the estimated landed value of £23 million for all sea fish taken in at Irish ports in 1978, the total value of exports in that year (see Table 8A.1) was a gratifyingly high £29.7 million; and this does not include the value of fish landed directly into foreign ports by Irish vessels. If the latter figure is included, the total value of fish exports for 1978 rises to £30.4 million, representing about 1.0 per cent of total exports from the State in that year.

In the Appendix to this chapter, Table 8A.2 provides a more detailed breakdown of imports and exports of fish in 1977 and 1978. For imports, herring was the major item in the fresh and frozen fish category in 1977, but its place was taken by cod in 1978. Cod, coley, and tusk rank high in the smoked fish category; and fillets and portions constitute most of the prepared and preserved fish imports. Prawns and scallops account for more than two-thirds of the rather small volume of imported shellfish.

On the export side, the table shows that fresh, chilled, and frozen exports consisted largely of herring, mackerel, and salmon. Although, in 1977, salmon accounted for only about one-twelfth of the combined volume of herring and mackerel, its value was only slightly less than that of the two species together. Again in 1978, although the volume of salmon exported was less than 5 per cent of the volume of these other fish, the value was almost half as high. In the export categories of salted and smoked fish and of prepared and preserved fish, herring holds the top position. Among shellfish exported, periwinkles and mussels account for the largest volume, but the small exported weight of lobsters returns a higher value than the combined value of the above.

Direct landings of wet fish by Irish vessels into foreign ports increased substantially in recent years, from 2,051 tonnes in 1975 to 5,510 tonnes in 1977, but declined sharply to 2,100 tonnes in 1978. Direct landings of shellfish into foreign ports varied more widely than those of wet fish; they totalled 3,545 tonnes in 1975, 5,286 tonnes in 1976, and then dropped to 140 tonnes in 1978.

Unit Values and Proportions of Different Categories of Irish Imports and Exports of Fish, 1972 and 1978

The unit values of Irish imports and exports of fish are summarised in Table 8.1, which shows import values of £517 per tonne in 1972 and of £1,385 in 1978, as against export values of £165 and £695, respectively, for the same years. The lower values for exports are attributable to two factors: the differing proportions among categories (i.e., fresh, semi-processed, processed, and shellfish) and the varieties of fish in each of the different categories (i.e., a category containing a high proportion of salmon would have a higher unit value than another dominated by fresh mackerel or whiting).

The table shows that prepared/preserved products and shellfish are higher valued on both the import and export lists than are the fresh, frozen, salted, etc., classes. In 1972, about 42 per cent of total Irish imports were in the high priced groups, as against less than 12 per cent of exports. Although the proportion of shellfish in total imports subsequently declined, the volume of preserved fish imported had increased to such a point that, combined with shellfish, it represented almost 64 per cent of the total imports in 1978. The pattern of exports also changed markedly between 1972 and 1978. In that time, prepared fish decreased from 9.4 to 3.0 per cent of total exports, while shellfish increased from 2.3 to 13.4 per cent. The resultant total for the relatively higher priced category was approximately 16 per cent, compared with only 11.7 per cent five years earlier.

The composition of the different categories is not itemised in Table 8.1, because the large number of species precludes such detail. It is obvious, however,

Table 8.1: Unit values and proportions of different categories of Irish imports and exports of fish, 1972 and 1978

Description	Imports				Exports			
	Percentage of total quantity		Unit value £/tonne		Percentage of total quantity		Unit value £/tonne	
	1972	1978	1972	1978	1972	1978	1972	1978
	Per cent		£		Per cent		£	
Wet Fish								
Fresh, chilled, frozen	26.5	15.3	510	1,050	49.4	59.5	179	561
Smoked, dried, salted	31.0	20.9	284	947	39.0	24.1	89	682
Prepared/preserved*	31.6	58.9	676	1,509	9.4	3.0	721	801
Shellfish								
Fresh, frozen, salted, dried	10.8	4.9	737	2,825	2.3	13.4	273	1,290
Total	100.-	100.-	517	1,385	100.-	100.-	165	695

* Includes some prepared shellfish.

Source: Table 8 A.1.

that an increase or decrease in a high priced variety, such as salmon, sole, or herring, will significantly change the unit value of a given category.

The main conclusion to be drawn from Table 8.1 is that the higher priced categories of processed fish and shellfish constitute only a small part of Irish exports and, as a result, unit export values are relatively low. If that proportion were improved, the total value of exports would increase considerably. This should inspire efforts to increase the level of fish processing within the State and to expand, if possible, the valuable shellfish industry.

Foreign Trade by Country of Origin and Destination

Imports

The volumes and values of imported fish are shown by country of origin in Appendix Table 8A.3. For 1978, the table shows Great Britain as the largest exporter of fish to Ireland, supplying 5,249 tonnes valued at £6.8 million. Northern Ireland followed, supplying 514 tonnes valued at £838,000. Canada supplied 502 tonnes valued at £972,000, and Japan supplied 353 tonnes valued at £613,000. Imports from all other countries were relatively low, in no case is any one country supplying more than 150 tonnes in any of the years shown.

Exports

Appendix Table 8A.4 shows, for 1978, that The Netherlands was the largest customer in terms of volume for Irish fish and fish products, importing 12,249 tonnes (valued at £6.2 million). Great Britain led in terms of value, with imports valued at £8 million (7,699 tonnes). West Germany and France imported, respectively, 6,519 tonnes valued at £4.7 million and 5,613 tonnes valued at £4.8 million.

Exports of the more important varieties of fish, classified by country of destination, are given in Tables 8A.5 to 8A.9. Table 8A.5 shows that total herring exports declined from 38,000 tonnes in 1973 to about 21,000 tonnes in 1978. Despite the volume decrease, values more than doubled, from £4.6 million in 1973 to £11.7 million in 1978. In most years, The Netherlands was the largest volume importer of herring, followed by West Germany, France, Norway, and Great Britain, in that order. In value terms, West Germany's imports were higher in all years except 1977 and 1978. The German market requires fat herring at higher prices than the thinner, spent herring acceptable in some other markets; and the bulk of German herring imports is in the more expensive dried, frozen, headless, or filleted form. Exports to other countries show a higher proportion of whole fish having a lower unit value. The forms in which herring were exported in 1978 to the major markets are shown in Table 8A.6.

The total volume of shellfish exports increased from 5,700 to 7,600 tonnes between 1973 and 1976 and declined again to 5,800 tonnes in 1978 (Table 8A.7). The value similarly increased from £2.5 million in 1973 to £5.8 million in 1976 but then continued upward - to £7.5 million in 1978. The bulk of Irish shellfish exports go to Great Britain, Netherlands, and to France but the distribution of varieties to Britain and the continental countries is markedly different. Table 8A.8 shows that in 1978 over 60 per cent of the shellfish exports to Britain were prawns/shrimps and mussels, mainly the latter. Less than 2 per cent of shellfish exports to The Netherlands and 16 per cent of those to France were of these species, the greater part being low-priced periwinkles. The most valuable of all shellfish are lobsters, most of which go to Great Britain, France, Belgium/Luxembourg, and The Netherlands, in that order. The value of lobsters exported in 1978 totaled £1.58 million, about one-fifth the value of all shellfish exports in that year.

Salmon exports (shown by country of destination in Table 8A.9) increased from 1,200 tonnes in 1973 to 1,650 tonnes in 1975, but declined again to 1,066 tonnes in 1978. The value rose from about £2.0 million in 1973 to £4.6 million in 1976, then dropped to £4.2 million in 1978. Great Britain is the largest importer of Irish salmon, followed by France, Northern Ireland, and Belgium/Luxembourg. Virtually all salmon is exported fresh, chilled, or frozen - 919 tonnes in 1978 as against a mere 69 tonnnes of smoked salmon (see Table 8A.2).

APPENDIX 8A

Table 8A.1: Irish fish imports and exports, 1972-1978*

	1972	1973	1974	1975	1976	1977	1978	1972	1973	1974	1975	1976	1977	1978
<u>Imports</u>	Tonnes							£'000						
Fish, fresh, chilled, or frozen	1,192	1,304	1,453	1,923	2,149	1,761	1,141	608	267	261	405	496	847	1,198
Fish, smoked, dried, or salted	1,396	1,622	1,569	1,550	1,465	1,522	1,558	396	536	685	715	866	1,334	1,475
Fish, prepared/ preserved	1,403	2,136	2,317	2,816	3,538	4,026	4,313	936	1,409	2,055	2,618	3,881	5,588	6,424
Shellfish, fresh, chilled, or frozen	486	637	204	485	575	254	361	358	374	271	435	468	602	1,020
Shellfish, prepared/ preserved	19	33	53	34	35	47	64	26	48	79	58	74	125	181
Total Imports	4,496	5,732	5,596	6,808	7,762	7,610	7,437	2,324	2,634	3,351	4,231	5,786	8,496	10,298
<u>Exports</u>														
Fish, fresh, chilled, of frozen	23,221	25,927	24,816	18,517	17,418	19,223	25,450	4,145	5,866	6,857	7,053	9,914	11,601	14,278
Fish, salted, dried, or smoked	18,344	17,938	12,610	8,848	6,597	8,705	10,314	1,636	2,078	2,264	2,168	2,244	5,562	7,032
Shellfish, fresh, salted, or dried	4,409	5,530	5,609	6,131	7,624	5,732	5,735	1,202	2,437	2,336	3,160	5,721	5,877	7,398
Fish and Shellfish, preapred/preserved	1,075	814	2,703	3,278	3,358	1,515	1,283	775	252	843	1,266	1,806	1,380	1,028
Total Exports	47,049	50,209	45,738	36,774	34,997	35,175	42,782	7,758	10,633	12,300	13,647	19,685	24,420	29,736

* Excludes fish landed directly into foreign ports.

<u>Source:</u> <u>Trade Statistics of Ireland</u>, December issues, Central Statistics Office, Dublin.

Table 8A.2: Irish exports and imports of fish classified by species and form in which shipped, 1977 and 1978

Imports

Description	1977	1978	1977	1978
	Tonnes		£'000	
Fresh, chilled, frozen				
Plaice	26	38	25	49
Herring	850	91	193	43
Cod	21	185	22	254
Salmon	33	20	105	79
Other	831	807	502	773
Smoked				
Cod, coley, tusk	1,363	n. a.	1,193	n. a.
Kippered herring	50	50	46	59
Other	1	1,403	-	1,316
Dried or salted	108	105	95	100
Prepared/preserved				
Salmon	778	851	1,672	1,698
Sardines	380	354	381	413
Fillets, portions, etc.	2,456	2,398	3,125	3,619
Other	412	710	410	694
Shellfish: fresh, frozen				
Prawns	160	248	365	716
Scallops	9	37	27	109
Other	85	76	210	195
Shellfish: prepared/preserved	47	64	125	181
Total	7,610	7,437	8,496	10,298

Exports

Description	1977	1978	1977	1978
	Tonnes		£'000	
Fresh, chilled, frozen				
Salmon	1,011	919	3,763	3,619
Herring and mackerel	13,357	19,197	4,739	7,563
Fresh water eels	145	99	278	210
Rainbow trout	123	111	167	138
Other	4,587	5,124	2,654	2,748
Dried, salted, smoked				
Salmon	57	69	445	571
Herring	7,652	8,389	4,385	4,950
Other	996	1,856	732	1,511
Shellfish: fresh, frozen				
Crawfish	210	81	576	457
Lobsters	301	306	1,447	1,576
Periwinkles	2,171	1,983	593	594
Mussels	1,244	1,068	366	365
Oysters	521	480	701	969
Other shellfish and preserves	1,302	1,939	2,263	3,577
Prepared or preserved fish				
Herring	1,469	906	1,271	648
Other	29	255	40	240
Direct exports ex fishing vessels				
Wet fish	5,510	2,100	1,845	597
Shellfish	339	140	243	98
Total	41,024	45,022	26,508	30,431

Source: BIM Annual Reports

Table 8A.3: Irish imports of fish and fish products by country of origin, 1973-1978

Country of Origin	1973	1974	1975	1976	1977	1978	1973	1974	1975	1976	1977	1978
	Tonnes						£'000					
Great Britain	3,489	3,217	3,787	4,129	4,932	5,249	1,514	1,919	2,461	3,485	5,261	6,812
Canada	304	256	158	77	361	502	338	428	265	164	770	972
Japan	506	556	506	781	601	353	195	381	610	1,019	1,021	613
Northern Ireland	809	1,170	1,828	2,359	1,161	514	193	197	370	507	652	838
USA	67	50	60	41	43	105	93	96	97	106	98	242
Denmark	7	11	10	22	54	120	9	12	9	36	28	20
Norway	61	46	50	50	24	18	52	53	77	93	57	44
Spain	13	4	16	24	78	45	6	4	21	24	91	63
France	11	28	38	34	4	16	19	16	19	22	15	35
Netherlands	51	57	81	21	62	125	15	16	41	17	43	120
Morocco	5	13	80	79	41	42	2	7	86	90	50	52
South Africa	24	20	43	36	34	1	10	10	21	18	25	1
Other countries	385	168	151	109	215	347	189	212	154	205	385	486
Total Imports	5,732	5,596	6,808	7,762	7,610	7,437	2,634	3,351	4,231	5,786	8,496	10,298

Source: Trade Statistics of Ireland, December issues, Central Statistics Office, Dublin, and BIM.

Table 8A.4: Irish exports of fish products by country of destination, 1973-1978

Country of destination	1973	1974	1975	1976	1977	1978	1973	1974	1975	1976	1977	1978
	Tonnes						£'000					
Great Britain	10,234	9,883	6,419	6,300	5,253	7,699	3,817	3,726	3,862	5,476	6,295	8,057
Netherlands	14,229	11,610	7,260	7,189	10,928	12,249	1,455	1,644	1,486	2,363	4,839	6,194
France	8,414	6,394	8,031	5,374	4,704	5,613	1,501	1,699	2,865	3,289	3,500	4,841
West Germany	8,237	6,443	5,221	5,821	4,844	6,519	1,315	1,623	1,700	2,475	3,439	4,730
Belgium/Luxembourg	2,070	1,949	1,222	1,746	1,171	1,582	599	690	666	1,104	1,264	1,332
Northern Ireland	1,046	1,013	1,075	1,252	1,597	2,696	277	365	479	933	1,057	1,657
Norway	2,864	3,655	2,532	1,505	2,517	1,414	436	789	682	565	795	342
Sweden	885	1,573	1,907	1,450	1,087	722	249	694	673	956	795	605
Spain	255	535	686	350	347	121	252	325	346	473	653	341
Denmark	845	291	537	873	1,039	461	172	96	274	554	736	278
Other countries	1,130	2,392	1,884	3,136	1,688	3,706	560	649	614	1,497	1,047	1,359
Total Exports	50,209	45,738	36,774	34,997	35,175	42,782	10,633	12,300	13,647	19,685	24,420	29,736

Source: Trade Statistics of Ireland, December issues, Central Statistics Office, Dublin, and BIM.

Table 8A.5: Quantity and value of Irish herring exports by country of destination, 1973-1978

Country	1973	1974	1975	1976	1977	1978	1973	1974	1975	1976	1977	1978
	Tonnes						£'000					
Netherlands	12,073	8,840	4,207	3,128	5,757	7,608	1,089	1,197	591	772	2,873	4,034
West Germany	8,034	5,574	4,695	5,093	3,441	4,495	1,127	1,246	1,338	1,834	2,152	3,307
France	5,894	3,734	4,676	2,934	1,902	3,095	628	698	1,021	880	909	1,737
Norway	2,844	3,513	2,422	1,468	1,069	446	434	762	644	538	617	199
Great Britain	4,393	4,480	1,706	979	693	1,898	432	889	363	230	609	960
Denmark	820	246	471	837	589	31	165	72	195	489	491	20
Sweden	786	1,412	1,541	958	599	162	217	556	588	548	477	123
Finland	n. a.	n. a.	262	374	269	286	n. a.	n. a.	64	161	259	215
Belgium/Luxembourg	1,766	1,654	794	726	406	825	333	426	229	252	226	546
Northern Ireland	374	546	436	128	534	1,334	43	101	92	31	156	496
Poland	1,246	1,393	n. a.	356	384	n. a.	171	265	95	88	119	n. a.
Other countries	117	365	683	-	14	532	14	75	10	-	10	102
Total Herring Exported	38,347	31,757	21,893	16,981	15,657	20,712	4,653	6,287	5,230	5,823	8,898	11,739

<u>Source:</u> BIM data.

Table 8A.6: Exports of Irish herring in 1978 to selected countries, classified by form in which exported

Country	Fresh, chilled, frozen		Dried or salted	Smoked	Prepared/ preserved	Total	
	Whole	Fillets	Whole pieces			Quantity	Value
			Tonnes			Tonnes	£'000
Netherland	2,086	925	4,597	-	-	7,608	4,034
West Germany	597	1,917	1,919	38	24	4,495	3,307
France	981	855	1,258	-	1	3,095	1,737
Norway	-	-	-	-	446	446	199
Great Britain	1,480	113	175	11	119	1,898	960
Denmark	-	-	19	-	12	31	20
Sweden	-	-	38	11	113	162	123
Finland	-	-	99	-	187	286	215
Belgium/Luxembourg	208	433	184	-	-	825	546
Northern Ireland	1,191	104	39	-	-	1,334	496
Other countries	527	-	-	1	4	532	102
Total	7,070	4,347	8,328	61	906	20,712	11,739

Source: BIM data.

Table 8A.7: Quantity and value of Irish shellfish exports by country of destination, 1973-1978

Country	1973	1974	1975	1976	1977	1978	1973	1974	1975	1976	1977	1978
	Tonnes						£'000					
Great Britain	1,751	2,421	1,834	1,862	1,902	2,224	1,044	846	802	1,081	1,968	2,798
Northern Ireland	118	59	57	94	111	198	66	34	35	102	90	248
France	2,197	1,602	1,673	1,694	1,321	1,609	539	539	900	1,492	1,559	2,154
Spain	188	448	643	261	277	90	133	188	261	265	393	184
Belgium/Luxembourg	101	68	102	154	115	68	191	164	305	498	488	340
West Germany	60	40	31	46	38	46	105	116	107	231	208	277
Netherlands	1,040	936	1,749	2,054	1,847	1,386	194	252	626	1,047	971	1,036
USA	170	44	14	n.a.	n.a.	n.a.	185	83	42	n.a.	n.a.	n.a.
Switzerland	9	11	19	n.a.	15	16	29	40	63	n.a.	86	92
Other countries	22	56	62	1,455	128	206	20	108	65	1,048	182	349
Total Shellfish Exported	5,656	5,685	6,184	7,620	5,754	5,843	2,506	2,371	3,206	5,764	5,945	7,478

<u>Source;</u> BIM data.

Table 8A.8: Exports of Irish shellfish to selected countries in 1978, classified by type of shellfish

Type of Shellfish	Country						All Countries		
	Great Britain	France	Belgium/ Luxembourg	Netherlands	Spain	Others	Volume	Value	Unit value
	Tonnes						Tonnes	£'000	£/tonne
Crustaceans									
Crawfish	20	36	4	1	7	13	81	457	5,642
Lobsters	87	79	48	36	4	52	306	1,577	5,154
Crabs, Crayfish	162	169	-	-	1	110	442	539	1,219
Prawns and Shrimps	455	137	-	-	13	139	744	1,522	2,046
Other crustaceans	285	44	-	-	24	18	371	824	2,222
Molluscs									
Oysters	93	114	16	251	3	3	480	968	2,017
Mussels	936	109	-	24	-	-	1,068	365	342
Squid	38	10	-	-	15	62	125	126	1,008
Scallops	42	47	-	43	23	26	181	456	2,519
Periwinkles	49	859	-	1,031	-	44	1,983	594	299
Other molluscs	57	5	-	-	-	-	62	50	806
Total	2,224	1,609	68	1,386	90	466	5,843	7,478	1,280

Source: Central Statistics Office and BIM, Dublin.

Table 8A.9: Quantity and value of Irish salmon exports by country of destination, 1973-1978

Country	1973	1974	1975	1976	1977	1978	1973	1974	1975	1976	1977	1978
			Tonnes						£'000			
Great Britain	847	866	1,078	781	631	734	1,337	1,176	1,965	2,886	2,224	2,573
France	184	171	269	126	108	92	288	273	550	513	452	408
Belgium/Luxembourg	20	41	33	36	76	37	36	71	93	176	361	213
Northern Ireland	38	78	105	122	73	82	50	106	152	410	269	263
West Germany	20	16	63	29	52	30	43	42	119	148	253	202
Netherlands	25	16	32	28	55	35	48	30	82	128	239	163
Spain	57	63	30	53	48	26	109	121	73	181	216	143
USA	5	7	5	11	12	16	14	22	20	75	96	121
Switzerland	7	9	10	14	7	8	17	23	30	61	40	53
Other countries	8	21	28	8	7	6	22	23	46	55	60	51
Total Salmon Exported	1,211	1,288	1,653	1,209	1,069	1,066	1,964	1,887	3,130	4,633	4,210	4,190

Source: BIM data

CHAPTER 9

ANALYSIS OF SOME INTERNATIONAL FISH MARKETS

In connection with the prepartion of this report a study of the market for processed fish products in some important continental countries was carried out by The Economist Intelligence Unit (Europe) SA, referred to below as the EIU, on commission for the ESRI. The countries covered by the study were Federal Republic of Germany, Netherlands and France. The methodology used is given as an appendix to this chapter (Appendix 9A).

The objectives of the study were:

(a) to identify European markets for products with a high value-added which can be processed from Irish landings of fish,

(b) to appraise European opinions on future markets for the Irish sea fishing industry, and

(c) to assess opportunities for joint ventures with continental partners in advanced processing and marketing of fish landed in Ireland.

In addition to the material obtained from the EIU studies, data on the UK fish market obtained from other reports are also presented.

FEDERAL REPUBLIC OF GERMANY

The supplies and disposal of fish in Federal Germany in the years 1974-1977 are given in Table 9.1. This table shows that landings have declined substantially over the period from 493,000 tonnes in 1974 to 395,000 tonnes in 1977. The dominant trend in this period has been the marked decline in landings of herring which fell from 58,000 tonnes in 1974 to 8,000 tonnes in 1977. In the latter year herring accounted for no more than 2.1 per cent of total landings. Over the same period imports increased fairly substantially but despite this the total supply in 1977 was about 6 per cent less than it was in 1974. German imports are very high and in recent years they have been greater than home landings. Exports are also fairly substantial, being somewhat more than half of imports in recent years. Home consumption at 9.1 kg per person in 1977 has been falling somewhat in recent years.

Table 9.1: Fish balance sheet for Federal Germany, 1974-1977 [(a)]

	1974	1975	1976	1977
	('000 tonnes catch weight)			
Landings	493.0	434.0	425.8	394.5
Imports (b)	411.6	422.0	456.8	469.8
Total supply	904.6	856.0	882.6	864.3
Exports (b)	184.7	202.0	239.5	235.0
Not for human food	76.2	63.0	55.9	69.0
Human consumption	643.7	591.0	587.2	560.3
Consumption per head (kg)	10.4	9.0	9.5	9.1

(a) Excludes fresh water fish, (see Table 7.2 for total consumption)

(b) Excludes fish meal.

Source: EIU commissioned report, 1979.

Sources of Supply

Of the total imports of fish in 1977, 106,000 tonnes were fresh or chilled, 117,000 tonnes were frozen and the balance processed or semi processed fish. Unfortunately the official statistics do not give a breakdown of imports by species, the data on herring in Table 9.2 being provided by the EIU based on discussions with members of the trade and other respondents. This table shows that total herring imports in 1977 were 97,000 tonnes. The main suppliers were Denmark, Canada and the USA which between them supplied 83.5 per cent of the total. Ireland's contribution was 1,634 tonnes or 1.7 per cent. Other important imports were saithe, pilchards and mackerel. Irish mackerel exports to Germany in 1977 were 877 tonnes.

Table 9.2: Federal Republic of Germany - imports of fresh and frozen herring by country of origin in 1977

Country	Quantity tonnes	Percent
Denmark	38,656	39.8
Canada	31,931	32.9
USA	10,453	10.8
Norway	4,766	4.9
Netherlands	3,211	3.3
Sweden	2,427	2.5
UK	2,290	2.4
Ireland	1,634	1.7
Iceland	707	0.7
Other	987	1.0
Total	97,062	100.0

Source: EIU report (op. cit.,)

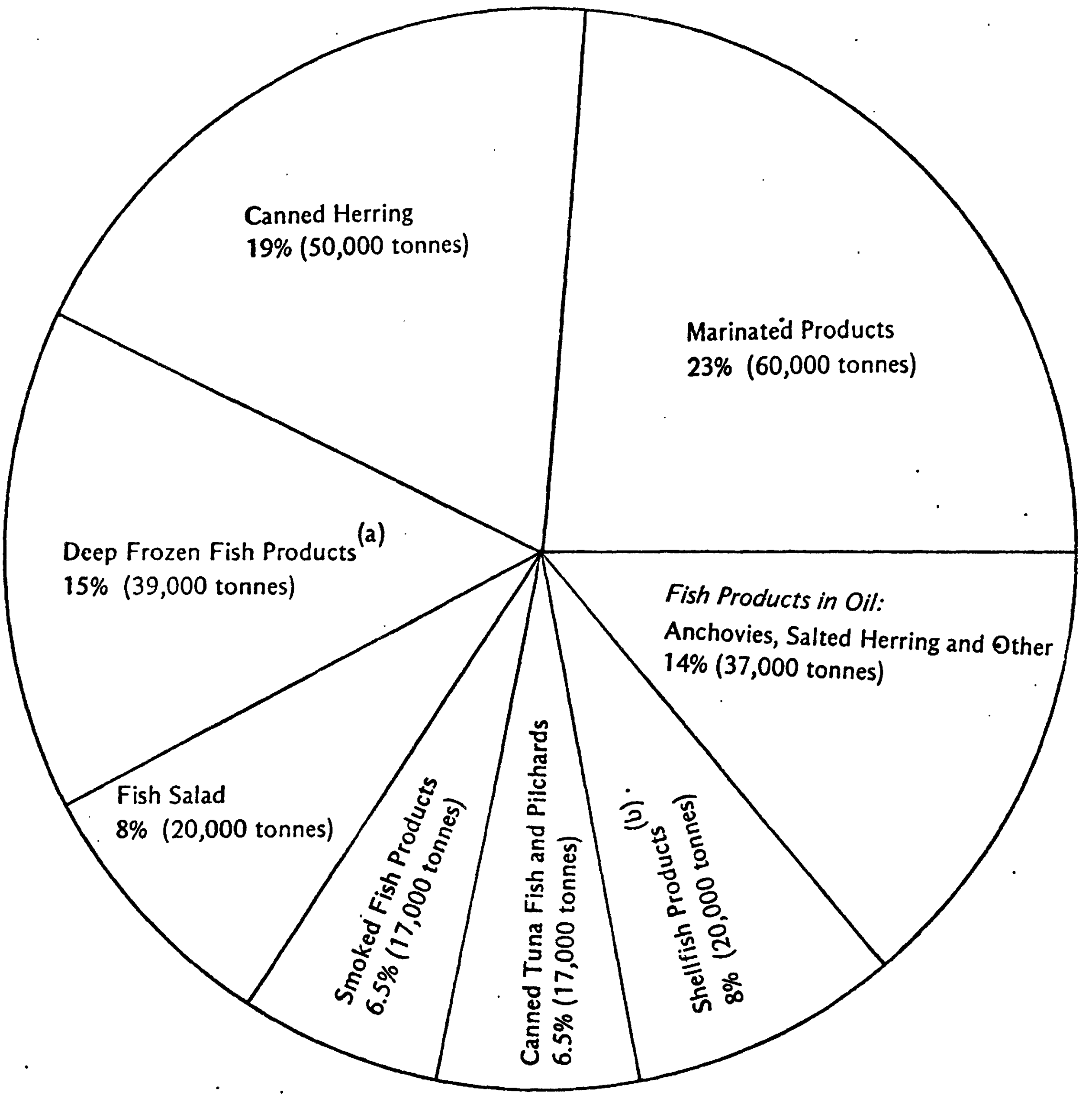
Pattern of Fish Consumption

The EIU estimates consumption of processed fish products at 260,000 tonnes in 1977. If this figure is converted to landed weight it can be seen that a very high proportion of German fish consumption is processed fish. The popular belief in Ireland that the Germans eat a great deal of unprocessed salted herring is, of course, unfounded. Such salted imports are desalinated before being converted into processed products. Actually German consumers prefer herring based products to have a dry sour/bitter flavour, known as the Central European taste as distinct from the reported Scandinavian sour/sweet flavour.

The quantities of the various processed products consumed in Germany in 1977 are shown in Figure 9.1 and are described briefly below.

The most popular of fish products are marinades. The popularity of these is largely attributed to the marked liking of German consumers for herring, which is the main ingredient of most marinated fish products (i.e. rollmops, Bismark herring and Kronsylt). It is estimated that in 1977 some 40 - 50 million packs

Figure 9.1: Breakdown of the various fish products consumed in Federal Republic of Germany in 1977



(a) Excluding shellfish

(b) Including deep frozen

Source: EIU estimates based on trade interviews.

were sold, mainly in glass jars, but also in plastic containers and cans. Demand for marinades has been growing slowly in the past four years but there was little growth in 1977 due to scarcity of herring and high prices.

Canned herring is second in popularity among processed fish products. Consumption of 50,000 tonnes in 1977 is equivalent to sales of 250 million cans of a standard 200 grams. Demand has fluctuated in recent years but has remained constant taking one year with another.

Herring accounts for about 10 per cent of deep frozen filleted fish, which category was made up of the following groups in 1977:

Filleted	11,802 tonnes
Filleted in bread crumbs	27,494 tonnes
Shellfish and other	4,321 tonnes
Total	43,617 tonnes

Household packs accounted for 55 per cent of sales of deep frozen fish in 1977, the balance comprising institutional packs, mainly destined for the catering trades. 'Fish products preserved in oil, anchovies, salted herring, etc.' is a very broad category. Smoked salmon, saithe and herring preserved in oil but not canned would also be included in this category. Canned tuna fish, pilchards and sardines are identified separately but most persons interviewed were of the opinion that these products were no longer as popular as they once were.

Demand for shellfish products was reported to be on the increase, particularly products based on crab, prawn and shrimp. Fresh mussels are also popular but there is little demand for preserved and processed mussels. Smoked fish - herring, saithe, mackerel and salmon - is increasing in popularity and is likely to increase its share of the market from its present 6.5 per cent. Fish salad is the product segment of the market which has achieved greatest growth in the last decade but remains a relatively small segment, accounting for an estimated 8 per cent of consumption in 1977.

Respondents in the fish processing industry were asked to identify those product segments which were benefiting from a rising trend in demand and those which were contracting. Based on the replies the EIU grouped product categories as follows:

Rising trend in demand

Fish salads
Shellfish products
Smoked fish (excluding herring)
Marinated herring
Canned herring

Falling trend in demand

Deep frozen fish
Preserved tuna, pilchards and sardines
Salted herring
Smoked herring

Product Characteristics

It is estimated that two-thirds of all processed fish products consumed in West Germany are based on herring. This species is taken up by the industry in a number of forms for processing into finished consumer products. Whole dried and salted herring and herring in brine, in particular, are important inputs for the processing industry which produces all kinds of choice products from them.

Saithe (Seelachs or Köhler) is also an important species for processing. The consumer often does not make a clear distinction between saithe and salmon. Saithe is often considered as a lesser variety of salmon, and the Statistics Office perpetuates the confusion by grouping saithe and salmon in official statistics. Saithe is mainly imported in a salted or frozen filleted form for further processing.

Cod and hake are the third and fourth most important species for the processing industry and they are used almost exclusively for the preparation of deep frozen products. Mackerel has been increasingly used during the past two years and recipes have been developed by the industry which have found favour with consumers. Industry sources expressed the opinion that mackerel could often replace herring, especially in canned and smoked products.

Sprat and pilchards are of limited importance on the German market. Pilchards and sardines are often treated as a single category. Pilchards are considered an inferior species and demand is low, sprats are usually smoked but receive little further processing. Whiting has been of little importance, except as an ingredient for fish meal. It was reported, however, that there was some processing of cuttle fish and blue whiting in 1977. This seems to be the first attempt at the processing of blue whiting for human consumption, but it was also reported that the marketing of frozen and filleted blue whiting had been difficult. Among shellfish, there is a ready market for lobster imported live, usually by air-freight. Crab is imported at relatively low cost from South East Asia.

Structure of the Fish Processing Industry

The EIU estimates that there were a total of 128 fish processors and wholesalers in Federal Germany in 1978, of which some 30 companies were wholesalers/importers or combined the functions of processing and wholesaling/importing. The turnover of the fish processing industry in 1977 was estimated at DM 1,449 million, of which only 15 per cent was derived from exports. The number employed in the industry in 1977 was 11,206, an increase of 2.5 per cent over 1976. Wages and salaries paid by the industry in 1977 totalled DM 223 million, equivalent to 15.4 per cent of turnover.

Competitive Position of Irish Products

Opinions on the competitive position of Irish suppliers and Irish products were sought in depth interviews with fish processors, importers and distributors. Respondents were not aware of processed fish products of Irish origin, with the exception of smoked salmon. They therefore tended to view Ireland mainly or solely as a supplier of semi processed fish - and of herring in particular - to the German processing industry. Furthermore, Ireland is seen as a marginal supplier. However since German processors tend to purchase raw materials through wholesalers they are often not fully aware of Ireland's role as a supplier of fish.

Among importers there was general agreement regarding the high quality of herring imported from Ireland, but some criticism of the capability of Irish suppliers who were sometimes compared unfavourably with Danish and Canadian suppliers. The main criticisms were related to the inconsistent quality of Irish fish, long delivery dates and delays in deliveries. Some respondents doubted whether the Irish fish industry was yet in a position to produce fully processed fish products and it was suggested that the industry should concentrate on improving its capability as a supplier of semi processed fish.

Price was a factor which was frequently mentioned when assessing the competitive position of Irish exporters. The price of herring imported from Ireland had risen appreciably in recent years, and was now reported to be above the price quoted for fresh and frozen herring imported from Denmark and Canada, the main suppliers to the German market. In 1977 the import price of whole frozen Irish herring in Germany was 1.83 DM/kg compared with a Danish price of 1.04 DM/kg and a Canadian price of 1.54 DM/kg.

Despite the high prices it was generally believed that Irish suppliers would at least maintain their position on the German market. The quality of Irish herring is high and the processing industry is very short of raw material. In these circumstances, prices, particularly for small quantities, is not a major factor.

Respondents could not foresee fully processed fish products of Irish origin making an appreciable impact on the German market, but it was evident that they had not previously given very serious thought to this idea. If Irish processors were to penetrate the German market their presence could be damaging to the business of established suppliers and the leading companies would retaliate with considerable force. It would be difficult therefore for Irish or other outside processors to acquire a share in the German consumer market.

Another difficulty for Irish processors would be the adaptation of fully processed products to German tastes. The EIU is of opinion, however, that too much can be made of this obstacle. The German consumer is attracted to a wide range of products, and within each product category the varieties offered are extensive. Moreover, the

Irish industry could easily recruit persons in Germany who are experienced in the formulation and preparation of fish products for the German market. In this context it should be noted that characteristics of many "prepared products" depend more on sauces, herbs and spices than on the fish.

Undoubtedly Irish processors would face many problems in trying to launch a fish product on the German market and the difficulties involved should be recognised. The EIU say, however, that the marketing obstacle could be overcome to a great extent by arranging joint ventures between Irish processors and German counterparts. Unfortunately, the economic climate is not favourable to joint ventures involving foreign investment by German companies. There is a great deal of over capacity in the German fish processing industry, at present created by scarcity of fish and high prices. Hence processors are reluctant to invest in further capacity.

While the notion of joint ventures should not be ruled out entirely the EIU feel that a franchising system might be easier to organise. Under this system Irish processors would enter the market with fish products produced to the specification of a German fish processor, who would take delivery and provide market services and promotional support. This approach, though lacking the attraction of direct German investment in Ireland would enable Irish processors to acquire technical knowhow and related expertise from German partners,and avail of the marketing experience of the German partners to promote and distribute the product in a large but complex continental market. Such ventures could provide the basis for the development and growth of the Irish fish processing industry.

THE NETHERLANDS

The volume of landings by the Dutch fleet rose from 300,000 tonnes in 1970 to 351,000 tonnes in 1975 but declined in 1976 to 284,000 tonnes. The disposition of landings between 1971 and 1976 is given in Table 9.3.

Table 9.3: Disposition of Dutch landings, 1971-1976 (nominal catch)

Disposition	1971	1972	1973	1974	1975	1976
	tonnes					
Marketing Fresh	204.1	266.1	234.2	215.7	208.9	201.0
Freezing	5.9	12.8	26.0	23.1	36.1	n.a.
Curing	61.9	66.4	69.6	58.6	65.6	51.7
Canning	13.8	16.4	14.4	16.5	14.9	12.4
Reduction	3.5	1.8	1.3	0.4	0.3	-
Miscellaneous	2.2	3.8	3.7	3.4	3.5	2.3
Offal for Reduction	(16.4)	(20.0)	(19.0)	(17.3)	(17.9)	(15.0)
Total*	291.4	367.3	349.2	317.7	329.3	n.a.

* All figures include the disposition of catches landed in foreign ports by Dutch vessels.

Source: 1976 Yearbook of Fisheries Statistics, Fishery Commodities, Volume 43, Food and Agriculture Organisation of the UN.

Foreign Trade

Imports

Imports of fish to the Netherlands, excluding fish meal and oil, in 1972 were 83,700 tonnes of which 59 per cent (49,000 tonnes) was in fresh chilled or frozen form. By 1976 the quantity of imports had risen to 131,000 tonnes, of which 69,000 tonnes were fresh chilled or frozen. Ireland's main exports to the Netherlands, in the latter year, were about 6,000 tonnes of herring and about 3,000 tonnes of mackerel.

The main processed fish products imported by the Dutch in recent years are shown in Table 9.4. The largest single export item in all years was cured and salted herring, which came mainly from the UK and Ireland. In 1977 the UK accounted for [illegible] per cent of imports of cured and salted herring compared with 32 per cent (3,400 tonnes) from Ireland.

Imports of canned mackerel come mainly from Japan, the Soviet Union, Morocco and France. In 1977 these countries supplied 82 per cent of the canned mackerel imported. The leading suppliers of canned salmon are the USA, the Soviet Union, Canada, Japan, West Germany and the UK. The USA and the Soviet Union are the major suppliers of crabmeat to the Dutch market. Imports of processed molluscs come mainly from West Germany and France. Malaysia has become the leading supplier of processed shrimps.

Table 9.4: Imports of selected fish products to the Netherlands, 1970 and 1975-1977

	1970	1975[a]	1976[a]	1977
	Tonnes			
Cured and salted herring	15,028	7,935	7,498	10,183
Smoked herring	7	14	16	60
Canned herring	570	347	485	424
Canned mackerel	1,449	1,766	1,271	1,478
Canned salmon	2,768	3,455	4,240	3,904
Frozen whole lobsters	16	33	4	22
Canned crabmeat	335	671	635	652
Processed shrimps	1,226	4,052	3,847	4,039
Other processed crustaceans	149	203	69	41
Processed molluscs	177	586	400	538
Frozen filleted saithe	n.a.	442	149	1,338

(a) Excludes imports from Belgium.

Source: EIU report, op. cit.

Exports

Exports of fish and fish products from the Netherlands (excluding fish meal and oil) stood at 220,700 tonnes in 1972. By 1976 exports had fallen to 204,000 tonnes, a decline of 8 per cent on the 1972 level. Table 9.5 gives a breakdown of Dutch exports of selected fish products for various years between 1970 and 1977. This table shows that the Netherlands is a large exporter of herring products, particularly cured and salted herring. She also exports relatively large quantities of smoked and canned mackerel, processed shrimps and preserved mussels. Irish fish imports

Table 9.5: Exports of selected fish products from the Netherlands, 1970 and 1975-1977

	1970	1975[(a)]	1976[(a)]	1977
	Tonnes			
Cured and salted herring	25,150	24,285	26,387	21,989
Smoked herring	2,675	2,596	2,865	2,019
Canned and bottled herring	5,807	6,759	6,120	4,927
Smoked mackerel	1,406	2,670	2,697	2,667
Canned mackerel	788	2,695	1,599	2,077
Canned salmon	123	102	61	197
Canned crabmeat	7	60	23	197
Processed shrimps	1,472	569	468	3,094
Processed molluscs	1,245	1,130	2,461	4,096
Frozen lobsters, whole	17 (b)	16 (b)	2	1

(a) Excludes exports to Belgium/Luxemburg.

