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Prospects for Development Cooperation in the Fishing Industry

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Preface

This study considers whether, in addition to the promotion of artisanal fishing and aquaculture projects, there may be sectoral openings in the coming years for German development cooperation in the fishing industries of developing countries that have relatively extensive fisheries potential.

This question was prompted by the following four observations in particular. First, in recent years the German development cooperation community too has realized that marine fisheries are now of growing importance in some 50 developing countries, especially in terms of trade, nutrition and employment. Second, world fish reserves will decline rapidly if demand continues to rise. Since 1993/94 there have been constant press reports of international disputes in marine fisheries. Third, while a large proportion of the world's oceans has been placed under national jurisdiction, research activities in the field of fisheries economics have developed and done much to clarify aspects of fisheries policy and so to throw light on development problems. Fourth, as it has progressively grown in size, the EU has also become one of the leading actors on the world fisheries stage, what it does and does not do being of major importance for the development of the fishing industries of a number of developing countries.

In these circumstances, German development cooperation is confronted with issues relating to fisheries in more and more partner countries at sectoral as well as other policy levels. These issues have already led many industrialized countries to take extensive general development cooperation measures, whereas they have hitherto played an appreciable part in German development cooperation with only two countries outside the areas of aquaculture and artisanal fishing. Although this is not bound to change in the future, there is a problem whose discussion should not be considered irrelevant from the outset.

The FAO's Fisheries Department has made extensive statistics on world fisheries available for this study. They have been analysed by Jan Kiel, an economics student, as part of his practical training. Development cooperation and fishing industry experts have helped us with information and advice. We would like to thank them all.

Two important aspects have been considered in this version of the study only in passing, owing to the absence of the background information needed for a debate backed by empirical data:

- the overfishing of the 200-mile EEZs of developing countries by domestic and foreign fleets;
- the examination of potential German development cooperation capacities in the fishery sector in the research community, trade associations and industry.

These aspects should possibly form the subject of further studies.

Berlin, October 1995

Hartmut Brandt

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Abbreviations

ACP	African, Caribbean and Pacific countries, associated with the European Union under the Lomé Convention
BMZ	Federal Ministry for Economic Cooperation and Development
CAP	common agricultural policy of the European Union
CFP	common fisheries policy of the European Union
CLS	Convention on the Law of the Sea
ECU	European Currency Unit
EEZ	exclusive economic zone of 200 nautical miles, established under the 1982 International Convention on the Law of Sea
FAO	Food and Agriculture Organization of the United Nations
GATT	General Agreement on Tariffs and Trade
GRT	gross register tonne
ITQ	individual transferable quota
MIFM	minimum information fishery management
NAFO	North Atlantic Fishery Organization
OECD	Organisation for Economic Cooperation and Development
TAC	total allowable catch
TOT	terms of trade
UNU	United Nations University
WHO	World Health Organization

merous fisheries agreements, because the prices at which foreign fleets operate are formed primarily in the ports where they obtain their supplies and market the fish they catch. It can, of course, be assumed that home-country subsidies are in some cases a major cause of the constant pressure exerted by foreign fleets for the extension of fisheries agreements (even when prices are rising).

The sustainability of fisheries may be reduced or ruined primarily by two types of activity: firstly, the taking of young fish, and secondly, the reduction of ripe stock below a critical level below which an inadequate biomass of young fish will grow. Above all, a practical fisheries policy must therefore ensure that the biomass and the age composition of fish stocks do not fall below certain critical levels. In the end, the last of the instruments in the above list are likely to be indispensable in most cases if the observance of such levels is to be guaranteed.

In the opinion of the vast majority of experts working on this aspect of fisheries, there is a danger that in the near future man will ruin the irreplaceable source of food that marine fisheries represent, and this throughout the world and permanently in some cases. A distinction must be made in this context between pelagic fish (living in upper waters) and demersal fish (living in deep waters). While pelagic fish demonstrate a high capacity for regeneration even after overfishing, the same cannot be said of all commercially exploited demersal fish stocks, which may suffer irreversible damage. As these stocks are usually to be found near coasts and so frequently play a major role in the income, employment and diet of the coastal population of Third World countries, such fishing has a socio-economic importance that cannot be accurately expressed in terms of contributions to gross national product: most of the fishers concerned belong to the poor, if not poorest, sections of the population.

Only balanced fisheries policies in both developed and developing countries can prevent overexploitation. Such policies must be based on knowledge of population dynamics in the main fisheries, followed by the determination of safe, fairly rational fishery yields and, finally, the adoption of a use concept that prevents prescribed total yields from being exceeded while allocating to and securing for the main user groups (foreign fleets, modern domestic fleets, traditional artisanal fishing) shares of the total yield. It is clear in this context that, as parts of the artisanal fishery sector are modernizing their production methods, their productivity is far from stagnant. In many developing countries limitation of access or effort and supervision and monitoring backed by suitable instruments are needed today even for artisanal coastal fisheries. There is also a great deal to be said for deliberately promoting the export-oriented marketing of highly priced species as part of an overall concept geared to rational resource use.

Given the bottlenecks in the physical and non-physical infrastructure of their fishery sectors, developing countries should concentrate on spatial and/or seasonal (non-transferable) access limitations, restrictions on fishing methods and the improvement of their infrastructure. Almost all the developing countries still lack basic statistics on their fishing industries and biological analyses of their fisheries. In most cases, the supervision and monitoring of fisheries are also undermanned and underequipped. This being the case, the rapid development of a sea-going fishing fleet and/or the granting of fishing rights to foreign fleets (under fisheries agreements) may very soon be followed by overfishing and stock depletion owing to deficient monitoring and, therefore, breaches of agreements and/or exaggerated yield expectations. Where the instruments with which they equip their fisheries policies are concerned, developing countries should, firstly, provide generally separate opportunities for the traditional artisanal fishery sector and the modern fleet, including the formulation of fisheries agreements. In particular, artisanal fishing, which is labour-intensive, cost-efficient, comparatively non-polluting and near the consumer, should be afforded effective protection in the coastal area (e.g. the 12-mile zone) against competition from (usually heavily subsidized) modern trawlers. Secondly, they should tackle the problem of overfishing primarily with an appropriate system of access

restrictions and requirements regarding fishing methods. It should be remembered in this context that experience has shown that a policy of transferable production quotas leads to extensive concentration in the fishing industry. Success very much depends on effective supervision and monitoring measures suited to the given situation.

The EU's common fisheries policy lays down rules on the structure of the fishing industry, on foreign trade and on the internal market and is binding on all the Member States. The EU also pursues a common external fisheries policy on behalf of its members: access for third-country vessels to the EU's fishing grounds, the negotiation and conclusion of fisheries agreements with third countries and membership of regional fishery organizations and the FAO. The accession of Spain and Portugal increased the EU's fishing capacity by about 75 %. To land the fishery yields that are sustainably achievable in EU waters, 60 % of the EU's present capacity would be ample. The problem of structural overcapacity in the EU, which can be solved only in the long term, mainly affects the two Iberian countries.

Under the common fisheries policy the EU also concludes bilateral fisheries agreements with developing countries (currently including 16 ACP countries). These agreements grant the EU fleet access rights (usually defined as a "monthly average GRT"), which are paid for with funds and development cooperation. The EU pays 70 % of the compensation, the EU fishing enterprises benefiting under the agreements the other 30 %. The total annual payment of some ECU 400 million is estimated to be equivalent to 20 to 25 % of the gross value of the yields harvested worldwide by EU fishing enterprises under fisheries agreements. These enterprises have a continuing interest in seeing the policy on fisheries agreements with the ACP countries upheld. The EU has recently begun to conclude "second-generation" agreements, in which the focus is no longer on short-term aspects (access rights in exchange for financial compensation) but on the shaping of long-term scientific and economic cooperation in the fishing industry (as in Argentina's case). This reflects the recognition of the need, in view of the long-term, structural nature of the overcapacity problem in the EU fishing industry, for fisheries agreements, if they are to last, to be backed or safeguarded by substantial, long-term development cooperation, since fisheries agreements become irrelevant when stocks are ruined by overfishing. The EU's Member States can deploy their fishing industry capacities within the framework of the EU's development cooperation or for complementary support measures of their own.

As development policy is becoming an increasingly significant component of the EU's policy on fisheries agreements, the question is whether Germany too should make greater use of its scientific, industrial and administrative capacities for development cooperation in the fishery sector. The importance of this sector for the development of some 50 coastal countries and, no doubt, Germany's quantitative and qualitative potential and also the desire to support the implementation of what is for the EU a costly and for external relations a significant policy might argue for such involvement. German development cooperation has hitherto been largely confined to artisanal fishery and small-scale aquaculture projects. In Mauritania and Namibia initial experience is being gained in projects involving advice to the fishing industry. It can be assumed that some German research institutes and enterprises will be competitive in the future main areas of development cooperation with fishing industries (research on fisheries and marine biology, marine research hardware, fishing methods, supervision and monitoring policy and the technology it entails, fish processing and marketing). Development cooperation more closely geared to the environment of the fishing industry might take advantage of these capacities. However, the integrating field of applied fisheries economics is unknown in Germany. This and a corresponding shortage of experts may be one of the main causes of the comparatively limited involvement of the German marine and fisheries research community in development cooperation in the past. This assessment cannot, however, be verified and underpinned with reliable data, since a detailed study has yet to be made of German development cooperation capacities in the marine fisheries field.

Given its principal goal of alleviating poverty by helping people to help themselves, German development cooperation should be used in particular to ensure that fisheries policies protect the artisanal coastal fishery sector, which could not withstand unsupervised and/or unrestricted competition with modern (subsidized) trawler fleets, especially off the long, unobstructed African coasts. If the artisanal subsector collapsed, serious shortages of protein supply to the poorest section of the population would occur. Such development cooperation does, however, presuppose that the partner country is no longer content to maximize its foreign exchange earnings under fisheries agreements in the medium term, but shows its willingness to adopt a fisheries policy geared first and foremost to maintaining and taking socio-economically optimum advantage of a fairly rational sustainable fishery yield. Articles 58 to 68 of the Lomé Convention, and Article 59 in particular, call on the ACP countries to pursue such a fisheries policy and on the EU to support them.

I Trends in World Fisheries

1 Production

In 1993 world production in inland and marine fisheries, including aquaculture (15.9 million tonnes), reached about 101 million tonnes of fish and other marine creatures.[1] Discards, bycatches separated from the main catch and then thrown overboard, are estimated at 40 million tonnes p.a. Of total production, some 28 million tonnes was processed to fish meal and fish oil, leaving about 73 million tonnes of fish and other marine creatures for direct human consumption. Processing and marketing losses should, of course, be deducted from this figure to give the actual quantity consumed. The proportion spoilt owing to poor preservation and storage may be very high, particularly in developing countries.

Determining the worldwide sustainable production potential of marine fisheries is difficult. On the one hand, there is probably room for expansion, especially in various Pacific fisheries; on the other hand, the age structure of many stocks throughout the world has been so badly affected by overfishing that in a few years' time the shortage of mature specimens will result in a structural, i.e. long-term, decline in usable stocks, which in some cases will not be made good for several decades, as experience in the North Atlantic has shown.

World production in inland and marine fisheries from 1950 to 1970 rose by an average of 6 % p.a. (see Figure 1), but by only 2.3 % p.a. in the 1980s, fluctuating at around 100 million tonnes between 1988 and 1993, without any clear trend being discernible.[2] Growth in the 1980s, however, consisted largely of low-value industrial fish, most of which was processed to fish meal. The statistical world catch of food fish in marine fisheries (about 57 million tonnes) has stagnated for some 15 years. Catches in the fishing grounds of the industrialized countries - the North Atlantic and North Pacific - are in decline or stagnating at a historically very low level (e.g. Atlantic cod, halibut, redfish and hake). Yields in nine of the world's 17 most important fishing grounds are declining, four being completely exhausted. In some southern marine areas increases are still being achieved (in the case of tuna and hake, for example), but in many cases, according to most experts, only at the expense of the regeneration of stocks and thus of sustainable production.

Available catch statistics and studies of the biology of fisheries lead the FAO to believe that two thirds of the world's fish stocks are already fully exploited to overexploited. On the other hand, it believes there still to be sustainable reserves in the Indian Ocean, off the coast of West Africa and in the southern Pacific. The latest trend, however, would appear to refute this optimism in the case of the West African fishing grounds, at least where groundfish species are concerned.

From a global viewpoint, the most important production reserves today are to be found not in capture fisheries but in aquaculture (see Table 1), where growth rates have been high for well over a decade. Here again, however, there are major limitations in the longer term. Firstly, in seawater aquaculture at least, the only substitute for fish meal as feed is meat flour, and sustainable world production of fish meal could essentially be increased only through the relatively expensive use of what is currently discarded, from which 6.5 million tonnes of fish meal could be produced. More than the global increase in fish consumption over four to five years could not, however, be produced. Secondly, aquaculture often damages the environment, which may also impair the sustainable production potential of marine fisheries. An example is the clearance of mangrove swamps, the spawning grounds and nurseries of many marine species on the coasts of Africa, South-East Asia and South America.

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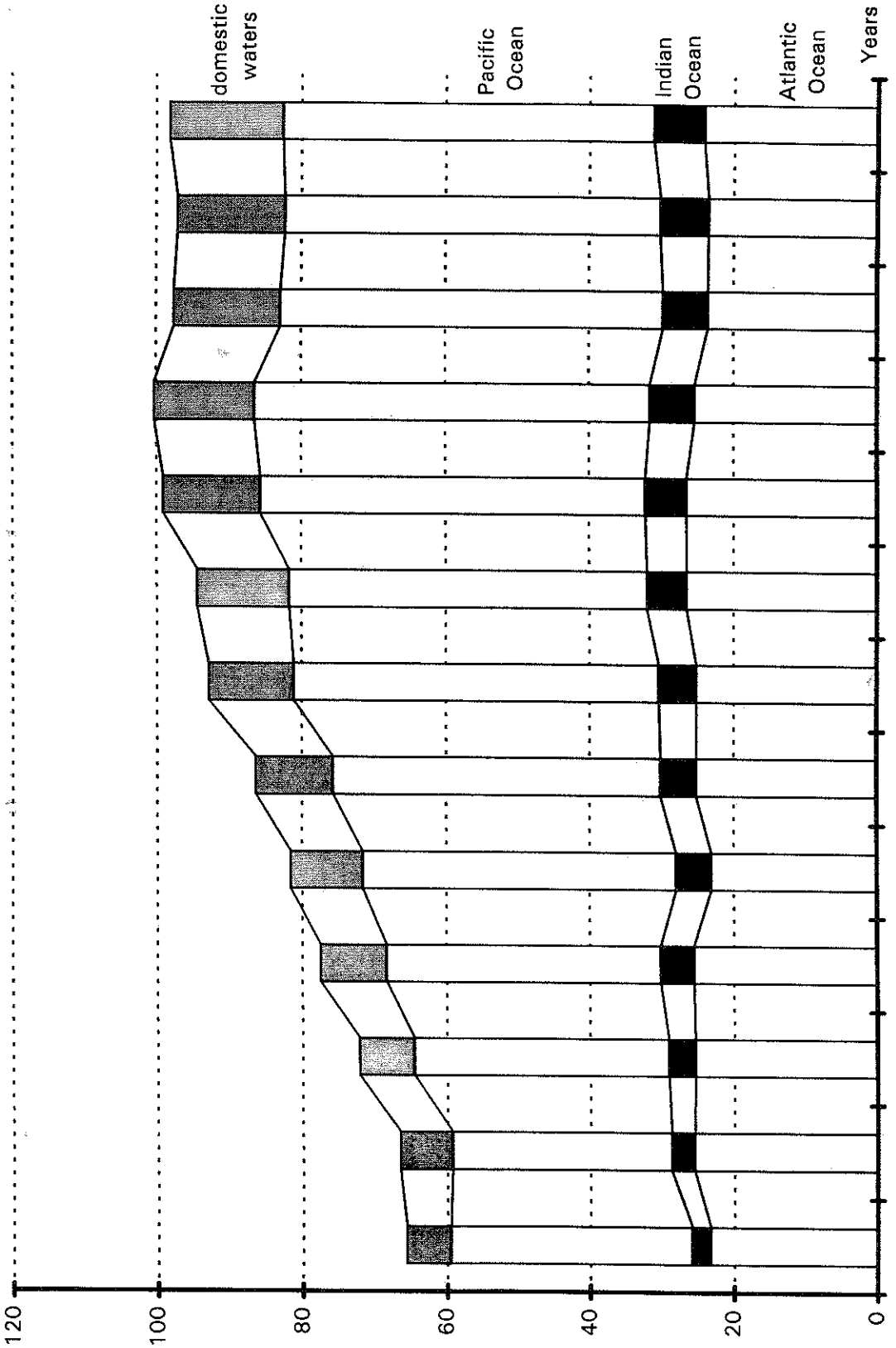
1 FAO, The State of the World Fisheries and Aquaculture, Rome 1995, p. 17.

