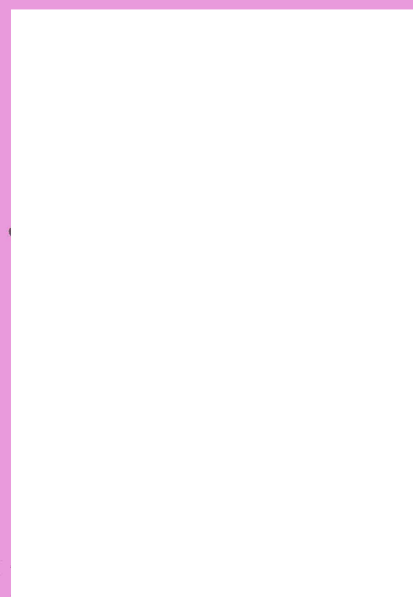


COMMISSION OF THE EUROPEAN COMMUNITIES  
INTERNAL INFORMATION ON FISHERIES

6



Regional impact of the EEC's fisheries policy

Economic and social situation and outlook for the fisheries sector in certain regions of the Community: the coastal regions of Northern Germany, in particular

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COMMISSION OF THE EUROPEAN COMMUNITIES  
Directorate-General for Fisheries  
Directorate B - Market and Structure  
Structural Policy Division

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## IMPACT REGIONAL DE LA POLITIQUE DE LA PECHE DE LA C.E.E.

Situation économique et sociale et perspectives du secteur de la pêche dans certaines régions de la Communauté : Régions côtières du Nord de l'Allemagne, en particulier

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### SCHLESWIG-HOLSTEIN

#### R é s u m é

L'étude en question a pour objet d'analyser la situation économique et sociale du secteur de la pêche dans les régions côtières du Nord de l'Allemagne. Elle porte essentiellement sur la pêche côtière et la pêche en cotres dans le Schleswig-Holstein, mais aborde également certains problèmes qui sortent du cadre étroitement régional et sectoriel de la pêche côtière et de la pêche en cotres dans le Schleswig-Holstein.

L'étude se divise en trois parties. La première comporte un inventaire détaillé du secteur de la pêche dans les zones côtières du Nord de l'Allemagne. En ce qui concerne plus particulièrement la pêche côtière et la pêche en cotres dans le Schleswig-Holstein ainsi que les secteurs situés en aval et en amont, on a réuni des données détaillées, provenant parfois de sources non publiées jusqu'ici en vue d'analyser de manière exhaustive la situation économique et sociale de ce secteur économique. Ces analyses descriptives constituent une base statistique suffisante pour de nouvelles recherches qui ne s'inscriraient pas seulement dans le cadre de la présente étude.

Dans la deuxième partie de l'étude sont analysées les modifications des conditions de base et les tendances d'évolution du secteur de la pêche côtière et de la pêche en cotres. Partant des changements intervenus dans la situation juridique internationale et des compétences élargies de la CEE, on y développe les critères théoriques d'une utilisation optimale des ressources de pêche et l'on y traite des possibilités d'adaptation structurelle.

Le point central de la troisième partie est constitué par un cadre organique au sein duquel pourront être obtenues certaines améliorations, sur le plan de l'efficacité, du secteur de la pêche. L'adjudication de licences de pêche est une partie constitutive essentielle de ce cadre organique. Un tel système prévient une exploitation trop rapide des stocks de poisson et créerait également les conditions d'une sécurité accrue pour les particuliers. Ce cadre organique sert enfin de schéma de référence pour l'appréciation de mesures alternatives en matière de politique de la pêche et de politique des structures.



Den regionale virkning af EF's fiskeripolitik, de økonomiske og sociale forhold samt fremtidsperspektiverne for fiskerisektoren i visse regioner i EF: kystregionerne i Nordtyskland, navnlig Schleswig-Holstein

### R e s u m é

Formålet med denne undersøgelse var at analysere fiskerisektorens økonomiske og sociale forhold i de nordtyske kystdelstater. Undersøgelsen er koncentreret om kyst- og kutterfiskeriet i Schleswig-Holstein, men også andre sammenhænge, der går uden for de snævre regionale og sektorbestemte rammer, som er afstukket for kyst- og kutterfiskeriet i Schleswig-Holstein, tages op til behandling.

Undersøgelsen falder i tre dele. Den første indeholder en detaljeret status over fiskerisektoren i de nordtyske kystdelstater. Navnlig for kutter- og kystfiskeriet i Schleswig-Holstein og de dertil knyttede sektorer er der indhentet detaljerede oplysninger til dels fra materiale, der ikke hidtil har været offentliggjort, for at foretage en omfattende analyse af denne erhvervsgræns økonomiske og sociale forhold. Med disse deskriptive analyser skulle der være skabt et tilstrækkeligt statistisk grundlag for yderligere, af denne undersøgelse uafhængige undersøgelser.

I anden del af undersøgelsen gennemgås ændringerne i de udefra givne forhold samt udviklingstendenserne inden for kutter- og kystfiskeriet. Med udgangspunkt i ændringerne i den internationale retsstilling og EF's udvidede kompetence opstilles der teorier om en optimal udnyttelse af fiskeressourcerne, og der anstilles betragtninger over de strukturelle tilpasningsmuligheder.

Tredje del er centreret om en rammeplan for effektivitetsforbedringer inden for fiskeriet. Bortlicitering af fangstlicenser er en central bestanddel af denne rammeplan. Et sådant system ville både modvirke en for kraftig udnyttelse af fiskebestandene og gøre det muligt for den private sektor at planlægge på et mere sikkert grundlag. Denne rammeplan tjener endelig som grundlag for en vurdering af alternative fiskeri- og strukturpolitiske foranstaltninger.

**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**

**R é s u m é**  
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Ziel dieser Studie war es, die wirtschaftliche und soziale Lage des Fischereikomplexes in den norddeutschen Küstenländern zu analysieren. Die Untersuchung konzentriert sich vorrangig auf die Küsten- und Kutterfischerei in Schleswig-Holstein, behandelt aber auch Zusammenhänge, die über den engen regionalen und sektoralen Rahmen der Küsten- und Kutterfischerei in Schleswig-Holstein hinausreichen.

Die Studie ist in drei Teile gegliedert. Der erste enthält eine detaillierte Bestandsaufnahme des Fischereikomplexes in den norddeutschen Küstenländern. Insbesondere für die Kutter- und Küstenfischerei Schleswig-Holsteins und ihre vor- und nachgelagerten Sektoren wurden detaillierte Daten, teils aus bisher unveröffentlichten Quellen, zusammengetragen, um die wirtschaftliche und soziale Lage dieses Wirtschaftsbereichs umfassend zu analysieren. Mit diesen deskriptiven Analysen sollte eine ausreichende statistische Basis für weitere Untersuchungen - nicht nur im Rahmen dieser Studie - geschaffen werden.

Im zweiten Teil der Studie werden die Veränderungen der Rahmenbedingungen und die Entwicklungstendenzen in der Kutter- und Küstenfischerei untersucht. Ausgehend von den Änderungen der internationalen Rechtslage und der ausgeweiteten Zuständigkeiten der EG werden theoretische Ansätze einer optimalen Nutzung der Fischereiressourcen entwickelt und strukturelle Anpassungsmöglichkeiten diskutiert.

Im Mittelpunkt des dritten Teils steht ein Ordnungsrahmen, innerhalb dessen Effizienzverbesserungen in der Fischerei erreicht werden können. Die Versteigerung von Fanglizenzen ist ein zentraler Bestandteil dieses Ordnungsrahmens. Ein solches System würde sowohl der zu rapiden Ausbeutung der Fischbestände entgegenwirken als auch mehr Planungssicherheit für die Privaten schaffen. Dieser Ordnungsrahmen dient schließlich als Referenzschema zur Beurteilung alternativer fischerei- und strukturpolitischer Maßnahmen.

Incedenza regionale della politica comunitaria della pesca :  
prospettive economiche e sociali del settore della pesca in determinate  
regioni della Comunità : regioni costiere della Germania settentrionale,  
in particolare Schleswig-Holstein

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### S i n t e s i

Lo studio analizza la situazione economica e sociale del settore della pesca nelle regioni costiere della Germania settentrionale. L'indagine è incentrata soprattutto sulla pesca costiera dello Schleswig-Holstein; sono trattate inoltre relazioni che oltrepassano l'augusto quadro regionale e settoriale della pesca costiera dello Schleswig-Holstein.

Lo studio è articolato in tre parti.

La prima contiene un inventario dettagliato del settore della pesca nelle regioni costiere della Germania settentrionale.

In particolare, sono stati raccolti dati precisi, desunti in parte da fonti finora mai pubblicate, sulla pesca costiera nello Schleswig-Holstein e nei settori a monte e a valle, per analizzare in modo esauriente la situazione economica e sociale di questo ramo. Con quest'analisi descrittiva si è inteso creare una base statistica completa per ulteriori indagini - da effettuarsi non soltanto nel quadro del presente studio.

Nella seconda parte dello studio sono esaminate le variazioni delle condizioni di base e le tendenze di sviluppo nella pesca costiera. Prescindendo dalle modifiche della situazione giuridica internazionale e dalle più estese competenze della CEE, si teorizza sull'utilizzazione ottimale delle risorse della pesca e si discutono le possibilità strutturali di adattamento.

Oggetto principale della terza parte è un quadro regolamentare che permetta una migliore efficienza del settore della pesca. L'aggiudicazione delle licenze di pesca è un elemento essenziale di questo quadro regolamentare. Tale sistema impedirebbe il troppo rapido esaurimento delle risorse della pesca, offrirebbe ai privati una maggiore sicurezza di pianificazione e servirebbe infine come schema di riferimento per valutare le misure alternative di politica della pesca e di politica strutturale.

## HET REGIONAAL EFFECT VAN HET VISSERIJBELEID VAN DE EEG :

Economische en sociale situatie en vooruitzichten van de visserijsector in bepaalde gebieden van de Gemeenschap : de kustgebieden van Noord-Duitsland en vooral SLEESWIJK-HOLSTEIN

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### S a m e n v a t t i n g

Het onderwerp van deze studie is de economische en sociale situatie van de visserijsector in de aan zee gelegen Noordduitse deelstaten. Het onderzoek is toegespitst op de kust- en kottervisserij van Sleeswijk-Holstein, maar reikt voor het leggen van verbanden veel verder dan het gebied en de sector van de kust- en kottervisserij in Sleeswijk-Holstein.

De studie bestaat uit drie delen. In het eerste deel is een gedetailleerde inventaris opgenomen van de visserijsector in de aan zee gelegen Noordduitse deelstaten. Vooral voor de kotter- en kustvisserij van Sleeswijk-Holstein en de in het economisch proces op deze produktietak aansluitende vectoren worden gedetailleerde gegevens - deels uit nog niet gepubliceerde bronnen - aangedragen voor een grondige analyse van de economische en sociale situatie van deze sector. Het is de bedoeling met deze beschrijvende analyses een statistische basis te leggen voor verder onderzoek dat ook buiten het bestek van deze studie valt.

In het tweede deel van de studie worden de gewijzigde omstandigheden en de tendensen in de kotter- en kustvisserij bestudeerd. Uitgaande van de gewijzigde internationale juridische situatie en van de verruimde bevoegdheden van de EG, worden theoretische beschouwingen gewijd aan een optimale exploitatie van de visbestanden en worden de mogelijkheden tot structurele aanpassing besproken.

Het centrale onderwerp van het derde deel is een model in het kader waarvan de efficiency van de visserij zou kunnen worden verbeterd. De verkoop van vangstvergunningen is een centraal onderdeel van dit model. Daardoor zou een te snelle exploitatie van de visbestanden worden voorkomen en zou aan de particulieren meer zekerheid worden geboden voor hun planning. Dit model kan ten slotte ook worden gebruikt als referentiekader voor de beoordeling van alternatieve maatregelen op het gebied van het visserij- en structuurbeleid.



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### Abstract

The purpose of this study was to analyse the economic and social situation in the fisheries sector in the North German coastal states. It deals mainly with the small-scale and inshore fisheries of Schleswig-Holstein but also with a number of topics that have broader implications outside these narrow regional and sectoral confines.

The study is divided into three parts. Part A gives a detailed account of the fishing industry in Northern Germany. A wealth of data, some previously unpublished, has been assembled on Schleswig-Holstein's small-scale and inshore fisheries and allied sectors, in order to present a comprehensive analysis of the economic and social situation. This descriptive analysis should provide an adequate statistical basis for further investigations (extending beyond the terms of reference for this study).

Part B examines the changing circumstances and trends affecting small-scale and inshore fisheries. In the light of the changes in international law and the wider powers assumed by the EEC, theories are advanced on the optimum use of fishery resources and possible forms of restructuring are discussed.

Part C puts forward a scheme whereby the efficiency of the fishing industry could be improved. Central to this scheme is the proposal that fishing licences should be auctioned. This would help to prevent the rapid depletion of fish stocks and would enable private operators to plan for the future with greater security. Lastly, such a scheme could serve as a frame of reference by which to assess alternatives in fisheries or structural policy.

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FOREWORD

This study, which was carried out by Professor Dr W. Prewé and Dr C. Thore of the Institut für Weltwirtschaft, Universität Kiel, was financed by the Commission as part of its programme of studies on regional fisheries.

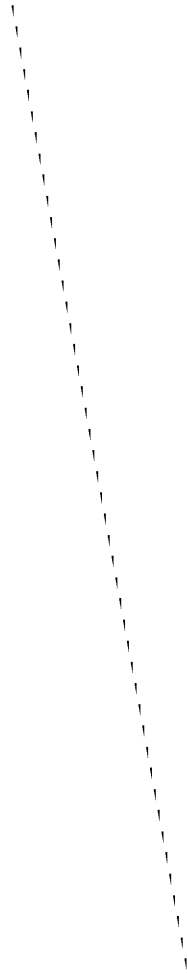
The Structural Policy Division of the Directorate-General for Fisheries participated in the work.

The study does not necessarily reflect the views of the Commission of the European Communities and in no way anticipates any future opinion of the Commission in this sphere.

Original: German

The information given extends up to December 1980.

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## I. The North German coastal states as a region of the Federal Republic

### Location, area and population

The North German coastal states are Schleswig-Holstein and Lower Saxony and the city-states of Hamburg and Bremen. The Federal Republic of Germany has 728 km of coastline: 313 km on the Baltic Sea and 415 km on the North Sea (excluding islands). Schleswig-Holstein accounts for the whole Baltic coastline and 213 km of the North Sea coast, and Lower Saxony for 202 km of the latter. Although the city-states of Hamburg and Bremen are not on the coast itself, they have ready access to the sea along the Rivers Elbe and Weser. The ports of Hamburg and Bremerhaven, which belongs to the city-state of Bremen, are the most productive sea ports in the Federal Republic of Germany.

The North German coastal states represent about a quarter of the total area of the Federal Republic (Table 1). Although the two city-states have a relatively high population density and so substantially increase the average population density of the coastal states, it is still well below the Federal average. While the average population density for the Federal Republic as a whole is 250 inhabitants per square kilometre, the equivalent figure for the coastal states is only 190; for Schleswig-Holstein alone it is 165 and for Lower Saxony only 153. Some 20% of the total population of the Federal Republic live in the coastal states.

### Population structure

An examination of the age structure of the population reveals that the proportion of young people is above the national average in Schleswig-Holstein and Lower Saxony but well below the national average in the city-states of Hamburg and Bremen<sup>1</sup>. Where the working population is concerned, however, the reverse is the case: in the coastal states the proportion of the population between the ages of 18 and 60 is

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1. See Annex, Table A1

Table 1. Area and population of the North German coastal states and the Federal Republic of Germany (FRG) as a whole. Situation as at 31 December 1977

State	Area		Population		Population density	
	km <sup>2</sup>	as % of FRG	1000s	% of FRG	Inhab. per km <sup>2</sup>	FRG avege=100
Schleswig-Holstein	15 696	6.3	2 587	4.2	165	66.8
Lower Saxony	47 415	19.1	7 224	11.8	152	61.5
Hamburg	748	0.3	1 680	2.7	2 248	910.1
Bremen	404	0.2	703	1.1	1 742	705.3
North German coastal states as a whole	64 263	25.8	12 194	19.9	190	76.9
FRG	248 630	100.0	61 353	100.0	247	100.0

Source: Bevölkerungsstruktur und Wirtschaftskraft der Bundesländer, Federal Statistical Office (publisher), Year 1978, p 30.  
Own calculations

below the average, whereas it is above the average in the city-states. The proportion of the population of retirement age - 60 years and over - is above the national average in all the North German states.

This population structure reflects regional differences in the birth rate and regional migration. An above-average birth rate in the coastal states during the 1960s and a traditionally below-average birth rate in the city-states have left their mark on the age structure of the population, as has the movement of people of employable age from peripheral regions to more highly populated areas, where incomes are higher and employment opportunities better.

Income levels

Incomes of the population in the North German coastal states as a whole are somewhat lower than the national average. Although Hamburg can boast the highest income per inhabitant anywhere in the Federal Republic, and even in Bremen per capita income is well above the national average, Schleswig-Holstein and Lower Saxony lag so far behind that the average per capita income in the coastal states is rather lower than the national average (Table 2). The difference in incomes between the North German coastal states themselves differs considerably, depending on which concept of income is taken as a basis. This is due partly to differences in the participation rate and in the capital input in production, but also to the high degree of interlinking between the coastal states.

The state boundaries pass through linked economic areas, and the statistics on the North German states are consequently comparable only to a limited extent with the figures on other Federal states.

Participation rate and employment status

The participation rate (measured as the proportion of the population of employable age who are economically active) in the North German coastal states is above the national average, although Bremen has a surprisingly low participation rate for a city-state<sup>1</sup>.

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1. See Annex, Table A2.



Table 2. Per capita income in the North German coastal states in 1976;  
National average = 100

State	National income per inhabitant	National income per economically active person	Gross income from paid employment per average employee
Schleswig-Holstein	94.2	97.8	97.6
Lower Saxony	90.6	91.5	95.5
Hamburg	134.4	125.1	113.5
Bremen	108.4	103.9	103.0
North German coastal states as a whole	98.5	98.6	99.3
FRG	100.0	100.0	100.0

Source: Volkswirtschaftliche Gesamtrechnungen der Länder, Gemeinschaftsveröffentlichung der Statistischen Landesämter, No 9, Entstehung, Verteilung und Verwendung des Sozialprodukts in den Ländern der Bundesrepublik Deutschland. Revidierte Ergebnisse 1960 bis 1976, pp 276 ff. Own calculations.

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The employment status of the gainfully employed in the North German coastal states differs only slightly from the national average. The proportion of salaried employees and civil servants in North Germany is somewhat higher and the proportion of wage-earners somewhat lower than the national average, while the proportion of self-employed and assisting family-members is approximately the same. In Schleswig-Holstein and Lower Saxony, however, the proportion of self-employed and assisting family-members taken together is well above the national average, while in Hamburg and Bremen it is well below. The proportion of civil servants and salaried employees in the city-states is far above the national average, but even in Schleswig-Holstein it is considerably higher than for the country as a whole.

On the other hand, the proportion of wage-earners among the gainfully employed, both in Schleswig-Holstein and in Hamburg and Bremen, is in some instances considerably below the average for the country as a whole.

These differences in the breakdown of the employment status of the labour force are largely a result of the differences in economic structure in the individual North German coastal states.

#### Economic structure

The economic structure of the North German states is to some extent still considerably affected by natural local factors. In Schleswig-Holstein and Lower Saxony, for instance, agriculture is very important, as is tourism - especially in the coastal areas along the North Sea and the Baltic, but also in the Harz mountains and on the Luneburg Heath. The number of persons working in agriculture, forestry and fisheries as a proportion of the total working population is well above the national average in both states, and the proportion working in the services sector is above the national average, especially in Schleswig-Holstein (Table 3). It is particularly in agriculture and services, however, that the proportion of self-employed is considerably higher than in the other economic sectors.

Table 3. Structure of the working population in the North German coastal states and the FRG as a whole, 1978 (as % of the total working population)

State	Total working population	Agriculture and forestry, animal husbandry and fisheries	Productive industry	Trade and transport	Other economic sectors (Services)
Schleswig-Holstein	100	7.5	33.8	20.1	38.3
Lower Saxony	100	8.1	41.1	18.2	32.6
Hamburg	100	1.2	30.5	29.9	38.4
Bremen	100	1.3	35.8	28.4	34.5
North German coastal states	100	6.6	37.7	20.9	34.8
FRG	100	5.8	45.4	17.7	31.1

Source: Bevölkerungsstruktur und Wirtschaftskraft der Bundesländer 1978, loc cit, pp 60 ff.  
Own calculations.

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The city-states of Hamburg and Bremen are greatly influenced by the fact of having access to the sea. These cities have always played a vital role in the international trade of the Federal Republic, and trade and transport continue to be of great importance in these states today. Almost 30% of the working population in the two city-states work in trade and transport, compared with a national average of less than 20%.

Industrialization in the North German coastal states is at a much lower level than in the country as a whole. In Schleswig-Holstein and the city-states the proportion of the working population engaged in productive industry is about one third. In Lower Saxony the figure of 40% is admittedly much higher, but is still well below the national average of 45%.

A similar pattern is found in the economic structure of the North German coastal states if we consider not the numbers of persons working in each economic sector but the contribution made by the sectors to the value added, ie how much the sectors have contributed to the generation of income in the states. But there are also some clear differences. For example, the difference in the contribution made by agriculture, forestry and fisheries to the gross value added in Lower Saxony and especially in Schleswig-Holstein as compared with the national average is very much greater than the difference in the numbers working in these sectors (Table 4). This reflects the high level of productivity of agriculture in the North German states.

#### Fisheries sector

The fisheries sector is of much greater importance in the North German coastal states than for the country as a whole, although it still does not play a vital part. According to the latest job census carried out in the Federal Republic in 1970, 6655 persons were engaged in fishing, 12 569 in the wholesale and retail fish trade and 13 656 in the fish processing industry. Some 0.1% of the total labour force was engaged in fishing, the fish trade and the fish processing industry altogether in the Federal Republic. In the North German coastal states the figure



Table 4. Structure of the gross value added in the North German coastal states and the FRG as a whole, 1977 (as % of the total gross value added)

State	Gross value added											
	Total	Agriculture, forestry, fisheries	Energy, water supplies, mining	Processing industry	Building	Trade	Transport, communications	Banking, insurance	Letting accommodation	Other services	State	Private households and private non-profit organizations
Schleswig-Holstein	100	7.1	3.7	24.1	8.2	9.6	5.1	3.3	6.9	12.8	17.5	1.5
Lower Saxony	100	6.0	4.7	32.4	7.8	9.1	4.9	3.4	5.9	9.8	14.2	1.8
Hamburg	100	0.7	1.7	28.8	4.6	13.9	14.5	6.2	3.8	14.9	9.5	1.4
Bremen	100	1.1	2.5	35.4	5.6	10.3	12.9	4.8	4.4	10.1	11.6	1.4
North German coastal states	100	4.6	3.7	30.3	7.0	10.4	7.8	4.1	5.1	11.5	13.5	1.6
FRG	100	2.8	3.9	36.4	7.0	9.5	5.8	4.3	5.4	11.6	11.6	1.6

Source: Bevölkerungsstruktur und Wirtschaftskraft der Bundesländer 1978, loc cit, p 202.  
Own calculations.

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was 0.5%. Of the 25 090 persons gainfully employed in this sector, 6635 were in fishing, 6524 in the fish trade and 11 931 in fish processing (Table 5). The fisheries sector was the most important for Bremen. Here, 2% of the labour force was engaged in fishing, the fish trade and fish processing. In Schleswig-Holstein also, the figure of 6.7% for the number engaged in the fisheries sector was above the average for the North German coastal states. In the process of structural adjustment the importance of the fishing industry, as reflected in the numbers employed, will probably have diminished further in the 1970s in all the coastal states. This applies especially to the last few years, during which the fundamental changes in fishing conditions - the introduction of the 200-mile limit and the management of fish stocks by quota controls - have drastically intensified the need for adjustment.

Even though the importance of the fishing industry is not very great for the North German coastal states as a whole, it should not be forgotten that fishing, the fish trade and fish processing are very important for certain areas of these states. And these are often areas in which there are very few industrial jobs available. It has to be recognized that employment opportunities in the North German coastal states have been far fewer than the average for the country. The unemployment ratio both in Schleswig-Holstein and Lower Saxony, and also in Bremen, has sometimes been well above the figure for the country as a whole. In the past, per capita incomes in Schleswig-Holstein and Lower Saxony were even more below the national average than today. Unemployment and the migration of some of the population of employable age were characteristic of the economic problems of the rural areas, eg on the west coast of Schleswig-Holstein or in the Weser-Ems area of Lower Saxony. In some cases these were regions in which the fishing industry was concentrated, so that regional problems already present in the coastal states have been aggravated by the shrinkage in the fishing industry.

Table 5. Numbers engaged in fishing, the fish trade and fish processing in the North German coastal states, 1970

State	Numbers of persons engaged				
	Fishing	Fish trade	Fish processing	Fish industry (1)+(2)+(3) as % of total working population	(5)
	(1)	(2)	(3)	(4)	
Schleswig-Holstein	1 527	1 173	2 995	5 695	0.7
Lower Saxony	1 972	2 543	3 778	8 293	0.3
Hamburg	468	1 732	1 577	3 777	0.4
Bremen	2 668	1 076	3 581	7 325	2.0
North German coastal states as a whole	6 635	6 524	11 931	25 090	0.5
FRG	6 655	12 569	13 656	32 880	0.1

Source: Job census of 27 May 1970, Federal Statistical Office (publisher), Fachserie C, No 2. Stuttgart and Mainz 1972

## II. Small-scale and inshore fishing in the North German coastal states

### 1. The structure of the West German fishing industry

#### a. Types of fishing carried out

In the German fishing industry three types of fishing are carried out. Deep-sea fishing, which at the end of 1976 consisted of a fresh-fish fishing fleet of 39 boats with an annual capacity of some 100 000 t and a deep-freeze fleet of 27 factory ships with an annual capacity of more than 200 000 t and accounts for some 70% of the catch, is the most important type. Lugger fishing (formerly herring fishing) accounts for little more than 1% and is of virtually no significance. The remaining 29% or so is accounted for by small-scale and inshore fishing. In 1976 this involved a total of 2400 vessels. The small-scale and inshore fishing grounds predominantly comprise the North Sea (three quarters) and the Baltic (one quarter). Table 6 gives some overall figures.

#### b. Restrictions on catch possibilities as a result of alterations in the law of the sea

Developments in the international law of the sea affect the fishing industry in the Federal Republic to very different degrees. A distinction has to be made between deep-sea and coastal fishing, but also within these types of fishing. Hitherto some 80% of deep-sea fishing catches came from waters off non-member countries, and the remaining 20% from "EEC waters". The individual fishing grounds off non-member countries with the catches for 1976 are shown in Table A3 in order of importance<sup>1</sup>. For all the areas listed in the table, with the exception of Namibia, 200-mile fishing limits have existed for some time. The high level of dependence on non-member countries raises the question of possible alternative grounds and different species of fish in the

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1. It is not possible to update this table on the basis of official statistics. In official fisheries statistics most catches in waters of non-member countries are grouped together under the heading "Mixed voyages".

Table 6. Catches in 1976 and 1978 (in 1000 t)

1. FRG catch compared to world catch	1976	1978
a. World catch in 1000 t	72 113	72 379
b. EEC catch	5 070	4 961
c. FRG	454	412
2. German fishing fleet catches		
a. Deep-sea fishing catches	291	286
- of which off non-member countries	235	246
b. Small-scale, inshore and herring fisheries	135	109

Sources: Fischerei, Fänge nach Fanggebieten, 1968-1977, Eurostat 1978; Tables 8, 9; Jahresbericht über die Deutsche Fischwirtschaft 1978/79, published by the Federal Ministry of Food, Agriculture and Forestry, Berlin, December 1979.

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event of restrictions on access. This problem is one which affects deep-sea fishing almost exclusively, and applies to the fresh-fish and frozen-fish fleets in different ways. The fishing grounds of the fresh-fish fleet are limited to the North-East Atlantic because of the perishability of the fish. EEC waters constitute a major part of the North-East Atlantic. This can provide German fishermen with only limited possible alternatives because of the EEC catch quotas.

In contrast to the fresh-fish fleet, the radius of operation of the deep-freeze fleet is subject to no limits because the catches can be processed and frozen at sea. In order to be able to operate on a rational basis, however, it is dependent on fishing grounds which contain high concentrations of identical species. This is not the case in EEC waters, or is no longer the case because of overfishing. The fishing grounds of the deep-freeze fleet are therefore concentrated almost exclusively on the continental shelves off non-member countries, ie their 200-mile zones. For biological and technological reasons the open sea offers only limited alternatives. The stocks there are either heavily overfished (especially tunny) or widely scattered, so that with current technology and current fish prices there is no profit in fishing there<sup>1</sup>. Some important exceptions are ocean waters near the equator or the northern North Atlantic (blue whiting) and perhaps the Antarctic (krill)<sup>2</sup>.

In analysing the implications of alterations in the law of the sea for German small-scale and inshore fisheries, a distinction has to be made between fishing areas (North Sea, Baltic) and types of fishing (fresh-fish, shrimps and mussel fishing). The Baltic, in which the Federal Republic has only 3% of the fishing areas allocated to it, accounted for some 10% of the German catch in 1977. Directly and indirectly,

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1. Mainly sardines (for fish-meal processing) and pelagic cephalopoda.
  2. See paper by Prof. Dr G. Hempel on "Problems of the Third UN Conference on the Law of the Sea with particular reference to mining of the sea bed", Report 19 of the Foreign Affairs Committee, Deutscher Bundestag, 8th electoral period, Bonn, 7 December 1977, pp 463-470.

the effects on inshore fishing in the North Sea and the Baltic will depend on what quotas are allocated to German fishermen in EEC waters, and what agreements on fishing rights are reached between the Community and non-member countries. These aspects will be examined more closely in parts B and C of this study.

c. Structural change

The German fishing industry is faced with serious problems of adjustment, and not only because of decisions by the Conference on the Law of the Sea and the EEC's fisheries policy. Major changes in fishing conditions and in demand have already called for a considerable degree of adjustment in the Federal Republic's fishing industry in the past. Landings by the German fishing fleet had already fallen by almost 40% between 1960 and 1976. This decline affected deep-sea and herring fishing very much more than small-scale and inshore fishing (Table 7).

The fishing fleet has become very much smaller both in deep-sea fishing and in inshore fishing. Between 1960 and 1976 the number of deep-sea fishing vessels dropped by more than 200%; however, the modernization of the fleet which was taking place at the same time left its capacity in terms of GRT almost unchanged. Only since 1975 has there been a clear tendency towards a decrease in capacity (Table 8). In deep-sea herring fishing the decline was even more marked; today it is of virtually no significance. By 1978 there were only 5 vessels engaged in deep-sea herring fishing; in 1960 there were more than 100. Parallel to the restructuring, there was a strong move towards concentration of enterprises in deep-sea fishing. Small operators are no longer active in deep-sea fishing. The deep-sea fishing fleet is today in the hands of only four groups; food and luxury food concerns (Unilever, Oetker, Jacobs) are involved in the three largest groups (Pickenpack being the exception). The number of cutters fell by about half between 1960 and 1978. In the 1960s and 1970s it was only the inshore fishing fleet which showed little change in the number of vessels, although here too there has been a downward trend in the last few years.

Table 7. Landings from sea fishing in the FRG by type of fishing

Year	Deep-sea fishing			Deep-sea herring fishing			Middle-water and inshore fishing			Total	
	1000 t	as % of total	Mill DM	1000 t	as % of total	Mill DM	1000 t	as % of total	Mill DM	1000 t	Mill DM
1960	383	64.7	187	69	11.7	33	140	23.6	43	593	262
1965	351	64.2	245	54	9.9	29	142	25.9	55	546	329
1970	405	68.6	265	8	1.4	5	177	30.0	75	591	345
1971	345	70.1	269	8	1.5	4	140	28.3	83	493	356
1972	268	66.1	235	7	1.7	4	130	32.2	92	405	332
1973	315	69.1	318	8	1.7	6	133	29.2	102	465	426
1974	349	70.8	414	5	1.1	4	139	28.1	103	493	522
1975	314	72.2	312	4	1.0	3	116	26.8	96	434	411
1976	291	68.3	326	6	1.4	4	129	30.3	107	426	437
1977	279	70.6	309	5	1.3	5	111	28.1	118	395	433
1978	286	72.3	279	4	1.0	4	105	26.3	112	395	395

Source: Die Fischwirtschaft in Zahlen, published by the Institute for Agricultural Market Research of the Federal Institute for Agriculture, Brunswick-Völkensrode, 3rd edition 1978, Brunswick 1978, p 29. Jahresbericht über die deutsche Fischwirtschaft, 1977/78, 1978/79, loc cit.



Table 8. FRG fishing fleet by type of fishing

End of year	Deep-sea fishing			Deep-sea herring fishing			Middle-water and inshore fishing					
	Number	GRT (1000)	Crew	Number	GRT (1000)	Crew	Number		Crew		Inshore vessels	
							Cutters	Inshore vessels	Cutters	Inshore vessels	Cutters	Inshore vessels
1960	202	119.5	4 591	104	24.2	1 874	1 348	1 661	3 435	1 434	1 370	1 370
1965	155	131.4	4 703	64	18.6	1 109	1 044	1 625	2 631	1 370	1 370	1 370
1970	110	117.1	3 902	14	5.4	162	958	1 734	2 328	557 <sup>a</sup>	557 <sup>a</sup>	557 <sup>a</sup>
1971	104	113.7	3 583	10	3.1	131	921	1 820	2 241	646 <sup>a</sup>	646 <sup>a</sup>	646 <sup>a</sup>
1972	97	122.4	2 997	10	2.9	127	864	1 819	2 131	576 <sup>a</sup>	576 <sup>a</sup>	576 <sup>a</sup>
1973	84	135.2	3 576	8	2.3	65	820	1 770	2 050	542 <sup>a</sup>	542 <sup>a</sup>	542 <sup>a</sup>
1974	74	124.0	3 688 <sup>b</sup>	7	2.1	.	794	1 688	2 005	485 <sup>a</sup>	485 <sup>a</sup>	485 <sup>a</sup>
1975	71	121.6	3 236 <sup>b</sup>	5	1.5	.	746	1 702	1 856	457 <sup>a</sup>	457 <sup>a</sup>	457 <sup>a</sup>
1976	64	112.2	3 003 <sup>b</sup>	5	1.5	.	715	1 676	1 753	442 <sup>a</sup>	442 <sup>a</sup>	442 <sup>a</sup>
1977	65	109.9		5	1.5		663	538 <sup>c</sup>	1 748	428 <sup>a</sup>	428 <sup>a</sup>	428 <sup>a</sup>
1978	58	103.7		5	1.5		667	522 <sup>c</sup>	1 671	391 <sup>a</sup>	391 <sup>a</sup>	391 <sup>a</sup>

a. Excluding part-time and sport fishermen. b. Including deep-sea herring fishing.  
 c. The large decrease between 1976 and 1977 is due to the fact that from 1977 onwards the sport fishing boats included for Lower Saxony and Bremen are no longer included.

Source: Die Fischwirtschaft in Zahlen, loc cit, p 25; Jahresbericht über die deutsche Fischwirtschaft, 1978/79, loc cit.

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This decrease in the fishing fleet has sometimes brought serious problems of adjustment for the individual ports. Only a few were affected by the decline in deep-sea fishing since it was concentrated in only a few ports. The main ones were Bremerhaven and Cuxhaven. In 1960 these were the home ports of more than three quarters of the vessels, the rest being based in Hamburg and Kiel. Since 1975 there have been no deep-sea fishing vessels operating out of Schleswig-Holstein. The last nine deep-sea fishing vessels stationed in Kiel were chartered to Cuxhaven in 1975.

## 2. Resources

### Fishing grounds and species in the North Sea and the Baltic: general survey

The German small-scale and inshore fishing areas in the North Sea and the Baltic are among the potentially richest fishing grounds in the world. While the North Sea makes up only 0.15% of the area of the world's seas, it accounts for about 5% of the total world fish catch<sup>1</sup>.

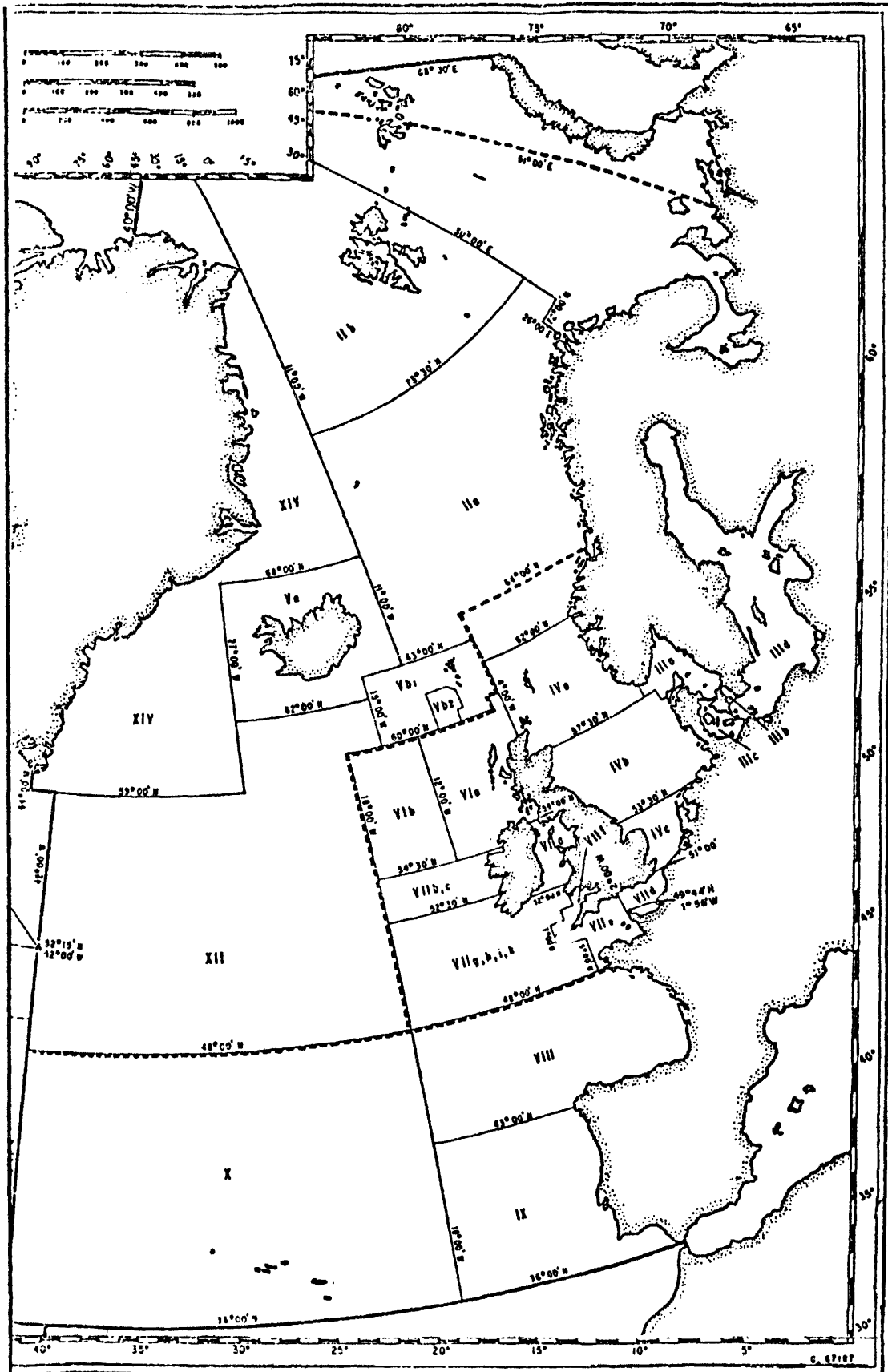
There are no comprehensive, exact and continuously updated statistics on fish stocks in the North Sea and the Baltic. From the point of view of fishery biology alone such a survey would require an enormous amount of research. For example, the growth in fish stocks depends to a very great extent on the oxygen content and salt content in deep water. As these parameters are subject to fluctuations both in time and space, fish stocks could be estimated only at the cost of a great deal of fishery biological research. Without such research, however, the estimates of fish stocks are usually subject to substantial errors. In many cases it is therefore necessary to use catch statistics in order to obtain at least some guide as to the nature of the stocks.

Figure 1 shows the fishing areas off the North European coasts. The most important catches, by species and by area, are given in Table 9,

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1. See K. Tiews, Fishery resources of the North Sea and their importance for the German small-scale fishing industry, in: Fishery resources, fisheries policy and market structure and their importance for small-scale fishing, Proceedings of the German Fisheries Association, No 17, Hamburg, 1974, p 17.

Figure 1. Fishing areas in the North-East Atlantic  
Sub-areas of region 27



Source: Eurostat 1978, loc cit.



Table 9 (continued)

Fishing area	Species	FRG			EEC			Total		
		1967	1972	1977	1967	1972	1977	1967	1972	1977 (1976) <sup>2</sup>
27 of which	Pollack	100	100	150	2 100	2 300	9 250	8 000	5 900	(5 840)
III a	"	11	2	4	15	2	1 781	456	308	(996)
IV	"	58	149	81	384	458	1 032	3 314	1 641	(1 099)
IV b	"	35	141	19	181	383	:	181	383	:
27 of which	Whiting	700	500	615	180 500	158 400	184 111	185 500	160 100	194 988
III a	"	3	0	1	30 134	14 538	18 157	30 157	14 562	(18 595)
III b,c,d	"	4	6	137	2 759	1 168	593	2 760	1 170	(3 805)
IV	"	612	264	461	87 636	108 188	116 424	92 158	109 425	(190 644)
IV b	"	461	231	196	:	:	42 208	:	:	:
27 of which	Haddock	5 200	6 400	9 868	211 100	258 500	198 719	366 900	520 100	363 481
of which	"	6	20	16	429	2 836	7 122	469	2 989	(9 094)
III a	"	0	5	1	1	5	1	1	5	(0)
III b,c,d	"	1 872	4 020	3 764	125 284	170 505	141 323	168 128	213 466	(204 432)
IV	"	952	3 664	2 753	:	:	32 134	:	:	(:)
IV b	"	200	200	64	32 300	26 700	19 275	117 500	94 900	(92 372)
27 of which	Hake	1	1	0	353	747	1 366	374	804	(1 353)
III a	"	125	146	63	1 746	1 927	1 496	2 017	2 945	(2 814)
IV	"	56	83	48	:	:	:	:	:	:
IV b	"	100	0	310	2 600	4 200	15 400	119 400	265 200	223 502
27 of which	Horse mackerel	96	4	2	134	406	653	144	7 980	(8 668)
IV	"	96	0	2	116	11	:	118	11	:
IV b	"	96	0	2	116	11	:	118	11	:

Table 9 (continued)

Fishing area <sup>1</sup>	Species	FRG			EEC			Total		
		1967	1972	1977	1967	1972	1977	1967	1972	1977 (1976) <sup>2</sup>
27 of which	Herring	95 900	22 300	8 135	625 800	677 311	200 860	3302 300	1362 100	711 216
III a	"	1 259	0	32	145 700	89 217	52 740	244 698	106 822	(87 125)
III b,c,d	"	23 546	10 793	7 660	47 096	26 874	33 127	267 224	286 556	(386 377)
IV	"	39 949	5 532	221	272 368	307 062	28 354	824 514	604 808	(162 454)
IV b	"	27 997	4 652	221	:	:	12 090	:	:	(:)
27 of which	Sprat	14 400	2 000	11 758	70 300	92 200	376 632	154 800	325 200	624 588
III a	"	-	-	-	3 099	2 142	60 497	6 339	4 445	(93 348)
III b,c,d	"	2 930	297	713	6 544	1 899	17 646	61 487	193 294	(194 065)
IV	"	11 462	1 654	5 890	56 042	73 760	277 552	69 496	92 371	(564 748)
27 of which	Mackerel	2 500	500	5 317	89 100	68 700	314 072	1015 900	367 800	687 015
III a	"	34	0	0	9 055	570	1 373	20 069	5 961	(7 013)
III b,c,d	"	22	0	0	279	21	5	306	23	(8)
IV	"	2 098	103	577	33 798	13 694	27 668	911 042	182 292	(296 829)
IV b	"	290	103	140	:	:	7 382	:	:	(:)
27 of which	Shrimps	0	-	1	4 800	3 200	3 557	16 700	20 100	34 477
III a	"	-	-	-	859	773	763	-	-	(5 830)
IV	"	4	-	1	3 936	3 140	2 771	-	6 880	(5 230)
IV b	"	4	-	1	:	:	270	:	:	(:)

1. For fishing area codes see Fig. 1: IIIa Kattegat and Skagerrak; IIIb,c,d Baltic itself, Sunde and Belte; IV North Sea; IVb Central North Sea.