(b) Includes lobster in pieces

Source: ibid.

from the Netherlands are relatively small only 62 tonnes in 1977, half of which were made up of herring fillets and dried salted herring.

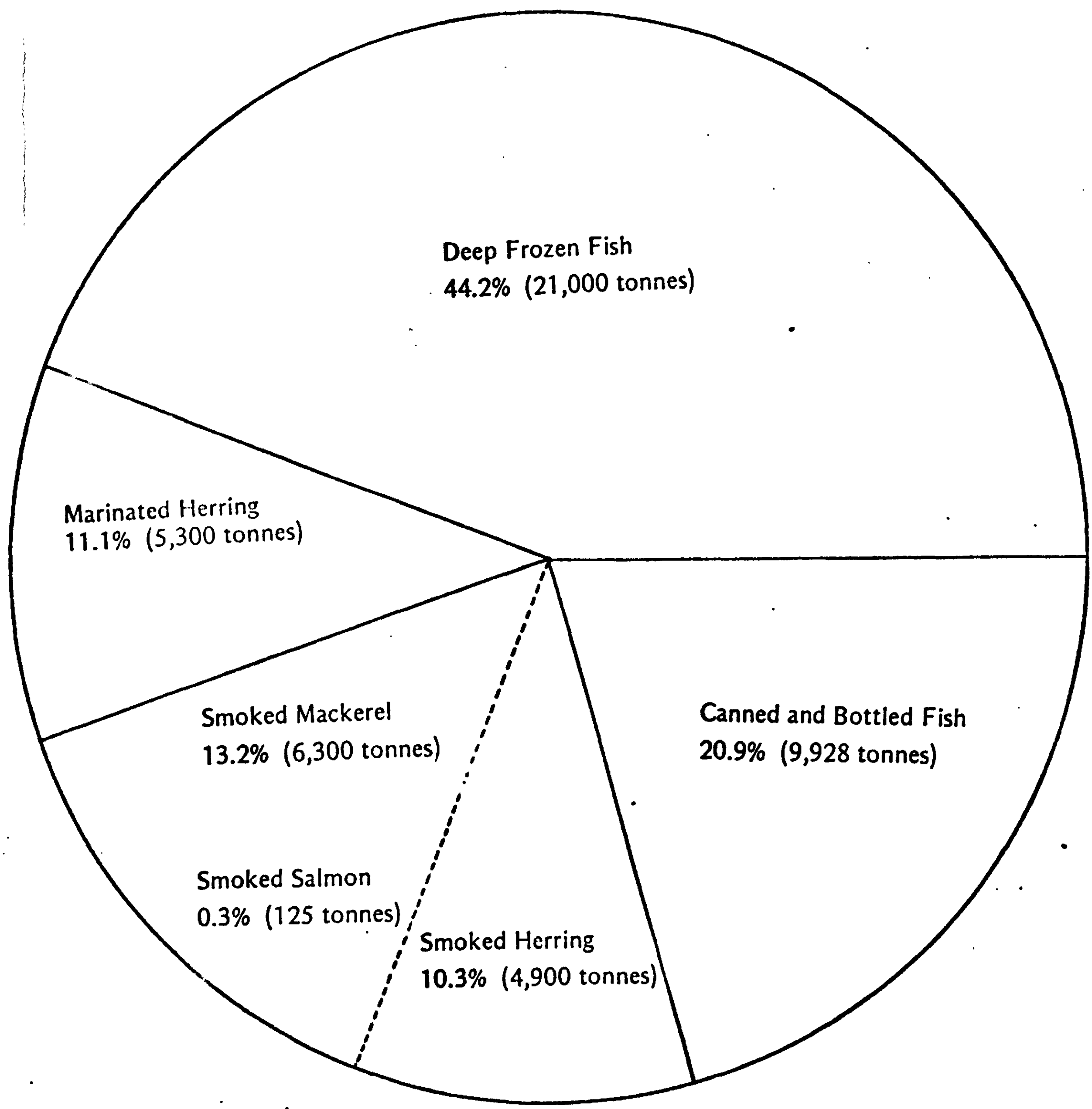
The Fish Processing Industry

A breakdown of the various fish products produced in the Netherlands in 1977 is shown in Figure 9.2. Forty four per cent were deep frozen fish, 24 per cent were smoked fish (herring, mackerel and salmon), 21 per cent were canned or bottled fish, and the remaining 11 per cent were semi-preserves (marinated herring and mussels). These products are described briefly below.

Deep Frozen Fish

According to respondents in the trade this is the most buoyant area of the market for processed fish and is estimated to be growing at an annual rate of about 10 per cent. The most popular product types are cod, saithe, haddock and fish sticks. Fish sticks were often made from whiting in the past but there has recently

Figure 9.2: Breakdown of the various fish products produced in the Netherlands in 1977*



* Excluding production of semi preserved mussels.

Source: EIU estimates based on trade interviews.

been a marked tendency among manufacturers to use cod and haddock to make sticks. Other deep frozen products are herring, shrimps and prawns but the market for these is quite small. About two-thirds of the deep frozen fish produced are consumed on the home market and the balance is exported.

Canned and Bottled Fish

Deliveries of wet sea fish to the Dutch fish canning and bottling industry decreased somewhat after 1975. This was due to the drop in supplies of herring. Nevertheless the production of canned and bottled fish increased from 9,336 tonnes in 1975 to 9,928 tonnes in 1977 because of substantial increases in the volumes of mackerel and shellfish utilised. Of the latter the major species processed is mussels. About 44 per cent of the canned and bottled fish are used for the domestic market and the balance are exported.

Smoked Fish

Production of smoked fish products decreased slightly from 12,375 tonnes in 1975 to 11,325 tonnes in 1977, a fall of 10 per cent. This decline is due solely to a decrease in the quantity of smoked herring, which fell from 7,000 tonnes in 1975 to 4,900 tonnes in 1977. The quantity of smoked mackerel increased over the period from 5,250 tonnes in 1975 to 6,300 tonnes in 1977. Production of smoked salmon remained more or less constant over the period and is estimated at roughly 125 tonnes per annum.

Semi-Preserved Fish

Semi-preserved fish is a distinct category in the Netherlands. This category consists of two products, marinated herring and semi-preserved (marinated) mussels. It is estimated that the production of marinated herring decreased from 6,600 tonnes in 1975 to roughly 5,300 tonnes in 1977, a fall of over 20 per cent. This decline was due to the restrictions on herring fishing imposed by the EEC and the Dutch government. Only about one-fifth of the marinated herring produced is consumed in the Netherlands; the bulk is exported. Semi-preserved mussels are cooked mussels which are then marinated in a marinade consisting of water and vinegar. About 600 tonnes were produced in 1977, all of which were consumed at home.

Consumption

Expenditure on fish in the Netherlands is about 10 per cent of that on meat and is approximately 2 per cent of total expenditure on all foodstuffs. EIU estimates for the composition of fish consumption in the Netherlands are given in Table 9.6. This table shows that per capita consumption rose from 10.4 kg per annum in 1964 to 12 kg per annum in 1977, an increase of 15.4 per cent over the period.

Table 9.6: Per capita consumption of fish, in Netherlands, 1964 and 1975-1977

	1964	1975	1976	1977
	Kg/per head			
Herring	2.0	2.6	2.7	1.9
Seafish	5.0	5.2	5.0	4.9
Crustaceans and molluscs	1.6	2.2	2.4	3.2
Canned fish	1.3	1.6	1.6	1.6
Fresh water fish	0.5	0.4	0.4	0.4
Total	10.4*	12.0*	12.1	12.0

* Differ from figures in Table 7.2, being from a different source.
Source: EIU Report, op.cit.

Two categories which have shown higher than average growth are crustaceans/molluscs and canned fish. For the first group the increase between 1964 and 1977 is 100 per cent, while canned fish consumption, which had grown significantly up to the early 1970s has remained stable over recent years. In the case of herring, consumption increased up to 1976 but fell sharply in 1977 because of the shortage of this species and high prices. Demand for fresh water fish has remained more or less constant for the years shown.

Two factors are identified as causing consumption to remain stable in recent years, first, the population is approaching a zero growth rate and secondly fish prices have risen more sharply than meat and poultry prices.

Distribution Channels

Wholesalers

In the case of imports, fish wholesalers either import the products themselves or obtain their supplies from other importer/wholesalers or from major preserved fish importers which are members of the Netherlands Dried Fruit Association. In the case of domestic products, fish wholesalers buy directly from local manufacturers.

Central Buying Organisations and Chains

By far the largest proportion of fish products is handled by the grocery trade. The shares in sales taken by fishmongers and other non-grocery outlets have decreased rapidly in recent years while, on the other hand, sales in the chain stores have increased sharply. The importance of the large self-service retailers in the distribution of fish products reflects a general trend towards a higher distribution level for processed foods in supermarkets.

Competitive Position of Irish Fish Products and Potential for Joint Ventures

In the opinion of must manufacturers and traders, Ireland tends to be considered as a supplier of semi-processed fish to Dutch processors and there is very little belief that she could become a significant supplier of processed products. According to several respondents, Ireland is mainly to be considered as an alternative supplier, in particular of semi-processed herring, because of the limits imposed on fishing by the Dutch in the North Sea. However, in terms of semi-processing itself, the prevailing image of Ireland is still a poor one. There are numerous problems: delivery delays, supplies not fully in line with purchasers requirements, and for fish other than herring or mackerel, irregularity of supply. It was also claimed that Irish harbours in the west of the country were not equipped for the swift handling of merchandise and there was a lack of cold storage facilities to cope with seasonal booms in fish supplies.

However, it is believed that if more attention were paid to marketing, Ireland could retain a competitive advantage in the supply of fresh and semi-processed herring and mackerel on continental markets. In this field a serious competitor to Ireland is Canada, which has become increasingly interested in the European markets. Currently, Canadian frozen herring is around 10 per cent cheaper than equivalent products from Ireland.

FRANCE

In 1977, human consumption of fish in France (including shellfish) was 1.017 million tonnes. Another 200,000 tonnes were used for animal feed, while 126,000 tonnes were exported and about 300,000 tonnes were imported. Ireland's total exports to France in that year were 4,700 tonnes.

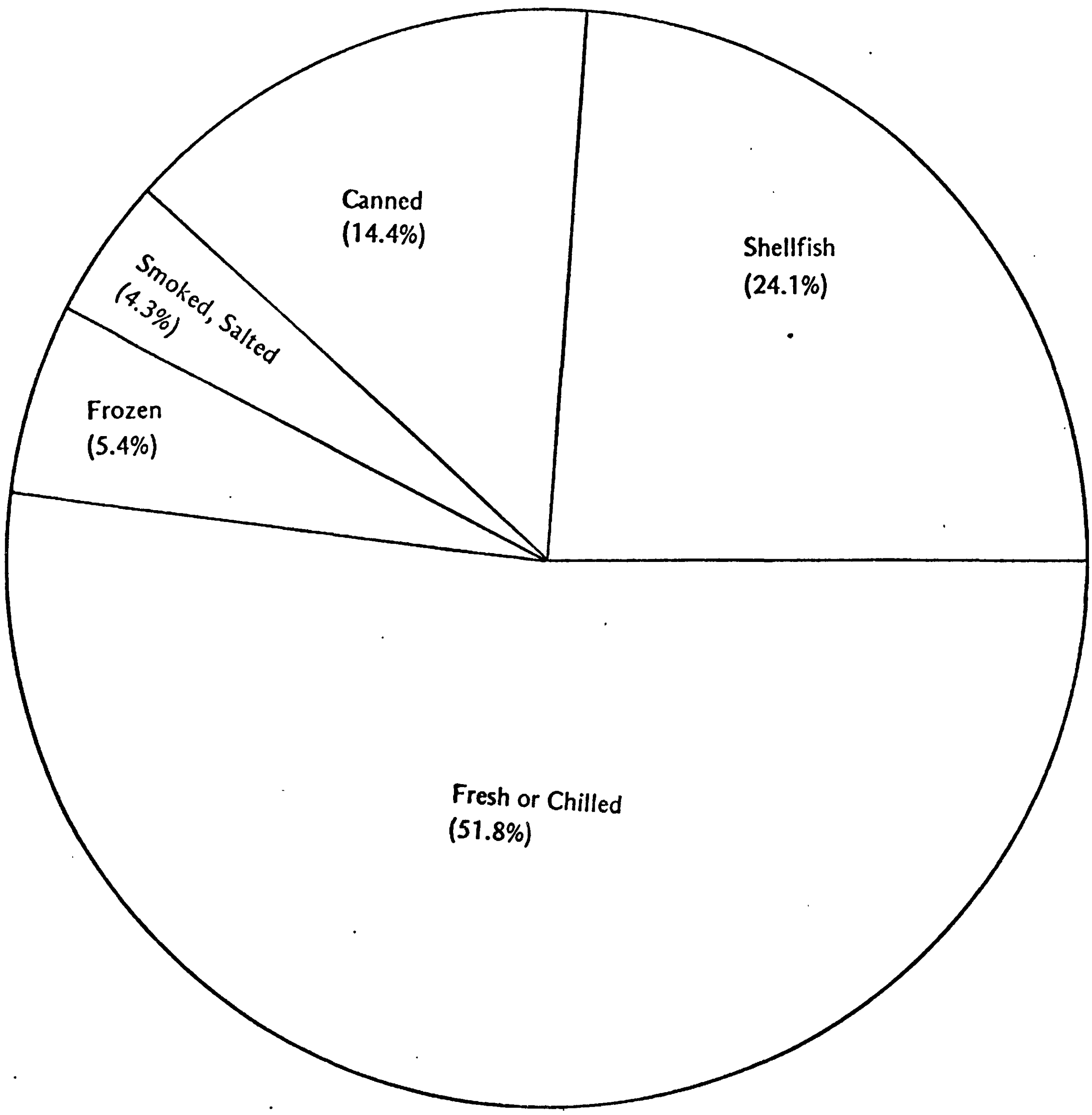
On a liveweight basis, about three-quarters of human consumption in France is wet fish, the remaining quarter being shellfish. Roughly two-thirds of the wet fish is consumed in an unprocessed form (fresh or chilled), one-fifth is canned and the remainder is frozen, salted, dried or smoked (see Figure 9.3).

Description of the Processed Fish Market

Canned Fish

Production of canned fish, including shellfish, fell sharply in 1976, but recovered in 1977 to 98,800 tonnes which was 4 per cent above the 1975 level. The virtual disappearance of herring and reduced catches of other fish were responsible for a serious shortage of raw materials, particularly in 1976.

Figure 9.3 Consumption of fish and fish products in France for 1977*



* Total consumption = 1.017 m tonnes

Source: EIU estimates

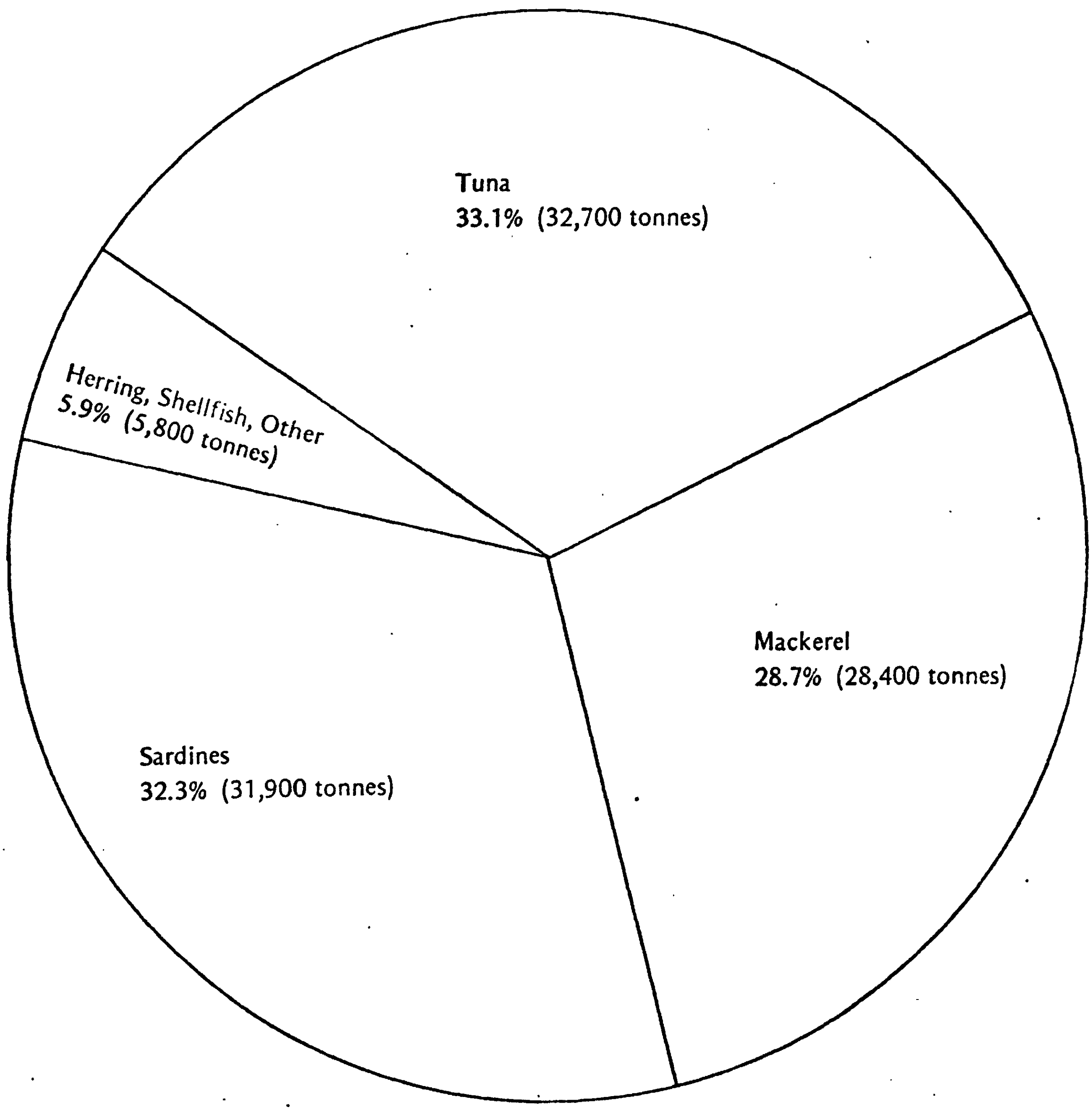
The main canned fish products produced in 1977, in tonnes, were sardines (31,9[illegible]0), tuna (32,700), mackerel (28,400), herring (700), other wet fish (4,300), and shellfish (800) (see Figure 9.4). In addition to the above products, production of semi-preserved anchovies in France amounts to close on 5,000 tonnes. These are packed in cans and other containers.

France imports about 40 per cent of its requirements of canned fish and a much higher proportion of its requirements of canned herring, pilchards, crabmeat and other shellfish. Imports of canned mackerel are relatively small, accounting for no more than 4 per cent of consumption. Total imports of canned fish products were 59,000 tonnes in 1977, of which the following species accounted for 37 per cent: herring (2529 tonnes), mackerel (1,019 tonnes), saithe (102 tonnes), pilchard (1,199 tonnes), salmon (4,053 tonnes), crabmeat (3,313 tonnes), other crustaceans (5,850 tonnes) and molluscs (3,384 tonnes).

Canned herring is mainly imported from the Netherlands and the Federal Republic of Germany. Imports from the Netherlands are mainly of German origin as Dutch importers purchase large quantities of canned herring from German processors which they re-export. The Netherlands is the main country of origin of canned mackerel, but again these are mainly re-exports of imports from Germany and Denmark. Other important suppliers of canned mackerel are the Soviet Union and Portugal. Imports of canned mackerel have decreased since 1970 when they stood at 2,000 tonnes.

Practically all imports of canned saithe are of German origin, while South Africa is the main country of origin of canned pilchards. Imports of canned crabmeat have fallen sharply since 1974. The Soviet Union used to supply about half of all imports but shipments from that country have fallen dramatically and she now supplies less than one-third of imports. Canada, Thailand and Taiwan account for the greater part of the balance. The leading countries of origin for canned salmon are the Soviet Union, Japan and Canada.

Figure 9.4: Breakdown of the various canned fish products produced in France for 1977



Source: Ministère de l'Agriculture et Chambre Syndicale Nationale des Industries de la Conserve (CSNIC).

Smoked Fish

Statistics relating to the activities of fish smokers are poor. The major species smoked are herring and salmon. The market for smoked mackerel is small and production is marginal. Between 1975 and 1977 output of smoked herring fell from 13,000 tonnes to 11,000 tonnes. Output of smoked salmon is currently estimated at 600 - 625 tonnes a year.

Imports of smoked fish are relatively small. Imports of smoked herring amount to 100 tonnes a year and imports of smoked salmon have been of the order of 125 - 150 tonnes per annum in recent years. Smoked herring is mainly imported from Belgium. The major portion of imports of smoked salmon comes from Denmark. Imports of salmon, of all kinds, from Ireland in 1977 were 108 tonnes of which only 6 tonnes were smoked.

Frozen Fish for Direct Consumption

Production of frozen fish for direct consumption in 1977 was 52,800 tonnes, of which 45,400 tonnes were wet fish and 7,400 tonnes shellfish. Imports of frozen fish are not available since the official trade statistics do not distinguish between fresh, frozen and deep frozen fish. The EIU was, however, able to obtain a breakdown of imports of some of the more important species of interest to Ireland. For 1977 these imports were:

Herring	413 tonnes	Crab	691 tonnes
Saithe	3,004 tonnes	Shrimps and Prawns	10,669 tonnes
Ling	40 tonnes	European Lobster	26 tonnes
Whiting	814 tonnes	Spiny Lobster	1,879 tonnes
Cod	8,700 tonnes	Norway Lobster	248 tonnes
Haddock	1,400 tonnes	Scallop	2,985 tonnes
Sprat	301 tonnes	Mussels	2,441 tonnes

The main species of wet fish imported are cod, saithe, haddock and whiting. Among the shellfish the most important species are shrimps and prawns, scallops, mussels and spiny lobster. Of the shellfish, shrimps come mainly from the Netherlands, and prawns from Senegal, the Netherlands and Denmark.

Dried and Salted Fish

Little information is available on the dried and salted market. Ling and tusk are two species which are dried and salted for export to developing countries; there is a small market for ling and tusk in France where it is eaten mainly by immigrants of African origin. During the course of interviews by the EIU, persons in the industry showed no interest in the processing of ling and tusk for European markets. Some ling is used to make deep frozen products.

Product Characteristics

Canned Fish

After tuna and sardines, mackerel is the most popular species of canned fish. Consumption of canned mackerel in 1977 was of the order of 27,300 tonnes. The section of the market for canned mackerel is dominated by mackerel marinated in white wine which accounts for 77 per cent of domestic output. Mackerel fillets in oil and in tomato sauce account for 14 per cent of production. The remainder is made up of fillets in a solution of vinegar.

Demand for canned herring is mainly for filleted herring in wine or sauce. The most popular variety of canned salmon is Keta salmon (white salmon). Canned saithe is usually "au naturel" without addition of oil or sauce. The most popular varieties of canned pilchards are pilchards in oil or tomato sauce.

The market for canned lobster is mainly for Norway lobsters. "Au naturel" canned crabmeat consists mainly of white meat of King Crab, and is a relatively expensive product. There is also some demand for small pieces of crab canned "au naturel". Canned mussels may be "au naturel" or in a marinade. There is also demand for marinated mussels packed in jars. Canned shrimps and prawns are almost exclusively "au naturel".

Smoked Fish

Herring is most often cold smoked at a temperature of 20^{o} to 30^{o} centigrade. The most popular variety is "harengs saurs doux salés". These are desalted herring which are slightly smoked following pre-salting in brine during two to six days. Other popular preparations are "harengs saurs semi-sal", "harengs saurs au naturel", "bouffis" and kippers. Kippers can be heavily salted, but mostly the methods of preparation and smoking are similar to those used in the UK and Ireland. As the French consumer usually prefers a smoked fish of mild texture with an oily flavour there is little hot smoking of herring, although cold smoking processes are labour intensive and costly.

Smoked salmon is produced in France from Pacific salmon imported from North America. The salmon is imported frozen. After filleting, salting and drying, the salmon is hot smoked. Canadian frozen salmon is imported at a price of around 25 frs. per kilo, whereas the price of Irish smoked salmon would be some 40 per cent higher.

Frozen Fish

About half the consumption of deep frozen fish takes the form of prepared fish sticks, croquettes and fish in breadcrumbs. The fish is cut into portions of various sizes, is coated with a preparation of breadcrumbs and vegetable fat, and the portions are deep frozen. Deep frozen fish which is not processed into sticks, croquettes or breaded fish is usually sold in fillets.

Packaging

Frozen Fish

In the retail market, frozen fish is sold mainly in wax-board packs, although a growing range of products is now marketed in plastic bags. Since January 1976 the weights of retail packs of frozen fish products have been standardised and have the following weight ranges:

Whole fish	0.30 - 2.5 kilos
Slices of fish	0.10 - 2.5 kilos
Fish sticks	0.15 - 2.5 kilos

Retail packs which weigh over 0.5 kilos are exceptional.

Catering packs are not standardised and are considerably larger than retail packs; the usual sizes are 500 grams, 1 kilo and 2 to 3 kilos. Giant packs of 5 and 10 kilos are also on the market.

The packaging of frozen foods is subject to regulations enforced by the Ministry of Agriculture and the Commission Française d'Hygiène Alimentaire. The main regulations relating to frozen foods are contained in the law of 9 September 1964 (No. 64-949). The law states that deep frozen foods must be sealed or packed in such a way as to ensure the protection of the contents, and when offered for sale the pack must carry the following markings:

(a) The description "surgelé" (deep frozen) and the name of the product. Where the product's name does not provide a clear description of its composition, a list of ingredients, in descending order of importance must appear on the pack.

(b) The brand name and address of the processor in sufficient detail to allow the Service de la Répression des Fraudes to identify the freezing plant or the importer.

(c) The origin of the product: if the origin is not French, the description "foreign" is sufficient.

(d) The minimum net weight in grams. A weight indication is not required if the pack contains a number of individually wrapped items.

(e) Instructions for use.

(f) A code indicating the date of freezing, consisting of a letter for the year and a number from 1 to 366 for the day of the year. The date of freezing has been defined by the Service de la Répression des Fraudes as the date of the final freezing operation before packing for sale.

The markings called for under (a), (b) and (e) above must be in French.

Interpretation and clarification of legislation on the packaging of frozen fish products are obtainable from the Ministry of Agriculture: Direction Générale de la Production et des Marchés Service de la Répression des Fraudes et du Contrôle de la Qualité.

Canned Fish

Sizes and shapes of cans for fish products are defined by the Confédération des Industries de Traitement des Produits des Pêches Maritimes (CITPPM). Regulations on the packaging, labelling and hygiene of canned fish products are complex and are set out in the Normes de Fabrication drawn up by the Confédération des Industries. These industry standards have been accepted and given the force of law by the government. They list the species and products which may be canned in France, the forms in which they may be prepared and the labelling which must be applied. The labelling for canned products is somewhat similar to that used for frozen fish.

Smoked Fish

Fillets of "harengs saurs" are packed in bags, trays and cellophane containers of 200 grams, 500 grams and 1 kilo. These are often put into cardboard boxes of 12 or 24 units. Other varieties of "harengs saurs", "bouffis" and kippers are packed mainly in wooden boxes of 3 kilos net weight.

Smoked salmon is usually sold as sides, whole or pre-sliced. The forms of packaging are most often a plastic film binding the side of smoked salmon to a cardboard base, or a polystyrene box. Sides of salmon usually weigh between 1 and 2 kilos, the popular weight being around 1.5 kilos.

Competitive Suppliers

Canned Fish

In 1977, the French marine products canning industry had an overall turnover of 1,223 million frs. and took up 116,200 tonnes of fish as raw material. There were 64 canning plants operated by 52 companies. There has been a marked reduction in the number of canning companies which in 1965 numbered 120. Of the 52 companies which make up the fish canning industry, 11 had an annual turnover of more than 25 million frs. in 1977. These companies accounted for 76 per cent of total turnover of the industry. In terms of volume, 16 companies had an annual output of over 2,000 tonnes in 1977, and the accounted for 74 per cent of the industry's total production. The number of small companies producing under 250 tonnes annually fell dramatically from 21 in 1973 to 7 in 1977. The industry as a whole is static, but within the industry the small company is going out of business while the larger companies are expanding their operations.

In 1977, there were 32 companies producing canned mackerel, of which 11 were producing more than 1,000 tonnes a year. These 11 accounted for 74 per cent of output of canned mackerel. The number of companies producing canned mackerel in 1970 had been 46.

Smoked Fish

There are 75 smoking firms in France producing 10,000 - 12,000 tonnes of smoked fish annually. Fifty four are located on the Channel Coast between Dunkirk in the Département Nord and Fécamp in Lower Normandy. The latter companies account for close on 60 per cent of total production of smoked fish and about 50 of them are mainly involved in curing, salting and smoking herring.

Frozen Fish for Direct Consumption

In 1978, the trade association representing the freezing industry, the Fédération des Industries et Commerces Utilisateurs des Basses Températures (FICUR), had 58 members processing fish. Most of these companies produce a variety of fish products in frozen or deep frozen form. Of these, 25 process mainly wet fish, the others process mainly crustaceans and other shellfish. Frozen fish processors are mainly located in the region around the town of Boulogne-sur-Mer and in Normany, Brittany and La Vendée. A number of firms freezing fish products are also involved in the export and import of frozen fish products.

Competitive Position of Irish Products

Respondents, both processors and distributors, were generally agreed that Ireland would maintain its position as a supplier of semi-processed fish to processors. Few envisaged Ireland becoming an important supplier of processed fish products apart from smoked salmon. Ireland is at present the main foreign supplier of frozen whole or headless herring and of salted, cured or dried herring

Ireland is also an important supplier of live European lobster (more than 15 per cent of lobster imports) and a leading supplier of fresh and frozen scallops and periwinkles (more than 20 per cent of these imports). Many processors obtain important raw materials through fish importers and know Ireland essentially as a supplier of quality herring. While Irish herring was reputed to be of the highest quality, it had become relatively expensive. Imports from Canada have been increasing and Canadian herring is currently available at prices some 10 per cent below the prices sought for Irish herring. Ireland, the UK and Canada are usually mentioned as leading exporters to France of live lobsters. There is little demand for frozen lobster. Irish exporters were considered to be in a strong position as suppliers of semi-processed herring, live lobsters and shellfish.

Some processors doubted whether the Irish fish industry was yet in a position to produce processed products to the quality standards required by the French market. It was suggested that Irish fish processors should seek the co-operation of French processors as it would be essential to adapt Irish made products to the requirements and tastes of French consumers. French processors, however, did not see great prospects for exports to France of processed products from any foreign origin. They felt that they themselves had the capacity to meet any increase in demand. There is considerable under-utilised capacity in the French fish processing industry, particularly among canners and smokers.

Potential for Joint Ventures

The French fish processing industry faces two serious constraints on its development - shortage of raw materials and rising production costs. Many of the persons interviewed were aware that production in Ireland offered the great advantage of going a long way towards overcoming these obstacles. The major French fish processing companies have, however, shown a preference for increasing their capacities in France where they have interests in fishing fleets. Most fish processing companies simply do not have the financial resources to invest abroad.

While there was interest in the Irish fishing industry expressed by respondents they focussed mainly, if not exclusively, on the availability of supplies of semi-processed fish as raw materials for French plants which are operating well below capacity. The greatest interest in commercial links with foreign suppliers of finished products was shown by processors of frozen foods. These are prepared to enter into co-pack agreements and long-term contracts. These policies could lead to joint ventures for production abroad. Medium-sized companies are often looking for new frozen fish products to launch into an expanding market, and this is an area of the market for processed fish where Irish companies may well find buyers for finished products, and possibly partners for joint ventures.

The EIU suggests that Irish fish processing firms should make contact with French processors and importers of frozen fish products with a view to sounding out opportunities for supplying frozen fish products for direct consumption, and opportunities for investment in Ireland. Contact could be made through the BIM office in Paris.

A condition of any agreement should be that the French party be responsible for supplying the technological know-how required to produce the products to the specifications required. The French party might be prepared to second a production expert to the Irish producer to supervise production in the initial phase.

UNITED KINGDOM

Fish Landings

The figures in Table 1.1(Chapter 1) show that total landings of sea fish in the UK are about 1 million tonnes per annum at the present time. There has, however, been a decline in landings in recent years, particularly of cod and herring, due to the continued closing of distant waters to British fishing vessels.

Disposal of Catch

Of the total catch in 1977, of something less than 1 million tonnes (OECD Review of Fisheries, 1977), 40 per cent were marketed in a fresh or chilled form, 37 per cent were frozen, 3.3 per cent were cured, salted or smoked, 0.7 per cent were canned and 1.1 per cent went for miscellaneous purposes. Some 18.6 per cent were reduced to meal and oil. The latter consisted mainly of mackerel; consumption of this species has continued to expand, and the food market cannot as yet cope with the available supplies.

Foreign Trade

Omitting fish meal and fish oil, imports of fish to the UK in recent years have been in the region of 200,000 tonnes, while exports have been around 150,000 - 160,000 tonnes. Imports and exports of some of the main categories of fish, classified by country of origin are shown in Tables 9.7 and 9.8. Table 9.7 shows that the largest category of fish imported in 1978 was frozen fish, filleted and unfilleted (102,000 tonnes). Most of this fish came from Norway and Iceland. Ireland's share was a little over 1,000 tonnes. The next most important category was fresh and chilled fish (81,000 tonnes) of which the major suppliers were the Netherlands, Iceland and Denmark. Imports of prepared and preserved fish were 44,000 tonnes. These came mainly from Japan (8,000 tonnes), Denmark (7,200 tonnes), Canada (5,800 tonnes), USA (4,600 tonnes) and Portugal (3,100 tonnes). Shellfish imports were 28,000 tonnes of which Norway supplied 3,200 tonnes, Denmark 3,000 tonnes, Ireland 2,300 tonnes and Netherlands 1,600 tonnes.

The largest category of exports was unfilleted fresh or chilled fish (149,000 tonnes) of which 32,000 tonnes went to the Soviet Union, 26,000 to East Germany, 23,000 tonnes to France, 21,000 to Poland and 16,000 to Bulgaria. Exports of unfilleted frozen fish were 141,000 tonnes. Of these, 50,000 tonnes went to Nigeria, 12,000 tonnes to Bulgaria, 9,500 to Norway, 7,800 tonnes to the Netherlands and 7,600 tonnes to France. The other categories were rather small, the largest being fresh, chilled or frozen shellfish (24,000 tonnes) of which 15,000 tonnes went to France. In 1978 Ireland imported from the UK 3,800 tonnes of prepared or preserved fish, 1,500 tonnes of smoked fish and 480 tonnes of frozen fillets.

Fish Consumption

National Food Survey Results (Retail Business, August 1977) show that in the period 1968 to 1974 consumption of fresh fish in the UK declined fairly steadily, although this trend was partly offset by an increase in the consumption of fish sold frozen in retail packs, including white fillets and preparations such as fish fingers and fish bites.

Consumption of fish as a whole recovered in 1975. In that year expenditure on fish at 1970 prices was £211 million representing 3.3 per cent of total food expenditure. The corresponding figures in 1974 were £200 million and 3.1 per cent respectively. National Food Survey (NFS) data relating to fresh fish are not available for periods after the end of 1974, but figures relating to fresh and processed fish (smoked and canned) taken together, suggests that consumption of fresh fish was at least stable in 1975 and may have increased in 1976 though there is some doubt about this.

Table 9.7: Imports to UK of some of the main fish categories, classified by country of origin, 1978

Country	Wet Fish					Shellfish		Total all fish
	Fresh chilled	Frozen unfilleted	Frozen filleted*	Dried, salted, smoked	Prepared/ preserved	Fresh, chilled, frozen	Preserved	
	Tonnes							
France	6,118	--	--	--	--	700	--	6,818
Belgium	7,586	--	--	--	--	--	--	7,586
Netherlands	29,575	1,025	--	--	--	1,602	--	32,202
Ireland	6,296	919	368	571	--	2,308	--	10,462
Denmark	11,664	2,743	3,179	92	7,164	2,072	1,058	27,972
West Germany	--	--	3,375	--	--	--	--	3,375
Norway	--	4,746	37,154	--	--	809	2,405	45,114
Iceland	12,258	3,762	10,155	337	--	--	493	27,005
Faroe Islands	--	--	2,614	868	--	--	--	3,482
Spain	--	870	--	--	1,911	--	--	2,781
Portugal	--	--	--	--	3,148	--	--	3,148
Canada	--	6,820	501	460	5,843	--	709	14,333
USA	--	3,034	--	--	4,571	--	209	7,814
Argentina	--	--	2,848	--	--	--	--	2,848
Japan	--	333	--	--	8,037	--	--	8,370
Other (not classified)	7,600	12,435	5,290	1,888	13,196	8,032	7,637	56,078
Total	81,097	36,687	65,485	4,216	43,869	15,522	12,512	259,388

* Includes some fresh fillets.

Source: HMSO, British Trade Statistics, December 1978.

Table 9.8: Exports from the UK of some of the main categories of fish, classified by country of destination, 1978

Country	Wet Fish					Shellfish		Total all fish
	Unfilleted fresh chilled	Unfilleted frozen	Fillets fresh frozen	Dried, salted in brine, smoked	Prepared, preserved	Fresh, chilled, frozen	Prepared, preserved	
	Tonnes							
France	23,096	7,623	943	--	--	14,913	133	46,708
Belgium/Luxembourg	1,774	--	--	--	--	1,091	158	3,023
Netherlands	8,407	7,855	47	3,624	--	1,731	248	21,912
West Germany	3,701	5,473	1,645	--	--	--	133	10,952
Italy	1,385	--	--	1,179	--	870	--	3,434
Ireland	--	--	480	1,483	3,803	--	--	5,766
Norway	--	9,532	--	567	--	--	--	10,099
Soviet Union	32,005	--	--	--	--	--	--	32,005
East Germany	26,131	--	3,633	--	--	--	--	29,764
Poland	21,160	--	--	--	--	--	--	21,160
Australia	--	--	1,829	383	2,992	--	--	5,204
Bulgaria	16,124	12,188	--	--	--	--	--	28,312
USA	--	739	2,307	467	325	732	--	4,570
Nigeria	--	50,143	--	--	--	--	--	50,143
Other (not classified)	15,296	47,273	3,526	8,685	5,305	4,838	463	85,386
Total	149,079	140,826	14,410	16,388	12,425	24,175	1,135	358,438

Source: HMSO, British Trade Statistics, December, 1978.

Fresh Fish

The decline in fresh fish purchases may have been caused in part by price rises but the main factors involved have not been economic. Fish is difficult to retail when fresh because of its short shelf life, and the way it tends to taint other nearby food. Ordinary grocers, particularly supermarket managers, are becoming more reluctant than heretofore to handle fresh fish and hence the housewife, who is increasingly using the supermarket for all her purchases, does not have the same opportunity of buying fresh fish (see Report on The British Meat and Fish Processing Industry, by Dataquest Ltd.). To do this she must make a trip to the fish mongers, which may be in a different part of the town. Fishmongers, in turn, are becoming scarce; the number of such shops in the UK had fallen by 28 per cent between the 1961 and 1971 Census of Population and presumably has declined further since the latter date. Another factor has been the problem of gutting, cleaning and perhaps filleting in an age of packaging and convenience foods. Housewives are increasingly unwilling to become involved in the preparation and cooking of fresh fish. It should, however, be stated that this has not been the experience in Ireland. In some of the large towns such as Dublin, supermarkets have special display cabinets for fresh fish.

Frozen Fish

The reason for the success of frozen fish is that it is everything that fresh fish is not - grocery orientated, professionally marketed, packaged, hygienic and easy to cook. In particular the displays of fish finger packs present a striking contrast to the old fashioned slabs of fresh cod (ibid.). Also in contrast to the limited number of outlets selling fresh fish, the sale of frozen fish is through over 100,000 outlets. The trend is therefore for an increase in the consumption of frozen fish at the expense of fresh fish.

Canned Fish

This market falls into two distinct sections, canned salmon and the rest. Canned salmon used to be the major force in the market but supply problems with consequent enormous price rises, have reversed the situation, so that "other" canned fish (pilchards, sardines, tuna, etc.) are now much more important. In 1960 canned salmon sales were worth £34 million at retail prices, compared with

£8.5 million for other canned fish. In 1976 sales of canned salmon at current prices were worth only marginally more than in 1960 (£35 million), whereas those of other canned fish came to £46 million.