2 Idem, Review of the state of world marine fishery resources, Rome 1994, p. 3.

Figure 1: World fish production, 1970 - 1992 (millions of tonnes)



Sources: FAO, Fishery Statistics, Yearbook 1992, Vol. 75, Rome 1994; Institut für Landwirtschaftliche Marktforschung, Fischwirtschaft in Zahlen, Brunswick 1994.

Table 1: Trend in world fish production, 1993 to 2010, in millions of tonnes

	Capture fisheries	Aquaculture	Industrial fisch	Total fisheries[b]
1993	56,5	15,8	27,7	100,0
2010	60,0	31,0	29,0	(120,0)[a]

[a] Author's estimate

[b] Fish and other marine creatures excluding discards (equivalent to about 6,5 million tonnes of fish meal)

Source: FAO, The State of World Fisheries and Aquaculture, Rome 1995, p. 44

These are, of course, very uncertain estimates. Firstly, it is uncertain what proportion of current discards can and will be used for human consumption. Secondly, it is questionable - where catches are not monitored effectively - whether catches on the high seas and under fisheries agreements are accurately reported. Thirdly, it is uncertain how far present yields are already being achieved at the expense of the regeneration of stocks and thus of future yields. A reliable answer can be provided only by long-term and sufficiently accurate catch statistics and population studies based on random samples. Fourthly, no more than a rough estimate can be made of production by the artisanal fishery sector. Added uncertainty is caused by weather conditions, coastal ecology and national fisheries policies, including fisheries agreements.[3],[4] The FAO, the leader in the field of world fisheries statistics, therefore maintains: "This issue is one of the more urgent ones to resolve globally if true trends in marine productivity are to be established as will be needed, for example, in order to evaluate the effects of climate change."[5]

As evident from the statistically comparatively well documented North Atlantic, with its high proportion of naturally highly productive fishing grounds, production in many fisheries remains well below the sustainable maximum or rational level because of overfishing. Developing countries increasingly face similar problems (see section 8). Seen as a whole, the FAO's global assessment is thus likely to be correct at least where it predicts that world marine fisheries production will reach the absolute limits of its capacity this decade. This is also indicated by maintained prices of high-quality fish (see section 3) that has occurred despite disproportionate growth in fishing capacities (see section 4): "The truth is stark: if the current intensity of exploitation of marine resources is not properly regulated, the resource will simply be depleted to the point where it will virtually disappear. The economic impact can already be seen in reduced supplies, higher prices, loss of employment opportunities and international tension."[6]

3 Weber, P., Safeguarding Oceans, in: State of the World, 1994, pp. 41 ff.

4 Idem, Protecting Oceanic Fisheries and Jobs, in: State of the World, 1995, pp. 21 ff.

5 FAO, The State of World Fisheries ..., op. cit., p. 5.

6 Emerson, W., Hitting the High Seas, in: The OECD Observer, No. 195, August/September 1995, p. 36.

In the past 20 years, as demand has expanded and fishing grounds have been depleted, fish has become an increasingly scarce commodity. Careful conservation of stocks and both economically and nutritionally rational fisheries policies will be vital for many coastal countries of the Third World in the future. The industrialized countries will be able to continue fishing outside their own 200-mile EEZs under bilateral fisheries agreements only at growing expense and only if the other parties to such agreements adopt (and enforce) rational fisheries policies that conserve stocks.

2 Trade and Nutritional Importance

Over a third of the world's fisheries production is traded internationally. In 1992 the value of global gross exports of fish and fishery products was about US $ 40 billion (see Figures A3 and A10 and Table A4). In 1993 the developing countries' net exports had a value of some US $ 11 billion.[7] After oil, fish is thus the most important raw material exported by the developing countries, and among foodstuffs, its value is exceeded only by coffee exports, and then only in boom years for this commodity.

Japan (at US $ 12 billion) and the EU (at US $ 8 billion) are the most important net importers (see Figures A3 and A4 and Table A7); Thailand, Norway, Canada and Indonesia are the leading net exporting countries, the value of their exports totalling US $ 7 billion.

This importance is likely to grow appreciably in the next decade or so as the fishing industries of African, South American and South-East Asian developing countries modernize and become even more commercial, which in the long term will, of course, be to the detriment of catches under fisheries agreements. Demand in the OECD countries is likely to continue growing for some time to come, while domestic fishery yields will stagnate or decline slightly. If world production stagnates and demand for imports rises, the result will naturally be a tendency for world market prices and export proceeds, especially from high-quality fish, to increase in real terms.

As fish and other marine creatures form a qualitatively very heterogeneous product group (with highly disparate price levels and trends; see section 3) and as the industrialized countries' demand for imports will primarily concern the best qualities, this trend will not necessarily exacerbate nutritional problems in the exporting countries. If, on the other hand, the species on which the local population live are seriously overfished, either because the right balance has not been struck in fisheries agreements or because large-scale fishing gets out of hand, the result will be inadequate protein intake in many countries, especially for the poorest sections of the population. This has already happened in Senegal because of rising exports and prices since the devaluation of the FCFA.

The poorest of the poor in developing countries with long coastlines meet a substantial proportion of their animal protein requirement by consuming fish. In East and South-East Asia alone fish is the most important source of protein for more than a billion people.[8] A comparison of the FAO's empirically determined requirement figures, which include an empirical safety margin of the calculated average egg protein requirement (see Annex I for total consumption converted to egg valency), with current per capita consumption of animal and vegetable protein shows how critical the supply situation already is in many developing countries (see Figure 2).

At the comparatively low per capita consumption of animal protein in Africa, fish is of critical importance for a minimum intake of essential amino acids, which vegetable foodstuffs contain in far

7 OECD, Review of Fisheries in OECD Member Countries, Paris 1994, pp. 20 ff.

8 Ministry of Foreign Affairs, Fisheries in Developing Countries, The Hague 1995, p. 3.

from adequate quantities, but which must be absorbed by the human organism with food (lysine, methionine, tryptophan, histidine, phenylalanine, leucine, isoleucine, threonine, serine, valine). This is particularly true of the West African coastal countries, where fish still accounts for 50 to 80 % of all animal protein consumed (see Table 2). But in Asia, Oceania and Latin America too many countries are heavily dependent on fish for their supply of protein (see Figure 2). On average, the developing countries now meet over a third of their minimum requirements of essential amino acids through the consumption of fish (see Figure 9).

In these economies the income elasticity of demand[9] for fish is between 0.80 and 1.0, with own local price elasticities probably between -1 and 0 in most cases. A development policy in the fishery sector that ranges from the rational sustainable management of stocks to a policy on fisheries agreements and foreign trade is of paramount economic and nutritional importance and will become even more important in the near future as world and domestic demand grows and new fisheries agreements are negotiated.

3 Price Trends

For fish, unlike the classical agricultural raw materials, there are no long price series representative of the world market. There are two main reasons for this: firstly, fish forms a qualitatively very heterogeneous product group - on the demand side some qualities are hardly substituted one for another - and secondly, inadequate infrastructure and the speed at which fresh fish goes bad mean that there are large and largely isolated regional markets in the developing countries that have no or no more than tenuous links with the world market. In recent years, however, there have been signs of a change due to a number of factors (see Figure A5): fresh high-quality fish,

Table 2: Meat and fish consumption in the West African coastal countries, in 1980 and 1990, in kg per capita and % fish

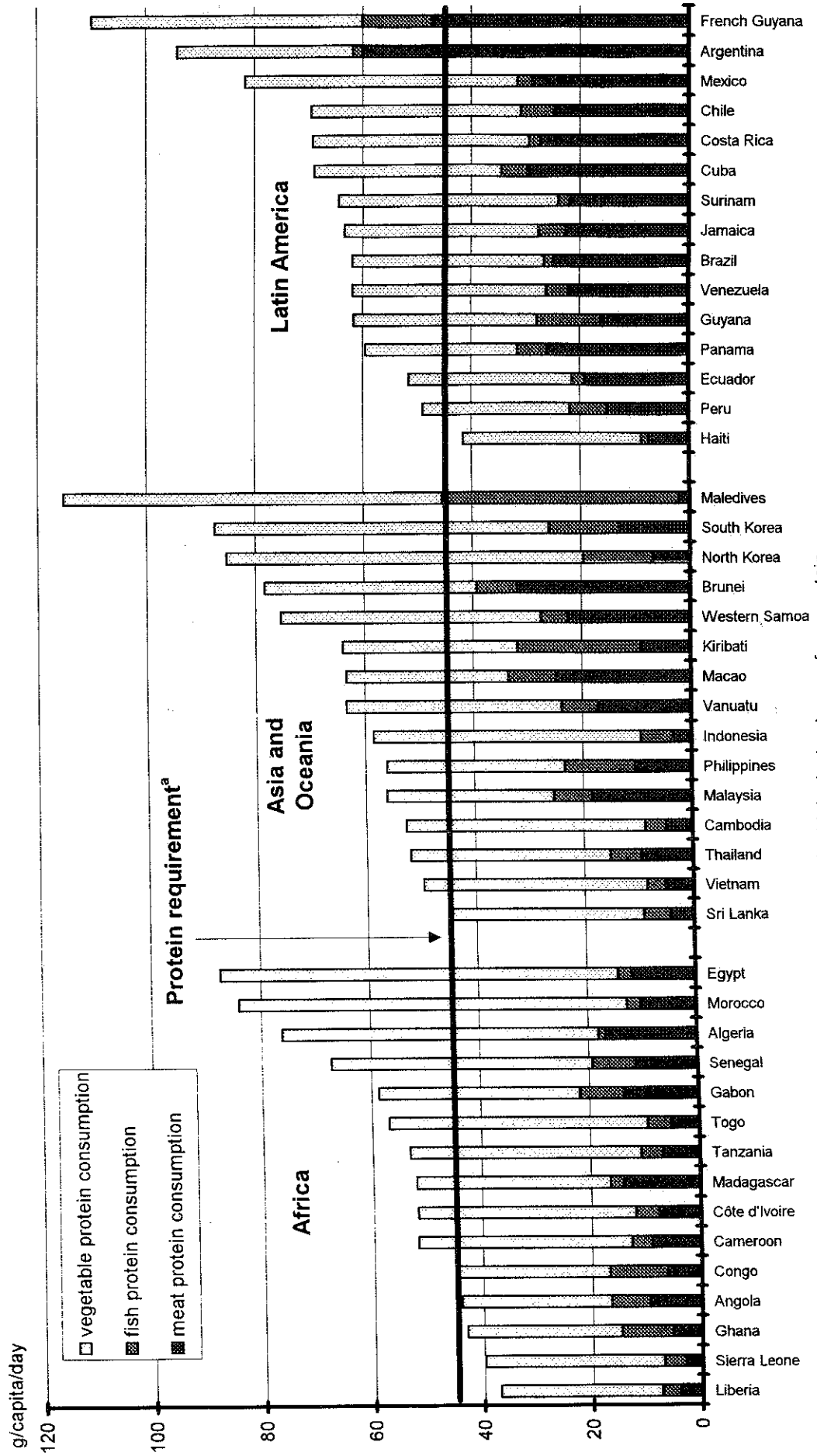
	1980		1990	
Country	kg per capita	%	kg per capita	%
Côte d'Ivoire	33.1	63	30.2	64
Ghana	24.1	82	32.2	82
Togo	16.6	49	19.8	59
Nigeria	17.8	53	13.4	69
Cameroon	24.3	49	19.0	49
Benin	17.1	52	17.7	58
Total[a]	20.0	58	18.0	67

[a] average weighted by population

Source: Rolland, J.-P., Impact de l'accord du GATT et de la réforme de la PAC. Le cas du marché euro-africain de la viande bovine, Paris 1994

9 Ibid., pp. 44 ff.

Figure 2: Average per capita protein consumption and requirement in selected countries, 1990 (g/capita/day)



[a] Protein requirement in the form of a safe level of protein intake in the biological valency of egg protein

Sources: FAO, Fish and Fishery Products, Rome 1992; FAO, The State of Food and Agriculture, Rome 1994; FAO/WHO/UNU, Energy and protein requirements, Geneva 1985; author's own calculations

for example, is increasingly exported by air. Until 1993 the trend in retail prices in Côte d'Ivoire, for instance, paralleled German prices of Atlantic cod. After the FCFA devaluation in January 1994 they rose by 60 to 250 %, depending on the species.[10] Producer prices rose by 20 to 70 %.

Given the EU's relatively liberal policy on trade in fish and fishery products and the Federal Republic's 75 % import quota, prices in the German fish markets can be taken as an indication of the trend in international prices (Table A5). The prices of low-fat food fish (Greenland cod, haddock) have roughly tripled in nominal terms since 1975. The price trend reflects growing demand for lean filleted fish (deep-frozen fish) in the industrialized countries and increasing global scarcity of supply.[11] Thus even in an exporting country like Norway the producer prices of Greenland and Atlantic cod and redfish have risen by a factor of 3.0 to 3.5 in nominal terms since 1975.[12,13] Owing to the decline in the production of groundfish (low-fat food fish) in the northern continental shelf areas, increasing quantities of groundfish are being exported from South American and African countries to the highly solvent industrialized countries. In some places the restrained management of stocks has already given way to a market-oriented approach to satisfying demand. Sedentary coastal fishers are, as it were, selling their livelihood. With "good" money to be made, they are ignoring sustainability. On the other hand, the prices of herring and other industrial shoaling fish, which are determined by their marginal utilization in the production of fish meal, have stagnated (see Figure A6). However, as an animal feedingstuff, fish meal can be largely replaced with soya meal, the supply of which is still comparatively price-elastic. The price quoted for fish meal in Hamburg averaged US $ 40 per tonne in the 1980s. This compared with an average cost price to the factory for fresh industrial fish of US $ 44 per tonne (50 % of production costs, processing quotient 1/4.55). Though high, the prices of salmon and shrimps, both already available from aquaculture in relatively large quantities, are showing a slight tendency to fall.[14]

In West Africa the producer prices of small shoaling pelagics (sardinella, horse mackerel) have averaged US $ 0.25 per kg in the 1990s, with a margin of fluctuation of US $ 0.15 to 0.40 per kg.[15] This is equivalent to about a third of local wholesale beef prices (see Figure A12). The extensive imports of presumably highly subsidized frozen fish of poorer quality have had a retarding influence on producer prices in the traditional artisanal fisheries of some countries.[16] In Nigeria the difference between fish and meat prices has been even more pronounced (see Figure A7) because of this country's policy of independence from the world market, which has caused meat prices in particular to rise relatively steeply.[17]

Where the world market in marine fish is concerned, reference thus needs to be made in the overview (see Figure A11) to at least four quality groups, differing significantly in terms of supply, demand and price trends:

- industrial shoaling fish (small shoaling pelagics), in demand mainly for fish meal production and in local markets where purchasing power is low, with no clear trend in

10 Qualmann, R., Makroökonomische Anpassung und Perspektiven für die Wettbewerbsfähigkeit der Klein- und Mittelindustrie nach der Franc CFA-Abwertung: Der Fall Senegal, Berlin 1994, p. 14.

11 Sommer, V., Fischwirtschaft in Zahlen, Brunswick 1994.

12 Hannesson, R., The Supply of Groundfish Products in Norway: A Simultaneous Equations Model, in: SNF, Working Paper No. 76, 1993.

13 Weber, P., Protecting Oceanic Fisheries and Jobs, in: State of the World, 1995, p. 28.

14 FAO, The State of World Fisheries ..., op. cit., pp. 33 ff.

15 Idem, Report of the Study on Exploitation and Use of Small Pelagic Species in West Africa, in: FAO Fisheries Circular No. 880, Rome 1994, pp. 14 ff.

16 Brandt, H., Auswirkungen von Exporterstattungen der EU auf die Rindfleischsektoren westafrikanischer Länder, Berlin 1995, pp. 21 ff.

17 Ibid., p. 22.

nominal prices (about 30 % of global fishery yields);

- aquaculture products, especially shrimps and salmon, nominal prices being very high, but tending to fall (about 3 % of world production);
- high-quality, filletable shoaling fish (Atlantic and Greenland cod, haddock, saithe, pollack, hake, redfish), the real prices of which have been maintained;
- top-quality fish (tuna, halibut, sole), price levels being very high and nominal prices fluctuating wildly. Producer prices of tuna have sometimes exceeded US $ 20,000 per tonne.[18]

4 Fleet Capacity

In 1992 the world fleet capacity was about 26 million GRT. In the past decade the developing countries have recorded the highest increase in capacity (see Figure 3). While the world's fishing fleet makes up only about 30 % of merchant tonnage, it accounts for 80 % of the world's merchant fleet in terms of replacement value.[19,20] These figures indicate that trends in national fishing fleets are influenced not only by governments' fisheries policies but also to a significant extent by the vicissitudes of national shipyard and shipbuilding policies. And it certainly cannot be simply assumed that fisheries and shipbuilding policies are always coordinated. To throw light on this largely ignored and uncharted problem area would require a number of case studies, which cannot be provided here. Such studies might, however, lead to the conclusion that shipyard and shipbuilding subsidies are among the main causes of overcapacity in the fishery sectors of many countries.