2. Figures in brackets are for 1976.

Source: Eurostat 1978, loc cit.

which shows the catches by Germany, the nine EEC Member States and the total catches for 1967, 1973 and 1977. In the allocation of figures for the individual areas, the catch for the whole of region 27 is given first; this is then broken down into North Sea and Baltic, with catches in the middle North Sea (area IVb), the Kattegat and Skagerrak (IIIa) and the Baltic itself with Sunden and Belten (IIIb,c,d) given separately.

#### a. North Sea

The most important species in the North Sea are cod, saithe, plaice and other flatfish (turbot, common sole, witch). Because of fishing bans, herring fishing in the North Sea is largely at a standstill. Haddock occurs mainly as a by-catch in saithe and cod fishing in the central and northern North Sea<sup>1</sup>. To illustrate the importance of the individual fish stocks, the catches of the EEC Member States in the North Sea are given in Table 10 and presented as a graph in Figure 2. Figure 3 shows the most important fishing grounds in the North Sea.

#### i. Fish for everyday consumption

In the case of cod, quantitatively the most important food fish in the North Sea, a distinction is made between three stocks: (1) in the southern part of the central North Sea, south of the Dogger Bank; (2) north of the Dogger Bank in the central part of the North Sea; and (3) north of the Dogger Bank in the waters off England. North Sea cod reaches reproductive maturity at three to five years and its weight at six years is 10 kg. The most intensively exploited areas are the coastal areas, eg German Bight<sup>2</sup>. There are important fishing grounds off Borkum and Heligoland up to the North Friesian Islands.

The fact that middle-water fishing is highly dependent on cod raises various problems. In the first place, the sometimes drastic fluctuation in cod seasons has major economic effects on the fishing enterprises. Secondly, overfishing of cod has reached such proportions

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1. See Die Kleine Hochsee- und Küstenfischerei Niedersachsens und Bremens im Jahr 1978, Annual report of the Bremerhaven State Fisheries Office, reprinted from: Das Fischerblatt, 2-6, 1979, p 27.

2. See Tiews, loc cit, p 4

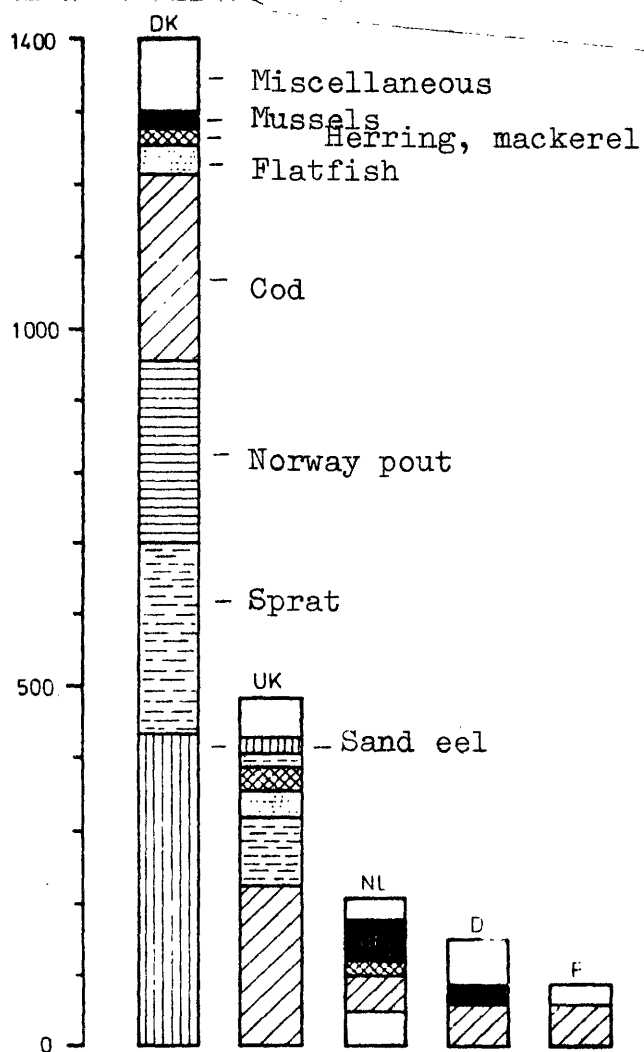
Table 10. Catches by EEC countries in the North Sea by species, 1976 (in 1000 t and as a percentage of the total catch)

	Belgium		Denmark		France		FRG		Netherlands		UK		EEC	
	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%	Qty	%
Cod	7.5	27	53.3	4	8.1	9	24.4	18	21.8	10	86.1	18	201.2	9
Haddock	2.2	8	46.9	3	5.5	7	3.4	3	1.7	1	97.8	21	157.5	7
Whiting	2.6	9	17.0	8	19.5	23	0.3	-	12.3	6	31.3	7	183.0	8
Saithe	0.1	-	47.6	3	32.6	39	38.5	29	6.1	3	19.3	4	144.2	6
Plaice	4.6	16	25.6	2	0.5	1	3.6	3	46.5	22	27.1	6	107.9	5
Sole	1.4	5	0.6	-	0.6	1	0.2	-	11.0	5	0.5	-	14.3	1
Norway pout	0.5	-	245.2	18	-	-	-	-	-	-	19.1	4	264.8	11
Sand eel	-	-	424.7	31	-	-	-	-	-	-	18.7	4	443.4	19
Herring	1.4	-	32.5	2	7.3	9	1.7	1	17.9	8	24.9	5	85.7	4
Sprat	-	-	261.5	19	-	-	1.7	1	-	-	80.8	17	344.0	15
Mackerel	0.3	1	26.9	2	2.6	3	0.3	-	2.1	1	1.3	-	33.5	1
Mussels	-	-	30.2	2	-	-	22.7	17	73.3	33	6.4	1	132.6	6
Other	7.2	27	80.8	6	7.1	8	36.5	28	23.0	11	62.0	13	216.6	9
Total	27.8	100	1392.8	100	83.8	100	133.3	100	215.7	100	475.3	100	2328.7	100

Source: "Bygd", Esbjerg, Vol 9, No 1, p 31; own calculations.



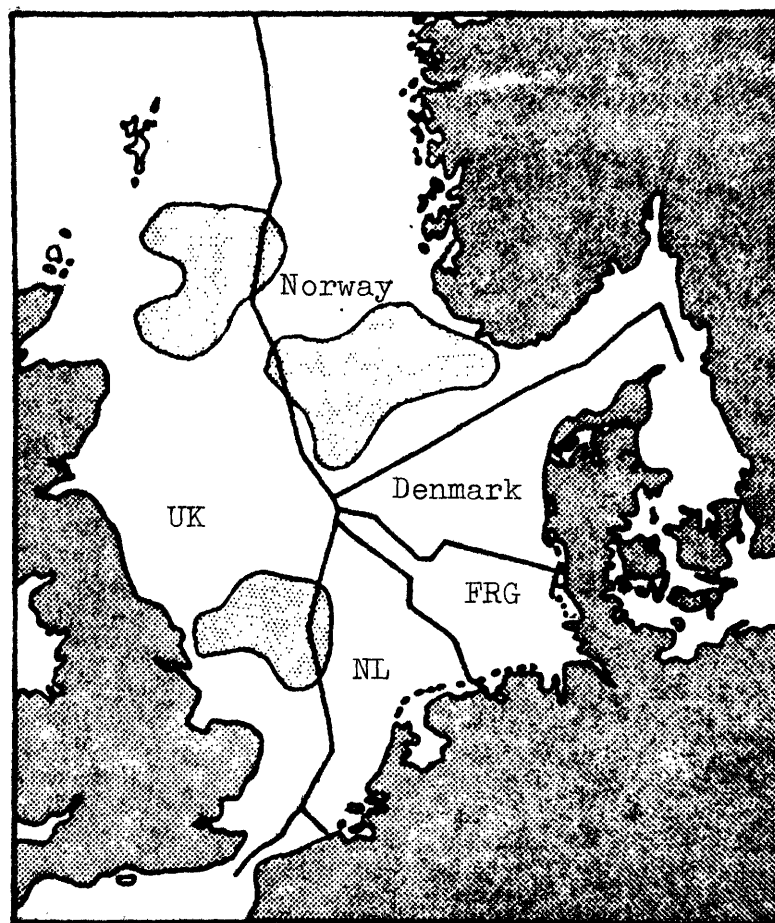
Figure 2. Catches by EEC countries in the North Sea, 1976 (1000 t)



Source: "Bygd", Esbjerg, Vol 9, No 1, p 31

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Figure 3. The most important fishing grounds in the North Sea and the division of the North Sea by the median line principle



Source: "Bygd", Esbjerg, Vol 9, No 1, p 15.  
The grey areas represent some of the largest  
fishing grounds in the North Sea.

that the German cod catch is concentrated on grade V, ie one-and-a-half-year-old cod, which has just reached a minimum commercial size. The above parameters on growth and reproductive maturity illustrate the economic objections to this degree of overfishing.

Of fish for everyday consumption, the next most important fish for middle-water and inshore fishing after cod is saithe. The most important fishing grounds are West Bank and Viking Bank. In the last few years, however, there has been a steep decline in saithe fishing. The long distances to the fishing grounds in the central and northern North Sea and the heavily fished resources, with only slightly higher prices, have made this form of fishing less profitable than cod fishing in the German Bight.

Third in order of importance for small-scale and inshore fishing come haddock and plaice. As recently as 1970 haddock made up the second largest fish stock (after herring) in the North Sea<sup>1</sup>. Haddock, however, occurs only as a by-catch in pollack and cod fishing in central and northern North Sea waters; because it is a secondary product and there is less fishing in these waters, haddock catches have also been on the decline in recent times.

Of the flatfish, plaice is the most important. The main breeding grounds are in the Waddensee between the chain of islands and the North Sea coast from Denmark down to the Netherlands<sup>2</sup>. Plaice are caught both in middle-water and inshore fishing. Middle-water fishing is carried out almost exclusively on the Schlick Bank, while inshore fishing concentrates on the fishing grounds off the islands. In the waters of 10 to 20 metres depth there, sole, turbot and hen fish are also important catches. Apart from that, sole, witch and turbot also occur as by-catches in middle-water fishing. Eels for everyday consumption are also caught with trawl nets in the inner German Bight<sup>3</sup>.

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1. See Tiews, loc cit, p 5

2. Ibid, p 2

3. Die Kleine Hochsee- und Küstenfischerei Niedersachsens und Bremens im Jahr 1978, loc cit, pp 34 et seq.

ii. Fish-meal and industrial fish

Apart from fish for everyday consumption, various species are caught as raw material for fish-meal and animal feeding stuffs. These include sand eels and Norway pout. Sand eels are found in the southern part of the central North Sea, while Norway pout are concentrated in the northern part of the North Sea<sup>1</sup>.

iii. Shrimps

While cod fishing provides the largest catches and proceeds for middle-water fishing, shrimps are the most important catch for inshore fishing. In terms of quantity and value shrimp fishing is by far the most important type of fishing for middle-water and inshore fishing as a whole in the North German coastal states. And within the North German coastal states it is shrimp fishing along the Schleswig-Holstein coast that occupies a dominant position: landings by Schleswig-Holstein shrimp boats are some 50% higher than those in Lower Saxony<sup>2</sup>.

iv. Mussels

Compared with shrimp fishing, mussel fishing occupies a secondary position: in terms of value it is in a proportion of about 1:8 relative to shrimp fishing. About one fifth of the mussel catch consists of cockles, but the majority are blue mussels. Special mention must be made of the mussel cultivation beds (a total of 40 with an area of 854.4 hectares) on the Schleswig-Holstein west (North Sea) coast. However, in contrast to shrimp fishing, landings in Schleswig-Holstein are only slightly higher than those in Lower Saxony, one of the reasons for which is to be found in the advantageous location (near the consumer markets) of the East Friesian - and Netherlands - mussel producers<sup>3</sup>.

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1. Tiewes loc cit, p 8

2. Die Kleine Hochsee- und Küstenfischerei Niedersachsens und Bremens im Jahr 1978, loc cit, p 30; and Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins, loc cit, p 16.

3. Die Kleine Hochsee- und Küstenfischerei Niedersachsens und Bremens im Jahr 1978, loc cit, p 18.

b. Baltic

On average, over the years 1970 to 1975 the biomass of all fish throughout the Baltic at the beginning of the season was some 4 million tons. The growth rate was 2 million tons a year, catches totalled 0.9 million tons and the potential catch was about 1 million tons; 90% of the landings and 85% of the biomass comprised herring, sprats and cod. The biomass, growth rate and quantities caught diminish from south to north within the Baltic<sup>1</sup>.

i. Fishing grounds

The eastern, central and western Baltic are the fishing areas for Schleswig-Holstein's Baltic cutters. Figure 4 shows the Baltic and its division into the regions relevant to international fisheries management. Traditional fishing grounds for the Schleswig-Holstein fishermen in the central Baltic were the grounds off Bornholm, where mainly codling was caught, and around Rügen, where mainly herring was caught; salmon fishing, on the other hand, was concentrated in the eastern Baltic<sup>2</sup>.

The economic importance of these fishing grounds has, however, diminished in recent times because of overfishing and unfavourable environmental effects. The annual codling catch in the Baltic reached its peak in 1957 and since then has always remained below this level in spite of (or because of) more intensive fishing and the use of new technologies (in 1957: some 174 000 tons)<sup>3</sup>.

Unfavourable environmental influences (lack of oxygen, increased salt content and higher temperatures in deep waters) have also had a detrimental effect on the productivity of Baltic fishing. In addition, in recent times there have been political developments and changes in

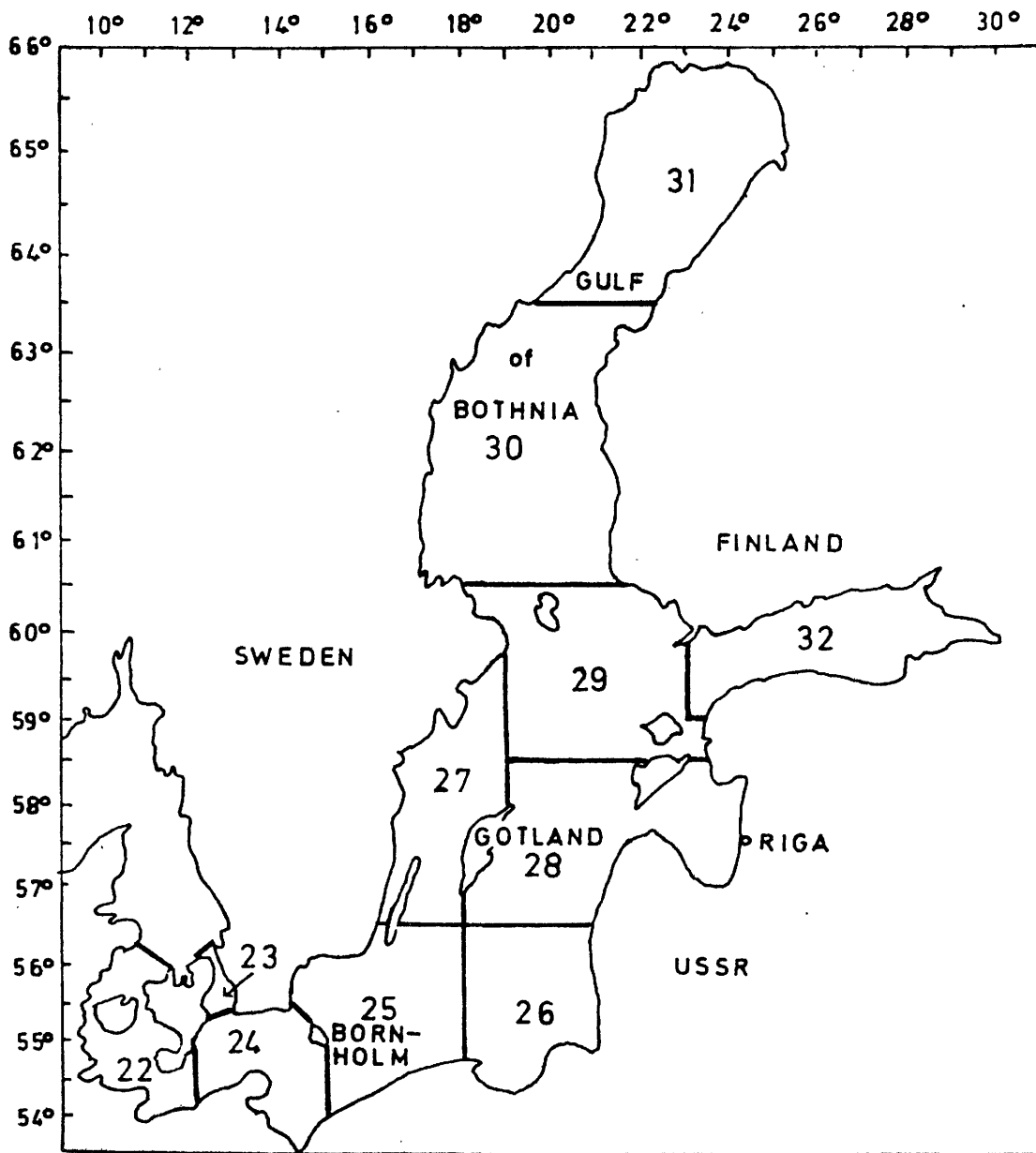
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1. Federal Fisheries Research Institute, Hamburg, Annual Report 1978, p 720.

2. Heinrich Hoffmeister, "Deutschland", in: Fischwirtschaftliche Perspektiven, Chamber of Trade and Industry, Lübeck, 1972, p 75.

3. See Central Association of Swedish East Coast Fishermen at the Baltic Fisheries Conference 1972 "Is the Baltic threatened by overfishing?", in: Fischwirtschaftliche Perspektiven, loc cit, pp 10 ff.

Figure 4. The Baltic and its fishing areas



Source: FAO Fisheries Circular No 708

fishery laws which have excluded the German Baltic fishermen from further access to traditional fishing grounds<sup>1</sup>. This aspect is dealt with in detail below (Part B. I); Figure 5 illustrates the changes in the law of the sea in the western Baltic, showing the territorial waters and economic zones of the States bordering on the Baltic.

Because of the changes in the law of the sea, only the western Baltic now offers unlimited fishing for Schleswig-Holstein's Baltic fishermen. This area, which traditionally accounted for some two thirds of the Baltic landings and thus one third of the total landings of Schleswig-Holstein's small-scale and inshore fishermen, is not large enough to accommodate the whole of Schleswig-Holstein's Baltic fishing fleet. In the past these fishing grounds in the western Baltic were mainly used by "day fishermen" and fixed-net fishermen. The diversion of the small-scale fishing fleet into this area because of changes in the law of the sea has resulted in congestion between the two groups with the inevitable consequences: overfishing and inefficient use of fishing gear.

#### ii. Species

In terms of quantity and yield codling is the most important species for Schleswig-Holstein's Baltic fisheries<sup>2</sup>. The two stocks in the actual Baltic (Arkona, Bornholm) can no longer be fished without restriction by the Schleswig-Holstein cutters, as mentioned above. The codling stocks in the western Baltic, on the other hand, are considered to be overfished. This overfishing is attributed to the congestion

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1. In 1978 German salmon fishing was virtually ended and codling fishing remained possible only in the Danish EEC ring around Bornholm and on the basis of a few Swedish licences. See Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins im Jahre 1978, reprinted in Das Fischerblatt 2-6, 1979, pp 3 ff.
  2. The total landings of Schleswig-Holstein cutters in 1978 were 10.4 tons on the east coast. To this are added the landings abroad and the catches by the Schleswig-Holstein, Bremerhaven and Lower Saxony North Sea cutters. See Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins im Jahre 1978, loc cit, pp 6 and 32.

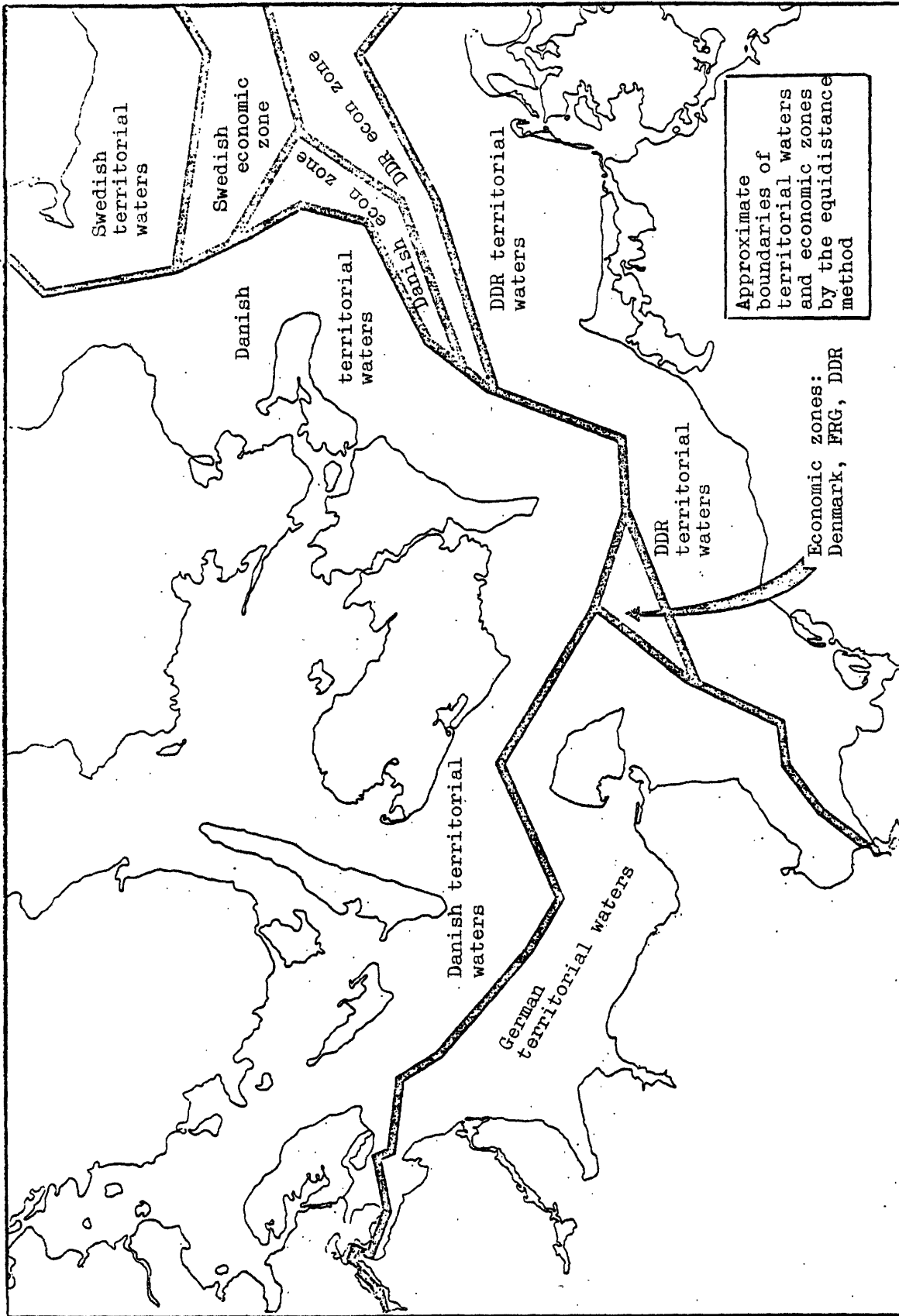


Figure 5. Western Baltic territorial waters and economic zones of the States bordering on the Baltic

Source: Minutes of the 19th meeting of the Foreign Affairs Committee, loc cit, p 460.



between the boats and the use of modern fishing gear. The result is a sharp rise in the small grades (VII and VIII), the percentage of which in the codling catch in the western Baltic rose from 17% in 1976 to 32% in 1978<sup>1</sup>. Recently (1978) the catch there was just under 70% of the adult stock<sup>2</sup>.

Fishing for herring and sprats, on the other hand, is concentrated on the Kieler Bucht, the total herring landings at present (1978) being just under half (6000 tons) of the codling landings from the Baltic; 80% of these herring landings come from the Kieler Bucht. In terms of quantity, sprat catches occupy third place after codling and herring, but are only some 500 tons (1978)<sup>3</sup>. In 1978 the eel catch was only just 63 tons; eels are fished intensively off the coasts of East Holstein and Fehmarn<sup>4</sup>. Other species (plaice, flounder, dab, turbot) amounting to some 1000 tons were mainly caught in the western Baltic<sup>5</sup>.

### 3. Small-scale and inshore fishing in the North German coastal states

#### a. Structure and development trend of the West German small-scale and inshore fishing industry

##### i. Fishing fleet

By far the most small-scale and inshore fishing, usually referred to in statistics as "Middle-water and inshore fishing", is carried out from Schleswig-Holstein and Lower Saxony. In 1976 almost 90% of the West German middle-water vessels (cutters) and more than 90% of the inshore fishing vessels were stationed in these two states (Table 11). The composition of the West German inshore and small-scale fishing fleet changed very considerably in the 1960s and 1970s. While the number of inshore fishing vessels was still increasing in the 1960s and decreased only slightly in the 1970s, the number of middle-water boats showed a continuing decline.

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1. Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins im Jahre 1978, loc cit, p 19.
  2. Federal Fisheries Research Institute, Annual report 1978, p 721.
  3. See Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins im Jahre 1978, loc cit, p 6.
  4. Hoffmeister, "Deutschland", loc cit, p 75.
  5. See Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins im Jahre 1978, loc cit, p 21 (Table 10).

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This decrease in fishing capacity in the West German inshore and small-scale fishing industry affected the individual coastal states to different degrees. In Schleswig-Holstein and Hamburg the number of fishing vessels fell by approximately half between 1960 and 1976. In Lower Saxony the number of middle-water vessels fell by about a third during this period, while the number of inshore fishing vessels almost doubled. Until recently there was a sizeable rise in the number of boats in this region, although these were mainly those used by sport fishermen. In Bremen, on the other hand, the number of fishing vessels, both middle-water and inshore vessels, increased only up to the beginning of the 1970s. Since then the numbers of fishing vessels there have been in decline.

ii. Quantities caught

Of the quantities caught in small-scale and inshore fishing, some 85% is accounted for by the fishermen of Lower Saxony and Schleswig-Holstein and 15% by those of the city-states Hamburg and Bremen (Table 12). Within these groups there have been some clear shifts in the last few years. Bremen and Schleswig-Holstein have been particularly affected by the sharp drop in quantities caught. In Lower Saxony the fall has been less severe, and for Hamburg there has even been a marked increase. These differences are less evident in the proceeds than in the weight of the catches. In 1977, despite reduced landings, the proceeds were some 10% higher than in the previous year. In 1978, with the continuing decline in landings, there was also a fall in proceeds, a trend which seems likely to have continued after 1978 with the rapidly rising costs.

iii. Income levels

Only estimates are possible of how severely this drop in proceeds and increase in costs has affected the fishermen's income. There are no continuous series of income statistics which can be considered representative of the West German small-scale and inshore fisheries. In the Agrarbericht (Report on Agriculture) for 1978 the government published the results of 108 fishing enterprises as a representative cross-section of West German small-scale and inshore fisheries. In

Table 11. FRG fishing fleet by states and by numbers of middle-water vessels (cutters) and inshore vessels

End of year	Schleswig-Holstein		Lower Saxony		Bremen		Hamburg		Total	
	Middle-water	Inshore	Middle-water	Inshore	Middle-water	Inshore	Middle-water	Inshore	Middle-water	Inshore
1960	843	1 072	376	473	26	75	103	41	1 348	1 661
1965	632	919	304	579	27	102	81	25	1 044	1 625
1970	537	823	310	765	37	129	74	17	958	1 734
1971	517	812	294	828	39	150	71	30	921	1 820
1972	488	781	270	861	35	138	71	39	864	1 819
1973	456	701	261	883	36	148	66	38	819	1 770
1974	436	636	256	892	37	128	65	32	794	1 688
1975	406	608	246	948	33	119	61	27	746	1 702
1976	392	567	235	992	31	99	57	18	715	1 676

Source: Jahresbericht über die Deutsche Fischwirtschaft 1977/78, published by the Federal Ministry of Food, Agriculture and Forestry, Berlin 1978

Table 12. Quantities of fish caught in middle-water and inshore fishing in the North German coastal states, 1976-78

State	Weight caught (in t)		Landed weight (in t)		Proceeds (in DM 1000)				
	1976	1977	1978	1976	1977	1978			
Schleswig-Holstein	55 012	46 152	40 545	53 558	41 031	36 132	45 496	50 723	47 103
Lower Saxony	55 972	47 029	48 288	48 756	40 972	40 847	42 793	46 432	45 325
Hamburg	4 791	5 759	6 940	4 090	4 980	5 877	7 363	8 480	9 855
Bremen	13 024	11 937	9 227	10 594	9 662	7 461	10 946	12 404	9 636
Total for all North German coastal states	128 799	110 877	105 000	116 998	96 645	90 317	106 598	118 039	111 919
FRG total	128 799	110 877	105 000	-	-	-	106 598	118 039	111 919

Source: Jahresbericht über die Deutsche Fischwirtschaft, published by the Federal Ministry of Food, Agriculture and Forestry, Berlin, various years.

1978 these enterprises achieved an average profit of DM 77 442 per enterprise. This profit was obtained from average business earnings of DM 316 866 and average expenditure of DM 239 481. The rate of profit, ie the profit as a percentage of earnings, was 24.4%. There were considerable differences between the incomes of the fishing enterprises in the different states. Much higher average incomes were achieved in Bremen, Lower Saxony and Hamburg than in Schleswig-Holstein (Table 13).

This was due partly to the different fishing areas, but also to differences in the structure of the fishing fleet. Profits from shrimp fishing were lower than for other forms of fishing (Table 14). A breakdown by length of fishing vessel shows that much higher profits are obtained with the larger boat-size class than with the smaller, although much higher capital investment is required for larger vessels.

#### iv. Profitability

Profitability comparisons between the West German small-scale and inshore fisheries and other economic sectors are very difficult to make, because the necessary figures for comparable economic sectors are not available. As a rule, the profit of a fishing enterprise is used to cover the wages of the owner and the interest on capital invested. To calculate the earning power on capital, it would be necessary to fix a wage rate for the labour provided by the owner of the vessel. As there are no suitable comparable figures for this, no attempt has been made here - or in the Federal Government's Report on Agriculture - to determine profitability figures for small-scale and inshore fisheries.

Table 13. Income situation in small-scale and inshore fishing in the FRG in 1978, by states (DM)

	Bremen and Lower Saxony	Hamburg	Schleswig-Holstein	FRG as a whole
Business earnings including sales	507 259 482 365	431 010 415 103	192 280 193 294	316 923 297 699
Business expenditure	413 743	339 297	127 761	239 481
Profit	93 516	91 712	64 518	77 442
Assets including vessel engine fishing and other gear	372 476 192 834 12 241	161 911 78 239 9 012	102 739 41 848 13 418	169 127 79 917 11 976
Own capital	17 893	25 488	36 342	29 911
Borrowed capital	291 954	136 415	64 223	126 449

Source: Agrarbericht 1980, Materialband, Bundestagsdrucksache 8/3636, 31 January 1980, p 272 ff.

Table 14. Income situation in small-scale and inshore fishing in the FRG in 1978, by fishing area and boat size (DM)

	Baltic			North Sea				
	Fish			Fish				
				Length of boat in m				
	under 17	17 and over		under 22	22 and over	under 16	16 and over	Shrimps
Business earnings including sales	153 306	228 191	411 494	523 314	124 712	199 000		
Business expenditure	127 318	200 988	405 059	498 315	111 547	190 631		
Profit	87 103	152 934	315 181	423 048	74 329	145 561		
Assets	66 203	75 257	96 313	100 266	50 383	53 438		
including: vessel, engine, fishing and other gear	41 132	85 442	102 660	289 114	85 082	184 090		
Own capital	9 512	26 225	46 664	143 457	40 447	92 693		
Borrowed capital	5 044	17 033	14 153	11 904	5 947	16 597		
	19 982	25 654	31 461	20 075	49 888	46 758		
	19 618	58 451	68 299	236 807	35 194	132 722		

Source: Agrarbericht 1980, Materialband, loc cit, p 274 ff.

b. Small-scale and inshore fishing in Schleswig-Holstein

i. Fishing fleet

At the end of 1977 the Schleswig-Holstein fishing fleet comprised 370 cutters: 221 fishing boats, of which 197 were used in the Baltic and 24 in the North Sea, 136 shrimp boats, which operated exclusively in the North Sea, and 13 mussel boats (12 North Sea, 1 Baltic). It is not always possible to draw a clear distinction between fishing boats and shrimp boats in the North Sea, because shrimp boats are often also used for ordinary fishing, especially for flatfish. There is a marked difference in the age of the fishing boats and the shrimp boats: almost 70% of the fishing boats were more than 25 years old, but less than 24% of the shrimp boats were this old (Table 15). More than three quarters of all the cutters were less than 18 m long; the proportion was slightly higher for the Baltic than for the North Sea. Engine power was less than 200 hp in some 70% of the boats (Table 16).

Apart from the medium-sized boats (cutters), the Schleswig-Holstein fishing fleet at the end of 1977 included 656 small fishing boats, of which 520 had engines. Some three quarters of the small boats belonged to professional fishermen and one quarter to part-time fishermen<sup>1</sup>. More than 80% of Schleswig-Holstein's small fishing boats operated in the Baltic.

ii. Landings and proceeds

Landings by the middle-water and inshore fishermen of Schleswig-Holstein show a marked drop. In the 1960s the quantities caught fluctuated around 95 000 tons, but from the beginning of the 1970s they fell drastically and in 1977 and 1978 were approximately 47 000 tons (Table 17). At the beginning of the 1970s, on the other hand, proceeds rose quite substantially. Price rises more than offset the decline in catches, at least until 1977, although it has to be taken into account that the

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1. See Annex, Table A4



Table 15. Age of cutters in Schleswig-Holstein  
(as at 31 December 1977)

Age in years	Number of fishing boats		Number of shrimp boats
	Baltic	North Sea	
1- 5	9	1	12
6-10	7	3	39
11-15	12	3	30
16-20	14	6	19
21-25	20	3	7
26-30	39	-	8
31-35	40	2	9
36-40	23	3	3
41-45	24	1	5
46-50	2	-	1
51-55	4	1	1
56-60	3	1	1
71-75	-	-	1
	197	24	136

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins, Niedersachsens, Bremens im Jahr 1977 (from the annual reports of the Fisheries Offices), Das Fischerblatt 2-4, 1978.

Table 16. Boat length and engine rating of cutters in Schleswig-Holstein (as at 31 December 1977)

	Number of boats with length of														Total	GRT of boats in m <sup>3</sup>
	up to 10 m	10 m-12 m	12 m-14 m	14 m-16 m	16 m-18 m	18 m-20 m	20 m-22 m	22 m-24 m	24 m-26 m	26 m-28 m	28 m-30 m	30 m-34 m	over 34 m			
North Sea	13	24	46	46	15	2	25	5	2	1	-	-	-	198	18 102.22	
Baltic	3	24	44	44	21	10	10	6	2	5	-	-	-	172	18 772.00	
Schleswig-Holstein as a whole	16	48	90	90	36	12	35	11	4	6	-	-	-	370	36 874.22	
	Number of boats with engine rating of														Total	hp of boats
	up to 50 hp	50 hp-75 hp	75 hp-100 hp	100 hp-125 hp	125 hp-150 hp	150 hp-200 hp	200 hp-250 hp	250 hp-300 hp	300 hp-350 hp	350 hp-400 hp	400 hp-450 hp	450 hp-500 hp	500 hp-600 hp	over 600 hp		
North Sea	19	7	17	21	48	39	24	11	2	2	5	1	1	3	1	39 553
Baltic	2	5	5	6	40	47	34	23	1	1	5	1	1	2	-	38 833
Schleswig-Holstein as a whole	21	12	22	27	88	86	58	34	3	3	10	2	1	5	1	78 386

Source: Data from the Schleswig-Holstein Fisheries Office

Table 17. Earnings of middle-water and inshore fishing in Schleswig-Holstein, 1962-78

Year	Quantity (t)	Proceeds (million DM)	Takings adjusted for rising prices <sup>a</sup>
1962	96 845	31.4	31.4
1963	84 458	28.0	27.2
1964	97 085	31.8	30.1
1965	95 216	34.1	31.3
1966	107 008	40.1	35.5
1967	95 121	38.1	33.1
1968	89 665	41.8	35.7
1969	94 082	39.8	33.3
1970	98 461	40.8	33.0
1971	73 756	43.7	33.5
1972	57 495	44.1	32.1
1973	69 265	52.6	35.7
1974	71 220	51.0	32.4
1975	55 071	48.1	28.7
1976	62 100	53.5	30.6
1977	47 700	59.0	32.5
1978	47 109	56.8	30.5

<sup>a</sup> deflated by the rise in price of goods for private consumption

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins (from the annual report of the Fisheries Office), current years.

purchasing power of the proceeds has fallen considerably over this period because of the general rise in prices. Adjusted for rising prices, proceeds have changed little since the beginning of the 1960s. Measured by the proceeds, the fishing grounds in the North Sea and the Baltic were of approximately equal importance for the Schleswig-Holstein small-scale and inshore fisheries (Table 18). The nature of the catches is, however, very different. While shrimps and mussels are extremely important in the catches from the North Sea, it is ordinary fish for everyday consumption which dominates in the Baltic catches.

iii. Landings on the Baltic coast

Measured by proceeds, codling fishing is by far the most important for the Baltic fishermen; in the 1970s more than half the revenue came from codling and in some years it was as much as two thirds. Herring comes second in Baltic fishing, accounting for some 20% of the proceeds, although the proportions vary considerably from year to year (Table 19). Altogether some 80% of fishing revenue on the Baltic coast comes from codling and herring catches. The rest is accounted for by eel, salmon, sprat and other species.

iv. Landings on the North Sea coast

On the North Sea coast of Schleswig-Holstein the majority of the revenue comes from shrimp fishing: in recent years it has accounted for two thirds to three quarters of the total revenue. Second comes mussel fishing, with about 10%. The rest is divided mainly between cod, flatfish and eel. Herring catches have become virtually insignificant for the ports of the Schleswig-Holstein North Sea coast.

v. Numbers gainfully employed in fishing

Just on 1500 persons were working on fishing vessels in Schleswig-Holstein in 1977, somewhat more than 10% of them on a part-time basis. Of the full-time fishermen, 70% were on middle-water boats (cutters) and 30% on small boats (Table 20). A comparison of the number of fishermen with the number of vessels reveals that there are more boats

Table 18. Landings in middle-water and inshore fishing in Schleswig-Holstein in 1977 and 1978, by fishing area

Fishing area	1977				1978			
	Landings		Proceeds		Landings		Proceeds	
	in t	as %	1000 DM	%	in t	as %	1000 DM	%
1. North Sea	16 497	40.45	24 473	48.56	16 020	44.35	25 644	54.44
2. Kattegat	31	0.08	34	0.07	26	0.07	23	0.05
3. Baltic	24 252	59.47	25 890	51.37	20 078	55.58	21 436	45.51
of which								
western Baltic	15 827	38.81	16 018	31.78	15 488	42.87	16 276	34.55
central Baltic	6 344	15.56	6 684	13.26	3 744	10.26	3 912	8.31
eastern Baltic	2 081	5.10	3 188	6.33	886	2.45	1 248	2.65
Total landings in Schleswig-Holstein	40 780	100.00	50 397	100.00	36 124	100.00	47 103	100.00

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins, Niedersachsens und Bremens im Jahr 1979, loc cit, p 4.

Table 19. Landings and proceeds for middle-water and inshore fishing enterprises in Schleswig-Holstein by landing area and species, 1972-78

Species	Landings													
	1972		1973		1974		1975		1976		1977		1978	
	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM
Landings in ports on the Schleswig-Holstein Baltic coast														
Herring I-IV	6 279	3 954	5 223	3 670	6 326	4 794	7 729	5 825	5 610	4 069	6 033	5 153	6 353	6 219
Sprat	235	266	507	537	886	790	559	527	374	366	535	655	449	477
Codling	11 113	8 243	16 650	17 523	12 398	15 887	10 748	10 159	13 861	12 977	14 263	17 075	10 417	12 047
Eel	147	1 470	151	1 619	110	1 332	124	1 495	103	1 294	78	1 071	63	913
Salmon and sea trout	111	1 424	99	1 196	48	543	63	686	57	739	30	530	14	219
Mussels	151	24	81	13	76	15	67	14	9	4	4	1	14	6
Other fish for human consumption	2 668	1 555	2 204	1 537	1 097	1 094	1 360	1 416	1 043	1 164	1 054	1 200	1 128	1 399
Fish for fish meal and fodder	5 275	445	3 139	409	5 017	741	6 891	1 064	2 194	274	2 285	241	1 692	211
Total for Baltic coast	25 979	17 382	28 054	26 503	25 959	25 196	27 540	21 185	23 252	20 888	24 283	25 927	20 130	21 491

Table 19 (continued)

Species	Landings													
	1972		1973		1974		1975		1976		1977		1978	
	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM
Landings in ports on the Schleswig-Holstein North Sea coast														
Herring I-III	283	0	10	4	356	244	393	192	63	38	139	96	0	0
Sprat	-	-	2	1	-	-	-	-	-	-	-	-	-	-
Cod	1 258	1 154	664	940	658	1 034	776	877	1 284	1 549	1 467	1 845	1 434	1 785
Flatfish	126	294	239	678	108	249	203	606	150	430	198	885	244	1 346
Bel	92	889	105	1 000	114	1 298	103	1 161	102	1 175	136	1 556	101	1 338
Shrimp	4 285	10 859	3 669	10 552	5 183	11 138	5 126	16 033	7 961	16 480	4 725	17 674	5 542	18 642
Cockles and mussels	2 766	549	6 102	1 072	11 476	1 950	12 014	2 150	17 040	4 180	6 645	1 602	7 199	1 831
Other fish for human consumption	76	189	80	194	98	233	256	364	193	429	183	479	209	560
Fish for fish meal and feedstuffs	1 093	123	4 517	624	8 104	1 520	1 658	453	227	29	1 540	202	266	30
Shrimps for feedstuffs	3 116	165	8 167	720	6 158	446	770	34	3 222	299	1 465	132	1 000	80
Total for North Sea coast	12 813	14 223	23 555	15 786	32 255	18 113	21 299	21 869	30 291	24 609	16 497	24 471	15 994	25 612

Table 19 (continued)

Species	Landings													
	1972		1973		1974		1975		1976		1977		1978	
	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM	in t	in 1000 DM
Landings by Schleswig-Holstein boats in German ports outside Schleswig-Holstein														
Baltic boats	14 360	9 080	12 342	6 876	7 579	5 038	4 371	3 518	5 738	5 657	3 930	4 949	6 120	6 579
Fish for human consumption	9 681	8 554	4 964	5 618	3 194	4 243	3 344	3 428	5 121	5 596	3 929	4 949	5 211	6 473
Industrial fish	4 679	526	7 379	1 259	4 385	796	1 027	90	616	61	2	0	908	106
North Sea boats	4 343	3 410	5 302	3 402	5 420	2 676	1 841	1 445	2 667	2 066	2 424	2 156	2 357	1 677
Fish for human consumption	3 893	3 361	2 365	2 965	1 536	1 975	1 361	1 395	1 871	1 978	1 424	2 019	1 262	1 545
Industrial fish	450	49	2 937	437	3 883	701	480	50	796	88	1 000	137	1 095	131
Landings by Schleswig-Holstein boats abroad														
Baltic boats	-	-	11	21	7	5	20	70	136	212	482	1 317	2 452	1 326
North Sea boats	-	-	-	-	-	-	-	-	18	21	83	179	56	110
Total landings	57 495	44 095	69 265	52 590	71 220	51 029	55 071	48 088	62 100	53 453	47 700	58 999	47 109	56 795

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins. From the annual report of the Fisheries Office, current years.