Other Preparations

In addition to the consumption of fresh, frozen and canned fish, there is also a fairly high consumption (106,000 tonnes) of other fish and fish products. The breakdown of the different types of fish consumed in this category in 1976 is estimated as follows: shellfish 7,000 tonnes, smoked and other processed fish 34,000 tonnes, cooked fish 54,000 tonnes and fish products 11,000 tonnes. Details of the trends in these sales are not available.

Consumption of Fish by Type

Prior to 1974 filleted white fish was the type most commonly consumed in the UK. At that time these fillets were derived mainly from cod, haddock, whiting, saithe, ling and plaice. Consumption of fresh herring and other fat fish - mackerel, sprats, salmon, trout, eel, etc. - were relatively unimportant. Since 1974 the main change seems to have been a reduction in the overall importance of cod, reflecting the reduced availability of this species. To some extent, however, reductions here are offset by increases in the consumption of other types of white fish such as haddock, saithe and whiting.

The popularity of white fish, as opposed to fat fish, lies in the relative ease with which it can be prepared. Most of it is bought filleted, whereas fat fish are not usually filleted. In addition to this, it is quite likely that many consumers prefer the bland flavour of white fish to the rather more pronounced taste of herring and other fat fish. Also fat fish tend to "go off" more quickly than white.

Traditionally the image of fresh fish as a food has not been very good in the UK and according to reports (The Retail Market for Fresh Fish, Retail Business, op.cit.) it has not improved much in the 1970s. The most popular varieties seem to have less flavour than other protein sources and are usually difficult to prepare.

For whatever reason, fish of all sorts has failed to make the break-through into popular acceptance achieved by chicken in the early 1960s.

Distribution of Fish

The chain of distribution of fresh fish from fisherman to retail outlet normally includes the port wholesalers and the inland wholesalers. Port wholesalers pass about 36 per cent of their sales volumes to the inland wholesalers and about 64 per cent directly to retailers. There are thought to be about 200 companies involved in the inland wholesale trade, mostly concentrated at the main markets, Billingsgate (London), Birmingham, Bristol, Glasgow, Liverpool, Manchester and Sheffield. Of these, Billingsgate is by far the largest with about 85 companies. Some 50 wholesalers operate independently of the main markets. The most important retail outlet for fresh fish is the specialist fishmonger but fish is also sold from specialist market stalls and travelling fish vans. According to the 1971 Census of Distribution there were then 4,680 specialist fishmongers/poulterers in the UK, 1,430 market stalls and mobiles and some 2,500 greengrocers who were also selling fish. These numbers had however declined substantially since 1961 and it is likely that they will go on doing so, though probably at a slower rate than heretofore. A survey of fishmongers carried out by The White Fish Authority (WFA 1969) painted a rather depressing picture of an ageing and highly conservative group of businessmen lacking in the energy and imagination to combat the difficulties of their situation. There is little evidence of any general improvement since then. Indeed it is reported that the market stall and mobile with their lower expenses, smaller range of products and less arduous work are tending to prove more profitable and more attractive to younger men, in the fresh fish trade, than the traditional shop outlets. It seems unlikely, however, that these will be able to make up for the volume of fish formerly sold through shops.

Prices

Changes in certain categories of meat and fish prices in the UK between 1966 and 1976 are given in Table 9.9.

Table 9.9: Percentage changes in retail meat and fish prices in the UK between 1966 and 1976

Meat	Increase Per cent	Fish	Increase Per cent
Beef and veal	172	White filleted fish	231
Mutton and lamb	182	White unfilleted fish	174
Pork	171	Herring unfilleted	279
Bacon and ham	215	Shellfish	201
Corned meat	198	Frozen white fish	158
Canned meat	116	Other frozen fish	142
Broiler chicken	111	Processed white fish	249
Pork sausages	144	Canned salmon	180
Beef sausages	166	Other canned fish	119

Source: The British Meat and Fish Processing Industry, (1978), Jordan Dataquest Ltd., 47 Brunswick Place, London.

This table shows that over the period concerned carcase meat prices of all kinds increased, on average, by almost 190 per cent. Three categories of fish, showed a much greater increase than any of the meat categories, i.e. herring, white filleted fish and processed white fish. Varieties of fish which showed similar price increases to those of carcase meat over the period were: shellfish, unfilleted white fish, frozen fish of all kinds and canned salmon. The category of fish which showed the least increase was other canned fish, while the category of meat showing the smallest rise was broiler chicken which increased by 111 per cent.

These figures indicate that price could have been a deterrent to the purchase of filleted fish but that other things being equal, it should not have had much of an effect on the purchase of unfilleted white frozen and canned fish. The Report on The Retail Market for Fresh Fish (op.cit., p.39) says that in the early 1970s there was a notable correlation between the declining trend in fish sales and the tendency for prices of fish to increase more rapidly than those of other foods including meat. It states, however, that prices of fish kept roughly in line with other food prices during the 1960s even though it was also a period of declining sales. On the other hand, the apparent recovery in consumption in 1975 and 1976 coincided with a marked slowing down in the upward trend in fish prices relative to those of other foods. Another significant factor, in the latter years, was a general decline in disposable incomes - certainly in real terms. Fresh fish as a relatively cheap source of protein has a special appeal for those compelled to practise economies in their life styles. Despite increases in average real incomes there will always be a large group who will have difficulties in balancing their budgets. For these and many others the traditional fish and chip snack is a relatively inexpensive and popular food.

It seems likely, therefore, that the chief determinant for the future in the retail market for fresh fish in the UK will be the supply situation which directly affects retail prices. As has been indicated, the bulk of the fish consumed in the UK is of the demersal or white varieties. The future supply of these is obscured until the conflicts about UK fishery limits and fishing rights have been settled.

What seems likely and is in fact happening, is that:

- Cod and plaice supplies will be severely decreased.
- Haddock and whiting supplies will remain about the same.
- There will be an increased availability of fat fish, particularly mackerel and sprat. It is unlikely, however, that the increased availability of these species will wholly offset the reduced supplies of demersal fish so that the overall supply will be reduced.

In these circumstances the traditional structure of the UK market could only be maintained by an increase in imports. As this might have unacceptable implications for the balance of payments, the future of the market depends on the willingness of the consumer to substitute new varieties for traditional staple purchases. There is some indication of a movement towards a greater consumption of haddock, whiting and saithe, as cod becomes less available and more costly. The introduction, on a large scale, of unfamiliar varieties is however most likely to be ventured by processors with substantial capital resources. For this reason the main increase in supplies is likely to take the form of frozen, canned and smoked varieties rather than fresh fish.

APPENDIX 9A

METHODOLOGY OF EIU STUDY OF CONTINENTAL FISH MARKETS

In conducting this study, official statistics on production, foreign trade, and consumption of fish and fish products were sought and analysed to reveal the main trends in supply and demand. Because published statistical sources are a poor guide to the structure of the market for processed fish products, in that identification of product segments is often confined to broad categories, The Economic Intelligence Unit carried out a programme of interviews with leading producers of fish products, trade associations, and with major importers. On the basis of these interviews the market for processed fish was broken down into the following products, by species:- canned, bottled, vacuum packed, cured/salted and frozen for direct consumption.

The main suppliers of processed fish products to the different markets - national producers and importers - were identified and their competitive position assessed in terms of product ranges and market shares. Names and addresses of these firms were given in the reports, together with relative sizes and market shares. As much of this material is of a confidential nature it cannot be published in detailed form.

To assess the competitive positions which Irish suppliers might achieve in the market for processed fish products, a comparative analyses was made of the structure and operations of a selected number of existing producers in the three countries studied. The companies selected were not necessarily the leading suppliers to the market. It was considered that a description of the larger companies - such as Unilever and Nestle - would be too far removed from the present potential of the Irish industry. Four criteria were used for the selection of companies for study. These were:

(1) Companies with which Irish producers of processed fish products would be likely to compete.

(2) Companies whose structure and operation are close to those of existing Irish producers of processed fish.

(3) Companies which could be taken as a model for firms which could be set up in Ireland as the fish processing industry expands

(4) Companies for which detailed balance sheets and profit and loss accounts are published or filed. Such companies are those having the legal status of a:

- Societe Anonyme (SA) in France
- Aktiengesellschaft (AG) in West Germany
- Naamloze Venootschap (NV) in the Netherlands

Detailed studies were carried out on three companies in each country selected according to these criteria. In addition a number of other people connected with various facets of the fish trade were interviewed and their views noted. In these interviews answers were sought to the following questions:

- Is Ireland seen as being destined to remain a supplier of semi-processed fish to continental markets?
- Will Ireland retain its competitive advantages as a supplier of fish (fresh and semi-processed) to continental markets in the face of growing competition from third countries?
- Could the Irish fishing industry compete with its present continental customers who currently buy semi-processed fish for processing into final consumer products? Would continental customers retaliate to frustrate the objectives of the Irish industry?
- What scale of operation would be envisaged so as to compete effectively with continental processors in terms of production and marketing capabilities?
- Are there any government restrictives on imports of processed fish such as type and size of package, description of contents, language on package, etc.?

As a result of the interviews it was envisaged that a short list would be drawn up of persons and companies in each country which were considered to be possibilities for joint ventures. Reasons would be given for selecting the companies, the products of interest would be identified and means of approach suggested. Such a list would be confidential and could not be published.

CHAPTER 10

FISH PROCESSING - CHARACTERISTICS OF THE INDUSTRY

Introduction

The characteristics which distinguish fish processing from other industries stem in the main from the nature of the raw material used - fish. There is a wide variety of fish species which can be used as raw materials by processors. The official Irish statistics on sea fish landings list 32 species caught in waters surrounding the Irish coast. There are, of course, many more species than these but they are not landed in sufficiently large quantities to be noted. Most of these fish look and taste different and are handled by the processor in a different manner.

Though there is a large variety of raw materials available, there are also a large number of products which can be made from them. A number of processes can be carried out on each species of fish. It can be frozen, filleted, smoked, breaded, marinated, canned, bottled, etc. Some would argue that the freezing of whole fish is not processing in the strict sense of the term but since this treatment enables fish to be stored and transported long distances it is generally regarded as primary processing. Secondary processing, which adds considerable value to the basic raw materials includes such treatment as marinating, smoking, breading, bottling, and canning as well as the preparation of portions and salads, to mention but a few of the various fish products in current production.

Because of the variety of products that can be produced there are a large number of different markets. And because consumer tastes differ from place to place, a product which may be in high demand in one country may be disregarded in another. A general picture of the type of processing carried out on Irish fish in 1977 is given in Table 10.1. This table shows that about 34 per cent of total landings was marketed in fresh or chilled form, 30 per cent was frozen, 16 per cent was dried, salted or smoked while about 5 per cent was prepared or preserved. The remaining 15 per cent was used for fish meal.

Table 10.1: Utilisation of Catch* 1977

How Marketed	Quantity (tonnes Landed Weight)	Percentage of Total Landings
Whole Fresh/Chilled	18,380	22.3
Whole Frozen	14,020	17.0
Fillets Fresh/Chilled	9,500	11.5
Fillets Frozen	11,170	13.5
Whole Dried/Salted/Brine	10,060	12.2
Fillets Dried/Salted/Brine	1,610	2.0
Smoked	1,400	1.7
Prepared/Preserved	4,300	5.2
Fishmeal etc.	12,050	14.6
Total	82,490	100.0

* These figures are estimated and exclude landings at foreign ports and landings of salmon and freshwater fish.

Source: BIM.

Unfortunately for many processors a steady flow of raw materials cannot be assured. Fishing is a "hunting" activity and this, coupled with fluctuations in seasonal availability of fish and in weather, means that raw material supplies are uneven and uncertain to the processor. For this reason the Irish processor cannot plan production or marketing schedules adequately in advance of catch. He can only process the species and the quantities that become available at any particular time. Plant must therefore be such that it can cope adequately with peak catch and also deal with a variety of species. This means that for much of the time there is a considerable amount of spare capacity. (See Table 10.2 for seasonality of Irish catch, classified by species.)

Another problem associated with fish is its perishability. It must be handled quickly after landing. In some cases it may be landed late at night and the processor must arrange to purchase and store it in a hurry. Also because there is usually a long distance between supplier and plant, transport must be quick and efficient. Public transport in Ireland cannot be relied on in this regard and for this reason processors must generally have their own trucks.

In common with most food industries the efficient recovery and marketing of offal can be of crucial importance. Offal can often amount to over 50 per cent of the original raw material weight. If this can be turned into marketable products it adds to the processor's income but in some cases processors have no outlet for the offal and it must be dumped.

The great strength of the fish processing industry lies in its regional distribution. Table 10.3 shows that nearly 40 per cent of the employment in the industry is located on the west and north west, while 14 per cent is located in the south western part of the country. This favourable regional distribution is an important reason why its development should be encouraged, and both BIM and IDA says that their plans take into account the contribution which fish processing can make to regional employment targets.

Development of Processing Industry

Prior to 1970 fish processing activity was largely confined to that undertaken by the BIM factories in Killybegs, Galway and Schull and that of a number of established

Table 10.2: Monthly landings of major fish species in 1978

Month	Herring	Mackerel	Cod	Haddock	Saithe	Whiting	Plaice	Total
				Tonnes				
January	2,590	30	222	19	97	809	121	3,888
February	3,495	13	471	52	183	666	156	5,036
March	780	69	1,292	32	353	609	108	3,243
April	1,124	755	812	145	273	816	132	4,057
May	2,443	1,623	257	61	120	585	158	5,247
June	552	375	124	74	76	520	123	1,844
July	595	716	134	28	92	388	136	2,089
August	3,290	1,050	128	46	88	707	171	5,480
September	5,464	614	84	18	50	563	152	6,945
October	3,360	14,789	162	12	37	500	139	18,999
November	2,157	11,215	167	14	28	492	107	14,180
December	1,868	745	90	16	29	299	63	3,110
Total	27,718	31,994	3,943	517	1,426	6,954	1,566	74,118

Source: Department of Fisheries data.

Table 10.3: Regional breakdown of the number of firms by degree of processing in main activity and by numbers employed, 1977

	Region*					All Regions
	East	South East	South West	West	North West	
Degree of Processing in Main Activity			Number of firms			
Whole, chilled, frozen	4	4	5	1	3	17
Fillets, salted, spiced	6	2	9	4	6	27
Smoked, whole, fillets	7	2	1	3	2	15
Bottled, canned, breaded, etc.	-	-	-	-	1	1
Total Number of Firms	17	8	15	8	12	60
			Number of firms			
Number of Employees						
5 - 14	7	5	11	5	2	30
15 - 29	4	1	3	3	7	18
30 - 49	3	2	1	-	1	7
50 - 99	1	-	-	-	2	3
100 +	2	-	-	-	-	2
Total Numbers Employed	570	156	213	186	425	1,550
Per Cent Employed (%)	36.8	10.1	13.7	12.0	27.4	100.0

Note: Excludes firms employing less than five people, firms carrying out solely fresh operations and fish meal production.

* East = Counties Louth, Meath, Dublin and Wicklow; South East = Counties Wexford and Waterford; South West = Counties Cork and Kerry; West = Counties Clare, Galway and Mayo; and North West = Counties Sligo and Donegal.

Source: Bord Iascaigh Mhara.

family firms in Dublin. Since that date there has been a slow but perceptible development of the industry. In the early 1970s the significance of herring landings was very considerable. This species then accounted for 55 per cent of the catch in volume terms, the bulk of which was landed at Dunmore East/Cobh and Killybegs over the winter months of November, December, January and February. In 1972 the catch at Dunmore East/Cobh was almost 21,000 tonnes with over two-thirds of this being exported rough, packed in barrels, and the balance sent out fresh or frozen whole. There were limited opportunities for processing by home concerns, given the short season of the fishery and the types of fish landed (i.e., high fat content fish which are not suitable for machine filleting). Landings of herring in Killybegs in 1972 were about 15,000 tonnes but fish were of the leaner spent variety and were more suitable for filleting or curing. Considerable rough packing took place at this port also but production of frozen fillets and some cured products was already under way following market probing by BIM's Market Development Division.

Mackerel landings at this time were much lower than those of herring and were made mainly in the Castletownbere area during the autumn. Market outlets for this catch were mainly the West Indies for salted split mackerel and the Netherlands for eventual smoking. In these years the domestic market accounted for a large proportion of the whitefish catch and it is estimated that over 50 per cent was channelled via the Dublin Fish Market. Exports of whitefish mainly consisted of fresh cod, haddock and whiting during the spring season to the UK and sales of prime species during this and other periods of the year to the UK and Continental markets. Prawn and crab processing facilities were also beginning to expand around 1970, and limited processing of mussels was undertaken. Most other varieties were exported fresh.

Employment and Investment in Recent Years

At present the great bulk of processing operations is carried out by some 60 firms employing about 1,550 people. These firms, which also include a small number of fishermen's co-operatives, range in size from factories employing about 150 people to smaller units employing five or six people (see Table 10.3).

There is a very high level of part-time employment in the industry (about 30 per cent) as a result of the seasonal nature of the industry, particularly in primary processing. Also firms concentrating on a limited number of species are likely to have a higher part-time labour force participation than firms producing a wide variety of fish products. For example, on the north west coast, where many processors concentrate on herring, 37 per cent of the labour force are part-time workers, while in Dublin where a wider variety of species are processed only 10 per cent are part-time.

Of the total labour force it is estimated that about 35 per cent are female. About 11 per cent of these are part-time, while among the males 43 per cent are in this category. Most of the female labour is employed in the Dublin region. Of the total employed in this region, over 80 per cent are female, while in all the other regions only 3-6 per cent are females.

Between 1970 and 1975 additions to total fixed asset investment in the industry were only £4.1 million compared with an investment in the primary fish catching sector of over £16 million. In 1976 and 1977, however, fixed asset investment increased by a further £2.6 million compared with an increase in fleet investment of £15.9 million. Figure 10.1 shows the cumulative investment in the fishing fleet and shore processing industries between 1968 and 1977 inclusive.

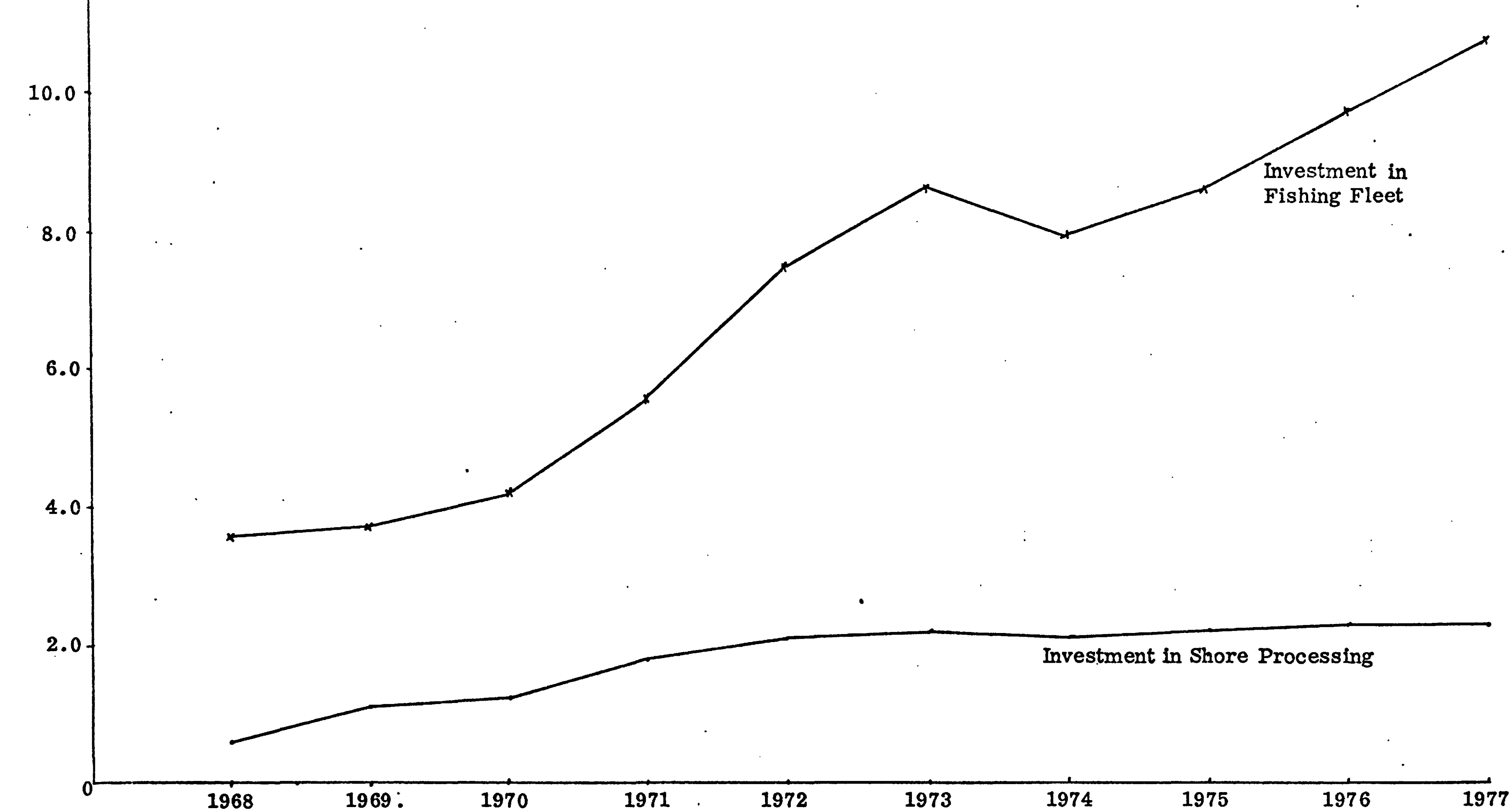
The Processing of Different Species

A number of firms specialise in pelagic or shellfish products, but most have aimed at securing facilities which would give them considerable flexibility in producing a wider range. Many of the firms are relatively new and bulk processing has formed a necessary first stage in their activities but the principal firms are continually reviewing opportunities in the production of semi-processed and finished products.

Demersal Fish

The volume of whitefish landings has remained relatively static over the last few years though there is a rise noted to date for 1979. Not only are the annual landings quite low but the seasonal pattern shows that a major portion is taken in the spring months, about 40 per cent being landed in the 10-week period mid February to end of April. Because of this landing pattern it is difficult for a processor to

Figure 10.1: Total cumulative investment in the fishing fleet and shore processing at 1968 constant prices, 1968-1977



specialise in whitefish processing, and many of those that are involved only carry out very limited operations such as filleting and freezing. Another factor limiting production of high value added products is the pricing structure at points of landing where whitefish processors have to compete with significant fresh product demand. Margins obtainable in the fresh trade, both for home and export markets, are very attractive and processors have great difficulty in competing with buyers for the fresh fish trade.

The firms which we interviewed claimed that if whitefish processing was to develop in Ireland it would be necessary to increase substantially the volume of landings throughout the year. The industry cannot develop on the basis of present landing levels. It is hoped, therefore, that the current period of uncertainty in the fishing industry will soon be ended and that the larger Irish boats, at present under commission, will move further afield and bring back increased catches.

Pelagic Fish

The position in regard to the processing of pelagic fish is different from that for demersal. In this case the quantities involved can be quite large and are landed during a short season. The cost of freezing and storing such a seasonal commodity can be very onerous. The processor must therefore minimise this cost to the best of his ability. Usually he is faced with two alternatives:

(1) Freeze and store the whole fish as landed and process them later as required.

(2) Fillet first to reduce bulk and then freeze and store the filleted product.

Since the weight of the filleted product is only about 40-50 per cent of live weight, the cost of freezing and storage is much less if the filleting is done first. If, however, this course is adopted, sufficient filleting machinery must be available to deal with peak supplies as they arrive. If, on the other hand, the whole fish is stored as it arrives, a large amount of freezing and storage space is required but the processor can get by with a small amount of filleting machinery. The decision then depends on the relative costs of purchasing and operating the freezing, storing and filleting facilities.

It is difficult to make general statements about these costs since there are wide variations from place to place depending on various factors. However our studies indicate that generally it is much cheaper to fillet first and then freeze than to do the opposite, because the provision of freezing and cold storage facilities is extremely capital intensive. For example a freezer to handle 20 tonnes of whole fish per 18 hour cycle costs about £40,000, while a cold store to handle say 200 tonnes (10 days' supply of frozen fish) costs a further £18,000. On the other hand a filleting maching costing £18,000 can fillet 20 tonnes in two nine-hour shifts producing 9 tonnes of product which can be frozen and stored at slightly over half the cost of freezing and storing the whole fish. For this reason it is usually more economical to have filleting capacity for peak supplies even though it is idle for long spells at a time. Unfortunately there are certain high fat content fish which are not suitable for machine filleting and these must be frozen whole.

Notes on the Processing of Mackerel and Herring

Mackerel: This species, with landings of 32,000 tonnes in 1978, is the highest volume fishery at present and it is difficult to find markets for all of it either in fresh or processed form. In a 10-day period from 23 October to 1 November 1978, average landings of mackerel at Killybegs were 385 tonnes per day, with a peak of 1,123 tonnes and an average in five consecutive days of 460 tonnes. Landings of this capacity cannot be dealt with adequately at present as there is serious under-capacity in freezing and storage facilities at all the major ports. Large quantities must therefore be withdrawn. Pending the expansion of processing facilities onshore for the handling of mackerel, it is hoped to make arrangements with eastern European vessels to take surplus stocks during the peak spring and autumn seasons to reduce the amount withdrawn.

Herring: This variety had been the large volume fishery until 1977, but since then the quantities landed have declined considerably. In these circumstances it is difficult to maintain supplies for the herring processing industry. Also the prices which European processors are prepared to pay for Irish herring are so high that it is much more profitable to export semi-processed or whole herring than to process them at home.

Regional Profile of Processing Industry

The current state of the processing sector on a regional basis is given below.

East Region

The main ports in this region are Howth, Skerries and Clogherhead. The region is characterised by proximity to Dublin and by the importance of the Dublin market for fresh demersal fish. The existence of this market provides a stimulus for the growth of processing of fish consigned from other parts of the country. Consequently employment in processing is high in proportion to fish landings in the region.

Shellfish accounts for about one-fifth of the volume of landings, and prawn is the most important species, particularly Dublin Bay prawn. Landings of this species in 1978 were valued at nearly £2 million out of a total state shellfish landing of £6.6 million. Prawn processing is labour intensive and landings in this region account for over 80 per cent of national prawn landings. Three firms are engaged mainly in prawn processing while a few others concentrate on prawns in the summer season. Most of the other firms are engaged mainly in demersal and pelagic fish processing. Public cold storage and freezing facilities are available in Dublin and these are used by a number of firms, particularly during herring, mackerel and salmon seasons.

South East Region

The main ports here are Dunmore East and Kilmore Quay. Historically Dunmore East has been a seasonal herring port. With the closure of the Celtic Sea herring fishery, activity at the port has declined sharply, though this has been compensated to some degree by the opening up of a developing sprat fishery and an increase in whitefish landings.

The main shore-based activity in this region is the processing of shellfish such as prawn, mussels and crab. The closure of the herring fishery has had a minimum effect on processing activities because little or no herring processing had been carried out. The trade in the area over the years had been the export of fresh and salted herring to the continent. A small amount of whitefish processing is carried out in the region.

South West Region

The main ports here are Castletownbere, Dingle, Valentia and Cahirciveen. Six firms are engaged in a mixture of whitefish and shellfish processing activity. The remainder concentrate on pelagic varieties and salmon. Mackerel is a significant species in this region, landings amounting to 9,080 tonnes in 1977. Processing, cold storage and freezing facilities for this species are limited at present but efforts are being made to improve the situation. The closing of the Celtic Sea herring fishery has confined vessels from Castletownbere and Dingle, to a greater extent than previously, to their home ports; consequently mackerel and sprat landings have assumed increased importance.

West Region

The main ports in this region are Galway/Rossaveel and Achill. Processing firms comprise of one specialising in herring products, while two or three others concentrate largely on shellfish - crab, shrimp and lobster. The remaining firms are engaged in processing whitefish. The port of Galway is centrally situated on the west coast and processing firms from the Donegal and Dublin regions draw supplies regularly from this port. Hence, a sizeable proportion of the landings are processed outside the region. There are no public cold store facilities in the western region; Dublin is the nearest centre, but even here other foods have priority over fish.

North West Region

The main ports in this region are Killybegs, Burtonport and Greencastle. In Killybegs, the dominant port, there are eight fish processing factories. All of these factories are engaged in processing herring but two of them are also engaged in whitefish activity. The variety of herring products produced range from whole frozen to canned. Most of the firms involved in herring production started off from a small base and, with second and third phase expansions of their facilities, have gradually moved from bulk processing to semi-processed and finished products. Companies in this region make extensive use of the ferry services to Scotland for exporting fish products to continental outlets.

Management and Financial Details

A survey of the fish processing industry was carried out by the IDA in 1975 to obtain a picture of the industry in order to assess its employment potential and prospects. Though the results of this survey are now somewhat out of date, we present some results here as they give certain information about the industry not available to us from other sources.*

The survey covered 29 fish processing firms located throughout the country and included 13 of the largest processing firms in the State. These firms accounted for two-thirds of the total employment in processing and 75 per cent of the total fish exports in that year. The input of fish to the surveyed firms was 45,000 tonnes and the output about 30,000 tonnes. A large proportion of this output was whole frozen fish. Only about 1,400 tonnes of high value-added product was turned out. Since the survey covered all the large firms in the State it can be taken that it represented the vast bulk of the high valued products produced.

Professionalism

The survey concluded that the fish processing industry as constituted at the time had not reached the potential it is capable of achieving. The bulk of the units in the industry are too small to support the sophisticated management needed to produce high value-added products for export.

* Processors interviewed in connection with this study were unwilling to be subjected to another formal survey.

Fourteen firms representing 67 per cent of total employment in the surveyed firms have professionals (people with third level educational qualifications) participating in their management. These include five of the six largest companies. The one exception among the large companies was a firm, most of whose staff are part-time. Eleven of the 15 firms without professionals in management employ less than 30 full time and part-time staff. It is fair to deduce from this that professionalism in management in the industry is a feature of the size of operation. Smaller firms generally do not have the financial resources to "carry" professional management.

The fourteen firms with professional management employed 19 professional people, 11 of whom were accountants and two were food technologists. Among the others, were an industrial engineer, a catering and a management graduate and a marketing graduate. Other than the latter, there were no professional marketing people in the industry. The lack of such people in an industry exporting 75 per cent of its output could be considered a cause for concern, although the same situation holds in most other small Irish industries.

Management

Thirteen of the 29 firms surveyed were each managed completely by one man. These firms comprise about 28 per cent of total employment in the industry. The bulk of the larger firms in the industry have a management team comprising 2-3 people. Sixteen firms believed that management in their particular companies needed to be developed if they were to expand and progress. Of the 13 who did not consider that their companies' management needed to be developed, most were one-man controlled operations whose owners felt that their own management expertise was sufficient. Five of the firms which wanted their management strengthened felt the need for marketing expertise also.

Skills and Training Requirements

Six of the 29 firms visited stated that their employees had no specific skills and did not need any. These were firms which did little more than primary processing, i.e., freezing, gutting and removing heads and tails. The other 23 stated that certain aspects of the work in their plants did require such expertise. Hand filleting of fish was regarded by 18 companies as a skilled job in their firms. Other skills referred to were scampi processing, handling shellfish, salting and marinating fish and maintenance of machinery.

In general the study found that operatives in the industry received very little formal training; they were trained mainly on the job. AnCO, The Industrial Training Authority, in co-operation with BIM is operating a training scheme for both management and operatives in the fish processing industry but so far the demand for such courses is not very great.

Technology and Quality Control

Generally speaking the requirement for technology is small in primary processing of fish. In advanced processing, technology is somewhat more sophisticated but it could not by any means be called a high technology industry. Quality control, both at the primary and secondary stages, is probably more important than technology in regard to the competitiveness of the firm. Regardless of the relative importance of these factors, however, the survey results indicated that both the levels of technological development and quality control in the Irish fish processing industry are low. Most of the surveyed firms did not have an R and D unit or a product development unit, nor was anyone in particular employed to look at those aspects seriously; only two firms employed professionals in the R and D or quality control fields. The reason for this of course is that the bulk of Irish exported fish does not go directly to the consumer but is processed by foreign importers.

Despite the above deficiencies, it was found that equipment such as freezers, smokers, cold rooms, filleting machines, etc., was relatively new and in good condition. Apart from one plant whose machinery was fairly old, all the fish processing firms had equipment which was post 1970; much of it post 1974.

Transport

Over 75 per cent of the output of the fish processors surveyed by the IDA was exported. Transport costs could therefore be a critical factor in determining the competitiveness of the sales on export markets. Information from BIM shows that for the most part, shellfish exported are transported by air. Fresh salmon and fresh prime fish such as brill, turbot and sole are sometimes transported by air also. Frozen fish are exported in refrigerated and insulated containers with 90-140 kg of dry ice per container. The decision as to whether to use insulated or refrigerated containers is influenced to a large extent by the time and distance to export destination.

Table 10.4 shows that most of the firms surveyed by the IDA exported their products in insulated or refrigerated containers and trucks. Mostly the containers were hired but the bulk of the trucks were owned, particularly for transport to the home market. In most cases the firms said they were happy with the services of private transport companies employed but in cases where CIE was used, mixed feelings were expressed regarding the service.

There was a difference of opinion among the processors as to the reasonableness of transport and distribution costs. The level of difference seemed to be a function of the location of the processing factory. In general, those in the eastern half of the [illegible] considered that transport costs did not present a significant problem, while those located on the western side felt that they were being penalised by excessive transport costs.

Table 10.4: Methods of transport used by the fish processors surveyed by IDA

Mode of transport	Hired	Own vehicles
	Number of firms	Number of vehicles
Refrigerated containers	15	-
Refrigerated trucks	1	10
Insulated trucks	2	27
Insulated containers	4	-
Vans	-	10
Train	4	-
Air freight	2	-
Cargo vessel	7	-
All modes of transport	35	47

The evidence presented in the accounts submitted by the companies supported a locational difference as indicated by the figures in Table 10.5. The overall average of nearly 6 per cent on sales is, however, not excessive by international standards and the general feeling in the industry seems to be that even the western plants, despite the transport costs, are still price competitive in overseas markets.

Since the transport costs given in the IDA study are now out of date, selected charges to different destinations based on Spring 1979 quotations obtained from BIM are given in Table 10.6 The air freight charges in this table look exceptionally high but when they are related to the value of the product they are not unreasonable. For example, the air freight charge of 45p per kg is only about 11 per cent of the export value of 1 kg of salmon and about 10 per cent of the export value of 1 kg of lobster.

Table 10.5: Transport costs as a proportion of sales classified by region

Region	Sales £'000	Transport costs £'000	Transport costs as percentage of sales
East, South East	2,698	109	4.0
West, North West	3,989	285	7.1
All Regions	6,687	394	5.9

Source: IDA (1977)

Table 10.6: Transport costs to different destinations (Spring 1979)

Destination	Method of transport	Cost P/Kg
Export		
Waterford - Rotterdam	Ship - transport cases	1.5
Rosslare - Le Havre	Ro/Ro Containers return*	2.6
Killybegs - Boulogne	Ro/Ro - Refrigerated Container	4.7
Killybegs - Hamburg	Ro/Ro - Refrigerated Container	5.5
Killybegs - Rotterdam	Ro/Ro - Refrigerated Container	4.8
Dublin - Boulogne	Ro/Ro - Insulated Container	5.7
Dublin - Hamburg	Irish Shipping Standard Cases	1.6
Dublin - Paris	Aerfreight - Over 100 Kg	27.5
Shannon - Dusseldorf	Aerfreight - Over 100 Kg	43.5
Cork - Amsterdam	Aerfreight - Over 45 Kg	45.0
Cork - Amsterdam	Aerfreight - Over 500 Kg	27.5
Internal transport		
Killybegs - Dublin	Truck - Insulated Container	1.25
Castletownbere - Dublin	Truck - Insulated Container	1.32

* Charges are the same for refrigerated and insulated containers and may be almost halved if back loads can be obtained.

Source: BIM.

Source of Supplies

Fish processing firms tend to be located close to source of raw materials. However, not all the firms' requirements are met from local landings and must be supplemented from other ports. The extent to which processors in the IDA survey sourced their raw materials locally is shown in Table 10.7. Very few of the processors in the survey were directly involved in the catching sector. In fact, only 10 per cent of the raw materials used were acquired in this manner.

Table 10.7: Sources of raw materials for processors included in survey

Location of firm	Sourced in region	Sourced elsewhere
	Per cent	
East	61	39
South East	73	27
South West	97	3
West	30	70
North West	79	21
Total	74	26

* The source of supplies to western factories has changed considerably since this survey was carried out. A much higher proportion of raw materials are now sourced in the region.

Source: IDA (1977)

Marketing Structures and Strategies

It was estimated that the 29 fish processing firms surveyed accounted for a total of £13.7 million sales in 1975, a little over three-quarters of this amount (i.e., £10.4 million) being export sales. Official trade statistics show that fish and fish products to the value of £13.6 million were exported in 1975; hence the sample accounted for over 75 per cent of fish exports in that year. Sales and exports classified by region for the sample firms in 1975 are given in Table 10.8.

Table 10.8: Sales and exports of fish and fish products by the sampled firms in 1975, classified by region

Region	Sales	Exports	Percentage of sales exported
	£'000	£'000	%
East	6, 200	3, 800	62
South East	300	300	100
South West	1, 600	1, 400	87
West	900	800	92
North West	4, 700	4, 100	87
All Regions	13, 700	10, 400	76

Source: IDA (1977).

The figures in this table show that the east region exports a smaller share of its processed fish than the west of the country where firms are primarily exporters of fish. This reflects the fact that the east region firms deal extensively in whitefish for which there is a good market in Dublin.

Marketing Effort Abroad

Only two of the surveyed firms had distribution or marketing depots abroad. Both these firms are engaged in producing products for direct human consumption. The other exporting companies, the bulk of whom produce semi-processed fish, do not have a permanent market presence abroad. BIM's European Office in Paris does, however, play an important role in this connection, particularly in building up new business for processors and exporters and in developing continental markets for processed mackerel, crabmeat and mussel meat products.

Offal Disposal*

The IDA study estimated that over 15, 500 tonnes of offal (excluding shellfish) are created each year and that about 10 per cent of this offal is dumped. The remaining

* The data contained in this section was derived mainly from up-to-date information from BIM.

90 per cent is sold for fishmeal or to mink farms. In addition to the offal, 10,000 tonnes of fish were sold directly for fishmeal in 1975. A somewhat larger quantity of good fish was used for meal in 1977.

There are two fishmeal plants at present operating in the country, one at Killybegs, and one in Rossaveel, Co. Galway. A large plant at Mornington in Co. Louth has recently been closed, because of shortage of raw materials, but may open again. The Killybegs firm can handle between 120 and 160 tonnes of fish or offal per day depending on the type of raw material available. This factory is now being extended and will have a capacity of nearly 300 tonnes per day. The Rossaveel plant has about a quarter of the capacity of the present Killybegs factory.

These plants cannot process the amount of fish available during peak landing periods. There has been a shortage of capacity over the past year during periods of heavy fishing, and, in fact, some withdrawn fish had to be dumped. It is expected that this problem will be solved shortly as a result of the increased capacity at Killybegs and the erection of a new plant at Castletownbere.

A point worth noting in this connection is the localised nature of fishmeal plants. Because of the low value of the raw material to the seller, transport costs can make meal production uneconomical if the fishmeal plant is some distance away from the source of supplies. Consequently, fish processing factories not within a reasonable distance of a fish processing plant will either sell the offal to mink farms at a very low price or dump it.

Value-Added, and Employment Creation in Fish Processing

The level of value-added created on fish by Irish fish processors is low. This is borne out by the evidence presented in the up-to-date accounts of 18 fish processors included in the IDA sample. The average value-added (sales less costs of raw materials as a percentage of cost of raw material) was 52 per cent but the range was from 9 per cent for one firm mainly handling wholefish to 103 per cent for a shellfish company. Not included here (because accounts were not made available) are two firms producing high value consumer products whose value-added on semi-processed raw materials was estimated at around 200 per cent and much more than this if the calculation was based on the cost of landed fish.