Over the last two decades the world's fishing fleet capacity has developed roughly twice as quickly as fishery yields. If sustainable fishery yields are taken as the yardstick, there is serious fleet overcapacity in the industrialized countries. The EU and Iceland, for example, could both achieve the same yield with 60 % of their catching capacity. In Norway a mere 30 % would be enough. Consequently, the global average of statistically recorded productivity has declined (see Figure A8). This development can be ascribed to five main factors: the subsidization of shipbuilding, the subsidization of fisheries, the rise in the real world market prices of high-quality fish and fishery products, investors' lack of appreciation of the aggregate trend in capacity and the limited production potential of fish stocks.

The worldwide overcapacity is bound to result in enormous maintenance or follow-up subsidies. The FAO has estimated the annual operating costs of the world fishing fleet in 1989 at US $ 92.2 billion and capital costs at US $ 32 billion. This compared with revenue earned by producers of US $ 70 billion. Subsidies thus totalled at least US $ 54 billion, or expressed in more immediate terms: for every kilogram of fishery yield intended for direct human consumption a global average subsidy of about US $ 1 went to marine fisheries. A precise analysis would probably bring further subsidies to light in individual cases, e.g. modernization aid, government grants for the purchase of rights of access to other countries' 200-mile EEZs and storage and marketing subsidies.

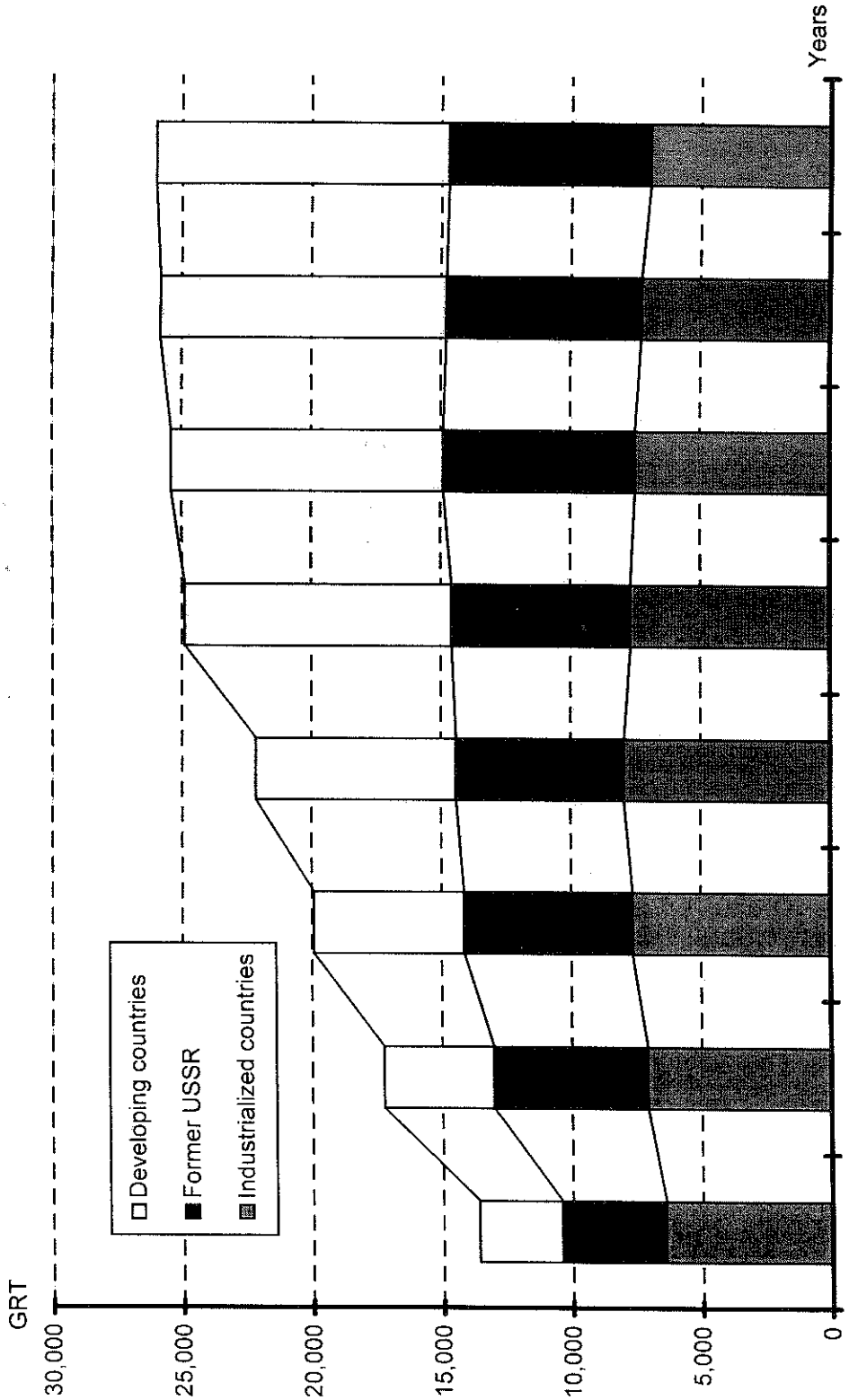
Financial problems encountered by fishing companies where there is overcapacity and fishing options are limited are, of course, a potential incentive to exceed government catch restrictions, and one that becomes particularly strong where monitoring is inadequate. According to numerous press reports, this is often true of distant-water fishing by foreign fleets in the 200-mile EEZs of many developing countries under fisheries agreements between industrialized and developing countries (see section 9). Given their mobility, foreign fleets operating under fisheries agreements have little interest in (profit-reducing) sustainable fisheries. The promotion of domestic

18 Gaski, A.L., Bluefin Tuna, Cambridge 1993.

19 Ministry of Foreign Affairs, Fisheries in Developing Countries, The Hague 1995.

20 FAO, The State of World Fisheries ..., Rome 1995.

Figure 3: World fishing fleet, 1970 - 1992 ('000 GRT)



Source: FAO, The State of World Fisheries and Aquaculture, Rome 1995.

fleets fishing in their own waters, with foreign competition reduced, would be a first step in the generation of awareness of natural resources at home by representatives of the trade and others. Helping to lay the technical and organizational foundations for more effective monitoring in the long term will undoubtedly be one of the focal areas of future development cooperation in the marine fishery sector.

A quarter of all fishing vessels are more than 25 years old, and 47 % are older than 20 years. In the course of the next decade a substantial proportion of the present world capacity is therefore likely to be written off as technically obsolete or no longer fit for use, depreciation through use normally being put at 25 years. However, technical advances mean that newbuildings of the same tonnage have a catching power ratio 1.5 to 3 times that of the vessels they replace. The capital costs and, therefore, the financial pressure to utilize capacity to the full are correspondingly higher. Hence the increasingly urgent need to adapt the development of national fleet capacities to sustainable resources and to take account of the growing technical efficiency of fishing vessels in this context. At present this is, of course, no more than a pious hope. Used stern trawlers no more than five years old are being sold in the world market at very low prices equivalent to 20 % of their capital cost or less (or they are passed on to developing countries as part of development cooperation projects) and replaced with heavily subsidized, very modern factory trawlers equipped with sonar electronics to control and steer the nets and capable of catching and processing 200 tonnes of fish a day.[21] The conflicts and difficulties inherent in this undertaking are evident from the trend in the EU's fishing fleet and from its policy on fisheries structures (see section 11.3).

21 Mann Borgese, E., Brave new overfishery, in: The Ecologist, Vol. 25, No. 2/3, 1995, pp. 55 ff.

II Sustainability Problems in World Fisheries

5 Explanatory Approach

5.1 The "Tragedy of the Commons" or Market Failure in the Fishing Industry

"Freedom of the commons" denotes the situation in law (or international law) where opportunities exist for the free exploitation of natural resources, free in the sense that the private sector incurs no costs by exploiting these resources, although the global and national economies certainly do.[22] Under market economy conditions there has been ample opportunity for free access to wildlife, fish, forests, land and water only in the exceptional cases of pioneering and land acquisition. This led to extensive labour and capital input by exploitative means, which in turn gradually resulted in the physical degradation of the resources freely exploited by the private sector. Where scarcity exerted sufficient pressure, however, exploitation rights eventually had to be privatized by the legislator if a struggle for ownership was to be avoided. As soon as exploitation rights were privately held, they were also traded, and market prices formed, guided primarily by capitalized rents and risk factors. Subsequently, resource-conserving or sustainable management became worthwhile as the prices of resources rose in relative terms and the interest on capital fell. That traditional, subsistence production systems usually solved these problems by means of socio-institutional restrictions on access and rules on exploitation can be ascribed to one important factor: there were no or only very "thin" markets in which rents could have been freely achieved.

In marine fisheries, however, it is difficult to trace the same route because a fish stock in the sea is a rapidly changing variable and one that can be defined only at a specific time. It can be owned only after it has been caught. Unless rights of access, or fishing rights, are privatized as an alternative as it were and limited to a sustainably rational overall level, the eventual outcome, if demand rises, will be the destruction of this resource, a result which Hardin has aptly called the "tragedy of the commons": "Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all."[23] In a free fishery the individual user thus optimizes his share of the total yield without regard for its sustainability as long as he can hope for an economically attractive market price, since what he does not take for himself today will be taken by another today or tomorrow. To be precise, then, the "tragedy of the commons" is the consequence of a legal and market vacuum in relation to the exploitation of scarce resources, but not of a real market failure since, where private exploitation rights do not exist, the market cannot put a value on the resource and is therefore unable to advance cost arguments for it to be exploited sparingly.

This was precisely the situation in marine fisheries until 1982, while the unrestricted freedom of the seas prevailed and anyone could fish as much as he liked and wherever he liked outside the three-mile limit. Real fish prices rose and encouraged an increase in fishing capacities and effort. Fishing methods were constantly improved, and modern fishing fleets overfished stocks in one area after another, the following vicious circle accelerating the plundering of stocks: declining fish stocks increased production costs and fish prices. This prompted investment in more efficient locating, catching and processing methods, larger fishing vessels (see section 4), etc. As a result, remote marine areas were fished and overfished, and the old fishing grounds of the North Atlantic and North Pacific became increasingly depleted. The North Atlantic cod, the Alaskan and Newfoundland halibut, the North Sea herring and the Namibian pilchard and hake are well-known examples. However, even a number of developing

22 Hardin, G., The Tragedy of the Commons, New York 1968.

23 Ibid., p. 38.

countries - on the West African coast, for example - have recently begun to complain about this situation (see section 8).

The national fisheries policies of both the industrialized and the developing countries have greatly exacerbated the above vicious circle in a subsidy race - prompted not only by sheer national greed but also by their underestimation of the global resource situation and the trend in fishing capacities. "Freedom of the commons - tragedy of the commons" - clearly, this sequence is also true of internationally free resources. Appeals to users on moral grounds will not be enough to remedy the situation - especially where nations' access to free resources is at stake: "This appeal, so counterproductive among individuals, is even more so among nations."[24]

With the establishment under the 1982 international Convention on the Law of the Sea of an exclusive economic zone (EEZ) extending 200 miles seawards from the coastline, national rights of disposal over fish stocks in the EEZ were created (see section 6). This did away with the international freedom to fish within the EEZ. Anyone wanting to fish in another country's EEZ must obtain its permission, under a fisheries agreement, for example. This has not by any means solved all the problems of overexploitation. At international level the following areas of conflict persist:

- the overexploitation of fish stocks in the open seas outside the 200-mile EEZ;
- the management of straddling fish stocks in agreement with neighbouring countries and fishing fleets operating outside the EEZ;
- the formulation, supervision and monitoring of the observance of fisheries agreements.

To this list must be added the issues that national fisheries policies have failed to resolve, especially overfishing by a country's own fleet and/or foreign parties to fisheries agreements (e.g. in the EU; see section 10.1):

- strong internal forces encourage the overexploitation of fish stocks within the EEZ;
- the fishing rights or quotas allocated under fisheries agreements to foreign fleets introduce a further element of uncertainty and distrust into the management of the EEZ;
- surveillance and inspection remain a key problem, to which a satisfactory solution has been found hardly anywhere.

At the beginning of this chapter it was said that, while in the sea, fish stocks cannot be owned and that the alternative must therefore be the allocation of access or fishing rights by the state. How well these rights are enforced depends, however, on the efficiency of a fishery surveillance and inspection system. At national and international level the only solutions so far found are unsatisfactory to a greater or lesser extent. Thus the syndrome of the "tragedy of the commons" persists in the fishing industry, albeit in moderated form. What Izaak Walton said of English inland fishing 350 years ago is true today of marine fisheries worldwide: "That which is everybodies business is nobodies business. If it were otherwise, there could not be so many nets and fish that are under the statute size sold daily amongst us, and of which the conservators of the waters should be ashamed."[25] Fishing fleets continue to plunder the open seas outside the 200-mile EEZ and the various national EEZs if there are no restrictions and/or they are not enforced. Rising fish prices in real terms, advances in fishing methods and subsidies continue to exacerbate the problem. For the moment the coastal fish stocks of many developing countries are protected against extreme exploitation by the fact that the limited purchasing power of local markets excludes demand for fish produced by costly methods. The natural regulative - little fish, high production costs, less demand because purchasing power is too low - fails if the price in the industrialized countries rises to such a level that marketing fish there is worthwhile even though transport costs are high. It is to

24 Ibid., p. 41.

25 Walton, I., The Compleat Angler, London 1653 (1st edition), quoted from a more recent, undated edition.

be feared that this will lead to the early extinction of fish stocks already under considerable pressure (see section 3), as is already happening, for instance, to Senegal's coastal demersal stocks.

5.2 The Concept of Sustainability in Fisheries

"While there is general agreement that resource conservation is necessary for sustainability, the concept of sustainability must involve more, since there are an infinite number of different use options that will result in biologically sustainable yield."[26] This basic realization applies to the management of all renewable resources by use systems: land by arable farming, extensive pasture by ranching, forests by forestry, wildlife by hunting, tundra by reindeer nomadism, fish stocks by fishing. Every use system has its specific sustainable resource equilibrium (between the decline and restoration of its productive capacity) and a sustainable physical yield.

After a change in the use system, e.g. intensification or extensification in arable farming, there is, of course, some delay before resource sustainability and natural yields recover; but in the long term it is always true to say that, as an indirect input, the state of the resource has a decisive influence on the sustainable yield level.

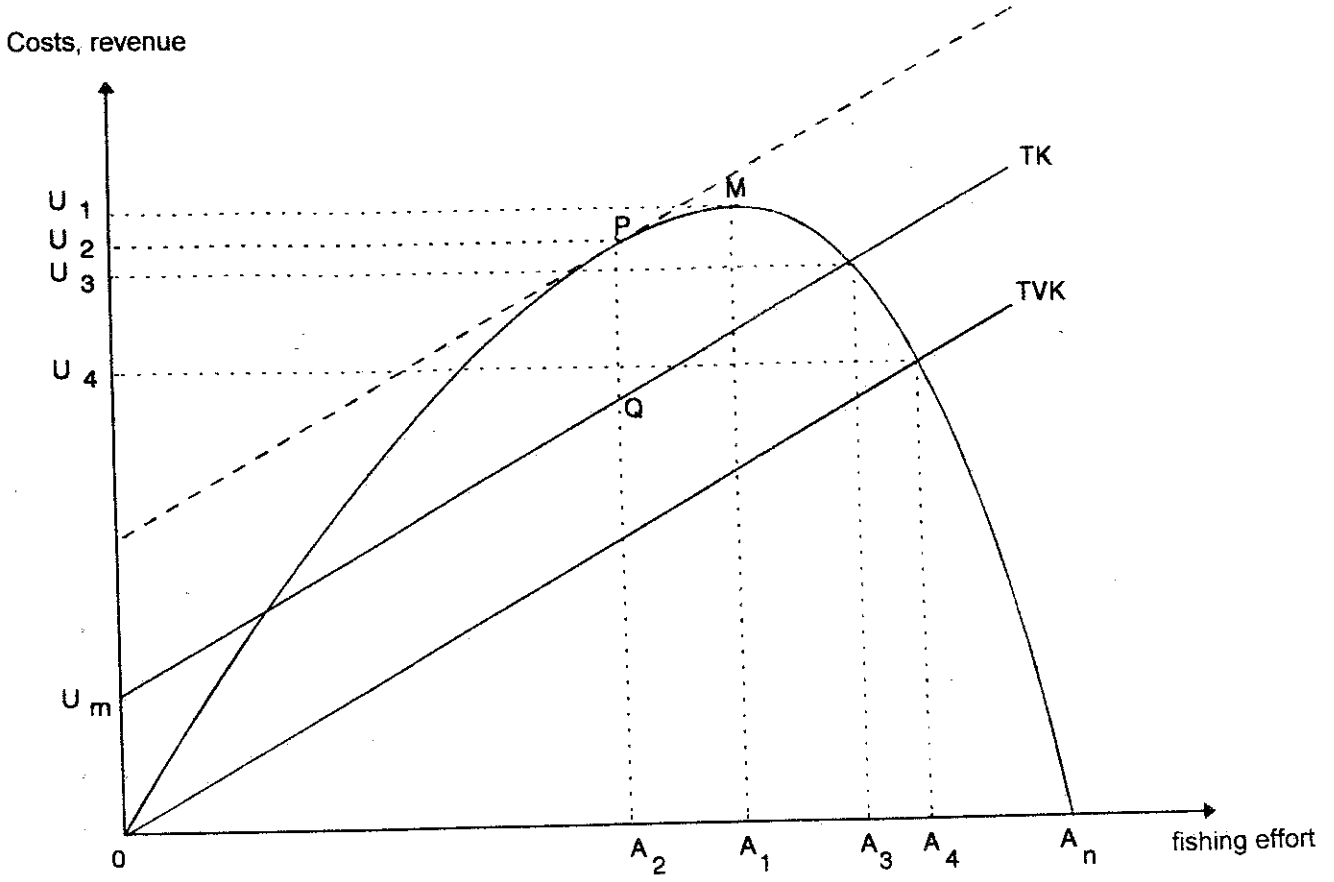
Accordingly, analyses of fisheries are based on a functional concept of sustainable fishery yield which, as a long-term average, largely depends on a fishery's state of reproduction (see Annex II). For a fishery, which is defined as a reproductively cohesive stock of a species of fish in an area of sea, a functional relationship between physical fishing effort (measured, for example, in kWh) and a sustainably achievable fishery yield is assumed. If, as a crude simplification, there is assumed to be no link between fish prices and fishery yield, which may, however, be true to some extent of many fisheries where liberal price and trade policies are pursued, the quantitative fishery yield and the revenue from it differ only by the constant price as multiplier.