Table 20. Number of fishermen in Schleswig-Holstein (as at 31 December 1977)

	Number of fishermen			Average crew		
	on small boats		on medium-sized boats (cutters)	on small boats		on medium-sized boats (cutters)
	full-time	part-time		full-time	part-time	
Baltic	312	125	497	0.75	1.05	2.51
North Sea	72	42	408	0.91	0.98	2.37
Schleswig-Holstein as a whole	384	167	905	0.78	1.03	2.45

Source: Data from the Schleswig-Holstein Fisheries Office

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than fishermen. This therefore means that some fishermen have more than one boat. The fishermen are almost exclusively boat owners themselves. On the middle-water boats (cutters) the average crew consists of 2.5 people. The captains are as a rule the owners, employing a crew that is often made up of members of the family. The owners of middle-water and small boats have in many cases joined together to form co-operatives through which they sell their catches and also order a large proportion of their gear.

vi. Drift away from the fishing industry

The number of fishermen and the number of fishing boats in Schleswig-Holstein have declined considerably in the last decade. After the Second World War there had initially been a marked increase in the number of fishermen. Many fishermen expelled from the eastern areas of the German Reich tried to build a new life in Schleswig-Holstein. They settled mainly on the Baltic coast, from where they could continue to fish the traditional fishing grounds. In the 1950s the number of expellee fishermen on the Baltic coast of Schleswig-Holstein was greater than that of the local fishermen, but on the North Sea coast the number of expellees was less than 10% of the North Sea fishermen as a whole. Yet even in the 1950s fishermen were already transferring to other economic sectors. Between 1953 and 1959 the number of professional fishermen dropped by about 2% per year, between 1959 and 1970 the rate of exodus more than doubled to 4.3%, and between 1970 and 1978 it accelerated again to more than 5%. As the fishermen moved away there was a marked decline in the number of vessels. The number of cutters fell from 902 in 1953 to 370 in 1977, representing an average annual drop of more than 3.5%. It was mainly the smaller, low-powered boats which disappeared: the total hp of the cutters in 1977 was 78 386 hp, which was far higher than the 1953 figure of 62 688 hp. There has also been a trend towards larger boats for a long time. The decline remained much more marked for smaller cutters than for the larger ones well into the 1970s. But here there was a reversal of the trend in the 1970s because of the marked changes in fishing conditions and cost structure. The number of small professional fishing boats fell from 1236 in 1953 to 483 in 1978, so that the decline was somewhat more pronounced than

in the case of the cutters. Long-term comparisons in respect of part-time fishing cannot be made because of changes in the method of recording part-time, spare-time and sport fishermen.

vii. Income levels

As regards incomes, it has already been pointed out that the profits of fishing enterprises in Schleswig-Holstein are on the average well below those of the other Federal states. As already mentioned, this is partly due to the lower profits from whitefish in the Baltic as compared with the North Sea. But within the Schleswig-Holstein fishing industry, since shrimp fishing predominates over ordinary fishing on the North Sea coast and the profits achieved from this were only half those obtained from whitefish in the North Sea, the average profits of the fishermen in Schleswig-Holstein are still much higher on the east coast than on the west coast (Table 21). The average business earnings on the North Sea are higher than on the Baltic, but the differences in expenditure are more pronounced.

viii. Capital investment

The capital investment of the Schleswig-Holstein fishermen is much lower than the national average, especially on the Baltic coast. This is mainly attributable to the high average age of the fishing boats on the Baltic: in 1978, 73% of the middle-water boats (cutters) were more than 25 years old. On the North Sea coast, on the other hand, only 36% of the middle-water boats and 17% of the shrimp boats were in this age category. As regards financing, the proportion of capital contributed by the Schleswig-Holstein fishermen themselves is much higher than the national average. This may be partly due to the relatively low borrowing capacity because of the low level of assets; however, the high level of own capital invested by the North Sea fishermen also, whose material assets are not very different from the national average, indicates that the Schleswig-Holstein fishermen are also less prepared to take risks.

Table 21. Income situation in middle-water and inshore fishing in Schleswig-Holstein, 1978 (DM)

	Schleswig-Holstein			FRG as a whole
	North Sea	Baltic	Total	
Business earnings including sales	196 595	188 253	182 280	316 923
Business expenditure	185 719	161 697	173 294	297 699
Profit	138 408	117 824	127 761	239 481
Assets, including vessel, engine, fishing and other gear	58 186	70 429	64 518	77 442
Own capital	146 590	61 810	102 739	169 127
Borrowed capital	68 136	17 312	41 848	79 917
	16 395	10 639	13 418	11 976
	51 036	22 629	36 342	29 922
	92 599	37 740	64 223	126 449

Source: Agrarbericht 1980, Materialband, loc cit, p 272 ff.

c. Regional distribution of catching capacities and landings in Schleswig-Holstein

The Schleswig-Holstein fishing fleet is distributed over a large number of localities. In 1977 there were fishing vessels registered in 47 localities on the east coast (including Schlei) and 33 localities on the west coast of Schleswig-Holstein. Most of these localities are of very little significance for the fishing industry. Often there are just a few small fishing boats that lie-up there. A larger number of fishermen are to be found in ports in which middle-water boats (cutters) are stationed. The individual localities are grouped together under the local branches of the Fisheries Office. On the east coast these are the Kappeln, Kiel, Heiligenhafen and Travemünde branches, and on the west coast the Büsum and Husum branches.

i. Catching capacities on the Baltic coast

On the east coast, of the 809 fishermen 110 come under Kappeln, 239 under Kiel, 215 under Heiligenhafen and 245 under Travemünde; on the west coast the 480 fishermen are made up of 205 in Husum and 275 in Büsum (Table 22).

Based on the number of fishermen, Maasholm and Kappeln are the most important fishing ports on the northern Baltic coast of Schleswig-Holstein. Almost a quarter of all fishermen under the Kappeln branch of the Fisheries Office in 1977 belonged to these two ports, and almost 70% of the cutters. Flensburg is no longer important as a fishing port. Farther south, in the Eckernförder Bucht and the Kieler Förde, the ports come under the Kiel branch of the Fisheries Office. Heikendorf (with 78 fishermen), Laboe and Eckernförde are the most important fishing ports here. Some 80% of the middle-water boats and almost half of all small fishing boats of this central region lie in these three ports. The ports of the eastern Kieler Bucht and the island of Fehmarn come under the Heiligenhafen branch. Heiligenhafen and Burgstaaken on Fehmarn are the dominant ports in this area. Some 80% of the fishermen, 90% of the middle-water boats and 45% of the small fishing boats coming under the Heiligenhafen branch are to be found in

Table 22. Fishing fleet and number of fishermen in Schleswig-Holstein,  
by Fisheries Office branch

Branch of Fisheries Office/locality	Fishermen 1959		Fishermen				Part-time fishermen		Small boats <sup>a</sup>				Cutters					
	Local	Refugee	on small boats		on cutters		1970	1977	without engine		with engine		1959	1970	1977	1959	1970	1977
			1959	1970	1970	1977			1959	1970	1977	1959						
KAPPELN	297	100	170	143	52	157	127	58	39	268	162	17	105	197	114	73	57	28
incl:																		
Flensburg	30	19	24	40	12	25	16	-	38	26	27	3	25	42	26	16	8	-
Langballigau	11	13	6	12	6	16	11	1	13	7	6	-	4	18	4	7	5	-
Maasholm	85	1	37	20	4	49	48	20	7	100	21	1	28	38	18	23	20	10
Kappeln	10	42	10	5	5	42	30	21	20	16	14	1	7	17	7	17	15	9
Arnis	53	6	47	2	2	12	11	8	29	25	12	-	4	23	12	5	5	2
Schleswig	41	-	41	34	13	-	-	-	-	28	22	3	19	27	21	-	-	-
KIEL	207	493	163	106	96	537	218	143	695	126	196	37	72	586	127	179	84	52
incl:																		
Eckernförde	65	36	22	18	6	79	30	21	99	17	26	8	9	85	16	34	16	11
Friedrichsort	2	90	24	10	15	68	15	4	89	22	39	8	7	53	20	20	4	1
Kiel	19	66	22	10	8	63	18	15	226	10	34	2	7	191	22	19	8	5
Heikendorf	4	203	19	18	15	188	101	63	65	10	24	3	11	59	20	52	32	21
Laboe	43	63	23	15	16	83	36	27	65	13	12	7	16	66	20	34	18	10
HEILIGENHAFEN	124	266	138	94	64	252	245	151	244	141	201	35	58	208	52	102	93	67
incl:																		
Heiligenhafen	42	146	30	24	18	158	149	81	62	30	54	10	16	61	15	59	57	35
Burgstaaken/ Fehmarn	2	70	8	8	9	64	81	62	38	8	34	6	5	24	8	26	29	26
TRAVEMÜNDE	274	366	177	120	100	463	198	145	139	136	121	34	87	216	118	147	77	51
incl:																		
Travemünde	39	181	23	16	14	197	66	34	35	15	5	-	17	52	22	61	24	7
Niendorf/ Timmendorf	77	72	48	22	25	101	52	45	17	35	15	4	14	35	31	30	21	14
Haffkrug	55	5	35	16	6	25	21	18	14	27	21	5	4	14	8	7	7	6
Neustadt	26	91	33	18	16	84	29	25	49	36	34	12	9	49	14	28	13	9

Table 22 (continued)

Branch of Fisheries Office/ locality	Fishermen 1959		Fishermen				Part-time fishermen		Small boats <sup>a</sup>				Cutters								
	Local	Refugee	on small boats		on cutters		1970	1977	without engine		with engine		1959	1970	1977						
			1959	1970	1970	1977			1959	1970	1977										
East coast as a whole	902	1225	718	463	312	1409	788	497	1238	125	1977	671	680	123	322	1207	411	501	311	198	
Büsum <sup>b</sup>	579	67	68	74	53	580	413	222	642 <sup>c</sup>	36	1977	19	138	3	24	505	91	252	176	96	
incl: Büsum	239	40	-	1	4	279	154	110	22	5		-	-	-	-	23	8	108	66	18	
Friedrichskoog	126	6	4	-	2	128	105	88	13	1		-	-	-	-	11	3	68	48	39	
Glickstadt	14	-	-	-	-	14	6	6	52	2		-	6	-	-	39	2	3	2	2	
Helgoland	79	6	-	38	29	85	7	5	13	3		1	1	-	-	47	32	44	3	2	
Tönning	185	15	28	3	19	172	116	186	23	6		2	7	10	-	21	18	76	50	76	
HUSUM <sup>b</sup>	88	10	2	-	-	96	68	79	269	1		-	2	-	22	43	2	76	50	76	
incl: Tönning	31	-	5	3	3	26	14	14	17	1		1	2	-	1	13	1	43	29	32	
Pellworm	24	2	7	-	-	20	18	15	6	-		-	-	-	6	7	3	12	6	4	
Wyk	820	73	84	77	72	809	529	408	-	-		-	-	-	3	-	-	8	7	6	
West coast as a whole	1722	1298	912	540	384	2218	1317	905	2552	167	1977	680	825	136	375	1755	520	854	537	370	
Schleswig-Holstein as a whole																					

<sup>a</sup> Because of changes in the way the numbers of boats belonging to hobby fishermen are recorded, the figures for the individual years are not exactly comparable.

<sup>b</sup> Because of a redefinition of the Fisheries Office areas, the figures for the Fisheries Office branches are not comparable. Some ports which now come under Husum formerly came under the Büsum branch.

<sup>c</sup> Excluding fishermen on foot

Source: Data from the Schleswig-Holstein Fisheries Office.

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these two ports. Finally, the ports of the Lübecker Bucht come under the Travemünde office. Here some 65% of the fishermen, 60% of the middle-water boats and 75% of the small fishing boats are concentrated in the three ports of Travemünde, Niendorf/Timmendorf and Neustadt. Taking together the ports which are most important for the individual branches of the Fisheries Office in the Baltic, some 60% of the Baltic fishermen, more than 75% of the middle-water boats and more than 40% of the small fishing boats on the Baltic coast come under the 10 ports mentioned above. The geographical location of these ports is shown in Figure 6.

The influx of refugees after the Second World War varied from one Baltic port to another. In the traditional fishing port of Maasholm at the mouth of the Schlei only 1 expelled fisherman was active in 1959. In places like Heikendorf or Burgstaaken, on the other hand, fishing only began to achieve any importance with the advent of the refugees. In the Kiel, Heiligenhafen and Travemünde branches the number of refugees in 1959 by far exceeded the number of local fishermen; of the 1730 fishermen in these areas, 1125 were refugees and 605 were locals.

In all the ports on the Baltic coast the number of fishermen and also the number of fishing vessels have clearly diminished and in a great many places the fishing vessels have disappeared altogether. Thus, in 1959 fishing vessels were still registered at 60 localities on the Baltic coast, but by 1977 they were only to be found at 47. The decrease has been most marked in the North: in the Kappeln district the number of fishermen decreased on average by nearly 7% a year between 1959 and 1977, and the number of cutters by more than 5% a year. For small fishing boats it is not possible to find data for individual years recorded under comparable conditions. The figures given in Table 20 are therefore not suitable for year-by-year comparisons. The decrease in the Kiel and Travemünde districts was slightly smaller than in the North. The average annual fall in the number of fishermen here was between 5 and 6%, but the number of cutters fell somewhat more sharply than in the North. The Travemünde district was the least affected by the process of shrinkage: here the average annual decrease





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in the number of fishermen was only just slightly more than 3% and in the number of cutters it was even less than 2½ %.

ii. Catching capacities on the North Sea coast

On the North Sea coast the ports of the northern part of the west coast are administered from the Husum branch of the Fisheries Office, and those of the southern part, including the Schleswig-Holstein Elbe ports, from Büsum. The most important ports on the west coast include Husum and Tönning in the northern part and Büsum and Friedrichskoog in the southern part. These four ports accounted for just on three quarters of the west-coast fishermen and two thirds of the cutters in 1977, but less than 15% of the small boats. On the west coast the latter are scattered over numerous localities. The only locality where a fairly large number are concentrated is Heligoland, where there were 32 small boats in 1977, ie more than a quarter of all the west-coast small boats. Thus, in 1977 29 of the 72 small-boat fishermen were to be found in Heligoland alone. The number of small-boat fishermen on the west coast is much lower than on the east coast, although it had dropped only slightly over the years. The average annual reduction in the number of small-boat fishermen between 1959 and 1977 was less than 1%, while the number of cutter fishermen fell by almost 4%. There were marked differences between the individual ports. In Tönning, for example, the number of cutter fishermen dropped only slightly between 1959 and 1977; in 1959 there were 85 such fishermen operating from there, and in 1977 there were still 79. In Büsum, on the other hand, the number fell from 279 to 110.

iii. Landings on the Baltic coast

Landings by the fishing fleet on the Baltic coast are concentrated more at individual ports than is the fishing fleet itself: almost 99% of all landings on the east coast in 1977 were made at nine ports (Table 23). If Kiel is regarded as the landing port for fishing vessels from Heikendorf and Laboe, these main landing ports are identical with the ports pointed out earlier. The concentration becomes even more marked if we take only the five most important ports: Burgstaaken, Kiel, Heiligenhafen, Travemünde/Schlutup and Kappeln accounted for almost three

Table 23. Middle-water and inshore fishery landings at the ports on the Baltic coast of Schleswig-Holstein

Ports	Landings in t									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	
Flensburg	177	271	207	161	142	116	99	37	50	
Langballigau	65	43	64	76	103	107	69	75	92	
Maasholm	3 202	3 070	2 664	2 413	2 109	2 214	1 623	1 782	1 889	
Kappeln	3 729	3 490	2 828	2 506	2 068	2 760	2 407	2 337	2 083	
Schleswig	81	102	59	85	108	167	142	137	147	
Eckernförde	1 320	1 317	875	751	526	536	777	783	709	
Kiel	6 716	6 472	5 157	6 257	5 937	5 898	4 499	5 308	3 642	
Heiligenhafen	5 897	4 471	3 381	4 054	4 130	4 720	3 724	4 302	2 902	
Burgstaaken	5 252	5 574	5 049	5 413	4 485	4 670	4 149	3 905	3 653	
Neustadt	1 372	1 397	1 158	1 031	886	834	658	815	597 <sup>a</sup>	
Niendorf	1 308	1 243	1 078	1 619 <sup>a</sup>	1 697 <sup>a</sup>	1 701 <sup>a</sup>	1 611 <sup>a</sup>	1 546 <sup>a</sup>	1 358 <sup>a</sup>	
Travemünde/Schlutup	4 631	3 281	2 913	3 008	3 151	3 159 <sup>a</sup>	2 911 <sup>a</sup>	2 876 <sup>a</sup>	2 523 <sup>a</sup>	
Other ports and localities on the open coast	475	445	546	680	617	658	503	384	485	
Baltic coast as a whole	34 227	31 176	25 979	28 054	25 959	27 540	23 252	24 283	20 130	

<sup>a</sup> Estimated breakdown: Travemünde/Schlutup 65%, Niendorf 35%

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins, loc cit, current years.

quarters of landings in 1977. If the landing ports are related to their Fisheries Office branches, we find that in 1977 almost one third of all landings were made in the Heiligenhafen district. The remainder is spread fairly evenly between Kappeln, Kiel and Travemünde. Looking at the trend in the 1970s, apart from the general decline in landings the most striking feature is that Kiel had to yield its leading position as the main landing port to Burgstaaken.

iv. Landings on the North Sea coast

On the North Sea coast Büsum, Husum, Tönning and Friedrichskoog are by far the most important landing ports. In 1978 these four ports accounted for more than 90% of all landings. Apart from these four ports, Wyk is also important for mussel landings. In 1978 some 70% of the Schleswig-Holstein North Sea mussels were landed here (Table 24). Landings of fish for human consumption are also highly concentrated; more than 80% were landed at Büsum. In the case of shrimps the four major ports on the Schleswig-Holstein west coast are of approximately equal importance. In 1978 Büsum had just a slight lead over Friedrichskoog, Husum and Tönning. Büsum has achieved this leading position only in the last few years; at the beginning of the 1970s Husum was still in the lead. Of course the landings at the individual ports vary considerably from year to year, so that shifts in order of precedence are to be found fairly frequently. In the case of fish for fish meal and animal feedstuffs, Husum was well in the lead in 1978 with almost 85%. At the beginning of the 1970s Büsum had still held the leading position in this sector. At that time, however, landings were also made in Tönning and Friedrichskoog. In the last few years, marked decreases in landings as a whole have led to concentration in the ports of Husum and Büsum, the landings at Büsum being subject to substantial variations from year to year.

Table 24. Middle-water and inshore fishery landings on the North Sea coast of Schleswig-Holstein

Ports	1973 Landings in t						1978 Landings in t					
	Fish for human consumption <sup>a</sup>	Shrimps	Mussels	Fish for fish meal and feed-stuffs	Deep-water prawns, crabs, lobster, Dublin Bay prawns	Fish for human consumption <sup>a</sup>	Fish for fish meal and feed-stuffs	Shrimps	Mussels	Fish for fish meal and feed-stuffs	Deep-water prawns, crabs, lobster, Dublin Bay prawns	
List	0.3	3.8	-	-	-	- <sup>b</sup>	-	2.0	-	-	-	
Munkmarsch	-	-	43.6	-	-	-	-	-	59.5	-	-	
Hörnrum	10.6	34.8	-	-	-	1.2	-	2.0	-	-	-	
Wyk	6.4	4.5	5010.4	-	-	1.2	-	2.0	5033.3	-	-	
Schütttsiel	3.8	-	-	-	-	3.8	-	-	-	-	-	
Husum	2.1	939.0	1047.8	3864.6	-	35.1 <sup>b</sup>	-	1334.9	1032.5	0.6	-	
Tønning	40.3	703.2	-	1416.5	-	45.9	-	1247.5	-	-	-	
Friedrichstadt	32.6	-	-	-	-	32.5	-	-	-	-	-	
Büsum	791.5	814.3	-	5477.9	-	1602.8	-	1576.6	1135.8	0.2	-	
Friedrichskoog	-	897.1	-	1925.0	-	13.6	-	1376.8	-	-	-	
Dagebüll	-	272.4	-	-	-	-	-	-	-	-	-	
Elbe and related waters	123.5	-	-	-	-	99.0	-	-	-	-	-	
Heligoland	71.5	-	-	-	17.9	80.4	-	-	-	-	8.9	
Total	1082.7	3669.0	6101.7	12683.9	17.9	1915.7	5541.8	7261.0	1265.6	9.7		

<sup>a</sup> including eels

<sup>b</sup> Oysters: Munkmarsch 5100, Husum 3900

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins, 1973 and 1978, loc cit.

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#### 4. Upstream interlinking

Very little statistical information is available on the upstream interlinking of the fishing industry. Statistics from suppliers such as shipyards, ships' chandlers, etc, usually do not provide any information on fisheries, as these sectors do not classify their sales by type of customer. Similarly, data on the cost structure of the fishing industry itself do not provide any direct information on interlinking with other economic sectors in the FRG or Schleswig-Holstein in particular, because such data do not show the geographical origin of the services. In a number of cases only part of the upstream services are obtained from within the country. Repairs to the cutters of Baltic fishermen, for example, are often carried out at Danish (Bornholm) or Polish yards.

##### i. Input-output tables

Some guide to the upstream interlinking of the fishing industry can be obtained from input-output calculations for the Federal Republic. However, these input-output tables contain only figures for fishery and fish-farming products as a whole, and only for 1970. The upstream service structure given for the fishing industry is therefore made up of very varied cost structures. It includes deep-sea fishing as well as freshwater fishing or fish farming. Compared with sea fishing, however, freshwater fishing is of almost no importance in the FRG. The value of the input-output tables as a source of information about small-scale and inshore fishing is particularly low, however, because in 1970 deep-sea fishing held a dominant position. According to the input-output tables for 1970, the upstream service ratio (upstream services as a percentage of gross production) was slightly more than 50%. Most of the upstream services (18%) were accounted for by shipbuilding<sup>1</sup>. In second place (about 15%) come unspecified services by the wholesale trade, which includes most of the ships' chandlers. Then come service contributions of between 6 and 8% from the fisheries sector itself, petroleum products, steel, plate and metal goods, textiles and other

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1. See Annex, Table A5

transport services. This already covers two thirds of all upstream fishery services.

ii. Bookkeeping records of fishing enterprises

Useful information on small-scale and inshore fisheries can be obtained from the fishing enterprises' accounts mentioned earlier. Again, these do not provide any indication of the geographical origin of the upstream services used by the fishermen, but at least they provide a picture of the structure of the upstream services and can be evaluated, in particular for Schleswig-Holstein specifically (Table 25).

Business expenditure by small-scale and inshore fisheries in the Federal Republic amounts to about three quarters of the business earnings. If this ratio is applied to the total earnings of all small-scale and inshore fishermen, the volume of expenditure for 1978 is found to be about DM 85 million. There are three main items in the structure of the upstream services: more than 40% of the expenditure is accounted for by wages and salaries including social insurance contributions, just on 15% is accounted for by fuel and lubricants and the same amount for vessel costs (maintenance and depreciation). Some 70% of business expenditure is covered by these three categories.

In Schleswig-Holstein the ratio of business earnings to business expenditure is slightly better than the national average. For the North Sea fishermen expenditure on wages and salaries in particular is lower than the national average, while for the Baltic fishermen their lower expenditure on vessels is most important, although expenditure by the Baltic fishermen on taxes and other charges is also well below the average. On the other hand, engine maintenance and depreciation cost them more.

Table 25. Business expenditure by middle-water and inshore fisheries in the FRG and in Schleswig-Holstein, 1978

Type of expenditure	FRG as a whole		Schleswig-Holstein						
	DM per enterprise	as % of business expenditure	North Sea		Baltic				
			DM per enterprise	as % of business expenditure	DM per enterprise	as % of business expenditure			
						DM per enterprise	as % of business expenditure	Total	as % of business expenditure
Overall business expenditure	232 547	100	132 421	100	115 979	100	123 916	100	100
including:									
Goods and services	2 930	1.3	2 381	1.8	0	0.0	1 150	0.9	0.9
Wages, salaries, social insurance	99 371	42.7	48 176	36.4	50 962	43.9	49 617	40.0	40.0
Trade association	420	0.2	508	0.4	363	0.3	433	0.3	0.3
Labour, loading costs, machinery hire	6 058	2.6	4 817	3.6	0	0.0	2 326	1.9	1.9
Fuel and lubricants	31 271	13.4	18 590	14.0	15 001	12.9	16 734	13.5	13.5
Vessel maintenance	20 651	8.9	12 827	9.7	10 541	9.0	11 645	9.4	9.4
Vessel depreciation	10 565	4.5	4 946	3.7	3 393	2.9	4 143	3.3	3.3
Engine maintenance	2 130	0.9	872	0.7	3 790	3.3	2 381	1.9	1.9
Engine depreciation	2 083	0.9	2 283	1.7	2 520	2.2	2 406	1.9	1.9
Refrigeration unit maintenance	22	0.0	85	0.0	0	0.0	41	0.0	0.0
Refrig. unit depreciation	77	0.0	297	0.2	0	0.0	143	0.1	0.1
Navigation and radar equipment	4 579	2.0	3 069	2.3	3 212	2.8	3 143	2.5	2.5
General business insurance	6 241	2.7	4 396	3.3	3 324	2.9	3 841	3.1	3.1
Taxes, charges	6 076	2.6	3 668	2.8	821	0.7	2 195	1.8	1.8
Ice, electricity, heating	4 636	2.0	1 454	1.1	2 042	1.8	1 758	1.4	1.4
fuels, water	139	0.1	55	0.0	302	0.3	182	0.1	0.1
Incidentals	0	0.0	0	0.0	0	0.0	0	0.0	0.0
Subsidiary business	254	0.1	30	0.0	80	0.1	56	0.0	0.0
Rent									
for information:									
Business earnings	304 350	-	191 913	-	164 496	-	177 732	-	-

Source: Agrarbericht 1980, loc cit, p 272 ff.



5. Downstream interlinking

a. General survey of marketing channels

The stages which come after the fishing operation are more important than the upstream links of fisheries and than fishing itself for economic activity and employment opportunities. According to the latest job census in 1970, there were 6655 persons employed in deep-sea and inshore fishing in the Federal Republic, as compared with a total of some 26 500 in fish processing and the fish trade<sup>1</sup>. The number employed in the fish and fish-products trade would be even higher if the figures included firms for which fish and fish products are not the main component but only a small part of their range.

The marketing channels for fish are shown diagrammatically in Figure 7. The conventional route to the consumer for fresh fish is via

- i. co-operatives and private sellers,
- ii. fish auctions and
- iii. the wholesale and retail fish trade<sup>2</sup>.

In the case of inshore fishing this chain is often much shorter. Co-operatives and private sellers frequently operate as coastal and inland fish wholesalers, and sometimes also as retailers. Some of the catches are also sold directly by the producers to the final consumer or retailer, although direct trade between the producer and the consumer is of minor importance.

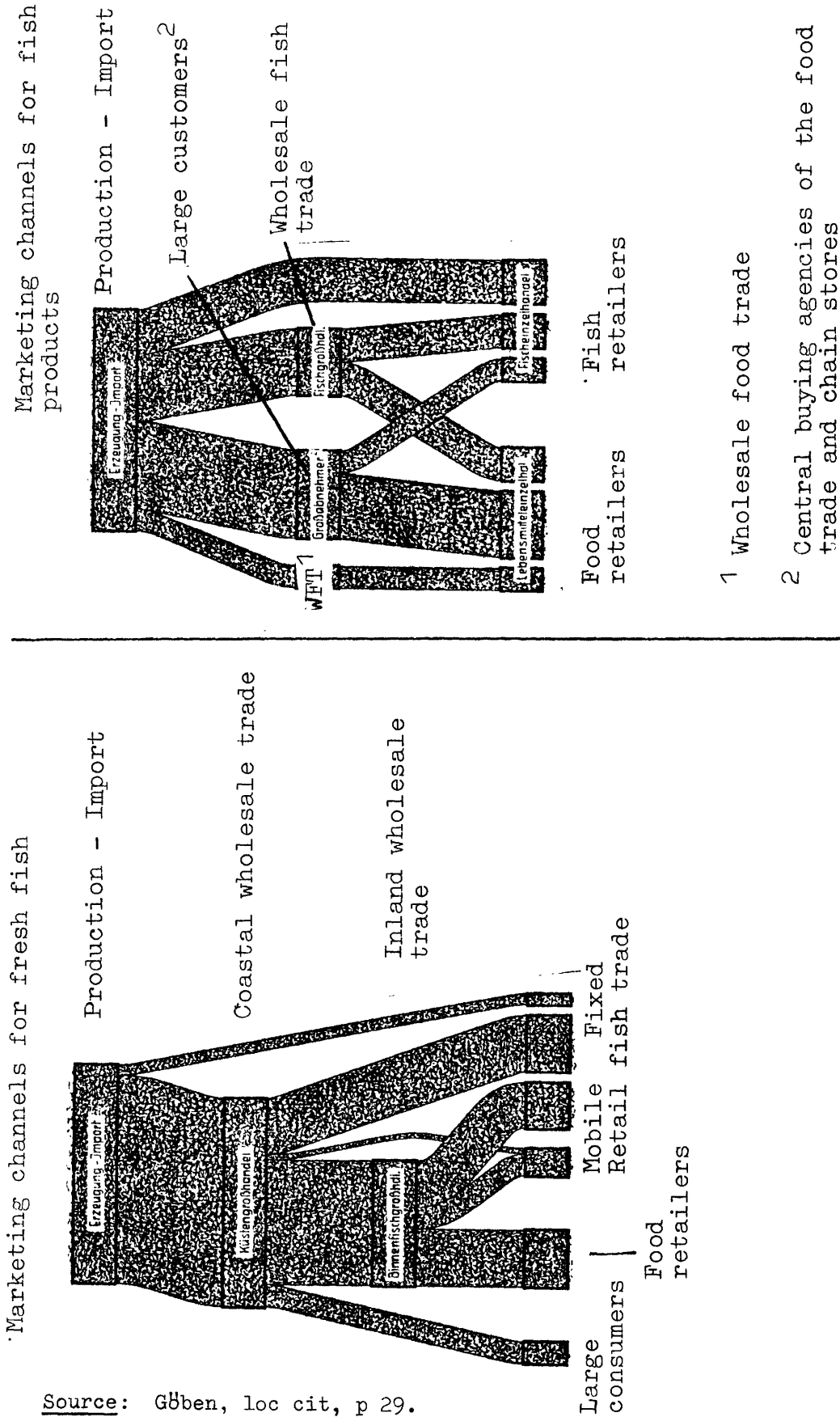
Fish processing and the wholesale and retail fish trade are dealt with separately below. Foreign trade is covered at the same time but is also dealt with later in Section 6.

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1. Federal Statistical Office, Series C: Unternehmen und Arbeitsstätten, job census of 27 May 1970, Vol 2: Nichtlandwirtschaftliche Arbeitsstätten und Beschäftigte, Stuttgart and Mainz 1972, p 10 ff.

2. See Heinz Göben, Marktstruktur und Preisbildung bei Fischen und Fischwaren in der Bundesrepublik Deutschland, Forschungsgesellschaft für Agrarpolitik und Agrarsoziologie eV, Bonn, 1966, p 27.

Figure 7. Marketing channels for fresh fish and fish products



Source: Gb̄ben, loc cit, p 29.

b. Fish processing

On the basis of the numbers employed, fish processing is the most important of fishing's downstream sectors. According to the 1970 job census there were almost 3000 people working in 116 firms in this sector in Schleswig-Holstein<sup>1</sup>. More up-to-date and detailed information on fish processing in Schleswig-Holstein is available only for the larger firms (more than 10 or 20 employees respectively), but these account for the bulk of the fish-processing industry. In 1970 only 65% of the 116 firms were covered by the industrial statistics, but these accounted for 96% of all persons working in fish processing.

Table 26 contains structural figures for the fish-processing industry in the FRG (1977 and 1978) and for Schleswig-Holstein. These figures relate to firms with 20 or more employees. No figures are available for 1978 for Schleswig-Holstein. The comparison with the FRG as a whole is therefore based on the figures for 1977. Schleswig-Holstein accounted for 17-18% of the total turnover of the FRG fish-processing industry in 1977. The numbers employed in Schleswig-Holstein also represent 17%; the average wages in Schleswig-Holstein are only slightly below the national average. The single (but significant) divergence between the fish-processing industry in Schleswig-Holstein and in the FRG as a whole lies in foreign sales, where Schleswig-Holstein accounts for only some 10% of the foreign sales of the FRG. Such sales are therefore much less important for Schleswig-Holstein than for the fish-processing industry of the Federal Republic as a whole.

The most important products of the fish-processing industry are:

smoke-cured goods

salted herring and other saltfish

salted fish products packed in oil (Seelachs in oil - coalfish as  
salmon substitute)

marinades

canned fish

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1. Statistische Berichte, Schleswig-Holstein Statistical Office:  
Arbeitsstätten, Unternehmen und Beschäftigte in Schleswig-Holstein  
am 27.5.1970. Kiel 1972, p 37.

Table 26. Structural figures for the fish-processing industry  
(firms with more than 20 employees)

	1978 FRG	1977 FRG	Schleswig-Holstein	Land/FRG ratio as %
Turnover in 1000 DM of which:	1560676	1449329	254745	17.6
Foreign sales	203381	211874	21847	10.3
Total employees	11132	11206	1915	17.1
Wage total, 1000 DM	156754	147799	23952	16.2
Salary total, 1000 DM	83551	75456	11556	15.3
Wages and salaries as proportion of turnover	15.40 %	15.40 %	13.9 %	-
Turnover per employee	140197	129335	133026	-
Average wage per hour worked, DM	9.48	8.95	8.65	-

Sources: Jahresbericht über die Deutsche Fischwirtschaft 1978/79, published by the Federal Ministry of Food, Agriculture and Forests, Berlin, December 1979; Statistisches Jahrbuch Schleswig-Holstein 1978, Schleswig-Holstein Statistical Office.

ready-to-serve dishes  
 fish salad  
 products containing crustaceans and molluscs.

Patterns of specialization in the German fish-processing industry are both regional and product-related. Regional specialization has developed alongside the development of the most important sea or trading ports and the fishing fleets operating from them. For instance:

- i. Bremerhaven firms specialize in smoked products,
- ii. Cuxhaven firms (Lower Saxony) specialize in marinades,
- iii. Hamburg firms specialize in high-quality products and
- iv. Schleswig-Holstein firms specialize in canned fish.

There are limits to product specialization because of the keeping properties of the products and fluctuations in supplies. Special firms exist for shrimp processing, particularly on the west coast of Schleswig-Holstein, but the fluctuating supplies of raw materials call for a flexible production programme<sup>1</sup>. For this reason, specialization is not always pursued to such a level that economies of scale in mass production are fully achieved with one product. Economies of scale can still best be achieved in canned-fish and marinade production. This explains why the largest firms are to be found in these sectors. Smoke-curing, on the other hand, is the province of small and medium-sized firms<sup>2</sup>.

Of the fish used for processing, herring is by far the most important. Since no fresh herring is at present being landed by German fishermen, other than in the Baltic, the processing industry is having to turn to foreign suppliers for its raw materials. The Schleswig-Holstein fish industry at present processes about 200 000 tons annually (weight caught). Of this, barely 7000 tons are landed by Schleswig-Holstein fishermen from the Baltic. The import level is about 97%.

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1. Heinz Göben, *Dynamik und Funktionszusammenhänge auf dem deutschen Seefischmarkt und Ansatzpunkte für seine Rationalisierung*, Verlag Paul Parey, Hamburg and Berlin, 1964, p 135.

2. Göben, "Marktstruktur...", loc cit, p 22.

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Quantities and values for the most important products of the fish industry in Schleswig-Holstein are given in Table 27 for 1971-76. The figures illustrate the special importance of canned fish, the product value of which is more than half the total value of the production of the Schleswig-Holstein fish industry: of a total of DM 212 million in 1976, more than DM 115 million were accounted for by canned fish. Marinades come second, with some 17% of the value of production. Smoke-cured goods and crustacean and mollusc products each account for about 6%.

Table A6 (Annex) gives figures for the number of firms; their main products, wages and salaries; turnover and investment in the fish industry in Schleswig-Holstein. The latest figures recorded (1977) show that there were 46 firms in the fish-processing industry in Schleswig-Holstein, of which 28 employed 20 or more workers. The 14 small firms had a total of less than 100 employees altogether and a monthly total turnover of approximately DM 1 million (see Table A7 in the Annex). While the number of small firms has fallen by about half in the last ten years and the number of employees has dropped by more than one third, turnover has declined only slightly. This is partly due to price rises and partly also to the switch to higher-quality products.

Altogether the Schleswig-Holstein fish-processing industry has some 2000 employees. The number of employees - not counting small firms - fell from more than 2700 in 1970 to about 1900 in 1977. Total wages paid rose by 18% in this period, and total salaries by as much as 40%. The average hourly wage rose by 17% between 1970 and 1977. This was approximately the same as the rise in wages in the food industry as a whole, although the level of wages in the fish-processing industry is much lower than in the food industry as a whole: in 1977 it was about 30% lower. Sales rose by a quarter in the period 1970-77 to more than DM 250 million. Foreign sales rose to approximately the same extent, but annual fluctuations in these are more marked than for total sales.

Measured against total sales, investment in the fish industry is relatively small and decreasing. In 1976 it represented only 1.6% of

Table 27. Production of the fish-processing industry in Schleswig-Holstein, in firms with 10 or more employees (quantities in tons, values in 1000 DM) (figures in brackets are for Federal Republic as a whole)

Product	1971		1972		1975		1976	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Fish and fish products of which:	-	191 824	-	173 497	41 472	197 395	44 699 (287 068)	211 605 (1219 971)
1. Smoke-cured goods	1 181	6 327	1 128	6 725	1 430	13 641	1 289 (15 423)	13 957 (126 164)
2. Salted fish, in oil etc, marinades, canned fish of which:	50 800	150 973	44 719	132 622	35 254	160 310	36 332 (138 443)	168 883 (600 043)
2.a. Marinades	19 453	46 916	18 907	46 298	7 036	35 558	7 129 (67 874)	35 570 (257 363)
2.b. Canned fish	31 347	104 057	25 812	86 364	25 912	109 470	26 458 (54 677)	115 410 (238 589)
3. Crustacean and mollusc products	588	7 188	828	8 479	784	11 067	882 (1 612)	11 928 (20 004)
4. Fish fillets	3 854	7 734	3 640	7 415	.	.	37 895	121 251

Source: Die industrielle Produktion in Schleswig-Holstein im Jahre 1976 (1972). Statistische Berichte des Statistischen Landesamtes Schleswig-Holstein, Kiel, 25 November 1977 (28 September 1973).

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turnover, while the food industry as a whole had a rate of investment of 2.8.

The regional structure of the firms, numbers employed and turnover of the fish-processing industry is shown in Table 27a. These figures come from the general census on industry in Schleswig-Holstein and relate to 30 September or the month of September for the years shown (1972-76). In contrast to the figures in Table A6, the general census also includes figures for small industrial firms.

Figure 8 illustrates the regional importance of the Schleswig-Holstein fish-processing industry by districts. It shows the regional concentration at the ports and the traditional fishing towns of Lübeck and Kiel. The Lübeck fish-processing industry, which is concentrated at Lübeck-Schlutup, comprises only 20% of all firms but about half the total turnover. The special position of the Schlutup fish industry is also evident from the number of employees. Apart from Kiel and Lübeck, monthly turnover of more than DM 1 million was achieved in only four other districts in 1976; in seven districts there are no fish-processing firms at all. The firms specializing in shrimp processing are located in Nordfriesland and Dithmarschen on the west coast of Schleswig-Holstein.

Fish-processing plants<sup>1</sup> do not necessarily constitute companies. In the case of many small firms, eg smoke-curing firms, the company and the plant are often one and the same thing, but in other cases the plants form part of larger foodstuff groups, for example the "Nordsee" Deutsche Hochseefischerei GmbH (50% owned by the German Unilever GmbH) and the German Oetker Group<sup>2</sup>. As well as these, the Fisch-Union GmbH und Co. KG, Cuxhaven, Hussmann und Hahn in Cuxhaven and the GEG Gross-einkaufs-Gesellschaft Deutscher Konsumgenossenschaften are among the five largest fish-processing companies<sup>3</sup>. These group-affiliated

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1. Unlike companies, plants are geographically separate entities.

2. Rolf Lasch, Die Struktur der Fischindustrie und des Fischhandels in der Bundesrepublik Deutschland, IFLM Arbeitsunterlagen 1974 No 1, Agricultural Market Research Institute of the Brunswick-Völkerode Agricultural Research Institute, September 1974, p 5 ff.

3. ibid. p 10.



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companies are found mainly in Lower Saxony and Bremen, however. In Schleswig-Holstein the fish-processing plant is mostly identical with the company.