An analysis of the IDA survey data showed that for every 200 tonnes of raw herring, primary processing creates on average 1.25 jobs at present. If the same 200 tonnes were further processed into consumer products, an additional 5.8 jobs could be created. Thus for every 200 tonnes of herring processed into consumer products, seven jobs could be created against 1.25 for primary processing. When it is considered that only about 2,500 tonnes of herring are now processed into consumer products, it would appear that there is considerable scope for an expansion of this enterprise. The problem, however, is not as simple as it appears on the surface. Different types and sizes of herring come into the picture and the relatively high prices and returns available for fresh and semi-processed products make it extremely difficult for Irish processors to compete in established markets for fully processed fish. Hence the prospects of creating employment in herring processing are not good.

Investment cost per job

It was estimated by the IDA that there is a greater payback on investment in fish processing in terms of jobs than the average for manufacturing industry. The average grant cost per job for 22 fish processing projects approved in 1974 and 1975 amounted to £1,985 as compared with an average grant cost per job of £3,707 for total projects approved in the same period under the IDA grant schemes. Total capital costs per job were not given in the IDA survey but BIM has estimated figures for average total investment per job at 1978 prices as follows:

Herring - marinated in jars	-	£10,000
Herring/Mackerel in cans	-	£17,000
Shellfish - breaded, frozen and packaged	-	£9,000
Whitefish - filleted, skinned and packaged	-	£8,000
Whitefish - breaded	-	£9,000

These figures should be increased by a factor of 30 per cent if extra cold storage and freezing facilities have to be provided.

Financial Analysis

In examining the financial status of the fish processing industry, the IDA took a sample of seventeen companies which operated mainly in the export area. Profits of £433,000 were earned by these companies on sales of £8.6 million, giving a return on sales of 5 per cent. Capital employed in the sample came to £2.3 million so that the return on capital (profit as a per cent of capital invested) was about 19 per cent. This return on capital employed, compares favourably with 15.7 per cent in 1974 for all Irish public companies engaged in industry. The sample companies demonstrated a very strong position with regard to the debt/equity ratio. Only four companies had any sort of long-term debt and only one company could be considered to have a bad debt/equity ratio. The value-added by the sample companies came to 52 per cent. This figure was calculated by subtracting the raw material costs from sales and expressing the difference as a percentage of raw materials. As a result of the analysis, the IDA concluded that the industry is in a sound financial position with adequate profits and adequate return on capital employed.

It might appear from this analysis that optimal economic use of Irish fish resources should involve producing more and more secondary products. There are problems however in this regard. The quantity of whitefish landed is small and irregular and is not capable, at present, of supporting a viable processing industry. For this to happen supplies would need to be increased on a regular basis. In addition, prices are very high due to competition from home and foreign buyers on the fresh fish market. In the case of herring, the quantities landed are inadequate and the price which processors have to pay for herring is much higher than those which European processors pay for imports from other countries. Despite these difficulties considerable development of the fish processing industry is planned for future years.

Future Development

In reply to a parliamentary question in the Dáil in October 1978, the Minister for Fisheries said that there were 20 processing proposals on hand at present, comprising expansion schemes by existing firms and the establishment of completely new projects including a large development at Castletownbere. The estimated total capital cost of these projects is £5.7 million with a potential job figure of 610.

In order to achieve this job target it is considered necessary in certain circumstances to bring in outside expertise, not alone in processing, but also in the fields of catching and marketing. Recent developments at Castletownbere, Co. Cork provide a good example of an integrated catching and processing operation established by means of a joint venture. A major shareholder in this venture is the Spanish company Pescanova, a large well known integrated firm which has successfully established this type of operation in other countries.

Though Castletownbere has the third highest value of landings in the State, domestic processing firms have been unwilling to establish factories here because landings at the port are very seasonal and would not maintain any continuous processing activity. On the other hand, the local fleet had not been expanding because of lack of processing and cold storage facilities. The objective of the new project is to have the company purchase as much fish as possible from the local fleet and also to provide a market outlet for species for which there is no local demand. In order to maintain continuous supplies the company plans to operate a number of its own vessels to fish for species not now fished by the local fishermen.

The factory is being built in three stages. Stage 1, incorporating a fish handling room, cold store, and freezers is at present under construction and is due to be completed in 1980. Stage 2, incorporating further cold stores, freezing plant, and processing equipment is scheduled for completion in 1981/82, while Stage 3, which includes the provision of equipment for the preparation and packaging of more sophisticated products for the consumer and catering market is planned for 1982/83. Shore employment in 1980 will be 35 and is expected to reach 140 by 1983.

In addition to the project at Castletownbere there are a number of other joint venture projects either operating or in the course of being set up. Among these are a fish canning plant and a fish smoking project.

The fish canning factory involves a wholly owned Irish firm working in co-operation with a British based marketing firm which, at present, takes most of the company's output. This joint arrangement has enabled the Irish firm to establish itself in new markets which heretofore were not open to it. The other project involves an Irish processing firm and a German distributor. Production of specially smoked fish product lines are planned in the Irish company's factory under the supervision of German technicians and using German recipes. Commercial shipments on a trial basis have already been made and are being test marketed.

In addition to these, other projects of a similar nature are also in operation or at an advanced planning stage. These include an Irish/Norwegian fish processing project at Donegal which has been operating successfully since 1974 and is currently examining proposals for expansion, having already enlarged its facilities in 1977. An Irish processing firm is also investigating a tie-up with a European firm (non-EEC) to improve the supply of fish to its factory and so maintain employment. A joint venture project is also under investigation for a mariculture development involving German and Irish interests.

JH. F ... i

THE FISH WITHDRAWAL SYSTEM IN IRELAND

The EEC fish marketing regulations have as their objective the replacement of national market organisations by a common organisation of the market throughout the Community.

It is proposed to achieve this through measures designed to promote the rational disposal of fish, to ensure market stability and to introduce common marketing standards, thus leading to a better adjustment of supplies to market demands. These measures are aimed at ensuring, as far as possible, a fair income to producers.

Provision is made for the setting up of producer organisations as the effective agent of the objective. Their members are bound by certain rules, in particular as regards production and marketing.

Fish Prices

Each year The Council fixes "guide prices" (and the Commission derives "withdrawal prices") for 11 species of fish of which the following are of direct interest to Irish fishermen:-

Herring	Mackerel
Haddock	Plaice
Whiting	Saithe (Black Pollack)
Cod	

The "guide price" is not a guaranteed price but a target price that is expected to be reached and could, of course, be exceeded.

The "withdrawal price" is, in effect, the minimum price below which fish, presented by members, may not be sold for human consumption by producer organisations. The "withdrawal prices" vary according to standards laid down for grading by freshness, size and presentation (whole, gutted, etc.). Grading according to these standards before the first-hand sale of the fish is compulsory if compensation to members is to be obtained.

Initially, special guide and withdrawal prices were determined for Ireland (and for the other new member countries) for the 11 species concerned. These prices were aligned with the level of the common prices in six equal stages, the first taking place on 1 February 1973, and the last on 1 January 1978, by which time the same prices applied throughout the whole of the enlarged Community.

Withdrawal of Fish from Market

A producer organisation may fix for any species of fish a withdrawal price below which it will not sell, for human consumption, the fish supplied by its members. Fish offered for sale but failing to reach the withdrawal price must be withdrawn from the market.

Withdrawn fish cannot be put back on the market* but may be used for:

(1) free distribution to charitable societies and institutions or to persons entitled to public assistance;

(2) animal feeding;

(3) manufacture of fishmeal;

(4) non-food purposes.

Where the fish thus withdrawn is herring, haddock, whiting, cod, mackerel, plaice or saithe, the producer organisation must indemnify the member on the basis of the withdrawal price fixed by the organisation. If, and only if, the EEC's official withdrawal price is used, financial compensation is granted from EEC funds towards the cost of withdrawing the fish from the market. If an autonomous withdrawal price is operated by the producer organisation no compensation from EEC funds is payable.

Where the fish withdrawn from the market is not one of the named species above, the producer organisation is free to grant the member an indemnity if it so decides. No financial compensation is payable from EEC funds in those cases.

---

* Because withdrawn fish is a low value product the cost of freezing, storing and handling would be greater than the eventual price received from sale. Hence losses on withdrawal are minimised by disposing of the fish immediately it is landed.

Financing the Withdrawal of Fish from the Market

Where the official withdrawal price is operated by the producer organisation, the funds needed by the organisation to operate the withdrawal system are derived from:

(1) amounts (if any) realised from sales e.g. for fishmeal;

(2) financial compensation from EEC funds; and

(3) the balance from the producer organisation's own funds, which in addition to paying compensation to fishermen must be used for defraying the transport and other costs of disposing of withdrawn fish.

Items (1) and (2) represent the major part of the cost of indemnifying the member and their total is usually fixed by the EEC at about 60 per cent of the withdrawal price. The balance at (3) is raised by the producer organisation itself through levies on fish sold. The changing of rate of this balance or the suspension of the balance from time to time are matters for decision by the producer organisations having regard to the state of their funds.

The EEC contribution is calculated in the following manner. At the beginning of each year the EEC decides on the proportion of the withdrawal price which will be paid to fishermen for each species withdrawn (usually 60 per cent). Let us call this the EEC compensation price. It then fixes standard or "notional" values for the different methods of disposal (i.e., sale for fishmeal, freezing for animal feed, etc.) and assumes that producers' organisations will get the standard values if they dispose of withdrawn fish in a particular way. The balance (i.e. the difference between the EEC compensation price and the standard value) is paid out of EEC funds. When a consignment of fish is withdrawn and the Commission is notified of the method of disposal, it credits the producers' organisation with this balance. If the fish have to be dumped (which may happen where small quantities are involved and a fishmeal plant is not convenient) the producers' organisation may be credited with the total compensation price provided the unsold fish have been properly graded and passed fit for human consumption.

How the Withdrawal System Works in Ireland

The withdrawal system was introduced in Ireland on 2 February 1976 and until the beginning of 1979 it was operated solely by the Irish Fish Producers' Organisation (IFPO). A second producers' organisation, The Killybegs Fishermen's Organisation (KFO) has since been set up in Donegal. This organisation will draw its members from the north western fishermen, representing one-third of the fishermen in the country.

The Irish withdrawal system is applied as follows. If at a recognised auction a consignment of fish does not reach the withdrawal price it is withdrawn from the market. The salesman does not then return a price on the sales note but gives details only of the quantity and species withdrawn. He then notifies the producers' organisation of these details and of the grades involved. If the total withdrawn at auction is large, the auctioneer sends it to a fishmeal factory if possible. The fishmeal factory returns a receipt to the organisation, where it is matched with the invoice from the auctioneer. The fisherman concerned is then paid compensation for the withdrawn fish at the rate applicable to the particular species and grade.

The amount of compensation received, however, is seldom equal to the full withdrawal price. Indeed as explained above, it may be only 60 per cent of this price which sum comes from the amount (if any) realised on the disposal of the fish and from the EEC. Usually, however, the producers' organisation adds to this amount out of receipts from a levy on fish sold for normal purposes by its members. In 1978 it was possible to pay about £9 per tonne out of the levy for mackerel withdrawn, or about 12.5 per cent of the EEC withdrawal price of £72 per tonne. In that year the price paid to producers for mackerel withdrawn was £52 per tonne made up of the following amounts.

(1) A standard value of £29 per tonne for withdrawn fish sent to fishmeal plants.

(2) An EEC contribution of £14.2 per tonne, and

(3) A contribution by the IFPO out of levies of £8.8 per tonne.

The sum of (1) and (2) is £43.2 which was the EEC compensation price in that year and was 60 per cent of the withdrawal price (i.e., £72 x 60% = £43.2). The amount paid by the IFPO was decided on the basis of the funds available from its levies. In addition to this payment the IFPO had also to pay transport and other costs of sending the withdrawn fish from point of withdrawal to fishmeal plants. It received, however, something more than £29 per tonne for fish sent to fishmeal plants and thus made a slight gain on this part of the transaction.

In some cases transport costs can be exceptionally heavy. There are only two fishmeal plants operating in Ireland at present: one in Killybegs and one in Galway. A large plant in Mornington, Co. Louth has recently closed down. There is no plant in the southern half of the country and so fish withdrawn at Castletownbere have to be sent to some one of the other plants at very heavy cost. The cost from Castletownbere to Galway is about £10 per tonne, while to Killybegs it is about £15 per tonne.

It is thus obvious that withdrawals along the southern coast are expensive and there is strong pressure from fishermen to build a fishmeal plant somewhere along the south west coast. The supporting arguments are that it would make withdrawal less costly in the area concerned; it would provide an outlet for fish not suitable for human consumption; and at a time when prime fish are scarce fishermen could fish directly for species not presently in demand for human consumption such as horse mackerel and blue whiting. A fishmeal plant is also a necessary complement to a processing factory. About half the landed weight of wet fish is inedible but is suitable for fishmeal. Without a fishmeal plant, therefore, the offal from a processing factory may go to waste. Blue whiting is a case in point. At present this species is being fished almost exclusively for fishmeal because the economic and technical breakthrough has not yet occurred for its uses in human food. But even when this breakthrough occurs it is reckoned that only about 20 per cent of the resource will end up on the food market. About 80 per cent will be reduced to fishmeal because of the low yield and the great number of small fish taken in the fishery.

The arguments against a fishmeal plant are:

(1) It may be uneconomic to operate due to scarce or irregular supplies. Hence the supply situation would need to be studied carefully before the investment takes place.

(2) When prime fish are scarce fishermen will fish directly for the fishmeal plant and in course of this may do serious damage to young stocks of food fish.

(3) The presence of a fishmeal plant tends to make withdrawal too easy and diverts attention from good marketing efforts to utilise fish for human consumption, which in the long run is the prime objective of the market policy.

A fishmeal plant should therefore be judged on its own economic merits; it should not be erected just to process withdrawn fish. The view that a fishmeal plant will generate processing activities around it and that much of the development in Killybegs has been due to the presence of the fishmeal plant there is widely held. On the other hand, it can be argued that most of the growth in Killybegs would eventually have occurred for marketing reasons and this would have generated a demand for a fishmeal plant to handle waste materials and reject fish. Success in consolidating landings in well-planned larger ports would provide a logical answer to the number and location of meal plants and of withdrawal operations.

Magnitude of Irish Withdrawal

From the inception of the withdrawal scheme in early 1976 until the end of 1978 the IFPO withdrew from the market about 24,000 tonnes of fish of all kinds valued at £1.25 million. This quantity is equivalent to about 11 per cent of the total wet sea fish (other than salmon) landings in the same period. Figures for quantity and value of withdrawal classified by species withdrawn are given in Table 11.1.

As can be seen from this table, mackerel accounted for most withdrawals in each year. In 1976 it made up about 80 per cent of the total quantity withdrawn. The percentage in 1977 was 99 per cent and in 1978 it was 97 per cent. If we compare mackerel withdrawn with total mackerel landings we find that withdrawals were 37 per cent of landings in 1976, 21 per cent in 1977 and about 36 per cent in 1978.

Figures for withdrawal by port of landing and species for 1978 are given in Table 11.2. The largest withdrawals were at Killybegs where a total of over 7,000 tonnes were disposed of in 1978. This represented 57 per cent of all

Table 11.1: Quantities and values of fish withdrawn from the market by species, 1976-1978

Species of fish	1976	1977	1978	1976	1977	1978
		Tonnes			£	
Mackerel	5,396.1	4,754.9	11,958.0	244,562	262,332	613,975
Whiting	931.9	34.1	126.3	62,936	3,004	15,898
Herring	343.3	19.0	162.5	20,659	1,509	20,800
Haddock*	35.3	-	3.4	2,324	-	561
Plaice	1.6	-	0.8	164	-	189
Prawns*	-	-	5.8	-	-	3,006
Sprat*	-	-	78.0	-	-	2,350
Ray	-	-	2.2	-	-	501
Saithe	26.2	-	-	2,070	-	-
Hake	15.1	1.6	-	4,351	534	-
Other	1.6	-	0.4	169	-	66
Total	6,751.0	4,809.6	12,337.4	337,235	267,379	657,346

* Species not included in EEC scheme.

Source: Department of Fisheries statistics and issues of the Irish Statistical Bulletin, Dublin: Central Statistics Office.

Table 11.2: Withdrawal of fish by port and species, 1978

Port	Species										All Species	
	Mackerel	Whiting	Herring	Haddock*	Plaice	Prawns*	Sprat*	Ray	Coley	Cod		
	Tonnes										Tonnes	Value (£)
Killybegs	6,917.0	82.0	22.0	2.4	0.2	-	-	-	-	-	7,024	369,676
Burtonport	3,906.0	6.0	121.0	1.0	-	-	-	-	-	-	4,034	218,631
Achill	12.0	-	-	-	-	-	-	-	-	-	12	496
Cleggan	16.0	-	-	-	-	-	-	-	-	-	16	815
Galway	245.0	12.7	0.4	-	-	-	-	-	-	-	258	13,635
Westport	30.0	-	-	-	-	-	-	-	-	-	30	1,352
Dingle	403.0	-	-	-	-	2.0	-	-	-	-	405	21,633
Sneem and Renard	81.0	8.5	7.5	-	-	-	-	1.0	-	-	98	6,348
Castletownbere	43.0	1.0	-	-	-	3.8	-	0.5	0.2	-	49	4,604
Dunmore East	78.0	0.5	-	-	0.5	-	78.0	-	-	-	157	6,540
Dublin Market	-	8.0	5.0	-	0.1	-	-	0.7	-	0.2	14	1,177
Howth	227.0	7.6	6.6	-	-	-	-	-	-	-	241	12,439
Total Quantity	11,958.0	126.3	162.5	3.4	0.8	5.8	78.0	2.2	0.2	0.2	12,338	-
Total Value (£)	613,975	15,898	20,800	561	189	3,006	2,350	501	25	41	-	657,346

* Species not included in EEC scheme.

Source: Irish Fish Producers' Organisation.

withdrawals in the state in that year. The next highest withdrawals were at Burtonport where just over 4,000 tonnes were disposed of. Hence over 11,000 tonnes or 99 per cent of all withdrawals were in Co. Donegal. Furthermore, of the total mackerel landed in Killybegs in 1976 and 1977, about 27 per cent were withdrawn while of the mackerel landings at Burtonport, almost 50 per cent were withdrawn.

Long Run Considerations

The objectives of the withdrawal system are common to the broader marketing programmes of the EEC and are not in question here. The detailed workings of the plan do, however, raise some issues that should be addressed.

One of the key problems in development of the Irish sea fisheries has been the tendency of Irish skippers to cling to well established inshore operations on highly marketable species. The withdrawal system applies only to certain of these attractively priced fish, and decreases still further the incentive to explore new opportunities based on volume catches of lower-priced fish on less familiar grounds. If risks in the latter type of operation could be reduced by providing minimum withdrawal prices, it seems certain that the programme could be made to stimulate rather than retard utilisation of underutilised stocks (or stocks now fished by others but accessible to Irish vessels).

There are certain dangers, however, in extending the withdrawal price system to lower priced and underutilised fish as it could lead to the killing off of foreign markets for such fish. For example, Ireland has lost a foothold she had on the Australian market for round whiting because of the introduction of withdrawal for this species at relatively high prices. In fact the whole withdrawal system needs to be carefully monitored by both the Irish government and the EEC to ensure that the withdrawal prices fixed do not work to the detriment of the processing and exporting industries. It is mainly a question of balance. The fishermen naturally want to obtain as high a price as possible for their catch, whereas the processors and exporters have to obtain their raw materials at a relatively low price in order to remain competitive.

It is of interest to note that arrangements have now been made with eastern European vessels to take up surplus mackerel caught by Irish ships at prices which are about 60 per cent higher than those received under the withdrawal scheme. The arrangement came into operation in September 1979 and should reduce considerably the quantities to be withdrawn. It might, however, (in the long run) hinder the development of the mackerel processing industry and will therefore need to be kept under review. If, of course, profitable markets can be obtained for processed mackerel products the best solution to the problem would be to increase the onshore filleting, freezing and cold storage facilities in order to cope with the very heavy landings which occur over a short period of 2 - 3 months. In this way the surplus could be distributed over the other months at reasonable prices.

PART III

DEVELOPMENT OF THE IRISH SEA FISHERIES:

CONSTRAINTS, POLICY OPTIONS AND RECOMMENDATIONS

CHAPTER 12

BIOLOGICAL CONSTRAINTS ON EXPANSION

Expansion of the Irish sea fisheries will require additional inputs of labour, capital, and raw materials. While there are problems with respect to the supply of labour inputs with the appropriate skills and training, they appear to be manageable and in hand. In the case of boats and gear both the Irish government and the EEC have expressed their intention to provide financial assistance for new construction. The extent to which availability of skills and capital of the appropriate types presents problems is dealt with in Chapter 13.

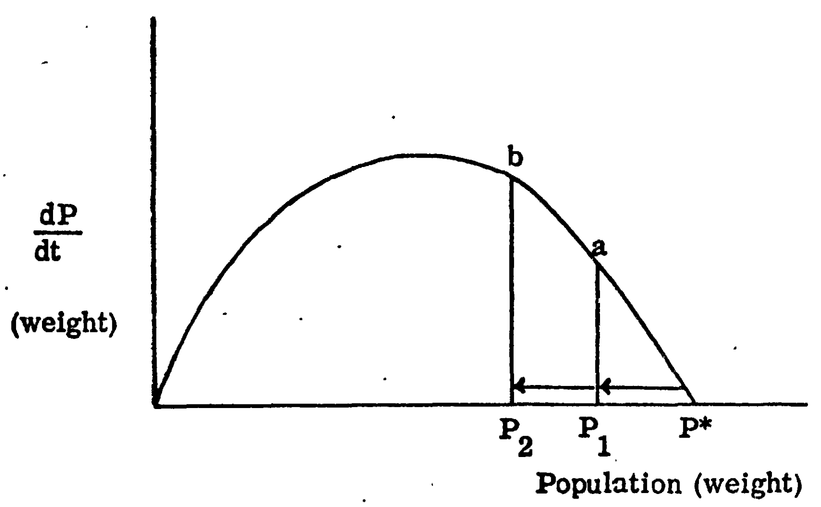
The all-important key to the potential growth of the Irish sea fisheries lies in the availability of raw material. The matter takes on particular importance in view of the general agreement among fisheries scientists in the north east Atlantic that major commercial species (e.g., herring, cod, plaice, haddock, salmon, and lobster) which form the basis for the present commercial sea fisheries of Ireland are under moderate to extreme fishing pressure. In the case of some species, such as herring and salmon, over-exploitation appears to be general, and full realisation of potential sustained yields can be realised only if a painful but essential period of curtailed harvesting is agreed to by all participating nations. In other cases the pressure on fishing populations varies by region; but even in these instances, there would appear to be only small opportunities for aggregate expansion of catches by EEC nations. Thus, an increase in Irish catches must come in part from curtailment in the fisheries of non-member nations now fishing within EEC waters under permit and their reallocation among Community members. Any further increase could come only from the quotas of the member countries.

In this setting, it becomes even more important, from the standpoint of long-range planning of Irish sea fishing, to develop with considerably greater precision the statistical base for estimating the yield capabilities of exploited sea fisheries and the status of stocks most readily accessible to Irish fishermen.

Marine fishery resources exist in an enormously complex environment, with marketable target species intermingled with many other related systems of living organisms. All of them are subject to changes in oceanic parameters (e.g., water temperature, salinity, currents, and sea state) which are beyond human control and which impinge on the availability of fishery resources in ways that are not fully understood. Oceanographic research may make such basic information available in the long term, but in the short term only at prohibitive cost. Within that complicated framework, the exploitation of individual species is subject to biological constraints that determine the size and age distribution of the biomass of the target population of a commercial fishery. In the following pages an examination in summary form is made of the determinants of population size and the reaction of such populations to the introduction of man as a predator. The prospects for Irish fishery expansion are then reviewed in that framework.

The aggregate weight of any fish population, not exploited by man, is regularly augmented through recruitment of new individuals to catchable size and through growth in the weight of individuals. It is also decreasing continuously through natural mortality - old age, disease, and natural predation. The instantaneous rate of change at any given population size reflects the relative strength of these two opposing tendencies. As a starting point, we can express the rate of change in population (dP/dt) as a function of population; the general form of that relationship is expressed in Figure 12.1 below.

Figure 12.1: Rate of change in population as a function of population

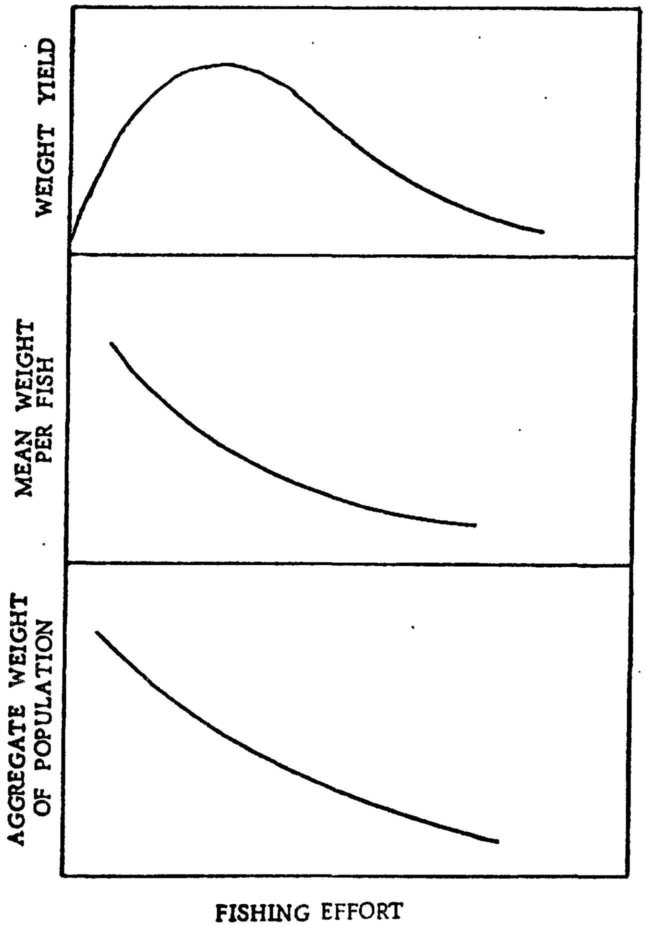


At zero population the rate of change is obviously zero by definition; and at some level P^*, the rate of change is also zero since the combined effects of recruitment and growth of individual fish are exactly offset by the rate at which natural mortality is claiming members of the population. In a crude sense, the population at this level could be regarded as being in equilibrium with its natural environment without interference from man. At any population below P^*, the natural rate of increase is greater than zero - i.e., growth and recruitment exceed natural mortality, and the population will expand; similarly, at any population greater than P^*, there will be a tendency toward contraction. These are long-term or steady state equilibrium relationships. The rate of increase at each level of population is that which would prevail after all short-term effects have worked out, and it is assumed that the host of environmental factors determining recruitment, growth rates of individual fish, and natural mortality remain constant.

This relationship between population and rate of change of population is, in a rough way, almost completely general to all marine fisheries. Its importance to the fishing industry (and thus to this study) lies in the fact that it is basic to the development of the critical function relating fishing effort - the introduction of man as an additional predator - and the yield in weight that can be taken on a sustained basis. This can be developed along the following lines. Assume that population is initially at P^*, and that a level of fishing effort sufficient to reduce the population to P_1 is undertaken. Figure 12.1 indicates that at a population of P_1 a sustained yield of P_1a can be taken (after short-term perturbations have been worked out). If fishing effort is expanded to P_2, the rate of change in population and therefore the sustained yield that can be taken leaving the lower population unchanged increases to P_2b. If fishing effort continues to expand, the long-term sustained yield increases to some maximum but thereafter decreases as the effect of high rates of fishing effort on the average size of fish taken overtakes the advantages of capturing them before they fall to natural predators, old age, or disease.

Figure 12.2 expressed these relationships in terms of the yields in weight that can be taken, under long-term steady state conditions, at alternate levels of fishing effort. In general, as indicated above, the increase in yield with increasing fishing effort reflects the fact that loss from reduced numbers and lower average

Figure 12.2: Basic physical relations in exploited fisheries



weight is more than offset by the gain in the reduction of losses to natural mortality - hence the positive sustained yield. In a fish stock, the decline in yields beyond some level of relatively high fishing effort normally does not imply any impairment of the reproductive capacity of the stock. Rather, it results from catching too many fish too soon, at a time when the growth potential would exceed the saving from natural mortality. If fishing is pushed to very high levels, of course, it may be possible to affect recruitment as well, in which case the decline in sustained yield with increased effort may be sufficiently rapid to constitute a collapse of the fishery.

It is also quite possible for yields to fall off severely as fishing pressure increases because of crowding in favoured grounds. As any fisherman knows, target populations are not commonly distributed equally over wide areas, but are concentrated. A large number of boats fishing such an area may reduce each other's catch simply by preventing effective use of the gear. Whatever the combination of reasons, for any fishery the "stock effect" and/or "crowding effect" will establish a finite limit to the catch that can be sustained.

Subject to some rather extensive qualifications, the yield function illustrated in Figure 12.2 traces out the biological limits within which a fishery must operate. Catches can exceed these values in the short run but only at the cost of a later decline below long-term equilibrium catch levels. Quantification of the determinants of these limits for the principal species exploited by the Irish sea fisheries thus becomes the essential base on which any rational programme of fishery development and management must rest. Unfortunately, it is vastly easier to illustrate qualitatively in simple diagrams these underlying biological determinants of productivity than to quantify the critical stock-recruitment, growth, and natural mortality factors on which they rest. Some of these real world complications that must be dealt with in assessing, in practical terms, the catches to be expected from a given set of marine fish populations are discussed below.

First, and most critical, the relationship linking fishing effort to sustained yield is never the neat single-valued function portrayed diagrammatically in Figure 12.2. Rather, it is unstable from year to year, sometimes violently so, for reasons that are almost entirely beyond man's control and frequently beyond his ability to forecast with any reasonable precision. Environmental factors such as temperature, salinity and current patterns can alter significantly recruitment, growth and the area distribution of fish, and thus change radically the amount of fish that will be taken by a unit of fishing effort. A fish stock is made up of cohorts recruited from successive spawning classes. For many fisheries under heavy fishing pressure, a large part of the population will be made up of a small number of relatively young spawning classes. Hence, variations in one or two classes could produce very substantial changes in fish available for harvest in any given season. Both the fishing industry and management of fishing effort must operate, then, in an environment of constantly shifting short-term relations between fishing effort and catch, which inevitably increases both the aggregate cost of fishing, processing, and marketing, and the cost of information required to manage a fishery from season to season.

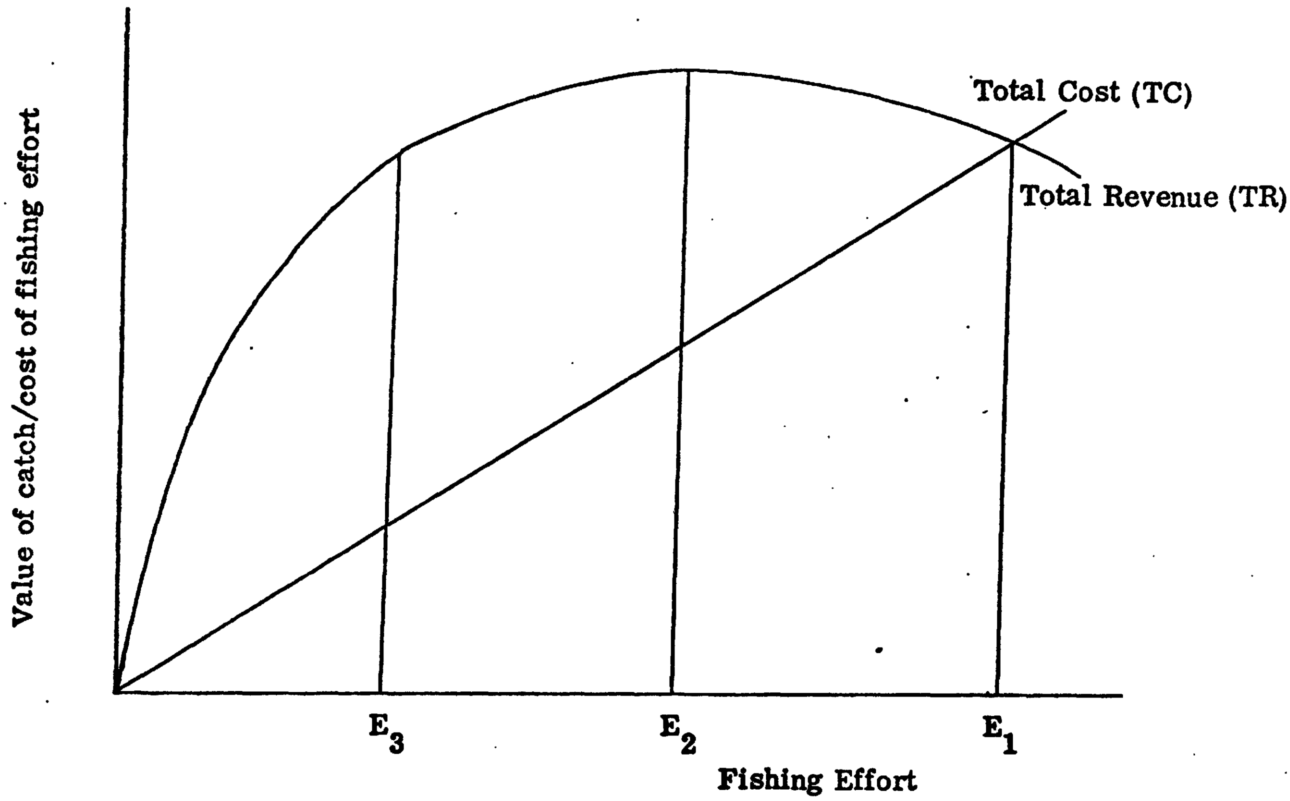
The simple yield function expressed in Figure 12.2 also conceals a host of complexities arising from the fact that most commercial fisheries operate on two or more species that are interdependent in one or more ways. Two stocks may be competitive for the same food or for the same space; they may stand in a predator/prey relationship; or they may be taken more or less indiscriminately by a given type of fishing gear. It is difficult enough, given the observational problems and the inherent complexity of life systems in the sea, to get a reasonable picture of the yield capabilities of one stock. The complications obviously go up dramatically when the yield from stock A requires consideration of the yield from stocks B and C which are biologically or technically linked to it.

At each step in fishery management - formulation of objectives, development of control techniques, and evaluation of results - physical and economic factors are intermingled. Biological characteristics and the oceanic environment determine the size of the catches that can be sustained. Technology limits the catching power of individual fishing units. Prices of final products and of inputs of labour and capital determine the amounts that will be taken by profit-seeking fishing enterprises.

This is illustrated in Figure 12.3 where total money receipts and total fishing costs are shown as functions of fishing effort. Any of the positions on the total revenue (TR) curve are consistent with biological equilibrium - i.e. catch rates = rates of growth in biomass. But, only at E_1 where total receipts = total costs would <u>economic</u> equilibrium hold; i.e., profits would be just sufficient to attract E_1 units of effort. At E_2, economic returns would exceed costs, and - under free access - new entry would occur. Thus neither E_2 nor E_3, the level at which net economic returns would be maximised, could be maintained unless effort could be controlled.

As indicated above, determining the physical input-output relations in an exploited fishery is an enormously complex task. The general form of the functions relating effort to sustained yield can be deduced, but even where excellent statistical records have been maintained, it can be made quantitative only within certain limits of precision. Moreover, the actual level of effort and output in a commercial fishery cannot be determined in economic terms from these data alone. Full

Figure 12.3: Bio-economic equilibrium



equilibrium requires not only that the catch taken be sustainable but that the price received and the cost incurred at that level of effort are just sufficient to yield a competitive return to labour and capital.

Sea fisheries are common-property resources owned by no individual and therefore regarded as a free commodity. Under these conditions, fishing effort may be pushed to the point where sustained physical yields are actually reduced. What would normally accrue as rent to the owner of a resource is simply dissipated in excessive costs. Any improvement in fishing techniques or increase in market price will then reduce the catch still further as new vessels are attracted. In the absence of regulation, the equilibrium level of catch might have become so low as to render the fishery completely uneconomic.

In light of the discussion above, what are the biological prospects for growth in the Irish sea fisheries?

State of Major Fish Stocks. - The Community

A full review of the state of exploited stocks within Community waters as a whole is beyond the scope of this study. These stocks are, of course, assessed and reviewed annually by ICES (International Council for the Exploration of the Seas) scientists, and more recently by the Scientific and Technical Committee for Fisheries of the EEC. It is sufficient at this point to note that fishing effort directed at most of the valuable northwest Atlantic stocks is greater than ICES scientists feel would provide greatest yields consistent with conservation of stocks. Expansion of total landings will come only as a result of the cumulative effect of more vigorous management measures by the Community members as a whole. The evolution of a regional approach to the management of fishing in EEC waters, based on multi-national scientific assessments by teams of experts, represents a major step in stabilising and rebuilding commercially important stocks. But the potential gains in production will come only slowly, and only if the scientific base, and institutional arrangements for management continue to improve, and if fleets can be successfully revamped to reduce excess fishing capacity.

The State of Stocks of Major Concern to Irish Fishermen

Recent TAC's (Total Allowable Catches) and catches of major species from waters adjacent to Ireland are shown in Table 12.1. The brief summary of expert opinion on the state of key stocks that follows is based on reports of the Advisory Committee on Fishery Management (ACFM), membership of which is made up of nominees from each of the ICES member countries and reflects current thinking on the conditions of major stocks within Community waters. These conclusions are based on previous historical data and detailed knowledge of the fleets involved. Forecasts are made with full recognition of the fact that conditions may change from year to year.

Herring

(1) Celtic Sea. The Celtic Sea which is off the south east coast of Ireland is not shown separately in Table 12.1. It is estimated, however, that in 1978 the stock size of herring in this sea had sunk to a level of about 6,000 tonnes, in contrast to a management objective of 40,000 tonnes. The committee regards the condition of this stock as extremely critical. There is no hope that it can

Table 12.1: Recent catches by Irish and foreign vessels and recommended TAC's for certain fisheries, 1976-1980

Fishery	Recommended TAC's					Actual Catches		
	1976	1977	1978	1979	1980	1976	1977	1978
					'000 tonnes			
Sub-Area VI								
Cod	14.0	19.0	12.2	10.4	12.1	19.0	13.0	16.0
Haddock	23.0	18.0	12.0	11.0	11.5	62.0	22.0	21.0
Whiting	13.0	22.0	17.0	12.0	10.5	25.0	17.0	16.0
Saithe	30.0	20.0	32.0	32.0	31.0	42.0	29.0	31.0
Division VI a								
Herring	66.0	48.0	53.0*	0.0	0.0	111.0	48.0	32.0
Sub-Area VII (excl. Division VII a)								
Cod	-	-	-	8.0**	9.0	9.4	10.4	13.8
Haddock	-	-	-	8.0**	9.0	5.1	2.7	3.0
Whiting	-	-	-	17.0	18.0	21.9	18.3	16.3
Irish Sea (Div VII a)								
Herring	-	12.0	9.0	11.0	10.0	21.0	15.0	11.0
Cod	-	-	8.6	7.3	5.0	10.3	8.1	6.3
Whiting	-	-	-	10.0	10.0	11.7	10.2	10.4
Plaice	4.0	4.0	4.0	2.5	2.5	3.5	2.9	3.2
Sole	1.6	1.4	1.4	1.4	1.3	1.5	1.2	1.1
Division VII b-c								
Herring (Donegal)	-	10.0	7.0	7.0	7.0	21.0	12.0	8.0
Division VII j								
Herring (Bantry Bay)	-	-	-	-	6.0	5	5	8.0
Divisions VII f and VII g								
Plaice	-	-	-	-	0.7	0.9	0.8	0.9
Sole	-	-	-	-	1.0	1.4	1.0	0.8
Sub-Area VII and Divisions IVa, VIa and VIII a, b								
Hake	-	-	-	43.0	30.0	68.0	50.0	47.0
Sub-Area VI, VII and VIII								
Mackerel	295.0	250.0	450.0	435.0	335.0	507.0	326.0	507.0

* In March 1978 it was recommended to stop all fishing for herring in 1978.

** Excludes zone VII f.

\- No TAC set.

0.0 Zero TAC set.

Source: ACFM report of ICES, 1979.

recover unless all fishing is prohibited in season for 1979/80 and 1980/81, together with vigorous efforts to prevent the illegal fishing and excessive by-catches that resulted in an estimated catch of 3,880 tonnes in 1978/79.

(2) Division VIa. Conditions are somewhat better in this herring fishery. Despite large Irish by-catches from the mackerel fishery, the spawning stock is expected to increase slightly (from 72,000 to 79,000 tonnes in 1979) and preliminary estimates of the 1976 and 1977 year classes indicate considerable strength. Thus, given appropriate restraint by all countries concerned, the herring stocks north of Ireland and west of Scotland could be rebuilt to the target of 100,000 tonnes as early as 1980. This would permit the resumption of some herring fishing, but not at previous levels.