A diagram comparing sustainably achievable fishery revenue and the associated cost of the fishing effort involved (see Figure 4) then reveals a number of fundamental cause-and-effect links in fisheries. The curve OMA represents sustainably achievable fishery revenue over the corresponding physical effort. At point 0 the fishery is not exploited, and the fish stock has its maximum average biomass. At effort level A_1 the maximum sustainable yield and revenue are achieved. At effort level A_n the fishery would be so badly overfished that no sustainable yield or revenue would be achieved. As physical effort increases, variable (TVK) and total (TK) production costs rise. The section of the vertical axis OU_m corresponds to total fixed costs, with capital costs as the largest item. The sustainably achievable maximum profit occurs at effort A_2 or revenue U_2. At this point sustainable marginal revenue equals marginal costs. The fishery's upper loss threshold lies at effort level A_3 and the upper production limit at A_4. At these points sustainable total revenue just covers the corresponding variable or total costs. The sustainable maximum profit or the maximum resource rent QP of the whole fishery is always achieved at less than effort level A_1. The more efficient the locating and fishing methods become and the lower the ratio of fish price to input prices, the closer A_2 comes to A_1.

Until government imposes and enforces restrictions on total effort and/or total fishery yield, the total effort in a fishery will as a rule be pushed way beyond the point of sustainable maximum yield, in borderline cases to A_4, since each fishing enterprise takes its investment and short-term decisions on the basis of freedom of access to the fishery and in ignorance of the reactions of competing enterprises and of the sustainable fishery yield curve. This race for the free resource rent regularly ends with the plundering of the stock, destruction of the fishery and economic ruin for any fishing enterprises that are submarginal in this situation, mainly because the technical life of

26 Charles, A.T., Towards sustainability: the fishery experience, in: Ecological Economics, Vol. 11, No. 3, 1994, p. 204.

Figure 4: Basic economic arguments relating to the fishing industry: sustainable total revenue and total costs over fishing effort



$\overline{PQ}$ = resource rent

Source: own draft

a fishing vessel is calculated in decades and the decline in fishery yield due to overfishing follows the capacity trend with only a few years' delay. Technical advances, booming fish markets and government subsidy programmes may greatly accelerate this race towards the "tragedy of the commons". Especially where rising producer prices in real terms and government cost subsidization coincide, the individual enterprise may be tempted to continue overfishing to maintain profitability even though physical fishery yields have already fallen well below their sustainable aggregate maximum.

Thus if the simplification of constant fish prices or completely price-elastic demand is abandoned and account is taken of expanding fish markets and the possibility of fairly price-inelastic demand, as is presumably true of high-quality species of fish, to judge from the trend in quantities and prices, the above revenue/cost diagram changes significantly. Two factors in particular should be borne in mind:

- At a price demand elasticity between -1 and 0 maximum revenue A_1 also moves towards A_n, and the sustainable revenue function becomes more skewed to the right the nearer own price elasticity approaches zero.
- Rising demand (due to a growing number of potential buyers and rising real per capita income) raises the trend in fish prices if the quantity produced can no longer be sustainably increased. At relatively rising fish prices, sustainably achievable fishery revenue and thus the pressure to overfish grow with the passage of time. Point A_3 moves towards A_n (see Figure 4).

In the fishing industry in some markets both effects (combined) are already much in evidence (see sections 3, 5.1 and 8), but in the debate on fisheries little attention has so far been paid to the fact that, for the two reasons given and because of the subsidy syndrome mentioned above, the free play of forces is bound to take fishing very close to destroying stocks of high-quality species unless government intervenes beforehand to regulate quantities. Consequently, there are not only economic arguments for government intervention, as has already been shown, but also, as a rule, sound social and ecological arguments.

All past experience indicates that the socially, ecologically and economically irrational outcome of a legal and market vacuum can be avoided at present price ratios and with current technical possibilities only if state fisheries policies ensure that the fishery yield and fishing effort considered politically acceptable are not continuously exceeded. This task is, of course, far more complex in practice than in a simple schematic cost/revenue presentation, since the environmental and, therefore, exogenous reproduction situation in a fishery is in practice by no means constant but, as a rule, quite variable: changing ocean currents, water temperatures and pollution levels, whether the target is predatory fish or its prey, and possibly endogenous stock cycles. The quantitative rhythm needed for individual fisheries is not found until after many years of statistically well documented experience (see Annex II). Besides this, the social and structural situation of a fishing industry has, of course, a considerable, if not crucial, influence on decisions taken under fisheries policies.

In the practical application of a fisheries policy the concept of a sustainably optimum fishery yield must take account both of constantly changing stock and reproduction data, including a safety margin, and of the social and structural situation in the fishing industry. A fresh attempt is always made, as it were, to resolve conflicts as far as possible without ruining fish stocks in the process. This task tends to be even more difficult in developing countries than in the industrialized countries because the tropical marine environment is comparatively complex[27] and because, as a rule, there are still major shortcomings in the fishing industry's statistics.

27 Loayza, E.A. / L.M. Sprague, A Strategy for Fisheries Development, Washington 1992, p. 82.

6 International Law of the Sea and International Fishery Problems

The first two UN Conferences on the Law of the Sea in 1958 and 1960 did not produce any significant results. After ten years of negotiation the Third Conference on the Law of the Sea that ended in April 1982 brought revolutionary changes to the international law of the sea, especially with regard to marine fisheries. The recognition of an exclusive economic zone (EEZ) extending 200 nautical miles seawards from the coastline gave coastal countries, among other things, the sole right to exploit the fisheries in their respective EEZs. The coastal countries were thus able to deny foreign fishing fleets access to the 200-mile EEZ, waters they had previously fished free of charge (Article 57 of the CLS). The 1982 Convention on the Law of the Sea placed 85 to 95 % of the world's marine fish stocks under national jurisdiction. The ten countries with the longest coastlines today account for about 50 % of the global EEZ. The Convention finally entered into force in November 1994 after being ratified by the required minimum number of signatory states (60), which included the Federal Republic of Germany.[28]

However, national jurisdiction over 90 % of marine fish stocks has in no way brought international conflicts of interest in marine fisheries to an end. The contentious issue today is the exploitation of joint stocks and highly migratory stocks. Joint stocks are populations in the biological sense that straddle the boundary between neighbouring countries' EEZs or between the EEZ and the high seas.[29] Such highly migratory species as tuna and cod simply cannot be placed under national jurisdiction. The magnitude of the problem of straddling fish stocks is evident, for example, in the North-East Atlantic, where 80 % of all fisheries are classified as joint stocks: although the coastal countries have the right of disposal within their own EEZs, they actually "own" only 20 % of the total fishery. Similar problems arise in the North Pacific and many other marine areas. They are, of course, considered particularly pressing by coastal countries when fish stocks can, as it were, be suctioned off from outside because of their migratory behaviour. This occurs, for instance, when a foreign distant-water fishing fleet heaves to off the EEZ and intensively fishes an area of the adjoining high seas, which is replenished from the EEZ stock by migration. The same problem can, of course, arise between the EEZs of neighbouring countries.

The 1982 CLS has consequently eliminated only some of the dissatisfaction and distrust in the fishing industries of the coastal countries. The recent conflict between Canada and the EU over fishing on the high seas outside the 200-mile EEZ off Newfoundland is a well-known example. If nothing else, the provisions of Articles 116 et seq. are likely to be reviewed in the coming years (possibly at the level of such regional fishery organizations as NAFO) with a view to international measures being taken to conserve stocks, monitor fisheries and impose sanctions when rules are broken.

Although total catches and national quotas are already specified, within the North Atlantic Fishery Organization (NAFO), for example, ensuring compliance and inspection are a national responsibility. Although the NAFO agreement gives the signatory states the right to inspect vessels of other signatory states outside their own EEZ, it does not give them the right to impose sanctions for proven violations. In May 1994 Canada passed a law permitting the Canadian fishery authorities (under Canadian, but not international law) to use force against fishing vessels sailing under other flags in or outside the EEZ if they suspected a breach of the NAFO agreement. A motive for such action arose in the spring of 1995 when the EU refused to accept the Spain's halibut quota in NAFO waters, which had been reduced from 60,000 to 27,000 tonnes. This might well constitute the usurpatory preliminaries for further changes to the international law of the sea.

28 Werbke, A., Hohe-See-Freiheit und Entwicklungsländer heute, in: Nord-Süd aktuell, 1993, No. 3, pp. 422 ff.

29 Sullivan, K., Overfishing and the New Law of the Sea, in: OECD Observer, No. 129, July 1984.

How difficult this process will be is evident from the Galician fishing industry's reaction to Canada's action and the subsequent prompt failure, as it were, of the negotiation of a new fisheries agreement between the EU and Morocco: "In Spain it is now feared that the action taken by the Canadian patrol boats could be seen as a precedent by other countries similarly attempting to extend their territorial waters and then, like the Canadians, attacking other countries' vessels in international waters between 200 and 400 miles off their coast."[30]

The line to be followed by an international fisheries policy aimed at conserving stocks has been under discussion within the UN and, more specifically the FAO, for many years. An interim result has been the Rome consensus on world fisheries of 15 March 1995, in which the fisheries ministers called (without any legal commitment) for:

- fishing to be reduced to an environmentally acceptable level where stocks are overfished or exhausted;
- the capacities of fishing fleets to be reviewed and - if necessary - reduced;
- international cooperation to be increased within the framework of regional and subregional fishery organization;
- the developing countries to be helped to introduce environmentally acceptable fishing methods;
- states to be encouraged to develop ecologically acceptable aquaculture as a major contribution to food security.[31]

The international agenda has thus been set in general terms. The problems relating to quota, inspection and sanction mechanisms for straddling stocks and stocks on the high seas outside the 200-mile EEZ have, of course, yet to be solved.

The latest outcome of the international debate is the international agreement negotiated by 99 countries on the monitoring of high seas fisheries, which is likely to make a decisive contribution to halting the overfishing of highly migratory species. Once 30 countries have ratified and signed the agreement, the international law of the sea will for the first time prohibit any violation of the requirements regarding fishing methods laid down by regional fishery organizations and of the member countries' quotas or rights of access to individual straddling fisheries (outside the 200-mile EEZ). Subject to the findings of a review of some articles of the present text of the agreement, the EU has given its approval. It believes that the limited opportunities for the use of force by the fishery inspectors of a member country of a regional fishery organization on the high seas (outside the 200-mile EEZ) permitted by the present version of Article 21(8) in conjunction with Article 22(1)(f) are particularly in need of review in the light, inter alia, of the 1982 CLS.

7 Points of Departure for Fisheries Policy

7.1 Objectives

A perusal of press articles and the literature reveals that fisheries policies normally pursue economic, social, ecological and nutritional objectives:[32]

- improvement of the economic efficiency of the fishing industry;
- preservation of a traditional fishing industry structure and of the associated jobs;
- at least some protection of fish stocks and the marine environment;

30 Frankfurter Allgemeine Zeitung, 18 April 1995, p. 7.

31 FAO-aktuell, Konsens von Rom zur Weltfischerei verabschiedet, 31 March 1995, No. 13/95, p. 1.

32 See, for example, Hilborn, R. / C.J. Walters, Quantitative Fisheries Stock Assessment, New York 1992.

- an adequate supply of biologically high-quality protein to the population.

An added factor for developing countries in particular is the need to begin by laying the structural foundations for a fisheries policy: analysis of the biology of the sea and fisheries, analysis of the fishing industry, formulation of a political concept for this industry, statistics, surveillance and inspection of catches.

The importance the various fishing industries attach to these aims and measures varies widely. The nutritional objective, for example, is of paramount importance for the South-East Asian and West African coastal countries (implicitly at least, given the scarcity of protein). For them a serious decline in national fishery yields would be a nutritional disaster since fish accounts for a very high proportion of a very low level of per capita consumption of animal protein (see section 2). There would then be very little prospect of finding a substitute, especially for low-income consumers, since other animal protein would be too expensive and imported fish, unless subsidized and distributed by a chain of cold storage units, would similarly be too costly or unavailable, if only because of inadequate marketing infrastructure. In these circumstances, the following chain of events might occur: overfishing - structural protein deficiency - poverty-oriented protein aid.

The goal of economic efficiency in both fishery resource exploitation and processing is relatively important in the structural fish-exporting countries because much of what they produce has to be internationally competitive in cost and quality terms. Its importance will grow with the relative volume of exports and the decreasing availability of subsidies. However, even countries with inward-oriented fishing industries will want so to control their national yield and yields ceded under fishery agreements that they do not fall into the trap of seriously overfished stocks.

The preservation of a traditional fishing industry structure is particularly important (for employment and nutrition) where whole coastal regions largely depend for their livelihood on fishing and the up- and downstream sectors of the economy and there will be no significant income alternatives in the foreseeable future. The Spanish and Portuguese fishing fleets, for instance, employ some 120,000 people from structurally weak coastal regions. If up- and downstream sectors are added, an estimated 600,000 jobs depend on fishing. In Canada, Scotland, Greenland and Norway there are regions with a similar structural dependence on fishing. In developing countries artisanal fishing, processing and marketing are far more labour-intensive. The social and nutritional consequences would therefore be serious, particularly for the poorest sections of the population, if the traditional fishing industry was destroyed.

The importance of the goal of protecting fish stocks depends particularly on whether overfishing and stock depletion have already occurred (see section 8 and Annex AII). A high priority is, for example, now given to the conservation of fish stocks in the 200-mile EEZ around the North Atlantic, firstly, because the complementarities with the economic and social objectives have been fully recognized, and secondly, because it is known from long, statistically proven experience that whole populations of marine mammals and sea birds depend on the fish stocks. But people learn from their mistakes, and developing countries too are quick to learn, as is apparent during the negotiation of fisheries agreements. As biological estimates have hitherto been vague or even non-existent in such cases, it is difficult to decide in specific instances how interested the developing countries are in protecting their stocks and how far this is just a pretext to gain as much as possible from the other party to an agreement. The EU's recent negotiations with Morocco on a new bilateral fisheries agreement are a good example in this respect.

The supply of protein to the population is a particularly important goal for the fisheries policies of many African and Asian developing countries (see section 2), and one that has usually not been voiced simply because an adequate supply of cheap fish has hitherto been taken for granted. It is now becoming clear in more and more countries that the precondition, the sustainability of

current domestic fishery yields at something like a rational level, can no longer be taken for granted.

This brief discussion of objectives already shows that fisheries policy always has many facets, is always apt to give rise to conflict and should always be related to specific locations.

7.2 Points of Departure and Instruments

As the basic model of the fishing industry (see Figure 4) and fisheries policy as pursued in practice show, fisheries policy essentially has five direct points of departure where the capture fishery sector is concerned:

- output prices,
- input prices or costs,
- requirements regarding fishing methods,
- limitation of fishing effort based on capacity and/or fishing area and/or fishing season,
- division of the physical fishery yield into quotas.