Table 27a. The fish-processing industry in Schleswig-Holstein: general census and regional structure

	Firms					Numbers employed on 30 September					Turnover (1000 DM) in September					Annual turnover 1975
	1972	1973	1974	1975	1976	1971	1973	1974	1975	1976	1972	1973	1974	1975	1976	
All firms including: small firms usually with less than 10 employees	59	60	57	55	46	2 194	2 315	2 153	2 020	2 144	17 138	17 450	17 772	21 479	20 883	
Flensburg	4	4	4		2	115	128	101	98	66	1 028	989	948	988	804	
Kiel	14	11	11	11	11	29	37	45	32	.		338	276			
Idbäck	12	13	12	11	10	471	439	412	394	450		2 306	2 953		2 849	
Dithmarschen	6	5	5	6	6	795	940	855	816	849		8 967	8 317		10 363	
Nordfriesland	6	6	6	5	4	183	174	181	187	196		1 154	1 383		1 897	
Rendsburg-Eckernförde	6	6	6	5	4	65	72	56	53	52		879	1 133		1 016	
Schleswig	5	6	5	4	3	50	44	44	32	26		166	214		213	
Segeberg	3	3	3	3	3	162	147	147	122	154		.	1 094		1 713	
						426	385	345	323			2 322	2 006			

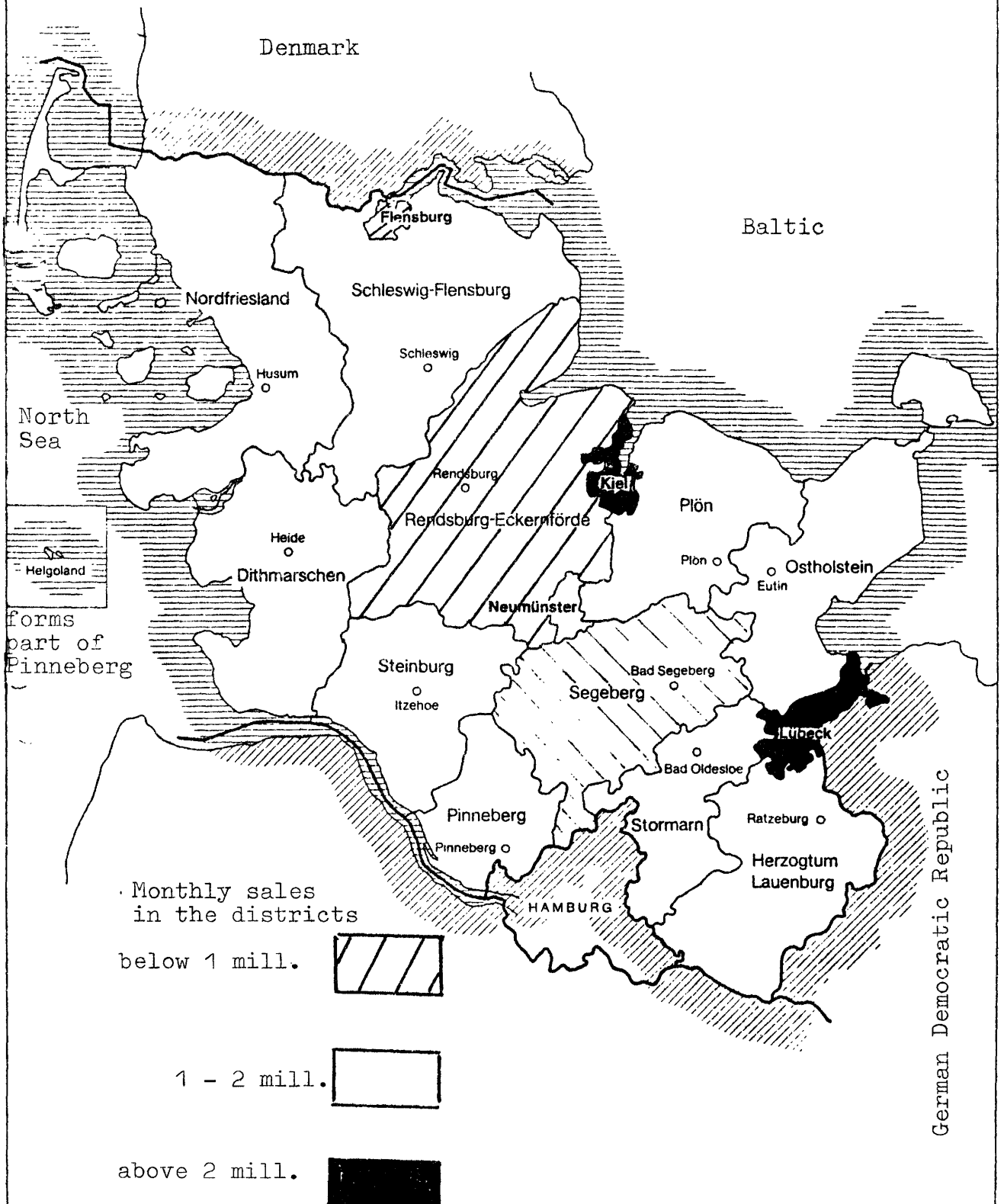
No firms in:

Neumünster, Hzgt. Lauenburg, Ostholstein, Pinneberg, Plön, Steinburg, Stormarn

Source: Die Industrie in Schleswig-Holstein am 30 September 1973 (1974, 1976), Ergebnisse der Totalerhebung, Statistische Berichte des Statistischen Landesamtes Schleswig-Holstein, Kiel, 3 April 1974 (14 May 1975, 13 July 1977).

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Figure 8. Regional structure of the fish-processing industry in Schleswig-Holstein



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c. Fish trade

i. General survey

The development trend of total sales from 1975-78 is shown in Table 28, classified according to three product groups: herring, whitefish and shellfish, and crustaceans and molluscs. Total sales are further subdivided into types of domestic fishing (deep-sea and middle-water fishing) and imports and exports. These subdivisions illustrate the importance of the various sources of supply and production in the total sales. It is thus clear that deep-sea fishing for herring is now of only minor importance. Only some 5% of total sales are accounted for by domestic fishing - and this is middle-water fishing - and 95% is imported. In the case of chilled whitefish about two thirds of the total sales are accounted for by domestic production, of which deep-sea fishing provides some 60%. In the case of shellfish, crustaceans and molluscs, domestic production again predominates (about 75% of total sales), almost the whole of this being accounted for by middle-water fishing. Of the three groups of product, this is also the only one in which export surpluses have been produced (especially 1976).

In the Federal Republic as a whole in 1970 almost as many people were employed in trade in fish and fish products as in fish processing. In Schleswig-Holstein, on the other hand, the figures according to the job census were much lower; compared with the 3000 persons employed in fish processing, there were fewer than 1200 working in the fish trade. This is typical of the coastal states, where fish processing is highly concentrated.

ii. Fish markets

In contrast to the other coastal states, sales via fish markets are of only minor importance in Schleswig-Holstein. In 1978 the Kiel fish market handled only 1.6% of the sales by the four major German markets in Bremerhaven, Cuxhaven, Hamburg and Kiel<sup>1</sup>. It relies almost exclusively on small-scale and inshore fisheries, with landings by cutters

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1. Kieler Seefischmarkt GmbH, Annual report 1978, p 5.

Table 28. Development trend of sales and import and export of herring, whitefish, shellfish, crustaceans and molluscs, by type of fishing (1000 tons weight caught)

	1975	1976	1977	1978
<b>a. Fresh and frozen herring</b>				
Total sales	218.3	194.7	155.3	146.4
Deep-sea fishing (frozen)	38.7	16.1	0.4	0.6
Middle-water fishing (fresh)	9.5	6.3	6.8	6.9
Imports (excluding finished products)	170.1	172.3	148.1	138.9
Exports (excluding finished products)	19.7	16.8	10.4	3.4
<b>b. Chilled whitefish</b>				
Total sales	200.1	219.8	237.3	216.2
Deep-sea fishing	88.1	81.7	91.4	81.9
Middle-water fishing	47.8	61.8	62.7	55.3
Imports (excluding finished products)	60.8	71.4	83.2	79.0
Exports (excluding finished products)	20.9	24.8	29.8	31.5
<b>c. Shellfish, crustaceans and molluscs</b>				
Total sales	39.5	51.5	32.7	38.5
Deep-sea fishing	-	1.2	1.4	1.0
Middle-water fishing including:	31.6	41.3	22.8	27.3
Shrimps	10.4	15.9	9.2	10.9
Mussels	21.1	25.4	13.6	16.3
Imports (excluding finished products)	7.9	9.0	8.5	10.2
Exports (excluding finished products)	12.2	23.5	8.2	9.7

Source: Jahresbericht über die deutsche Fischwirtschaft, loc cit.

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clearly predominating (Table 29). The importance of the Kiel fish market has declined very sharply in the last few years. This is partly due to the transfer of the last Schleswig-Holstein deep-sea fishing vessels from Kiel to Cuxhaven, but also to the declining catches in the Baltic. The sales volume of the Kiel fish market in 1978 was down to 40% of that in 1972. Of the 4075 tons of fish for human consumption sold in 1978, 1200 tons were accounted for by herring and 2875 tons by other fresh fish<sup>1</sup>.

Table 29. Fish sales at Kieler Seefischmarkt GmbH, 1978

Landed or supplied by	Quantity in tons	%	Value (1000 DM)	%
Small-scale fishing	3 665	87.1	4 416	72.4
Inland-water fishing	136	3.2	908	14.9
Sent from elsewhere	406	9.7	776	12.7
Total	4 207	100.0	6 100	100.0

Source: Kieler Seefischmarkt GmbH, Annual report 1978

### iii. Wholesale trade

There are about 500 wholesale fish and fish-product companies in the Federal Republic<sup>2</sup>. A large proportion of these companies, however, do not deal in seawater fish, or not exclusively, but also in ornamental fish or special fish products, for example. In 1960 the number of wholesalers of importance for sea fishing was estimated at 350 out of a total of 600<sup>3</sup>.

1. Kieler Seefischmarkt GmbH, Annual report 1978, p 4.

2. Cf Federal Statistics Office, Fachserie C, Unternehmen und Arbeitsstätten, Reihe 1. Die Kostenstruktur der Wirtschaft, V, Heft 1. According to 1972 sales tax statistics there were 516 wholesalers. Total turnover was DM 1500 million.

3. Cf Göben, loc cit, p 23

Table 30. Fish sales at Kieler Seefischmarkt GmbH, 1972-78  
(quantities in tons)

Year	Total t	Small-scale fishing	Inland-water fishing	Sent from elsewhere	Express consignments*
1972	10 421	7 036	273	1 367	1 745
1973	13 789	10 974	287	1 145	1 384
1974	11 847	9 712	258	767	1 110
1975	7 488	5 863	230	709	686
1976	5 623	4 422	201	587	413
1977	6 270	5 312	185	492	281
1978	4 207	3 665	136	406	-

\* by lorry from Cuxhaven. These were discontinued in 1978 when the freight subsidies were abolished.

Source: Kieler Seefischmarkt GmbH, Annual report 1978

The wholesale fish trade is concentrated geographically on the fishing ports of Bremerhaven, Cuxhaven, Hamburg and Kiel<sup>1</sup>, where about half of all the wholesalers are located. A more detailed regional breakdown for Schleswig-Holstein shows that about 40% of the Schleswig-Holstein wholesale companies are concentrated around Kiel (Table 31). The activities of the wholesalers in the coastal area are not confined to trading, as is the case with the so-called "inland fish wholesalers" but to some extent include processing, especially filleting<sup>2</sup>.

The main sources of supply for the coastal wholesale fish trade were traditionally the fish markets<sup>3</sup>. As the small-scale and inshore fisheries co-operatives and private sellers are also active in the trade, however, a considerable proportion of the actual volume of the wholesale trade takes place outside the fish markets. Apart from the trading activities of the co-operatives and private sellers, three types of business operation can be distinguished in the coastal wholesale trade:

1. Independent, non-specialist wholesalers: this includes most firms.
2. Independent specialist coastal wholesalers: specializing in a particular range (eg crustaceans) or a particular set of customers.
3. Wholesale firms affiliated to a concern: these firms are sections of the major fisheries companies, eg "Nordsee Deutsche Hochseefischerei" (Unilever) or Oetker Group, or other fish-processing companies with their own wholesale departments<sup>4</sup>. Lastly, with the concentration in the food trade, independent wholesalers have also been eliminated where department stores have their own food departments.

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1. Lasch, loc cit, p 16

2. ibid, p 16

3. Cf Göben, loc cit p 24

4. Cf Lasch, loc cit, pp 9a and 10a.



Table 31. Regional structure of the fish and fish-product import/wholesale trade in Schleswig-Holstein, 1979

Locality	Number of firms
Kiel and district	12
Lübeck	2
Ostholstein coast	3
Flensburg area	2
Eckernförde	1
Rendsburg and district	1
Neumünster	1
Husum	3
Tönning	2
Marne	2

Source: Mitteilung der Fischwirtschaftlichen Vereinigung Schleswig-Holstein eV, 12 December 1979.

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iv. Retail trade

The population is supplied with fresh fish via

- a. the fixed retail trade;
- b. the mobile retail trade;
- c. the fresh-fish departments of department stores.

The retailers obtain their produce principally from wholesalers, but also directly from the fish market or the producers where this is possible because they are located near the coast. According to estimates by the Fischwirtschaftliche Vereinigung Schleswig-Holstein eV, 75% of the supplies for the retail trade (and the fish processing industry) in Schleswig-Holstein come from imports<sup>1</sup>. The most important country of origin is Denmark.

According to the turnover tax statistics, in 1972 there were 2267 fish and fish-product retailers with total sales of DM 474 million<sup>2</sup>. Detailed information on the regional structure of the retail fish trade cannot be given because figures are often given only in conjunction with those for the retail food and drinks trade. According to information from the Fischwirtschaftliche Vereinigung, there are some 50 fish retailers in the Kiel area alone and 15 in Eckernförde.

As far as the size of the firms is concerned - mainly one-man businesses or partnerships - small firms predominate. In 1972, 40% of the fish retailers in the Federal Republic had a turnover of less than DM 100 000 per year, and in a further 40% the turnover was between DM 100 000 and 250 000. Only 5%, or 130 firms, achieved yearly sales of more than DM 500 000, but this group accounted for approximately one third of the total turnover.

The mobile trade, ie market traders and street traders, is still vitally important in the retail fish trade. This is reflected in the large

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1. Cf Mitteilung of 12 December 1979, loc cit.

2. Federal Statistical Office, Fachserie C, Unternehmen und Arbeitsstätten, Reihe 1. Die Kostenstruktur der Wirtschaft, VII. Einzelhandel 1973, p 5.

number of small retail businesses. Actual figures for the mobile trade are available only for 1967. At that time there were 973 mobile retailers and 1589 fixed retail firms (shops); 1956 persons were employed in the mobile fish trade and 5203 in the fixed trade. At that time the mobile retail fish trade accounted for 50% of the annual sales of the small firms (turnover less than DM 100 000)<sup>1</sup>.

Apart from the actual retail firms, the shops run by the fish-processing industry are also important to the retail trade. Again, the only figures available are for 1967. At that time 355 such shops had a turnover of DM 112 million, ie approximately one third of the total retail fish trade.

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1. Cf Lasch, loc cit, p 17 ff.

## 6. Foreign trade

While landings have declined sharply, the consumption of fish in the Federal Republic over the last few years has remained relatively constant (Table 32). Rising fish imports largely offset the lower domestic catches. In the 1976/77 financial year, consumer expenditure of DM 680 million on fish was met by domestic production of some DM 430 million and net imports of DM 250 million (Table 33). Gross imports of DM 495 million were already in excess of domestic production. The value of fish exports was only half that of imports.

The Federal Republic also has a trade deficit in the case of fish meal. At DM 196 million (1976/77), domestic production covers less than half the consumption of DM 426 million. Fish-meal imports amounted to DM 305 million, and exports to only DM 75 million.

Both for fish meal and for fish and fish products the foreign trade deficit rose between 1975 and 1977 by about 10% per year. As Table 34 shows, the foreign-trade deficit in fish and fish products was DM 670 million, ie one-and-a-half times the exports of DM 417 million. In the case of fish meal the deficit of DM 229 million was almost three times the exports. However, in recent years exports have risen more than imports. An annual rise of 13% in the value of imports from 1976 to 1977 contrasts with an annual rise of 20% in the value of fish and fish products exported. Nevertheless - because of the higher value of the imports - the Federal Republic's foreign-trade deficit in fish and fish products has risen substantially in the last few years.

Foreign-trade figures for Schleswig-Holstein are available only for certain sectors. The export figures of the Schleswig-Holstein fish industry have already been mentioned in Section 5 above. Foreign landings by Schleswig-Holstein fishing vessels have also already been discussed. The figures are given again in Table 35, shown separately in terms of quantity and value for Baltic and North Sea cutters. Until 1976, Schleswig-Holstein's North Sea cutters made their landings exclusively in home ports, and even since then the extent of foreign landings has remained limited. It is mainly a question of shrimp landings in Denmark by Schleswig-Holstein boats. Because of the perishability of

Table 32. Fish consumption in the Federal Republic of Germany  
(kg per head and per year)

Financial year	Weight caught	Filleted weight
1968/69	11.0	4.6
1969/70	10.5	4.0
1970/71	11.4	4.4
1971/72	9.8	3.7
1972/73	9.5	3.6
1973/74	11.0	4.2
1974/75	10.9	4.1
1975/76	9.7	3.8
1976/77	10.3	3.9

Source: Statistisches Jahrbuch 1978 für die Bundesrepublik  
Deutschland, loc cit.

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Table 33. Fish and fish meal supplies in the Federal Republic of Germany

	Fish million DM	Fish meal million DM
Domestic production		
1974/75	470	198
1975/76	446	223
1976/77	432	196
+ imports 1976/77	495	305
- exports 1976/77	248	75
Consumption		
1974/75	738	458
1975/76	661	481
1976/77	679	426

Source: Statistisches Jahrbuch 1978 für die Bundesrepublik Deutschland, loc cit.

Table 34. FRG foreign trade in fish, fish products and fish meal

Year	Fish and fish products		Fish meal and the like	
	Imports mill. DM	Exports mill. DM	Imports mill. DM	Exports mill. DM
1975	853	289	212	52
1976	978	360	252	66
1977	1 087	417	309	80

Source: Statistisches Jahrbuch 1978 für die Bundesrepublik Deutschland, loc cit.

Table 35. Home and foreign landings by Schleswig-Holstein's Baltic and North Sea boats, 1972-78  
(quantity in 1000 tons, value in 1000 DM)

Year	Landings abroad		Landings in FRG		Total landings	
	North Sea boats					
	Baltic boats		Quantity	Value	Quantity	Value
1972	-	-	57 495	44 095	57 495	44 095
1973	11	21	69 254	52 568	69 265	52 590
1974	7	5	71 213	51 024	72 220	51 029
1975	20	70	55 051	48 018	55 071	48 088
1976	136	21	61 947	53 219	62 100	53 453
1977	482	1 317	47 134	57 503	47 670	58 999
1978	2 452	1 326	44 601	55 358	47 109	56 795

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins, reprinted from Das Fischerblatt, various volumes.

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the shrimps and the capacity of the boats these landings are made at the ports nearest the fishing grounds. The 20 or so boats working for "Büsumer Feinkost" (formerly Büsumer Fischerei-Gesellschaft mbH), for example, land their shrimp catches along the Jutland coast in Denmark. The catches are then transported to Büsum for processing, using the firm's own refrigerated vessels<sup>1</sup>.

In contrast to the situation on the North Sea coast, Baltic boats have been making foreign landings since 1973. While such landings remained relatively modest until 1976, they have risen sharply in recent years with the switch in fishing to other fishing grounds. At 2500 tons in 1978, they had already reached 12% of the landings made on the Schleswig-Holstein Baltic coast.

#### Summary of marketing channels

The marketing channels for seawater fish and fish products that are intended for human consumption are summarized in Table 36 for the Federal Republic as a whole. Starting from the domestic catch, subdivided by type of fishing, total sales of seawater fish and fish products are determined by adding the imports; after deducting exports, domestic sales are obtained. The table shows these marketing channels both for raw fish (fresh and frozen herring, chilled whitefish, crustaceans and molluscs) and for finished products. The figures are by weight (1000 tons), but those for raw fish (catch weight) are not directly comparable with those for finished products (eg weight of fillets).

It would be useful to link the two parts of the table directly, ie a continuous flow chart from the catch to the consumption of the products. Figure 8a contains such a flow chart for 1976. Corresponding charts for subsequent years are not yet available. Because of differences in measurement and lack of information about the direct sales of unprocessed fish to the consumer, it has not been possible to draw up a supply/consumption chart from Table 36.

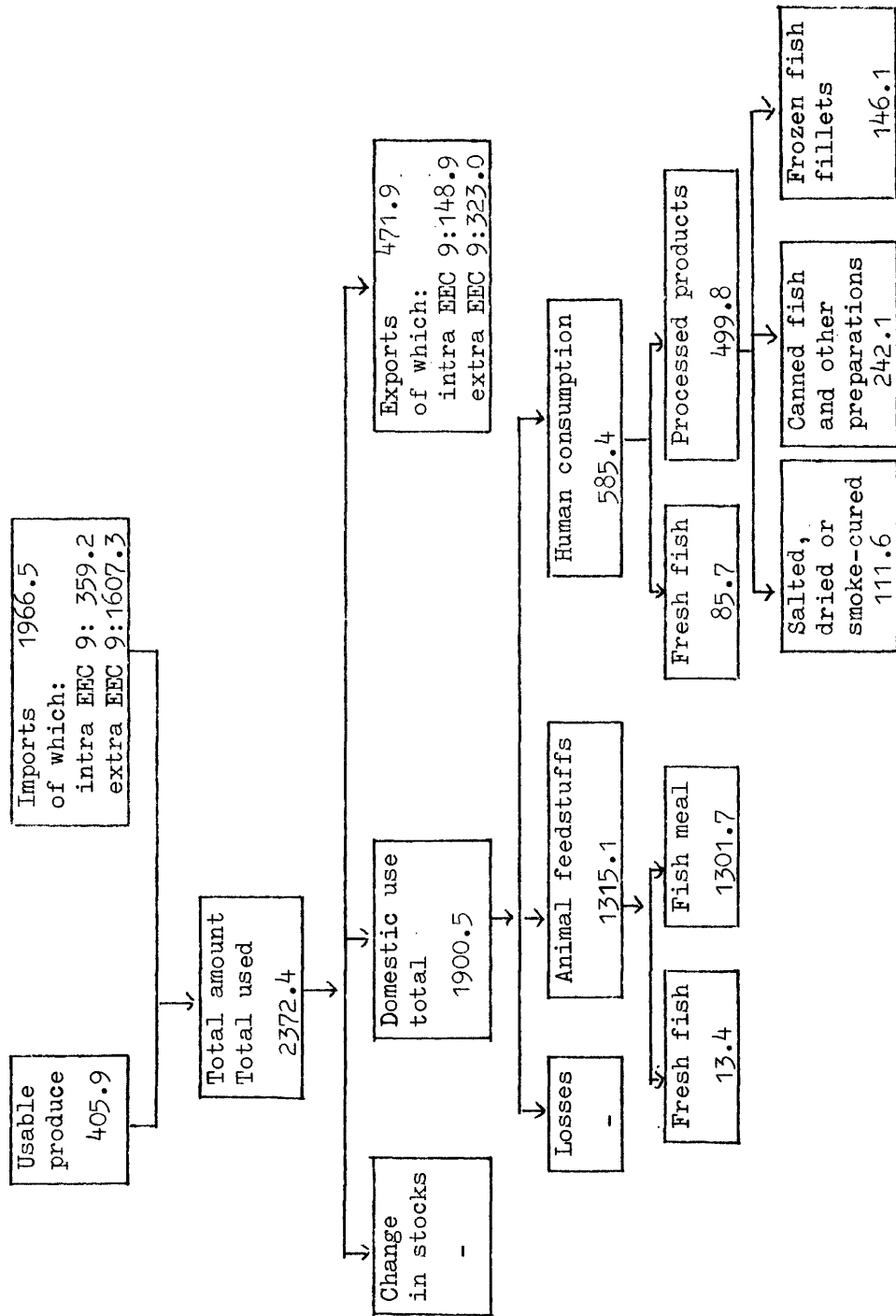
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1. Allgemeine Fischwirtschaftszeitung, 1978.



Figure 8a. Fish and fish products supply/consumption chart for the Federal Republic of Germany in 1976

(quantities in tons)



Source: Fischerei - Waren und Flotten, 1976-77, Eurostat, Luxembourg 1979

Table 36. Marketing channels for seawater fish and fish products in the Federal Republic of Germany in 1978 (in 1000 t)

I. Raw fish		
1. Domestic fishing		
a. Deep-sea fishing	83.5	
b. Middle- and near-water fishing	89.5	
2. Imports	228.1	
3. Total sales	401.1	
4. of which exports (excluding finished products)	44.0	
5. Domestic sales of raw fish	356.5	
II. Finished products		
6. Finished goods: total domestic sales		446.5
1. Fresh fish		
i. Production	51.7	
ii. Imports	+ 30.7	
iii. Exports	- 11.3	
		71.1
2. Frozen fish		
i. Production	73.6	
ii. Imports	+ 48.6	
iii. Exports	- 45.8	
		76.4
3. Other finished products (canned fish, marinades, smoke-cured goods, etc)		
i. Production	199.1	
ii. Imports	81.2	
iii. Exports	18.7	
		299.0

Source: Jahresbericht über die Deutsche Fischwirtschaft, 1978/79, loc cit.

Part B. Changing circumstances and trends affecting small-scale and inshore fishing

I. The changing international legal situation and the EEC's fisheries policy

The economic and legal-institutional circumstances affecting the exploitation of the seas, and particularly fishing, changed radically in the 1970s. There is an urgent need for an economic analysis of these changes because the biological resources of the sea are becoming increasingly scarce. An additional and related factor was the re-arrangement of maritime rights of disposal and exploitation.

Economists had previously taken little interest in the biological resources of the sea. They were regarded as inexhaustible or technically inaccessible and considered to be common property to which everyone had free access without let or hindrance. Technological, economic and legal-institutional developments in recent years have refuted what was in any case a superficial view: unrestricted, cost-free access to the fishing grounds of the seas was not founded in the fact that fish was a free and abundant commodity, but merely remained a practicable solution as long as the cost of fishing was so high compared with the proceeds from the catch that there was no major threat to fish stocks. The benefit to be derived from limiting access and creating exclusive fishing rights would not at that time have compensated for the cost of creating and maintaining exclusive jurisdiction.

This cost-benefit ratio changed dramatically in the period after the Second World War, and particularly in the 1970s. The increase in the demand for protein and the introduction of new fishing and processing technologies greatly widened the price-cost gap that can be achieved in fishing: high scarcity rents can be attained in fishing as long as the optimum management of fish stocks is ensured. Furthermore, the development of new inspection techniques has substantially reduced the cost of creating and maintaining exclusive jurisdiction: it has become possible,

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and worthwhile, to inspect large areas of the sea. This has resulted in a growing number of claims to sovereign rights to exploit both mineral resources and fish stocks, and these claims have been taken up at the UN Conference on the Law of the Sea. The circumstances surrounding fishing, and also the EEC's fisheries policy, have consequently undergone fundamental change. The question of allocative efficiency, ie optimum use of fish stocks, has assumed importance not only because fish stocks have become scarce owing to technological advances and rising prices but also because of the arrangements governing access to them.

1. Developments in the international legal situation

a. Law of the sea: evolution of the 200-mile ruling

i. World-wide

The first claims by coastal States to exclusive fishing or economic zones extending 200 miles offshore were made in the early 1950s. The trend was set by a number of Latin American countries (Chile, Ecuador and Peru), who found encouragement for their claims to sovereign rights as coastal States in the declarations of the USA's Truman Doctrine of 1945. While claims by coastal States to sovereign rights to exploit resources on the offshore continental shelf (principally oil and natural gas) were soon widely accepted in international law, attempts to claim sovereignty over 200-mile zones remained highly controversial. These claims were accordingly not reflected in the conventions concluded at the First and Second United Nations Conference on the Law of the Sea. It was not until the time of the Third Conference on the Law of the Sea, which has been in progress since 1973, that the concept of the 200-mile zone as a resource-oriented economic zone in which the bordering States have exclusive jurisdiction over the exploitation of resources was recognized in international law. Although this concept was still disputed at the beginning of the Conference, the 200-mile ruling can now be assumed to be firmly anchored in international common law as a tenet of maritime law even though certain details await clarification and the new law of the sea has not yet been given uniform shape or codified,

almost all coastal States having meanwhile claimed 200-mile zones, either as resource-related economic or fishing zones or even as comprehensive territorial waters. The stage of negotiation at the UN Conference on the Law of the Sea, as reflected by the Informal Composite Negotiating Text (ICNT), is corroborated by the fact that many of the national arrangements correspond to the Conference text in many details relating to fisheries.

ii. EEC

Major examples of the recognition in international law of the 200-mile ruling are the declaration of a 200-mile zone by the USA, the country with the largest fishing area (US Fishery Conservation and Management Act, Public Law 94-265, 13 April 1976), and the resolution adopted by the Council of the European Communities on the introduction of the 200-mile fishing zone on 1 January 1977. Both the USA and the EEC took so long to adopt legislation that they must be regarded as latecomers rather than leaders in the field of 200-mile arrangements. Their relevance in international law lies in their anticipation and recognition of important consequences of the negotiations on the law of the sea. The particular significance of the EEC fishing area is that not only were the national 200-mile zones of the Member States simultaneously established but that a Community zone ("EEC waters") was also created. From an institutional standpoint, special emphasis must be placed on the integrating effect of the Community zone, which is particularly important at a time of numerous points of divergence within the Community. The significance of the Community zone as regards resources, however, is that a fragmentation of Community responsibility in the fisheries sector would run counter to a fisheries policy geared to the preservation of fish stocks. The problem of the necessary increase in the area of the fishing zones will be discussed in greater detail below. Even though the aim of other 200-mile arrangements was to prevent the emergence of regional fishing disputes - an example being the US ruling, which made it impossible for its individual states to legislate independently on fishing in the 200-mile area - the Community ruling is so far the only attempt that has been made to pave the way for international legislation on fisheries related to resources while creating 200-mile zones.

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b. Fisheries management

The 200-mile ruling is of outstanding importance for the fishing industry, since its operations are very largely (80-90%) confined to areas near the coast where the photosynthetic production of nutrients principally occurs. If whaling on the high seas is ignored and Antarctic coastal waters are not regarded as part of the high seas, almost all commercial fishing is done in 200-mile areas. This illustrates the importance of 200-mile zones. However, in the case of fish which cover large distances (eg tunny, salmon, herring); the ruling means that management is confined to the 200-mile areas.

The negotiating text of the UN Conference on the Law of the Sea (Informal Composite Negotiating Text - ICNT<sup>1</sup>) provides for coastal States to have sovereign rights in the exploitation of fish stocks (Article 56(1) (a) of the ICNT). The term "fisheries" in this context embraces not only commercial fishing but also fisheries research in the 200-mile zone, for example. With this comprehensive recognition of the resource-related sovereign rights of coastal States a rigid national, rather than international, approach was adopted as the basis and framework of further fisheries management provisions.

The other provisions of the ICNT provide for a two-stage fisheries management procedure. In the first stage, the total allowable catch (TAC) is fixed by the coastal State (Article 61(I) of the ICNT), and in the second stage, the TAC is shared among domestic and foreign fishermen (Article 62 of the ICNT). However, the management criteria established in the negotiating text for both these stages are vague and in some cases contradictory, and in addition they are designed to take account of biological, ecological and economic factors and also special requirements (Article 61(3) of the ICNT) without in fact ranking fisheries management objectives in any order of priority. Much is left to the discretion of the coastal States by these arrangements, and they will

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1. Informal Composite Negotiating Text, in Third United Nations Conference on the Law of the Sea, Official Records, Vol III, UN Doc. A/CONF. 62/WP. 10, New York 1978; referred to hereinafter as the ICNT.

not find it difficult to justify a fisheries policy which does not satisfy biological and economic management criteria.

i. Total allowable catches (TAC)

The dominant criterion (although not the sole or exclusive guiding principle) in the fixing of the total allowable catch (TAC) is to be the concept of the maximum sustainable yield (MSY) (Article 61(3) of the ICNT). This is a partial concept which seeks to establish for the various stocks the growth rate which will allow the highest possible catch over an indefinite period. This concept does not stand up to criticism on either economic or biological grounds, however. From an economic standpoint the MSY is inadequate because it completely ignores economic factors, and costs in particular. In biological terms, since it is related to individual stocks the concept is meaningless when the interrelations between different species of fish within an ecosystem is considered. Moreover, it fails to recognize biological parameters as stochastic variables subject to fluctuating environmental influences. Such interrelations are also significant from an economic point of view because selective fishing, confined to particular species of fish, is not always possible with modern fishing techniques. The call for economic relationships to be seen as part of a system of equilibrium has consequently been joined by the growing demand that fisheries management should not consist of selective, partial approaches but take account of the relationships within an ecosystem. The practical application of this demand, however, requires a high level of information. But it would reduce the danger of a misguided fisheries policy.

ii. Distribution of catch quotas

The second stage, the distribution of the total allowable catch between domestic and foreign fishermen, would, according to Article 62 of the ICNT, similarly be a matter for the coastal State alone. Protectionistic and discriminatory measures are sanctioned by the ICNT. Foreign fishermen would be allowed access on the surplus principle, by which they could exploit anything left of the TAC after the domestic harvesting capacity had been exhausted (Article 62(2) of the ICNT). Economic

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criteria such as comparative costs in fishing, ie the relative efficiency of domestic and foreign fishermen, are completely ignored. The definition of "surplus" is also questionable, since the terms "total allowable catch", as has already been mentioned, and particularly "capacity" can be interpreted on the basis of different criteria. For instance, the negotiating text does not stipulate whether capacity is measured in accordance with economic or physical criteria. Leaving the definition of both variables (TAC and capacity) to the discretion of the coastal State opens the way not only for protectionist discrimination against foreign fishermen but also for their complete exclusion from fishing activities if, for example, domestic capacity is defined as being equal to or greater than the total allowable catch. Furthermore, the ICNT permits fiscal, quantitative and technological restrictions (Article 62(4)), which cannot be justified simply as measures to protect stocks because, again, they can be used as selective instruments of discrimination. Discrimination against foreign fishermen on the grounds of nationality is also sanctioned explicitly (Article 62(4)(6) of the ICNT).

## 2. Common EEC fishing areas

### a. The competence of the Community in the fisheries sector

#### i. The substance of Community powers

At the time the European Economic Community was established, no thought was given to extensive fishing areas in the North Sea. Under the international law in force at the time, territorial waters ended three nautical miles from the coast, where the high seas began; the implication was that anyone was free to fish in these waters. In addition, the then Member States with North Sea coasts - the Federal Republic of Germany, the Netherlands, Belgium and France - engaged in relatively little fishing in the North Sea compared with the Member States who joined later - Denmark, the United Kingdom and Ireland.

Consequently, it was the institutional affiliation of fisheries to the agricultural sector and the many problems common to fisheries and



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agriculture, rather than aspects of fisheries management, which resulted in products of the fishing industry being included in the "common market" pursuant to Article 38 (and Annex II to Articles 38 and 43) of the EEC Treaty. The competence for product markets stemming from this arrangement thus provided a basis for a common fisheries policy.

The common fisheries policy of the Community is founded on two cornerstones: Regulations 2141/70 (later 101/76) and 2142/70 (later 100/76) of 20 October 1970. Regulation 2141/70 established a common structural policy, which was supplemented by Regulation 2142/70 on a common organization of markets in fishery products.

As overfishing increased, the significance of problems connected with the rules on access grew. While the provisions of the EEC Treaty (especially Articles 52, 53, 59 and 60) guarantee free access to the fishing areas of other Member States and the freedom to sell the products of fishing activities, increasing overfishing in the 1960s revealed the need for rules on access to Member States' fishing grounds and - in line with Article 7 of the Treaty - the need to prevent discriminatory measures by individual Member States.

The provisions of the Act of Accession of 22 January 1972 modified the time-span of these rules on access and also the area of territorial waters, firstly to accommodate the fishing interests of the new Member States and secondly to take account of the extension by many States of their territorial waters beyond the 3-mile line. National priority rights will apply for ten years (until 31 December 1982) within coastal areas 6 or 12 nautical miles in width (Articles 100 and 101 of the Act of Accession). Also, Article 102 of the Act of Accession extends Article 4 of Regulation 2141/70, which empowered the Council to take measures to conserve stocks, in that from 1 January 1979 the Council was to determine conditions for fishing, acting on a proposal from the Commission. This ruling further extended the functional responsibility of the Community institutions, and it may also be interpreted as meaning that the Member States can no longer act independently in determining these conditions.

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ii. Extension of the area of common fishing waters

The declaration of 200-mile zones from 1 January 1977 considerably increased the area for which the Community is responsible. The territories of the Community countries have a total coastline of some 20 000 km (Greenland accounting for 8000 km) while the Federal Republic has only about 700 km. The area of the 200-mile economic zones is, as can be seen in Table 37, more than twice as large as the area of the land masses. Excluding the overseas territories of the United Kingdom, the area of the Member States' 200-mile zones is about 3 million square kilometres, about half of which belongs to the United Kingdom. The enlargement of the Community to include Greece (505 000 square kilometres), Portugal (1 774 200) and Spain (1 219 400) would more than double the area of Community waters.

In 1978, after the declaration of the 200-mile zones in the North Sea and the North Atlantic, Denmark and the Federal Republic declared fishing zones in line with the action taken by other States bordering the Baltic. In the case of the Federal Republic, this declaration took effect on 15 June 1978. It explicitly confirms the responsibility of the Community institutions for fisheries. These economic zones in the Baltic Sea would lose their significance, however, if territorial waters were extended to 12 nautical miles. The Federal Republic's economic zone is confined to part of a triangle in the Bay of Mecklenburg some six square nautical miles in size (see Figure 5).

b. The EEC's fisheries policy instruments

As mentioned above, the EEC's fisheries policy has two cornerstones: a common structural policy and the organization of markets in fishery products, which were created in Regulations 2141/70 and 2142/70 and reformulated in Regulations 101/76 and 100/76.

i. Market organization

The organization of markets in fishery products is far more liberal than most other arrangements in the agricultural sector, an important reason possibly being that the Community needed to import large

Table 37. 200-mile economic zones of the EEC Member States

Member State	Land area (1000 sq.km)	200-mile zone (1000 sq. km)
Belgium	112.6	27.1
Denmark	43.1	68.6
Federal Republic of Germany	248.6	40.8
France	547.0	341.2
Ireland	70.3	380.3
Italy	301.2	552.1
Netherlands	40.8	84.7
United Kingdom	<u>286.7</u>	<u>2336.5</u>
	1650.3	3831.3

Source: Report of the Group of Experts on Hydrographic Surveying and Nautical Charting, UN Doc. E/CONF. 71/C.1, 12 May 1978, pp 10-13

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quantities of fish and fish products at the time the market organization was established and that it is still a net importer despite the accession of Denmark, the United Kingdom and Ireland.

Marketing standards are among the most important constituents of the common market organization (Regulation 100/76, formerly 2142/70). With the exception of hake and common shrimps of the genus Crangon, these marketing standards concern fresh fish for everyday consumption, ie cod, saithe, haddock, whiting, plaice, redfish, redbream, ocean perch, mackerel, herring, sardines and anchovies falling under heading 03.01 B 1 of the Common Customs Tariff. With the above-mentioned exceptions, pieces of fresh fish, eg fillets and frozen fish, are not subject to the marketing standards.

The marketing standards cover classification by freshness and size, prohibiting fish which has been imported or originates from domestic production from being offered for sale unless it conforms to the standards. The classification of fish is itself not without its difficulties. Although objective classification by size can be achieved by measuring or weighing the fish, in assessment of the degree of freshness subjective impressions cannot always be avoided. Such impressions cannot be excluded even by the establishment of detailed assessment criteria (see Annex A to Regulation 103/76 on the appearance of skin, eyes, gills, etc, the condition of flesh and bones, and smell). Furthermore the provisions relating to the assessment of size do not specify minimum sizes. Minimum specifications are, however, applicable indirectly as a result of international fishery agreements and national legislation. In the case of the Federal Republic of Germany, provisions of this kind are to be found in the implementing regulation to the Sea Fishery Conventions Act, and prohibit the landing, offer for sale, sale, and processing of fish less than the stipulated size. The Member States are responsible for ensuring that the common marketing standards are observed.

Apart from marketing standards, the regulations on EEC market organization cover producers' associations and organizations, prices and tariff provisions relating to imports from non-member countries. For the

fresh fish listed above guide and reference prices are laid down. The guide price, which is arrived at by reference to average wholesale prices in previous years, acts as a guide both for common measures taken to stabilize prices within the EEC and for arrangements applicable to trade with non-member countries. To stabilize producer prices within the EEC, producers' organizations may fix withdrawal prices. If market prices fall below this level, the producers' organizations remove the products offered by their members from the market at the withdrawal price. The level of a withdrawal price is left to the discretion of the producers' organization. The financial compensation which the Community grants to producers' organizations for withdrawal provided certain requirements are satisfied is, however, based on the guide price. If the withdrawal price amounts to more than 65% of the guide price, 60% of the guide price is paid in compensation; if it is below 65%, only 55% of the guide price is refunded. The common market organization provides a common customs tariff for trade with non-member countries in fish and fish products. Apart from these customs duties, import restrictions and countervailing charges may be introduced to stabilize the markets in the Community if import prices fall below reference prices fixed by the Community, the reference price for fresh and chilled products being expressed as a percentage of the guide price (between 60 and 90%).

ii. Structural policy

The legislation on the common structural policy (Regulation 101/76, formerly 2141/70) is designed to allow co-ordination of activities under national fisheries policies, with a view to encouraging the rational exploitation of fish stocks, safeguarding fishermen's incomes and ensuring equal treatment within the Community. The establishment of a Standing Committee is intended to ensure the development and implementation of the policy.

The requirement that there shall be no discrimination in the legislation of the various Member States is central to the common structural policy. This principle of equal treatment was, however, initially restricted by the Act of Accession, although this restriction is subject

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to a time limit. The restriction permits exceptions to the principle of equal treatment within territorial waters 6 and, in some cases, 12 nautical miles in width. The principles of equal treatment and Community authority laid the foundations for a common fisheries policy for what were later to become EEC waters. At the same time, the bases for structural policy measures in support of the fishing industry were established. These measures are designed

- to increase productivity by restructuring fleets and other means of production;
- to adjust production and marketing conditions to market requirements, with processing plants and the activities of the producers' organizations recognized as being particularly worthy of support;
- to improve the living standards of those engaged in fishing.

c. Action on fisheries policy after the introduction of the 200-mile limits

The aim of the Community fisheries policy is the management of fish stocks in EEC waters. But since Member States also have fishing interests in the fishing areas of non-member countries - and vice versa - and since EEC waters do not form a single entity where the stocks of many species are concerned, the harmonization and co-ordination of action taken by the EEC and non-member countries on their fisheries policies is an important aspect of the management of EEC waters.

i. Internal aspects

The rules on fishing in the Community zone are geared to the management of resources. In the short and medium term, the object is to conserve and increase stocks, some of which have been badly overfished, so that in the long term they can be maintained at a level which permits their optimum use. Apart from objectives related to stocks, however, the Community legislation also pursues objectives which in the long term will also be axiomatically achieved with measures to protect stocks, but which in the short- and medium-term period of adjustment may conflict with measures to protect stocks. Such objectives include the maintenance and improvement of employment and

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incomes in coastal regions which are dependent on fishing and where employment and income levels are in many cases relatively low. Furthermore, management of fish stocks will necessitate the restructuring of fleets and the adaptation of fishing methods. On the one hand, existing capacities must be reduced to eliminate one of the main causes of intensive overexploitation - excessive fishing activities; on the other, vessels must be scrapped or refitted and new vessels must be built so that fleets and fishing methods can be adapted to the new situation that has resulted from the change in the law of the sea and in the state of fish stocks. There must also be increased research into the development of the fishing industry for commercial exploitation by activity, eg aquaculture.

The Community has various instruments available for the achievement of these objectives. Foremost among them is the restriction of catches by means of quotas. Such quantitative restrictions are regarded as an approved means of protecting fishing grounds and fish stocks and of achieving balanced or "fair" exploitation by individual fishermen. As an additional safeguard for the management of stocks, fishing seasons are to be limited where necessary and technological regulations relating, for example, to mesh sizes and fishing gear are to be adopted.

The quota system is based on the total allowable catch (TAC), which is to be laid down for each species that is to be subject to catch restrictions. In this respect, the EEC system complies with the negotiating text of the UN Conference on the Law of the Sea and the already widespread international practice of establishing annual allowable catches.

If fishing schedules are to be drawn up and total allowable catches defined, a suitable institutional framework must be created. For this it is intended to base the establishment of fishing schedules on the scientific findings of fisheries laboratories and research institutions and information provided by the national statistical offices. A Community-level committee will draw up appropriate proposals for quotas which, once adopted by the Council, will be implemented by a Commission management committee.

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The second stage in the Community scheme consists in sharing out the overall quota between the Member States. During this process particular account will be taken of economic aspects in the fishing areas and coastal regions affected. To offset economic hardship, a Community reserve will first be deducted from the total quota, and this will be allocated to particularly hard-hit fishermen in addition to their national quotas. Such cases will apply especially in regions where the Community's management operations would otherwise result in a drastic reduction of fishing activities.

The quantity remaining after the deduction of the Community reserve will be shared out between Member States in accordance with a key that takes account of past fishing activities. This gives Member States historic title, as it were. National fishing activities will thus continue and be afforded some measure of protection. It cannot be said with any certainty how far this will result in the consolidation of traditional structures. The limited mobility of the factors of production used in fishing would seem to indicate a pronounced tendency towards inertia, although the planned allocation of quotas, while maintaining the freedom of establishment, would not exclude changes of location.

ii. External aspects

Approximately one third of all fish caught by Member States in the North Atlantic come from fishing grounds outside EEC waters (see COM (76)500, p 4 and Annex I, p 21). This illustrates the need for negotiations with non-member countries. The Community's negotiating objectives are guided by the fishing interests of Member States in non-member countries, and vice versa. Accordingly, a three-pronged approach is to be adopted:

1. Fishing rights are to be exchanged with non-member countries with which there is reciprocity of fishing interests. In other words, barter deals are to be used in an attempt to maintain Member States' fishing activities at their present level wherever possible. In addition, the plan is to retain the right of access to any surpluses that may arise in non-member countries on the basis of the surplus principle: TAC minus the non-member country's catching capacity.



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Similarly, however, fishing rights granted to non-member countries within the Community zone are not to be allowed to conflict with internal Community rules.