(3) Divisions VIIb, c and VIIj. A precautionary TAC of 6,000 tonnes was recommended for Area VIIj for 1980 and a firm TAC of 7,000 tonnes for Area VIIb,c. In the latter case, it is difficult to estimate stock conditions because of intermingling with fish from area VI and the mobility of the Irish fishing fleet between the two areas. In any event, it is unlikely that any major increase in herring fishing will be available in the near future in either area.

(4) Division VIIa. The Mourne stock is still regarded as in critical condition, and should not be fished in 1980. The closing down of the Mornington industrial plant should facilitate the desired recovery. Since about 2,500 tonnes were taken from the Mourne stock in 1978, considerable additional restraint will be required. The Manx stock, in which there is some Irish interest, is also under stress and a TAC of 11,000 tonnes was recommended for 1979.

Mackerel

The total catch of mackerel from Sub-Areas VI, VII, and VIII for 1978 was substantially in excess of the recommended total allowable catch - 507,000 tonnes as compared to 450,000 tonnes. While the stocks are in generally good condition, with a strong 1976 year class offsetting an expected weakness in the 1977 year class, the continued increase in catch for 1979 indicates a need for substantial curtailment. The TAC adopted for 1980 of 355,000 tonnes represents a substantial reduction from the catches of the previous two years.

The ACFM also points out that for both biological and economic reasons a minimum size limit of 30 cm. is highly desirable. To make this effective, however, a total prohibition of fishing would be required in certain areas where immatures are heavily concentrated to avoid the problem of excessive discards at sea.

Thus, the mackerel stocks are apparently in reasonably good condition, but recent levels of effort cannot be maintained if the target stock size is to be reached. Better utilisation (curtailment of catches of immature fish) could result in some improvement in both volume and value of landings.

Roundfish (cod, haddock, whiting)

(1) Area VIa. In Area VIa, the cod spawning stock biomass has been increasing and prospects for the future look moderately bright. Some reduction in fishing mortality will be required, however, to reach the ACFM stock objectives. The recommended TAC for haddock for Area VIa was also unchanged for 1979, (but below the actual catch), and slightly increased for 1980, this reflects a generally good stock condition. Whiting, on the other hand, should be exploited at a reduced rate in 1980, since any increase in effort above the 1979 level would not result in appreciable long term gains in yield.

In general, roundfish stocks in Area VIa should continue to contribute substantially to total Community catches, but there is no immediate prospect of any major increase, and both safety of the stocks and economic considerations dictate a reduction in effort in the short run.

(2) Irish Sea (VIIa). The ACFM has indicated concern over declines in the spawning stock of Irish Sea cod. It is highly desirable to reduce total effort, including measures to prevent further growth in the fleets that operate on these stocks. In addition, a larger minimum mesh would reduce the catch of one-year-old cod and improve yield, stability of catches, and catch rates for individual vessels. In short, a considerable degree of restraint will be required to build Irish Sea cod stocks to desired target levels. There appears to be no possibility for expansion of catches in the short or intermediate

term. Although total stock biomass of whiting appears to be fairly stable, fluctuating between 16,000 and 19,000 tonnes from 1972-1978, the present level of fishing mortality is regarded as excessive. In order to achieve desired stock and yield levels, the ACFM recommends a reduction of 20 per cent in fishing mortality.

Plaice/Sole

Both Celtic Sea and Irish Sea plaice stocks are regarded by ACFM as overfished, and this stock has shown a steady decline since 1970. Irish Sea and Celtic Sea sole are already fully exploited and there is little possibility of any expansion in landings if the stocks are to be maintained in a healthy state.

Other Gadoid Stocks

Apparently the biological data available on cod, haddock, and whiting in Areas VIIf and VIIg and haddock in Area VIIa are inadequate to permit stock assessments to be made.

The ACFM also notes that there has been a steady rise in fishing effort and a steady decline in catch per unit effort in demersal production in the Irish Sea and Bristol Channel since 1954. This tends to confirm the individual species assessments and reinforces the conclusion that expansion of fishing effort will not increase total catches, but may actually result in lower production, and certainly will worsen the economic position of all participants.

Hake

Although hake do not figure prominently in Irish catches at present, the reduction in Spanish activities off the west coast of Ireland offers an opportunity for considerable increase in catches of this species by Irish fishermen, primarily for export to the Continent. In general, the data available on the hake fishery are difficult to interpret, given the changing pattern in fishing in recent years and the resulting inability to assume an equilibrium situation for purposes of analysis. Nevertheless, there appears to be a declining trend in landings in Divisions IV, VIa, VII and VIII a, b, and both a reduction in fishing effort and an increase in mesh sizes would produce long-term gains in total yields.

Saithe

As in the case of hake, relatively small quantities of saithe are landed by Irish fishermen, but it is a potential species for expansion. The stocks in Area VIa, west of Scotland, appear to be in good condition. Landings have increased only slighly since 1972 and have been relatively stable at about 31,000 tonnes. This is also the recommended TAC for 1980.

Salmon

The condition of Irish salmon populations is discussed in more detail below. They are under very severe pressure, and - despite an occasional large run to individual spawning streams - are believed to be well below levels that would permit optimum yield.

Shellfish

No assessment of these stocks was available. The ICES working group on lobsters indicates that effort in European waters is excessive and that a larger minimum size would be beneficial. It is generally believed that little or no expansion of the main shellfish species can be anticipated with increased effort.

Blue Whiting

There is great international interest in blue whiting. Huge stocks in northeast Atlantic waters are lightly fished at present, and there is some evidence that it can be processed to produce acceptable products for direct human consumption. Multi-national research on these stocks is still incomplete, but it is possible that sustained yields as great as ten times the 1976 catch of 100,000 tonnes could be available.

The potential for both EEC and Ireland depends, however, on the creation of an inevitably complex set of international agreements. Blue whiting are accessible to fishermen in the EEC, Norwegian, Icelandic, and Faroes Zones (and possibly in international waters as well). There is a real danger that the rush to utilize the capacity in each of these countries before others get started could lead to the familiar cycle of overexpansion and economic collapse. In addition, the need for larger vessels to fish blue whiting from Irish ports, coupled with a rather short fishing season in adjacent waters, calls for careful analysis of the economics of the operation.

We have emphasised the general situation of excessive effort and the urgent need for accepted and enforced management programmes in Community waters bordering Ireland. On the optimistic side, the fact that the task of stock assessment is now being carried out systematically, in conjunction with an integrated, Community-wide approach to the management of both catch and fishing effort, offers the best hope for long-term improvement and stabilisation in total Community landings at levels reasonably close to maximum. This would not have been even remotely possible under previous partial management regimes. Though stabilisation and recovery will not come automatically or overnight, it is most encouraging that the first steps toward rational management on a region-wide basis have been taken. The Irish sea fisheries, like those of all other Community nations, can only benefit from this development in the long run.

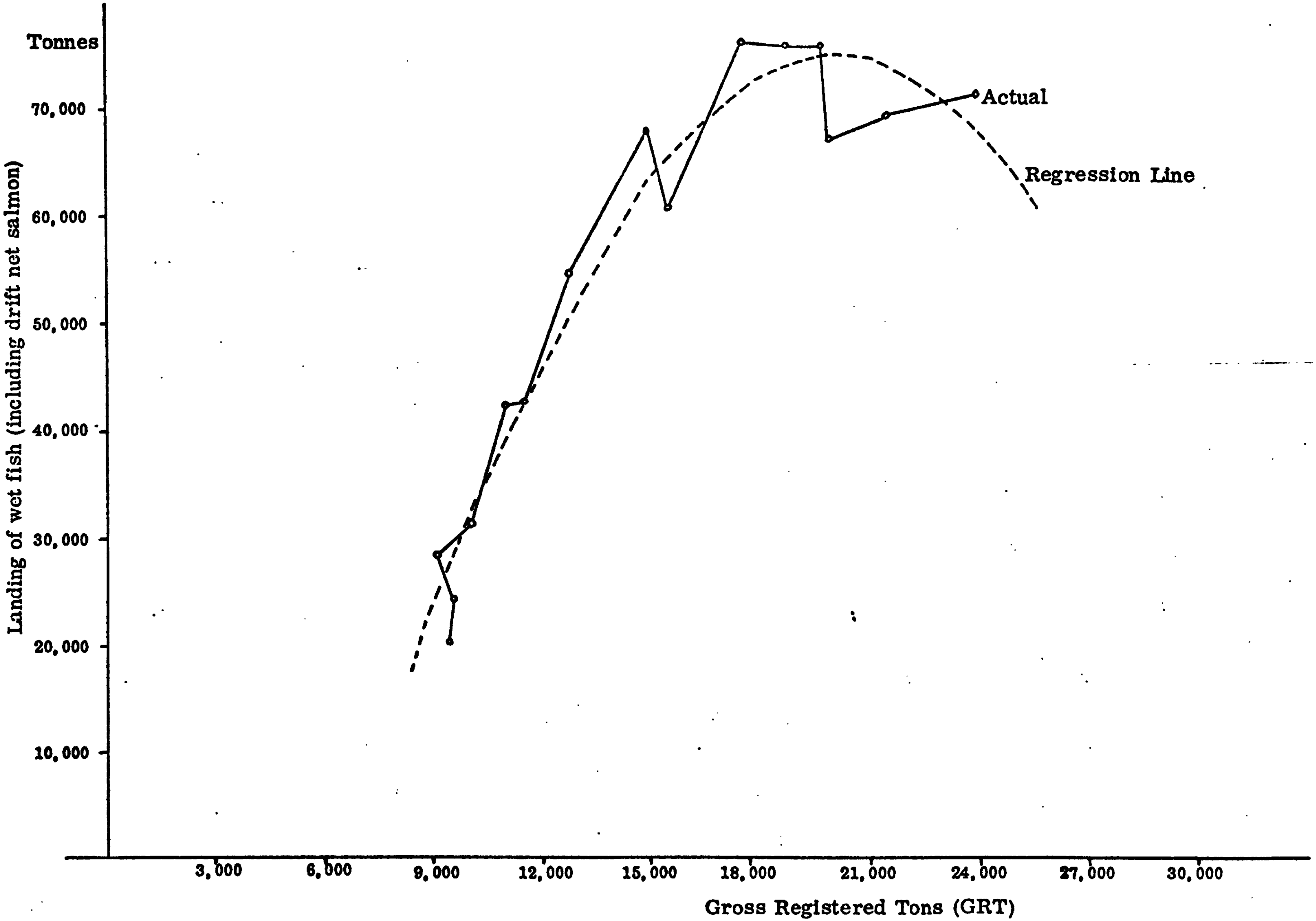
The species referred to above cover the overwhelming bulk of the Irish catch. Again, however, it is essential to point out that the basic data on which these assessments rest are, for the most part, available only for the rather large ICES statistical areas. As indicated previously, the condition of sub-stocks that may be separate, lying entirely within Irish in-shore waters is imperfectly known, and it is therefore not always possible to translate the wider area forecasts to the Irish fisheries directly. Nevertheless, there is a general feeling, even among the fishermen surveyed, that further expansion of Irish effort in inshore waters, directed at the traditional fish stocks, would produce little or no increase in sustained yield. Rough confirmation of the view that Irish inshore waters are fully exploited is provided by the data in Table 12.2 and the graphs in Figures 12.4 and 12.5 which

Table 12.2: Relationship between Irish catch of wet fish, including drift net salmon (volume and value), GRT and the Consumer Price Index (CPI), 1963-1977

Year	Catch: Volume	Catch: Value	GRT	Consumer Price Index (CPI)	Real value of catch
	(1)	(2)	(3)	(4)	(5) = (2)/(4)
	Tonnes	£'000			
1963	20,680	1,266	9,605	100.0	12.66
1964	25,172	1,297	9,726	106.7	12.16
1965	29,000	1,483	9,412	112.1	13.23
1966	32,203	1,691	10,798	115.4	14.65
1967	42,857	1,894	11,189	124.0	15.27
1968	43,036	1,972	11,456	124.7	15.81
1969	55,353	2,651	13,187	134.0	19.78
1970	68,123	3,414	15,221	144.9	23.56
1971	61,312	3,591	15,662	157.9	22.74
1972	76,686	5,260	17,626	171.5	30.67
1973	76,411	7,200	19,020	191.1	37.68
1974	76,176	8,668	19,786	223.5	38.78
1975	67,756	8,809	20,162	270.2	32.60
1976	69,838	12,602	21,626	318.8	39.53
1977	71,747	17,131	24,185	362.3	47.28

Figure 12.4: Landings of wet fish, including drift net salmon, per unit GRT, 1963-1977

Figure 12.5: Landings of wet fish, including drift net salmon (tonnes), related to GRT (tons)



show the relationship between the growth in the Irish fleet between 1963 and 1977 as measured in gross registered tonnes (GRT) and the data on wet fish catch (including drift net salmon). In preparing Table 12.2, GRT was obtained by taking all of the wholetime motor boats plus half the part-time motor boats. Rowing boats and those with outboard engines only were omitted since these fish mainly for shellfish. It would not have affected the trend, however, if these boats had been included. In preparing the graphs, GRT was taken as a proxy for fishing effort. This may not be an entirely correct approach but generally speaking it can be taken that the greater the tonnage of the fleet the greater the fishing effort exerted.

Figure 12.4 shows that catch per GRT increased up to 1970 and then started to decline, while Figure 12.5 shows that landings of fish increased with fishing effort up to a level of 18,000 GRT and declined thereafter as effort increased. A regression analysis, based on the data in Table 12.2, gives the regression line shown in Figure 12.5. The equation derived from the regression analysis is as follows:

$$Y_1 = -104{,}299 + 17.79X - 0.00044X^2 \qquad R^2 = 0.98$$

$$\text{t values} \quad (8.79) \quad (-7.015) \qquad DW = 2.185$$

where Y_1 = total wet fish catch in tonnes (including drift net salmon) and X = GRT in tonnes.

The equation is an excellent fit and the regression coefficients are highly significant as indicated by the high t values. A t value of 2 shows significance at the 5 per cent level.

It should be noted that the decline in landings after a level of about 18,000 GRT was reached does not reflect the growth of Irish fishing effort alone. During the period in question there was a rapid growth in European fishing in the north east Atlantic, including waters adjacent to Ireland. In addition, GRT as a measure of effort is biased downwards, since the new units entering the Irish sea fishery in later years were technically superior to older vessels. Had the entire fleet been upgraded to the level of the newer vessels the decline in catch would have occurred at a lower total GRT (and earlier in time).

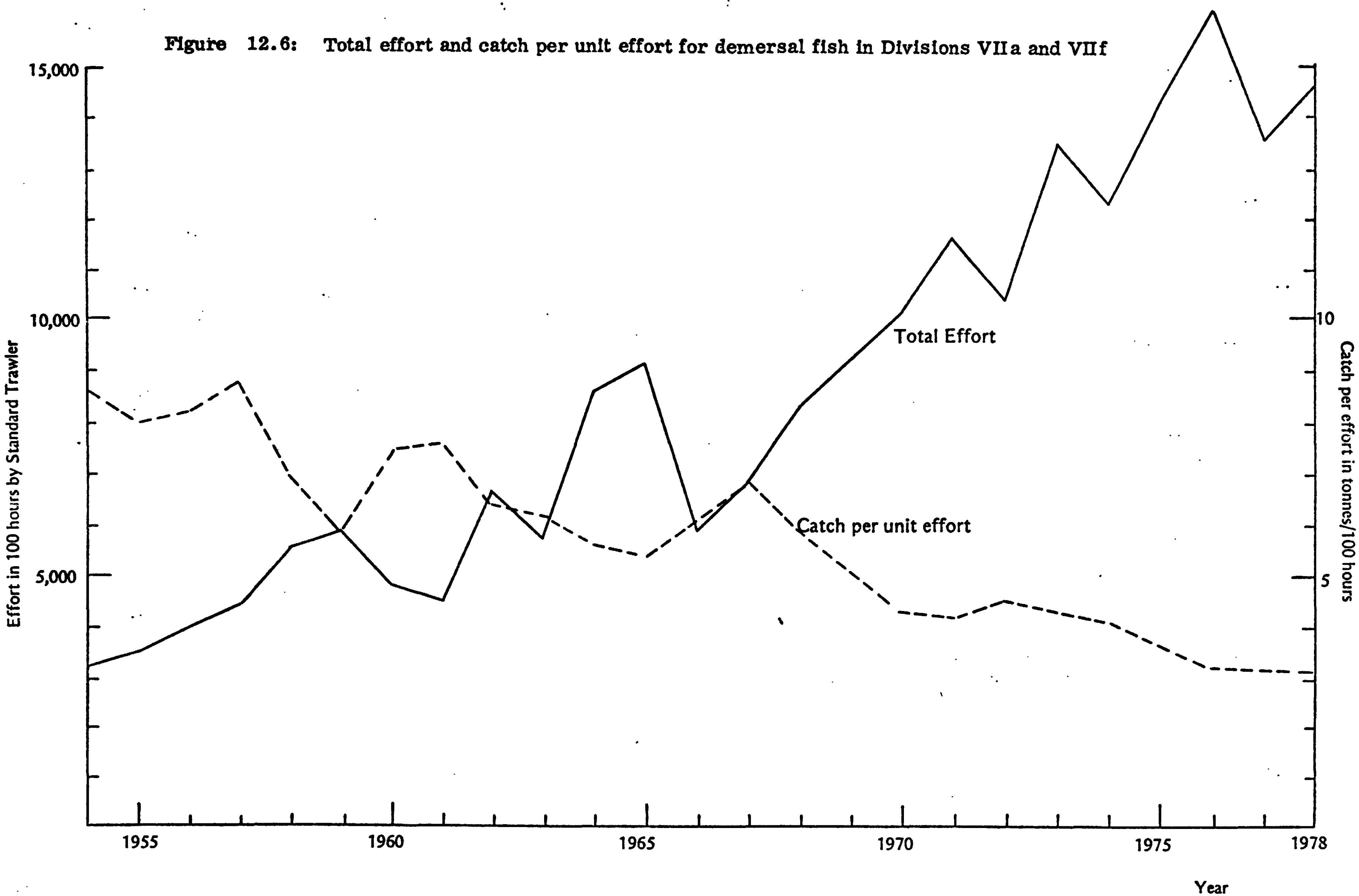
Crude as they are, however, these comparisons point strongly to the conclusion that further expansion of effort by Irish fishermen in traditional waters on traditional stocks will not increase total landings. Indeed they may lead to further declines unless offset by reduced fishing in Irish inshore waters by other states. Clearly, Irish expansion must come from a shift to new waters and/or underutilised species, through modification of Community country quotas, or through utilisation of fish formerly caught by non-Community nations. Further support for this view can be found in the Report of the Irish Sea Bristol Channel Working Group, 1979, (ICES Doc. CM 1979/ G: 23). Part of this area is a major source of demersals for Irish vessels. Figure 12.6, taken from this report, shows the trend in effort and total demersal catch per unit of effort since 1954. The divergent trends in the two measures are obvious and a reason for concern. Total demersal yield curves developed by regression analysis of the above data indicate that in 1978, the level of effort was between 23 per cent and 38 per cent above the optimum. These findings are also consistent with current assessments of individual stocks included in the total demersal group.

Unfortunately, equally detailed analyses for all areas fished heavily by Irish vessels are not available. The presumption remains, however, that additional effort on stocks of traditional importance to Ireland, whether by Irish fishermen or others, may yield little or no sustainable increase in catches.

It has been pointed out repeatedly that the Irish catch has concentrated on a rather small group of species in its adjacent waters. There may be more room for expansion in other species that obviously find markets in Europe but are not utilised by Irish vessels. Hake, at present, taken by Spanish fishermen off the west coast of Ireland would be an attractive addition for example. Unfortunately, most of the others bring lower prices, and the willingness of Irish skippers to target these fish has been curtailed in the past by the limited domestic market for anything except the traditional herring, cod, plaice, sole, haddock, and whiting. The low proportion of Irish to total catches in waters around the country provides no real measure of the scope for profitable expansion of the Irish share.

Against this background, it is apparent that any programme to expand Ireland's marine catches rests on Community willingness to grant the state quotas that are

Figure 12.6: Total effort and catch per unit effort for demersal fish in Divisions VIIa and VIIf



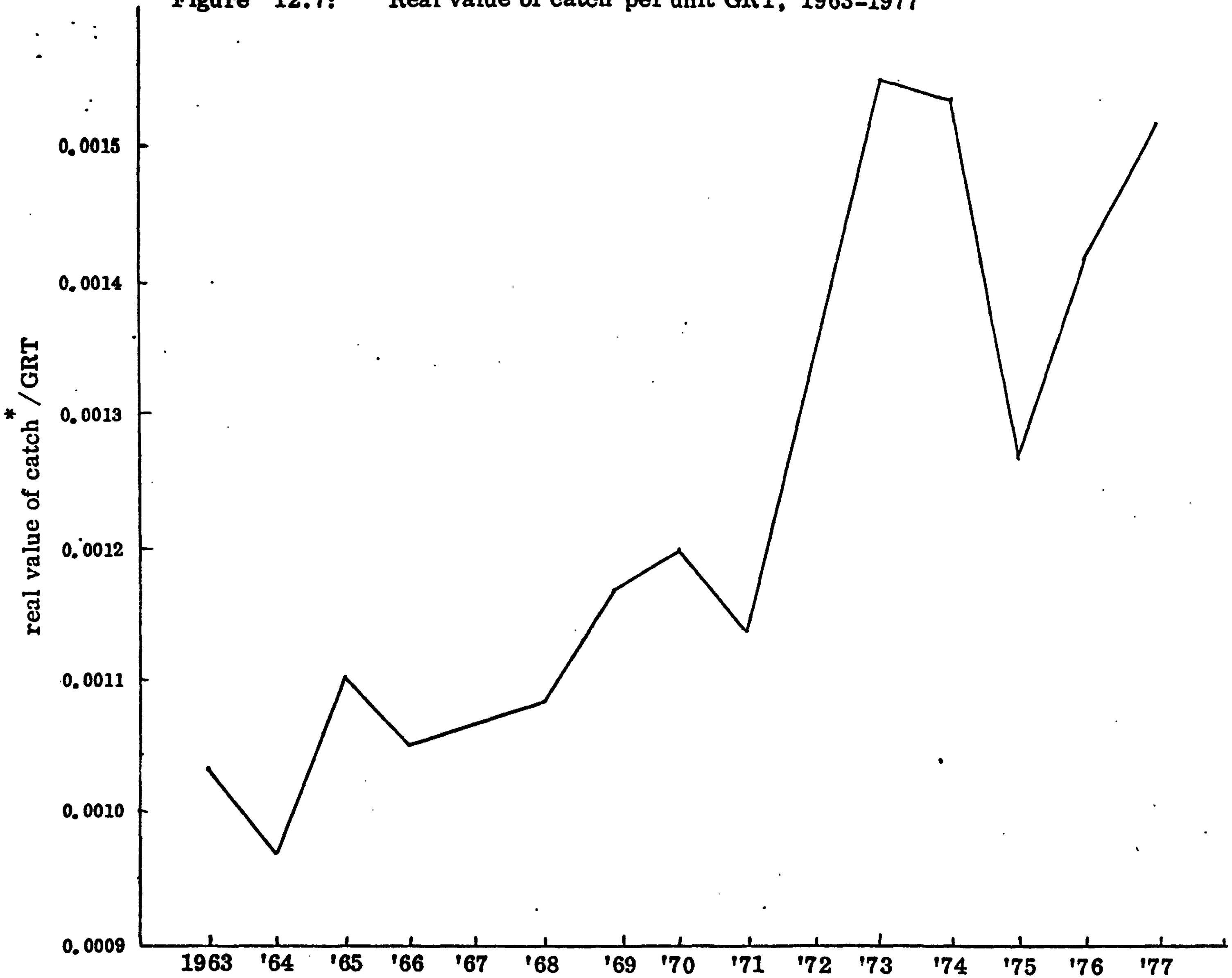
substantially higher than historical catches would suggest, and, equally important, that the increased quotas are in species that are accessible to a modernised Irish fleet and sufficiently high in price to provide economically viable operations. This calls for a review of the state of the stocks of greatest relevance to expansion plans for the Irish sea fisheries.

Recent developments in the prices of Irish fish, particularly herring, salmon, and shellfish have obscurred, to a dangerous degree, the real problems posed by high rates of exploitation and the condition of the stocks. The fisherman is interested in pounds and pence; it makes little difference to him whether he catches 50 crans of herring at £50/tonne or 25 at £100/tonne, but it makes a great deal of difference to the country. The folly of pouring more capital into a static or declining fishery is obvious; yet rising prices for scarce and highly prized fish will bring precisely that result unless specific steps are taken to prevent it. See, for example, Figure 12.7 which shows the relationship between the real value of catch and GRT for 1963-1977. Catch quotas and mesh size regulations can protect the fish stocks, but will not prevent the economic waste resulting from excessive fishing capacity if real prices continue to rise. Equally disturbing is the fact that the attractiveness of the high-priced species, even at low catch rates, makes it still more difficult to persuade traditionally conservative Irish skippers to move out into offshore grounds or to new species where Irish catches could be increased.

Salmon

Salmon present special problems for future management of Irish fisheries. Although normally thought of as a river fish, catches of Atlantic salmon are definitely a factor in the Irish sea fisheries. Their extraordinary market value makes them an important element in Irish fish exports, and in the west of the country salmon catches provide a large part of the income of small boat fishermen (see Chapter 1). Biologically, an anadromous species is peculiarly vulnerable to overfishing, depletion, and - too frequently - extinction. That vulnerability becomes much more menacing when the price of salmon to fishermen reaches £5/kilo without corresponding increases in costs of harvesting.

Figure 12.7: Real value of catch* per unit GRT, 1963-1977



* Current value of total wet fish landings including drift net salmon deflated by consumer price index.

Rational use of the salmon resource is more difficult to achieve than for other marine stocks since there is, quite literally, at least one separate "management unit" for each spawning river. It is impossible to look at total harvest in connection with total desired escapement to spawning grounds and reach any meaningful conclusion as to the state of the resource when much of the catch is taken by drift nets operating on mixed stocks in the open sea. A given total catch might represent a desirable and sustainable level (i.e., adequate escapement to every river) in one year, and in another the same total might conceal gross overfishing of some populations while others are untouched. The present state of knowledge about migrations of Irish salmon simply does not permit accurate evaluation of the rivers of origin of salmon taken in the drift net fishery. Since this gear now accounts for about two-thirds of the total salmon catch, the likelihood of serious overfishing of runs from some rivers approaches certainty.

Finally, assessment of the "state of the stocks" in the case of salmon is complicated by the competition of commercial and recreational users. As all salmon anglers know, it requires a rather full river to produce consistently good rod catches - more than would be required for satisfactory spawning escapement. Quite apart from the well-known difficulties of valuing salmon taken by anglers to provide comparison with market values of net caught fish, management for an optimal sport fishery would result in much lower total catches than management for maximum economic yields from commercial usage.

Available data are inadequate to support firm conclusions as to the condition of Irish salmon stocks, river by river. All the evidence suggests, however, that there is no possibility of increasing catches, except through a long-term research programme, backed up by a management system that would permit monitoring and control of catches on a stock basis. It is also clear that expansion of the drift net fishery has simply diverted catches from anglers and estuarine commercial fishermen. The rather ineffective enforcement of regulations governing the drift net fishery and widespread poaching in the rivers suggests further that total catches may be well above the reported figures.

Since there is every reason to anticipate continued strength in the salmon prices (there are no alternative supplies that are not in the same or worse condition), it may be expected that pressure on the limited salmon resource will increase. The most urgent need is clearly to establish firm control over fishing effort. For the longer run, acquisition of the data required to identify catches by river of origin, and development of a rational basis for the sharing of catches by river system, among anglers, drift netters, and estuarine and river engines is also essential.

The above discussion presents a classic example of the difficulty in reconciling conflicting objectives. From the national viewpoint, severe curtailment or elimination of the drift net fishery would result in much improved prospects for management to allow essential escapement. The fish would then be taken in areas where the river of origin is known, and at substantially lower total investment cost. Moreover, as shown in an earlier study (O'Connor and Whelan, 1972) the economic contribution of angling is an important consideration. Elimination or reduction of drift netting to the levels of - say - 1965 would make it much easier to maintain quality salmon angling on a larger number of rivers while realising equal or larger commercial drift net and trap catches.

But regional considerations raise a number of serious qualifications to such a policy. In the past a high proportion of estuarine commercial catches was taken by a small number of large companies with the local fishermen getting rather few fish. Today the position is changed as more and more salmon are taken on the high seas by small boat fishermen. This netting at sea has literally revitalised some areas in the south and west of Ireland. Though the tonnage taken is small, unit prices are so high that a small boat fisherman can earn an aggregate income well above that offered in any alternative employment. Thus the fishery raises local incomes, reduces the incentive to leave the region, and stabilises secondary activity in adjoining villages. Whether or not it offers a stepping stone to more diversified (and, from the national point of view, more productive) fishing from larger vessels is not quantifiable but there is some evidence that it has contributed to more lasting development in this sense. Perhaps most important, it has added an increment of income and employment, in chronically depressed areas.

In terms of political feasibility, it might have been very difficult to prevent the drift net fishery from developing beyond the "traditional" level that had gone on for decades. But it seems unlikely that it could now be cut back to that level without plausible charges of hardship and extremely strong local public reation. This said however, the fact remains that unless strong action is taken, salmon stocks are in danger of extinction.

Conclusion

The variability of the biological and economic determinants of MEY (maximum economic yield) preclude any simple "magic number" approach to maximising the Irish sea fisheries' contribution to GNP. A well-managed system of fishery regulation, stimulation, and enhancement involves a continuous weighing of the costs and benefits of better information, a balancing of precision against timeliness. A "best guess" by experienced and well-trained fishery management teams, available in time to guide a season's fishing, is far more useful to society than a precise answer to what should have been done five years after the fact. "Maintaining a reasonable net economic benefit over time" might be a better description of the economic objective of fishery management than "maximisation". And the indispensable bases for a sensible set of policies toward economic utilisation of the fishery resources are quantitative estimates, continuously updated, of the condition of the exploitable stocks and the yearly catches that can be taken. The data supplied to the Community by ICES Working Groups are of precisely these practical types. Unfortunately, the same kind of information cannot at present be generated for all the stocks fished by the Irish fleet (except herring).

Appraisals of the stocks basic to the Irish sea fisheries yields a mixed assessment of prospects for development. On the positive side, the willingness of EEC to endorse and assist in achieving substantial expansion of Irish landings is encouraging. But the convincing evidence of general overfishing in the northeast Atlantic and the urgent need to cut back both catches and effort make it much more difficult to pinpoint which fish, which areas and, which types of gear are to be singled out as a basis for further Irish development. Simply expanding the number of Irish boats and fishermen without tight control over their development will lead only to economic waste in fisheries already heavily exploited, particularly inshore, and could make the lot of the poorer small boat fishermen even worse.

Perhaps most significant, it highlights the urgent need for implementation of programmes to provide a data base and a current monitoring system for stock assessment, without which a realistic development programme with flexibility to meet changed situations in the sea or in markets will not be possible. The analysis also points inexorably to the concurrent need for licensing of all sea fishermen, and regulation of some fisheries and stimulation of others that can support additional Irish effort. The framework for such a multi-faceted management programme does not exist at present, though the essential elements and skills are there.

CHAPTER 13

ECONOMIC CONSTRAINTS

In this chapter we commence with a short discussion of the problems which faced the Irish sea fishing industry in early post war years. We then go on to discuss state expenditure in relation to fisheries and continue by examining the data from Parts I and II in order to identify the economic constraints on the development of the Irish sea fisheries in fishing capacity, marketing and infrastructure.

Post War Problems

The problems facing the Irish fishing industry today are in many ways similar to those which were outlined in the First Programme for Economic Development over 20 years ago (Economic Development 1958). At that time it was stated that the slow growth in the Irish sea fishing industry could be attributed to:

(1) Emphasis on inshore fishing rather than fishing in more distant waters, thus contributing to irregularity and inadequacy of supplies.

(2) Inadequate investment in processing facilities.

(3) Lack of retail outlets, particularly in the midlands, and

(4) Lack of training facilities for fishermen.

The report stated that policy in regard to boats was the key to the problem. With the small number and size of boats available at the time, there was no hope of competing with other countries which had developed large fleets of modern trawlers.

On the basis of this report and of recommendations by the FAO and other consultants and the Government produced a White Paper in 1962 entitled "Programme of Sea Fisheries Development". This laid down a scheme for the future expansion of the sea fishing industry. BIM was to be re-organised as a development body and further State financial assistance was to be given to help stimulate the industry.

As a result of this policy, state expenditure on sea fisheries was increased gradually over the years. Grants for boats (at 1964 constant prices) rose from about £25,000 in 1964/65 to £574,000 in 1978, while overall state expenditure in relation to fisheries went from £324,000 to £2.1 million. Details of the latter figures, at current prices, for the years 1976, 1977 and 1978 are given in Table 13.1.

In 1978, total expenditure was about £8 million. This was made up of current expenditure totalling £3.8 million and capital expenditure of £4.2 million. Most of the current expenditure was for salaries and administration in the Department of Fisheries and Bord Iascaigh Mhara, where the total numbers employed were about 270 people. In addition, there were about 3,000 fulltime and 5,700 part-time fishermen together with 1,600 in on-shore processing and 1,000 in other ancillary industries. The capital expenditure was composed of grants for boats and boatbuilding,* harbour works, other infrastructure and grants towards fish processing plants.

Consideration of Reasons for State expenditure in Relation to Fisheries

It would be appropriate at this stage to ask whether or not the present level of state expenditure on sea fisheries is justified, although it is clearly outside the scope of this study to undertake a detailed assessment of this question which in itself would be a separate major research project. We would like, however, to indicate some considerations relevant to such a study. A significant part of current expenditure on fisheries would arise even if the state were not so actively involved in developing the industry. Nowadays, governments typically take responsibility for regulating agricultural, industrial and service activities in many ways. For example, they negotiate agreements with other countries and with the EEC affecting these industries; they represent their interests in several international organisations; they develop regulatory measures and they undertake various steps to raise productivity, improve training, develop marketing, etc. These, and many other functions are taken for granted in relation to productive activities generally, not only in Ireland, but in all advanced countries - even in those most committed to private enterprise. Some would argue that such functions should be questioned more often, that the industries concerned should be

* As stated in Chapter 2 boatbuilding is no longer carried out by BIM in its boatyards.

Table 13.1: State Expenditure (capital and current) in relation to sea fisheries, 1976-1978[a]

Item of Expenditure	1976	1977	1978
		£	
Capital			
Fishery Training Centre	2,979	4,139	25,794
Main Fishery Harbour Works	671,928	580,859	696,327
BIM Capital Development[b]	2,750,000	1,968,000	2,628,000
Industrial Development Authority[c]	250,000	470,000	412,000
Gaeltarra Eireann[d]	443,000	574,000	421,000
Miscellaneous Marine Schemes	2,530	77	2,324
Total Capital	4,120,437	3,597,075	4,185,445
Current			
Department of Fisheries, salaries, administration, etc. (e)	327,400	406,920	508,100
Sea Fisheries Development[f]	104,142	151,406	159,104
Fisheries Harbour Centres	7,500	15,500	21,000
BIM Administration and Current Development	1,425,000	2,575,000	3,103,000
Waiver of Repayment of Exchequer Advances	120,000	115,000	20,136
Total Current	1,984,042	3,263,826	3,811,340
Total Capital and Current	6,104,479	6,860,901	7,996,785

Notes:
(a) Excludes small expenditures by local authorities.
(b) Boat yards, capital grants for boats and equipment, ice plants, etc.
(c) Expenditure approvals by IDA for fish processing.
(d) Fish processing, boat yards and grants for boats in Gaeltacht areas.
(e) Estimated by the authors from Total Fisheries Appropriation.
(f) Current cost of training schemes, research and grants to producer organisations.

Source: Appropriation Accounts for various years and Department of Fisheries figures.

expected to contribute to the cost, or even that the state should not be involved in some of them at all. Whatever the merits of these viewpoints, they go far beyond the question of state services to fisheries, and could only be considered in a much wider context.

The more relevant question, in the context of a study of state expenditure on fisheries, is whether such expenditure is disproportionately large in some sense compared with other activities. In this regard, questions have been raised from time to time about the grants to skippers for new boats. It is argued that the average grant per job is far higher than in industrial development; that these skippers are thereby enabled to make substantial profits; and that this represents a redistribution of income not justifiable by reference to the amount of increased economic activity and employment. Assuming that the grants are necessary to attract sufficient skippers, these arguments amount to a questioning of whether the sea fisheries industry should be developed at all with state assistance.

In considering this issue, it should be noted that the mere fact that Ireland owns or controls an area with a natural resource in the form of fish,does not in itself constitute an economic case for exploiting that natural resource. Ireland has other natural resources which it does not exploit simply because it would be uneconomical to do so. Moreover, even assuming it were economical to exploit any particular natural resource, it does not necessarily follow that this should be done by developing a native industry. The possibility that more benefit might accrue to the nation by exploiting it in some alternative fashion would have to be considered. In the case of sea fisheries, one alternative that has sometimes been suggested is the leasing of fishing rights to foreign trawlers. Under EEC rules, however, other EEC vessels would have first preference with regard to resources which Irish vessels could not exploit themselves and the principle of negotiating any leasing arrangements with non-community countries would have to be accepted by the community as a whole. Another alternative would be to allow boats from other countries to fish Irish waters on condition that they landed the fish in Ireland, with a prospect of developing on-shore processing industries. The main problem here is that in order to be eligible to fish in Irish waters the vessels concerned would, under present EEC rules, have to fly the flag of Ireland. Given that foreign vessels are accustomed to returning to their home ports and would probably not wish to enter into such an arrangement on a long term basis, the problems of making satisfactory agreements along these lines appear insurmountable.

In the light of these difficulties it would seem that the only method of exploiting the fishing resources in Irish waters to the benefit of Ireland is by developing an indigenous Irish fishing industry. This development is certainly not going to take place without state assistance. Indeed, as evidence of this, it may be pointed out that despite what some consider to be substantial boat grants, it is not always easy to find suitable applicants. Nor is this surprising, given the historical factors which inhibited the development of the Irish fishing industry and the capital intensive nature of the catching sector.* For those contemplating investment for the first time, a substantial amount of capital must be found from own resources. In the case of a 24 metre boat the purchase price is about IR£1.2 million of which one-tenth must be remitted in the form of a down payment by the buyer. The loan repayment costs are also very high, possibly IR£70,000 per annum even with state and EEC grants and a subsidised loan; for larger boats which do not qualify for EEC grants the annual repayments could be IR£200,000. This may be a rather extreme example since the purchaser of a 24 metre boat would not normally be a first-time buyer. Nevertheless it indicates the large amount of capital required to become the owner of a fishing vessel which would be suited to modern fishing techniques in the Irish environment.

Given the above difficulties, the question still remains whether the development of a native industry is worthwhile, or whether it would not be better to leave it to private enterprise to utilise the natural resource to such level as it would reach without state assistance. In this case the funds saved could be used to develop other activities or to reduce the state borrowing requirement. Those who argue that expenditure in relation to sea fisheries is excessive presumably have this consideration in mind.

---

* Other deterrants to applications are the technical expertise required which is obtained normally through rather expensive state training programmes and the current high interest rates and tight credit controls.

There are a number of issues however, which would have to be considered before any such conclusion would be warranted. First the state may wish to undertake a broadly based development strategy, on the ground that concentrating on a more limited range of activities would be unduly risky. At the limit, it would not wish to put all its eggs in one basket. This is particularly so where the overall cost of development of a particular sector is relatively small: the entire annual expenditure on the fishing industry is only a fraction of the amounts spent on other, admittedly larger, sectors such as agriculture and manufacturing. Second, the fishing industry is dispersed regionally, with various economic advantages which accrue therefrom. Some of these advantages are susceptible to economic calculations, such as the avoidance of urban congestion costs. Others of an economic welfare nature, such as the preference of individuals for jobs in their own areas, are more difficult to evaluate but may be nonetheless real on that account. As we have indicated in Chapter 1 the regional value of the fisheries to isolated regions must not be underestimated. Areas within Donegal, Mayo, Galway, Kerry, and west Cork are now thriving regions due almost entirely to income from fishing. Without such incomes they would be deprived under-populated places. There are few other sources of income available.