These points of departure will be discussed below in the light of available empirical reports from a number of fishing industries. Transferability to developing countries will be considered in this context. However, experiments with and experience of national fisheries policies geared to conserving stocks are confined to the period since the creation of the 200-mile EEZ under the 1982 CLS. National fishing industries throughout the world are currently engaged in an intensive process of gaining experience of fisheries policies and consolidating them. Two generally valid basic rules on the instruments to be used under fisheries policies are gradually emerging: firstly, without at least some biological statistics on fisheries and unless fisheries are supervised and monitored effectively, anything like a rational policy of conditionality and catch restriction is impossible. Whether or not these basic requirements are met largely depends, of course, both on physical and non-physical infrastructure and on the general socio-economic environment of the fishing industry concerned. Secondly, it must be borne in mind that there is no such thing as an off-the-peg fisheries policy suitable for a given location. A set of instruments that is appropriate for industrialized countries is far from always suitable for a developing country that has to take account of weak infrastructure, a traditional fisheries structure and an internal market system that is no more than partly integrated.

With a change in producer prices the sustainably achievable revenue and the free resource rent can in principle be so changed that a target fishery yield emerges (see Figure 4). But this is true only if imported fish is available at far lower prices than domestically produced fish. However, as fish quickly goes bad (even in a structural import situation), this quantitative support for a producer price policy presupposes modern marketing facilities and chains of cold storage units, which few developing countries have, and even then they are thin on the ground. Although some West African coastal countries regularly import subsidized shoaling fish, mainly for consumer policy reasons, the market effects are largely confined to their capitals.[33] The basic structural problem of overinvestment or overcapacity in tonnage terms and the resulting overfishing can hardly ever be solved by a producer price policy alone. Where the producer prices of foreign fleets that have been granted fishing rights form in their home ports, the producer price policy of the country granting the rights naturally has no impact.

It can also be said of the western industrialized countries, Eastern Europe, the CIS and a growing number of developing countries that governments have sound reasons for heavily subsidizing their fishing industries: "In many countries the owners of boats receive investment grants or low-interest loans, they are able to buy diesel at less than the usual price, and almost everywhere fish prices are shored up by government market regulation and

33 Brandt, H., Auswirkungen von Exporterstattungen .... op. cit.

purchasing."[34] Market regulation in this context means primarily tariff or non-tariff import restriction, and purchasing means primarily denaturing food fish to fish meal because of technical and/or financial storage problems.

A cost policy approach has better prospects. A fuel tax or a reduction of fuel subsidies - fuel accounts for up to 70 % of production costs - increases variable costs, for example (i.e. the cost curves become steeper); a licence fee or a reduction of investment subsidies increases the fixed or capital costs (moves total costs upwards). A system of this kind would in principle enable the syndrome of the "tragedy of the commons" to be overcome since it would increase fishing costs and reduce or completely eliminate the free resource rent. It would also have the advantage of being administratively relatively easy to introduce and monitor. However, being highly visible, this approach usually meets stiff resistance on social policy grounds. For this reason it has yet to be seriously attempted anywhere. What is more, so one-sided a system would hardly be able to take sufficiently flexible account of changes in the basic biological state of fisheries that may have causes other than overfishing (natural factors, endogenous cycles, etc.). Despite all its technical elegance in theory, its introduction in practice would probably lead to an endless dispute, if not to chaos in the fishing industry. Here again, a cost policy approach would, of course, have no impact on foreign fleets with rights of access under fisheries agreements if any fees involved were subsidized by the state wanting the agreement.

An approach commonly adopted consists in restricting fishing capacity and/or fishing effort. To this end, a whole range of separate measures are employed, including the limitation of fleets or tonnage by restrictive licensing and/or the limitation of fishing areas and periods. As a rule, the use of certain fishing gear or methods (e.g. drift nets, bottom trawls, minimum mesh sizes, maximum tonnage and power of vessels) is also prohibited. The considerable practical experience of such measures shows that individual measures are regularly circumvented by fishers using alternatives, i.e. they are unable to solve the problem of overcapacity and stock depletion. Where fishing capacity or effort is nonetheless restricted for social and/or structural and/or inspection policy reasons, past experience indicates that a package of complementary measures should be taken to prevent fishers as far as possible from resorting to alternatives: "But because maintaining and enforcing such measures is usually quite costly, the net benefits generated may easily turn out to be negative."[35] The cost of surveillance and inspection naturally rises with the size of the package of measures. What is feasible and affordable must be decided in each case.

The most difficult instrument to monitor is the allocation of quantitative catch quotas. It is usually what fishery economists advocate, at least when they are discussing the industrialized countries' fisheries policies. In the implementation of their fisheries policies the industrialized countries too increasingly use forms of production quota, where, at least, social and structural policy objectives play a subordinate role.

This approach is always based on the fixing of total national quotas, where possible below the sustainably achievable maximum output of the various fisheries. Otherwise, the national quota systems differ widely: individual or ship-based quotas, temporary or permanent individual quotas, tradability and transferability or the state's reversionary right to individual quotas, allocation free or sale by the state and many other options besides. The advantage of global quotas and individual quotas derived from them, if actually enforced as tradable rights, is that the "tragedy of the commons" is overcome directly, since they restrict the total yield both directly and indirectly: by tying up capital, they tend to eliminate the free resource rent (see Figure 4), which now becomes

34 Zank, W., Wann geht der Fisch aus?, in: Die Zeit, No. 17, 21 April 1995, p. 13.

35 Arnason, R., Theoretical and Practical Fishery Management, in: Loayza, E.A. (ed.), Managing Fishery Resources, Washington 1992, p. 6.

a private-sector cost. In this respect, the impact is equivalent to that of a tax chargeable as an expense. Quotas and such taxes differ, of course, in the impact they have on income distribution in the fishing industry, the speed of capacity adjustment and other factors. Experience shows, however, that a policy of tradable production quotas creates a strong tendency for fishing to become concentrated in certain regions and enterprises.

The most important aspects of the highly varied experience of quota policy to be borne in mind are the following:

- Without an efficient system of surveillance, inspection and sanctions a quota policy cannot be enforced.
- Without the approval and cooperation of the enterprises in the fishing industry a quota policy requires a disproportionate amount of monitoring.
- To achieve the necessary quantitative flexibility in a quota policy, the state must either act as the principal actor in an open market for individual quotas or these quotas must be allocated as percentages of a flexible total national quota.
- Experience has shown that a policy of freely tradable individual quotas fairly soon leads to the oligopolistic concentration of enterprises and the regional concentration of landings, processing and marketing facilities. Artisanal fishing suffers accordingly and may even be forced out of the market.
- A policy of maintaining and promoting a traditionally structured fishing industry must therefore work primarily with measures to restrict fishing effort (access, tonnage, power, fishing methods and gear).

7.3 The Fisheries Policies of Developing Countries

It has become clear that direct yield restriction and/or the absorption of a free resource rent are the way to overcome the "tragedy of the commons" in marine fisheries. In principle, this can be achieved by changing producer prices, fishing costs and the restriction of access (including requirements regarding fishing methods) and by introducing catch quotas. Given the constraints on developing countries in terms of their fishing industries' physical and non-physical infrastructure, their long-term approach to establishing an orderly fisheries policy must usually begin primarily with the limitation of access, restrictions on fishing methods and (as a complement) an improvement in infrastructure. Complementing such measures with taxes in the nature of variable and/or fixed costs should be considered for the modern subsector on a case-by-case basis.

As a rule, there are neither basic systematic statistics on the fishing industry nor anything like adequate biological analyses of fish stocks. The quantitative base for a fisheries policy is thus largely lacking. In addition, fisheries surveillance and inspection capacities are usually very poorly endowed or developed in terms of both manpower and equipment. In such circumstances, it can be said: "Even with all its imperfections, a licensing system could be preferable to an ITQ system that cannot be controlled and enforced. Enforcement and monitoring are thus key considerations in evaluating an ITQ system. If enforcement and monitoring are difficult, such as in small-scale fisheries in which the catch can be landed with no elaborate landing or harbor facilities (by moonlight on a beach, for example) and sold to local consumers, an ITQ system would be useless. Another type of fishery in which ITQs would seem to be a poor choice is one in which it is difficult to make reasonably accurate predictions of the future size of the fish stock ..."[36] Other details should be discussed on a case-by-case basis.[37]

Reference should also be made to the concept of minimum information fishery management (MIFM), which is discussed in the literature, but

36 Hanneson, R., Trends in Fishery Management, in: Loayza, E.A. (ed.), Managing Fishery Resources ..., op. cit., p. 95.

37 Arnason, R., Theoretical and Practical ..., op. cit., p. 8.

has yet to be put to the test anywhere. It certainly seems temptingly simple: the state progressively distributes or sells individual percentage quotas, which are freely tradable, and adjusts the total quota until its market value reaches a maximum level: "Minimum information fishery management is a relatively recent idea that has not yet been put into practice in any ITQ fishery. Although it should be beneficial in all fisheries, it appears particularly attractive for fisheries in which there is little centralized knowledge and data processing capabilities are low."[38]

There is, of course, room for scepticism here; developing countries persuaded to undertake such an experiment as part of a structural adjustment programme, for example, would probably soon experience what market power is capable of and where it leaves their traditional fishing industry. And, to mention just one other problem, what would happen if the sustainably achievable fishery yields dwindled as a result of natural factors (ocean temperature and currents, the weather) or overfishing? Would the state or a professional organization not then have to play the part of buyer in the quota market? One thing is fairly certain: unless government pursued a general open market policy, it is unlikely that MIFM could be maintained politically. Nor could this concept be implemented unless government surveillance and inspection were able to ensure compliance with the quotas.

For whichever concept fisheries management may opt, it will always be true to say that, even under a policy of restricting fishing effort, rapid modernization, the development of a sea-going fishing fleet and the granting of access rights to foreign fleets under fisheries agreements may very soon be followed by overfishing and, eventually, the exhaustion of fish stocks, because there is no reliable overview either of the sustainable yields that stocks are capable of producing or of the current fishery yield and because there is no fishery surveillance and inspection. There is always a need for:

- at least some biological analysis of fish stocks,
- adequate surveillance and inspection capacity,
- adequate basic statistics on the fishing industry and adequate analytical and conceptual capacity.

These are some of the possible points of departure for development cooperation, and they should be given a particularly high priority in development policy towards countries where fish accounts for a large proportion of a generally low per capita supply of animal protein. In such cases a more traditional, project-oriented form of development cooperation that encouraged a little aquaculture here, some artisanal coastal fishing there would indeed evade a core nutritional and social issue. This may seem like wishful thinking, given the technical and political problems in practice, but it is, after all, the direction in which Articles 58 to 68 of the Lomé Convention point.

To summarize, it must be said, however, that the ideal information, inspection and intervention options for a fisheries policy as postulated in the literature[39] are not as a rule open to developing countries. In the instruments used, their fisheries policies should therefore begin by adopting largely separate approaches for the traditional artisanal subsector and the modern fleet, including the formulation of fisheries agreements. They should then tackle the question of monitoring fishery yield, primarily by the indirect means of a system of access restrictions and requirements regarding fishing methods that is appropriate to their situation. All technical cooperation measures relating to fisheries must be conceived on the basis of legal prescriptions and a sufficiently accurate knowledge of the reproductive capacity of the

38 Chapman, M., Basic elements in the sustainable development of fisheries: implications for aid programs in developing countries, in: Resource Management and Optimization, Vol. 9, No. 1, 1991, pp. 71-83.

39 Pearce, P.H. / C.J. Walter, Harvesting regulation under quota management systems for ocean fisheries, in: Marine Policy, Vol. 16, No. 3, 1992, pp. 167 ff.

fish stocks. Where this basis does not exist, its creation must have priority over all other development measures. Ideally, these processes should ensure that the local know-how of fishers makes a socially acceptable contribution to the shaping of the legal basis for fishing. The interests of high seas fisheries, with their rights and obligations, must form an integral part of a balanced fisheries policy that takes appropriate account of both the ecological and the social and economic aspects of sustainable stock management. Past experience indicates that foreign fleets operating under fisheries agreements can be supervised and monitored efficiently and at reasonable cost only if appropriate measures are taken at regional level, possibly by fishery inspection organizations embracing all the parties concerned. Much the same is demanded by Article 63 of the Lomé Convention: "The ACP States and the Community recognize the need for direct or regional co-operation or, as appropriate, co-operation through international organizations, with a view to promoting conservation and the optimum use of the living resources of the sea."[40]

8 Excursus: Namibia's and Other ACP Countries' Experience of Overfishing by Foreign Fishing Fleets

The World Bank draws the following general conclusion on the problems posed by the developing countries' fishing industries and fisheries agreements: "Only a few of the developing countries have the technology and infrastructure to translate the transfer of harvest rights into economic benefits. And most do not possess the biological and economic information or political mechanisms to optimally manage the resources."[41] It continues: "Large foreign fleets operate off the coast of developing nations under licensing and other agreements. Most less developed countries lack the means to manage these fleets and many are not receiving an equitable share of the catch value."[42] An already classical case of this syndrome and of experience with and the consequences of a fisheries policy is Namibia's fishing industry in the period from about 1965 to 1990.

In its 200-mile EEZ Namibia has some very productive fishing grounds (Benguela Stream), from which a total annual yield of over 1.5 million tonnes was harvested in the mid-1970s. Uncontrolled predatory fishing by distant-water fleets, particularly from the former COMECON, halved the total yield from 1.2 million tonnes in 1978 to 600,000 tonnes in 1985/86. As Namibia restricted domestic production of pilchards from 1981, without the foreign fleets following suit, and as its purse seine fleet was inferior in catching capacity and efficiency to the modern foreign trawler fleets, it was hit far harder by the depletion of the stocks than were the foreign fleets. The yield harvested by the Namibian purse seine fleet consequently fell from 700,000 tonnes in 1974 to 130,000 tonnes in 1985/86 (see Figure 5). The trend in the 20 years since 1964 makes the decline in yields even clearer (see Figure A2). During a "pillage systématique de cette zone très poissoneuse"[43] the stock of pilchards, sardine-like shoaling fish, was reduced to 2 % of its original size. In the 1970s 500,000 to 600,000 tonnes of hake, a long-lived groundfish species, were caught each year. In 1987 the catch fell to 300,000 tonnes and in 1991 to a mere 83,000 tonnes, including a very high proportion of young fish.

The International Commission for the Southeast Atlantic Fisheries (ICSEAF), which was set up in 1969, did not prevent the overexploitation of Namibia's waters. Although the General Administrator of South-West Africa declared the establishment of a 200-mile EEZ as early as 1981, it

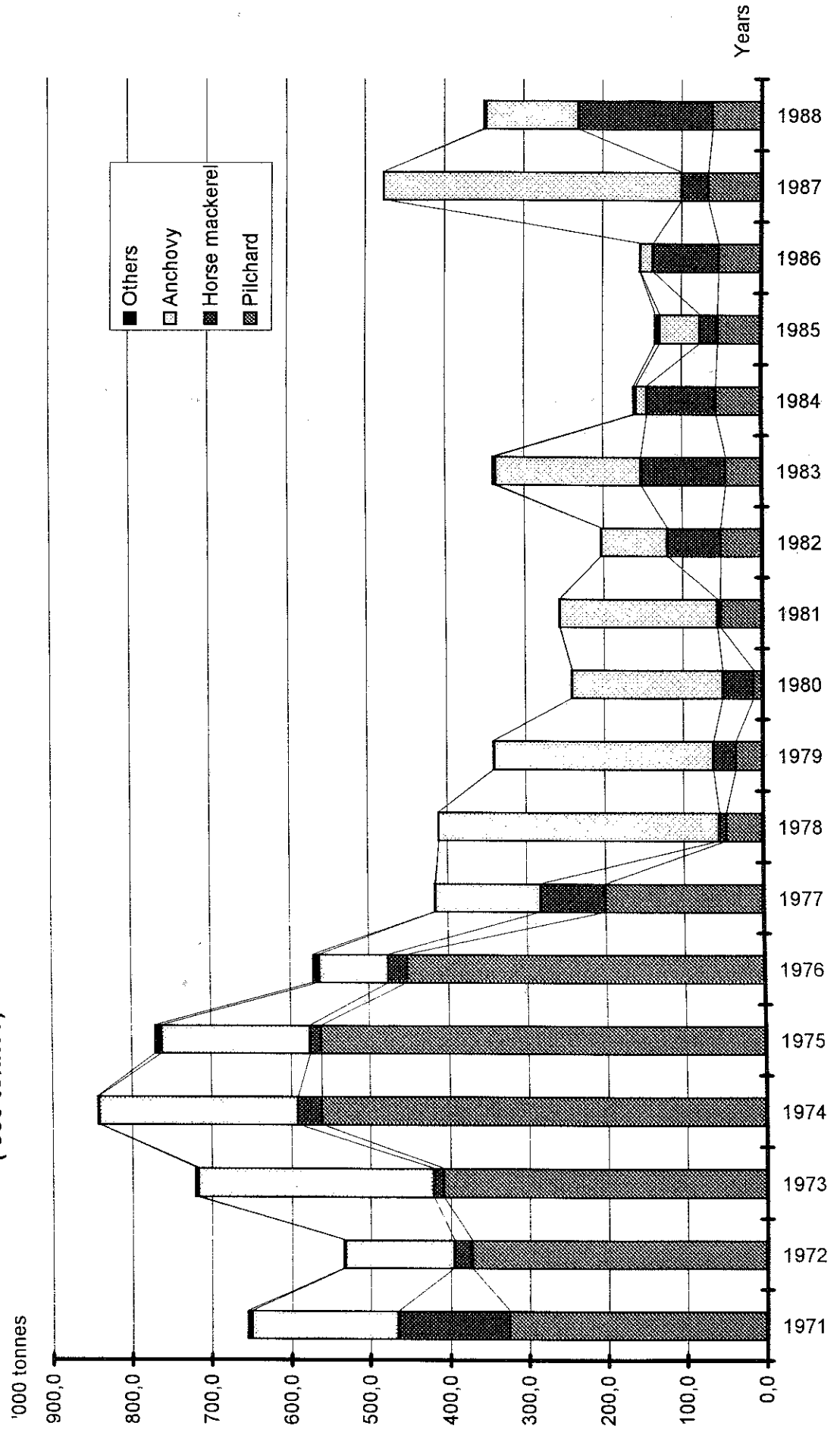
40 BMZ, Materialien Entwicklungspolitik, No. 82, Bonn.