2. Negotiations with non-member countries in whose zones the Community has fishing interests but which do not themselves have any reciprocal interests in the Community will aim at obtaining a share of the surpluses. It is even hoped to achieve an increase in Member States' catches in these non-member zones.
3. Non-member countries which want to safeguard fishing interests in Community waters without granting Member States reciprocal treatment are, on the other hand, to be progressively excluded from fishing in EEC waters. Negotiations will aim primarily at finding transitional solutions, the ultimate objective being the complete withdrawal of the fishing fleets concerned.

All three negotiating strategies are subject to the internal Community arrangements for the protection of stocks. The external arrangements will therefore be introduced at a secondary stage, after the internal arrangements. But since the fishing industries of the Member States are in many cases very largely dependent on guaranteed access to non-member zones, it is doubtful in many instances whether the negotiating objectives mentioned above can be achieved unless some of the internal management objectives are dropped.

## II. Theoretical approaches to an optimum utilization of fishery resources

The legitimation of the principle of the "freedom to fish" as an assurance of open, unrestricted and cost-free access to fishing grounds was chiefly based on the assumption that the biological resources of the sea were inexhaustible. For several centuries this principle of the freedom to fish formed the cornerstone of the conditions governing access to the fishing industry. Even though growing doubt was cast on the assumption that fish stocks were inexhaustible, free access to fishing grounds continued to be regarded at least as a practicable

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legal-institutional basis for sea fishing. For even if fish were not a free commodity of which there will never be any shortage, the benefit to be derived from restrictions on access and an extension of the jurisdiction of coastal States still would not have justified the cost of establishing and maintaining a system of limited access. For one thing, the primitive fishing methods used in the past kept catches down to a level at which the regeneration potential of stocks was not seriously endangered. For another, the establishment and supervision of a system of limited access, always supposing it had been technically possible, would have been relatively expensive. Such cost/benefit comparisons have played an important role in the history of the law of the sea. A good example of this is the former restriction of territorial waters to 3 nautical miles, which allegedly corresponded to the range of a cannon.

The basic conditions have changed radically. The advent of new fishing methods led to a substantial reduction in average fishing costs, while prices rose as the demand for protein increased: the economic rent, ie the difference between prices and costs, is an indication of the scarcity value of fishing grounds. What is more, the development of modern inspection methods has considerably reduced the costs that are incurred when restrictions are imposed on access to national fishing areas: the control of large areas of sea may not only produce benefits, but is also technically possible.

Recent developments in the law of the sea reflect the growing economic potential of the sea. Almost all coastal States have already declared exclusive national, 200-mile fishing areas, a trend which cannot be reversed at the Third UN Conference on the Law of the Sea now in progress. Where fishing is concerned, the Conference can merely endeavour to find a common denominator for the various national forms of fishing areas. 200-mile economic or fishing zones will generally represent the limits to fishing activities. They have already assumed considerable substance in common law. It would therefore seem appropriate to establish the economic conditions for the optimum use of fish stocks, against which the new legal-institutional framework conditions can be measured.

## 1. Efficiency of allocation in fisheries

### a. Optimum use of fish stocks

A natural resource is exploited optimally in terms of general economic criteria if the general economic net benefit is maximized. (Net benefit in this context is defined as the difference between gross benefit and costs.) In the case of resources which can be exploited over long periods, both present and future opportunities for using them must be taken into account when weighing up costs and benefits in this way. This is done by determining the present value of resource utilization as the sum of present and future net benefit. Optimum resource utilization in terms of time is achieved when the present value is maximized. This time-related course of resource utilization then also represents the optimum balance between future and present opportunities for utilization or the optimum use of the resource over the years.

To illustrate this, a resource can be regarded as a capital fund: exploitation of the resource corresponds to the reduction in value (depreciation) of the capital fund, while resource management (planting, fertilizing, aquaculture) increases the capital, as investments do. However, such measures are almost completely absent from sea fishing. Cultivation measures such as fish farming and aquaculture, which correspond to land-based farming, are still atypical of the fishing industry. On the other hand, fish stocks, being biological resources, have the special feature of growing in the natural run of things. Non-utilization at any given time can therefore be regarded as forming part of the management process.

The crucial economic rule, which follows from the maximization of the present value of resource utilization, is that a resource should be exploited in such a way that price corresponds to marginal costs. Marginal costs consist of both private elements (marginal fishing costs) and general economic components (marginal utilization costs). The latter are the amount by which the present value of resource utilization is reduced when an additional fish is caught. Increasing the catch reduces future fishing potential, since future utilization is deprived

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both of the additional fish caught and of its contribution to the growth of stocks. Unlike fishing costs, which occur now, utilization costs are opportunity costs which do not at present require expenditure. If they are not taken into consideration, however, future generations pay for this through having less opportunity to utilize the resource.

Two fundamental problems are encountered in the application of the maximization principle. The first concerns the calculation of the present value. The present value of future net benefits must be established, and this requires information or assumptions on social preferences with regard to the time distribution of consumable goods. The second problem concerns the right of disposal over a stock of fish, the question being whether individual actions result in general economic efficiency, ie optimum use of the stock of fish, or whether State intervention or changes in the structure of rights of disposal are needed in order to achieve a match between individual and general economic efficiency. As regards the first problem, the present value of future net benefits is formally calculated with the aid of the social discount rate. However, there is no accurate yardstick for the social discount rate, since this would require comparisons of the preferences of individuals and generations, ie judgements on the appropriateness and fairness of the distribution of goods between individuals and between the present and all future generations. (The preferences of the latter are, of course, still unknown.) Hence, without having explicitly to make normative judgements of this kind, market interest rates such as the interest on long-term government securities are frequently taken as approximate values for the social discount rate. Such approximate values are naturally open to the criticism that they do not fully reflect the structure of social preferences. No such calculation of the present value can therefore claim to be the only admissible assessment of social costs and benefits.

Nonetheless, the principle of maximization is not obsolete because of these constraints. Calculations of the present value can at least be used for qualitative evaluations of alternative opportunities for utilization by revealing the implications of alternative assumptions on discount rates. Two examples, taking an extremely low and an extremely high discount rate, can serve to illustrate this: a social discount

rate of zero would mean that society attached a very great deal of importance to future yields. Future yields are assessed today exactly as present yields. This results in an extremely high value being attributed to restrictions on present utilization, because the present loss of benefit incurred as a result of restricted exploitation of resources will always be outweighed by the flow of (non-discounted) corresponding future benefits if stocks grow. The application of a zero discount rate would therefore lead to the most conservative fishing of resources. In contrast, the other extreme - an infinitely high discount rate - would mean absolutely no importance being attached to future benefit because it would be discounted to zero. Society would then not include future exploitation in its deliberations on the present utilization of resources and would not therefore be prepared to forgo fishing now in favour of future exploitation. This extreme would result in the most rapid exploitation of the resource. Obviously, neither of these two extremes, a zero or an infinite discount rate, is acceptable in general economic terms. But they do illustrate the significance of the discount rate for the management of resources, and they reveal the general economic implications of alternative approaches to resource management.

The second fundamental problem connected with the application of the maximization principle concerns possible divergences between private and general economic costs incurred through the utilization of fish stocks. Only if private and general economic costs were the same, would optimum utilization be automatically achieved by granting unrestricted access to fishing grounds.

b. Implications of unrestricted access to fishing grounds

If unrestricted access to fishing grounds is allowed, however, only in exceptional cases will the private-enterprise attitude of fishermen result in the level of resource utilization which is desirable in general economic terms and is expressed by equivalence between price and the sum of marginal fishing and utilization costs. This would occur only if the marginal utilization costs were zero, ie stocks would be maintained at precisely the optimum level by fishing. When unrestricted access is granted, however, economic, biological and legal-

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institutional aspects usually result in a discrepancy between the private and social optimum. Firstly, the economic barriers to the practice of fishing are low. Many fish stocks can be fished from small boats for which little investment of own capital is required. Except in deep-sea fishing, fishing enterprises are consequently for the most part small and numerous. The fishing industry thus offers favourable conditions for the development of competition between a large number of fishing companies. Secondly, most fish stocks do not remain stationary, and their location can never be determined with absolute accuracy. This means that ownership of fish cannot be defined: ownership of fish is achieved only by catching them. Thirdly, unrestricted access to fishing grounds means that an individual fisherman's right to fish is not exclusive: it does not entitle him to limit the quantity of fish his competitors may catch or indeed to prevent them from fishing, either now or in the future. The individual fisherman cannot therefore decide on the assessment of present or future alternative opportunities for utilization.

These economic, biological and legal-institutional aspects have both static and dynamic implications for the conduct of individual fishermen: firstly, the value of fish stocks in situ (fish not yet caught) has no bearing on the present profits of the individual fisherman or, therefore, his present expenditure. This is not to say that fishermen do not recognize the importance of maintaining stocks for future catches. They are in the best position to appreciate the need to maintain stocks. Nonetheless, the impossibility of controlling the fishing activities of competitors does result in the individual fisherman ignoring future exploitation, ie utilization costs. In addition to this long-term aspect, other social costs are ignored in the individual's line of reasoning. These costs stem from the fact that fishing, like hunting, is a search-and-gather activity, in which yields decrease and costs rise as stocks decline. Every additional fish the individual fisherman catches increases not only his own fishing costs but also those of his competitors. Such extraneous effects on competitors are ignored by the individual, because they do not affect him personally. While the marginal effects may appear insignificant, the aggregate, overall effect of such reciprocal extraneous costs is substantial.

c. Overfishing and scarcity rents

Social costs are disregarded because fishermen are all subject to one and the same restriction, the level of fish stocks, but do not adjust their attitude accordingly. Where there is unrestricted access to fishing grounds, competition results in individual fishermen taking their decisions without regard for general economic effects, just as if each were completely independent of the others. The dilemma they face is that, although they all recognize the benefit of maintaining stocks and of a general restriction of fishing, they tend to reject such measures because of the impossibility of extracting the benefit from such efforts and sharing it among all concerned. Hence, if access to fishing is unrestricted, competition results in fishing continuing until total proceeds equal total fishing costs or price equals average fishing costs. In contrast, if the general economic optimum is to be achieved, fishing should continue only as long as the sum of marginal fishing and utilization costs remains below the price level. This usually means lower expenditure on fishing than with the private-enterprise approach first mentioned, since the sum of marginal fishing and utilization costs is almost always higher than average fishing costs. In the case that is the optimum from the general economic standpoint, therefore, the price is as a general rule higher than the average fishing costs. The difference between them is the economic rent, and it reflects the scarcity value of fishing grounds. Where there is unrestricted access, no benefit is derived from this rent: it is destroyed. The prospect of enjoying the benefits of the economic rent attracts too many fishermen when access is unrestricted and results in their increasing their expenditure in the competition that follows. Each fisherman hopes to make the rent part of his profit. But the accompanying external effects result in these hopes being dashed and the rent being eliminated by increased costs. In value terms, unrestricted access results in unnecessary costs occurring and production factors being wasted. It also means that stocks are exploited too rapidly, or overfished.

Overfishing in economic terms (like excessive hunting or grazing) is bound to occur if unrestricted, cost-free access is granted to scarce

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resources. But whether it leads to overfishing in biological terms, ie to the reduction of stocks below the level that allows the largest possible yield in the long term (maximum sustainable yield (MSY)), depends on how high fishing costs are and how fish prices react to changes in the quantities caught. If fishing costs are high and prices drop sharply as catches increase, stocks will not fall below the MSY level even where access is unrestricted, since at a high level of relative fishing costs optimum expenditure for the individual may be so low that only part of the surplus production of stocks is "creamed off", without growth potential being endangered. In the past, this situation has in fact prevented "biological overfishing". The development of modern fishing techniques, however, has drastically reduced fishing costs, while the rise in demand for protein has resulted in an increase in the difference between price and costs, or the rent. Whenever higher scarcity rents can be achieved, fishing will be stepped up as long as access to fishing grounds remains unrestricted. This situation will continue until average fishing costs reach the current higher price level and the potentially higher rent has again been consumed.

Unrestricted access to fish stocks is not only economically inefficient because it leads to the wastage of scarce resources - natural resources and production factors: it also means that no value is attached to future exploitation. This can be illustrated within the frame of reference outlined above by calculating the social discount rate that arises at what is the optimum level of expenditure for fishing from the private-enterprise standpoint. If access to fishing grounds is unrestricted, the optimum level of fishing from the private-enterprise standpoint corresponds to the choice of an infinitely high discount rate, because, as already stated, the individual fisherman gives no thought to future exploitation when trying to maximize his immediate profits. This means discounting future benefit to zero. All that counts is present benefit. Unrestricted access to fish resources thus implies a social norm in which the interests of future generations are not considered.



## 2. Legal and institutional framework for the management of fish stocks

The discrepancy between the outcome of competition and the general economic optimum was originally described in the literature as "market failure", because complete freedom of competition that deviates from the ideal does not result in social efficiency. More recently, however, closer attention has been paid to the legal aspects. Seen from this angle, it is defects in the structure of rights of ownership or disposal which ultimately cause a "market failure". According to this interpretation, social costs are ignored by the individual fisherman because what is in general economic terms desirable conduct (eg measures to conserve stocks) is not rewarded with rights of ownership or disposal. In fishing, unrestricted, cost-free access means that there are no private agreements or contracts to prescribe conduct that is optimum in general economic terms and to guarantee that the individual will derive benefit from the proceeds of such conduct (scarcity rents). Unrestricted access precludes controls to ensure the implementation of such measures from the outset.

If general economic efficiency is to be achieved in fishing, unrestricted, cost-free access would need to be replaced by a legal and institutional framework within which access is subject to economic criteria and the rent can be skimmed off. This could be done either by allowing private ownership or possession of fishing grounds or by introducing government checks to control private access to fishing grounds. In either case - private possession or government control - general economic efficiency can be achieved in certain circumstances, although the distributive aspects of the two systems differ substantially. Unlike freshwater fishing or hunting, where private possession is common, sea fishing does not appear to lend itself to this solution because of the complicated problems connected with defining boundaries and also because of the political factors involved. This alternative will not therefore be pursued further here.

If access is to be subject to government controls, the authority seeking the optimum management of fishing grounds has to conduct itself like a sole owner maximizing the present value of the resource. The

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catch that is desirable in general economic terms would be defined in accordance with this rule. The controlling authority would then issue licences or the like giving private individuals the right of exclusive access to given fishing grounds for a given period. Under a control system of this kind the value of such licences would correspond to the economic rent.

If optimum fisheries management is to be both possible and worthwhile under a system of this nature, two conditions must first be satisfied. Firstly, an appropriate legal and institutional framework must be created: jurisdiction over fishing grounds must be established. Secondly, the legal and institutional framework must be such that fisheries management involves minimal costs. These costs must also be lower than the resulting benefit.

a. Jurisdiction

i. Legal content

Biological and economic considerations will determine the geographical and legal scope of jurisdiction in fishing. To avoid overlapping rights of disposal, the jurisdiction of the management authority must cover whole stocks or ecosystems of interdependent stocks. In view of the considerable distances covered by various species of fish, there is an obvious need for geographically extensive jurisdiction. In general, limiting management measures to national coastal zones will not be appropriate because only a few species remain within the coastal zone of one country at all times. Not even EEC waters in the North-East Atlantic constitute an enclosed area for the purposes of the management of the most important commercially exploited species. As the basis for effective fisheries management, therefore, there should be exclusive jurisdiction over large areas of the sea. Consequently, the legal framework for fisheries management should be created at international level.

ii. Functional content

The object of fisheries management is to control access to fishing

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grounds on the basis of biological and economic criteria and to grant fishing rights to individual fishermen. There are three methods of controlling access: firstly, quantitative restrictions related to the total catch (quotas), the catch per boat or fisherman or the fishing period can be imposed; secondly, technical restrictions can be imposed on fishing methods (nets, mesh size, size of boats, engine power); and thirdly, fiscal restrictions can be introduced, levying a tax on the catch or the gear used, for example, or charging a licence fee. In terms of efficiency, quantitative and technical restrictions, although common, are unsuitable unless accompanied by fees or taxes. Quantitative or technical restrictions pure and simple, such as catch quotas and fishing seasons, occasionally result in a reduction in the quantity of fish caught, but if this objective is achieved at all it is usually at the expense of increased inefficiency in the use of the means of production. For example, once the total quota has been caught or the fishing season is over, expensive ships lie idle in port - a waste of capital and labour. In other cases, such restrictions have not even resulted in effective protection of stocks. An outstanding example of this is the introduction of quotas and fishing seasons for tunny in the Pacific by the Inter-American Tropical Tuna Commission. Limits on time and quantity have resulted in fishermen investing in increasingly larger and faster boats to ensure that they catch as high a proportion as possible of the total quota before the fishing season ends. Capacity thus tripled from 1967 to 1973, while the fishing season was reduced from nine to three months<sup>1</sup>. In the off-season the boats lie idle or are used to fish for other species or in other waters, where they contribute to overfishing.

Unlike quantitative and technical restrictions, which indirectly increase fishing costs owing to the greater inefficiency to which they necessarily give rise, fees and levies have a direct effect in increasing private costs. Charging a fee for the use of fishing

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1. See, for example, Francis T. Christy, Jr., "Property Rights in the World Ocean", *Natural Resources Journal*, Vol 15, October 1975, p 699 ff.

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grounds equivalent to the economic rent would cause fishermen to reduce their expenditure to the level that is desirable in general economic terms.

iii. Institutional arrangements

For the introduction of a system of fees it would be sufficient to create an authority with tax sovereignty over the fishing industry under its jurisdiction. In contrast to the broad geographical area of jurisdiction required for efficient management of fish stocks, the functional content of rights could be kept within narrow limits. Above all, a narrow definition of the substance of jurisdiction could prevent other aspects of the utilization of the sea from being adversely affected by fisheries management measures.

b. Fisheries policy to protect stocks and increase efficiency

Although the economics literature does not dispute that charging fees for the use of fishing grounds is an appropriate means of controlling fishing activities, there are various proposals regarding the form a fee of this kind should take and how it should be collected. As stated above, there are three basic alternatives: fees levied on the product (the quantity caught, proceeds from the catch) or the factor input (boats, gear, labour) or non-variable levies such as licence fees. Which of these forms of levy is chosen will chiefly depend on the administrative problems raised by collection and recording and the empirical problems connected with the availability of data. Although a levy on the size of catch is easier to calculate and collect than a levy on the total factor input, information requirements make it impossible in both cases to fix an optimum levy rate ex ante. Such levy systems therefore fail in practice since, if it is to fix the levy at an optimum rate, the tax authority would need not only all the relevant biological data but also accurate information on the cost structure in fishing.

Instead of levy rates being fixed beforehand, however, the optimum fee might be determined on a market basis. The fishing authorities would

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merely have to decide on the number of licences to be issued and then auction them. The price of a licence would be equivalent to the fee for the utilization of fishing grounds. Auctions might also be held at which licences were auctioned against payment of variable catch levies. This system has the advantage that fishermen would not pay levies should their fishing be unsuccessful. The variable catch levies would become due only in the event of successful fishing. The risk involved in fishing would thus be shared with the authorities. This government risk-sharing would be particularly beneficial to the smaller fisherman, who has only limited access to capital markets.

Auctions also have other advantages: in contrast to a scheme under which the authority responsible for fisheries management has to fix fees at the optimum level, the authority would not need to have any information on the structure of costs incurred by individual fishermen. Access to fishing grounds would be controlled on the basis of efficiency criteria: efficient fishermen would be the highest bidders and so win at auctions. Their bids would be a reflection of the economic rent, ie the difference between fishing costs and market prices. Through the fees they paid, fishermen would thus bear the social costs they would otherwise pass on to each other and society through over-fishing. In line with the claim that the sea does not "belong" to anyone or that it is public property, the general public rather than individuals would enjoy the benefit of the rent in the form of fees. The undesirable implications of the distribution of fishing grounds among private owners could be avoided in this way, without private ownership of the means of production being affected.

The transition from the present approach to fisheries management to an auction system should not be too difficult. The experience gained with quantitative restrictions could be fully utilized. If the authority intended to auction licences, for example, it could make use of existing information on optimum total catch quotas and offer a number of licences commensurate with the total quota desired.

c. Costs and benefits of fisheries management

Optimum fisheries management must produce a positive net benefit. If

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the cost of administrative and other inputs exceeds the gross benefit, it is not worthwhile. The gross benefit of efficient management is equivalent to the social costs or, to put it another way, the potential savings of resources that are wasted under a system of unrestricted access. The costs of fisheries management arise in the establishment and shaping of a system of this kind, ranging from negotiations to institutionalization (eg in the form of an authority) and then as current administrative expenditure on the implementation and supervision of the measures adopted.

No comprehensive empirical analyses have yet been made of the wastage of resources where access is unrestricted. There have been sporadic investigations into individual regions or species of fish<sup>1</sup>, but for the world as a whole no more than rough estimates are available. It has been estimated, for example, that in the early 1970s the wastage of resources in the case of overfished species amounted to over 25% of the costs. This is equivalent to US\$ 2000 million annually<sup>2</sup>. Nor can the costs of an efficient system of fisheries management be estimated with any accuracy at present. There are no regional or worldwide estimates of these costs. The only clues are provided by the experience of countries which have already introduced national fishing zones. For instance, the cost of managing the USA's 200-mile zone is said to be US\$ 100 million per year, with annual gross revenue estimated at US\$ 300 million<sup>3</sup>. The assumption that fisheries management is worthwhile is endorsed by these figures.

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1. No figures on the North Sea and the Baltic are available.
  2. See Richard N. Cooper, "The Oceans as a Source of Revenue", in Jagdish N. Bhagwati, ed., *The New International Economic Order: The North-South Debate*, The MIT Press, Cambridge, Mass., 1977, pp 108 ff.
  3. US Congress, *200-Mile Fisheries Zone and Joint Ventures*, Hearings Before the Subcommittee on Fisheries and Wildlife Conservation, 94th Congress, First Session, Serial No. 94-44, US Government Printing Office, Washington, DC, 1976, pp 47 ff. Compared with optimum fisheries management, the above-mentioned costs are higher because they include the cost of protectionistic practices, ie the exclusion of foreign fishermen and inspection activities in this connection.

Cost considerations should also determine the institutional format of fisheries management and the division of labour between national and international authorities. Although the fact that fish is a trans-frontier resource makes an international approach to fisheries management necessary, this is not to say that all administrative measures must be implemented centrally by a single international authority. Many supervisory functions are more easily performed on national territories, eg at fishing ports. A decentralized or mixed international and national management system therefore seems appropriate. In a system of this nature, the fishery management guidelines should be established at international level. Administrative tasks connected with implementation and inspection could, however, be performed at national level in many cases. Firstly, a system of this kind would bring the cost advantages already referred to: secondly, it would avoid having an international authority equipped with far-reaching and comprehensive sovereign rights.

### III. Structural adjustment problems in fisheries

#### 1. Context surrounding the need for adjustment

The extension of fishing and economic zones and the catch quotas that have been introduced have led to a fundamental change of conditions for the fishing industry in the Federal Republic. Fishing has been banned or restricted in traditional fishing grounds. Fishermen have had little opportunity to move to other fishing grounds and, where they have done so, they have often come into conflict with fishermen who have traditionally fished in those areas. Where advantage has been taken of the limited opportunities of fishing for other species, the teething problems have been considerable. It has not been possible to maintain traditional downstream links within the fishing industry. New marketing and procurement channels have had to be developed. This need to adjust, which has been further aggravated by the steep rise in oil prices<sup>1</sup>, has in many cases prompted those concerned to take action

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1. Fuel and lubricant consumption is the largest item of expenditure after labour costs.

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which even in the long term can be expected to contribute to the solution of the structural problems in the fishing industry. In view of the uncertainty about the further development of the legal situation and fisheries policy, effective adjustment measures are, however, often postponed, especially as it is frequently feared that a restriction of fishing capacities and activities will have an adverse effect on the expected allocation of quotas.

a. Extent of restrictions on fishing

i. Fishing limits

In the North Atlantic, which accounts for the bulk of the West German fishing fleet's catches, all the coastal States had introduced 200-mile zones by the spring of 1977. However, some differences of opinion on the boundaries of national fishing areas still persist. This is particularly true of the line dividing the national fishing areas of Norway and the Soviet Union: an extensive border area has been established here, in which both countries supervise and control fishing. In addition, the right claimed by Norway to take action to conserve fish stocks in a protected fishing area around Spitzbergen is disputed. Nor has agreement yet been reached on authority to control fishing around Jan Mayen: both Norway and Ireland claim responsibility. In other areas of the North Atlantic too, fishing disputes are still far from being settled. In the summer of 1979, for example, a violent dispute broke out between Canada and the USA over the boundaries of their fishing areas and reciprocal rights of access. In the Baltic region, all the bordering States extended their fishing limits from 1978 onwards, thus staking their claims to a share of the Baltic. The trend was set by Sweden, Poland, the GDR, the Soviet Union and Finland, all extending their fishing limits as from 1 January 1978. They were followed by Denmark (1 March 1978) and the Federal Republic (15 June 1978)<sup>1</sup>. But here too, this extension of national fishing areas has failed to end

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1. See Jahresbericht über die Deutsche Fischwirtschaft 1977/78, loc cit, p 7.



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in an apportionment of the Baltic among the coastal States that is accepted by all sides. Poland claims that the dividing line between its own area and that of Sweden should be the middle line between the two countries and wants to allow only a 12-mile zone around the Danish island of Bornholm, whereas Denmark claims the middle line between Bornholm and the Polish mainland as the boundary between the Danish and Polish fishing areas there. Owing to these conflicting territorial claims, there is now a grey area south of Bornholm (Figure 9). A second disputed area in the Baltic lies to the east of Gotland and is known as the banana. Both the Soviet Union and Sweden claim this area.

ii. Fishing agreements with non-member countries

In some cases, the restrictions on the activities of West German fishermen - and fishermen from other EEC countries - that have resulted from the introduction of fishing areas have been relaxed to some extent by agreements concluded between the EEC and non-member countries. The arrangements which have been negotiated with Norway, Sweden, Canada and the USA permit the continuation of traditional fishing activities, albeit at a much restricted level. In the Baltic, West German fishermen are limited to the fishing areas of the Federal Republic, Denmark, Sweden and Finland. The Danish and West German areas are equally accessible to both Danish and West German fishermen under the agreements on EEC waters, and the EEC has negotiated a framework fisheries agreement on allowable catches with Sweden and Finland based on reciprocity<sup>1</sup>. No such reciprocal agreements have yet been reached with the Eastern Bloc countries, however, because they reject the EEC as a treaty partner and the area-of-validity clause it requires. West German fishermen are consequently excluded from fishing in the grey areas, unlike the fishermen of the countries directly involved. Despite strong protests by the Federal Government, the Polish authorities have repeatedly seized and put on trial West German fishermen who have ventured into the grey area south of Bornholm.

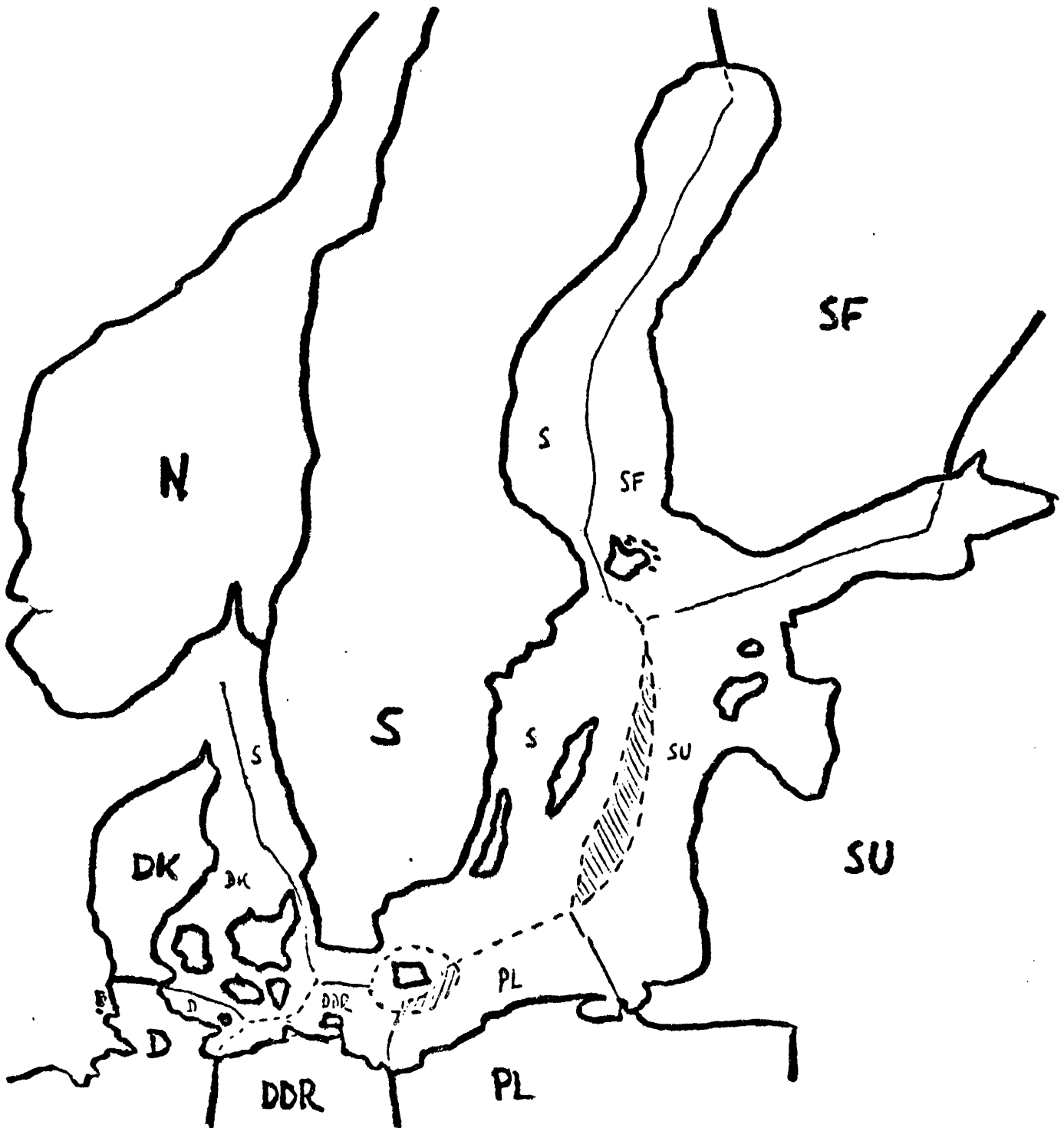
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1. OJ No. C 146/14 of 21 June 1978

Figure 9

DIVISION  
of the Baltic by  
middle lines and equidistance  
lines

- open or disputed limits
- limits governed by treaties (on the Continental shelf)



### iii. Application of quotas

In addition to the spatial constraints on fishing, fishermen have to observe restrictions on the quantity of fish they catch. These restrictions arise both from the limits on catches included in the fishing agreements and from the fixing of catch quotas in EEC waters. Thus, Baltic cod (codling), sprats and herring are subject to quotas. In 1977, however, these three species accounted for almost 90% of all fish landed on the Baltic coast of Schleswig-Holstein. Salmon fishing off the Swedish coast has had to cease completely.

In the North Atlantic too, the reciprocal fishing agreements and the fixing of catch quotas in EEC waters have in some cases resulted in considerable restrictions on the quantities caught. The Community has been fixing national quotas for cod, haddock, coalfish, whiting, plaice, sole, mackerel, sprats, horse mackerel and hake in the North Sea (or, to be more precise, the EEC section of ICES/ICNAF areas IVa, b and c) since 1978. Fishing for herring has been completely banned, only by-catches up to a national maximum quota being allowed. Failure to exhaust the quotas negotiated with non-member countries is often due solely to technical and organizational problems. For example, the USA requires EEC fishermen to buy licences and insists on their reporting and submitting records to various agencies. Canada requires the presence of on-board observers (paid for by the fishermen).

### iv. Changes in the quantities caught

An impression of the extent to which fishing restrictions have affected the activities of West German fishermen can be gained from the fishing statistics. Table 38 compares quantities caught in 1978 and 1979 with average quantities in 1973-78 and reveals a steep decline. The breakdown by fishing areas also shows that fishing opportunities have been drastically reduced in individual areas.

### b. The significance of the fishing restrictions for small-scale and inshore fishing

The small-scale and inshore fishing industry has been directly affected

Table 38. Quantities caught by the deep-sea and inshore fishing industries, by fishing area  
(incl. landings abroad) (1000 t)

Year	Total	North Sea <sup>1</sup>	Western British waters	Baltic	Faroes <sup>2</sup>	Iceland	Norwegian coast <sup>3</sup>	Greenland	Labrador <sup>4</sup>	Remainder of east coast of N. America <sup>5</sup>	South Atlantic <sup>6</sup>
1960 ...	664.0	x	x	x	x	x	x	x	x	x	x
1970 ...	597.7	147.0	19.7	37.9	5.1	111.8	37.8	76.5	50.5	110.7	0.6
1975 ...	438.6	100.0	21.4	34.8	15.8	55.1	122.8	19.9	24.5	39.8	4.4
1973/78 <sup>7</sup>	441.8	118.7	24.3	33.8	15.8	53.8	95.0	38.4	17.1	35.6	9.4
1978 ...	407.4	124.3	57.9	27.0	18.1	-	51.9	89.9	7.5	3.0	27.7
1979 ...	343.2	91.6	30.7	28.0	22.4	-	38.4	106.0	2.1	4.8	19.2

1. incl. Skagerrak, Kattegat, Channel

2. from 1978, incl. fishing area "north of the Azores"

3. incl. Barents Sea, Bear Island

4. 1979: incl. Baffin Bay

5. Newfoundland, Nova Scotia, New England, New Jersey

6. 1975: South Pacific

7. average for 1973-78

Source: Federal Statistical Office, Fachserie 3, Reihe 1, Selected Figures on Agriculture 1979, p 93.

by these changes in circumstances, either because it has been denied access to traditional fishing grounds or because quotas restrict fishing opportunities in traditional fishing areas. It is also indirectly affected by the increase in the activities of the deep-sea fishing industry, which has moved into EEC waters because of the severe restrictions imposed on fishing in what were formerly international waters.

i. Baltic

Small-scale and inshore fishing has been hardest hit by the restrictions on fishing in the Baltic. In particular, traditional fishing areas - especially for Schleswig-Holstein fishermen - off the Polish coast and the GDR are no longer accessible. Particularly clear evidence of this is provided by the declining quantities of fish caught by Schleswig-Holstein fishermen in the central Baltic<sup>1</sup>, but catches in the western Baltic are also falling. Indirect effects caused by fishermen forced to fish elsewhere are less significant in the Baltic area, however. In many cases, even cutters based on the North Sea coast, which in the past fished principally for codling in the Baltic, have moved to fishing areas outside the Baltic region.

ii. North Sea

In the North Sea, the problems for the small-scale and inshore fishing industry have been caused less by restriction of access to fishing areas as such than by the limits imposed on catches and the growing competition from the deep-sea fishing industry. As the radius of action of the small-scale and inshore fishermen is largely confined to EEC waters, it is mostly affected only peripherally and indirectly by the EEC's external arrangements with non-member countries, particularly since a fisheries agreement between the Community and Norway permits the continuation of traditional fishing activities off Norway, albeit at a reduced level. Of the North German coastal states, the small-scale and inshore fishing industry of Schleswig-Holstein has been the least affected by this development. The emphasis here is on shrimping, which so far has not been

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1. See Table 18

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affected by changes in the international law of the sea or by quota arrangements.

## 2. Scope for adjustment

The fishing industry must take drastic action to adjust to the fundamental changes in circumstances. Increased efforts to open up the exploitation of new fishing grounds and new resources and the use of more cost-effective fishing methods may be a way for many fishermen of safeguarding their livelihood. But many of them will have to seek alternative ways of earning a living outside the fishing industry.

### a. Scope for adjustment within the fisheries sector

#### i. New fishing grounds

Opening up the exploitation of new fishing grounds could uncover new areas of activity for the fishing industry. This might be achieved both through the discovery of new fishing grounds in national or international waters or through the acquisition of fishing rights in the fishing areas of non-member countries. Frequent attempts have been made in the past to acquire fishing rights in the fishing areas of non-member countries through bilateral joint ventures. Leaving aside efforts to locate new fishing grounds linked to the exploitation of new species of fish, which will be discussed in greater detail in the next section, measures to open up new fishing grounds are far less important for the small-scale and inshore fishing industry than for the deep-sea fishing industry. The radius of action of the West German small-scale and inshore fishing industry is largely confined to parts of EEC waters which have already been explored relatively thoroughly, at least as far as the traditional species are concerned. The Federal Government has taken account of this difference in the opportunities open to the deep-sea and the small-scale and inshore fishing industries respectively for the development of new fishing areas when making grants for such development, by fixing separate quotas for the two industries. The range of the small-scale and inshore fishing industry can be increased only by using larger vessels.

ii. New species of fish

Another possible form of tapping new sources of income for the fishing industry consists in the exploitation of marine resources that have been hitherto ignored. Here again, because of its greater range, the prospects for the deep-sea fishing industry are far more favourable than they are for the small-scale and inshore fishing industry. But the latter could also improve incomes by catching and marketing species of fish that have not previously been exploited, provided that the conditions for fishing for new species are sufficiently favourable for it to be profitable. To reduce the risk attached to both fishing and marketing, the Federal Government has adopted a programme for the introduction of new species of fish, which will be discussed later. It provides not only for fishing subsidies to help cover the cost of exploring and developing fishing areas for these species but also for participation in financing advertising campaigns designed to promote their sale. It is still too early for a final assessment of these measures, since they have been in progress for too short a time (since 1978). Traditional consumer habits cannot be expected to change so quickly. Nevertheless, there have been noticeable changes in the range of fresh fish on the market in the Federal Republic. However, a continuous supply of the new species to the market is not yet ensured, and it would seem that supplies must be continuous if consumer attitudes are to be permanently changed in favour of these new species and if the fish-processing industry is to take them in increasing quantities. Furthermore, numerous problems have to be surmounted during the introductory phase, particularly as regards fishing methods, preserving and processing. At best, new species are likely to ease, not solve, the structural adjustment problems faced by the small-scale and inshore fishing industry.

iii. Restructuring of catching capacities

The change in circumstances and the steep increase in oil prices have in some cases radically altered the relative advantages of the various fishing methods. The opportunities open to small-scale and inshore fishermen for adjusting to the new situation vary according to their location and operating structure.

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- Large cutters

Virtually the only vessels capable of increasing the industry's range are large cutters, which are also most likely to benefit from further lay-ups of catching capacities expected in the deep-sea fishing industry. At present, however, they face fierce competition from this industry, which operates - usually at a loss - in fishing areas that could be fished more cost-effectively by the small-scale industry. In addition to their more extensive range, large cutters have a larger catching capacity. Although this might at first sight be considered a disadvantage in view of the existing overcapacities in fishing, this form of restructuring could prove to be advantageous not only for the individual but perhaps also in general economic terms.

For the individual fisherman an increased catching capacity can be particularly advantageous where quotas have been fixed at national level. The higher the individual fisherman's catching capacity, the greater his chance of taking a large share of the national quotas. Hence national quotas, adherence to which is controlled and which are not allocated down to the level of the individual enterprise, invite the creation of overcapacities. Rivalry for the largest possible share of national quotas would thus result in fishing seasons being shortened and catching capacities being used at less than the optimum level. A development of this kind would be undesirable from a general economic standpoint. In general economic terms, a partial change-over to large cutters in the small-scale and inshore fishing industry would be beneficial if it resulted in more rational fishing operations overall. This would, however, entail the widespread laying-up of traditional catching capacities as the change to large cutters was made. The administrative measures taken to manage fishery resources would then have to be such as not to encourage the creation of overcapacities<sup>1</sup>.

- Conversion of vessels to shrimping

An attempt could be made, in particular by the operation of smaller and

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1. See Part C.



medium-sized boats on the North Sea coast, to adjust to the new situation by changing from fishing to shrimping. In many instances such changes can be made at no great expense, since some North Sea cutters can be used for both fishing and shrimping. Consequently, many of these cutters have reduced their fishing activities while increasing their shrimping operations. The wide-scale conversion of fishing boats to shrimping might, however, be a serious threat to the shrimping industry<sup>1</sup> as regards both shrimp stocks and marketing. Even by the end of 1979 there was evidence of serious problems in the marketing of shrimps. The steep decline in prices at that time can be taken as an indication that sales of shrimps could be increased appreciably only at the expense of a sharp drop in prices. If this drop in prices cannot be absorbed through rationalization measures in processing (shrimp-peeling machines), an increase in catches is more likely to reduce earnings than raise them. For example, a 26% increase in the quantities caught off Schleswig-Holstein in 1979 was accompanied by an 8% loss of earnings)<sup>2</sup>.

#### - Stationary fishing

In view of the decline in the stocks that can be fished and the rise in the price of oil, fishing with fixed nets, rods, eelpots and traps has become more competitive with trawling. This has already prompted many fishermen to change to small boats some 10 m in length made of glass-fibre reinforced plastic. Since these small boats also require a smaller crew, the two largest cost items, labour costs and fuel, can be substantially reduced in this way. This change is particularly noticeable on the Baltic coast. However, it has not always been reflected in the statistics kept by the Fisheries Office on the fishing fleet, because half-covered vessels have been classified as motor boats for statistical purposes. But once additional superstructure and equipment have been installed, these vessels are entirely comparable with small cutters in appearance and range. In 1980 the Schleswig-

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1. See Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins im Jahre 1979; Jahresbericht des Landesfischereiamtes.

2. *ibid*, Table 5

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Holstein Fisheries Office consequently felt obliged to classify as small fishing boats 47 vessels previously regarded as motor boats<sup>1</sup>. In view of the growing profitability of stationary fishing in the Baltic compared with trawling with medium-sized cutters, other fishermen could well be expected to make the change. However, the severe winter of 1979 and the swelling of the number of jellyfish to plague proportions in recent years have affected stationary fishing more than trawling, which may have influenced the willingness of many fishermen to change.

#### iv. Aquaculture

Aquaculture is still largely confined to inland waters. The only exception so far has been the breeding of mussels and oysters off the coasts of the EEC countries. In the long term, fish-farming might well be an alternative to existing fishing methods. Experience is at present limited, however, making it difficult to assess profitability. Aquaculture represents the alternative of efficient fisheries management (albeit over a very small area) on a private-enterprise basis, which was referred to above in theoretical terms but has not been pursued further in the case of sea fishing. This need to limit the area involved has therefore largely confined aquaculture to waters which have natural boundaries or where such boundaries can easily be created, or to static cultures in open waters. For the time being, fish-farming would probably have to be restricted to cage farms.

Considerable research is going on in this field in the Federal Republic. Both the Federal Ministry of Agriculture and the Federal Ministry of Research and Technology support such projects financially. Research into aquaculture is at present being carried out, for example, by the Institute for Inshore and Inland Fishing of the Federal Fisheries Research Establishment in Hamburg, the Institute of Oceanography in Kiel, the Heligoland Biological Institute and the Institute for

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1. As most of these vessels are only a few years old, the age structure of the Baltic fishing fleet has changed greatly as a result of this reclassification.

Hydrobiology and Fisheries Science at the University of Hamburg. This research work has provided a valuable basis for aquaculture, but no practical experience has yet been gained of fish-farming off the coasts of the Federal Republic, and it is at present very difficult to calculate the risk attached to the establishment of inshore cage farms. For example, knowledge is lacking in particular on means of combating fish diseases and on breeding fish, and no trials have been carried out with fish likely to be suitable for inshore fish-farming. Nor is there any information on the prospects and economics of aquaculture systems<sup>1</sup>. Thus, the contribution aquaculture might make to the restructuring of the fishing industry seems limited in the short term, but its contribution in the long term could be considerable.