Third, because of the under-developed nature of the Irish sea fishing industry, the initial development costs may be much greater than at a later stage. It requires strong incentives to entice non sea-faring people to become fishermen, but as people become used to the idea much smaller grants may suffice.

Fourth, and related to the foregoing argument, there may be economies of scale which will, as the industry expands, lower the development costs and enhance the advantages of the fishing industry. For example, harbours and processing facilities must be of minimum size, but, once provided, their unit costs tend to fall up to the point of full capacity utilisation.

Fifth, the relatively small aggregate amount involved in state expenditure on fisheries, would, if spread over other major productive areas, or used to reduce state borrowing, have only a marginal impact. In this connection we are informed by the IDA that in most cases the availability of resources is not the major constraint in establishing industries. The principal limiting factor is the lack of entrepreneurial ability and ideas for saleable products. Fish processing would appear to fit the bill on the latter count.

Finally, the overall evaluation of any activity - be it fisheries, industry, economic research or whatever - and the amount of state subsidy that is justified, involves very broad issues, not all of which may be susceptible to economic calculation. At the end of the day there is always a judgment to be made, essentially a political judgment. The decision to pay heavy state aids to agriculture in pre-EEC days was not always easy to justify and was indeed questioned on many occasions (see Report of Committee on State Expenditure in Relation to Agriculture, 1970 and R. O'Connor "An Analysis of Recent Policies for Beef and Milk", 1969-70). Yet successive governments persevered with the subsidisation policies, which, since EEC entry, appear to have been well justified - similarly with decisions to assist many manufacturing industries. The role of research is to provide relevant data and analysis that will facilitate such judgment, and, once the objective is set, to propose and evaluate alternative ways of achieving it. In putting forward the foregoing considerations we should not necessarily be taken as agreeing with the present composition of state expenditure on fisheries. Indeed, we point elsewhere to modifications which are considered desirable in this respect.

Fishing Capacity

The results of the survey of Irish fishermen, summarised in Chapter 3, points out the dominance, by numbers, of very small vessels, with limited range, carrying capacity, and ability to operate in rough weather. The survey also reveals a trend in recent years toward larger vessels, properly equipped with navigation, communication, and acoustic gear. How much of this shift is to be attributed to changes in technical requirements as seen by the more skilled and venturesome skippers and how much to the vessel subsidy policies of BIM cannot be determined.

Two points stand out from the discussion of boats, gear and the deployment of fishing vessels in the preceding chapters. First, the increase in size and improvement in equipment of newer Irish vessels has not led to any marked expansion of their fishing range. On the whole the new boats have continued to fish familiar inshore waters and have continued to rely on the same species. This tendency has been reinforced by the unusually high prices for these species in recent years. Secondly, experience with Irish vessels under 24 metres (and the experience of other nations fishing off the west coast of Ireland) suggests strongly that larger vessels are essential if the full potential for expansion of Irish catches off the west coast is to be achieved. And only increased fishing offshore can be expected to add significantly to catches; further growth in the inshore fleet probably would result in little more than a division of the present landings into smaller amounts (although confirmation of this tentative conclusion awaits a more thorough evaluation of stocks off the Irish coasts).

If these findings are correct, they lead to a number of interlocking management problems. Larger boats (24 metres and over) would permit Irish skippers to participate in offshore fisheries now carried on largely by Spanish and French vessels. Since the latter, operating from more distant bases, have apparently found offshore trawling profitable there is no reason to expect that similar Irish vessels could not hold their own as skippers become familiar with grounds and the seasonal distribution of fish. But this would represent a new kind of operation for most Irish fishermen, and it might be necessary to provide financial incentives during the developmental phase (in addition to the market protection afforded by the withdrawal system). This would be even more necessary if, as available (though incomplete) evidence suggests, inshore waters are already fully exploited. It would make no sense to allow larger vessels into inshore waters except to fish pelagic species available in quantities that the small vessels cannot utilize. The best course would be to ensure economic viability through an incentive system (in lieu of capital grants) until the offshore operation is established.

Even more important, the expansion of Irish catches in western waters would require reconsideration of EEC policies. This problem is examined in detail in Chapter 14. The key point must however be raised at this juncture. Community fishery policy is geared to restructuring and reducing excess capacity of national fleets to permit efficient, safe operation of smaller vessels capable of catching allowable quotas. Reduction in opportunities for distant and middle water vessels should result in dis-investment, not in redeployment in inshore fisheries. The policy is well suited to the general question of harvesting the "Community pond" efficiently, equitably, and with due regard for conservation requirements. It is inappropriate, however, for the situation off the west coast of Ireland. These waters cannot be utilised effectively by vessels under 24 metres, and meaningful restructuring in the western region of Ireland will require larger vessels. This limited departure from one Community policy is essential if another - the commitment to regional development in low income areas with severe restrictions on employment opportunities - is to be implemented.

This is only part of the restructuring problem however. The survey data show clearly the dominant influence of salmon and shellfish operations for a very large number of small boats, particularly in the depressed north west and western counties. Yet there can be no doubt that salmon catches must be reduced and much more tightly regulated if this valuable resource and its export earning capacity are to survive. Regardless of the long-run benefits of such actions, the immediate regional impact will be very severe. The salmon landings of the past few years, which cannot be sustained, nevertheless provided an economic stimulus to scattered communities along the entire coast which will not be given up easily.

There are no easy solutions to the resulting dilemma. If incomes and employment are to be maintained, these fishermen must substitute some other species for salmon. But what? Shellfish are already heavily exploited. A mix of pelagic and whitefish operations - drifting, pair trawling, or other trawling - would require larger and more expensive boats. Most of the very small harbours would not accommodate these vessels, and the intermediate harbours would have to be improved and better equipped. Finally, the substitution of modern multi-purpose small boats would increase total fishing pressure on inshore stocks while adding little or nothing to total employment. If it develops, after careful investigation, that stocks available to an inshore fleet of safer, more efficient small vessels can stand additional catches, well and good. If not, some hard choices must be made. The status quo cannot be considered a workable solution since the salmon stock will dwindle to the vanishing point unless drastic steps are taken. The various alternatives are evaluated in Chapter 14.

Infrastructure

As indicated in Chapter 4, there are definite weaknesses in the existing infrastructure, centring on the size, facilities and future plans for fishing harbours.

Transportation can be dealt with very briefly. Internal transport costs (see p.10.18) are higher than the industry would wish, particularly from Killybegs and Castletownbere. Unfortunately, this is due primarily to the geographic separation of the west coast ports and both the domestic market, dominated by Dublin, and the ports serving export markets. It is also a reflection of a more general problem of growing pressure from motorcar and lorry traffic on the entire road system (a national matter that has already brought assistance from EEC regional funds). In short, transport of fish is not as rapid or cheap as might be wished, but it is not a major barrier to growth.

Harbours are a more serious matter. It was pointed out in Chapter 4 that while Ireland has a large number of "harbours" where sea fish are landed, only a few are large enough to provide full facilities. The scattered small harbours are still essential to a fishery dominated (in numbers) by very small boats with minimal range. But they cannot provide the basis for an expanded, modern sea fishing operation which demands some vessels of substantially greater size, and they add to the cost of assembling fish for processing and for transport.

The need for better fishery harbours has long been recognised, and steps taken to implement an earlier harbour development plan were discussed in Chapter 4. The question now arises, are those plans keyed to a fishing fleet including larger vessels with their attendant demands for chilled and frozen storage, service and repair, provisioning and fuel, etc.? With the exception of Killybegs and Howth, the answer is negative. Decisions must be made as to the ports to be expanded in light of planned growth in the fisheries and the proper mix of related services that will be required.

In terms of regional development it is perhaps equally important to identify the harbour requirements of the still decentralised inshore fleet - again, with proper consideration of the changes needed to service modern, diversified small vessels. Specific recommendations are set forth in the final Chapter.

The Domestic Market

The extent to which growth in the primary sector of the fishery could be absorbed in the domestic market is largely an economic rather than a nutritional issue. The Irish diet, even at lower income levels, is not deficient in protein. The recent sharp increases in food prices, particularly in meat, poultry, and fish, have had the usual regressive effects on low income families, but these are partly offset by the effect of higher agricultural incomes in a traditionally poorer sector of the national economy.

Analysis of *per capita* consumption in Chapter 7 suggests that the domestic market will grow more slowly in the future than during the past decade. A successful promotional programme mounted by BIM and the industry succeeded in raising Irish consumption per head from 3.4 kg to 5.4 kg over the period 1963 to 1977. Though Ireland still stands near the bottom of the Community in *per capita* consumption of fish, it is the only member showing significant increases in recent years.

A number of factors contributed to this growth. BIM's educational work, concentrating on simple, attractive recipes and media presentation on proper cooking and handling of fish, doubtless played an important role. Changes in religious dietary restrictions have been followed by a gradual shift toward consumption of fish throughout the week. Finally, the low price of some species of fish relative to meat and poultry provided a favourable environment for growth in fish consumption.

Looking ahead, we anticipate much slower changes in Irish taste and preference for fish. Further increases must come from fundamental changes in both consumer habits and industry practice. The distribution system apparently reaches consumers in the large coastal cities reasonably well, but the population in rural areas still purchases fish of limited variety, variable quality, and usually on only one or two days of the week. The industry thus faces the necessity of "buffering" landings that are inherently variable and markets that are relatively stable, but sharply peaked within each week.

Experience in other countries indicates, however, that the traditional "fish day" will ultimately yield to good marketing effort, particularly as consumers find that greater regularity in purchases produces a flow of better quality fish. The gradual elimination of deep-seated distrust of frozen fish and the slow shift of Irish consumers toward packaged frozen fish as the overall coverage of families of frozen foods increases, should also put more fish into all parts of the country; but the dominant position of the multinational firms in packaged frozen foods suggests that much of that increase will come, at least initially, from imports. If fish consumption patterns follow those of other EEC nations, the elasticity of demand for fish with respect to income will be low. Instead rising <u>per capita</u> incomes and the rapid growth of modern retailing will result in an increased demand for convenience in location, processing, packaging and use.

The only clearly defined deficiency in the domestic marketing system is the inadequacy of facilities and supplies in inland cities. To some extent, this is another "chicken and egg" problem. Country people in Ireland have traditionally had ample meat and poultry, and have regarded fish only as a necessary item on the Friday menu. Consequently there were no demands for regular deliveries of a diversified mix of fish products and no facilities to handle them.

The time is now ripe, in the opinion of both producers and some marketers, to break into this potential market. Economic growth has brought greatly increased mobility of the population, and more Irish consumers have been exposed to properly handled and prepared fish in Dublin and other coastal cities. Both co-operatives and private dealers can now assemble groups of products for regular delivery to the still limited inland market. The logical approach, borne out by experience in other countries, would be to establish single cold storage facilities in major inland centres which could be supplied by co-operatives or dealers on a regular basis; the fish would be available to selected retailers willing to provide facilities to adequate standards. A very modest assessment of market potential and a trial period would suffice to establish initial targets. Total cost of such facilities should not exceed IR£15,000 per installation, and could ultimately be financed by the industry which uses them.

The concept rests on the assumption that a viable market for fresh, chilled fish exists in interior markets and that the principal stumbling blocks to its development have been poor quality and limited variety of the fish perviously available. If it proves correct in one or two initial tests it could easily be extended to other cities. Since the programme is clearly developmental and also has the necessary contacts with both suppliers and retailers, it would appear appropriate for BIM.

The ultimate limits of this latent segment of the domestic market are not large, and the export market will remain the largest target for the Irish industry. On the other hand, the development of a stable, slowly growing group of new Irish consumers would be welcome to both the industry and the Irish householder.

The speed with which the domestic market expands is also dependent on the relative prices of fish and competitive sources of protein. It was pointed out that prices for the standard Irish table fish - herring, cod, plaice, haddock, and whiting - have risen much more rapidly than meat in recent years. The longer range outlook for fish supplies from EEC waters is not encouraging, and since world fish prices have been equally strong it seems certain that fish will not be the low cost protein source that it was before the 1970s.

In summary, the Irish market will continue to grow, but at a pace reflecting modest increases in population and a slow improvement in the availability of fish outside the larger coastal cities. The structure of demand for fish should also shift slowly with a continued leveling of fluctuations in daily consumption and an increase in the relative importance of processed packaged fish from the freezer.

The Report of the National Prices Commission (1974, updated in 1978), and the IDA study (1977, updated by information obtained from BIM), provide limited evidence that fish processing and marketing have been moderately profitable. As reported in Chapter 7, the rather peculiar structure of the Dublin wholesale market, with its multiple auctioneers, seems to function satisfactorily, both as a distribution centre for the heavily populated Dublin metropolitan area (with more than one-third of the nation's population) and as a "clearing" market for marginal supplies and requirements in other regions. Growth of outport marketing facilities is still restricted by the scattering of landings, the deficiencies in port development pointed out in Chapter 4 and inadequate service to inland markets noted above. Programmes to ease these are underway, and others are recommended in the final chapter of this report. At this point it is simply noted that the processing-marketing system geared to the domestic market, largely made up of small, non-specialised operations is reasonably well-adapted to its task. The rapid increase in Irish consumption of fish during the past decade was handled without evidence of strain on the marketing functionaries. The problems that have been noted are related almost entirely to the inherent instability and small volume of fish available to them.

The Export Market

The pattern of Irish fish exports, by country and product, described in Chapter 8 does not suggest any constraint on growth of the Irish sea fisheries.

An overwhelming proportion of Irish exports go to the UK and other Community members - their natural market - and the paramount problem throughout the EEC market will continue to be supply. Landings from its own waters and from other waters under permit are short of total consumption. Continuing concern by ICES over the condition of major stocks in the EEC 200-mile zone and the need for further curtailment of fishing effort are clear indicators of continuing strength in fish prices.

Two qualifications should be noted. First, the serious declines in herring catches have created an abnormal price situation that could not be maintained if stocks are permitted to recover and landings return to previous levels. From the standpoint of the Irish fishermen, recovery of the herring stocks would impose no burden, since the effect on volume would be a welcome substitute for the current high prices. It would also have a most desirable impact on employment in herring processing plants.

Secondly, the EEC market has not been able to absorb all of the increase in mackerel landings of recent years. The EIU survey confirmed that French, German and Dutch marketers have experienced some shift in demand from herring to mackerel products, but they are clearly not close substitutes as yet. In Ireland this has resulted in an unfortunately large movement of mackerel into withdrawal; and limited meal plant capacity and high transport costs to the existing plants has led to more dumping than can be viewed with comfort. Meanwhile, until promotional efforts and product development can channel Irish and other EEC landings into the Community market at profitable prices, delivery of mackerel to outside nations' floaters, that would otherwise go to withdrawal, seems eminently sensible. It would avoid the waste of good protein product now occurring, and would take up some of the slack in fishermen's incomes caused by the herring situation. If and when Community marketers can handle mackerel landings profitably the arrangements with outside nations could simply be terminated.

The mackerel situation is, however, the exception. For other major species increased Irish landings not absorbed in domestic channels will find ready buyers in the Community. Indeed, one of the key reasons for orderly development of the Irish sea fisheries is to integrate their contribution to Community supplies in a manner that contributes as fully as possible to regional income objectives.

There remains the possibility of shifting Irish exports away from the now dominant semi-processed toward fully processed final products. From the standpoint of Irish interests and the Community's, concern with employment and incomes in peripheral areas, it would be useful if the jobs and value-added from more complete processing of fish remain in Ireland.

The obstacles, however, are numerous and severe. Perhaps the most formidable originate in the structure of European fish markets. Increasingly fish products are sold in the packaged form - even items with relatively short shelf-life. Like other packaged foods, they can be branded and the brand names promoted; alone, as part of a family of fish products, and, in the case of the larger multi-nationals and retail chains, as one of an ever larger family of packaged foods. The Findus and Birds Eye labels on frozen fish products, the major German and French brands of processed herring, and the storewide private brands of chain retailers would be impossible for a small limited-line Irish processor to displace except at sharply lower prices. The EIU report also points out the tendency in Germany, Holland and France to concentrate processing and marketing in larger firms, many of them vertically integrated by function, and horizontally linked to other food products. Scale economies at several levels account for this tendency, and they can be realized only at volumes far beyond the capabilities of Irish firms.

In Chapter 14 we consider the use of joint ventures as a means of bridging the gap between Irish processing capacity and the requirements of the Community market. In effect this would use the position of Ireland as an important marginal supplier of semi-processed fish as a bargaining device in dealing with European marketers increasingly hard-pressed for raw materials.

The attractiveness of such operations to Ireland are obvious - more jobs, diversification of markets, and an opportunity to acquire advanced processing techniques, recipes, etc. The appeal to processing and marketing firms in the Community is less clear, and depends on the type of joint operation to be considered. There seems little reason to expect much interest in a true equity venture. There is already too much excess capacity in Europe to make further capital outlays in Ireland attractive. In addition to the usual problems of language, terms for non-Irish managerial and technical staff, different operating practices, etc. (all of which are manageable) there is the very real issue of finding an equal partner in the Irish private sector. The minimum investment in a reasonably scaled, diversified operation would run to perhaps 15 - 20 per cent of total Irish investment in the processing sector. There is no single firm in Ireland that could take on that level of investment at present.

A much more likely arrangement would involve a smaller Irish commitment and a much less ambitious set of tasks to perform. The proposed joint venture at Castletownbere is a good example. Initially, it will provide for Spanish operation of vessels owned by the Irish joint venture, shared investment in a relatively simple freezing plant; and opportunities for Irish fishermen to train and work with Spanish vessels. At a later stage more complete processing is expected; this would provide a useful addition to local employment and the necessary raw material for a meal plant.

Another possibility, less likely in the short-run, would be a contractual arrangement under which an Irish firm would process final products to a foreign partner's specifications for distribution under his brand. The multi-national food firms, in particular, are constantly seeking new sources of supply for products tailored precisely to their own requirements, and often prefer to obtain them with minimum direct investment. The stumbling block here is volume. The minimum output of processed whitefish, according to EIU respondents, simply could not be met on a regular schedule by Irish processors from present landings - in part because these fish would frequently bring better prices in the fish market, and in part because unpredictable weather and seasonal availability prevent production on a firm schedule. If herring landings return to more normal levels there might be more attractive prospects in contract production of a variety of processed items for German distributors.

It cannot be emphasized too strongly that these constraints on growth of fish processing and marketing in Ireland are not inherently the result of inadequate access to capital, technical knowledge, or managerial talent. Even if the latter two were scarce in Ireland they could be readily purchased abroad. The real problem goes back inexorably to the supply of raw materials. A fish processing plant, like any other manufacturing operation, must be utilized throughout the year on a reasonably uniform schedule if minimum unit costs are to be realized. This calls for a regular flow of fish of the right species at a level sufficient to sustain a high rate of average utilization capacity. This simply cannot be assured at the present levels of Irish fishing. Intermittent operation also poses a constraint problem of maintaining a trained work force. Periodically idle machinery is serious, but periodically idle salaried and regular wage workers is much worse. Peak period requirements are met in Ireland, as elsewhere, by drawing on temporary local help, but experienced permanent staff must be retained through the year.

The fundamental problem of low and intermittent deliveries of fish is, in part, an inevitable result of seasonal variations in the availability of major species, and is accentuated by the restricted range of most of the Irish fleet. Frequent periods of severe weather also produce low spots in fish receipts. Cold storage and freezing are used to reduce the impact of erratic and seasonally peaked landings, but at a cost which puts the Irish processor at a competitive disadvantage vis-à-vis UK and continental firms. Scattering of landings in small outports and high internal transport costs add further complications. Finally, processing equipment can be shifted from one species to another and can handle different sizes, but only within limits; and, if shifts are to frequent, at significant cost.

This situation contrasts sharply with that of the major British, Dutch, German and French firms, which receive much larger landings and can draw on many more sources of supply. Scale economies can be fully realized, marketers can be supplied a full range of products, and continuity of inputs allows much greater flexibility in operations. In addition, much of the cost of freezing, storage, transportation, and promotion is shared with other food products to a greater degree than the Irish fish handler can achieve.

On balance, we conclude that Irish exports, even with increased landings, will continue in much the same pattern of semi-processed fish to be finished and marketed in Community countries, through their own developed channels and brands. Opportunities to increase the level of processing, particularly in joint operations, may arise and would be useful; otherwise the likelihood of any major increase in the output of final products for Community markets seems remote.

CHAPTER 14

DEVELOPMENT PLANNING: MAJOR POLICY ISSUES

Community Policy

It is obviously difficult to define either the policy issues facing the Irish government or the specific projects and programmes to be supported by Ireland and/or the Community without specific details of the common fishery policy which will eventually emerge from the Community. Nevertheless it is necessary to make some general assumptions about the principal elements of such policy as it will relate to Ireland. Accordingly, the discussion of policy options rests on the following propositions.

Under the Hague Agreement, the Community undertook a commitment, confirmed by later action, to permit substantial expansion of the Irish sea fishing industry. This action is consistent with the Community's expressed concern with the low income nations of the Community; and the commitment enshrined in the preamble to the EEC treaty to ensure the harmonious development of the economies of the member states by reducing the differences existing between the various regions and the backwardness of the less favoured regions. It has not been made clear - indeed, it could not be, as a general proposition - precisely how long this opportunity will remain open for Irish development, nor how far the Community might be prepared to go with respect to further increases in the Irish share of the Community catch (or the extent to which Ireland might be protected from decreases in catches that might be dictated by deterioration in the condition of some key fish stocks).

In developing the conclusions and recommendations of this paper, the authors have assumed that the EEC commitment under the Hague Agreement, while not open indefinitely, recognises that the Irish industry cannot be expanded overnight, in an efficient manner, to take immediate advantage of the increased quotas. On the other hand, it is an Irish responsibility to see that necessary steps are taken to remove or reduce barriers to growth so that expansion in exports, employment, and income contemplated by the Community action will be realised within a reasonable period of time. This implies, though without definite agreement, that the possibility of further increases in Irish quotas would depend on performance. If development policies in Ireland result in the growth of an economically viable industry that meets the regional objectives of both EEC and the Irish government, and if there are indications that further growth, equally desirable in nature, can be achieved, then additional opportunities to participate in the Community pond might be forthcoming. In short, the Hague Agreement does not contemplate a rigid formula for limited growth, but rather a progressive, on-going commitment to view Ireland's regional problems within the Community setting and to monitor the opportunities to ameliorate these problems through fishery policy. Once the common fishery policy takes final form, it should be possible to make more specific quantitative commitments as to minimum catches available to Ireland.

It is also assumed that some degree of protection of small-boat, inshore fishermen will be forthcoming - probably in the form of special consideration for coastal fishermen within a 12-mile zone for each of the member states. Fish taken within that zone by domestic fishermen would, of course, be counted against the quotas allocated to the country.

It is assumed that Community policy aimed at reduction of excess capacity, particularly in medium and distant water fishing capacity, is a general policy only. While it is clearly appropriate in the difficult North Sea fishery situation and in some other areas where deployment of "unemployed" larger vessels into the coastal fisheries would worsen existing management and social problems, there are other cases (such as the west of Ireland) where restructuring must include some expansion in larger vessels if regionally disadvantaged fishermen are to take full advantage of opportunities opened up by the reduction of catches of non-member nations and the re-allocation of quotas within the Community. In short, restructuring is not a rigid formula for reducing the size of individual vessels throughout the Community, but rather a flexible tool to adjust both total capacity and fleet configuration to specific fishery requirements of the sub-regions involved.

Irish Policy Issues

Statistical and Stock Assessment Programmes

Perhaps the highest priority issue facing the Irish government stems from its inability to define with reasonable precision the state of many important stocks in Irish inshore waters. With the exception of herring and a few cod and flatfish population, the basic resource situation in Irish waters is not defined adequately for management purposes, nor is it possible to monitor current fishing activities with sufficient detail to permit essential current assessments. Stock assessments from ICES cover such large sub-areas that they cannot provide reliable estimates of yields from the present fishing grounds of the Irish fleet. Such estimates are essential for policy purposes.

It is impossible to determine the appropriate size distribution of new vessels to be added to the Irish fleet without some indication of the extent to which additional fishing pressure can or cannot be sustained in inshore waters. Indeed, a whole series of policy decisions rests upon the establishment of a programme that will provide more accurate, consistent, and timely recording of catches; tie catch figures to data on fishing effort and location of effort; computerise the resulting data so that it can be retrieved easily in any form desired; and analyse the resulting data to assess the state of commercially exploited stocks; and to monitor their condition over time.

It should be noted that the creation of such a data collection and analysis system is a recommendation from ICES to the Irish government but which has not yet been implemented. The procedures being developed for assessment of all fisheries within Community waters by working groups of ICES scientists, their review by the Advisory Committee on Fishery Management and the Scientific and Technical Committee for Fisheries, set up by the Commission, and the establishment of TAC's and country quotas inevitably takes time each year. The effectiveness of the management programme is intimately tied up with the ability of each member state to generate the necessary data rapidly and to provide, for both regulatory authorities and the industry, targets that permit orderly planning of the next year's activity. At present Irish statistics are inadequate to meet these requirements, and they are frequently substantially later than called for by existing agreements. The shortcomings of the existing statistical system and recommendations as to the type of data required, the methods of assembling the data for convenient storage and retrieval, and analysis of the resulting information is given in Appendix 15B.

The forthcoming common fishery policy of the Community may make the task of establishing an adequate statistical programme considerably easier. One of the key requirements for such a programme is the keeping of standard fishing logs to permit accurate collation of data on effort and location of catches. It is likely that Irish fishermen would have resisted any effort to institute such requirements on the part of the Irish government; but since the Community intends to require that all sea fishermen be licenced and that all licenced vessels develop such log book data, the problem should be in hand by the time the appropriate monetary and personnel provisions are made by the Irish government.

The full benefit of statistics of the type described above cannot be realised until at least five years of data are available. However, even one year of accurate information on landings, effort, and location of catches, coupled with long experience with the fisheries involved and the ability to extrapolate from similar fisheries elsewhere, would permit a major improvement in management policy within 12 to 24 months after initiation of the programme.

Restructuring the Irish Fleet

The policy issues with respect to restructuring the Irish sea fishing fleet cannot be fully resolved until much better stock assessments, in both inshore and offshore areas of concern to Ireland, are available. But action cannot wait on perfect information. The Community commitment to expansion is an opportunity only. It is incumbent upon the Irish government and the Irish industry, in co-operation, to transform it to jobs and incomes. That, in turn, calls for an expanded and modernised fleet capable of exerting the right kind of fishing effort in the right areas.

The analysis in this report raises the following issues with respect to the restructuring of the Irish fleet to achieve economically viable expansion within the Community framework.

(1) Although statistical basis for assessment of stocks fished by inshore fishermen is weak, it is unlikely that these stocks, generally, can stand significantly heavier pressure than they are now undergoing, though specific fisheries in specific areas may have some room for growth. If Irish landings are to be increased, the catches must come largely from areas outside those normally harvested by Irish vessels or from stocks that have previously been ignored by Irish fishermen.

(2) Despite the continuing increase in both the number and tonnage of Irish vessels, the rapid growth in landings of the 1960s has not been maintained. Between 1972 and 1977 catches have been virtually static. There are several reasons for this disturbing situation. First, our survey data and landing statistics show that most of the new boats, regardless of initial fishing plans, have been deployed against the same stocks that have served as the backbone of the Irish fishery in the past - herring, flatfish, cod, haddock, and whiting. Only with respect to mackerel has there been any opportunity for real expansion, and the prices of mackerel have been so low, relative to others, that they are sought only when more attractive targets were not available.

Secondly, the expansion in the Irish fleet (and the shift from very small boats to vessels in the 20-25 metre range) from the late 1960s to the present was paralleled by growth in other European fleets and in foreign fishing effort in waters adjacent to Ireland.

Most of the larger new boats added to the Irish fleet in recent years have not, in general, gone much further afield, nor have they attempted to expand catches of species taken within Irish waters by foreign vessels but not previously of interest to Irish skippers. Instead, they have simply fished the same waters, more efficiently and with greater pressure, than the smaller and older fleet. To the owner of a new vessel it makes no difference at all that his catches of herring, salmon, or inshore flatfish simply represent a diversion of catch from other Irish vessels. He considers that he can make more income in that fashion than he can by fishing offshore or seeking larger catches per unit effort.

The danger inherent in this situation has been recognised, and BIM has tried to exert as much influence as possible on new vessel owners receiving grants and loans to expand into new areas and species. Once the vessel joins the fleet, however, it has not been possible to control its fishing operations.

It has also been pointed out that even the newer Irish vessels have had great difficulty establishing themselves in offshore fisheries already heavily exploited by Spanish, French, and East European fleets. Congestion of larger trawlers on the better gounds, lack of familiarity with seasonal patterns of availability of fish, and the absence of a strong Irish market for some of the major species taken offshore have contributed to the problem.

We are convinced, despite the absence of Irish operating experience with vessels larger than any now fishing under the Irish flag, that such vessels will be required if Ireland is to expand into offshore waters to the southwest and northwest of Ireland, where stocks previously exploited by Spanish and Soviet vessels can now provide additional catches for Irish vessels. In terms of seaworthiness, the ability to stay on the grounds for long enough to reduce the proportion of time spent running to and from port, the ability to work on deck efficiently and provide adequate chilled storage, the larger vessels would clearly be advantageous.

This brings its own set of problems, however. At present there is only a limited group of Irish skippers who are capable of utilising the larger boats, and implementation of the proposed BIM training scheme will be required. Moreover, the larger boats must be kept out of inshore waters (with the exception of some pelagics in season), yet they are unlikely to undertake the risks of learning a new type of fishing in a new environment offshore without additional financial incentive.

It is not easy to develop policies that would encourage offshore fishing by larger Irish vessels while maintaining the necessary degree of control over effort on inshore stocks. Zoning seems unlikely to provide a fully satisfactory answer, since the limited evidence available suggests that the habitat of some of the stocks most important to inshore fishermen lies outside 12 miles as well. A limitation on fishing inside 12 miles by the larger vessels, whether Irish or foreign, may provide only partial protection to inshore stocks, and would be unlikely, alone, to encourage exploration and development of Irish offshore fishing capability. In addition, full harvesting of some pelagic stocks will require participation by some of the larger Irish boats during periods when rough weather limits the small operators. The most direct technique would involve incentive payments based on actual fishing operations rather than a straight grant for capital construction. It is felt that such programmes could be developed without contravening Community regulations against operating subsidies.

It may be that a middle ground will be required initially, treat the new, large vessels as experimental operations only; limit them to a predetermined schedule of fishing activity in the areas and on the stocks that will leave the inshore fisheries adequately protected; and provide financial incentives, on a clearly experimental basis, until the economic viability of the larger boats is established. Hopefully, a limited period of experimental operation with a limited number of vessels will suffice to determine whether or nor the operation is profitable. If it is, there should be no major difficulty in requiring adherence by larger Irish boats to a profitable fishing plan that keeps them out of inshore waters. The observed trend toward vessels of 35 to 40 metres in the fleets of other countries operating well offshore of Ireland's west coast suggests that Irish fishermen, in similar vessels, can utilise an expanded share of these stocks to meet expansion goals. But they cannot be allowed to work inshore as well.

When efforts to revitalise the Irish sea fisheries were first begun in the 1960s the fleet consisted almost entirely of small and technologically obsolete boats. From that very low level (and in the absence of hard evidence of serious pressures on fish stocks) it made sense to use financial incentives to achieve a general expansion of modern boats that could be expected to operate profitably, repay loans, and lead the way to self-sustaining growth. This period was one of growth in fishing effort in the north east Atlantic region by virtually all Western European participants and the new entrants from Eastern Europe.

That period has passed. Continued general subsidisation of boats that must fish inshore waters now appears to serve no useful end in meeting short-run expansion targets.

There is however, a legitimate need to upgrade the existing vessels to permit more diversified operation and in the interest of the comfort and safety of the fishermen. This would involve reconstruction and refitting of newer hulls, with new construction matched by retirement of older boats where possible. It is in the fishermen's own best interest to do this, particularly since there are generous grants available (see Appendix 3C). Some expansion in total numbers of vessels will be required, of course, if the Irish industry is to reach the targets allowed by EEC, but the areas of operation must be controlled.

Underlying these views of the ways in which the opportunity for expanded Irish catches are to be realised is a most important assumption that should be made explicit. We feel that the prime concern in restructuring is the welfare of the existing sea fishing industry. If it can be put on a sound economic footing, with improved health and safety conditions, by increasing its catching capacity at or near existing employment levels, so be it. Additional jobs in fishing should be considered only if and when the overall living standards of sea fishermen can be maintained. This will almost certainly be possible. To view expansion only in terms of the maximum number of people who can be supported by the fishery would not achieve the most desirable regional contribution.

Licensing and Management Programmes

It should also be apparent that both data collection and fleet restructuring on the one hand, and the general state of the sea fish stocks on the other call for a comprehensive licensing programme for sea fishing vessels. Ireland has reached the point where management of its fisheries - by EEC and the Department of Fisheries and Forestry - is a necessity if economic waste and biological depletion are to be avoided. No real framework for licensing and regulation exists at present (except for salmon) and an extensive educational campaign will be required to convince the fishing industry of the need for management measures with real teeth. It is also likely that some steps in this direction will be required of all Community states under a common fishery policy.

Regardless of Community action, however, it is highly desirable that the Irish government initiate a general licensing programme as soon as possible. The need is particularly acute for licensing of boats fishing for lobster, crab and crawfish.

Enforcement

As indicated above, it is impossible to anticipate exactly details of the forthcoming Common Fishery Policy of the Community or the enforcement procedures and problems that will accompany it. There are, however, some enforcement issues, peculiar to the Irish development situation, that call for comment.

It is expected that management of the sea fisheries in Community waters will be based on total allowable catches by species, divided into individual country quotas. (Ultimately a two-tier quota system may be required, since species interactions may result in a total desired area catch that is smaller than the sum of the individual TAC's.)

Whatever the mechanics of the programme, it is essential that quota determinations be speeded up. Compliance cannot be expected unless quotas are known far enough in advance to permit orderly planning of fishing activities; yet it is equally important that the quotas, to be credible, be based on catch records of the previous year. For pelagic species in particular, the TAC may be dangerously far off target where there is a two year gap between the latest available data, and the year for which the TAC is being forecast. Admittedly, this would place a heavier burden on fishery agencies that collect catch statistics, scientific teams that analyse them, and administrators who must translate their recommendations into regulations. But it is difficult to avoid the conclusion that effective regulation demands timely action, even at the cost of some precision in data.

The mobility of the Community fleets poses additional problems. Biological considerations call for management in terms of the smallest separable populations that can be determined. Yet many vessels take the same species in several areas and mixed species in each. Rapid, detailed and accurate reporting of catches by fishing vessels is obviously vital if area quotas are to be effective. With the best possible intentions, however, individual countries may find it very difficult to determine exactly which fish were caught in which area. National data can be no more accurate than those reported by the individual skippers.

This is nothing new, of course, but it applies with special force to fisheries off the west of Ireland. The huge expanse of water to be monitored and the prevailing weather conditions make surveillance by patrol vessels and aircraft difficult and expensive. The desirability of placing observers aboard non-Community vessels fishing Community waters under permit appears to have wide acceptance. The same basic considerations may also make it desirable to place observers on the larger vessels of all nations fishing in areas where surveillance is particularly spotty. It would not be necessary to have observers on all vessels, since catch rates on those carrying observers would provide a useful check on others. The cost of such a programme would be far less than equivalent monitoring by sea and air patrols.

Experience world wide makes it clear that anything short of a high level of compliance by fishermen of all Community states could be fatal to the plans for integrated, scientific, regional management. Once one group breaks over (or is widely believed to have done so), the possibility of widespread breakdown of control is very high.

It must be stressed, however, that enforcement is not only a matter of Community responsibility. The Irish government can hardly expect vigorous efforts to assure member country compliance with EEC regulations unless it is prepared to implement those same regulations within its own waters. The seriousness of the situation is exemplified by recent experience in the Celtic Sea. The state of the herring stocks in that area is critical and Irish fishery scientists argue that only complete cessation of fishing for at least several years can prevent a total disaster, yet the total catch taken there by Irish and continental vessels in the last few years was large enough to pose a threat to the future existence of the herring stocks. Obviously, it is a dual responsibility for each member state and the Community to see that regulations are enforced. It is not surprising that Irish fishermen should feel that they are discriminated against if fishermen of other states are taking undue quantities of herring; but if one type of illegal fishing is undertaken as a response to another, both the resource and the industry must ultimately suffer.

The need for even-handed, fair, but vigorous enforcement is related to the recommendation that a more rigorous licensing and statistical programme be instituted by the Irish government. Unless violators face the loss of the right to fish - a real economic penalty - it seems unlikely that even flagrant violations can be controlled.

Development of Fish Processing and Marketing

The preceding chapters raise a series of questions about the appropriate policies to be followed by the Irish government in expanding the number of jobs in secondary industries associated with the fisheries. Earlier discussion of these issues (e.g., in the IDA study of Irish fish processing and in BIM's last five-year development plan) seemed to imply that a market for final consumer products produced in Ireland could be taken for granted (given adequate promotional work). Both argued that the principal obstacles to more advanced processing of Irish-caught fish, with its associated increase in value-added and employment, were the absence of satisfactory quality control; insufficient analysis of various taste, texture, and other elements of consumer preference in European markets for processed fish; and the small scale and limited range of activities of Irish processors.

Our analysis casts some doubt on this position, and while it suggests considerable scope for improvement in the utilisation of the Irish catch, the path to greater numbers of jobs and value-added in fish processing is neither simple nor clear-cut. The EIU studies, buttressed by the opinions expressed by other experts interviewed, confirm that the Community market is already formidably well organised with respect to production of consumer packages. In every country surveyed there is a clear trend toward expansion of the relative importance of large, horizontally and vertically combined firms, paralleling a trend toward consumer preference for packaged fish products in convenient forms for sale through conventional retail channels. The nature of chain-store operation, in particular, makes it rather unsuitable for the handling of fresh and chilled fish in traditional forms. Both consumer preferences and organisational and management practices of the rapidly expanding chain retailers suggest a continuing shift toward packaged, brand-identified products.

In this kind of market, the individual Irish producer (or even a combination of producers, if such could be achieved) would be at a pronounced disadvantage. European brands of fish products are identified and quite heavily promoted, not only by themselves but as members of a family of packaged foods produced by the processor and/or marketer. To break into such a market would require an outlay which would surely make Irish fish non-competitive.

An equally formidable obstacle to the development of more highly processed Irish seafood products arises on the supply side. As noted in several of the earlier chapters, seasonal variations in the availability of fish (particularly herring), weather conditions, and the state of the domestic fresh market all operate to make the supply of raw materials to Irish processors, in total and by species group, too small and too irregular to permit them to reach the level of efficiency of competitors in the larger Community nations. This is particularly true in the case of whitefish, an area in which the relatively straightforward development of packaged fingers, fillets, and portions might be considered an avenue into the continental market for processed foods.

To some extent the same problems would face a processor of final herring products. Herring, like most pelagic species, shows very marked seasonal variations in availability, in Ireland and in other areas. There is a substantial difference, however, in the supply situation facing Irish processors and their potential competitors in The Netherlands, Germany, and the UK. The latter are able to draw herring from a wide range of supply areas, and thus are able to maintain a reasonable throughput over much of the year. This is simply impossible for an Irish processor except by use of frozen storage - at additional cost.

The future is not all dark. On the optimistic side there is already tangible evidence of another method of increasing value-added and employment from Irish landings - the establishment of joint ventures and contractual arrangements for supply of fish processed to the specifications of large scale marketers in other countries. As indicated earlier, the present state of overcapacity in processing facilities in the Community makes it unlikely that such firms would be interested in full joint ventures with large capital investments in Ireland at present. On the other hand, their increasing concern about availability of raw material will make it more and more attractive to enter into arrangements with Irish processors under which the desired products could be produced to the specifications of the marketing firm for sale under its own brands and in its own established markets. The pressure of high and rising fuel costs may strengthen such developments. Most of the multinational operations in the seafood field are well equipped to utilise arrangements of this type effectively, and - from their standpoint - it offers diversification of supply sources with minimal capital investment in the various countries concerned. On the assumption that Irish sea fisheries are permitted to expand landings of desirable species, it should be possible to reach a level of catch sufficient to meet the minimum output required under contractual arrangements of this type. BIM is well aware of the potential of contractual joint ventures and the excellent prospects of the canning operation at Dungloe indicates the practicality of the arrangement.