41 E.A. Loayza / L.M. Sprague, A Strategy ..., op., cit., p. 12.

42 Ibid., p. XII.

43 Zaugg, M. / D. Williams, L'avenir se joue à terre, in: Courrier Afrique, January 1992, p. 7.

Figure 5: Namibia's purse seine fishing, composition of catches by species, 1971 - 1988 ('000 tonnes)



Source: Institut für Landwirtschaftliche Marktforschung, Grundlagenstudie Namibia, Vol. 7: Sektorstudie Fischerei, Brunswick/Munich 1989.

was not recognized internationally and could not be enforced by the Namibian fisheries authority. Finland supported Namibia's claim to a 200-mile EEZ before the UN in the mid-1980s, but its efforts failed in the face of objections from the then Soviet Union and SWAPO. In 1990 Namibia, having gained its independent in 1988, announced the establishment of a 200-mile EEZ and enforced it with coastguard vessels.[44] As a result of these measures Namibian fish stocks, especially of pelagic shoaling species, quickly recovered. For the long-lived hake it will take considerably longer.

Given the comparatively high labour intensity of catching and processing, the expansion of the fishing industry may make a major contribution to easing Namibia's labour market situation. As its economy is heavily dependent on imports and the TOT are deteriorating, exports of fish and fishery products, the world market prices of which are tending to rise (see section 3), are becoming increasingly important for Namibia's trade balance. By the year 2000 Namibia wants to double its output of fish and fishery products. This plan and the country's unsatisfactory experience with foreign fishing fleets explain its current reservations about fisheries agreements. Within the SADC Namibia coordinates the fisheries policies of the souther African countries.

From Senegal, Morocco and Mauritania - to name but a few cases in the ACP group - declining fishery yields are reported. The main reason given is overfishing by foreign fleets, some of which simply ignore the quantitative restrictions imposed by fisheries agreements. The Moroccan government has halted new investment in fisheries, new licences are not being issued, and 87 of 367 high seas fishing vessels have been taken out of service.[45] "In the case of Mauritania ..., the EC, in its answer to the court, admits that according to documents in its possession, the underutilization of the fishing potential by the European fleet might result from the depletion of stocks, because of overexploitation."[46] Mauritania's production, as shown in the statistics, fell by 38 % in 1994, and this in a country that derived some 50 % of its foreign exchange revenue from fish exports from 1992 to 1994. In Mauritania's case foreign fleets are already ruining the fishery yield of the traditional artisanal sector. What is the situation in this respect in other West African coastal countries, for example?

In Senegal the artisanal coastal fishing industry is protesting against the violations of the 7-mile exclusive zone by foreign trawlers.[47] Similar complaints are to be heard in Sierra Leone. But the West African coastal countries' own trawler fleets are also growing apace. From Morocco to Zaire the number of units rose from 1,056 in 1979 to 1,842 in 1989.[48]

The difficulties during the negotiation of a new fisheries agreement between the EU and Morocco were partly due to similar factors. The Moroccans demanded better monitoring of fishing activities and a 65 % reduction in the EU's fishing capacity in their 200-mile EEZ over the next three years. The Spanish and the Commission, representing them, would not accept this because of the Spanish fleet's overcapacity problems. At risk were 7,000 jobs in Spain's fishing fleet and a further 30,000 in its fish-processing industry. The EU's fisheries Commissioner declared she would propose to the Member States that they review all relations with Morocco.[49] A solution was found only after a year of tough negotiations. In this case the Council of Ministers and the EU governments needed to ensure the coherence of fisheries, foreign and development policy (see section 11.4).

44 Schumacher, A., Sektorstudie Fischerei, Munich 1989.

45 Zuiber, K., La reconquête de la mer, in: Jeune Afrique, Vol. 35, No. 1794, 1995, p. 93.

46 Misser, F., Who gains from Euro-African fishing agreements?, in: African Business, February 1994, pp. 27 f.

47 Le Sann, A., Réaccorder les accords, in: Courrier Afrique, No. 3, January 1992, p. 4.

48 FAO, Promoting Industrial Fisheries in West Africa, Rome 1994, p. 18.

49 Neue Züricher Zeitung, 30 August 1995, p. 3.

These few examples are enough to show that development cooperation must establish and support fisheries policies if EU policy on fisheries agreements is to be sustainable in the years to come. Only if its ACP partners pursue consolidated fisheries policies can the EU defend its fisheries interests in the 200-mile EEZs of the ACP and other third countries in the long term. This is, moreover, urgently needed, since one of the conclusions already drawn in 1992 on West African waters was that "à court terme dans certains pays, à moyen terme ailleurs, la présence des flottes étrangères est condamnée."[50]

However, foreign trawler fleets are not always the only potential "villains". India's Kerala Coast, for example, shows that an artisanal fleet that becomes mechanized can also cause serious overfishing problems in coastal waters. The annual yield per fisher in this area fell from 3.5 tonnes in 1961 to 1.6 tonnes in 1982 and continued to fall thereafter. In the end the government introduced a seasonal ban on the use of dragnets.[51]

50 Le Sann, A., Réaccorder les accords ..., op. cit.

51 Kurrien, J. / T.R. Thankappan Achari, Overfishing along Kerala Coast, in: Economic and Social Weekly, September 1-8, 1990, pp. 2011 ff.

III EU Fisheries Policy

9 Outline and Relevance to Development Cooperation

The EU's common fisheries policy (CFP) lays down uniform rules on fisheries structure, foreign trade and the internal market and on access for third-country vessels to the EU's fishing grounds and is binding on all the Member States.[52] The EU also pursues a common external fisheries policy on behalf of the Member States: the negotiation and conclusion of fisheries agreements with third countries, membership of regional fishery organizations (e.g. NAFO) and of the FAO and cooperation in these organizations in matters relating to international fisheries policy, and participation in international conferences on fisheries and marine environment policy as negotiator and, where appropriate, contracting party.

The EU establishes the framework for its development cooperation in the fishery sector with individual ACP and other developing countries primarily by means of fisheries agreements, since development cooperation measures are becoming an increasingly important aspect of such agreements. This also creates, of course, decisive points of reference for the bilateral development cooperation of individual EU Member States in the fishing industries of third countries. It will, moreover, be more important in the future from the development policy angle to ensure the internal coherence of fisheries agreements so that, when EU vessels exercise access or fishing rights granted or actually achieved, due account may also be taken of the long-term nutritional and economic interests of the contracting third country, not because the EU is in principle not to be trusted, but because it too can make mistakes and therefore needs to discuss these matters.

52 Commission of the European Communities, The New Common Fisheries Policy, Brussels 1994.

10 Foundations, Development, Aims

Article 38 of the Treaty of Rome as amended in February 1992 makes the CFP part of the common agricultural policy (CAP). Article 39 defines the CFP's aims, and Articles 40 to 46 describe the main features of the instruments to be used. The first set of comprehensive CFP rules were set out in Council Regulation 170/83.[53]

The objectives defined in this regulation are bound by Article 39 of the Treaty: "The aim of the measures finally adopted was to prevent the overfishing of stocks, to assure fishers of a livelihood in the future and to ensure regular supplies to the processing industry and consumers at fair prices."[54] The devil, or perhaps the wisdom of the very general wording of the regulation, is in the detail of the laboriously negotiated individual instrumental measures, which can be ascribed to the following subpolicies:

- policy on the conservation of stocks and access to fishing grounds,
- policy on the supervision of fishing activities,
- price, market and trade policies of the fishing industry,
- policy on the structure of the fishing industry (including employment safeguards, research and environmental protection),
- external fisheries policy (fisheries agreements with third countries, membership of regional fishery organizations and international conventions).

The development and state of these policies is outlined below. The structural overcapacity in terms of fishing vessels in the EU, one of the principal motives for concluding fisheries agreements with ACP and other third countries, and the care taken to consider the need for coherence

53 Misser, F., Who gains from Euro-African ..., pp. 27 f.

54 Frankfurter Allgemeine Zeitung, Die spanische Lobby spricht von einem Katastrophenjahr, 19 May 1995, p. 16.

between the CFP (in the case of fisheries agreements with third countries) and development cooperation have concentrated the mind in this context. It should be pointed out even now that, where the sustainable catch potential of a third country's 200-mile EEZ is known, it cannot be in the EU's medium- to long-term fishing interests for this potential - on which the value of access rights very much depends, of course - to be devalued or destroyed.

Greenland's departure in 1985, the accession of Spain and Portugal in 1986 and the incorporation of the former GDR in 1990 brought a fundamental change to the structures of the EU's fishery sector and especially to the ratio of fisheries potential to fishing capacity. The accession of the Iberian countries increased the fishing capacity of the EU fleet by 75 % and consumption and fish production by 45 %.

Although a review of the fishing industry and fisheries policy in 1992/93 did not result in any basic change in the overall design of the 1983 policy, it did lead to clear shifts of emphasis in five problem areas in particular:

- rational and sustainable exploitation of fish stocks,
- balance between fishing effort and available or accessible resources,
- strict access controls and improved enforcement of Community legislation,
- better coordination within the CFP and with other EU policies, such as the policy on relations with third countries,
- cushioning of economic social consequences of the adjustment of fisheries structures.

In the context of structural adjustment it is pointed out that "the peculiarities of the various fisheries and the possible economic and social consequences must be taken into account."[55] The EU Commission, on the other hand, says: "How the consequences of these developments (i.e. the reduction of fishing effort in the coming years and of customs duties in foreign trade) are cushioned largely depends on the individual Member States, which are responsible for establishing alternative employment programmes."[56] This difference of attitude is an indication of the contentious issues surrounding the financing of the EU fisheries policy that will have to be resolved by the year 2002, when the policy is due to be fully harmonized. When it is considered that, compared with a rational level of production in the EU's own fishing grounds, the current excess of fishing capacity is likely to be as high as 40 % and that a total of 600,000 to 700,000 jobs depend, 120,000 of them directly, on Spain's and Portugal's fishing industries, the political magnitude of the unsolved problems becomes clear: "The Community's fisheries are plagued by a formidable overcapacity, financed in part by Community grants that did not take into account their long-term consequences."[57]

What cannot be denied in this situation, however, is that the short-term goal of full capacity utilization under fisheries agreements with ACP countries may eclipse interest in sustainably rational fish production in the 200-mile EEZs of some of these countries. An impression of the political urgency of full capacity utilization in the short term is provided by the recent fisheries conflict between the EU and Canada and the difficulties that arose during the EU's negotiation of a new fisheries agreement with Morocco.[58]

In each case, however, given the EU's need for coherence, it is not only not repugnant, it is even necessary in this area of potential short-term conflicts that the long-term perspective should not be overlooked, since overfishing under a (usually two- or three-year) fisheries agreement not only harms the third country concerned but also de-

55 Foders, F., Reforming the European Union's Common Fisheries Policy, in: European Policy Forum, London, February 1994, pp. 12 ff.

56 Commission of the European Communities, The New ..., op. cit., p. 8.

57 Ibid., p. 10.

58 Ibid., p. 43.

stroys the foundations for a long-term (or sustainable) EU policy on such agreements. What must always be added, of course, is that discipline exercised by the EU fleet can conserve stocks only if it is matched by other fleets (including the host country's).

11 Subpolicies

11.1 Access to EU Fishing Grounds, Conservation of Fish Stocks and Monitoring

Fishing in a Member State's 12-mile zone is reserved for its coastal fishing industry. Exceptions are permitted only on a small scale in the case of coastal fishers of adjoining EU countries who have traditionally fished in the neighbouring country's 12-mile zone. This arrangement expires in the year 2002, after which either the principle of free access for all EU vessels will apply, or the Council of Ministers will extend the exclusive 12-mile arrangement.

Access to the 200-mile EEZ is free for all EU fishing vessels - but only in principle. There are protection areas, where access rights are strictly limited. Spanish and Portuguese vessels will have no more than restricted access to the North-East Atlantic, with the exception of Ireland's waters, until 1996. In late 1992 the EU imposed further restrictions on access to the fishing areas or made provision for even stricter limitations by introducing a number of specific measures ranging from the creation of protection areas to the specification of minimum mesh sizes.

The crucial long-term importance of the issue of access to internal EU waters for its external fisheries policy is that, realistically, there is no automatic internal access mechanism for the year 2002. In the final analysis, everything depends on the decisions the Council will then have to take. Given the domestic importance of the fisheries issue in some EU countries, a cautious approach is likely to be adopted. One need only think of the potential conflicts of interest between Spain and Portugal on the one hand and France, Ireland and Britain on the other. Spain and Portugal would then essentially have two options for their underutilized fishing capacities: to obtain fishing rights under fisheries agreements with third countries or - if that option was subject to restrictions - to reduce their capacities.

The latter option would, however, entail an enormous social burden and/or require a huge investment in restructuring. If it is assumed that 350,000 new jobs would have to be created at investment costs of only DM 200,000 per job - in the Federal Republic each job in the new Länder is estimated to cost DM 300,000 to 400,000 - the capital needed would amount to DM 70 billion. And this takes no account of the elimination of infrastructure bottlenecks. Such other interesting long-term options as the promotion of private direct investment and equalization through the EU's labour market could, of course, be added.

In view of the magnitude of this problem compared with the financing options on the one hand and the internal EU access problems on the other, the policy on fisheries agreements with third countries will have a key role to play in solving the EU's structural fisheries problems for many years to come. A correspondingly long-term policy, however, will also require sustainably rational management of the 200-mile EEZs of the third countries with which agreements are concluded. Such management will also be a crucial coherence criterion as regards development cooperation in third countries' fishing industries and the EU's policy on fisheries agreements. Efficient development cooperation that supports the rational and sustainable management of fish stocks and, in particular, protects the yields of traditional coastal fisheries within the 12-mile zone and a sustainable policy on fisheries agreements will complement each other for a long time.

TACs (total allowable catches) form the quantitative basis of the EU policy on the conservation of the most important fish stocks in the 200-mile EEZ. They are set each year for the most important stocks or groups of stocks in a fishery by the

Council of Ministers on the basis of scientific estimates. Depending on the basic data, these estimates are derived from biological simulation models of fisheries or the more or less cautious extrapolation of empirical figures. A key negotiated in 1983 is used to break the TACs down into national quotas. Fishing vessels are granted access rights under a licensing system. Access rights are supplemented by the specification of close seasons and protection areas. Fishing methods that conserve stocks are also prescribed.

EU fisheries law applies equally in all the Member States. Compliance with national quotas is monitored by the Member States on the basis of logbooks and landing statistics, and the enforcement of EU fisheries law is also the Member States' responsibility. Monitoring is a weak point in the EU's fisheries policy: "This system has been notorious for its weak enforcement. Some national authorities, in collaboration with local fishers, have refused to cooperate with the authorities in Brussels in providing timely and correct landing statistics. It is widely recognized that the landing statistics for some species are grossly incorrect."[59] Many similar statements are to be found in the press and the literature. This creates distrust among the fishing fleets: "... there is a natural suspicion that foreign vessels are not everywhere throughout the Community subject to ... tight controls. ... Whether or not such suspicions are valid, they offer further encouragement against compliance with the legal regime."[60]

The EU system for controlling catches amounts to the granting of individual fishing rights accompanied by strict limitation of the times when and places where stocks may be fished and by extensive standardization of fishing methods. The eventual solution, Foders suggests, might be tradable IFRs (individual fishing rights), a government policy of open IFR markets, strict limitation of access, extensive standardization of methods and strict supervision and monitoring.

It is fairly certain that this situation will not be achieved by the year 2002, but quantitative restrictions are being increasingly enforced. It is therefore all the more important for the EU to pursue a long-term policy on fisheries agreements that can rely on complementary development cooperation measures if it is to solve the problem posed by the structure of its fishing industry.