On the whole, the opportunities open to small-scale and inshore fishermen for defending and restoring their past income levels by means of adjustments within the fisheries sector are very limited in the short term. The success of conversion measures will largely depend on the attitudes adopted by other fishermen. Internal adjustments cannot be expected to solve the industry's problems. If these problems are to be solved, overcapacities must be reduced, and this means that some of the factors of production used in fishing must develop areas of activity outside the fishing industry.

b. Scope for adjustment outside the fisheries sector

i. Alternative uses for fishing vessels

The change in circumstances in the fishing industry has greatly reduced the economic value of fishing vessels for fishing. Whether fishing vessels are sold or retained by their present owners, alternative uses must therefore be considered. The alternatives are very limited, however, if the owner is to continue to earn his living through his own labour on his own boat.

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1. See K. Tiews, Gedanken zum gegenwärtigen Stand der Aquakulturforschung und -entwicklung in der Bundesrepublik Deutschland, Allgemeine Fischwirtschaftszeitung 4/78, pp 31 ff.

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As small fishing boats are not really suitable for the transport of goods, the only feasible alternative is to convert them for use by amateur fishermen and for transporting passengers. The statistics kept by the Fisheries Offices do not reveal how many fishing vessels have been converted for use in this way in recent years, such vessels being classed together in the figures with fishing boats that have been scrapped. There are not even any unofficial estimates of the numbers involved. The only source of such information is the sea shipping register, but this would entail an examination of the classification (fishing vessel, passenger ship, etc) of all registered fishing vessels in a base year and a comparison of the various entries. Processed statistics on changes in entries in the sea shipping register are not published by the authority concerned<sup>1</sup>. But although no accurate figures are available, in the case of Schleswig-Holstein it is known that a good number of fishing vessels have been converted in recent years for use by anglers and to transport passengers. It is difficult to estimate, however, what scope there is for further expansion in this area. The future prospects of passenger vessels will largely depend on what rules are adopted regarding duty-free purchases on ships. If restrictions are introduced, the opportunities for making a living in this way are likely to decline sharply. It is also difficult to estimate potential demand for angling trips. These are usually offered in combination with shopping trips, and angling trips consequently also depend to a great extent on future arrangements for duty-free sales.

ii. Alternative forms of employment

As regards alternative employment opportunities for fishermen, the first question to ask is how the wide range of alternatives should be defined. On the one hand, an occupation-oriented approach might be adopted, involving the consideration of employment opportunities similar to their

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1. It does not seem worthwhile carrying out a manual evaluation of the sea shipping register to answer this question, or indeed for the purposes of any "one-off" study. The sea shipping register could, however, become a valuable source of information on any question relating to the level of and changes in catching capacities if it were transferred on to data-processing media.

present occupation. On the other, the approach might be based on where the fishermen live, involving the consideration of employment opportunities in that same area.

Of the occupation-oriented alternatives, one, ie the change to angling and passenger trips, has already been discussed at some length. Here the former fisherman continues to earn his living in a familiar environment. Changing to other activities in shipping is usually more difficult. Fishermen do not have the qualifications for managerial posts in sea shipping, and the pay for jobs that can be performed without such formal qualifications is too low for them to be considered a genuine alternative by fishermen. In addition, such jobs would as a rule involve long periods of absence from home and so result in a fundamental change in the fishermen's family life and leisure activities. The question of qualifications also bars the way to many jobs ashore for fishermen. They could use their expertise most profitably in the fisheries sector, and here again, prospects are closely linked to the development of fisheries resources.

The tourist trade offers the best opportunities for fishermen seeking an occupation as self-employed persons outside the fishing industry in the area where they have always lived. Most fishermen live in places which are attractive to tourists because of their natural beauty. The tourist trade is therefore also likely to play a role of some significance as a source of employment near where the former fisherman lives, especially as the rapid development of facilities for tourists in the late 1960s and early 1970s in particular created a considerable number of jobs. In the industrial sector, on the other hand, employment opportunities are usually very limited. There is a shortage of jobs on the West coast in particular. This is reflected clearly in above-average unemployment levels and a below-average participation rate. Although there are more industrial jobs on the Baltic coast, the change in sectoral structure has created serious employment problems, particularly in the shipbuilding industry. As a result, unemployment on the Baltic coast has also been above average in recent years.

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### 3. Obstacles to adjustment

There are numerous obstacles barring the way to an adjustment of catching capacities to the changed circumstances. Some of these obstacles have already been mentioned in the discussion of possible forms of adjustment. These and other obstacles are considered in detail below.

#### a. The cost of intrasectoral adjustments

As a rule, intrasectoral adjustments cause the individual far fewer problems than extrasectoral adjustments because they permit the continued use of most existing assets and know-how. The cost to the individual of intrasectoral adjustments consists principally of additional expenditure on assets and on acquiring information, knowledge and experience relating to the efficient use of the new equipment. These various forms of expenditure vary in magnitude depending on which alternative is pursued.

#### i. New fishing grounds and different species

The opening up of new fishing grounds and the introduction of new species of fish on to the market would not involve the investment of a great deal of additional capital. The costs in this case are chiefly attributable to the increased risk attached to the discovery of grounds that can be fished profitably and to the marketing of fish with which the public are not familiar. As has already been said, these costs appear to be relatively high for the small-scale and inshore fishing industry. Similarly, little capital investment would be required to change over combined fishing boats/shrimp boats on the North Sea coast from fishing to shrimping. The actual conversion of fishing boats would, of course, entail a sizeable investment of capital. On the other hand, the marketing risk is greater in shrimping than in fishing because shrimps are not covered by the common organization of the fish market, there consequently being no guaranteed minimum price for shrimps.

The high risk attached to shrimping is reflected by sharp fluctuations in earnings. Above all, however, it must be remembered that average profits in shrimping are substantially lower than in fishing. The

accounts drawn up for the Federal Government's agricultural report, as referred to above, show the profits per fishing enterprise in the North Sea in 1978 to have been DM 96 313 for vessels less than 22 m in length and DM 100 266 for vessels over 22 m. In shrimping, on the other hand, profits averaged only DM 50 383 for boats of less than 16 m and DM 53 438 for boats of more than 16 m<sup>1</sup>.

ii. New large cutters

The commissioning of new fishing vessels requires a large capital investment. For example, a medium-sized Baltic cutter some 16 m in length will cost around DM 750 000, and a large cutter of 24-26 m around DM 1.5 million. Despite the present overcapacities, the individual fisherman is still able to improve his income by using a more efficient cutter, as is evident from the income levels just quoted and from the results of random surveys conducted for the Federal Government by the Institute for Agricultural Market Research of the Federal Agricultural Research Establishment on costs and earnings with respect to cutters more than 17 m in length and the surveys<sup>2</sup> by the German Fisheries Association on the economic situation of the middle- and near-water, small-scale and inshore fishing industries<sup>3</sup>. However, the average relative advantage enjoyed by large cutters has decreased somewhat recently, although it is still substantial. The greater efficiency of larger cutters in fishing outweighs the higher costs incurred, especially as laying-up premiums can be claimed for periods in which putting to sea does not appear worthwhile.

iii. Stationary fishing

These large differences in profits depending on the size of fishing boats also form the principal obstacle to a greater willingness to change to fishing with fixed equipment. Although severe restrictions have been imposed on trawling and fuel costs have risen steeply, the differences in the average earnings/cost ratio are so pronounced that on average they

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1. See Table 14.

2. These results are not published, however.

3. See Jahresbericht über die Deutsche Fischwirtschaft 1977/78, loc cit, p 27.

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are unlikely to be offset by these changes. On the other hand, the spread of profits within the various groups is very uneven, and the business risk is likely to increase with increasing size of fishing boat; the change in circumstances may therefore persuade many fishermen that a change to less cost-intensive fishing methods is worthwhile even if they are less successful, although the assistance that can be obtained has a considerable impact on the calculation of profitability.

iv. Aquaculture

Changing over to aquaculture at present entails both heavy investment and a high risk. Investment costs, for example, are comparable to the purchase price of a cutter. For the establishment of an inshore fish-farm that can be operated by 2 or 3 people, investment costs must be estimated at around DM 1.5 million. The lack of experience and knowledge of breeding, keeping and feeding fish and of pest control and the treatment of fish diseases also means that the risk is very high. Individual experiments with fish-farming have so far been almost entirely confined to research institutes and provide little information on the commercial operation of fish-farms. Scientific experiments show that substantial profits can be achieved in fish-farming, although it is still difficult to calculate the risk involved.

An assessment of intrasectoral adjustments in general economic terms largely depends on the extent to which they are accompanied by extra-sectoral adjustments and increase the natural resource base. As things stand at present, too many factors of production are tied up in the fishing industry, and from a general economic point of view there would appear to be an urgent need for some of these factors to be released and put to other uses. Action taken by the individual entrepreneur to improve the efficiency of fishing by increasing catching capacities adds to the general economic problems unless catching capacities are simultaneously reduced elsewhere or the natural resource base is enlarged.

b. The cost of extrasectoral adjustments

A major obstacle to the diversion of both capacities and labour away from the fishing industry is the virtual impossibility of using equip-



ment, knowledge and experience specifically relevant to fishing as a means of making a living in other sectors. As a rule, withdrawal from the fishing industry still entails the writing-off of substantial assets (in a broad economic sense rather than the fiscal or management sense of the term), although the change in circumstances in the fishing industry has already resulted in low value being attached to equipment, knowledge and experience specifically relevant to fishing, which is indicative of a decline in the incomes of the factors of production used in fishing. This reduction in value would be even higher if it were not for such forms of government aid as laying-up premiums, which prevent incomes from declining further. Consequently, average incomes achieved in fishing are still considerably higher than what can be earned by the factors of production in wage-earning employment in other sectors at average rates of interest on capital and average incomes. It must be remembered, however, that comparisons of incomes in the fishing industry with average incomes in the economy as a whole carry little information value. As with other groups of self-employed persons, it is difficult in fishing to find representative calculations of the incomes of other groups in which similar combinations of factors are used. A comparison with incomes in agriculture, where representative calculations of incomes are made by reference to a network of test farms, reveals that the average profit of an enterprise engaged in small-scale and inshore fishing in 1978 (DM 77 442) was well above that of a full-time agricultural holding (DM 31 950) - and the input of own capital in the fishing industry is far lower. But such comparisons of incomes in a given year have little information value in the case of sectors in which earnings are subject to sharp fluctuations from one year to the next. Nor are average figures of any great value in an assessment of the incomes of individual enterprises. Accounting records show a very wide spread for all self-employed occupations. This is also true of the fishing industry. Although no figures on the range of individual results in the fishing industry were published in the case of the representative calculations of incomes made for the government's agricultural report, the above-mentioned random survey of incomes of fishing enterprises with boats more than 17 m in length does reveal that the highest earnings are more than ten times higher than

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the lowest. Even by 1978 a number of fishing enterprises were unable to make a trading profit, and in view of the further stresses that have set in since then as regards both fishing possibilities and costs, the number of fishermen operating at a loss is likely to have increased. The pressure on the individual fisherman to leave fishing may be considerable, but the wide range of incomes shows clearly how difficult it must be for fishermen to earn the same incomes outside the fishing industry.

Employees in the fishing industry usually lack the qualifications required for above-average incomes in other fields of activity. Acquiring such qualifications often proves to be a decisive obstacle to adjustment, and account must be taken here not only of the costs involved, such as the cost of training and loss of earnings, but also of other factors. Grants can be obtained from the Federal Institute towards the cost of obtaining qualifications and any costs of moving away to live elsewhere.

Apart from adequate qualifications, fishermen usually lack the capital for other self-employed occupations. In 1978, the average fisherman had own capital of only just under DM 30 000<sup>1</sup>. The proceeds from the sale of fishing vessels and other equipment would probably have to be used to pay off borrowed capital. Furthermore, a man who leaves the fishing industry often has to repay any assistance he has received. In Schleswig-Holstein own capital makes up a very much larger proportion of balance-sheet assets than in other Federal states, and the conditions for beginning a new career are therefore more favourable here than elsewhere.

c. Non-economic obstacles

In addition to the obstacles inherent in cost/benefit considerations, other barriers have to be surmounted before a man can leave fishing. The vital factor that is usually emphasized is that fishing is not only

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1. See Table 13

a way of earning a living: it is also a way of life not to be found anywhere outside fishing. This bond between fishermen and their way of life is most easily compared with the reluctance of farmers to leave the land, which similarly has exerted a considerable influence on structural change in agriculture. An additional factor is the uncertainty that the individual feels about the prospects and problems in other sectors, which it is difficult to overcome with rational decisions. But this last is a factor that is not specific to fishing alone: it occurs, to varying degrees, whenever a change of occupation is considered.

Of particular importance for fishing, however, is undoubtedly the uncertainty that exists regarding the general conditions that will govern fishing in the future. Fishermen's earning prospects very largely depend on the situation created by political decisions. The individual cannot yet judge what the situation will be in the medium and long term. This uncertainty about the future is certainly a significant factor at present, and one that delays decisions by individuals. It is further aggravated by a national policy which is endeavouring to meet an acute need for adjustment by granting laying-up premiums.

#### 4. National and regional fisheries policy

##### a. Background

For some considerable time now an attempt has been made in the Federal Republic of Germany to improve the competitiveness of the fishing industry through government action. In view of the large numbers leaving the fishing industry, the Federal Government felt constrained to take steps to increase the productivity of the fishing fleet, which was in part very old and inefficient. As early as 1962, the structural programme for sea fishing provided for low-interest loans for the building and purchase of fishing vessels, backed by scrapping-assistance schemes and grants to strengthen the market position of producers and producers' associations<sup>1</sup>. Since then the directives on financial assistance have been amended a number of times, although the principles of the national fisheries policy have remained essentially unchanged. Nor did the introduction of a common fisheries policy and the changes in the international legal situation and fishing conditions result in any fundamental change in the Federal Republic's fisheries policy. The traditional instruments have simply been added to and adapted. 1978 saw the adoption of an immediate programme designed to help fishermen over losses of earnings in the short term and to facilitate their adjustment to the change in circumstances in the medium and longer term. In 1980, a once-and-for-all liquidity aid was paid to compensate for the further sharp increase in energy prices that had occurred in 1979.

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1. A general idea of the extent and development of financial assistance to the fishing industry can be obtained from the subsidy reports published by the Federal Government: see Report of the Federal Government on the development trend of financial aids and tax concessions pursuant to Article 12 of the Promotion of Economic Stability and Growth Act, Bundestagsdrucksache V/2423 of 21 December 1967; VI/391 of 16 February 1970; VI/2994 of 23 December 1971; 7/1144 of 29 October 1973; 7/4203 of 22 October 1975; 8/1195 of 17 November 1977 and 8/3097 of 8 August 1979.

b. National fisheries policy

i. Market policy

The Federal Government's activities in the field of market policy, which before the organization of the common market in fish entered into force<sup>1</sup> were primarily concentrated on promoting the sale of fish, are now aimed at supplementing or modifying Community arrangements. Thus, two goals of German fisheries policy are a change in the organization of the market in fish and greater flexibility in the intervention system. In particular, it is felt that producers' organizations should not be compelled to apply the EEC withdrawal price unchanged throughout the year. Seasonal fluctuations in fishing activities should be reflected by the system of market organization. The German Government has also called for the introduction of minimum sizes.

In addition to these efforts to change the Community market policy, the Federal Government made DM 12.3 million available in 1978/79 for information campaigns to promote the consumption of fish. This action forms part of the immediate programme and is intended to stimulate the consumption of both little-known species of fish and fish products that are new to the market.

ii. Structural aid

There are three conventional Federal aid programmes designed to improve the structure of the sea-fishing industry. Grants, reduced interest rates and public loans are offered in order to modernize the catching capacities of the fishing industry. Furthermore, special depreciation of up to 40% of the cost of purchase or construction in the year of purchase or construction and in the four subsequent years may be claimed in addition to straight-line depreciation in respect of sea-fishing vessels, as also for merchant vessels and aircraft.

The first programme provides for grants for the construction of deep-sea fishing vessels. The grant amounts to a maximum of 23% of the

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1. Since 1973 expenditure on the promotion of the sale of fish has been financed entirely from levies on the fishing industry.

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investment (the owner being required to invest a minimum of 25% from his own capital), up to a limit of DM 3.5 million per vessel.

The second programme provides for grants for structural improvement and consolidation in the sea-fishing industry. This includes the payment of scrapping premiums (DM 600 per GRT), grants for the purchase and conversion of vessels engaged in middle- and near-water fishing (up to 10% of the investment) and grants for the modernization of deep-sea fishing vessels and the construction of middle- and near-water fishing vessels (up to 20% of the investment). For the modernization of deep-sea fishing vessels a reduced interest rate may also be claimed. The value of the assistance (grant plus interest concession) may not, however, exceed 20% of the investment.

Lastly, the third programme provides for loans for structural improvement in the small-scale fishing industry. Loans are granted for the structural improvement, modernization and rationalization of small-scale fishing enterprises. Specifically, aid is offered for the construction of fishing vessels, the purchase of used fishing vessels (at home or abroad), the conversion and modernization of fishing vessels, major structural and technical repairs and catch-processing equipment (excluding structural work). As a rule, the loans amount to at least DM 10 000 and at most DM 100 000 and, in the case of the construction of deep-sea vessels, to a maximum of DM 200 000. Up to 25% of the investment for the construction of vessels where the cost of construction exceeds DM 400 000, and up to 50% for the acquisition and installation of catch-processing equipment by fishing co-operatives and associations, can be financed in this way. The interest rate on these loans is 3% per annum over 6-15 years.

Apart from these programmes, the Federal Government adopted immediate measures for the adjustment of capacities under a supplementary budget in 1978. This programme is limited to three years, and therefore expires in 1980. It provides for grants for the adaptation of fishing activities to species and fishing grounds which have hitherto been little exploited, premiums for laying up vessels for limited periods and forms of assistance for scrapping. A new rate is fixed for each of

these various forms of aid every year<sup>1</sup>. When the programme was adopted, the rate fixed for adaptation to other species of fish was set at DM 1/hp for each vessel used and each day of sailing in the case of deep-sea fishing and at DM 1.30/hp in the case of small-scale fishing, and DM 200/t weight of catch for new species of fish. The grants made for deep-sea fishing may not, however, total more than 75% of the average operating costs directly connected with sailing (excluding personnel costs), and in small-scale fishing the grants plus the proceeds from the sale of the new species for a given sailing may not exceed DM 1300/t landed weight. As regards adaptation to other fishing grounds, grants of DM 2000 were paid for each day it could be proved a deep-sea fishing vessel had spent in stipulated fishing areas plus prorated sailing days, compared with DM 100-500 for small cutters, depending on size. The laying-up premium is paid in respect of vessels first commissioned after 1 January 1967 and before 1 January 1978 and laid up for at least one quarter of the average number of days they had been used in previous years. For a full calendar year, the premium amounted to 8% of the cost of purchase and construction of the vessel capitalized in accordance with the principles of income tax legislation. The scrapping premium amounted to DM 700 per GRT in the case of deep-sea fishing vessels and DM 1000 per GRT in the case of small-scale fishing vessels at least 7 m in length. For a limited period, therefore, fishermen are thus offered a scrapping premium that is far higher, particularly in the case of small-scale fishing, than the scrapping aid available under the programme for structural improvement and consolidation in the sea-fishing industry.

Negotiations are still being conducted on the actual form the once-and-for-all adjustment aid should take in the 1980 budget. The plan is for the small-scale fishing industry to receive DM 2.5 million and the deep-sea industry DM 5 million, to offset the sudden increase in energy costs. The slow progress being made in the talks on the payment procedures has caused considerable annoyance among the fishermen, particularly shrimpers.

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1. With effect from 15 July 1979, a new version of the directives on the immediate programme entered into force: see Bundesanzeiger No. 142 of 2 August 1979.

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iii. Fisheries research

In addition to the measures it has adopted to restructure the fishing industry, the Federal Republic has long made efforts to improve conditions for the fishing industry through government research and research supported by the government<sup>1</sup>. For instance, the scientific work of the Federal Research Establishment is at present focused on studies of useful fish stocks in the North Atlantic and in the North Sea and the Baltic, the opening up of new fishing areas and useful species for exploitation, the development of new products from marine organisms of which little use has been made in the past (eg krill, blue whiting), the development and testing of new fishing and detection equipment and new fishing methods, and the development of aquaculture<sup>2</sup>.

iv. Expenditure

Budgetary spending on fishing has risen steeply in recent years, principally because of the immediate programme launched in 1978 (see Table 39). The deep-sea fishing industry accounts for by far the largest proportion of the expenditure under this immediate programme. In 1978 assistance totalling DM 2.8 million was granted to the small-scale fishing industry, chiefly for temporary laying-up. Most of this sum went to the operators of cutters in the Baltic, ie Schleswig-Holstein fishermen. Although the budget figures for 1980 feature smaller amounts for laying-up premiums and higher appropriations for adaptation and scrapping premiums, expenditure under this programme remains equivalent in its coverage.

So far, expenditure has focused on measures to provide immediate assistance in cases of hardship. Welcome though these measures may be from a regional and social point of view, the real question is whether they do not mask the extent of the adjustment needed, and whether the immediate assistance does not lead the recipients to feel that there is no

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1. A survey of institutions involved in fisheries research in the Federal Republic is given in the annual report on the German fishing industry; see Jahresbericht über die Deutsche Fischwirtschaft 1978/79, loc cit, pp 67 ff.

2. See Agrarbericht 1980, loc cit, p 81.



Table 39. Breakdown of expenditure on the fishing industry under the Federal Budget, 1975-80  
(in DM 1000)

Purpose	Financial year					
	1975	1976	1977	1978	1979 <sup>a</sup>	1980 <sup>a</sup>
Remunerations, fishery protection vessels	6 448	6 811	7 419	7 993	8 138	8 297
Remunerations, fishery research vessels	6 582	7 115	7 356	8 349	8 505	8 652
Remunerations, trawlers	598	464	505	-	-	-
Upkeep of fishery protection vessels	2 409	3 122	2 621	3 177	2 990	4 896
Upkeep of fishery research vessels	3 440	4 117	4 502	4 402	3 640	5 986
Upkeep of trawlers	926	1 072	867	-	-	-
Trawler or cutter fee and equipment for exploration of new fishing areas	4 963	374	107	71	2 310	90
Trawler fee, fishery protection	6 491	5 388	4 720	-	-	-
Reductions in interest rates	4 767	4 461	4 004	3 482	4 500	3 000
Exploration of new fishing areas	-	-	-	-	6 000	-
Construction and conversion of fishery research vessels	71	273	-	-	480	-
Construction and conversion of fishery protection vessels	-	-	-	58	10 000	10 000
Fitting out of fishery protection vessels	57	799	-	134	60	105
Fitting out of fishery research vessels	118	98	135	108	186	352
Cutter loans	1 763	1 850	3 801	3 339	4 500	4 000
New construction loans	7 330	5 532	693	654	-	-
Structural and consolidation assistance	10 070	7 280	6 099	3 147	4 400	4 400

Table 39 (continued)

Purpose	Financial year					
	1975	1976	1977	1978	1979 <sup>a</sup>	1980 <sup>a</sup>
Aid measures for Baltic cutters	-	-	-	74	-	-
Fish marketing	4 117	3 422	3 509	2 975	- b	- b
Immediate measures:						
Adaptation, deep-sea fishing				8 838	17 000	17 000
Adaptation, middle- and near-water and inshore fishing				197	400	500
Scrapping premiums, deep-sea fishing				.	5 200	4 100
Scrapping premiums, middle- and near-water and inshore fishing				206	1 700	1 100
Laying-up premiums, deep-sea fishing				.	1 100	1 100
Laying-up premiums, middle- and near-water and inshore fishing				2 685	4 700	3 300
Publicity campaigns				5 800	6 500	2 200
Once-and-for-all adjustment aid for sea fishing	-	-	-	-	-	2 500
Total	60 150	52 178	46 338	55 689	92 309	86 578
<sup>a</sup> Budget appropriations						
<sup>b</sup> No amount shown: expenditure may not exceed revenue from the levy collected under the Fish Act						

Source: Agrarbericht (Agricultural Report), current years; Federal Budget 1980

need for change. However, it has to be borne in mind when assessing these measures that it is difficult for the individual fisherman and even for a national government within the EEC to foresee the future situation in the fishing industry. In the specific case of the Federal Republic, much depends on the outcome of the EEC's negotiations with non-member countries, on the one hand because the country is so dependent on deep-sea fishing and on the other because West German vessels have been excluded from traditional fishing grounds in the Baltic.

v. Aid to the fishing industry in Schleswig-Holstein

The fishing industry in the Federal Republic is assisted not only by national programmes but also by regional programmes. For example, both Bremen and Schleswig-Holstein grant interest subsidies to fishing enterprises. In Schleswig-Holstein these interest subsidies and loans are granted for construction, purchase, conversion and technical modernization and for the consolidation of short-term liabilities. Also of importance, however, are the legislative measures taken by the regional authorities. In an amendment to the Fisheries Act in 1980, for instance, Schleswig-Holstein restricted the use of stationary fishing equipment (fixed nets, traps, rods, eelpots) in coastal waters to professional fishermen. Amateur fishermen may only fish with a hand-held rod. This is designed to make it easier for professional fishermen to change over to stationary fishing in the Baltic.

The financial assistance given to the Schleswig-Holstein fishing industry by the Federal and regional authorities amounted to DM 8.4 million in 1979, DM 4.3 million of this being in the form of structural and consolidation assistance and DM 4.1 million in the form of immediate Federal measures for the adjustment of capacity. The construction of new vessels accounts for almost half of all structural and consolidation assistance (Table 40), mostly for shrimp boats or combined shrimping/fishing boats. None of the larger fishing boats was replaced in 1979. All the new boats for fishing were small glass-fibre reinforced plastic boats, nine of which were commissioned in 1979. The most popular size is around 9.50 m in length.

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Table 40. Aid to the Schleswig-Holstein small-scale fishing industry  
(forms of structural and consolidation assistance), 1979

Purpose	DM 1000	
	Loans	Grants
A. Federal aid	829	1 478
of which:		
1. Federal fishery loans	829	-
2. Structural and consolidation assistance:		
i. Scrapping assistance	-	16
ii. Grants for construction	-	997
iii. Purchase grants	-	169
iv. Conversion grants	-	89
v. Shrimp-peeling machinery	-	112
3. Reduced interest rates (estimated)	-	95
B. Regional aid	989	1 047
of which:		
1. Regional fishery loans	989	-
2. Grants	-	817
3. Reduced interest rates	-	230
Regional + Federal assistance	1 818	2 525
Total	4 343	

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins  
im Jahre 1979, loc cit.

Major overhauls principally concern engine replacements. Most of the used boats bought were fairly large shrimp boats (18 m to over 20 m), which cost more to operate than new boats. Modernization projects concentrated on the acquisition of net winching-reels and automatic pilot gear for day-time fishing. This shows that the attempt is being made to compensate for the shortage of suitable crew members for such activities by rationalizing operations. The normal scrapping campaign in 1979 led to the withdrawal of only two boats, to which must be added a further seven boats (two in the North Sea and five in the Baltic) whose owners left fishing for good and received an increased premium of DM 1000 or 1500/GRT. This supplementary immediate measure expires in 1980, and there is therefore likely to be a considerable increase in the number of vessels scrapped by the end of 1980. Assistance given to initial buyers went principally on freezing capacities and refrigerated trucks in the shrimping industry, the development of shrimp-peeling machinery and equipment for de-sanding mussels in Emmelsbüll.

Assistance provided at Federal and regional level in the form of loans and grants and the purpose for which it was used are shown in Table 41. State assistance amounts to about 47% of the total, half being provided in the form of fishery loans. Of the total, grants accounted for 58% and loans for 42%.

Of the immediate measures taken by the Federal authorities to adjust capacities in the sea-fishing industry, some DM 4 million went to Schleswig-Holstein (Table 42). Laying-up premiums alone accounted for about DM 3 million to which must be added the increased scrapping premiums mentioned above. Consequently, only a limited amount was available under the immediate measures for adaptation to new species and new fishing grounds.

In addition, assistance was received from the European Agricultural Guidance and Guarantee Fund (EAGGF) for the construction of seven cutters in 1979. The Commission of the European Communities approved DM 912 288 in respect of applications submitted at the end of 1978. A further seven applications for a total of some DM 1.2 million were made in 1979. Total resources granted thus amount to almost 50% of the construction costs.

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Table 41. Utilization of assistance granted by the Federal authorities and the state of Schleswig-Holstein for the Schleswig-Holstein fishing industry in the 1979 financial year

Purpose	North Sea		Baltic		Total	
	Cases	DM 1000	Cases	DM 1000	Cases	DM 1000
Scrapping campaign	1	5	1	11	2	16
New construction	5	1 385	9	453	14	1 838
Major overhauls	8	349	11	572	19	921
Modernization	13	53	17	62	30	115
Purchases	7	508	5	265	12	773
Initial buyers	7	329	2	26	9	355
Total	41	2 629	45	1 389	86	4 018
Reduced interest rates (Federal/regional)						325
						4 343

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins im Jahre 1979, to be published in Fischerblatt, 1980

Table 42. Immediate measures taken by the Federal authorities to adjust capacities in the Schleswig-Holstein sea-fishing industry in 1979

Purpose	Amount	
	DM 1000	% of total
Laying-up premiums (of which carry-over from 1978)	3 011 (771)	74
Increased scrapping premium	366	9
Increased scrapping premium (deep-sea herring fishing)	420	10
Adaptation to "new" fishing grounds	147	4
Adaptation to "new" species	124	3
	4 067	100

Source: Die Kleine Hochsee- und Küstenfischerei Schleswig-Holsteins im Jahre 1979, loc cit.

#### IV. Structural adjustment problems in upstream and downstream sectors

##### 1. The need and scope for adjustment in upstream sectors

The change in circumstances for the fishing industry also raises problems for the upstream and downstream sectors. However, these sectors usually have more scope for external adjustment, and they are also able to react more flexibly to changes within the fishing industry.

The need for adjustment in the sectors supplying the fishing industry very largely depends on the future shape of fisheries policy and the extent of structural change within the fishing industry. As already stated, no information is available on the level of services supplied to the fishing industry or, therefore, on changes in these supplies. Total expenditure in the small-scale and inshore fishing industry in 1978 has already been estimated at DM 85 million, wages and salaries accounting for more than 40% of this<sup>1</sup>. A decline in fishing activities is highly likely to be accompanied by a proportional decline in demand for the services of ships' chandlers. The trend in domestic demand for fishing vessels and equipment chiefly depends on the structural change within the fishing sector, and this is strongly influenced by fisheries policy. If this policy provides for the present pattern of ownership to be retained and obstructs structural changes, this sector can be expected to suffer a disproportionate decline in demand. But if policy makes for a situation in which competition can act as an allocation mechanism, no sharp decline in investments in the fishing sector is likely, given the present wide variations in efficiency in the small-scale fishing industry. Added to this, the change in the law of the sea has given many countries the right of disposal over national fish resources although they do not have a fishing fleet, or at any rate not an efficient one. Many developing countries will therefore be trying to expand and develop their fishing fleets, which is likely to result in a considerable increase in the demand for fishing vessels.

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1. See p 61

As a rule, the upstream sectors can also increase their range to include services not related to fishing, or at least expand their range of services without having to branch out into completely new areas of activity. Even shipyards which specialize in fishing vessels can be adapted to other types of ship and boat. It should not be forgotten, however, that the order books of the shipyards are generally far from full. But this is principally due to a lack of competitiveness with suppliers abroad and is not a problem specifically connected with the demand situation, let alone a problem specifically related to the fishing industry. The growing demand for boats for leisure use offers considerable potential, particularly for smaller yards. The share they can obtain of this market will largely depend on their competitiveness. Chandlers can also win other customers with only slight changes to the range of services they offer. These are chiefly wholesale services, few of which are specifically related to the fishing industry. For example, it is not only fishermen who want supplies of oil products, but also other enterprises and private households. Once a regular clientèle has been built up outside the fishing industry, it should also be possible to increase the range of services offered without any serious difficulty. Activities not connected with the fishing industry already play a fairly important role in the business of many chandlers, although no figures are available.

## 2. The need and scope for adjustment in downstream sectors

The need for adjustment in the downstream sectors is more or less proportional to changes within the fishing industry. The various sectors have been particularly hard hit by restrictions dictated by the type of production in which they are involved. However, various substitute activities are usually possible as regards both the chain of supply and the product range. A change-over to activities unrelated to fish nevertheless faces serious obstacles in most cases. Trade in fish, for example, is for the most part a separate area, and only in exceptional cases is it handled by the general food trade<sup>1</sup>. There is little chance of the firms concerned increasing their range to include non-fish products. Some fish-processing firms are also closely tied to fish

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1. See pp 75 ff.



products, although it should be somewhat easier for them to include other foodstuffs in their processing range than it is for the trade. Traditional marketing channels could be used to introduce new products to the market. But on the whole the opportunities for adjustment outside the fishing industry are likely to be limited.

a. Changes in the chain of supply

The effect the change in circumstances in the fishing industry has had on downstream sectors is evident from the trend in 1978. Not only was the total quantity of fish landed well below that of the previous year, but landings were also extremely unevenly distributed. Each fisherman's anxiety to obtain as large a share as possible of national catch quotas, combined with the possibility of claiming laying-up premiums, resulted in a growing discrepancy between days on which supplies were excessive and periods in which the quantity of fish landed was insufficient. The small-scale fishing industry, for instance, exhausted most of its 1978 quota in the first six months of that year. Furthermore, it is not possible for the seawater-fish markets to be regularly supplied by the small number of fishermen in the West German deep-sea fishing industry. In 1978, for the first time ever, Bremerhaven went a whole week without any fish being landed<sup>1</sup>.

This lack of continuity in supplies from the West German fisheries sector prevents the fish trade and the fish-product industry from fully using their production capacities to process domestic catches. Filletting firms in particular complain of the considerable fluctuations in quantities landed, particularly since they cannot resort to casual labour, as they did in the past and as other countries still do, and are forced by cost factors to align their capacities with a quantity which is continuously available. They also complain that the fish landed at the West German fish markets are too small and cannot be filleted economically because of the low yield at the current withdrawal prices. This is true, for example, of ancona codling and also

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1. See Jahresbericht über die Deutsche Fischwirtschaft 1978/79, loc cit, p 43

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of redfish. The fish industry and wholesale trade have long called for appropriate changes to the EEC's organization of the market.

On the other hand, the competitiveness of the fish trade and fish-processing industry need not be impaired by restrictions on domestic landings resulting from changes in the legal situation and fisheries policy, provided that a continuous supply of raw fish is assured. To be competitive, the downstream sectors need not necessarily obtain the bulk of their raw fish from the domestic fishing industry. Imports could well represent a competitive and reliable source of supply. This does presuppose, however, that the fish trade and fish-processing industry are able to expand their supply links and to make use of this opportunity.

The initial effects of the international redistribution of available fishery resources as a consequence of the changes in the international legal situation and the quota measures are apparent from the patterns of foreign trade in fish and fish products in 1978<sup>1</sup>. Although the quantity exported by the Federal Republic continued to increase in 1978, the increase was largely due to the growth in exports of lower-priced fish which could not be sold on the domestic German market, consisting, on the one hand, of a large proportion of "new" fish caught under the Federal Government's programme of immediate measures and, on the other, of almost 50% of all the cod caught, most of it small. Thus the quantity of fish and fish products exported in 1978 was 3922 t, or 3.5% higher than in the previous year, but in terms of value exports were 3.6% down on the previous year. Although the quantity imported rose by only 1.7%, this was 5724 t more than in the previous year. The increase in the value of imports was far higher, at 9%. This trend in the Federal Republic's foreign trade in fish and fish products was even more pronounced in 1979. There was an increase in the quantities of fish and fish products exported of 1538 t or 1.3%, compared with an increase in imports of 20 093 t or 5.8%<sup>2</sup>. But on the whole the increase

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1. See U. Sommer, Der fischwirtschaftliche Aussenhandel im Jahr 1978, in: Jahresbericht über die Deutsche Fischwirtschaft 1978/79, loc cit, pp 59 ff.
  2. See Federal Statistical Office, Fachserie 7: Aussenhandel, Reihe 3: Aussenhandel nach Ländern und Warengruppen (Spezialhandel), 1978 and 1979.

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in the Federal Republic's net imports was far lower than the decline in domestic catches.

b. Changes in the product range

In addition to this decline in supplies of raw fish, the change in range of species supplied has caused adjustment problems. Firstly, the range of fish caught by the West German fishing fleet has altered considerably owing to the change in the general circumstances (Table 43). Secondly, changes in the price structure on import markets have made adjustments to the product range seem profitable. This is particularly true of herring processing. Until a few years ago, herring was absolutely dominant as the raw fish for the West German marinading and canning industry. With the ban on herring fishing in the North Sea and the rise in the price of herring compared with other species (probably more the expected rise than the actual rise), the processing industry has turned increasingly to mackerel and pilchard. Within a few years these products have gained a considerable share of the market. For instance, some 20 000 t of pilchard were processed by the canning industry in 1978, and mackerel accounted for 15% of all canned fish<sup>1</sup>. In contrast, the consumption of herring has dropped substantially. Not only were catches by the domestic fishing industry well below the figures in previous years: imports also fell sharply from 1977 to 1978, almost 6500 t less fresh and frozen herring being imported in 1978 than in the previous year.

These changes in the range of species are not reflected by the production statistics, which make a distinction only by type of product. But they do reveal the persistent changes in the structure of production. Marinading continues to be the most important form of processing, and the proportion of marinated products is still rising (Table 44). Canned fish, in second place, has fallen behind in recent years. The production of table-ready fish dishes and products has risen sharply, particularly in 1979. There has also been considerable growth in products made from

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1. See F. Marr, Fischindustrie und Küstenfischgrosshandel, in: Jahresbericht über die Deutsche Fischwirtschaft 1978/79, loc cit, p 42.

Table 43. Quantities caught of the most important species

Year	Total	Herring	Cod and codling	Haddock	Saithe (coalfish)	Redfish	Shrimps and crabs	Mussels	Other <sup>1</sup>
1960 ...	644.4	190.6	110.5	10.9	59.7	152.6	24.8	13.2	82.1
1970 ...	591.4	166.3	174.3	8.9	60.4	71.6	38.4	9.6	61.9
1975 ...	434.0	53.1	119.9	22.8	77.0	54.0	22.8	21.6	62.8
1973/78.	432.9	36.9	109.2	15.2	76.6	61.5	24.2	18.3	91.1
1978 ...	394.7	8.2	72.8	3.4	44.2	58.8	16.8	16.3	174.1
1979 ...	330.2	7.8	50.9	3.1	34.6	47.8	19.6	8.5	158.0

<sup>1</sup>. including other marine creatures

Source: Federal Statistical Office, Fachserie 3: Land- und Forstwirtschaft, Fischerei,  
Reihe 1: Ausgewählte Zahlen für die Agrarwirtschaft, 1979, p 93

Table 44. Production in the fish-processing industry, 1977-79

Product	Quantity in t		Value in DM 1000			
	1977	1978	1979	1977	1978	1979
Fish and fish products	11 584	11 118	10 275	30 796	27 705	28 588
Fish, heads removed, gutted, cut into pieces or similarly treated						
Fresh						
Deep-frozen						
Trout, incl. trout fillets	1 292	2 374	2 529	1 977	4 252	4 950
Other fish						
Fish fillets						
Fresh	22 295	20 950	20 522	86 922	85 372	83 117
Deep-frozen	8 801	9 349	10 673	36 051	43 346	43 354
Deep-frozen fish products						
Crumbed, incl. pre-baked	31 663	32 708	34 122	133 411	132 431	136 125
Other fish products (consisting entirely of fish), eg table-ready fish dishes	20 930	18 528	24 024	134 831	114 656	156 833
Salted fish and fish fillets (excl. matjes fillets)						
Salted herrings, incl. fillets	6 366	5 690	5 656	31 895	34 565	35 125
Other salted fish and fish fillets, also dried	.	.	.	.	.	.
Smoked fish						
Smoked herring and sprats	3 202	3 572	3 369	16 911	19 990	18 888
Other smoked fish	11 707	10 882	11 111	125 600	129 223	137 857
Products of salted fish in oil and similar products, marinades, canned fish						
Salmon and saithe, smoked, in oil	11 263	10 774	10 172	94 213	99 246	97 450
Anchoses, anchovies and matjes fillets	5 881	5 473	6 178	48 819	51 670	57 134
Marinades (incl. fried and cooked marinades)	67 513	70 008	72 678	283 115	325 712	325 243
Canned fish	53 234	50 572	46 279	241 725	249 891	226 456

Table 44 (continued)

Product	Quantity in t			Value in DM 1000		
	1977	1978	1979	1977	1978	1979
	Products made from crustaceans and molluscs	1 943	2 235	6 310	21 714	27 656
Other products of fish for human consumption	21 131	15 296	15 571	75 964	72 073	79 228
Fish salads	2 202	.	.	16 065	.	.
Other products of fish, eg pastes, caviar	-	-	-	-	-	-
Crude liver oil, clarified	17 930	13 144	16 738	23 312	13 883	18 426
Fish tran, fish oil (pressed and centrifuged tran, extraction tran)						

Source: Federal Statistical Office, Produktion im Produzierenden Gewerbe, 1979

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crustaceans and molluscs. On the other hand, the production of fish salads has gone into a sharp decline. The production of fish fillets has remained approximately stable, although frozen fillets continue to gain in popularity over fresh products.

### 3. Outlook for sectors allied to the fishing industry

#### a. Fisheries research

In view of the changes in the law of the sea and fisheries policy, fishery research has an important role to play in studying methods the German sea-fishing industry might use to catch unusual species and to exploit new fishing areas. For legal and biological reasons, however, these studies principally concern the interests of the deep-sea fishing industry, eg off Argentina and New Zealand. The fishing grounds and species of fish which are of interest to the small-scale and inshore fishing industry are sufficiently well known, and the developments that have taken place in the law of the sea do not leave this branch of the fishing industry any room to move to new fishing grounds. On the other hand, an increase in research that leads to improved fisheries management and a reduction of marine pollution is of interest to the small-scale and inshore fishing industry. The contributions made under the aegis of the International Council for the Exploration of the Sea should be mentioned here. The resulting recommendations for fisheries management will, however, largely depend on the scope for political manoeuvre enjoyed by the decision-making bodies.

It is impossible to say at the present time how far fish-farming and other future forms of fisheries operation represent adequate alternatives to traditional inshore fishing. Studies of alternative forms of fisheries have so far resulted in no more than various pilot projects. Examples in Schleswig-Holstein are the breeding of oysters in the Eckenförder Bucht and the breeding of trout near power stations, as is done in the Kieler Förde.

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b. Equipment and technology for fishing and processing

The changes in the international law of the sea provide the makers of fishing and processing equipment with new market opportunities. If the coastal States which have benefited by these changes become more active in fishing their own waters, there is likely to be an increase in the demand for the products and services that go with fishing. Fishing and processing equipment and technologies, port construction, commercial fisheries research and inspection methods are notable examples here. Branches of activity which offer such products and services are principally located in the traditional fishing countries. It can therefore be assumed that the demand for the goods and services of sectors associated with the fishing industry will expand if coastal countries themselves take advantage of their newly acquired fishing potential. It is therefore relevant to consider whether the products of sectors associated with fishing can be substituted for commercial fishing in the North German coastal states.

From the official statistics, however, it is not possible to forecast the opportunities and prospects of producers of fishing and fish-processing equipment or the development and marketing of fishing and marine technologies. The inadequacy of the data base does not allow any direct conclusions to be drawn on activities connected with fishing or on fishing and fish-processing equipment, since the component elements of fishing equipment and processing facilities (eg marine electronics, refrigerators) can as a rule be used for very many different purposes and are not shown in the statistics under the specific need of the purchaser (in this case, the fishing industry). In addition, the manufacture of products for the fishing or fish-processing industry and the development and marketing of fishing and marine technology usually forms only one - not always very large - aspect of the economic activities of the firms concerned.