While full joint ventures, involving joint contributions to equity and the establishment of substantial physical facilities in Ireland, are unlikely in the immediate future as far as Community partners are concerned, it is possible that they may become more attractive in the future. Meanwhile, non-Community countries are indicating definite interest in this type of arrangement. The Irish-Spanish company operating out of Castletownbere illustrates the kind of progressive development that might be anticipated. The initial establishment of freezing facilities, to be followed later by limited processing operations and an associated fishmeal plant would represent an excellent way of utilising immediately anticipated increases in Irish catches off the southwest coast as Spanish catches are curtailed by the Community. This operation carries with it the usual advantages of such a joint venture - an immediate increase in the flow of raw material above what might be expected from Irish vessels alone; an opportunity for Irish skippers and fishermen to become familiar with the grounds and Spanish fishing techniques; and an opportunity for Irish vessels to enter the fishery earlier and under much more favourable conditions. The fact that the Spanish partner has full access to one of the most lucrative markets in Europe means that any foreseeable expansion in Irish catches landed at Castletownbere could be marketed, in some cases with additional processing, at profitable prices.

In summary, it does not seem appropriate to pursue any "forced draft" investment programme aimed at increasing Irish output of fully processed seafood products at this time. The more cautious approach via joint ventures and contractual processing for established European marketing concerns could, however, add both income and employment in the near term, and provide the necessary development framework for ultimate production of fully processed products at a later date. Since joint ventures of any type are difficult to work out (given the diverse interests of the partners), active government support is essential. BIM is now charged with this responsibility and has, we understand, given it high priority.

The key to any further development in both the quantity and level of seafood processing in Ireland lies in expansion of total catches and improvement in the regularity and continuity of supplies. Given an adequate flow of raw material, better frozen storage facilities, and an aggressive market research programme by BIM, profitable opportunities for more complete fish processing will be taken up promptly.

The EIU reports and some of our interviews suggest the possibility that Ireland is not getting the maximum possible benefit from its export of raw and semi-processed products at the present time. Improvement of export earnings and incomes through better current information on alternative European markets, programmes to upgrade and maintain uniformity of quality, efforts to reduce delivery times and to assure adherence to delivery schedules, and adjustment of partial processing to buyer requirements are all ways through which more can be wrung out of the existing pattern of landings and processing than is presently being obtained. This is another area where BIM's current efforts and future plans can be most helpful.

Expansion of Harbour Facilities

The desirability of reassessing the need for improved Irish harbour facilities is accentuated by the likely restructuring of the Irish sea fishing fleet. There are, however, a number of important policy issues to be resolved in determining the location, scale, and timing of harbour improvements if they are to be in place when needed.

We stress again, as in Chapter 4, the need for regional considerations in the choice of harbours for expansion and improvement investments. In part this is dictated by the need to provide peak harbour capacity in a number of areas that may be substantially in excess of average utilisation. This is necessary to take care of the highly seasonal availability of fish along the entire Irish coast and the frequent occurrence of very rough weather which requires boats to seek shelter at short notice.

The result is a number of harbours and a level of total investment in them which seems high in comparison with total Irish landings - but unavoidably so. In addition, the general objective of concentrating landings in a smaller number of harbours in order to improve the efficiency of the harvesting-processing-marketing sequence must be modified to take account of the social and economic immobility of many small boat fishermen in the south west, west, and north west regions. Improved facilities in many of the smaller harbours is primarily a matter of saving lives, and - secondarily - to permit a greater degree of diversification in fishing activity and a shift to somewhat larger boats.

There seems little doubt of the need for ongoing / and planned improvement in the primary fishing harbours for each region of the country: Killybegs in the north west; Castletownbere in the south west; Rossaveel in the west; and Howth on the east coast. The proposal to initiate fishing by larger vessels out of Killybegs and Castletownbere cannot be implemented fully until these improvements are undertaken. Howth does not require facilities for larger vessels, but is badly overcrowded during some period of the year and needs to be expanded.

The selection of a secondary group of harbours should be based on specific needs of the restructured fleet. Thus, development at Ballyglass permits boats berthed at Killybegs to unload and return to fishing grounds with a considerable saving in time and provide shelter in rough waters when the long run to Killybegs might be dangerous. Other ports are also needed on the exposed west coast. In some cases development of one of a cluster of small ports will serve to concentrate landings for greater efficiency in handling and transportation.

It is quite possible that harbour expansion may require considerable additional investment in ancillary facilities. This presents some organisational problems, since the Department of Fisheries and Forestry is responsible for harbour development, but the necessary roads, water, electricity supply, and development of housing fall under other authorities. The ultimate usefulness of harbour development may depend critically on improvement of access roads, adequate supplies of water and electricity, and - in some cases - provision of a minimal amount of housing.

Management and Rehabilitation of Salmon Stocks

The seriousness of the policy issues facing the Irish government with respect to the salmon fisheries cannot be over-estimated. Despite the relatively small physical volume of the catch, salmon contribute a major part of total landed value of the sea fisheries and of the value of Irish seafood exports. Much of the catch is taken by small-boat fishermen in areas where limited employment opportunities are chronic problems. One such area is the Ballinakill Fishery District in west Galway/Mayo. In this area a small number of fishermen own 10-12 metre boats and the rest fish from currachs. Practically all of these men fish for salmon and those fishing from currachs rely almost totally on salmon for their income (Interim Report of National Committee on Pilot Schemes to Combat Poverty, November 1978).

The rapid growth in the drift-net fishery since 1969, encouraged by the unprecedented increases in salmon prices in the 1970s has brought an important economic stimulus to a large number of minor fishing ports along the north west, west, and south west coasts of Ireland. Since the benefits of that bonanza have extended from fishermen to whole communities, resistance to any change in the status quo is likely to be strong. On the other hand, it seems dangerously likely that the status quo cannot be maintained over time - the present and prospective level of catches, legal and illegal, has reached a point where salmon stocks, river by river, face depletion or even extinction. In short, the communities now dependent on salmon are going to face severe economic hardship one way or the other - but the social impact of a reduction in salmon effort to levels that will permit orderly and continuing landings will be far less shattering than the economic, if not biological, extinction of whole runs that now seems in prospect.

Small-boat fishermen operating draft nets in estuaries used to account for over 50 per cent of total salmon landings. These men's livelihood was based on farming of smallholdings and salmon fishing. Since the development of coastal drift netting, the poor escapement from this fishery has severely curtailed draft netting, which in 1977 took only 17 per cent of the total salmon catch.

A number of alternative policies, ranging from modest to severe, might be considered. First, if the number of licences can be held at present levels, and restrictions on size and composition of nets and days of fishing strictly enforced, the situation may be stabilised to some extent. Steps taken by the Irish government in 1979 have strengthened its control to some extent. Unfortunately, however, this option rests on two assumptions which seem dubious. First, the price of salmon has risen to a level where even confiscation of nets and the occastional arrest and fining of fishermen does not seem to provide a real deterrent to widespread illegal fishing. Second, a policy aimed at stabilisation of present fishing effort may not prevent long-term declines in salmon abundance - it may be too high already; and over time existing licence-holders are virtually certain to increase the efficiency of their operations, even though the important action to restrict the use of larger boats has been taken.

A second, tougher, option would require reduction in the total salmon harvesting capacity. For reasons discussed in Chapter 12, harvesting of Atlantic salmon at sea by drift-netting is inefficient in both biological and economic terms. Moreover, virtually all of the growth in harvesting capacity in recent years has come from new entrants to drift-net fishing. It would seem logical, therefore, to reduce effort by cutting back on drift-net capacity. This could be done in either of two ways (or both in combination). One is to implement vigorously a recent regulation relating to the phasing out of the larger boats, most of which have entered the fishery fairly recently, and which have alternatives to which they can be diverted. While the number of such vessels is not large, their impact on the fishery has been substantial. In addition, it might be possible to reduce slowly the number of remaining licences by failing to re-issue them as licence-holders leave the fishery for any reason. We recognise that such a policy would be resisted strenuously, since there is always a list of "worthy applicants" for a property right as valuable as a salmon drift-net licence. Nevertheless, it would be in the long-term interest of both Ireland and the fishermen themselves if the number of licences could be slowly reduced to a level which approximates the fishing effort applied during the period when drift-netting was a traditional small-boat fishery.

Finally, the most drastic measure would be a complete closure of the salmon fishery for a period long enough to permit recoverty of the severely stressed stocks. Apart from the political difficulty of such Draconian measures, they seem likely to cause unnecessary short-term hardship. The fishery is still viable enough to permit protection and slow recovery without complete curtailment of all fishery activity.

Regardless of the longer term measures proposed to protect and rebuild the stocks, it is imperative that a more effective enforcement programme be developed. The basic problem can be stated very simply: as long as there are both willing sellers and buyers of illegally caught fish, compliance will be low. Any effective programme to reduce illegal fishing must apply with equal force to buyer and seller alike, but in the ultimate analysis, probably the most effective means of protecting salmon from illegal drift-netting is to impose very heavy penalties which include, not alone fines and confiscation of gear, but also confiscation of boat.

Other steps must be taken to insure protection and - hopefully - rebuilding of Irish salmon runs to their full potential. In addition to the all important reduction in redundant fishing effort, habitat protection in the salmon rivers is essential Current technologies for water quality control are such that there is no legitimate reason to permit pollution to damage salmon runs in Ireland. The results of water diversions and channelisation are more difficult to detect, but are probably more dangerous to salmon in the long-run. Full representation of fishery interests in evaluation of any investment scheme involving water flow and habitat in salmon and sea trout streams and lakes is essential.

If these measures are taken to preserve the basic productivity of the Irish salmon rivers, it would not appear necessary to interfere further with the present division of fish among netsmen and anglers. If the stocks are in good condition angling will be attractive; and its efficiency is so low that it poses no threat to necessary spawning escapement. If present downward trends are not reversed, the substantial economic contribution made by foreign salmon anglers may dwindle rapidly.

Development of Aquaculture

Aquacultural activities fall into two main groups: on the one hand we have fairly simple shellfish production on the bottom, which though labour intensive does not require a great deal of capital. This type of activity is particularly suitable for small scale operators around the coast. Pen-rearing or closed-system production of salmon or trout on the other hand, requires substantially larger investment in both capital and technical knowledge. Control of disease, maintenance of necessary water quality and temperature, establishment of optimal feeds, development of sources of supply of smolts - all require a high level of managerial skill and can only be done effectively in relatively high value operations. The concern must also be able to withstand periodic heavy losses of fish which characterize virtually all fin-fish rearing schemes. Eventually, even those more demanding types of aquaculture may become available to small enterprises, and in the interim the larger firms will provide a useful number of jobs.

The attractiveness of expanded investment in aquaculture in Ireland is enhanced by the substantial groundwork already laid. Research and development effort by the Electricity Supply Board, University College Galway, the Department of Fisheries and Forestry and others have made headway, as evidenced by the existence of some promising commercial aquaculture in Ireland today. The major effort by the NBST, in its forthcoming Mariculture Development Programme, to define research needs, identify potentially promising sites and spell out the roles of various agencies, will add an important action-orientated element to previous work.

Marine Research

Repeated reference has been made in preceding chapters, particularly those dealing with stock assessment and aquaculture, to the need for an expanded research effort in fisheries. How and where to provide marine research raises a series of difficult questions that should be faced in Ireland fairly quickly if both sea fisheries and marine aquaculture are to develop and maintain the desired momentum.

Research efforts in the sea are, almost by definition, interdisciplinary in nature. Whether the primary concern is with the biology, geology, chemistry, or physics of the oceans, some overlap of scientific programmes is inevitable; and all are tied together by a common need for research in material, techniques, and energy sources that will enable man to work efficiently in the hostile marine environment and to record his observations for future use. Obviously, this involves "big science" - that is, research involving very expensive vessels and equipment, long time-lags between the initiation of mission-oriented projects and useful output; and generous doses of basic science before more applied effort can be made effective in solving specific problems.

This raises the question of whether the present distribution of marine research effort in Ireland permits any one of the governmental and university units involved to achieve the necessary critical mass and continuity. From the standpoint of fishery development, the research needs that stand out are in basic fishery biology and genetics, fish pathology, population dynamics and pollution control. A combination of basic and applied work is necessary to improve the accuracy with which harvestable surpluses of wild stocks can be estimated and key variables impeding the culture of shellfish and finfish under confined conditions resolved. But there is also need for research in choosing optimal vessel types and configuration; improved methods and materials for fishing gear; and other aspects of what might be called ocean engineering that relate to the harvesting, transport, and processing of marine products. In this broader sense, the research needed to support expanded and more efficient use of Ireland's marine resources extends into a number of government departments.

The issues to be resolved can be summarised as follows:

1. What is an appropriate level at which to fund marine research, and how should it be broken down by major components?

2. What is an appropriate division of support for basic as opposed to mission-oriented or problem-solving types of work?

3. To what extent should the research be carried on within government, and to what extent should industry and the academic community participate?

4. Granted that there are both advantages and disadvantages to each option, are the research needs of the country best served by having each specialised department carry on its own activities? Or would a centralised marine research institute, funded in large part by the departments that it is intended to service, and working closely with them in identifying and establishing priorities for projects, make better use of available funds?

There are no easy answers to these questions, and all are dependent to some extent on the past history and level of research in the country involved. In view of

Ireland's small size and the need to assemble, on a more permanent basis, both staff and funding for research in the sea, there is much to be said for the creation of a central marine research institute. It could make more efficient use of vessels, laboratories, and equipment; unite the government and academic needs and capabilities more effectively; and provide the budgetary control necessary to force consideration of research priorities. On the other hand, there is ample experience to support the view that separation of research functions from operating agencies can be unproductive. If the researchers simply develop their own areas of interest (always justifying them in terms of national interest, of course), while the departments, shorn of official research functions, develop contacts with consulting organisations or simply divert funds to "research bootlegging", nothing is gained.

The present system (or, more accurately, lack of system) in establishing the level, composition, and management of marine research in Ireland is fundamentally unsatisfactory. It is not flippant to say that nothing is more wasteful than underfunded research; and nothing dries up the effectiveness of applied research more thoroughly than to divorce it from the exciting activities going on at the forefront of knowledge in its basic disciplines. Both situations appear to exist in Ireland as far as marine research is concerned, and one of the several options available to remedy the situation should be chosen if fishery development programmes (and others) are to proceeed as rapidly and efficiently as possible. How this might be accomplished calls for detailed analysis of alternative organisational arrangements that goes far beyond the scope of this study. However the urgent needs are clear: continuity in funding to support longer term work; and development of groups of researchers who will have both the time and the incentive to devote their careers to marine research.

CHAPTER 15

RECOMMENDED PROJECTS AND PROGRAMMES

This chapter pulls together in summary form the recommendations for action that emerge from the analysis of problems and potential of Chapters 1 through 13 and the discussion of policy options in Chapter 14. Sources of EEC funds for the different options, where applicable, are given in Appendix 15A.

The European Economic Community

Any general recommendations to the Community would obviously be beyond the scope of this study. There are, however, several matters directly related to the relation of the Irish sea fisheries to the Community that should be included.

It was noted in the preceding chapter that the extent and duration of the Community commitment to expansion of Irish catches must remain flexible for the immediate future. It would be desirable and ultimately necessary, however, to firm up that agreement as soon as possible - at least in terms of minimum increases that will be considered. Improved knowledge of the yield capabilities of stocks to be utilised by the Irish fleet and completion of the Common Fishery Policy should make this possible within a reasonable period. For obvious reasons, planning for restructuring the Irish fleet, harbour development, etc., will become increasingly difficult without reasonably firm catch targets, which should take into account any established trend in stock biomass.

An important element in the planning and implementation of an orderly programme to enhance the Irish sea fisheries lies in the willingness of the Community to grant higher Irish quotas for specific species that can be exploited by local fishermen at reasonable cost and with maximum contribution to the nation and the Community. We reiterate the need to speed up the process of determining TAC's and quotas to permit use of the latest possible data while allowing adequate time for both industry and national fishery agencies to plan for the future. Unless the TAC's are determined in time for establishment of specific country quotas there is no way to assure that actual catches for a given year will fall within the desired range. Experience with other international fishery management programmes (e.g., Pacific halibut and tropical tuna in the south east Pacific) demonstrates the disastrous effects of international competition if only a single area quota is established.

This issue is of vital importance to Ireland, since the ability to realise expansion plans, mutually acceptable to the Irish government and the Community, would be seriously jeopardised by a weakening or breakdown of the quota programme in Community waters.

For reasons outlined in Chapter 14, restructuring of the Irish fleet to achieve expansion objectives must be selective rather than general. It would be most helpful if Community approval could be obtained for developmental use of incentive measures to encourage new, efficient Irish vessels to operate in areas and on stocks that do not impinge on the coastal fishermen's activities.

THE IRISH GOVERNMENT

Improvement in Fishery Statistics

Deficiencies in the present statistical programme have been recognised by the Department of Fisheries and Forestry. A detailed set of recommendations to correct these deficiencies is set forth in Appendix 15B. It is felt that the programme outlined is both feasible and sufficient to provide a sound statistical basis for assessment, monitoring, and management. The annual extra cost of the suggested service has been estimated at IR£63,000 in 1979 prices. In addition there would be an initial capital cost of about IR£9,000 for the purchase of a control unit, line printer, modums, etc.

The importance of implementing these recommendations cannot be overstated. If management of marine fisheries is to be successful, collection of basic statistical data must be carried out by a qualified government agency that is provided with the necessary fiscal support. It is encouraging to note that the necessary data collection problems are quite tractable; systems for monitoring sea fisheries, analysing the resulting data, and implementing flexible management controls for rational utilisation are well established throughout the world, and the necessary expertise to develop and utilise them is available in Ireland.

It should also be pointed out that the development of statistical and stock assessment information of this type will point the way to further research required in life histories of commercially important species and the relationships between these stocks and their physical and biological environment. These longer term research requirements are related to the programme of data collection and monitoring, but are largely separable. It is recommended that they be undertaken as part of the integrated marine research programme outlined below.

It is very important to provide appropriate computer facilities to implement the statistical data collection programme recommended in Appendix 15B. The volume of data and the fact that a successful management programme requires monitoring of fishing activities virtually on a wholetime basis make it impossible to process information except through use of the computer. The Department of Fisheries and Forestry should be responsible for the fishery statistical programme but it should keep in close touch with the Central Statistics Office at all stages of the work and avail to the fullest extent of the latter's experience in this regard.

Restructuring of the Irish Sea Fishery Fleet

The analysis of the preceding chapters suggests a thorough reappraisal of policy towards the construction of new vessels for sea fishing. The specific recommendations are as follows:

(a) Under no circumstances should any additional licences for salmon fishing be issued. If possible, a programme of steady retirement of licences (and perhaps older vessels) now engaged in salmon fishing should be developed (see recommendation on salmon fisheries below).

(b) Despite the uncertainty about the state of Irish inshore stocks, the available evidence points strongly toward full utilisation of most of them. Accordingly, financial assistance for new construction of vessels for use in inshore waters (24 metres and under) should be accompanied by more stringent controls over areas and types of fishing. Specific programmes for modernisation and re-equipping of some of the more recently built vessels should also be encouraged. This would involve substitution, over time, of somewhat larger and more efficient vessels for older units, with some increase in both fishing capacity and range. If and when the forthcoming stock assessments indicate that some inshore fisheries can stand greater effort, construction of additional units can be readily authorised.

We repeat, for emphasis: This recommendation goes beyond limitations on financial assistance. It suggests the need for national and regional control over the number of fishing units. While this will doubtless require a strong educational programme and is likely to provoke opposition, it will be infinitely less difficult than the re-adjustment process that will inevitably be required if additional unnecessary capacity is allowed to develop in fisheries already fully exploited. This recommendation is not inconsistent with long-run expansion of both vessels and employment in the inshore fisheries; it simply points out the necessity of establishing beyond reasonable doubt that expansion takes place only for those stocks and fishing areas where additional sustained yield can be expected.

(c) It is impossible to extrapolate the operating experience of existing smaller vessels to indicate the kind of financial results that might be expected from much larger units operating farther offshore on species now exploited by Spanish, French, and (previously) East European vessels. On the other hand, the tendency toward larger vessels in the fleets of these countries suggests strongly that they are more efficient than the smaller vessels that have sometimes been employed in these waters. It is therefore recommended that an experimental programme be undertaken to determine the economic feasibility of operating vessels in the over 24 metre range from southwestern and northwestern Irish ports. Vessels of this class can be purchased abroad, either new or in excellent used condition, and made available on attractive terms to qualified Irish owners and skippers. Alternatively, it might be desirable to initiate the programme by chartering vessels of this class to be operated by qualified personnel on a fully commercial basis to determine appropriate operating schedules and fishing techniques.

In either case, the vessels should be limited to offshore fishing, with the exception of seasonal situations in which pelagic species can be fully harvested only by allowing larger vessels to fish closer inshore. These "fine tuning" exceptions will have to be worked out in close co-operation among the Department of Fisheries and Forestry, BIM, the industry, and the Community. The ultimate number of larger vessels that may be required to realise the expansion possibilities authorised by the Community cannot be determined at this time. An experimental programme of several years duration should suffice to establish the desirability of more units of this type.

(d) We recommend strongly that government policy towards boatbuilding in Ireland be adjusted to the biological and economic circumstances of the fishing fleet, rather than vice versa. We are fully cognizant of the serious social problems created by instability in boatyard activity in Ireland, particularly in light of the relatively isolated communities in which the yards operated. But the number of vessels added to the commercial fishing fleet cannot be dictated by employment objectives in the boatbuilding industry. Given the overall situation of marine fish stocks, to maintain boatbuilding employment by pushing excessive numbers of vessels into the fishery will ultimately result in serious economic damage to both industries.

Licensing and Enforcement

It was emphasised in Chapter 14 that a successful statistics programme requires licensing of all fishermen and vessels and that no management programme can produce meaningful results without vigorous enforcement that is accepted as necessary by the industry. It would appear both necessary and desirable, to prepare and undertake an educational programme to make clear to fishermen their stake in a properly framed licensing and record-keeping programme. Log book information, essential to stock assessment work, is also highly valuable to the fisherman himself. If skippers and their organisations are convinced that all such information will be held in the strictest confidence, they may well accept the point that the gains to themselves far exceed the slight additional burden imposed on them. But such acceptance does not come automatically; it requires a concerted effort to meet with fishermen and their representatives throughout the country once the EEC requirements are made clear and any additional requirements to fit the Irish situation are worked out.

With respect to enforcement, we recommend selective use of observers on larger boats fishing in the large areas south west, west, and north west of Ireland. While such a programme will not replace air and sea surveillance already planned, it can add greatly to their effectiveness at minimal cost. Equally important, it can provide an avenue for participation by Community fishermen in enforcement programmes - an essential step in winning general compliance throughout community waters.

Training of Fishermen

We have reviewed carefully the training programme recommended to BIM by its consultant and subsequently proposed as a major BIM initiative. The programme seems well adapted to Irish needs. In particular, the linking of successive steps in training to periods of active involvement in the fishery is highly desirable. This approach is consistent with our only substantive recommendation; that the training programme be reviewed periodically to ensure that the number of trainees at each level is geared to an accurate forecast of employment opportunities. The BIM programme seems to be set up in a way that will serve two definite needs: upgrading skills of men at present engaged in fishing to standards appropriate to the vessels, gear, and methods now in use; and training new personnel to meet expansion goals, particularly on the larger new vessels recommended.

Processing and Marketing of Sea Fish Products

For reasons detailed in Chapters 10 and 13, it is felt that the principal obstacle to more efficient processing and marketing, and to the production of a broader range of products, is the low and erratic flow of raw materials available to the processing industry. To the extent that other elements in the sea fishery development programme increase and regularise landings, it would be expected that normal commercial incentives would lead to appropriate expansion of processing activities, with technical guidance and selective financial assistance from BIM and/or IDA.

Since these supply constraints will not be overcome in the short run, we do not feel that a broad programme of training personnel for more advanced processing would be appropriate at this time. Instead, the emphasis should be placed on two other types of activity that will lay a sound long-term basis for expansion and deepening of Irish fish processing activities. First, BIM's present and planned activities aimed at product development, market identification, and market information represents an essential service to the Irish fish processing and marketing community. These should be maintained and modified in future as new needs become evident. To the extent that these activities turn up opportunities for more advanced processing of sea fish, so much the better. In general, however, their greatest short term benefit would appear to come from more efficient utilisation of supplies presently available and realisation of larger net returns from proper placement in appropriate markets and in appropriate forms. In addition a comprehensive quality control programme embracing all fish products is of vital importance.

Secondly, efforts to couple Irish entrepreneurs with foreign processors and marketers in various types of joint venture arrangements seem highly desirable. As indicated in previous chapters, such enterprises provide entry to markets that would otherwise be difficult for Irish processors to penetrate; they make technical expertise available through regular business channels, rather than through publicly supported training programmes; and they provide a reason and an opportunity for both Irish and foreign vessels to land fish in Irish ports on a more regular basis. Contractual joint venture arrangements might also make it possible for the Irish economy to derive some employment benefits from species not marketable in Ireland or in export channels through which Irish firms have previously operated.

Finally, the longer term effects of higher energy prices and biological constraints on the aggregate supply of fish from Community waters may lead to increasing interest in the establishment of much more extensive receiving facilities in Irish ports for fish destined for markets in other Community nations. These developments should be monitored carefully, and appropriate steps taken to encourage the establishment of required facilities (e.g., dock space, freezing, cold storage, and fuel supplies) wherever needed to attract foreign landings.

Harbour Developments

The desirability of reassessing the need for improved Irish harbour facilities was discussed in Chapters 4 and 14, where the considerations which should be taken into account in this assessment, were outlined. The need for substantial improvement in primary harbours at Killybegs, Rossaveel, Castletownbere, Howth, and Greencastle is generally accepted. The development of a secondary group of harbours should take place as funds become available, based on considerations of shelter, proximity to fishing grounds, convenience of access to market, fleet configuration and the contents of the Common Fisheries Policy.

Salmon Fisheries

The serious situation in the Irish salmon fisheries leads to the following recommendations (in addition to the steps taken by the Irish government in 1979 to reduce drift net fishing pressure). First, we feel that additional steps should be taken to reduce salmon fishing capacity. A programme of retiring licences as existing holders leave the fishery is one possibility. Another would be to purchase and retire licences from a fund financed by a levy on salmon landings.

Secondly, the difficulty of dealing with illegal fishing suggests the need for a totally new approach now under discussion in Ireland. This would rest on a tagging system widely used in game management programmes. A limited number of tags to be determined by the Department of Fisheries and Forestry, based on catch experience - port by port and fisherman by fisherman - would be issued. Salmon must be tagged when caught, and the tag must remain affixed at each level of distribution to retailer or exporter. Full accountability would be required at each level of distribution. Periodic random checks at harvesting and marketing levels, accompanised by severe fines for possession of untagged salmon, would provide an inexpensive and effective way of cutting down the flow of illegally caught fish. Control over the number of tags issued would also represent an effective management tool. In addition to this tagging regulation, very severe fines should be imposed on illegal drift netters. These would include, not alone confiscation of gear, but also confiscation of boats. Similar regulations in other countries in respect of illegal lobster fishing have proved highly successful.

Marine Aquaculture

The prospects for aquaculture range from very good to marginal with guarded optimism for overall development sufficient to make a useful contribution to incomes and employment. As in every other country, development of aquaculture even with native species as a base, must be regarded as a very risky financial undertaking. It requires long-term continuing applied research, economic analysis, training in aquaculture techniques and financial aids.

Research is needed in the following areas:

(a) Engineering and materials: to identify better uses of rafts and other structures.

(b) Nutrition: to determine if growth rates can be improved by using, for example, moist pellets based on a wet mix of fish rather than the currently used dry pellets.

(c) Disease: to identify the principal diseases which will face Irish fish farmers, and to initiate programmes on their locations, frequency, pathogenesis, and treatment. A review of the literature suggests that significant advances in disease control can be expected from the results of a not very complicated research programme and already some success in this area has been achieved in the Micro-biology Department of University College Galway and in the Pathology Unit of the Department of Fisheries and Forestry.

(d) Genetics: precocious sexual maturity presents a serious problem among intensively cultured salmon, leading to small sizes and high susceptibility to fungus diseases. Although some success has been achieved in this area further research is required if pen rearing salmon is to become an economic proposition.

(e) Hatcheries: many of the commercial hatcheries built during the past decade have not been very successful. Therefore research is needed to improve the performance of hatcheries by improving reliability and reducing costs. As a result of recent research, Bradán Mara has decided to establish a hatchery to produce salmon smolts specifically for sea farms and to develop further its breeding and selection programme.

(f) Economic analysis: except for a few species the viability of aquaculture in Ireland has not been established. Therefore, in most cases full scale tests of new systems are required to determine economic viability before commercial applications can be encouraged. This will require state expenditure from government agencies and/or semi-state bodies. Large grant aid or heavy technical assistance costs should not be incurred until the economic viability of a system has been determined.

Regarding training and advisory services, there is no doubt that training and education are of crucial importance in aquaculture in Ireland. The type of training and advisory services required were outlined in Chapter 5. It is important to get these courses underway as soon as possible so that those wishing to undertake fish farming activities will have an opportunity of qualifying themselves for their tasks. It is also important to initiate an advisory service, and to appoint site survey officers to advise on site selection. The supply of juvenile fish is an essential element in the progress of aquaculture, and steps must be taken by the relevant authorities to see that such supplies are available to fish farmers.

The development of aquaculture in Ireland will require substantial grant aid if it is to make full use of our natural resources, and have the greatest impact on employment. Grant aid, which for the most part will be administered by BIM and Gaeltarra Éireann, should take two forms (a) pilot scheme grants, and (b) expansion grants. The former should enable operators to initiate schemes and test their viability, while the latter should be available to those who have shown that they have a viable project. The grant aid should relate to capital items of equipment, but, repayable loans should be available for the remaining capital and operating expenses, particularly for approved persons who may have little or no collateral to offer.

Marine Research

The development of fisheries in Ireland, including both sea fisheries and aquaculture, requires an expanded programme of basic and applied research if it is to be fully effective. The management of fishery resources calls for both an expanded programme of statistical data collection and analysis, and longer term studies of the principal commercial species from the standpoint of their biology and response to environmental change. In addition, applied research and development work in fishing gear, techniques, and materials must be tied in with exploratory work aimed at developing new grounds and new marketable species for the industry. The development of aquaculture requires multifaceted research in many dimensions before commercial success can be expected.

The advantages and disadvantages of centralising marine research were reviewed in the preceding chapter. It would appear from a preliminary examination that the advantages of more efficient use of funds and facilities, continuity of research, and coupling of industry-oriented research to more fundamental work in both government and the academic community would best be accomplished in a central marine research institute. Before a definite recommendation can be made in this regard, however, a detailed analysis, going far beyond the scope of this study, would need to be undertaken of alternative arrangements.

APPENDIX 15A

APPENDIX 15A: EEC SOURCES OF FINANCIAL AID FOR FISHERIES AND FISH PROCESSING

The major EEC sources of finance for structural and/or regional projects which are possible sources of finance for some of the projects and programmes discussed in Chapter 15 are outlined below.

The European Agricultural Guarantee and Guidance Fund (FEOGA)

FEOGA is an instrument for financing the common agricultural policy and is divided into two sections; the Guarantee Section which supports the market by helping to guarantee prices and the Guidance Section, which is designed to help improve agricultural structures.

The Guarantee Section

The fish withdrawal system is operated under this section which provides funds for the reimbursement of producer organisations as described in detail in Chapter 11. Export refunds for certain fishery products are also available under this section. To the extent necessary to enable economically important exports of these products to be effected on the basis of prices obtaining on the world market, the difference between these prices and prices obtaining within the Community may be covered by an export refund.

The Guidance Section

Under this section grants are given for the modernisation or expansion of production and marketing facilities. Assistance may also be given to small-scale projects, aimed at providing the basic facilities without which firms could not operate, for example: Construction, equipping or modernisation of aquaculture establishments for the commercial rearing of fish, crustaceans, molluscs in salt or brackish water, and construction and purchase of fishing vessels (EEC Council Regulation Numbers 1852/78 and 592/79). For these types of investments grant rates of up to 50 per cent of the total investment costs are available to improve structural development in less favoured community regions amongst which Ireland is included. The beneficiary must finance at least 25 per cent, and the member state at least 5 per cent of the total investment cost.

Grants are also available under Council Regulation Number 355/77 for:

- Rationalising or developing storage facilities, market preparation, preservation and treatment or processing of fishery products.
- Improving marketing channels.
- Improving knowledge of the facts relating to prices and their formation on the markets for fishery products.

For these types of investments, grant rates, are in general, 25 per cent of the eligible investment but may be increased to 45 per cent for projects to improve production structures in the less favoured regions.(1) The recipient must provide at least 50 per cent (or 35 per cent in special cases) of the investment, and the member state at least 5 per cent.

There is also aid for special schemes which attempt to overcome Community problems of a short-term nature. Few of these are relevant to Ireland as they were introduced to deal with situations which arose before Irish entry to the EEC. However one important area is where aid is given for the initiation of fruit, vegetable and fish producer organisations. Member states may grant aid producer organisations during the three years following the date on which they are established. These organisations must give adequate guarantee as regards the duration and effectiveness of their activities. In the case of fisheries, the grant aid shall not exceed 60 per cent, 40 per cent and 20 per cent of the organisation's administrative costs in the first, second and third years respectively. Fifty per cent of the aid granted by the member state shall be reimbursed by FEOGA.(2)

The European Social Fund (ESF)

The general objective of this Fund is to give help in the case of employment difficulties within the Community and to encourage measures which will increase the

(1) European Agricultural Guidance and Guarantee Fund, Commission of the European Communities, June 1977.

(2) Murray, B., 1975. A Guide to Grants and Loans from EEC Sources, Dublin: Haughey Boland & Co., January.

occupational and geographical mobility of workers. This scheme covers:

- the cost of preparation, operation and management of training courses. This includes income maintenance for the trainee and transport costs etc.;
- the cost of re-settlement, when people have to change their place of residence;
- the Commission may use the fund to help finance preparatory studies and pilot schemes in order to give guidance to the Council and the Commission in the choice of areas of intervention.

The social fund will not grant aid the cost of physical capital investment in the training centres, e.g., cost of the site, cost of building construction, etc. Assistance will, however, be given towards the rental and depreciation costs of buildings on condition that such costs are eligible for aid from the national agencies. The European Regional Fund may however contribute towards the cost of fixed capital investment in training centres, and thus complement the European Social Fund.

In order to qualify for grant aid from the social fund, each training programme must be partly financed by the member state. There are two rates of contribution from the fund:

(a) In the case of operations organised by the Public Authorities or semi-State bodies assistance from the fund will be granted at the rate of 50 per cent of eligible expenditure.

(b) In the case of operations undertaken by private concerns the fund will contribute an amount equal to that paid by the member state - usually one-third of the total cost.

The fund's contribution can be stepped up by 10 per cent in the case of operations undertaken in regions with particularly serious or prolonged employment problems. For pilot schemes the fund may contribute more than 50 per cent of the actual cost.(1)

---

(1) Practical Guide on the Submission and Consideration of Application for Aid from the European Social Fund, European Parliament, October 1977.

European Regional Development Fund (ERDF)

This fund is designed to provide additional aid for operations and projects mounted by national public authorities for regional development. This means that Community resources help to boost member States' own efforts for regional development. Eligible projects include:[1]

- investments in industrial, artisan or service activities which are economically viable and which are being assisted by State regional aids - provided that at least ten jobs are created or preserved.

- infrastructure investment which contributes to the development of the region or area in which they are situated and the cost of which is borne in whole or in part by the public authorities - e.g., the development of industrial zones, transport infrastructures, port facilities, etc.

- investment in rural infrastructure, particularly in mountain areas and the other less favoured regions.

The ERDF contributes 20 per cent of the cost of investment in industrial, artisan or service activities; in exceptional cases it may exceed 20 per cent. However, it may not exceed 50 per cent of the total amount of regional aid granted by the public authorities for the investment. In general the Fund may contribute up to 30 per cent of the expenditure incurred by the public authorities for infrastructure investments under 10 million units of account (approximately £6.7 million) and between 10 per cent and 30 per cent maximum on expenditures over 10 million units of account or more.

This level of aid may, in exceptional cases, be as high as 40 per cent for projects of special value to the development of the region where they are situated. Aid from this fund may take the form of 3 per cent point interest relief on loans granted by the European Investment Bank.

---

(1) Grants and loans from the European Community, Commission of the European Communities, November 1978.

The European Investment Bank (EIB)

The aim of the EIB is to contribute to the balanced development of the Common Market. For this purpose it can give long term loans and provide guarantees to firms, public authorities and financial institutions to finance investment that can help to solve regional problems.

Undertakings which are eligible for assistance from the bank are:

- Projects in the less developed regions of the Community.
- Projects in industrial regions faced with structural difficulties and in need of re-development.
- Projects of priority interest as regards the development of the Community as a whole.
- Infrastructural projects of common interest to several member countries, ports, roads, etc.

While the bank finances infrastructure and investment in all the sectors of the economy, manufacturing industry is the prime beneficiary, although agricultural and fishery improvement projects and services are not ignored. Loans may only be given for investments which directly or indirectly contribute to increased economic productivity in general. Great importance is attached to the economic merits of the projects and the likely effects on employment.

The bank normally finances no more than half the cost of a project. Loans are granted for terms set in accordance with the nature of the project. The maximum term depends also on the conditions obtaining on the capital markets on which the bank raises its funds and is generally seven to twelve years. As the bank is a non-profit making enterprise its loans are generally at interest rates close to those prevailing on the commercial capital markets.

The EIB can also take action to assist in the financing of investment meeting its own criteria. In those cases it provides guarantees for loans raised directly by firms or authorities from commercial institutions.

APPENDIX 15B

APPENDIX 15B: FISHERY STATISTICS - DEFICIENCIES IN THE EXISTING SYSTEM AND RECOMMENDATIONS FOR IMPROVEMENT

The general coverage of the fishery statistics collected to date is inadequate for modern policy decisions. The major shortcomings of the existing system are outlined below.

- The present system of statistics collection cannot yield any information on the area in which the catch was made nor does it provide any information on fishing effort.

- For those ports where the records of a co-operative are available for scrutiny, the information obtained on quantity and value is sufficiently accurate. However, the validity of data obtained from other sources is open to question, particularly since various estimation procedures are involved in their processing.

- Law enforcement duties and other interruptions in the Fishery Officer's work causes delays in collecting statistics. It is essential that the collection of statistics be carried out on a routine basis - but this is impossible with the present workload on the available manpower.

- The absence of any conversion to live weight from landed weight makes Irish published figures incompatible, both with those of other countries and with Irish figures in the statistical bulletins of ICES, FAO, and EEC.

- The use of a species breakdown of industrial landings supplied by the fishmeal plants leads to errors which influence both stock assessment work and quota regulations.

- As in the case of the personnel employed to collect the data, there is a shortage of staff in the statistics section.

- Finally, the entire system lacks any sort of valid cross checking procedure, nor is it possible to introduce one to the system as it is at present.

The recommendations outlined for improving the present system are:

- A primary source of information must be the skipper who can provide data on fishing effort and fishing area and on the quantities of each species caught.

- Information on the landed value of the catch must be obtained from sales records. A sales record identifying the boat, giving data of sale, quantity of each species and handling costs, should be provided daily to the Statistics Section. This recommendation includes all ports of first sale, co-operatives, auctioneers, wholesalers, processing plants, etc.

- The maintenance of a register of fishing vessels is a task for which computer processing is both eminently suitable and necessary. It is recommended that a computer file of vessels be set up immediately, identifying each boat, containing information on tonnage, horsepower, overall length, number of crew, and the date on which this information was last entered or corrected. Additional information such as, the date and place of building and the type of electronic equipment aboard, could also be included without difficulty.

- In the Statistics Section the form containing data on the species caught, time spent fishing, and the boat's identity would be paired with the same boat's sale docket either manually or with a computer programme. Either process would provide a cross check of the data on landed weight and value and fishing effort.

- Catch figures for publication by the Department should first be converted to live weight. The species composition of industrial landings as determined by biological examination should be used, and the value as well as the quantity, should be recorded and published as industrial landings.

- Higher priority should be given to completing the "statlant forms" for ICES and FAO, especially having regard to the resolution passed by ICES at its 1975 Statutory Meeting, which emphasised the increasing requirement for more timely catch data, particularly with regard to species under quota regulations.

- An expanded staff of statistics collectors is obviously necessary, together with improved facilities in the Statistics Section. It is recommended that ten full time collectors be appointed at the following ports: Greencastle, Burtonport, Killybegs (2), Galway, Dingle, Kilmore Quay, Howth (2), and Skerries. It is also recommended that eleven part-time collectors be appointed at: Achill, Valentia, Castletownbere, Schull, Union Hall, Cobh, Helvic, Dunmore East, Dun Laoghaire, Mornington, Clogherhead, and Rossaveel.