11.2 Price, Market and Trade Policy

Final demand for high-quality fish in the EU is probably far more income-elastic than demand for other animal agricultural products. In addition, fisheries (excluding aquaculture) cannot be intensified with yield-increasing inputs: taking an average over the years, more than a maximum sustainable yield cannot therefore be harvested in a 200-mile EEZ. Besides the placing of the 200-mile zone under national jurisdiction worldwide under the new Convention on the Law of the Sea (see section 6), the rapid rise in demand and the limits to its own yields are primarily responsible for the fact that some 50 % net of the fish consumed in the EU is now imported.

The structural import situation is commensurate with a comparatively liberal price and import policy. In 1994 customs duties averaged 11 % on fish and 20 % on fishery products.[61] During the GATT Uruguay Round reductions in tariffs on fish and fishery products averaging 25 % were agreed, to be achieved progressively from 1995. However, 60 % of all fish imports are already governed by preferential arrangements, like that provided (as tariff exemption) for the ACP countries in the Lomé Convention. Imports must, of course, satisfy the EU's extremely detailed quality standards, in practice a significant barrier to the import of fishery products from many ACP coun-

59 Hannesson, R., Trends in Fishery ..., op. cit., p. 95.

60 Jennings, M.G., Fisheries Enforcement. The United Kingdom Approach, in: OECD, Fisheries Enforcement Issues, Paris 1994, p. 169.

61 Foders, F., Die gemeinsame Fischereipolitik der Europäischen Union: Kritik und Reformvorschläge, in: Die Weltwirtschaft, No. 2, 1994, p. 225.

tries, which, according to confidential studies, would otherwise enjoy major competitive advantages in the EU market. Some fishery products are also subject to import quotas.

Each year the Council of Ministers sets import quotas and domestic prices: target prices for the EU internal market, minimum producer or withdrawal prices and reference or minimum import prices. If the internal market price (at the producer stage) falls below the minimum producer price, up to 20 % of the catch quota for the species concerned can be taken off the market and assigned to an inferior use (fish meal production). As fishery products have been governed by the provisions of the GATT since 1962, the minimum prices can be defended only if they comply with these provisions.

11.3 Structural Policy

The majority of EU fishers today belong to producer cooperatives, of which there are more than 150. The EU grants aid for the establishment of cooperatives and to help finance their landing and marketing facilities. The promotion of cooperatives results in closer links between the fishing industry and policy structures in the regions concerned. This lends added weight to socio-structural and regional policy objectives under the EU fisheries policy. The adjustment of the structure of the fishing industry is therefore likely both to proceed slowly and to avoid excessive concentration.

The policy on the structure of the fishing industry was overhauled in 1993. It is based on the need "to take account of the sweeping changes to which the sector is exposed because of the imbalance between present fishing capacities and fishing potential."[62] The Council of Ministers ruled that between 1992 and 1996 fishing vessel capacities must be reduced by 15 % in the case of flatfish and by 20 % for other groundfish catches (round fish). It remains to be seen how successfully these reductions are actually achieved and how far capacities shift to other (pelagic) fisheries through the conversion of vessels. The national shipyard and shipbuilding policies are still going their own way at present. "Spain, for example, provides heavy subsidies to its shipbuilders to attract foreign as well as domestic fishing vessel construction projects. It recently invested $ 42 million into rebuilding its distant water fleet, part of a project worth over a billion dollars."[63]

The reduction and modernization of the fishing fleet and processing, marketing, infrastructure and aquaculture are assisted by a number of funds. There are also social and employment policy measures financed from the Regional and Social Funds and special funds for the fishing industry.

Some 300,000 jobs in the EU depend directly on fisheries, the figure rising to a total of 1.5 to 1.8 million when up- and downstream sectors are included. All these jobs are in structurally weak coastal regions. The necessary structural adjustment will thus require considerable economic investment and long adjustment periods, since new jobs will not emerge overnight. Furthermore, as the producer cooperatives are greatly increasing the assertiveness of those who depend on fisheries, regional and social policy measures are likely to receive greater emphasis alongside economic efficiency in the list of EU fisheries policy objectives. This is yet another indication of the long-term importance of the EU's policy on fisheries agreements for an improvement in the utilization of domestic fishing capacities.

11.4 Fisheries Agreements with Third Countries

Since the introduction of the 200-mile EEZ under the 1983 Convention on the Law of the Sea and the accession of Spain and Portugal to the EU, the latter has felt obliged to provide opportunities for

62 Commission the European Communities, Die Neue ..., op. cit., p. 21.

63 Mann Borgese, E., Brave new ..., op. cit., p. 56.

the fishing fleets of these countries by concluding fisheries agreements with third countries.

The importance of these agreements for the EU's fishing industry is clear from both production and expenditure. More than 25 % of the EU fleet's catch of fish intended for consumption is harvested outside the EU's 200-mile EEZ. Payments to third countries under fisheries agreements accounted for about 40 % of total CFP expenditure (ECU 285 million) in 1993. The trend in these payments is upward. Indirect payments from development cooperation funds for the development of third-country fishing industries are also growing.

Besides conventional agreements with the countries on the North Atlantic coast (Greenland, Iceland, Norway, etc.), where reciprocity of market access and fishing rights has always played an important role, the EU concluded fishing agreements with 15 ACP countries in 1994. It now has 16 such agreements. They allowed the EU to deploy a total of 135,000 GRT in 1994. These access rights are usually defined as a "monthly GRT average". As a rule, the agreements also include requirements regarding minimum mesh sizes. When the time it takes a vessel to sail to and from a fishing ground, to unload the catch, to take on supplies and possibly to be repaired is added to the time spent actually fishing, it is clear that an estimated 15 to 20 % of the Iberian fishing fleets is employed under agreements with ACP countries. Another agreement negotiated with Argentina in 1992 permits an annual catch of 250,000 tonnes of fish. The main regions for EU fishing under agreements with third countries outside the North Atlantic are in the EEZs of Morocco, its West African neighbours to the South and Argentina. Since gaining its independence, Namibia has not been prepared to conclude a fisheries agreement with the EU. The old agreement with Morocco, under which 750 EU trawlers were deployed, expired on 1 May 1995. The negotiation of a new agreement proved difficult because Morocco wanted to reduce the EU's access rights by about half and because Spain and Morocco were busily "fingering" the sanction screw at the time (see section 8). The press was full of it. A compromise, which largely accommodates Morocco's demands, was not reached until October 1995. The agreement remains in force for four years and will not be extended. With Senegal too there were major differences of opinion over the EU's access rights: "Dans un premier temps, la Commission européenne proposa d'augmenter les quotas que les flottes des Douze (de l'époque) pouvaient capturer au large du Sénégal, alors que le Centre de recherches océanographiques de Dakar, créé et financé par la CEE, estimait urgent de les réduire ..."[64]

Where the policy on fisheries agreements is concerned, the EU is already referring to "second-generation" agreements in which the focus is no longer on the short-term aspects (access rights in exchange for financial compensation) but on the form to be taken by long-term scientific and economic cooperation in the fishing industry. In view of the long-term, structural nature of the overcapacity problems in the EU fishing industry and the third countries' very favourable bargaining position, which is becoming stronger as high-quality fish grow scarcer throughout the world, this change in the EU's attitude is a dictate of reason. It also creates opportunities in the fishing industry, up- and downstream processing and the research community for the expansion and long-term design of development cooperation between the EU, together with its Member States, and the third countries with which fisheries agreements are concluded. The need to assist these countries with studies of fish stocks, with fisheries management and monitoring and with the development of coastal fisheries is becoming increasingly urgent.

A problem facing the EU's policy on fisheries agreements with the ACP countries is that the latter have also concluded such agreements with other foreign fleets, which are often far more generous in terms of technical requirements and access limitations than the corresponding EU-ACP

64 Linard, A., La pêche, une guerre mondiale ignorée, in: Le Monde Diplomatique, Vol. 42, No. 495, June 1995, p. 14.

agreements based on Articles 58 to 68 of the Lomé Convention. In this situation the EU can do little to protect the fisheries of its ACP partners. The EU pays, for example, over ECU 400 million a year in financial compensation, only 30 % of which comes from the fishing enterprises that benefit from the agreements: 70 % (about ECU 285 million) is paid out of the EU's fisheries policy budget. If the EU now decided to pass the total cost on to these fishing enterprises in the hope of reducing their fishing effort or the volume the fisheries associations would like to see entered in the agreements, it would, in the final analysis, merely leave the way free for the fleets of other countries, and fishing effort in the ACP fisheries would not be reduced in the slightest. The development objectives for the fishing industry, as defined in Article 59 of the Lomé Convention, can be achieved only when the ACP countries are no longer satisfied with the substantial foreign exchange revenue they earn from their fisheries agreements in the medium term, as has already happened in the case of Namibia and Morocco. In the meantime the stocks in some fisheries may suffer damage it will take decades to repair.

IV Openings for German Development Cooperation in the Fishery Sector

12 Current German Development Cooperation in the Fishery Sector

Most German development cooperation projects in the fishery sector concern artisanal fishing. They include projects on the coast in Sierra Leone, Madagascar, Cape Verde, Papua-New Guinea, the Dominican Republic and Ecuador and inland in Brazil, Malawi, Nigeria and Zambia. Countries are given advice on appropriate technology development in boatbuilding, fishing methods and processing, on sustainable resource management, fish-breeding and the transport and marketing of catches and on organizing self-help approaches in the production environment and strengthening the representation of economic, social and political interests. Fish-breeding projects are being implemented, for instance, in Burkina Faso, India and Brazil and small-scale aquaculture projects in Malawi, Benin, Syria and other countries. And in Mauritania and Namibia initial experience is being gained in two projects in which advice is provided at sectoral level.

Both the experience gained in projects involving artisanal fishing, fish-breeding and small-scale aquaculture and the growing socio-economic importance of these subsectors suggest that assistance should continue on at least the present scale. Although experience of advising fishing industries is still limited, the global fisheries debate indicates the growing need for information, analysis, legislation and the enforcement of fisheries policies at a time when stocks are being overfished and marine resources destroyed. The major role allotted to development cooperation in the EU's new fisheries agreements with ACP and other developing countries points in the same direction.

Bäcker and Foders note "that the USA, Japan, France, Britain, the Netherlands and the Scandinavian countries are already providing considerable bilateral development aid related to the sea ...,"[65] but that the same is in no way true of Germany's bilateral development cooperation. Nor, they continue, have German capacities yet been involved to any appreciable extent in the UN agencies' marine projects: "There are many indications that their participation falls well short of Germany's financial contribution or at least of participation by comparable industrialized countries."[66]

As invitations to tender for the UN agencies' measures are published throughout the world and contracts are awarded on the basis of objective criteria, the obvious explanation for this deficiency is that German institutes and German industry are uncompetitive in qualitative or cost terms. A lack of interest in Germany or organizational and communication bottlenecks are other conceivable causes. German marine and fisheries research is characterized by a high degree of specialization in the scientific and technical fields in keeping with the times. However, there is no institute for fisheries economics and so no appropriate training course and little contract research on problems relating to the fishing industry. Could the absence of practical fisheries economists (capable of appreciating the links between fisheries technology, fishing capacity, stock dynamics, economics, social issues in the fishing industry and fisheries policy) be the real cause? As the British example shows, applied fisheries economics can make a major contribution by providing practical marine and fisheries research with essential decision-making tools. Whatever the causes of the relatively limited involvement of German development cooperation in marine projects, it is to be feared that a similar situation might arise in the EU's development cooperation in the future (second-generation fisheries agreements).

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65 Bäcker, H. / F. Foders, Kooperationschancen mit Entwicklungsländern in der Meeresforschung, der Meeresforschungstechnik und der Meereswirtschaft, in: Nord-Süd aktuell, No. 3, 1994, p. 410.

66 Ibid.

Yet there are enterprises in Germany that use efficient marine technology and have a long tradition of marine research at a high scientific level. Bäcker and Foders provide an overview.[67] "Applied marine research uses equipment manufactured in Germany that must be regarded as state-of-the art."[68]

German development cooperation is certainly not being asked to assist internationally uncompetitive sectors of the economy or research institutes in Germany. The possibility that organizational and communication problems that have so far prevented greater involvement cannot simply be ruled out, however.

It has been shown that, given the significance of the problem in development policy terms, openings might be found for German development cooperation in the main areas of fisheries development in addition to the assistance provided for artisanal fishing activities and aquaculture (marine and fisheries biology, fishing methods, storage and marketing, supervision and monitoring of the fishery sector and fisheries policy). To show how this might be achieved in practice, an overview would first be needed both of the constraints and problems in the fishing industries of partner countries and of Germany's own capacities in marine technology and fisheries research. Above all, such sectoral studies should give an impression of the resource situation, the domestic fishing industry, fisheries policy and the EU's and other donors' development cooperation.

This process might eventually reveal, firstly, that, organizational and communication problems aside, many German institutes and enterprises are competitive (for example, in fisheries and marine biological research, marine research hardware, fishing methods, supervision and monitoring policy and fish processing and marketing) and, secondly, that worthwhile openings for both development and technical cooperation now exist in a number of countries. It would also become apparent in this process, of course, that the majority of ACP countries are still satisfied with rising foreign exchange revenue earnt under fisheries agreements and consider aspects of a consolidated or sustainable fisheries policy to be of secondary importance. Only when they become aware of the attendant problems, as Namibia and Morocco have done, will the stage be set for successful development cooperation with their fishing industries.

13 Objectives of German Development Cooperation and of the EU Fisheries Policy and Coherence Issues

One of the main objectives of German development cooperation is to combat poverty in partner countries by helping them to help themselves. This means that the self-help it encourages should be socially compatible and, as a rule, economically self-supporting and should, as far as possible, develop socio-economic growth dynamism from its own momentum. This growth should not make excessive demands on natural resources or pollute the ecological system.

Given this description of the objective, the fishing industry increasingly represents a point of departure for development cooperation, since 80 % of the people who depend on fisheries for their livelihood typically fall into the lowest income bracket.[69] Furthermore, fish harvested by artisanal means is an indispensable source of an adequate and balanced supply of protein to low-income population groups in a number of coastal countries (see section 2). The poorest section of their population in particular has little or nothing to substitute for fish as a source of high-quality protein. The aim here is not only to promote artisanal fishing but also to ensure a rational and sustainable fishery yield level. A shortage of fish, making it relatively more expensive, would hit the

67 Ibid., pp. 411 ff.

68 Ibid., p. 411.

69 Loayza, E.A. / L.M. Sprague, A Strategy ..., op. cit., Washington 1992.

poorest section of the population hardest and, within this group, lead to protein deficiency particularly among children under 6 years of age and pregnant women.

It goes without saying that, with many areas of the land and sea adjoining coasts undergoing rapid ecological degradation, the importance of environmental stabilization in development cooperation is growing apace. This is especially true in the context of aquaculture projects in tidal and other coastal areas. The overall ecological situation is becoming particularly critical where aquaculture and/or waste water threaten the spawning and breeding grounds of whole marine fisheries. An example often quoted in this context is the clearance of mangrove swamps to make way for shrimp ponds in tidal areas.[70],[71]

Like the agricultural policy, the fisheries policy is a common task for the EU and is coordinated and decided by the Council of Ministers (see section 10). The effects of the instruments used under fisheries agreements and the policy on fish imports run counter to development cooperation in some respects. This is particularly true of fisheries agreements whose avowed main aim is to provide fishing opportunities for the EU's surplus fishing capacities in the 200-mile EEZs of third countries (see section 11.4).

On the other hand, one of the EU's structural objectives is to reduce its surplus fishing capacities, and as this objective is achieved over the coming years, the pressure to conclude fisheries agreements will ease. It remains to be seen what practical - and, of course, political - approach is adopted to solve the problem of EU fishing capacities. For the next decade at least there is likely to be some inconsistency between the EU's fisheries agreements and its own and the Member States' development cooperation. Where the effect of fisheries agreements runs counter to development cooperation objectives, there will be incoherence between development cooperation and the policy on fisheries agreements.

This possibility certainly cannot be excluded from the outset, and it should be presented as a hypothesis for a better understanding of the situation. If EU fishing vessels were partly to blame for serious overfishing in a third country's 200-mile EEZ under a fisheries agreement, they would threaten supplies to the low-income consumer groups referred to above; the average incomes of fishers would, of course, be at risk only if demand for fish was price-elastic. Inconsistency with development cooperation would then be primarily due to the instruments with which the partner country's fisheries policy was equipped, since overfishing resulting from the contravention of fishing rights would be due to the absence of monitoring and sanctions - in respect of all fishery activities. Overfishing resulting from the overestimation of the sustainable and rational fishery yield would be attributable to faulty biological stocktaking and/or shortcomings in the conception of the third country's fisheries policy.

Expressed in somewhat condensed form for practical purposes, a sequence of measures designed to check, achieve or maintain coherence can be deduced from the instruments with which the third country's fisheries policy is equipped:

- In the short to medium term, the establishment of an appropriate monitoring system and statistical procedure for recording and supervising fishing rights acquired under fisheries agreements.
- In the medium to long term the establishment of an appropriate system for the biological assessment and on-going monitoring of fish stocks. A socio-economically balanced general fisheries policy concept should also be formulated.
- In the long-term the development of a forward-looking outline plan showing in particular the trend in the third-country's own catches from the rational and sustainable total yield and so indicating the quantitative scope for fisheries agreements.