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Part C. Implications for fisheries policy

I. Tasks

The major changes which have occurred in the economic and the legal and institutional context have presented the fishing industry with basic problems of adjustment. Decimated fish stocks, restricted access to traditional fishing grounds and the steep rise in fuel costs have drastically reduced the earning capacity of fishermen. The traditional steps taken by fishermen to try to improve their earnings, ie changing over to more efficient fishing vessels and equipment, seem to offer less chance of success than before in view of these circumstances. So traditional fisheries policy measures, which mainly involved subsidies to modernize fishing capacity, are also largely inappropriate to the industry's basic problems. Fisheries policy was too late in recognizing that unrestricted access to the sea's fishing grounds was no longer an efficient system, given the increased worldwide demand for protein and the technological advances in fishing and fish processing. Instead, in conjunction with the deliberate national encouragement of modernization measures, this system led to the build-up of surplus capacity in the fishing industry. From the national point of view, of course, this policy may have been entirely rational; for as a result of the improved productiveness of fishing capacity, the national growth in revenue may have been far greater - proportionally - than the national loss resulting from increased overfishing. Presumably it was partly because of the inefficiency of this system that more efficient solutions were sought in the national context. The declaration of the 200-mile limit provided the necessary extension of national jurisdiction. It may be assumed that the 200-mile economic and fishing zones will be internationally recognized by the Conference on the Law of the Sea in the same way as the extension of national sovereign waters to 12 miles.

The 200-mile limit radically changed the situation as regards restrictions on access to maritime fishing grounds: new opportunities were opened up to fishermen in their national fishing zones and sovereign waters which fishermen from other nations had previously been able to

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exploit, while access to traditionally used fishing grounds in foreign fishing zones was closed. More efficient solutions to the question of reciprocal access to fishing grounds which have now become national must be sought, in the form of agreements which will have to be negotiated carefully in bilateral talks. It is difficult to estimate the extent to which such negotiations will offer the West German small-scale and inshore fishing industry additional opportunities. This will depend not only on the concessions the EEC, which is responsible for negotiations with non-member countries, makes under fishing agreements: as far as fishing in the Baltic is concerned, the decisive question is whether the Eastern bloc countries will even recognize the EEC as a negotiating partner. So there is a great deal of uncertainty about the conclusion and outcome of such fishing agreements between the EEC and non-member countries. Yet the future prospects of the West German fishing industry are crucially dependent on the outcome of international agreements, partly because of its traditionally high share of fishing in foreign waters and partly because of the special circumstances in the Baltic. The following section of this chapter considers possible solutions that take account of the various interests within the EEC.

In addition to such international negotiations, the creation of a legal framework regulating access to fish stocks is one of the major tasks of the EEC's fisheries policy. The starting-point must be to keep the cost/benefit ratio in fishing at a level at which the Community's fish stocks would be overfished if there were free access. The management of fishery resources based on fixing total allowable catches will therefore remain preferable to a system of free access to fishing grounds in the future also. And since stocks have been seriously overfished, these total catches will have to be fixed at a lower level than the optimum long-term quota.

In addition to fixing total catch quantities, the establishment of new overall conditions for the fishing industry will also entail regulation of the individual allocation of these quotas. The development of the fisheries sector largely depends on an efficient solution being found to this question of allocation. If the system of allocation is inefficient, it could lead to serious conflicts within the common fisheries

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policy and to a need for a large number of detailed fisheries policy measures, since it would seriously affect both market policy and structural policy. There is a risk that in the debate on methods of allocating catch quotas, short-term problems of adjustment and allocation will take precedence over the long-term effects; moreover, if the fisheries sector is considered in isolation, too much importance will be attached to these problems - as has been the case in other sectoral policies also - because solutions will be sought mainly within the problem sector itself and not in other areas. Such fears are confirmed by numerous examples of similar situations in agricultural policy.

That is why in the following pages the links with regional policy are also considered and an attempt is made in the various sections to discuss not only the individual policy area concerned but also the more wide-ranging effects for these areas of inefficient systems of allocation.

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## II. External fisheries regulations

### 1. Comparative evaluation of the 200-mile rule in the future law of the sea

#### National approach to fisheries management

The 200-mile rule represents a national approach to fisheries management. This rule took general effect only within the EEC, following the joint declaration of 200-mile zones and the transfer of powers to the Community.

Fishing or economic zones of 200 sea miles in width have in fact become a fairly common custom and most coastal states have now introduced such national zones. But their functional form varies very widely from one coastal state to another. A standard law on fisheries is therefore to be formulated by the current Third Conference on the Law of the Sea organized by the United Nations. Since the final text of the convention is not yet available, we shall use the Informal Composite Negotiating Text (ICNT)<sup>1</sup> as a basis for evaluating the new fisheries legislation. This negotiating text (ICNT) gives coastal states sovereign rights over the exploration, exploitation and management of living and non-living resources within the 200-mile zone<sup>2</sup>. This provision confirms, codifies and standardizes the numerous formerly individual rulings of the coastal states.

The new fisheries legislation will place almost all fishing under exclusive national jurisdiction, since approximately 90% of existing commercially exploited fish stocks are found within the 200-mile zones. The granting of jurisdiction, however, cannot by itself guarantee that fisheries management will be geared to resource management, for the 200-mile concept as embodied in the ICNT has three shortcomings: firstly, it restricts the offshore extent of jurisdiction to 200 miles, which does not prevent the continued overfishing of the few, but commercially

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1. Informal Composite Negotiating Text, in Third United Nations Conference on the Law of the Sea, Official Records, Vol VIII, UN Doc. A/CONF. 62/WP.10, New York 1978; referred to hereafter as ICNT.

2. Art. 56, ICNT

important, fish species whose migrations also take them to the high seas (eg herring, tunny). Secondly, the national parcelling-out of sovereign fishing rights does not satisfy the requirement that jurisdiction has to be granted exclusively if conflicts on fisheries policy are to be prevented from arising: most fish stocks will become cross-frontier resources under the system of national jurisdiction, which means that they will be exposed to overlapping and rival interests in fisheries policy. Thirdly, the functional terms of the jurisdiction of the coastal states are unnecessarily general. The ICNT sanctions fisheries policy measures which conflict with the economic and biological criteria for conserving resources.

The ICNT provides for a rigid national method of fisheries management. In order to control access to their fishing zones, the coastal states are to follow a two-stage procedure: first they will determine the total allowable catch (TAC)<sup>1</sup>, and then in the second stage this is allocated between domestic and foreign fishermen<sup>2</sup>. The criteria laid down for this are vague and at times contradictory. The coastal states are allowed a wide margin for the interpretation and application of management criteria. They will be able to introduce fisheries measures, without encountering any legal barriers, which conflict with a policy based on the conservation of resources.

Both the definition of the total allowable catch and its allocation between domestic and foreign fishermen are under the sole control of the coastal states. Protectionist and discriminatory practices against foreign fishermen are sanctioned. Access is given to foreign fishermen on the surplus principle, which means that foreign fishermen have access to any resources which remain only if the total allowable catch exceeds the domestic capacity<sup>3</sup>. Hence, no account is taken of comparative fishing costs - the relative efficiency of domestic

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1. Art. 61 (1), ICNT: 'The coastal state shall determine the allowable catch of the living resources in its exclusive economic zone'.

2. Art. 62, ICNT.

3. Art. 62 (2), ICNT.

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fishermen by comparison with foreign fishermen. Moreover, the two most important quantities - TAC and capacity - are fixed by the coastal state itself; and they can be defined in such a way as to ensure that there is no residual amount and that foreign fishermen are totally excluded from fishing. In addition to permitting this fisheries protectionism, the ICNT permits fiscal, quantitative and technical restrictions on foreign fishing<sup>1</sup>, which can be imposed quite arbitrarily. Discrimination against foreign fishermen on the basis of nationality is also expressly permitted<sup>2</sup>.

2. Reciprocity of fishing activities between the EEC and non-member countries and prospects of achieving a balance of interests

a. Exchange of fishing rights

i. General assessment

The Community is interested in access to other countries' fishing zones not only because traditionally a substantial part of the EEC catch comes from these areas - about one third of the total catch in the Northern Atlantic - but also because the species there are ones which cannot be caught, or at least not in such numbers, in the EEC zone. In 1974, ie before the introduction of the 200-mile limit, the catch in waters of non-member countries amounted to about 1.4 million t. It is important to note that these were mainly what are called white-fish species, which have a fairly low commercial value. In terms of quantity alone, in 1974 these catches were almost equalled by the catches by non-member countries in what later became EEC waters<sup>1</sup>. However, this quantitative balance masks qualitative differences. In the case of catches by non-member countries in what became EEC waters in 1974, it was mainly a question of seawater fish such as herring and mackerel. Although at present this comparison no longer applies because of the ban on herring fishing in the North Sea, it may be assumed that, once herring resources have increased, the fishing interests of the non-member countries will again correspond to what they were in 1974.

ii. Negotiating aim of the EEC

The Commission recommends a procedure vis-à-vis non-member countries aimed mainly at the allocation and exchange of catch quotas. The procedure vis-à-vis non-member countries is based on the fishing interests of the Member States in non-member countries, and vice versa. Accordingly, there are three approaches, depending on whether fishing interests

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1. A comparison of catches in later years is less meaningful, firstly because management measures did not help all states at the same time or in the same way, and secondly because after 1974 catches in EEC waters were greatly reduced by drastic fishing restrictions.

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are reciprocal or whether, for instance, the EEC or non-member countries have only a unilateral interest in fishing in the other's waters. In the first case, provision is made for the reciprocal exchange of fishing rights. Fishing rights granted by the EEC must take account of the system of TACs, to prevent any infringement of the measures to conserve fish stocks. Should any surplus quantities remain in the non-member countries over and above the TACs, the Commission stipulates that any EEC claim to these surpluses may not be counted against the quantities allocated to the EEC by reciprocal concessions. That would mean that the catch quantities obtained by the EEC from non-member countries by exchange should be a lower limit for EEC catches in those waters. In return, however, the Commission requires catches by non-member countries in EEC waters to be restricted where so required under the measures to protect fish stocks.

iii. Agreements

Meanwhile the Commission has concluded a number of such reciprocal agreements or prepared them for signature. The following can be listed<sup>1</sup>:

- (i) Norway (1978): provisions for the gradual reduction of EEC catches with an unchanged Norwegian catch quota in EEC waters;
- (ii) Faroes (1977): annual agreement on reciprocal catch quotas; at present, interim rulings apply;
- (iii) Sweden (1977): as (ii).

A framework agreement was also hoped for with Finland. But it has not yet proved possible to agree on reciprocal catch quotas - even on an interim basis as in the case of Sweden and the Faroes - because in EEC waters Finland is interested only in North Sea herring, and herring fishing is still forbidden.

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1. Cf also P. Hrubesch, Zur Fischereipolitik der Europäischen Gemeinschaft, Deutsches Institut für Wirtschaftsforschung, Berlin, No 4, 1979, p 404.



At first sight, the differences in fishing interests, together with the fairly similar quantities involved, would suggest an exchange of fishing rights between the Community and non-member countries. But it would probably be difficult to achieve a balance of interests on a purely quantitative basis because of the differing evaluations of fish qualities on the part of the Community on the one hand and the non-member countries on the other, with the Community considering the species caught in its zone considerably more valuable than those it caught in foreign zones<sup>1</sup>. Exchanges and negotiations on this matter are also complicated by the fact that, depending on the degree of overfishing and the necessary measures to conserve resources, the quantities that can be offered for exchange are not necessarily the same as those which would create an economic balance of interests.

The West German fishing industry is heavily dependent on the conclusion of such international agreements. Two thirds of its traditional deep-sea fishing areas were in the waters of non-member countries. The EEC waters cannot offer any substitute for the loss of many of these fishing grounds. The small-scale and inshore fishermen have been banned from access to most of their traditional fishing grounds, mainly in the Baltic. Primarily these are areas which the Eastern bloc countries have reclaimed as national fishing zones. That is why international agreements giving access to traditional fishing grounds are urgently necessary for the West German fishing industry. Nor should such agreements fail to come about because of failure to agree on the granting of reciprocal fishing possibilities.

b. Other possible forms of compensation

In view of these factors it is advisable to consider compensatory mechanisms other than quantitative exchanges. One approach could be to try to establish a financial balance with non-member countries; or a possible alternative might be to auction fishing rights and offer fishermen from non-member countries and from the Community reciprocal access to their respective auctions.

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1. Cf COM(76) 500 fin., 23 November 1976, p 5 ff.

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This system would have several advantages. Firstly, it would be consistent with that proposed for the internal regulation of fisheries which will be described in more detail in the next section. Fishermen from non-member countries, like those from the EEC countries, would indirectly pay duties which corresponded to the economic value of their fishing licence. Secondly, the question of the evaluation of the quality of different species would be regulated by the licence fees. Thirdly, such a system would not fail merely because the EEC and non-member countries could not offer equal catch quotas for biological reasons.

3. Unilateral fishing activities by the EEC in the waters of non-member countries

a. Access to surplus stocks

i. General

The EEC's fishing interests in non-member countries are meeting with increasing restrictions on access. In some cases these restrictions can be justified as biologically necessary measures to conserve resources. Yet in other cases they mainly serve to protect the domestic fishermen from foreign competition. Whenever fishing is generally restricted but the restrictions are mainly to the detriment of foreign fishing interests, it is likely that the fisheries policy in question is largely influenced by protectionist aims. The Community will not find it easy to gain access to the fishing zones of these countries, since for its own part (see below) it is proposing similar restrictions on access to its own zone for fishermen from non-member countries.

ii. Negotiating aim of the EEC; Agreements

It remains the Commission's intention to maintain the Community's access to the waters of non-member countries. Yet the Commission is aware that in view of the fisheries policy of these countries, the Community's access will largely remain restricted to surpluses (TAC minus domestic catching capacity). Accordingly, the following agreements have been reached:

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- (i) Canada (1978/79): The EEC is granted far more extensive fishing possibilities in Canadian waters than vice versa;
- (ii) USA (1977): The EEC has access to surplus stocks; the surpluses are fixed on the basis of species and geographical area; since fishing interests in the EEC and the USA are identical in many instances, the significance of this agreement is very limited.

b. Other possible means of securing access

At present the surpluses in the waters of non-member countries are not large enough to satisfy the EEC's fishing interests. On the one hand these surpluses have been considerably reduced for biological or protectionist reasons; on the other hand the Community is usually not the only applicant for such fishing rights. That is why other possible means of gaining access must be found. Coupling fishing interests with other policy areas, in particular development policy aims, seems a very promising solution.

Hitherto many developing countries have not been able to make the best possible use of the fishing grounds off their own shores. In the past they often had to watch while the main fishing was carried out by foreign fleets. Not only were domestic fishermen less competitive because of their primitive fishing techniques; in most cases these countries have also lacked the necessary capacity as regards fish processing and fish trading, which is an important precondition for making better use of their own fishing grounds. Only now, with the 200-mile rule, have these developing countries acquired rights over the waters off their own shores. They could ban or drastically restrict foreign fishing in order to improve the conditions of competition for domestic fishermen by protectionist measures. They could also sell fishing rights by introducing licences or other charges; or lastly, they could attempt, by means that include multilateral and bilateral forms of co-operation, to improve the conditions of competition for the domestic fishing industry; this would involve:

- building up a domestic fish-processing and trade network, eg cold-storage depots, seawater-fish markets, co-operatives, processing plants;

- 1/1 -

- improving the domestic fishing capacity;
- improving fishing, processing and trading methods: training of personnel;
- research projects.

Some industrialized countries, such as Japan, have realized that in the interests of their own secure fish supplies, they must take this opportunity to satisfy the demand of the developing countries for capital goods and services in the fisheries sector. Meanwhile the EEC is also making attempts to offer these goods and services and to secure fishing rights in return. Examples are the agreements with:

- (i) Senegal (1979): fishing rights for EEC fishermen with the participation of Senegalese seamen; compulsory landing in Senegal; financial support of development projects;
- (ii) Yugoslavia, Tunisia: the aim was agreements of special interest to Italy which grant fishing rights in return for financial and trade concessions.

#### 4. Unilateral fishing activities by non-member countries in EEC waters

In the long term, the EEC is attempting to secure the withdrawal of the fishing fleets of non-member countries from EEC waters in cases where the Community has no interest in the waters of those non-member countries. This withdrawal is to take place in stages and the negotiations are to be confined to appropriate transitional solutions.

This negotiating aim can be explained in part by the biologically necessary measures to protect resources. The fishing interests of the non-member countries are concentrated, as stated earlier, on seawater-fish species (such as herring and mackerel) which are intended for human consumption and which, in contrast to white-fish species, are relatively valuable commercially. That is why these resources are particularly heavily overfished. Moreover, the Community fishermen are themselves interested in catching these species. There is therefore no scope for giving wide-ranging catch concessions to non-member countries. Nor is

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there any point in critically assessing this negotiating aim at present, if only because fishing for the species in question has been severely restricted or even banned, as in the case of North Sea herring, for biological reasons. Whether, and if so to what extent, these stocks will increase again is not yet certain. Only when this is known will it be possible to evaluate the long-term fishing possibilities.

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### III. Fisheries regulations within the Community

The main reasons for the Community's endeavours to formulate informal fisheries policy measures are the economic situation of its fishermen, which is regarded as in need of improvement, and supplies to the consumer. The Commission's proposals on fisheries policy, which are in line with the results of scientific research into fish stocks and fishing grounds, start from the fact that overfishing in the past has destroyed or increasingly worsened the economic base of fishing. Short-term restrictions on catches are also necessary in order to improve the medium-term economic situation of the fishermen. The need for such measures is generally accepted. What is disputed, perhaps, is the scale of the fishing restrictions and the timetable of the fisheries policy measures; for although all concerned are anxious to achieve the expected long-term effect of fishing restrictions, namely increased future stocks and more profitable fishing, in the short and medium term these measures may worsen the economic situation still farther. Accompanying measures therefore seem advisable to compensate for these short-term effects. That is why fisheries policy must be based predominantly on long-term biological and economic considerations, but not exclusively: short and medium-term adjustment problems must also be taken into due account.

#### 1. Restrictions on the total catch

##### a. Protection of resources by fixing total allowable catches (TAC)

The basis of the Community's fisheries policy is the conservation of stocks. All other fisheries measures are directly or indirectly linked to the measures to conserve stocks. The Commission proposal provides for direct restrictions on catches by fixing the total allowable catch (TAC). As stated in Part B, this decision to restrict catches directly is consistent with the views put forward at the UN Conference on the Law of the Sea and the fisheries policy practice of many other countries. So it complies with international law.

Direct restrictions on catches may well be a very appropriate instrument

to conserve stocks<sup>1</sup>. However, one argument against direct fishing controls through the fixing of TACs is that this instrument can serve its purpose only if the TACs are based on reliable scientific data. The nature of the information needed must not be underestimated; moreover, with administrative control over catches, it is possible that the authorities will take only scientific criteria into consideration, and not political criteria. The Commission's proposals are therefore based on the recommendations of the International Council for the Exploration of the Sea (ICES); these reflect scientific criteria but, given the composition of the council, are not entirely free of political influences either. The usefulness of direct quantitative control of fishing depends predominantly on the quality of the bio-economic data. The probability of incorrect information being included, as a result of either political influences or inadequate scientific research, must not be set too low.

b. Scale of restrictions on fishing: Degree of overfishing

The scale of restrictions on fishing is to be based primarily on the degree of overfishing. For simplicity's sake, stocks are classified into four categories<sup>2</sup>:

1. Stocks which have been so seriously overfished that they can no longer be regarded as commercially viable;
2. Stocks which are in danger of becoming commercially unprofitable as a result of overfishing;

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1. Theoretically, however, it is not the only instrument available. Catches can also be restricted by auctioning licences without fixing the total catch in advance. (It would be inconceivable, for example, to have fishing rights that are limited as regards duration and geographical area without limiting the quantity caught.) However, this kind of fishing restriction is unlikely to be used as much on a worldwide basis as the method of fixing the total allowable catch proposed by the EEC.

2. Cf Aims of the common fisheries policy in terms of the conservation and management of stocks, in: COM (79) 687, 21 November 1979.

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3. Stocks which are still commercially profitable in spite of over-fishing;
4. Stocks which have not been overfished but which, in terms of the total catch, are of only minor commercial interest.

The scale of overfishing becomes clear when one considers that:

- i. the long-term annual yield from the five stocks for which fishing bans were proposed (category 1) exceeds 1 million;
- ii. long-term annual yields from the other eleven stocks which are classed as overfished (categories 2 and 3) may exceed 1.2 million t<sup>1</sup>;
- iii. on the other hand, the long-term annual yield from the ten actually overfished stocks amounts to a total of only 165 000 t.

As might be expected, the heavily fished stocks have a characteristic age structure, in that they consist almost entirely of young fish. The size of the stocks and therefore also of the catches thus depends far more on spawning and the birth rate in particular years than on the existence of several - good and bad - years. Given the wide scatter of annual rates of reproduction, fishing has a profitability rate that fluctuates greatly from year to year. In the case of normally fished stocks, the catches are much more likely to remain stable, because fishes from different age groups would be caught and annual reproduction rates that departed from the average could not influence the size of the catch so much. A constant catch level would allow fishermen to expand their investment and planning horizons; annually fluctuating catch expectations, on the other hand, force fishermen to opt for short-term investments and avoid new projects or replacement investment because they seem profitable only in the long term.

c. Criterion of quantitative restrictions: Maximum sustainable yield

The primary aim of the measures to conserve resources under consideration

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1. Total catches of 910 000 t are estimated for these stocks in 1980; this represents about 75% of the maximum sustainable yield.



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by the Commission is, therefore, to organize fishing in such a way as to ensure that fishing intensity conforms to the maximum sustainable yield. This clearly means that the allowable catch of overfished species is either set at zero or at least drastically reduced by comparison with the existing total catch. The proposed total allowable catches shown in Table 45 reflect this very clearly. The table is based on the 1976 TACs and compares the proposals for the TACs and the Community's share of catches in 1978 and 1980.

The advantage of aiming at fishing stocks at the level of their maximum sustainable yield is not only that it will lead to larger catches in the long term. Another important advantage is that the level of catches is stabilized, which substantially reduces the economic risk to the fishermen. With the current sharp fluctuations in stocks, the high degree of uncertainty is probably a strong motive for refraining from acquiring major new equipment and making replacement investments, since the fishermen have no way of knowing how long the amortization will take. Once catches have stabilized, the fishermen will be able to calculate on the basis of more stable stock dimensions than before and adapt the structure of their fleets to these long-term expectations.

Three criticisms can be made of the common fisheries' criterion of fishing stocks at the level of the maximum sustainable yield. Firstly, the maximum sustainable yield (MSY) is a purely biological criterion. It does not take account of fishing costs or of the social discount rate. If fishing costs were taken into account, the management aims would have to be modified and the optimum catch level would be lower than the MSY: with rising marginal costs in the fishing industry, it will not be worthwhile to fish the stocks at the full level of the MSY. If the social discount rate were taken into account, then the optimum fishing level might seem higher than the MSY<sup>1</sup>. The second criticism that can be directed against choosing the MSY as a management aim is the analytical bias of this criterion: it relates to a single resource and takes no

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1. This is a special case that can occur if the social discount rate substantially exceeds the natural growth rate. In practice this applies only to a few marine life forms, perhaps including whales.

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account of the interrelations between individual resources within an ecosystem. These interrelations, it is sometimes argued, can be so strong that to base management on the MSY could have serious adverse effects. The third criticism is again based on uncertainties; it cannot be assumed that the scientific data are reliable enough for the MSY to be estimated reliably. And the population dynamics of individual resources are so sensitive that catches only slightly above the MSY can have serious adverse effects. That is why it is often proposed that the allowable catch should be set lower than the MSY.

These criticisms, both economic and biological, are based on established theory and are generally recognized<sup>1</sup>. In practice, however, they cannot be taken fully into account because of the lack of reliable scientific data. For instance, very little research has yet been done on the interactions between individual stocks with a view to replacing the MSY by a more comprehensive criterion. So, for practical reasons, the MSY is often regarded as a suitable criterion. Because of the risks involved, however, and in order to take account of the relation between catch sizes and fishing costs, the TACs need to be set lower than the estimated MSY level.

No details are available at present on the effectiveness of the system of total allowable catches proposed by the Commission. So it is not possible to tell whether the proposed fishing restrictions are sufficiently stringent to ensure the recovery of overfished stocks. A comparison of the TACs of various years (eg 1980 and 1978, see Table 45) yields no information on this. For instance, the overall Community shares of the 1980 TACs are no lower than in 1978, even though the catches of individual fish species were severely reduced. The restrictions on fishing for codling (Baltic), sea salmon, mackerel and herring are particularly severe. In any case, for these species it is impossible to say how long drastic fishing restrictions will be necessary in order to achieve the aims in view (MSY). Only if this information were available would it be possible to investigate the economic sacrifices to be made by fishermen during this transitional phase.

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1. Cf COM (79) 687, 21 November 1979, p 4, item 10

Table 45. Total catches, TACs and Community shares in 1976, 1978 and 1980 for species and fishing areas in the North Sea and the Baltic

Species	Fishing area	(1) TAC or total catch 1976	(2) TAC 1978	(3) Community share 1978	(4) (3) as % of (2) or (1)	(5) TAC 1980	(6) Community share 1980	(7) (6) as % of (5)	(8) (6) / (3)	(9) (5) as % of (2) or (1)	(10) (7) / (-)
Cod/Codling	IIIa	37 980	-	32 200	84.8	33 400	23 400	70.1	0.73	-	0.83
"	IIIb,c,d	219 330	444 000	65 395	14.7	83 200	80 200	96.4	1.23	18.7	6.50
"	IV	236 000	236 000	204 944	86.8	200 000	179 200	89.6	0.87	84.7	1.03
Haddock	IIIa	9 094	-	8 500	93.4	6 600	4 500	68.2	0.53	72.6	0.73
"	IV	206 250	109 000	89 610	82.2	69 000	63 500	92.0	0.71	63.3	1.12
Saithe	IIIa, IV	290 586	230 000	130 000	56.5	129 000	67 000	51.9	0.52	56.1	0.92
Whiting	IIIa	18 595	-	21 700	116.7	22 000	20 000	90.9	0.92	118.3	0.75
"	IIIb,c,d	3 698	-	3 848	104.1	3 850	3 850	100.0	1.00	104.1	0.96
"	IV	189 000	168 000	145 400	86.5	105 000	98 450	93.8	0.68	62.5	1.05
Flaice	IIIa	24 390	-	24 673	101.2	24 800	23 000	92.7	0.93	101.7	0.92
"	IIIb,c,d	3 537	-	3 537	100.0	4 150	4 150	100.0	1.17	117.3	1.00
"	IV	99 900	95 000	92 920	97.8	116 000	115 180	99.3	1.24	122.1	1.02
Sole	IIIa	606	-	447	73.8	800	800	100.0	1.79	132.0	1.36
"	IV	12 500	10 000	10 000	100.0	15 000	15 000	100.0	1.50	150.0	1.00
Mackerel	IIIa, North IV	311 176	192 000	29 000	1.5	55 500	6 350	11.4	0.22	28.9	7.60
Sprat	IIIa	92 657	87 500	50 000	57.1	70 000	49 000	70.0	0.98	80.0	1.23
"	IIIb,c,d	188 411	184 000	13 500	7.3	4 900	4 900	100.0	0.36	2.7	13.70
"	IV	650 000	450 000	330 000	73.3	400 000	311 000	77.7	0.94	88.9	1.06
Horse mackerel	IV, VI, VII, VIII	272 570	250 000	230 000	92.0	250 000	228 500	91.4	0.99	100.0	0.99
Hake	IIIa	1 006	-	1 006	100.0	1 365	1 365	100.0	1.36	135.7	1.00
"	IV, VI, VII, VIII	68,024	37 250	24 810	66.6	30 000	20 235	67.4	0.82	80.5	1.01

Table 45 (continued)

Species	Fishing area	(1) TAC or total catch 1976	(2) TAC 1978	(3) Community share 1978	(4) (3) as % of (2) or (1)	(5) TAC 1980	(6) Community share 1980	(7) (6) as % of (5)	(8) (6) / (3)	(9) (5) as % of (2) or (1)	(10) (7) / (4)
Norway pout	IIIIa, IV	540 144	299 500	312 144	104.2	540 000	500 000	92.6	1.60	180.3	0.89
Blue whiting	IV, VI, VII, XIV	not known	580 000	(500 000)	(86.2)	580 000	431 000	74.3	0.85	100.0	0.86
Sandeel	IIIIa, IV	421 418	400 000	521 418	130.4	571 000	526 000	92.3	1.01	142.7	0.71
Herring	IIIIa Skagerak	14 010	14 500	6 000	41.3	11 900	3 700	31.1	0.52	82.1	0.75
"	IIIIa Kattegat	73 115	50 000	28 000	56.0	29 500	14 750	50.0	0.53	59.0	0.89
"	IIIIb,c,d	372 442	173 800	38 300	22.0	32 000	31 000	96.9	0.81	18.4	4.40
"	IV, VII d	160 000	0	0	0	0	0	0	-	0	0
Salmon	IIIIb,c,d	-	-	1 473	-	1 253	1 233	93.4	0.84	-	-
Total				2 901 825		3 300 213	2 827 263		0.97		

Sources: COM (78) 282 final, Brussels, 15 June 1978;  
COM (80) 25 final, Brussels, 24 January 1980

2. Allocation of the quantities caught

a. Distribution aspects: national quotas

The allocation of catch quotas is designed to ensure the fair distribution of the total catch and thus to compensate for the difficulties, which vary in severity from state to state, resulting from changes in the law of the sea and fishing restrictions. So it is not primarily a question of biological objectives but rather of aspects of distribution. The first criterion for the national allocation of catch quotas is the traditional fishing activity of a country as reflected by average catches (eg from 1973 to 1978). The total allowable catch is divided between the fishermen of the Member States in proportion to their historical catches, as though in a sense they possessed historical titles which, while not giving them any claim to the historical catch quantities, do ensure them a certain quota of the total allowable catch. This first criterion for quota allocation is modified by two others: firstly, the fishermen of regions which are especially dependent on fishing are to have priority over the others; secondly, the loss of fishing opportunities off non-member countries is to be taken into account when the shares of the total EEC catch are fixed. The quotas for German fishermen in the North Sea and the Baltic are shown in Table 46, which compares German quotas in 1980 with those in 1978 and shows the respective German shares of the total quantity that may be caught by the Community. The German share of Baltic fishing for codling, herring and sprat accounts for more than 25% of the total Community catch; in North Sea fishing, however, the German share is usually less than 10%.

In order to establish to what extent the allocation of quotas can lead to regional difficulties, Table 46 shows the 1978 and 1980 quotas separately for the three fishing areas of Skagerak and Kattegat (IIIa), the Baltic (IIIb,c,d) and the North Sea (IV). For each of these regions the German quota in 1980 is compared to that in 1978 (see column 13). A comparison of the intermediate totals shows that the German quota share in the Baltic (IIIb,c,d) is declining the least; on average the Baltic quotas for 1980 are 83% of those in 1978. The quota share in

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the North Sea, which has fallen by 45% (0.55) corresponds on the whole to the average total (0.54) for all three regions. There is a sharp fall in the case of saithe (IIIa, IV), which has also reduced the regional average for Skagerak and Kattegat to a comparatively low level (0.32). In the Baltic (IIIb,c,d) the declining herring quotas reduce the regional average in this region because of their relatively high share. The sprat quotas in the Baltic fell even more than herring quotas, but because of their lower share they affect the regional average far less. Against this, the codling quotas rose slightly (17%), so that the regional quota average in the Baltic for 1980 is only 17% lower than that in 1978. In the North Sea, the fall in sprat quotas (0.28) is largely responsible for seriously reducing the regional average there. The regional comparisons which emerge from this table again show the dominant importance of a few species: saithe, cod (codling), herring, sprat, plaice, haddock and whiting. It must be remembered here that even 1976, the year used by the EEC for purposes of comparison, was already very unsatisfactory for West Germany in terms of the utilization of capacity. In 1976 landings by West German fishermen represented little more than 70% of those in 1970 or in 1960<sup>1</sup>.

b. Other systems of allocation: the auctioning of fishing licences to individual enterprises

It is easiest to assess the EEC quota regulations by referring to the discussion in Part B. The main question here is whether the allocation of fishing quotas can achieve the long-term management aim of an efficient fisheries sector. This is doubtful, even assuming that:

- i. the level of the TACs allows for effective conservation of stocks, and
- ii. quotas are adhered to.

For if national quotas alone are allocated, the question of the allocation of these quotas at individual enterprise level between fishermen

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1. Cf Table 7.

and individual boats is left open. In this case there is a great danger that each individual fisherman will try to secure the highest possible share of his country's national quota. Investment will probably be concentrated on the types of fishing vessels and fishing equipment which are designed solely to maximize catches. The quotas would then be filled at breakneck speed, and as soon as they were exhausted the boats would lie idle in the port and the fishermen themselves would have no work. This system would prevent any adjustment to lower-cost fishing methods.

From this point of view, the auctioning of catch quotas to individual enterprises seems a more rational solution. If quotas were auctioned to individual enterprises, the payment of charges corresponding to the scarcity rent would force fishermen to choose their factors of production in such a way as to minimize costs. That would mean refraining from investing in excessively large boats if the capacity could not be used economically. Table 47 gives a schematic comparison between the auctioning system and the allocation of national quotas. Simply allocating national quotas is less likely to achieve any of the desired management aims than the auctioning of fishing licences. Moreover, these fishing licences can be accompanied by additional rules on fishing methods, seasons and areas and would therefore fit well into the range of fisheries policy instruments (see following section). The scheme would probably also reduce the risk of individual fishermen infringing technical or other rules, since in such cases the controlling bodies could threaten to withdraw their licences.

### 3. Regulations on methods of fishing

In addition to total allowable catches, the Commission recommends a number of technical measures, including<sup>1</sup>:

- i. increasing mesh sizes,
- ii. restricting by-catches,
- iii. minimum fish sizes,

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1. Cf COM(80) 385 final, Brussels, 4 July 1980.

Table 46. Catch quotas of the Federal Republic of Germany and comparison with total Community catches in 1978 and 1980

Fishing area	Species	(11) German quota 1978	(12) German quota 1980	(13) (12)/(11)	(14) (11) as % of (3)*	(15) (12) as % of (6)**
1) Skagerak & Kattegat IIIa	Cod	200	200	1.00	0.6	0.6
	Haddock	1 000	530	0.53	11.8	11.8
	Saithe IIIa, IV	56 315	17 608	0.31	43.3	26.3
	Whiting	-	-	-	-	-
	Plaice	50	50	1.00	0.2	0.2
	Sole	20	40	2.00	4.5	5.0
	Mackerel IIIa, IV	375	-	0	1.3	-
	Sprat	100	100	1.00	0.2	0.2
	Hake	-	-	-	-	-
	Norway pout IIIa, IV	-	-	-	-	-
	Sandeel IIIa, IV	-	-	-	-	-
	Herring Skagerak " Kattegat	- 100	- 50	- 0.50	- 0.4	- 0.3
	IIIa total	58 160	18 578	0.32		
	2) Baltic IIIb, c, d	Cod	18 515	21 680	1.17	28.3
Whiting		150	50	0.33	3.9	1.3
Plaice		309	320	1.04	8.7	0.8
Sprat		3 320	1 300	0.39	24.6	26.5
Herring		19 247	11 200	0.58	50.3	36.1
Salmon		107	-	0	7.3	-
IIIb,c,d total	41 648	34 550	0.83			
3) North Sea IV	Cod	29 539	20 875	0.71	14.4	11.6
	Haddock	2 858	1 648	0.58	3.2	2.6
	Whiting	2 696	1 030	0.38	1.9	1.0
	Plaice	5 060	5 266	1.04	5.4	4.6
	Sole	320	240	0.75	3.2	1.6
	Sprat	24 625	6 960	0.28	7.5	2.2
	Horse mackerel IV,VI,VII, VIII	-	-	-	-	-
	Hake IV,VI,VII, VIII	81	140	1.73	0.3	0.7
	Blue whiting IV,VI,VII, XIV	-	-	-	-	-
	Herring, IV, VII d	-	-	-	-	-
	IV total	65 179	36 159	0.55		
All regions	164 981	89 281	0.54			

\* (3) Community share of TAC in 1978, cf Table 45, column (3).

\*\* (6) Community share of TAC in 1980, cf Table 45, column (6).

Sources: cf Table 45 and COM(80) 452 final, Brussels, 16 July 1980.



Table 47. Allocation of fishing rights via national quotas compared with the auctioning of fishing licences

Instrument Aim	National quotas	Auctioning of fishing licences
Conservation of stocks	yes, if the total quantity covered by fishing licences is in harmony with bio-economic criteria (TAC)	
Efficient use of production methods	no; "breakneck speed"	yes
Investment	large, fast boats; surplus capacities	cost-reducing boats and fishing equipment
Utilization of factors of production through the fishing season	fluctuating; major fishing activity at beginning of season	continuous
Total costs	higher	lower

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- iv. restrictions on times and geographical areas for fishing,
- v. restrictions on fishing equipment.

These technical regulations are all very detailed. The restriction on total catches is further qualified by these specific regulations, especially as regards permissible fishing areas and times. The technical restrictions on fishing equipment and the rules on mesh sizes and fish sizes are mainly subsidiary measures to conserve stocks. Lastly, the restrictions on by-catches can be regarded as an instrument to take account of the interrelations between individual resources.

Regulations on methods of fishing are nothing new for the fishermen and the introduction of these should not pose any new problems for them; similar rules are also embodied in the regional fisheries regulations which every federal Land can enforce. The fishermen might be faced with new problems only if, for instance, the EEC rules were more restrictive than the provisions of the regional fisheries regulations. This is not the case for Schleswig-Holstein; where the Land regional regulations diverge from EEC regulations in terms of restrictiveness, the more restrictive provisions are of course applicable.

Although the aims of the individual technical measures seem reasonable, it is doubtful whether these regulations can be formulated in sufficient detail to take account of the difference in conditions from one fishing area to another. Since fishing conditions in the various fishing areas can differ even when the same species are fished, it might under certain circumstances be necessary to differentiate fishing methods not only by species but also by fishing areas. It is doubtful, however, whether it would be possible to translate so complex a system into practice. In particular, it would not be easy to monitor the measures, since this monitoring would have to be carried out mainly at sea.

#### 4. Monitoring and control

Monitoring and control measures have a central part to play in the Community's fisheries policy, given the wide range of instruments of

fisheries policy<sup>1</sup>. They can also serve an important statistical function. The Commission regards the compulsory keeping of a log-book as an important instrument of control. In this it is relying on control by the fishermen themselves. This is supplemented by landing declarations, which are probably also easier to check in practice. In view of the detailed nature of the measures to conserve stocks proposed by the Commission it is, however, doubtful whether log-books and landing declarations are adequate means of ensuring observance of the great variety of regulations.

## 5. Policy on market organization

### i. Price policy as an incomes policy?

The problems of adjustment in the EEC fisheries sector have also led to attempts to make more use of the organization of the market as a means of achieving incomes policy aims for the fishermen, by isolating the EEC increasingly from the world market. Unlike the case of most market regulations for agricultural products, the market regulation for fish is a comparatively liberal form of protection against the outside. As a rule, imports from non-member countries are subject only to a fixed duty. Only if the import price for fisheries products from the Community is lower than the fixed reference price can additional import restrictions and compensatory charges be introduced to stabilize the EEC market. If the organization of the market were geared more closely to incomes policy, then the EEC price level would have to be isolated from the world market price on a permanent basis and not just temporarily, in order to prevent the serious price fluctuations which occur in nearly all the forms of market organization for agricultural products. If protection were extended in this way, it would place an additional burden on EEC consumers in the form of higher prices for fisheries products, and the fish-processing industry would become less competitive because of rising raw-material prices, unless these additional costs were covered by corresponding customs protection for finished goods. Such a step would

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1. Cf COM(80) 465 final, Brussels, 17 July 1980.

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create a number of problems in the fisheries sector, as it is known to have done in the common agricultural policy: trade policy conflicts with non-member countries, redirection of trade flows even within the Community in order to regulate the market, distortions of competition as a result of differing effective levels of protection, an increasing burden on the EEC budget and, in particular, a misdirected allocation of resources because of distorted relative prices. From an overall economic point of view, it seems far more advantageous to pursue specific sectoral incomes policy aims through direct transfers of incomes than through a corresponding price policy, because in market economies prices have not only a market-balancing function (and thus also an incomes function) but also an allocation function. Moreover, the experience of the common agricultural policy has shown that even in the short term it is not possible to satisfy nationally divergent income demands by means of a common price policy.

ii. Continuity of market supplies

Several problems have arisen in the implementation of the current market regulations for fish, which are also typical of other forms of market regulation. They relate, firstly, to the continuity of market supplies and, secondly, to the quality of the goods landed. The introduction of a fixed sales guarantee at a set price reduces the individual fisherman's interest in striving for landings consistent with market requirements, because it reduces the risk of price decreases when landings are concentrated in a short span of time. This risk reduction has major effects in the context of the fixing of national catch quotas. As long as the quotas are not filled, the individual fisherman can make full use of his fishing capacity without having to fear a price drop if the market is oversupplied. This means that quotas are fished up even faster than would be the case without a sales guarantee. But even without national quotas, the current sales guarantee system has destabilizing effects on market supplies. A constant guaranteed price throughout the entire landing season in a market with very marked seasonal fluctuations means that the sales guarantee becomes most effective during the periods of favourable fishing conditions.

iii. Quality problems and inferior utilization

The second basic problem of market regulations concerns quality. The offer of a sales guarantee is an incentive to lower the quality level, because products which cannot be sold on the market (or only at lower prices) can be sold into intervention. That is why an intervention system requires the fixing of quality standards for intervention. But these standards are not stringent enough in the fisheries regulations. For instance, the fish-processing industry in the Federal Republic has complained of a large landing of cod in which the fish were too small to be filleted profitably, so that they were sold into intervention.

As a result of the intervention measures, a substantial amount of fish is still used for inferior purposes. Fish for human consumption is subsidized so highly by national budgets that it becomes profitable to use it as industrial fish, a trend which is further encouraged by the nature of the regulations for the EEC fisheries sector. An efficient system for the allocation of catches therefore seems a basic precondition for improving EEC market supplies also. Other measures to improve the system of regulating the market would be to introduce more stringent quality standards for intervention, to improve marketing conditions for intervention goods and to graduate repurchase prices on a seasonal basis.

#### IV. Implications for structural policy

##### 1. Fundamental considerations regarding organization

The search for a new form of organization for fisheries should not be limited to questions of access to fish resources. Basically the form of organization outlined above, ie the auctioning of fishing licences to fishermen, would allow an efficient management of fish resources. The price of the fishing licences would be a mechanism ensuring that the widely differing preferences of fishermen and fishing enterprises would be co-ordinated in such a way that optimum use is made of the factors of production. The advantage of this arrangement consists mainly in the fact that nobody has to be compelled against his wishes to discontinue fishing totally or in part. It is not, of course, permissible to take advantage of fishing possibilities free of charge. The price of fishing licences reflects mainly the capability of individual fishermen, but also to some extent the willingness to forgo income because of marked preferences for fishing or because of a lack of alternative employment opportunities. In contrast to the allocation of catch quotas by administrative decision, whether nationally or on an individual-enterprise basis, the price mechanism can balance out competing interests without these varying interests having to be assessed and weighed against one another by the authorities - when it is not even known whether such interests are really clearly defined and not certain whether in the decision-making process on fisheries policy they are in fact weighed against other interests of concern to society as a whole which are less well represented in this decision-making process. The objection may be raised against the auction scheme that only the economically strong will have a chance, but from the point of view of allocation this is precisely the advantage of the system, because the ones selected are the ones who fish the most efficiently. It should not be forgotten, however, that revenue is available from the sale of licences for use in the corrective adjustment of conflicts of aims. Justice can be pursued more efficiently by direct transfers of income than by intervention in the production process. Part of the licence fees could be used for such transfers of income. The beneficiary fishermen could then hold their own better in the licence auctions

against fishermen who are in a strong competitive position but do not receive such aid. But they could also use the transfers of income to open up alternative earning opportunities for themselves.

This form of organization of fisheries policy would not call for any other fisheries measures in the sphere of structural policy. The use of the factors of production in the fisheries sector would be controlled through the mechanism of the price of the fishing licences. Excess catching capacity would drive up the price of fishing licences in the same way as a sharp rise in the efficiency of fishing equipment. Such price rises would result in less incentive to build up new capacity and greater pressure to reduce capacity. Conversely, a small capacity would depress the price of fishing licences and thus increase the incentive to build up capacity.