- It is envisaged that the collectors would also record catches of shellfish at their respective ports, as well as catches of wetfish. It is also proposed that some of the fulltime collectors could be temporarily transferred to another port in accordance with seasonal fluctuations in landings. Ports not included in these proposals would continue to be covered by the Fishery Officers and Fish Quality Officers.

- It is recommended that a Ministerial Order be issued under the terms of the Statistics Acts for the purpose of compulsorily acquiring information from co-operatives, auctioneers, and wholesalers. It would appear at the moment that there is no suitable method of enforcing such an Order unless it is accompanied by a licencing scheme for fishermen. Non-compliance with the terms of the Order by either fishermen or others could be punishable by a fine of say, £100, plus £10 for every day on which information is not forthcoming. It should be emphasised that under the Statistics Acts, officers are obliged, under penalty, to maintain strict confidentiality with regard to the attributability of the data they collect or process.

- Additional staff and computer facilities will be needed in the Statistics Section of the Department of Fisheries in order to process the data. The staff required would be one key punch operator and one clerical assistant. It must be stressed that the volume of data which will be coming in under the system recommended here, can be handled only with the aid of computer facilities.

The annual extra cost of the suggested service at 1979 prices is estimated as follows:

	£
10 Full time collectors	34,000
11 Part time collectors	19,000
1 Clerical assistant	3,800
1 Key punch operator	3,600
Travelling and subsistence	3,000
Total	63,400

Initial Capital Cost

	£
Control unit, VDU and line printer	8,100
Modums	600
Total	8,700

LIST OF REFERENCES

REFERENCES

AMERICAN SURVEY TEAM, (1964). "Recommendations for Improvement of the Sea Fisheries of Ireland". Dublin: Stationery Office, June.

BJUKE, CARL, (1960). "Report on the Project of Improvement of Fishing Harbour Facilities in Ireland". Dublin: Stationery Office.

BORD IASCAIGH MHARA, Annual Reports for various years.

CENTRAL STATISTICS OFFICE, (1972). Census of Population of Ireland 1971. Dublin: Stationery Office, July.

——————, (1977). Labour Force Survey 1977. Dublin: Stationery Office.

COCHRAN, W.G., (1963). Sampling Techniques. London: Wiley.

COMMISSION OF THE EUROPEAN COMMUNITIES, (1977). European Agricultural Guidance and Guarantee Fund. Brussels: June.

——————, (1978). Grants and Loans from the European Community, Brussels: November.

DEPARTMENT OF FISHERIES AND FORESTRY, Annual Reports for various years.

DEPARTMENT OF INDUSTRY, COMMERCE AND ENERGY, (1979). Report of the Registrar of Friendly Societies for the Year Ended 31 December 1977. Dublin: Stationery Office, July.

ECONOMIST INTELLIGENCE UNIT (Europe, S.A.), (1979). Commissioned Reports.

EUROPEAN PARLIAMENT, (1977). Practical Guide on the Submission and Consideration of Application for Aid from the European Social Fund. October.

EUROSTAT, (1978). Fishery - Captures by Region 1968 - 1977. Statistical Office of the European Communities. November.

FOOD AND AGRICULTURAL ORGANISATION OF THE UNITED NATIONS, (1976). Yearbook of Fisheries Statistics. FAO, Vol. 42.

GLUDE, J. (1979). "An Evaluation of Coastal Aquaculture in Ireland with Recommendations for and Aquaculture Development Strategy". Dublin: draft report prepared for BIM, June (unpublished).

H M S O, (1971). UK Census of Population 1971. London.

———, (1976 - 1978). British Trade Statistics, London: December issues.

INDUSTRIAL DEVELOPMENT AUTHORITY, (1979). An Outline Study of the Development of the Fish Processing Industry in Ireland, Dublin: IDA, February (unpublished).

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA, (1978). Bulletin Statistique des Pêches Maritimes. (ICES), Vol. 60, April.

———, (1976). Herring Assessment - Working Group Report, (ICES).

———, (1979). "Advance Release Bulletin Statistique". (ICES). Vol. 62, January.

———, (1979). "Report of the Irish Sea Bristol Channel Working Group". (ICES).

INTERNATIONAL LABOUR OFFICE, (1978). Yearbook of Labour Statistics. Geneva: I L O.

IRISH AGRICULTURAL ORGANISATION SOCIETY, (1979). "Framework for Co-operative Development". Dublin: I A O S, January.

JORDAN DATA LTD., (1978). "The British Meat and Fish Processing Industry". London: Jordan Data Ltd., 47 Brunswick Place.

LEGISLATION: The Industrial and Provident Societies' Act, 1893.

Sea Fisheries Act, 1931, (No. 4 of 1931).

Fisheries (Revision of Loans) Act, 1931, (No. 33 of 1931).

Sea Fisheries Protection Act, 1933, (No. 53 of 1933).

Sea Fisheries (Protection of Immature Fish) Act, 1937, (No. 33 of 1937).

Sea Fisheries Act, 1952, (No. 7 of 1952).

Fisheries (Consolidation) Act, 1959, (No. 14 of 1959).

The Maritime Jurisdiction Act, 1959, (No. 22 of 1959).

LEGISLATION (Contd.): Fisheries (Amendment) Act, 1962, (No. 31 of 1962).

The Maritime Jurisdiction Act, 1964. (No. 32 of 1964).

Fisheries Harbour Centres' Act, 1968. (No. 18 of 1968).

The European Communities Act, 1972, (No. 27 of 1972).

Fisheries (Amendment) Act, 1978, (No. 16 of 1978).

Fisheries Act, 1980, (No. 1 of 1980).

LESER, C.E.V., (1964). A Further Analysis of Irish Household Budget Data, 1951 - 1952. Dublin: The Economic and Social Research Institute, Paper No. 23.

MURRAY, B., (1975). A Guide to Grants and Loans from EEC Sources. Dublin: Haughey Boland and Co., January.

NATIONAL PRICES COMMISSION, (1975). "Fish Distribution and Marketing", Dublin: NPC Monthly Report No. 39, April, pp 17-46.

——————————, (1978). "A Study of Distribution and Retailing of Fresh, Cured and Frozen Fish", Dublin: NPC, Commissioned report, October (unpublished).

NATIONAL BOARD FOR SCIENCE AND TECHNOLOGY, (1979). Draft Aquaculture Development Programme, Dublin: NBST, October, (unpublished).

NATIONAL COMMITTEE ON PILOT SCHEMES TO COMBAT POVERTY, (1978). Interim Report, November.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, (1973, 1974, 1977, and 1978). Review of Fisheries in OECD Member Countries.

O'CONNOR, R., (1969/70). "An Analysis of Recent Policies for Beef and Milk". Journal of the Statistical and Social Inquiry Society of Ireland, Vol. XXIII, Part III.

O'CONNOR, R., AND B.J. WHELAN, (1972). An Economic Evaluation of Irish Salmon Fishing I: The Visiting Anglers, Dublin: The Economic and Social Research Institute, Paper No. 68.

O'MEALLÁIN, S., (1957). "Development of Irish Sea Fishing and Fishery Harbours". Dublin: Department of Fisheries, April.

PRATSCHKE, J., (1969). Income Expenditure Relations in Ireland, 1965-1966. Dublin: The Economic and Social Research Institute, Paper No. 50, November.

RETAIL BUSINESS, (1977). "The Retail Market for Fresh Fish", Dublin: Retail Business, 234, August.

STATIONERY OFFICE, (1958). First Programme for Economic Development, Dublin.

——————— (1962). Government White Paper, "Programme of Sea Fisheries Development". Dublin.

——————— (1980). Investment and National Development 1979-1983, Dublin.

WHELAN, B.J., R. O'CONNOR, AND A. McCASHIN, (1974). An Economic Evaluation of Irish Salmon Fishing III: The Commercial Fishermen, Dublin: The Economic and Social Research Institute, Paper No. 78, November.

WHITE FISH AUTHORITY, (1969). "Fish Retailer Purchase Study". Edinburgh: Fisheries Economic Research Unit, WFA.

———————, (1976). "Preliminary Study of Factors Affecting the Future of the Fishing Industry". Edinburgh: Fisheries Economic Research Unit, WFA, November.

———————, (1977). "Fisheries of the European Economic Community". Edinburgh: Fisheries Economic Research Unit, WFA.

WRIGHT, G., (1978) The Irish Sea Fishing Industry. Dublin: unpublished Ph.D. Thesis, University College Dublin.

QUESTIONNAIRES

CARD 1

CODE NUMBER

1 2 3 4

5 6

QUESTIONNAIRE ON IRISH SEA FISHING: BOAT OWNERS/OPERATORS

INTERVIEWER NUMBER ....

Is this vessel powered by inboard engine or by outboard/sail/oar?

7

Inboard engine ☐

Tonnage?	
over 50 GRT	1
26-50 GRT	2
11-25 GRT	3
0-10 GRT	4

Outboard/sail/oar ☐

Length of keel?	
18 feet and over	5
Under 18 feet	6

The Economic and Social Research Institute is conducting a survey of fishermen in order to discover the true state of the Irish fishing industry and to allow fishermen to express their views. Could you tell me if you own or have operated a commercial sea fishing vessel during the past twelve months?

Yes ... 1 No ... 2

If No, thank respondent and terminate interview.

As a fisherman, we would be very grateful if you could co-operate with us since your views will represent those of many fishermen whom we cannot interview. The results of our study will be published in the form of statistical tables and nobody will be identified by name, so that your responses are entirely confidential.

Could you tell me first of all whether you are:

The sole owner of the vessel 1

Part owner of the vessel 2 8

Operator (skipper) but not an owner of the vessel 3

If boat is part owned and respondent cannot give all the information relating to the boat's fishing activities during the past twelve months interviewer is to contact the other part owner(s) for the additional information.

Name of respondent's principal boat: ____________________

Name of Port where interviewed: ____________________

Name of Port where principal boat is registered: ____________________

Name of Respondent's home port: ____________________

9 - 17

2.

CARD 1

SECTION 1: VESSELS OWNED BY RESPONDENT

1.1 How many fishing vessels do you own (fully or in part)? [ ] — 18

Please indicate the lengths of each of these vessels:

1 [| |] Feet   2 [|] Feet   3 [|] Feet — 19-21, 22-23, 24-25

1.2 I would now like to ask you about your principal vessel

In the case of the principal vessel could you indicate

Is the vessel used for fishing	Solely .. 1 Partly .. 2	26
Year of purchase	19 [|]	27-28
Initial cost of boat (including built in gear)	£ [| | | | | |]	29-35
Age of vessel	[|] Years	36-37
Estimated remaining life	[|] Years	38-39
Overall length	[| |] Feet	40-42
Beam	[|] Feet	43-44
Gross tonnage of vessel	[| |] Tons	45-47
Hull material (ring one answer)	Steel .. 1; Wood .. 2; Other .. 3	48
Type of engine (ring one answer)	Inboard ... 1 Outboard ... 2	49
Make of engine (specify)	______________	
Brake horsepower of engine	[|] H. P.	50-51
Navigation equipment (ring one answer on each line):		
RDF	Yes ... 1 No ... 2	52
Radar	Yes ... 1 No ... 2	53
Decca navigator	Yes ... 1 No ... 2	54
Track plotter	Yes ... 1 No ... 2	55
Other (specify) ______	Yes ... 1 No ... 2	56

Fish finding equipment?

		Type	Model	
Echo sounder	Yes ... 1 No ... 2			57
Sonar	Yes ... 1 No ... 2			58
Net sounder	Yes ... 1 No ... 2			59
Other	Yes ... 1 No ... 2			60

Radio equipment?

		Type	Model	
R/T	Yes ... 1 No ... 2			61
VHF	Yes ... 1 No ... 2			62
Other	Yes ... 1 No ... 2			63

Winch?

		Type	Model	
Power operated .. 1; Manual .. 2; None .. 3				64
Power block	Yes ... 1 No ... 2			65

Refrigerated hold?	Yes ... 1 No ... 2	66
Cool room capacity	[| |] Cubic Feet	67-69
Do you carry ice to sea	Yes ... 1 No ... 2	70
If yes, how much ice do you carry at a time (weight)?	[| |] Cwt.	71-73

			CARD 1
	Was vessel purchased under BIM scheme?	Yes ... 1 No ... 2	74
	If yes, current amount of annual repayments.	£	75-79
			80 = 1
			CARD 2
			Duplicate cols. 1-4
	Apart from your liabilities to BIM, are there any other mortgages on the vessel?	Yes ... 1 No ... 2	5
	If yes, current amount of annual repayments on these.	£	6-10
	What would you say is the maximum weight of fish that your boat could handle on one trip?	Cwt.	11-14
1.3	What is the current selling value of your principal boat and all the other items of fishing equipment that you own? If you cannot give separate values for different items please try and give total value on last line.		
	Boat alone and built in equipment	£	15-21
	Nets and catching gear	£	22-28
	Outboard engines	£	29-35
	Containers and boxes	£	36-42
	Refrigeration equipment (if not included above)	£	43-49
	Fish finding equipment (if not included above)	£	50-56
	Navigation equipment (if owned by you)	£	57-63
	Other (specify) __________	£	64-70
	Total value of boat and all owned equipment	£	71-77
			80 = 2
1.4	Now I'd like to ask about the operating costs of your principal vessel in the past twelve months.		CARD 3
	During that time, about how much have you spent on:		Duplicate cols. 1-4
	Maintenance/repairs to boat	£	5-9
	Repairs to nets	£	10-14
	Fuel and oil for boat	£	15-19
	Purchase of ropes, buoys, oilskins, etc.	£	20-24
	Social welfare payments ('Stamps')	£	25-28
	Ice	£	29-32
	Auctioneer's and Commission fees	£	33-36
	Salmon licence	£	37-38
	Harbour dues	£	39-40
	Oyster licence	£	41-42
	Insurance on boat	£	43-47
	Rental of navigation and other equipment	£	48-52
	Other (specify) __________	£	52-57
1.5	Do you have any difficulty in keeping your equipment in working order?	Yes ... 1 No ... 2	58
	If yes, could you tell me which items of equipment and specify the problems involved?		59

4.

CARD 3

1.6 If you got into difficulties at sea do you think you would have any difficulty in communicating with other boats or with the shore?

Yes ... 1 No ... 2 — 60

If yes, could you describe these difficulties? — 61

SECTION 2: FISHING ACTIVITIES

2.1 In what year did you first start fishing? 19 — 62-63

2.2 What type of catching gear do you use with your principal boat (ring all that apply)? — 64, 65, 66, 67

Drift nets 1
Draft nets 2
Seine nets 3
Trawl nets 4
Oyster dredge 5
Tangle nets 6
Lines 7
Pots for lobsters, etc. 8
Other (specify) X

2.3 During the past twelve months how many days did you spend fishing in different fishing grounds with your principal boat? — 68, 71, 74, 77

Name of Ground	Days spent fishing in this ground	Name of Port used when fishing this ground	Distance from this port to ground
Local ground (name)			
Other grounds (name) (a) ______ (b) ______ (c) ______ (d) ______			
Total			

29-31
32-34
35-37
38-40

80 = 3

CARD 4

Duplicate cols. 1-

5-
8-
11
14
17
20
23
26

5.

CARD 4

2.4 What is the maximum length of time that your boat could stay at sea without returning to port? [ ][ ] Days — 41-42

2.5 What is the usual number of crew on the vessel (including respondent) and on what basis are they fishing - as share members or as employees?

Total crew (including skipper)	[ ][ ]	43-44
Total share members (including skipper)	[ ][ ]	45-46
Total employees	[ ][ ]	47-48

2.6 Is the value of the catch shared with any non-fishing share members (e.g. shore owners/partners)?

Yes ... 1 — No ... 2 — 49

If yes, how many? [ ] — 50

2.7 Is the respondent himself fishing as: (Ring one of the following)

A share member	1	
An employer	2	51
An employee	3	

2.8(a) If fishing is conducted on a share basis, what proportion of the catch is received by?

Boat	[ ][ ]	%	52-53
Respondent	[ ][ ]	%	54-55
All other crew members	[ ][ ]	%	56-57
Non-fishing share members	[ ][ ]	%	58-59

(Interviewer: check that total of these adds to 100%)

2.8(b) What, if any, expenses are deducted before the shares are allocated? (Circle all that apply)

Maintenance/repairs to boat	1	60
Repairs to nets	2	61
Fuel and oil for boat	3	62
Purchase of ropes, buoys, oilskins, etc.	4	63
Social welfare payments ('Stamps')	5	64
Ice	6	65
Auctioneer's and Commission fees	7	66
Salmon licence	8	67
Harbour dues	9	68
Oyster licence	A	69
Insurance on boat	B	70
Rental of navigation and other equipment	C	71
Other (specify) ______________________	D	72

2.8(c) What would you say is the average take-home pay of one of your crewmen in the last twelve months? (Card 1) [ ] — 73

74-79 Blank

80 = 4

6.

CARD 5

Duplicate cols. 1

2.9 I'd now like to ask you about your catch in the past twelve months.

	Catch	Total weight (cwt.)	Total sale value £	Where caught - fishing ground	Distance from shore	Where landed - name of port
	Wet fish					
1	Herrings					
2	Mackerel					
3	Cod					
4	Whiting					
5	Plaice					
6	Sole					
7	Ray/Skate					
8	Salmon/Sea Trout					
9	Other wet fish					
	Shell fish					
A	Crabs					
B	Prawns					
C	Oysters					
D	Other shell fish					
	TOTAL	—		—	—	—

Puncher see acr
for columns
505 to 674

CARD 6

2.10 Did you catch any salmon in the past twelve months?

Yes ... 1 No ... 2 75

(If yes, interviewer check that weight and value of salmon caught have been entered at Q. 2. 9.)

About how many days did you spend salmon-fishing in the past twelve months?

[| |] Days 76-78

80 = 6

Was your 'principal boat' (as described in Section 1 above) the one which you used for salmon fishing?

CARD 7

Duplicate cols. 1-

Yes ... 1 No ... 2 5

If no, could you give some details of the boat you use for salmon fishing?

Length: .... [| |] Feet 6-8

Selling value of boat and salmon fishing gear £ [| | | |] 9-13

Type of engine: .... Inboard ... 1 Outboard ... 2 14

CARD 7

2.11 What is the main method that you use for disposing of your catch, and which other methods do you sometimes use?

	Main Method (Ring one)	Other Methods (Ring all that apply)	
Sell at local auction	1	1	15
Sell to Co-op	2	2	
Sell to private dealer	3	3	16, 17, 18
Sell direct to Dublin Fish Market	4	4	
Export direct	5	5	
Other (specify)	6	6	

2.12 Do you ever share or hire out your boat with/to another skipper?

Yes ... 1 No ... 2 19

If yes, on what basis is this done? Describe fully, giving details of times fished by different partners and charges or other arrangements made.

20

21

2.13 If you have to transport your catch from port to market, what is the main means of transport that you use?

Do not have to transport catch	1	
Use own lorry	2	
Use hired lorry/van	3	22
Use own car/trailer	4	
Rail	5	
Other (specify)	6	

2.14 Are you satisfied with the transport facilities which are available to you?

Yes ... 1 No ... 2 23

If no, what improvements would you like to see?

24

25

8.

CARD 7

SECTION 3: LIFE HISTORY OF RESPONDENT

We would like to get some idea of the sort of people who are engaged in fishing, their ages, the number of their dependants and so on. Could I therefore now ask you some questions about yourself?

3.1 Would you mind telling me how old you are? [ ][ ] 26-27

3.2 What age were you when you finished full-time education? [ ][ ] 28-29

3.3 What type of education was that?

- Primary 1
- Vocational 2
- Secondary .... 3 — 30
- Third level 4
- Other (specify) 5

3.4 Did you serve an apprenticeship or receive training in any trade (including fishing)?

Yes ... 1 No ... 2 — 31

If yes, what training? ______________________ [ ] 32 [ ] 33

Was this training:

- On-the-job training only........... 1
- Formal classes.................... 2 — 34
- Both 3

3.5 What would you say is your main occupation nowadays, i.e., the one from which you derived the greater part of your livelihood during the last twelve months? (Ring one only)

- Fishing 1
- Farming own farm 2
- Relative assisting on farm 3
- Self employed (other than fisherman or farmer) 4
- Professional/managerial/clerical employee .... 5 — 35
- Skilled manual employee 6
- Unskilled manual employee 7
- Unemployment Benefits/Assistance 8

3.6 In how many weeks during the last year did you engage in this activity? [ ][ ] 36-37

3.7 Could you indicate from the card about how much total income you yourself derived from it? (Card 1) [ ] 38

CARD 7

3.8 During the last twelve months, did you engage in any activities besides your main occupation? If yes, please indicate the type of activity, the number of weeks in which you engaged in it and the approximate amount of your income you derived from this source. (Card 1)

Type of Activity (Ring all that apply)		No. of weeks in which engaged in	Amount of income derived	
Fishing	1			39-41
Farming own farm.........................	2			42-44
Relative assisting on farm	3			45-47
Self employed (other than above)............	4			48-50
Professional/managerial/clerical employee ...	5			51-53
Skilled manual employee	6			54-56
Unskilled manual employee	7			57-59
Unemployment Benefits/Assistance	8			60-62

(Note that total weeks may add to more than 52 if more than one activity engaged in)

3.9 If respondent is a farmer or a relative assisting on a farm, (Codes 2 or 3 in Q's 3.5 or 3.8)

How many acres are there in the farm? st. acres 63-64

How many acres of it is good land? st. acres 65-66

Could you tell me a little about your farming activities?

Number of milch cows 67-68

Number of dry cattle 69-70

Number of sheep 71-72

Number of pigs 73-74

Acres of tillage (wheat, barley, oats, potatoes, etc.) 75-76

Do you sell milk? Yes ... 1 No ... 2 77

80 = 7

If yes, how much did you sell in the past twelve months? gals.

CARD 8
Duplicate cols. 1-4
5-9

3.10 Apart from the above activities, have you ever in the past worked in any job besides fishing? Which jobs? (Code all that apply)

No other occupation	0	
Farmer on own farm	1	10
Relative assisting on farm	2	11
Self employed (other than above)	3	12
Professional/managerial/clerical employee	4	
Skilled manual employee	5	
Unskilled manual employee	6	

Now I would like to ask you one or two questions about the household in which you live.

3.11 Are you: Single ... 1 Married ... 2 Widowed/Divorced/Separated ... 3 13

10. CARD 8

3.12 Are you: 14

Head of household	....	1
Son (in-law) of head	....	2
Father (in-law)	....	3
Other relative of head	....	4
Not related to head	....	5

3.13 If you normally reside with your own family or relatives, could you tell me something about the other members of the household in which you live (Omit if respondent normally lives alone or in lodgings). Complete one line of the table for each household member other than respondent.

Relationship to respondent		Age	Occupation: specify type of job or whether unemployed, retired, housewife or at school		
					15-18
					19-22
					23-26
					27-30
					31-34
					35-38
					39-42
					43-46
					47-50

3.14 (ALL RESPONDENTS) So there are [|] members in your household overall. 51-52

3.15 How many of these are mainly dependent on your income? [|] 53-54

3.16 Where does your household live? (Give nearest town and county) ________________ [|] 55 56

____

____

SECTION 4: ATTITUDES AND OPINIONS

4.1 Would you be prepared to have your boat operated by other crews on a shift basis so that it is at sea more often?

Yes ... 1 No ... 2 57

If yes, what kind of charge would you make for hiring out the boat (complete one of the following by specifying the amount)?

(a) [|] per cent of value of catch 58-59

(b) £[| |] per day 60-62

(c) Other form of charge (specify amount and type)

____

CARD 8

4.2 Are you satisfied that the capacities of the harbours which you use are adequate?

Yes ... 1 | No ... 2 | 63

If not, what improvements would you suggest in which harbours? 64

4.3 Are you satisfied with the facilities provided in the harbour(s) that you use?

Yes ... 1 | No ... 2 | 65

If not, which facilities are not adequate in which harbours? 66

4.4 Do you feel that at the moment there is adequate training for:

(a)	Skippers:	Yes ... 1	No ... 2	67
(b)	Fishermen:	Yes ... 1	No ... 2	68

If no, what improvement would you suggest? 69

4.5 Are you satisfied with the present system for financing the purchase of vessels?

Yes ... 1 | No ... 2 | 70

If not, why not and what improvements would you suggest? 71

4.6	(a)	Are you a member of a fisherman's organisation?	Yes ... 1	No ... 2	72
	(b)	Are you a member of a Co-op?	Yes ... 1	No ... 2	73
	(c)	Are you a member of a Trade Union	Yes ... 1	No ... 2	74

75-79 Blank

80 = 8

CARD 9
Duplicate cols. 1-

4.7 Thinking now about the stocks of various species in the areas you usually fish, could you say whether you think each of the following species is overfished, fully exploited but not overfished or capable of further exploitation (Card 2).

		Overfished	Fully exploited but not overfished	Capable of further exploitation	
1.	Herring	1	2	3	5
2	Mackerel	1	2	3	6
3.	Cod	1	2	3	7
4.	Whiting	1	2	3	8
5.	Plaice	1	2	3	9
6.	Sole	1	2	3	10
7.	Ray/Skate	1	2	3	11
8.	Salmon	1	2	3	12
9.	Lobster	1	2	3	13
10.	Prawn	1	2	3	14

Are there any other species which you consider are overfished?

11. ______________________________ 15

12. ______________________________ 16

____

Are there any other species which you consider could be further exploited?

______________________________ 17

______________________________ 18

____

____

4.8 In the case of those species which you consider overfished, do you think that the present policies are adequate to ensure the survival of these species?

Yes ... 1   No ... 2   19

If no, what policies should be adopted to ensure the survival of these species?

____

____

______________________________ 20

______________________________ 21

____

____

____

4.9 What distance from the coast do you usually fish? [| |] Miles   22-24

4.10 Why do you not go further out?

Boat too small 1

Fishing better in the area that respondent now fishes 2   25

Other (specify) 3

____

CARD 9

4.11 Do you think that there should be an exclusive limit for Irish fishermen? 26

Yes ... 1 No ... 2

If yes, what distance from the coast should it extend? ☐☐☐ Miles 27-29

Why this distance? ______________________________

______________________________ ☐ 30

____

4.12 Which would best describe your comments to a young person interested in fishing as a lifetime career? (Ring one code only)

It is a rewarding career and the outlook is good.................. 1

It is a rewarding career but the outlook is very uncertain.......... 2

It is a rewarding career but the outlook is poor 3 31

There are so many frustrations that I would do something else 4

4.13 Are there any other comments you would like to make about the present state of the fishing industry? ______________________________

____

______________________________ ☐ 32

______________________________ ☐ 33

____

____

____

____

4.14 In order to get the opinion of crewmen as well as owners, we'd like to talk to one or two of the men who usually fish in your crew. Could you give me the names of all your crew members (Interviewers: List surnames in alphabetical order and choose one from the following)

If there are 1 or 2 crewmen, interview No. 1

If there are 3 or 4 crewmen, interview No. 3

If there are 5 or more crewmen, interview No. 5

Get that crewman's address and interview him using the smaller (blue) questionnaire.

CARD 1

QUESTIONNAIRE ON IRISH SEA FISHING: CREWMEN

CODE NUMBER 1 2 3 4

INTERVIEWER NUMBER 5 6

Is this vessel powered by inboard engine or by outboard/sail/oar?

Inboard engine		Outboard/sail/oar	
Over 50 GRT	1	18 feet and over	5
20-50 GRT	2	Under 18 feet	6
11-25 GRT	3		
0-10 GRT	4		

7

4 8

The Economic and Social Research Institute is conducting a survey of fishermen in order to discover the true state of the Irish fishing industry and to allow fishermen to express their views. Could you tell me if you have worked as a crewman on a sea fishing vessel during the past twelve months?

Yes ... 1	No ... 2
If NO, thank respondent and terminate interview.	

As a fisherman, we would be very grateful if you could co-operate with us since your views will represent those of many fishermen whom we cannot interview. The results of our study will be published in the form of statistical tables and nobody will be identified by name, so that your responses are entirely confidential.

SECTION 1: FISHING ACTIVITIES

1.1 In what year did you start fishing? 19 ☐☐ 9-10

1.2 On how many boats have you acted as crewman

(a) in the past twelve months ☐ 11

(b) since you started fishing ☐☐ 12-13

1.3 Thinking now about the vessel on which you worked for the longest time in the past twelve months, could you say what proportion of the value of the catch did you receive?

☐☐ % 14-15

and how much was received by:

Boat	☐☐ %	16-17
Skipper	☐☐ %	18-19
All crew besides yourself	☐☐ %	20-21
Non-fishing share members	☐☐ %	22-23

(Interviewer: Check that total of these adds to 100%)

CARD 1

1.4 What, of any, expenses are deducted before the shares are allocated? (Circle all that apply)

Maintenance/repairs to boat	1	24
Repairs to nets	2	25
Fuel and oil for boat	3	26
Purchase of ropes, buoys, oilskins, etc.	4	27
Social welfare payments ('Stamps')	5	28
Ice	6	29
Auctioneer's and Commission fees	7	30
Salmon licence	8	31
Harbour dues	9	32
Oyster licence	A	33
Insurance on boat	B	34
Rental of navigation and other equipment	C	35
Other (specify) ______________________________	D	36

1.5 What would you say was your average take-home pay in the last twelve months? (Card 1)

37
38-79 Blank
80 = 1

SECTION 2: LIFE HISTORY OF RESPONDENT

CARD 7
Duplicate cols. 1-4

We would like to get some idea of the sort of people who are engaged in fishing, their ages, the number of their dependents and so on. Could I therefore now ask you some questions about yourself?

Cols. 5-25 Blank

2.1 Would you mind telling me how old you are? 26-27

2.2 What age were you when you finished full-time education? 28-29

2.3 What type of education was that? 30

Primary	1
Vocational	2
Secondary	3
Third level	4
Other (specify)	5

2.4 Did you serve an apprenticeship or receive training in any trade (including fishing)? 31

Yes   Yes ... 1   No ... 2

If yes, what training? ______________________________ 32 33

Was this training: 34

On-the-job training only	1
Formal classes	2
Both	3

3.

CARD 7

2.5 What would you say is your main occupation nowadays, i.e., the one from which you derived the greater part of your livelihood during the last twelve months? (Ring one only)

Fishing	1	
Farming own farm	2	
Relative assisting on farm	3	
Self employed (other than fisherman or farmer)	4	
Professional/managerial/clerical employee	5	35
Skilled manual employee	6	
Unskilled manual employee	7	
Unemployment Benefits / Assistance	8	

2.6 In how many weeks during the last year did you engage in this activity? [|] 36-37

2.7 Could you indicate from the card about how much total income you yourself derived from it? (Card 1) [ ] 38

2.8 During the last twelve months, did you engage in any activities besides your main occupation? If yes, please indicate the type of activity, the number of weeks in which you engaged in it and the approximate amount of your income you derived from this source. (Card 1)

Type of Activity (Ring all that apply)		No. of weeks in which engaged in	Amount of income derived	
Fishing	1	[|]	[ ]	39-41
Farming own farm	2	[|]	[ ]	42-44
Relative assisting on farm	3	[|]	[ ]	45-47
Self employed (other than above)	4	[|]	[ ]	48-50
Professional/managerial/clerical employee	5	[|]	[ ]	51-53
Skilled manual employee	6	[|]	[ ]	54-56
Unskilled manual employee	7	[|]	[ ]	57-59
Unemployment Benefits/Assistance	8	[|]	[ ]	60-62

2.9 If respondent is a farmer or a relative assisting on a farm. (Codes 2 or 3 in Q's 2.5 or 2.8)

How many acres are there in the farm?	[|] st. acres	63-64
How many acres of it is good land?	[|] st. acres	65-66
Could you tell me a little about your farming activities?		
Number of milch cows		67-68
Number of dry cattle	[|]	69-70
Number of sheep	[|]	71-72
Number of pigs	[|]	73-74
Acres of tillage (wheat, barley, oats, potatoes, etc.)	[|]	75-76

Do you sell milk? Yes ... 1 No ... 2 77

80 = 7

If yes, how much did you sell in the past twelve months? [. | | | |] gals.

CARD 8
Duplicate cols. :
5-9

CARD 8

2.10 Apart from the above activities, have you ever in the past worked in any job besides fishing? Which jobs? (Code all that apply)

- No other occupation 0
- Farmer on own farm 1
- Relative assisting on farm 2
- Self employed (other than above) 3
- Professional/managerial/clerical employee 4
- Skilled manual employee 5
- Unskilled manual employee 6

☐ 10
☐ 11
☐ 12

Now I would like to ask you one or two questions about the household in which you live.

2.11 Are you: Single ... 1 Married ... 2 Widowed/divorced/separated ... 3 — 13

2.12 Are you:

- Head of household 1
- Son (in-law) of head 2
- Father (in-law) 3
- Other relative of head 4
- Not related to head 5

14

2.13 If you normally reside with your own family or relatives, could you tell me something about the other members of the household in which you live (Omit if respondent normally lives alone or in lodgings). Complete one line of the table for each household member other than respondent.

Relationship to respondent		Age	Occupation: specify type of job or whether unemployed, retired, housewife or at school		
					15-18
					19-22
					23-26
					27-30
					31-34
					35-38
					39-42
					43-46
					47-50

2.14 (ALL RESPONDENTS) So there are ☐☐ members in your household overall. — 51-52

2.15 How many of these are mainly dependent on your income? ☐☐ — 53-54

2.16 Where does your household live? (Give nearest town and county) ____________________

____

____

☐☐
55 56

57-62 blank

SECTION 3: ATTITUDES AND OPINIONS

CARD

3.1 Are you satisfied that the capacities of the harbours which you use are adequate?

Yes ... 1 No ... 2 63

If not, what improvements would you suggest in which harbours? 64

3.2 Are you satisfied with the facilities provided in the harbour(s) that you use?

Yes ... 1 No ... 2 65

If not, which facilities are not adequate in which harbours? 66

3.3 Do you feel that at the moment there is adequate training for:

(a) Skippers: Yes ... 1 No ... 2 67

(b) Fishermen: Yes ... 1 No ... 2 68

If no, what improvement would you suggest? 68

3.4 Are you satisfied with the present system for financing the purchase of vessels?

Yes ... 1 No ... 2 70

If not, why not and what improvements would you suggest? 71

3.5 (a) Are you a member of a fisherman's organisation? Yes ... 1 No ... 2 72

(b) Are you a member of a Co-op? Yes ... 1 No ... 2 73

(c) Are you a member of a Trade Union? Yes ... 1 No ... 2 74

75-79 Bla

80 =

CARD 9
Duplicate cols. 1-4

3.6 Thinking now about the stocks of various species in the areas you usually fish, could you say whether you think each of the following species is overfished, fully exploited but not overfished or capable of further exploitation (Card 2).

		Overfished	Fully exploited but not overfished	Capable of further exploitation	
1.	Herring	1	2	3	5
2.	Mackerel	1	2	3	6
3.	Cod	1	2	3	7
4.	Whiting	1	2	3	8
5.	Plaice	1	2	3	9
6.	Sole	1	2	3	10
7.	Ray/Skate	1	2	3	11
8.	Salmon	1	2	3	12
9.	Lobster	1	2	3	13
10.	Prawn	1	2	3	14

Are there any other species which you consider are overfished?

11. ______________________________ 15

12. ______________________________ 16

Are there any other species which you consider could be further exploited?

______________________________ 17

______________________________ 18

3.7 In the case of those species which you consider overfished, do you think that the present policies are adequate to ensure the survival of these species?

Yes ... 1   No ... 2   19

If no, what policies should be adopted to ensure the survival of these species?

______________________________ 20

______________________________ 21

22-25 Blank

3.8 Do you think that there should be an exclusive limit for Irish fishermen?

Yes ... 1   No ... 2   26

If yes, what distance from the coast should it extend? [ ][ ][ ] Miles   27-29

Why this distance? ______________________________ 30

CARD 9

3.9 Which would best describe your comments to a young person interested in fishing as a lifetime career? (Ring one code only)

It is a rewarding career and the outlook is good	1	31
It is a rewarding career but the outlook is very uncertain	2	
It is a rewarding career but the outlook is poor	3	
There are so many frustrations that I would do something else ...	4	

3.10 Are there any other comments you would like to make about the present state of the fishing industry? ______________________

____

______________________ 32

______________________ 33

____

____

____

34-79 Blank

80 = 9

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF TECHNICAL TERMS AND ABBREVIATIONS

ACFM	Advisory Committee on Fishery Management
BIM	Bord Iascaigh Mhara
CFP	Common Fisheries Policy
CIE	Coras Iompair Eireann
CSO	Central Statistics Office, Dublin
CITPPM	Confédération des Industries de Traitement des Produits des Pêches Maritimes
CSNIC	Ministere de l'Agriculture et Chambre Syndicale Nationale des Industries de la Conserve
DED	District Electoral Division
EEC	European Economic Community
EIB	European Investment Bank
EIU	Economist Intelligence Unit
ERDF	European Regional Development Fund
ESB	Electricity Supply Board
ESF	European Social Fund
ESRI	Economic and Social Research Institute
FAO	Food and Agricultural Organisation of the United Nations
FEOGA	European Agricultural Guidance and Guarantee Fund
FICUR	Fédération des Industries et Commerces Utilisateurs des Basses Températures
GDP	Gross Domestic Product
GNP	Gross National Product
GRT	Gross Registered Tonnage
HMSO	Her Majesty's Stationery Office, UK
ICES	International Council for the Exploration of the Sea
ICOS	Irish Co-operative Organisation Society
IDA	Industrial Development Authority
IFO	Irish Fishermen's Organisation
IFPEA	Irish Fish Producers' and Exporters' Association
IFPO	Irish Fish Producers' Organisation
ITGWU	Irish Transport and General Workers' Union
KFO	Killybegs Fishermen' Organisation
MEY	Maximum Economic Yield
MSY	Maximum Sustainable Yield
NBST	National Board for Science and Technology
NPC	National Prices Commission
NFS	National Food Survey
OECD	Organisation for Economic Co-operation and Development
PAYE	Pay As You Earn
PRSI	Pay Related Social Insurance
TAC	Total Allowable Catch
UCG	University College, Galway
WFA	White Fish Authority

Series: INTERNAL INFORMATION ON FISHERIES

ALREADY PUBLISHED:

1 *Impact régional de la politique de la pêche de la CEE - Situation économique et sociale et perspectives d'avenir du secteur de la pêche dans certaines régions de la Communauté: BRETAGNE*	196-XIV-79-FR	January 1980
	196-XIV-80-EN	September 1980
2 *Impatto regionale della politica della pesca della CEE - Situazione economica e sociale e prospettive del settore in alcune regioni della Comunità: CAMPANIA - CALABRIA*	108-XIV-80-IT	July 1980
	108-XIV-80-EN	February 1980
	108-XIV-80-FR	March 1981
3 *Impatto regionale della politica della pesca della CEE - Situazione economica e sociale e prospettive del settore in alcune regioni della Comunità: SICILIA*	109-XIV-80-IT	July 1980
	109-XIV-80-EN	February 1981
	109-XIV-80-FR	March 1981
4 *Regional impact of the EEC's fisheries policy. Economic and social situation and outlook for the fisheries sector in certain regions of the Community: IRELAND*	140-XIV-80-EN	July 1980
	140-XIV-80-FR	March 1981
5 *EF's fiskeripolitiks regionale betydning. Den økonomiske og sociale situation og fiskerisektorens fremtidsperspektiver indenfor bestemte områder af EØF: JYLLAND*	127-XIV-81-DK	June 1981
	127-XIV-81-FR	July 1981
	127-XIV-81-EN	July 1981
6 *Regionale Auswirkungen der EWG Fischereipolitik – Wirtschaftliche und soziale Lage sowie Zukunftsperspektiven des Fischereisektors in bestimmten Regionen der Gemeinschaft: Küstenregionen im Norden Deutschlands insbesondere: SCHLESWIG-HOLSTEIN*	XIV-149-81-DE	June 1981
7 *Regional impact of the EEC's fisheries policy. Economic and social situation and outlook for the fisheries sector in certain regions of the Community: NORTHERN IRELAND*	*XIV-204-81-EN*	October 1981
8 *Impatto regionale della politica della pesca della CEE - Situazione economica e sociale e prospettive del settore in alcune regioni della Comunità: PUGLIA*	XIV-227-81-IT	October 1981
9 *Impatto regionale della politica della pesca della CEE - Situazione economica e sociale e prospettive del settore in alcune regioni della Comunità: ABRUZZI-MOLISE*	XIV-142-81-IT	October 1981
	XIV-142-81-FR	October 1981