A variety of objections may be raised to this mechanism of controlling capacity by incentive and pressure, but in its operation - as costly experience in other sectors shows - in the long term it cannot be effectively replaced by anything else. This is particularly true of sectors in which an economically justified increase in production capacity is subject to narrow limits because of specific demand conditions (saturation limits) or exhaustible natural resources. In such sectors, although the use of new technical methods produces a (temporary) improvement in the income of the individual who introduces such innovations, for the sector as a whole the outcome is a need to reduce capacity if the factors employed here are all to find adequate income opportunities and the natural resources are not to be overstrained. There are however a great many objections to such redundancies. They call for a high level of adaptability from the individuals who have been active in the sector. Familiar activities and a familiar social environment have to be abandoned; future earning opportunities cannot be gauged precisely. The individual who has to decide will weigh the advantages and disadvantages of such a step against each other, and if he attaches greater importance to the advantages he will decide to make the change. In the individual case the pressure to remain in the current activity and the attraction of alternative employment may differ considerably. The anonymous market mechanism, however, brings about an adjustment

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which - seen in the longer term - is in the interests of the economy as a whole. To expect such an adjustment from an active structural policy rather than the anonymous market mechanism is probably asking too much of the political decision-making machinery. Acute awareness of the problems brought about by a drift away from one sector of the economy makes it difficult in the political decision-making process to implement measures that curtail capacity. In structural policy, on the other hand, it is easier to carry out measures which promise an improvement in the economic situation of the individual enterprise through increased productivity. But most measures of this kind raise capacity considerably and thus from the point of view of the economy as a whole increase the need for reductions in capacity. An active structural policy therefore runs the risk of aggravating the structural problems rather than alleviating them.

Political-economic objections to measures for renewing capacity in sectors whose importance for the economy as a whole is in decline can be justified by numerous unfortunate experiences in the sphere of agricultural structural policy. Structural policy measures aimed at improving the economic situation of the individual enterprise predominate both at national level and at Community level. As a rule, however, these measures tend to a considerable extent to increase capacity and thus aggravate the familiar problems of surpluses which confront the European Economic Community with pressing financing problems.

This danger seems to be inherent in a sectoral structural policy. The value to the economy as a whole of a reduction in capacity, which in the medium term must be of fundamental interest to the sector itself, is not adequately represented in the political decision-making process in which sectoral structural policy measures are prepared, decided and implemented.

The basic scepticism about sectoral structural policy, especially when it has to be anchored in such complex decision-making processes as those within the framework of the European Communities, must not mean that all structural policy activity is axiomatically regarded in an unfavourable light. A change in production structures does not always take place as



a continuous process which, although involving some individual hardship, is fairly smooth overall. Problems of adjustment often arise abruptly and in batches. The resultant burdens of adjustment for the sectors in question may then be considered so severe that economic action seems necessary. There may also be the danger of over-reaction because of severe pressure. However, if it is decided to implement structural policy measures, an attempt should be made to take precautions which will either avoid or curb the unfavourable effects described above. The road towards a more efficient use of the factors of production, from the point of view of the economy as a whole, should be smoothed not blocked. Close attention should be paid to this in choosing the criteria for assistance. Any measure conceived as a grant to assist adjustment implicitly carries the risk that it will become a maintenance subsidy. There should therefore be strict time limits on assistance measures. The individual responsibility of those active in the sector who have to decide on the use of the forces of production should not be diminished, but reinforced. A policy which attempts to assess the advantageousness of using the factors of production at the micro-economic level, and to intervene in the individual-enterprise investment decision on that basis, gives the appearance of thereby assuming part of the investment risk. It will therefore also be open to demands for compensation if the investment is unsuccessful because of changes for which the individual is not responsible. If the policy were to meet such demands, however, it would soon become incapable of taking any action. These basic considerations regarding policy on organization should be kept in mind when assessing measures to assist adjustment in the fisheries sector.

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## 2. Restructuring of the fisheries sector

As at national level, the EEC too now wishes to take structural policy measures to help the fishing industry adjust to the change in circumstances. The envisaged measures largely coincide in scope with the work done in 1978 at national level in the Federal Republic in putting into effect the instruments proposed but not adopted at that time by the EEC. There are subsidies from the EEC budget to promote new fishing areas and species, co-operation agreements with non-member countries (joint ventures) are to be supported, restructuring assistance is to be granted for the fisheries sector, and the promotion and co-ordination of fisheries research are planned. In assessing these measures from the viewpoint of the problems facing the West German fisheries, it seems particularly important to establish whether these measures are to take the place of the existing national programmes, or whether the national programmes will be maintained alongside the EEC programme although modified by the arrangements adopted jointly. If national measures cannot be continued, there is reason to fear that assistance in future will be less directly geared to the specific needs of the West German fishing industry, because the common arrangements are directed towards the fisheries problems in the Community as a whole and not so much towards specific national problems and interests. The Commission has also drawn up guidelines for national aid measures in the fisheries sector. These Community proposals are based on Regulation 101/76. As this regulation is mainly concerned with the work of co-ordination in the field of fisheries policy, it will be necessary to discuss not only how far the proposed measures help in solving the fishing industry's problems of adjustment - especially the problems of the small-scale and inshore fisheries - but also the question of whether their implementation at Community level will bring any advantages as compared with national action.

### a. Expansion of fishing possibilities

As already stated earlier, the effects expected from the discovery of new fishing grounds and from joint ventures with non-member countries will benefit mainly deep-sea fishing rather than small-scale and inshore fishing. In the case of the former, these measures can help as transitional arrangements in overcoming the burdens of structural adjustment.

i. Redirection of fishing

Enlargement of the resource base, either by the opening up of hitherto unknown fishing grounds or by the introduction of new species, can bring about a lasting improvement in the earning capacity of the fishing industry, and clear externalities justify assisting such activities from the public purse. The discovery of new fishing grounds does not carry with it the acquisition of exclusive fishing rights, and the introduction of new species to the consumer is not protected by exclusive fishing and selling rights. Of course, there is also a risk that these measures will promote not only the discovery of new fishing grounds but also the fishing of known fishing grounds which previously were not profitable, and that they will support not only the introduction of new species into the market but also the marketing of known species for which marketing prospects were limited with the traditional cost/proceeds ratio. Aid from the public purse shifts this ratio, making it profitable to fish a number of fishing grounds and species which were previously not profitable. However, as these activities can be helped over the profitability threshold only by government subsidies, there is a risk that permanent government subsidies to maintain these activities will be requested and granted. The question also has to be asked of how effectively exploration projects are carried out by the private fishing industry and how it can be ensured that the information gathered can be made generally accessible and usable. These objections to such measures weigh less heavily if the time-limit on such action is made clear from the start. This would reduce the danger of a commitment to projects which in the long term are unprofitable without government subsidies; in addition, effective management should mean that in the medium term the fish stocks in EEC waters will have recovered, and for that reason also the value of using fishery resources to a lesser extent over a defined period can be seen.

How far the measures proposed by the Commission to assist the experimental fisheries campaign can bring relief to the German fishing industry depends quite decisively on what species of fish these measures are to cover and whether the national redirection measures can be continued. The list of species promoted has not yet been finalized. It is, however,

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expected that fewer species will be promoted by the Community than by the existing Federal Government programme. It is therefore feared that the possibilities of assistance for West German fisheries will be more restrictive if the national programme is replaced by the Community programme. This would particularly affect West German deep-sea fishing. The measures bring little relief anyway for the West German small-scale and inshore fisheries. By fixing a minimum length of 33 m for fishing vessels which can benefit from such assistance, the EEC programme actually excludes the West German small-scale and inshore fisheries. Should the adoption of this EEC measure lead to the discontinuation after 1980 of the national redirection measures, which do include assistance for small-scale and inshore fisheries, such fisheries in the Federal Republic would be worse off than without this EEC action.

ii. Joint ventures

Against the background of an expected recovery in EEC fish stocks, the promotion of a temporary transfer of catching capacities within the framework of joint ventures also seems an efficient method of overcoming the transitional problems. It should not be forgotten, however, that in the long term a substantial reduction in catching capacity is needed if the EEC fish stocks are to be fished efficiently. If this reduction is not allowed, particularly for social and regional policy considerations, there is a risk that the promotion of joint ventures, like the promotion of new species and the fishing of new fishing grounds, will become a form of permanent subsidy, because only in this way can areas of activity - however inefficient - be created for the catching capacity.

As regards the question of the level of responsibility, clear externalities justify financial participation by the EEC in these measures. The relieving effects of these measures apply to EEC waters as a whole, not just individual countries, and therefore benefit all the Member States. These clear externalities also show, however, how important it is for the EEC to create efficient framework conditions for the distribution of the total catch. Where quotas are allocated on the basis

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of catches in preceding periods, as is now done when fishing national quotas, a country runs the risk of losing entitlement to catch quotas in EEC waters as a result of successfully applying measures to transfer fishing activities to fish stocks outside the EEC management area. The same would apply to the allocation of catch quotas to individual enterprises on the basis of catches made in preceding periods. Fishermen who, for example, switch their fishing activities to non-member countries within the framework of joint ventures would run the risk of losing their entitlement to catches in EEC waters.

As regards the Commission's actual proposal, the question arises of how far the fixing of a minimum limit of 40% for the share of Community citizens in the capital of the joint venture will be taken up by the potential partners. The limited experience gained so far in negotiations on the founding of such joint fisheries ventures indicates that such a high minimum shareholding could lead to problems.

b. Measures for restructuring the fishing industry

In view of the marked differences in productivity and operating results of individual fishing enterprises, it must be assumed that there is still a considerable potential for increases in productivity at individual-enterprise level in the fisheries sector. For a policy that is aimed at raising the living standards of the individuals working in fisheries, measures to mobilize this potential appear to be strongly indicated. From the general economic viewpoint, however, there is a whole series of problems which make it doubtful whether a policy to promote the restructuring, modernization and development of the fishing industry based on calculations relating to the individual enterprise can be considered as efficient.

i. General problems in promoting the fishing industry on an individual-enterprise basis

-- Effects on capacity

It has to be realized first of all that restructuring and modernization usually involve considerable increases in capacity. In view of the

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excess capacity which already exists, however, such increases raise serious problems. From the general economic viewpoint, the more the structural measures increase capacity, the greater efforts are needed to limit it. Because of the existing excess capacity, the value of promoting further expansion appears very dubious from this point of view. In order to take at least some account of these objections, under the Commission proposals investment projects in the fishing industry are to be promoted only selectively. Only boats between 12 m (in exceptional cases 6 m) and 33 m in length are to be given assistance. In the case of boats more than 33 m long, the introduction of any new capacity has to be accompanied at the same time by a reduction of at least the same amount. In the case of large cutters the idea is to avoid promoting a further expansion of capacity, and in the case of the other boats at least some attempt is to be made to limit assistance to those cases which, from the point of view of the individual enterprise, are expected to make a contribution towards increasing productivity. Before entering into the details of these EEC proposals from the standpoint of West German fisheries policy, the fundamental considerations involved in promoting investment in individual fishing enterprises will first be examined somewhat more closely.

-- Influence on expectations of profitability

As already stated, from the general economic viewpoint there are serious objections to a general promotion of investment in fisheries because of the existing excess capacity. Intensive technical progress has meant that it is possible to achieve the same catching capacity in the fishing industry using fewer factors of production, so that with the increasingly widespread application of modern technologies fewer factors of production will be needed. The scope for expansion open to fishing enterprises depends far more on the extent to which competing firms withdraw than on how much government subsidy there is for new boats and fishing gear. The profitability of new investment is therefore very much influenced by the extent to which other firms reduce their capacity at the same time; this is very difficult to estimate for the individual enterprise. The government reduces this uncertainty about profitability, at least technically, if it undertakes selective promotion of

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investment. By the selection of the subsidized investment subjects it gives the impression that although investment in this sector is not generally profitable, it is in fact profitable for those areas which it has selected for aid. As experience in other sectors shows, especially in agriculture, it is difficult to make the individual understand that fulfilment of the selection criteria offers no guarantee of the long-term profitability of this investment.

-- Choice of selection criteria and basis of assessment

Another problem area in selective promotion of investment concerns the fixing of selection criteria and the basis of assessment. From the point of view of the individual enterprise, the profitability of fishing capacity depends above all on the technical efficiency of the equipment and the skill of the crew. The great disparity in the operating results of enterprises with technically comparable fishing gear shows that the second component is of very great importance; and management skill becomes more important with increasing catching capacity. But it is difficult to use this skill component as an operational selection criterion. One possible yardstick could be the formal qualifications of the manager of the enterprise - such as professional diplomas - but such formal qualifications indicate potential rather than actual ability. Another approach might be to use the actual operating results to assess the skill of the manager. However, this means a lot of administrative work and also causes problems when a new manager is to start or there is to be a change of manager.

It is very much easier from the administrative viewpoint to select the subjects for subsidized investment on the basis of technical criteria, and this method has also been adopted by the Commission in its proposals. With this approach, however, there arises the problem that it is very difficult to define "optimum" fishing equipment on the basis of only one criterion, even from the point of view of the individual enterprise. The efficiency of fishing equipment depends not only on the length of the vessel, but on the general fittings of the vessel. Even more difficult, however, is the fact that the question of what constitutes optimum fishing equipment can only be answered in regard to the fishing

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of particular fishing grounds and species from actual locations for a given package of factor prices. However, since fishermen as a rule fish different fishing grounds and species, basing their operations on short-term yields, it is not really possible to determine an optimum fleet structure on the basis of planning models. A high degree of uncertainty about the yield from individual fishing grounds means a high risk and calls for a great degree of flexibility. Rigid application of a selection criterion involves a risk that flexibility will be restricted. Fixing a selection criterion changes the investment calculation decisively for the individual enterprise. The same applies to the choice of the basis of assessment. If investment subsidies are paid in relation to the total investment, this means that in the investment calculation for the individual enterprise the capital factor of production becomes cheaper. It is therefore to be expected that fishing will be more capital-intensive with such aid than without aid. This distortion of relative prices can be an advantage from the general economic viewpoint if the private decision-makers estimate future price relations wrongly or if the price relations do not reflect the social cost relations. Usually, however, aid to investment results in a level of capital intensity which is below the optimum from the general economic viewpoint.

-- Incidental effects of the organizational framework

This effect is intensified if no back-up measures are taken to reduce surplus capacity or if the organizational framework through which fishing rights are allocated is inefficient. If national catch quotas are allocated which may be fished out by fishermen in competition, the individual fisherman has to be able to fish the largest possible quantities as quickly as possible if he wishes to obtain a high proportion of the national quota for himself. He therefore has to design his fishing vessel and his fishing equipment to suit this method of allocation, which from the general economic viewpoint is extremely inefficient.

-- Problems of the level of responsibility

These remarks have probably already revealed a basic difference between



investment aid and the measures discussed previously. Whereas re-direction of fisheries and joint ventures produce external benefits, because they are accompanied by an easing of the problem of adjustment, new investment which increases capacity results in external costs, because it further reinforces the surplus capacity already existing. Seen from this viewpoint it seems much more urgent to create a framework at EEC level to limit national investment aid than to participate in the financing of these national programmes. In fixing national catch quotas it is, of course, ensured that the general economic costs of promoting catching capacities cannot be passed on to other Member States in the short term, but it is quite possible that this will occur in the longer term. It can happen if the national catch quotas are adapted to the changes in the fleet structure or the catching capacities of the individual Member States.

ii. The proposed selection criteria from the viewpoint of the problems affecting the West German fisheries

Apart from these general objections to investment aid at Community level, there are two particular areas which raise problems for West German fisheries. One is the proposed selectivity as regards the groups of persons who will benefit. Restricting investment aid to individuals who have been engaged in fishing for at least five years, have obtained and are obtaining at least half of their income from fishing and have devoted and are devoting at least half of their working time to fishing, and to legal entities which for the five financial years preceding that in which the project is submitted have produced at least 85% of their total turnover in fishing or in the case of associations consist of individuals who fulfil the conditions set out above for individuals, would exclude broad sections of the German deep-sea fishing industry from the aid. No objective reasons can be discerned for such discrimination based on the legal status and gainful employment of the applicant; in contrast to the proposals on the transitional measures for inshore fisheries, which stipulated that aid should be restricted to ships of up to 24 m, deep-sea fishing is henceforth to be included in the aid, although only if the recipients undertake to reduce capacity by at least

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the same amount. And these proposals for laying up represent a second very critical point for West German fisheries. Lay-ups already carried out will not be recognized. National efforts to alleviate the problems of adjustment are therefore counterproductive in this programme as well. Furthermore, it is not clear why proof of the simultaneous reduction in capacity is required only for vessels more than 33 m long. The whole of the EEC waters could probably be fished with vessels 33 m long, and if this ruling is designed to prevent the build-up of further surplus capacity, a simultaneous reduction would have to be stipulated for much smaller vessel lengths.

In view of the restricted fishing possibilities to be expected in the medium term, adjustments to reduce costs appear to be urgently needed for the Federal German fisheries. As already stated elsewhere, the fishing possibilities to be granted to the West German fisheries are not sufficient to absorb the existing catching capacity. The deep-sea fisheries have already greatly reduced their fleet capacity, especially in the case of those fishing for fresh fish, in view of the restricted fishing possibilities. The scrapping premiums offered under the Federal Government's emergency programme until 1980 have been used up completely. As the deep-sea fishing industry only operates from ports outside Schleswig-Holstein and also makes its landings outside Schleswig-Holstein, the ports of Schleswig-Holstein are very little affected by this development. A reduction in the catching capacity of the deep-sea fishing industry may in fact help to alleviate the problems of absorbing the capacity of the small-scale and inshore fisheries and to that extent some relief can be expected in the Schleswig-Holstein fisheries sector from reduced deep-sea catching capacity. Nevertheless, considerable problems still remain for the small-scale and inshore fisheries in making full use of capacity. Under the EEC's proposed catch quotas, the fishing possibilities most severely curtailed would be those in the Skagerrak and Kattegat and the North Sea. Landings of fish for human consumption in the Schleswig-Holstein North Sea ports had already dropped by 32% by 1979. The reduction of catch quotas would intensify this trend. Because fresh-fish landings are heavily

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concentrated in a single North Sea port, Bülsum, the problems of adjustment are regionally concentrated<sup>1</sup>. A switch to shrimp fishing on any notable scale is not really possible on the North Sea coast. Reference has already been made to this in Part B<sup>2</sup>. The - government assisted - expansion of catching capacity has already led to surplus capacity. Marketing problems in 1979 and 1980 make this very clear.

For the Baltic fishermen it is almost exclusively the fishing possibilities in the Baltic which are relevant. Here the reduction is not so great as in the North Sea, but again the quotas are not sufficient to absorb existing catching capacities fully. Since there is little prospect, in the central and eastern Baltic, of ever again achieving the sort of fishing possibilities that were common in the past, much less use has been made of small boats in the Baltic fishing industry in the past few years. The severe changes in relative prices on the cost side, particularly as a result of the drastic increase in the price of petroleum, have further accentuated this trend. It has already been pointed out above that changes in fishing methods can bring about considerable cost savings. Conversion from trawling to less energy-intensive fishing methods and to small boats, from which stationary fishing can be carried out, can help to bring about marked savings. Such conversion will not expand catching capacity. On the contrary, changing to small boats made of glass-fibre reinforced plastic (GRP) will usually greatly reduce the catching capacity, and as a rule the numbers employed will also drop. Whereas there are usually several people working on the larger boats, GRP boats are operated by one or two men. The transition to small boats is thus accompanied by the loss of a number of jobs for fishermen. The drop in the number of employees in fishing raises fewer problems than the drop in the number of owners - as experience in other sectors shows. It is very difficult to determine in detail to what extent fishermen have already switched to such GRP boats, but the adjustment of the boat statistics in 1979 can provide some guide: 47 fishing vessels previously classified as motor boats

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1. See Table 24.

2. See p 125

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were regraded to small fishing boats. This regrading meant a considerable change in the age structure of the fishing vessels on the Baltic. As against 11 boats in 1978, there were 41 boats between one and five years old at the end of 1979.

In view of the problems of capacity, aid for conversion from trawling to small-boat fishing seems to make the most sense. If the aim is to employ as many fishermen as possible in fishing, then, given the limited fishing and marketing possibilities, efforts must be made to keep upstream services at a low level and have the fishermen produce as much as possible of the net product achieved in fishing. Nevertheless, where there is generous aid for such a structural change, problems of surplus capacity cannot be excluded here either; these vessels would be mainly suitable for fishing the already heavily fished stocks in the western Baltic.

c. Aquaculture

The development of aquaculture is to be promoted at EEC level as has already been done at national level. Reference has been made earlier to the prospects and present problems in the field of aquaculture. Given the lack of practical experience with fish-farming, a full listing and assessment of assisted aquaculture projects seems to be urgently needed, as is an intensive exchange of information on aquaculture research. In view of the very clear favourable externalities, financial assistance and participation by the EEC seems eminently reasonable, but from the general economic viewpoint care must be taken that the assistance is limited to the development stage and does not become a permanent subsidy.

This proviso is taken into account in the Commission proposal, in that EEC participation in aquaculture is to be limited in the first instance to the implementation of pilot projects. In view of the lack of experience and the many unsolved problems, it is important not to give the impression that the decline in sea-fishing yields could be largely offset by aquaculture even in the medium term. Moreover, it seems doubtful whether the call for suitable equipment to clean the products before

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marketing, in the case of mussel farming in waters which do not comply with national and Community quality standards, takes adequate account of the problems of environmental pollution.

d. Fisheries research

Fisheries research also cannot be expected in the medium term to provide any fundamental relief from the need for structural adjustment in the fishing industry. In view of the external effects - if research results are publicized they can be used by everyone - Community participation in the field of fisheries research would seem to make good sense, although the question arises of the purpose of the proposed permanent record of fishing activities in the Community. The efforts which would have to be made in regard to scientific information seem relatively high by comparison, say, with other possibilities for the exchange of information. Some doubts also exist about the co-ordination of research activities. Competition between scientists working on similar projects need not be interpreted as a waste of resources; it can also be a very effective instrument for producing new information. As research is a matter of discovering new information, and the success of these efforts is very uncertain beforehand, it is important not to expect too much from the co-ordination of research work within the Community. It should be considered whether the Commission's interest in the field of research might not be better served by having research programmes carried out on its own behalf rather than participating in national programmes.

3. Promotion of division of labour in the fisheries system within the EEC and with non-member countries

It has already been pointed out in connection with the problems of adjustment for the upstream and downstream sectors that these sectors are able to alleviate the problems of adjustment facing them because of reduced fishing possibilities at home by stepping up their trade relations with abroad. For instance, the processing industry and the fish trade can seek to offset the fall in home supplies by additional imports. As has already been shown, they have in fact made considerable use of this form of adjustment. Such reorientation of the chain of supply can,

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however, cause a number of difficulties. In the interests of continuous market supplies, these deliveries from abroad will not just function as a stop-gap; they will also crowd onto the home market at times when there are ample domestic landings, which may result in a collapse of producer prices and market intervention by the producer associations. With this kind of reorientation of the supply chain there is a risk that supplies of unprocessed fish will be increasingly secured by means of import contracts under fixed conditions, so that fluctuations in landings could cause price reactions only in the non-contracted quantities: these would be the domestic landings, which would thus intensify the instabilities on the seawater-fish markets. These problems are further aggravated if the organizational framework and the market organization encourage discontinuous market supplies. Such trends could intensify the already existing pressure for increased protection against imports from non-member countries, but this would be at the expense of the competitiveness of the fish-processing industry and at the expense of cheap supplies of fish and fish products for the consumer.

But even within the Community there is mistrust about changes in supply links. It is often reported that exporters from partner countries are trying to break into the market with aggressive prices, and it is suspected that often the home producers or marketers are being subsidized by their governments. These supposed infringements of the Common Market's rules on competition may be a serious hindrance to the reorientation of fishing within the EEC especially if it is constantly necessary to fight for national catch quotas. In any case, however, such a reorientation of supply links necessitates considerable adjustment in marketing arrangements. Declining landings mean that all the marketing facilities designed to take the landings from home catches are under-utilized, since additional imports usually bypass these reception facilities. The seawater-fish markets and the marketing facilities of the producers' associations would probably suffer most from such reorientation. Both are biased towards the marketing of home catches. It is therefore no surprise that demands for the retention of the national fishing fleet are strongly supported by producer associations and seawater-fish markets.

As regards stepping up the foreign-trade relations of the upstream services, it has to be recognized that it is difficult for small and medium-sized firms in particular to penetrate foreign markets because they have less effective sales organizations and because the risk of foreign commitments often seems too great for them. However, the efforts being made by many countries to build up fishing fleets in order to make use of the resources in their newly established fishing zones mean that foreign markets offer an attractive potential demand for fishing vessels and gear, as well as for fish-processing equipment. Such potential customers are to be found both among the developed industrialized countries (USA or Canada) and among the less developed countries. The government could help here in building up organizational structures that enable home firms to gain access to these foreign markets.

4. Assistance for adjustment in the fisheries sector via regional policy

The geographical concentration of the fishing industry in areas where there is usually little alternative employment is frequently put forward as justification for the need for measures to assist the fishing industry. As emphasized throughout this study, there is a risk that instead of excess capacity being reduced by these measures - which is what is needed - new capacity might be created, a trend which is intensified by an inefficient allocation of national catch quotas. Such measures might indeed slightly reduce the pressure of the problem in the fishing regions in the short term, but in the longer term the persistent excess capacity and the (subsidized) prevention of the relocation of fish processing will have a detrimental effect on the economic development of the region; the causes of the regional structural problems will not be solved, but will remain. For the purposes of regional development it would be better to promote structural change, either by the creation of alternative employment opportunities in the fishing regions, or by assisting with migration to other parts of the country.

a. Fishing regions and regional aid in the Federal Republic

The fishing industry in the Federal Republic is mostly located in

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regions that fall within the development areas of regional policy. The regional action programmes in the Community scheme for "Improvement of regional economic structure", under which regional development is carried out in the Federal Republic, embrace the coastal regions of Schleswig-Holstein and Lower Saxony as well as Bremerhaven. On the Baltic coast Flensburg, Kappeln, Schleswig, Kiel, Burg on Fehmarn, Neustadt in Holstein and Lübeck, and on the North Sea coast Husum, Tönning, Brunsbüttel, Glückstadt, Cuxhaven, Bremerhaven, Wilhelmshaven, Norden and Emden, are among the focal points of Community schemes in which private investment projects can be subsidized in the same way as measures for the development of the infrastructure. The EEC is also involved in the financing of such measures through the European Regional Development Fund. It should not be forgotten, however, that the regional policy has by no means been an overwhelming success so far. This is because the regional policy is not co-ordinated closely enough with other geographical policy sectors and, secondly, because the selection criteria and the basis of assessment for aid are not efficiently laid down.

b. Problems associated with regional aid

i. Co-ordination problems

There is not enough co-ordination of regional policy with other geographical measures such as transport policy, sectoral structural policy, housing policy or research and development policy in the Federal Republic. Attempts are made through various co-ordinating and planning bodies to include regional-policy and regional-planning objectives in the various specialist programmes, but there is virtually no chance of these objectives being implemented as part of the specialist programmes. Because of the comparatively small allocation of funds, regional policy is able to put up little resistance to developments in other areas of policy which run counter to its own objectives. Further co-ordination problems arise in the Federal Republic because central and local government have joint responsibility for regional policy.



ii. Basis of assessment

Regional economic aid in the Federal Republic is provided - as in most other countries - by means of tax-free investment allowances and investment grants. The basis of assessment used is the total investment. This type of assistance is based on the principle that regional development is particularly in need of real capital. If such a lack of private real capital can be regarded as the crucial limiting factor for regional development, such assistance would be seen to be extremely efficient. Experience of regional economic aid in the Federal Republic shows, however, that a large proportion of the jobs which have been promoted prove to be uncompetitive and that sometimes the effects on jobs have been only slight because of the very high capital-intensity of the assisted projects. Studies of regional development processes show that often such processes are blocked by lack of human capital rather than by shortages of real capital. Because of persistent migration, there is usually a higher than average proportion of lower skilled workers. There is therefore little incentive for firms to create skilled jobs in such regions. The lack of such jobs, in turn, means that the rising generation of workers in these regions, many of them highly skilled, then find too few opportunities for employment and so move away to other areas. This continuing drift of human capital must be halted by a development-oriented regional policy, and if possible reversed. Regional policy should therefore place less emphasis on assisting the expansion of the real capital and more on the use of human capital. Assistance in creating skilled jobs should be given priority, rather than assistance for capital-intensive production plant.

iii. Selectivity

In view of the relative shortage of funds, regional policy must try to concentrate its resources if it is to achieve anything at all. Hence the idea of providing aid at main trouble spots was adopted in the Federal Republic's regional policy; regional aid is directed mainly at "focal points". Nevertheless, the regional aid resources in the Federal Republic are still spread fairly widely; more than 60% of the total area of the country is classed in the category of development areas

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under the Community's scheme for "Improvement of regional economic structure" and there are more than 330 focal points. The efficiency of the regional aid could be greatly improved if, in selecting focal points in the development areas, which are chosen mainly according to need, greater attention were paid to whether the places were really worth assisting. In view of the relatively small numbers of workers in many problem regions, a successful regional policy has to rely on at least small-scale migration of the factors of production.

This strategy of "passive reorganization" is usually not very popular in the announcement of regional policy objectives. It is probably asking too much of politicians to expect them to admit to a strategy aimed at solving regional problems by means of the migration of workers. In practical policy terms this strategy has nevertheless played a considerable part, and it can also point to considerable successes judging from the development of per-capita income in many regions which have been passively reorganized. It is precisely in regions where a relatively low population density means there is little prospect of utilizing the advantages of conglomeration that income prospects are closely dependent on the exploitation of natural resources. The drift away from such regions gives those people who remain scope for improving their income prospects.

c. Approaches to overcoming the adjustment problems of the fishing industry within the framework of regional policy

A more efficient regional policy could make an important contribution towards alleviating the adjustment problems of the fishing industry; almost all the fishing regions are covered by the Community scheme for "Improvement of regional economic structure". It should therefore also be considered within the framework of the Community scheme how far, because of the altered conditions in the fishing industry, it would be useful to re-examine the system of focal points, as regards both their number and grading. In view of the problems of selectivity in regional aid discussed above, a reduction in the number of focal points seems urgently needed, rather than an increase. Consequently, special consideration of problems specific to the fishing industry as part of the

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general designation of focal points for aid does not seem to be indicated. It should be considered, however, whether these specific problems affect the regional situation so seriously within a small area that special treatment (with time-limits) seems appropriate for these regions.

There are examples of such special measures within the system of regional aid in the Federal Republic. In view of the pressing structural problems in the iron and steel industry, a special programme within the Community scheme was designed to create 17 300 jobs outside the iron and steel industry in the area of the Saarland-Westpfalz regional action programme between 1978 and 1981.

Opportunities apart from the Community scheme could also be sought to enable fishing regions to benefit from assistance. Because of their economic problems, the North German coastal states felt obliged to ask the government for support for a coastal programme, following the discussions on the Ruhr programme under which the structural problems of the Ruhr coalfields were to be alleviated. These negotiations are still continuing. The coastal states could try to integrate into this programme specific measures for those areas particularly affected by the structural adjustment of the fishing industry.

There would also be the possibility at EEC level of carrying out specific Community schemes within the framework of the Regional Fund to back up or supplement other Community policies, to enable jobs to be created more quickly in problem areas, to hasten development in marginal areas or, in the event of unforeseeable regional circumstances to alleviate real emergencies.

It must, of course, be recognized that, in view of the relative unimportance of the fishing industry in the labour market within a somewhat broader regional context both at national level and at EEC level, it would be very difficult to implement specific measures for fishing regions in the Federal Republic. At a time when major structural shifts are also taking place in other sectors which in some cases have a much greater impact on the regional labour markets, demands for special

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regional policy programmes to help with the problems of adjustment in sectors of the economy which - in terms of the numbers employed - are insignificant will meet with strong resistance. Increased support for structural change in the fisheries sector via regional policy can therefore only be expected in the first instance from a reform of the regional policy. But if fisheries problems are not accorded greater importance in regional policy, the justification of specific sectoral measures to help with regional employment problems will also be largely invalidated.

5. Assistance for adjustment in the fisheries sector via labour-market policy and social policy

a. Forms of aid for accomplishing the process of structural adjustment

As already shown elsewhere in this study, the basis of the problems of adjustment in the fisheries sector is that there are too many factors of production involved in fishing. The use of new fishing technologies has led to a very considerable expansion of catching capacity throughout the world; the drift of manpower away from the industry and the laying-up of fishing vessels have not been sufficient to offset the effects of the increase in capacity brought about by the new fishing vessels. The future of the European fishing industry depends on how far existing excess capacity in the fisheries sector throughout the EEC can be reduced and structural change steadily advanced so that, following further expected developments in fishing technologies, fish resources are not overfished and the individuals working in fishing have adequate income prospects. This reduction in excess capacity will entail scaling down the fishing fleet and shifting manpower to other sectors.

In Part B it was pointed out that, because of a relatively high standard of performance and the lack of other uses for fishing skills, as well as a marked preference for fishing, it would be difficult in the West German fishing industry to speed up the process of shrinkage to any great extent; scepticism was also expressed about the prospects for carrying out specific regional adjustment programmes in the fishing

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regions of the Federal Republic in view of the far-reaching structural problems in many other sectors. The possibility should therefore be examined of reducing the factor input in the fishing industry by specific sectoral measures. To reduce the labour force in the fishing industry this means, in particular, the promotion of retraining and arrangements for early retirement. The EEC can already make a financial contribution towards the promotion of retraining through the European Social Fund; and there is provision for grants from the EEC to give early pensions to sea fishermen.

b. Social action programme in sea fishing

Seen in the light of the problems of the EEC fisheries sector as a whole and the specific problems of the West German fishing industry that have been analysed in this study, the social action programme of the EEC seems to be directed less towards surmounting the adjustment problems of the fisheries sector and more towards restimulating the process of European integration (which has come to a standstill) by means of harmonization and administratively implemented standard regulations in the fisheries sector. Of the areas mentioned, a number of problems are addressed in the fields of vocational training, operational safety and industrial hygiene, and also working conditions, which can make an important contribution towards improving the social situation of fishermen. The main question, however, is whether the solution of these problems is really best tackled at EEC level. There are major differences in working conditions, social structure and the system of social security between the Member States. They reflect diverse national disparities and it seems dangerous to disregard these national disparities in common rules for a single branch of industry. In a pluralist society a state policy for a given sector must be based to a great extent on standards which reflect the sense of justice of the social groups. If these standards differ from one country to another, there is considerable potential for conflict in Community-wide regulations. The same applies if responsibility for these sectors is arranged differently in the individual countries, especially as regards differences in the competence of the two sides of industry.

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In addition to this fundamental question of the level of responsibility there is also the problem of how the proposals are to take adequate account of the different fisheries structures within the Community, quite apart from the problems of fitting in with the overall system of national working conditions and social conditions. The differences between small-scale and industrial fishing are so great that standard rulings for the entire fisheries sector could cause serious problems of adjustment.

Measures to promote employment in sea fishing are being called for as a priority contribution towards overcoming the problems of adjustment in the fishing industry. The socio-economic importance of such measures is asserted by stressing that for many disadvantaged coastal regions sea fishing is the sole profitable economic activity and that one job in fishing involves four or five jobs in the upstream and downstream sectors. However, this viewpoint fails to grasp the causes of the problems in the fisheries sector. The way to improve the situation in sea fishing and the circumstances of the individuals engaged in it is not to put a stop to the drift away from fishing, but to encourage it.

ANNEX

Table A1. Age structure of the population in the North German coastal states and in the Federal Republic (as at 31 December 1977)

State	Population in 1000												
	Total	aged from ... to ... years						18-21	21-45	45-60	60-65	65-75	75 and over
		under 6	6-15	15-18	18-21	21-45	45-60						
Schleswig-Holstein	2 589	152	386	123	110	876	413	114	260	155			
Lower Saxony	7 224	450	1 083	363	323	2 345	1 217	320	716	407			
Hamburg	1 680	78	190	66	64	582	297	84	198	121			
Bremen	703	37	91	32	30	235	123	35	77	43			
North German coastal states as a whole	12 196	717	1 750	584	527	4 038	2 050	553	1 251	726			
Federal Republic	61 353	3 653	8 579	2 983	2 762	20 722	10 651	2 696	6 029	3 278			
						as %							
Schleswig-Holstein	100	5.9	14.9	4.7	4.2	33.9	15.9	4.4	10.0	6.0			
Lower Saxony	100	6.2	15.0	5.0	4.5	32.5	16.8	4.4	9.9	5.6			
Hamburg	100	4.7	11.3	3.9	3.8	34.7	17.7	5.0	11.8	7.2			
Bremen	100	5.3	13.0	4.5	4.3	33.5	17.4	5.0	11.0	6.1			
North German coastal states as a whole	100	5.9	14.3	4.8	4.3	33.1	16.8	4.5	10.3	6.0			
Federal Republic	100	6.0	14.0	4.9	4.5	33.8	17.4	4.4	9.8	5.3			

Source: Bevölkerungsstruktur und Wirtschaftskraft der Bundesländer, Vol 1978, loc cit, p 40.  
Own calculations.



Table A2. Participation rate in the North German coastal states and in the Federal Republic (1978)

State	Economically active (1000)	Population aged between 15 and 60 yrs (1000)	Participation ratea (%)		Employment status of the economically active			
			total	female	self-employed	assisting family members	officials and salaried employees	manual workers
Schleswig-Holstein	1 089	1 634.3	66.6	49.0	9.6	3.9	49.2	37.2
Lower Saxony	3 008	4 567.6	65.9	46.6	9.1	5.2	42.5	43.2
Hamburg	748	1 093.0	68.4	54.8	8.7	1.3	54.7	35.2
Bremen	296	454.7	65.1	46.9	6.4	1.0	53.7	38.9
North German coastal states	5 141	7 749.6	66.3	48.3	9.0	4.1	46.3	40.5
Federal Republic	26 021	39 813.4	65.4	47.8	8.8	4.0	44.8	42.3

<sup>a</sup> Economically active as % of the population aged between 15 and 65 years

Source: Bevölkerungsstruktur und Wirtschaftskraft der Bundesländer 1978, loc cit, pp 40 and 56 ff.  
Own calculations.

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Table A3. Catches by German deep-sea fishermen outside EEC waters,  
1976

Fishing areas	Catches in t
Norway	70 000
Iceland	55 000
USSR (Barents Sea)	35 000
Canada	30 000
USA	15 000
South Africa/Namibia	12 000
Faroes	10 000
Bear Island/Spitzbergen	8 000

Source: Opinion of the Verband der Deutschen Hochseefischereien eV on "Problems of the Third UN Conference on the Law of the Sea with particular reference to questions of mining of the sea bed", Stenographic record of the 19th meeting of the Foreign Affairs Committee, Deutscher Bundestag, 8th electoral period, Bonn, 7 December 1977, p 479.

Table A4. Fishing boats in Schleswig-Holstein (as at 31 December 1977)

	Number of boats				hp rating of boats of	
	Professional fishermen		Part-time fishermen		Professional fishermen	Part-time fishermen
	without engine	with engine	without engine	with engine		
Baltic	108	307	15	104	4 430	1 236
North Sea	13	66	-	43	2 197	1 421
Schleswig-Holstein in total	121	373	15	147	6 627	2 657

Source: Information from the Schleswig-Holstein Fisheries Office

Table A5. Structure of upstream services in the production of fishery and fish-farming products in the Federal Republic, 1970

Sector	Upstream services	
	million DM	as % of all upstream services
Production of fishery and fish-farming products	12	7.4
Production and distribution of electricity	1	0.6
Production of mining products (excluding coal, petroleum, natural gas)	1	0.6
Production of chemical products	4	2.5
Production of petroleum products	10	6.1
Production of plastic, rubber and asbestos products	5	3.1
Production of products not mentioned elsewhere in wire, wire drawing, steel shaping, working, forging and the like	2	1.2
Production of motor vehicles (excluding cars and accessories)	30	18.4
Repair of road vehicles and appliances	1	0.6
Production of electrical products	2	1.2
Production of precision-mechanics and optical products and clocks	1	0.6
Production of iron, sheet metal and metal products (excluding motor vehicle accessories) musical instruments, sports goods, games and ornaments	10	6.1
Production of sawn timber and semi-finished wood and wood products	2	1.2
Production of wood pulp, paper, cardboard and products thereof	3	1.8
Production of printing products, blueprints and associated products	4	2.4
Production of textiles	11	6.7

Table A5 (continued)

Sector	Upstream services	
	million DM	as % of all upstream services
Production of clothing and bedding, upholstery and decoration work	4	2.4
Production of foodstuffs and semi-luxuries not mentioned elsewhere	6	3.7
Production of beverages	1	0.6
Wholesale services, etc (no recovery)	24	14.7
Trade agency services	3	1.8
Retail trade services	2	1.2
Other transport services	12	7.4
Communications	1	0.6
Insurance services (excluding agency and social insurance)	3	1.8
Market-oriented hotel and catering services	2	1.2
Publishing, literature and press services	1	0.6
Other market-oriented services	5	3.1
Total	163	100.0

Source: Federal Statistical Office, Fachserie 18, Volkswirtschaftliche Gesamtrechnung. Reihe 2 Input-Output-Tabellen, 1970. Stuttgart and Mainz 1977, p 54.

Table A6. The fish-processing industry in Schleswig-Holstein: firms, products, costs, turnover and investment in the period 1970-77

	1970	1971	1972	1973	1974	1975	1976	1977
	(10)*	(10)*	(10)*	(10)*	(10)*	(10)*	(20)*	(20)*
Firms	39	37	35	35	35	35	33	28
Employees	2 738	2 608	2 176	2 145	2 064	1 943	2 013	1 915
Wages (DM 1000)	20 261	20 615	18 418	20 472	21 897	21 725	24 297	23 952
Salaries (DM 1000)	8 252	9 301	8 734	8 744	10 200	10 541	11 360	11 556
Turnover (DM 1000)	203 951	202 210	196 913	207 339	222 691	215 912	261 101	254 745
Foreign sales (DM 1000)	18 045	17 012	13 754	13 738	16 384	18 630	23 279	21 847
Foreign sales as % of turnover	8.8	8.4	7.0	6.6	7.4	8.6	8.9	8.6
Product values								
of which:								
smoked fish products, etc <sup>x</sup>	.	.	61 230	76 263	56 441	64 481	67 429	.
canned fish	.	.	86 364	89 716	119 758	109 470	115 410	.
Investment (DM 1000)	.	.	.	4 560	.	5 461	4 102	.
Investment ratio	.	.	.	.	.	.	.	.
(as % of turnover)	.	.	.	2.0	.	2.1	1.6	.
for comparison: in the food industry	.	.	.	3.2	.	2.8	2.7	.
Average hourly wage	.	5.10	.	5.93	.	7.47	.	8.65
for comparison: in the food industry	.	6.33	.	7.73	.	9.77	.	11.24

\*Minimum numbers employed in the firms covered.

<sup>x</sup>Smoked fish products, salted fish in oil, etc, marinades

Source: Statistisches Jahrbuch Schleswig-Holstein, 1978, 1976, 1974, 1972, Schleswig-Holstein Statistical Office

Table A7. Schleswig-Holstein fish-processing industry:  
 Small firms in Schleswig-Holstein (firms with  
 less than 10 employees)

Year	Firms (end Sept.)	Employees (end Sept.)	Turnover (in DM 1000) (in Sept.)
1969	28	157	1 116
1970	26	140	1 000
1971	27	173	1 055
1972	24	115	1 028
1973	25	128	989
1974	22	101	948
1975	20	98	988
1976	12	66	804
1977	14	91	1 054

Sources: Statistisches Jahrbuch Schleswig-Holstein (for 1972, 1974, 1976, 1978), Schleswig-Holstein Statistical Office, Kiel; Die Industrie in Schleswig-Holstein am 30. September 1976, Statistische Berichte des Statistischen Landesamtes Schleswig-Holstein, Kiel, 13 July 1977.

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