70 Weber, P., Abandoned Seas, New York 1993.

71 Scholz, I., et al., Ökologische Produktanforderungen und Wettbewerbsfähigkeit: Neue Herausforderungen für chilenische Exporte, Berlin 1994, pp. 23 ff.

It is, of course, first and foremost a matter for third countries to complete this sequence under their fisheries policies, but the other parties to agreements with them should then do the same. The EU would have to decide how far it intended to support the third country's adoption of a fisheries policy, how far appropriate development cooperation measures should be pledged under the EU's fisheries agreements and how far the EU's Member States wanted to be involved in this field.

An examination of the general prospect reveals that the EU needs to continue deploying some of its (hopefully) shrinking overcapacity under fisheries agreements and that - with few exceptions - industrial fishing and processing capacities can be progressively developed in third countries only in the long term. From these two conclusions it follows that it is in the medium- to long-term interests of the EU's fisheries policy for agreements relating to the 200-mile EEZs of partner countries to make for sustainable and also socio-economically rational fishing. This should be joined by adequately efficient supervision and monitoring of fishing activities. Incoherence with development policy would occur only in cases of overfishing and/or shortage of supply to the third country's domestic market. This cannot, of course, be achieved in opposition to the partner country's political awareness or against its will (see section 11.4).

Those responsible for the EU fisheries policy may point out, firstly, that no reliable biological or economic records of fish stocks are kept in third countries and, secondly, that - despite the question of coherence - account must be taken of considerable political pressure to utilize fishing fleets to capacity. Although they cannot disregard these constraints in the short term, they would be well advised to join with those responsible for the EU's development policy in endeavouring to create a biological and economic fisheries information base and a set of supervisory and monitoring instruments appropriate to the situation in partner countries. Otherwise, there is every likelihood in the medium term that fleets admitted under fisheries agreements will engage in a kind of thoughtless competition and remove every fish from the partner countries' 200-mile EEZs. Fisheries agreements could then do little to help solve the EU's overcapacity problem, which is, of course, long-term in nature. The history of the plundering of Namibia's abundant fish stocks from 1965 to 1990 and their slow recovery, especially in the case of long-lived groundfish species, shows that this problem area is no fairy tale. The warnings of similar developments in the 200-mile EEZs of Morocco, Mauritania, Senegal, Sierra Leone, Côte d'Ivoire and Ghana, to name but a few, are growing in volume.

14 Other Openings for German Development Cooperation in the Fishery Sector

The development of their 200-mile EEZs means a great deal to some 50 coastal countries of Latin America, Africa and South and South-East Asia:

- socially (a livelihood for a total of 300 to 500 million people),
- ecologically (conservation of mangroves, coral reefs and fish stocks),
- nutritionally (a source of essential amino acids, especially to low-income groups),
- economically (export of such high-quality species as squid and lobster; benefits from fisheries agreements).

Development cooperation with these countries aimed at developing their fishery sectors in a way that is balanced in the long-term is consistent with the long-term objectives of the EU's fisheries policy, since only rational and sustainable fishery yields can create the prospect of a sustainable EU policy on fisheries agreements that leaves enough time for the achievement of the EU's own structural objectives. Despite all the difficulties arising during the negotiation of some fisheries agreements, this should not be overlooked in the EU.

Proceeding from its general objectives, German development cooperation should adjust to the following potential areas of assistance, varying the importance attached to each to suit the country concerned:

- aquaculture at suitable coastal and inland locations;
- artisanal coastal fishing;
- fish processing and marketing;
- biological records and observations of fish stocks and research on marine ecosystems;
- an appropriate (and cost-efficient) system of supervising and monitoring fisheries;
- a socio-economic analysis of the fishery sector, the conception of a sectoral policy and draft fisheries legislation.

These six main areas of development cooperation, the effects they have on each other and how they are justified will be discussed in somewhat greater detail below.

The promotion of aquaculture through advice and credit measures has hitherto been a focal area of German development cooperation in the fishery sector. As the productivity of the world's oceans has been largely exhausted and demand for fish is rising sharply, it will undoubtedly remain a focal area. A distinction needs to be made between two main branches: aquaculture in fresh water and aquaculture in coastal salt water. The output of the first branch is usually sold in the domestic market and depends on the availability of sufficient water and on relatively labour-intensive local agricultural conditions. In most cases, it must be regarded in socio-economic analytical terms as a cottage industry. As its introduction normally entails considerable capital costs relative to the income of a peasant family, it should, where possible, depend on the outcome of a careful socio-economical financial calculation. The scope for intensity and yields ranges in an international cross-section from 100 kg/ha to 7,000 kg/ha. An economically, technically and ecologically balanced assessment of intensity is extremely important if aquaculture is to succeed.

Salt-water aquaculture is usually a matter for specialized enterprises unconnected with agriculture. Production is often export-oriented. The leading examples are the breeding of shrimps in Latin America and South-East Asia and of salmon in Scandinavia, Scotland, North America and Chile. Production, which is frequently large-scale, usually causes serious pollution (faeces, feed residues, drugs) and consequential ecological damage (clearance of mangrove forests, damage to flora and fauna on the sea bed). The clearance of mangrove forests in particular destroys the "nurseries" of species of the coastal and high seas and so reduces their reproductive capacity. In salt-water aquaculture the design of ecologically appropriate use concepts within the framework of technical cooperation is likely to become increasingly important in the future.

Artisanal fishing is often the form of production best suited to local socio-economic conditions: "... developing the fishery sector does not necessarily mean industrializing it."[72] This second focal area of German technical cooperation in the fishery sector, in which the emphasis hitherto has been primarily on assisting with fishing and processing methods and with marketing, will undoubtedly retain its significance as a separate area, as it were, of socio-economic analysis and advice. Of fundamental importance in the future will be the integration of artisanal fishing into an overall fisheries policy concept, for what benefit could artisanal fishing projects have if the productivity of fishing grounds suffered long-term ruination due to unbalanced fisheries policies?

The promotion of fish processing and marketing (especially the export of high-value species) is likely eventually to become a focal area of the development cooperation of the EU itself and of its Member States in the context of EU-ACP cooperation. This trend may well quicken if the EU reduces its surplus capacities under its policy on fisheries agreements and if the ACP countries

72 Agricultural Economic Research Institute, Policy Instruments for Development of Fisheries, The Hague 1976, p. 15.

insist on taking up export-oriented fish production. But for the reasons mentioned and for many others besides it is a development that can be no more than gradual and is likely to be essentially confined for the time being to a few countries with an adequate overall potential (Argentina, Namibia, Angola, Côte d'Ivoire, Mauritania and Morocco). This development should be harmonized by the EU under consecutive fisheries agreements. Germany's development cooperation capacities should be appropriately taken into account in this context. It should also be clarified as the need arises whether Germany's bilateral development cooperation measures should be used to back up fisheries agreements.

An adequate knowledge of the links between the biological aspects of fisheries and marine ecology is an essential basis for a rational fisheries policy. It presupposes many years of research work, the cost of which is such that it can be accomplished only through development cooperation. Only a few developing countries have reached a level of development that would justify the installation of their own fishery and marine biological research capacities. "The period of taking stock of fauna and flora, which is well advanced in our country, is something they have still to embark on."[73] Foders is quite right to see long-term prospects for cooperation in this area. For a start, it is difficult enough to develop usable catch statistics broken down by quantity and age. How far appropriate development cooperation measures should be implemented under or in support of EU fisheries agreements should be clarified on a case-by-case basis. For cost reasons action should clearly be taken through regional fishery organizations, as the Lomé Convention suggests.

To some extent, the equipment and cost of fishery supervision and monitoring systems depend on the type of fishery management system, which may consist of licences and/or catch quotas and/or taxes and/or use rights for set periods and areas.[74] The comparatively very well developed British system, for example, costs about DM 50/sq.km of sea p.a.,[75] equivalent to the market value of 0.5 tonnes of industrial fish. Few developing countries will be able to operate at this cost level. Their systems will consist of licences, access limited to set periods and areas, standardized fishing methods, the satellite location of fishing vessels and random checks. The establishment of such a system - whether under fisheries agreements or bilaterally as a support measure - will primarily require technical cooperation, but financial cooperation will also be needed to provide the hardware (fishery protection vessels, fishing technology and such like). This problem too can be solved at reasonable cost only through regional cooperation among neighbouring countries.

Balanced fishery policy conceptions are essential for a lasting policy on fisheries agreements since, where serious imbalances exist, be they of a biological, technical, social or economic nature, such a policy is bound to fail. This is a priority, though politically very delicate, area for technical cooperation, which should, as far as possible, be included in EU fisheries agreements. It should be remembered in this context that one of the goals of German development cooperation is that artisanal fishing should be afforded special protection under developing countries' fisheries policies. It operates at low cost, it is labour-intensive, and it does comparatively little damage to the environment. It fishes near the coast, where there is a great temptation for foreign trawlers to "give it a try" under cover of darkness. This practice could have disastrous consequences for the employment and nutrition of the poorest section of the population, as experience in India and other countries has already shown.

73 Bäcker, H. / F. Foders, Kooperationschancen ..., op. cit., p. 414.

74 Loayza, E.A. / L.M. Sprague, A Strategy ..., op. cit., p. 16.

75 Jennings, M.G., Fisheries Enforcement ..., op. cit., pp. 168 f.

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Annex

Annex I:

Man's protein requirement

1 The Importance of Proteins for Human Nutrition

Proteins are simple albumins composed of amino acids. As basic nutrients, they are vital for the development and preservation of body tissue and as a source of energy for the undernourished. Essential amino acids are particularly important since they are needed for the development of endogenous proteins, but as they cannot be developed by the body itself, they must be absorbed with food.

As a rule, animal nutrients contain more protein than vegetable nutrients. For example, 100 g of fish contains some 15 g of protein, compared with only about 7 g in 100 g of rice. Tubers (manioc, sweet potatoes and yams), staples in many developing countries, consist of only about 1 to 2 % protein. As animal proteins also contain far more essential amino acids than vegetable proteins, they are of greater value as a source of human protein (especially where protein is scarce). Animal proteins thus have a higher biological valency in the human diet than vegetable proteins.

2 The Food Situation in the Developing Countries

Protein requirement in the developing countries is very largely (over 70 % in 1990) met from vegetable proteins, which contain comparatively little in the way of essential amino acids. Animal products are therefore a highly significant source of high-grade proteins in such countries. Given its high content of biologically high-grade proteins, fish is very important in this context. As shoaling fish (and industrial fish) is relatively cheap in the local fish markets, fish is, moreover, often more readily available than meat to poorer consumers, who usually depend on an excess of basic foodstuffs with a high starch content.

As the predominantly vegetable diet in many developing countries has a low protein content and biological valency, there is a danger of protein deficiency. The groups particularly at risk in this respect are children under 6 years of age, pregnant women and nursing mothers in the poor sections of society. A shortage of fish (due to overfishing, for example) or a consequent rise in prices has a direct impact on these groups and threatens their supply of vital proteins.

3 The Minimum Protein Requirement

It is difficult to specify a precise, generally valid minimum protein requirement, since it depends on the body weight and particular circumstances (childhood, adolescence, pregnancy, physical effort, lactation period) of the individual concerned. As a rule, what is prescribed is not therefore a specific minimum protein requirement but an average level of daily protein consumption that is considered "safe". This "safe level of protein intake" represents the quantity of protein needed each day to meet the protein requirement of virtually every individual in a given group (the FAO and WHO use the average protein requirement plus a double standard deviation for this purpose). The protein requirement is expressed in quantities of high-grade protein (the standard being milk or egg protein).

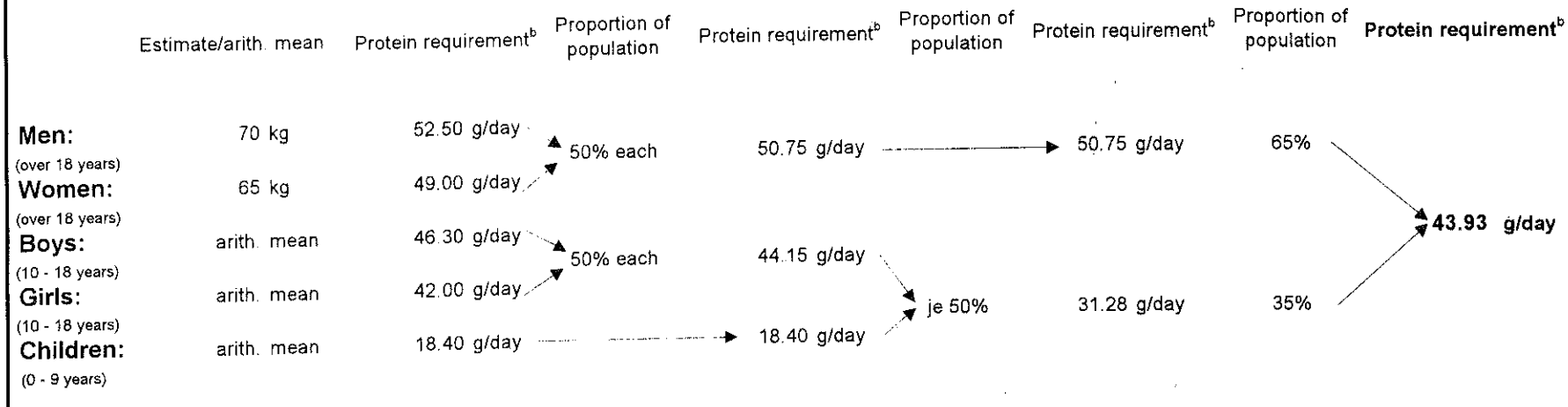
4 The Calculation of the Safe Level of Protein Intake

To determine an average safe level of protein intake per capita and day for society as a whole, an aggregation of the various individual protein requirements is needed. For this assumptions have to be made about the size of certain groups within the population and about their average weight and age.

The FAO, WHO and UNU give specific figures for a safe level of protein intake by individual population groups and weight and age brackets. Thus the safe level of protein intake for both men and women (over 18) is 0.75 g of high-grade protein per kg of body weight per day (see Table A1: Safe level of protein intake for adults). As the weight of adolescents (boys and girls aged 10 to 18) and children (up to 10) varies widely, the safe level of protein intake for these groups is broken down into age brackets and corresponding median weights, with very different results (see Table A2: Safe level of protein intake for adolescents and children). At an assumed average weight of men (women) in developing countries of 70 kg (65 kg), the safe level of protein intake is 52.5 g/day (49 g/day) per capita. The arithmetic mean of the per capita safe level of protein intake is 52 g/day (46 g/day) for adolescent boys (girls) and 21 g/day for children.

If the safe level of protein intake of the various groups is weighted with their size as a proportion of the population, an average safe level of protein intake per day and capita can be determined for the population as a whole. Adults (men and women over 18) account for about 65 % of the total population of the developing countries. If it is assumed that adolescents and children account for equal proportions of the remaining 35 % and that men and women are equally divided in all age brackets, the average safe level of protein intake for the population as a whole is about 40 g of high-grade protein per capita per day in the developing countries (see Chart A1). This does not take account of the significantly higher protein requirement during pregnancy and lactation (see Table A3: Additional protein requirement during pregnancy and lactation).

Chart A1: Estimate of the average[a] safe level of protein intake for the population as a whole (g per capita and day)



Average safe level of protein intake for society as a whole, per capita and day: approx. 44 g

[a] Average in the form of the arithmetic mean

[b] Protein requirement expressed as the biological valency of egg protein

Source: FHO/WHO/UNU, Energy and protein requirements, Geneva 1985

Table A1: Safe level of protein intake for adults (g/day/capity)

Men[a]		Women[a]	
Weight (kg)	Safe level of protein intake[c] (g/day/capita)	Weight (kg)	Safe level of protein intake[c] (g/day/capita)
50	37.50	40	30.00
55	41.00	45	34.00
60	45.00	50	37.50
65	49.00	55	41.00
70	52.50	60	45.00
75	56.00	65	49.00
80	60.00	70	52.50
		75	56.00

[a] For both men and women over 30 the safe level of protein intake is 0.75 g/kg of body weight per day.

[b] Protein requirement expressed as the biological valency of egg protein.

Source: FHO/WHO/UNU, Energy and protein requirements, Geneva 1985.

Table A2: Safe level of protein intake for adolescents and children (g/day/capita)

	Age	Median weight (kg)	safe level of protein intake[a] (g/day/capita)	safe level of protein intake[a] (g/kg body weight/day)
Adolescents:	10-18 years			
Boys	10-12 years	34.50	34.00	1.00
	12-14 years	44.00	43.00	1.00
	14-16 years	55.50	52.00	0.95
	16-18 years	64.00	56.00	0.90
Girls	10-12 years	36.00	36.00	1.00
	12-14 years	46.50	44.00	0.95
	14-16 years	52.00	46.00	0.90
	16-18 years	54.00	42.00	0.80
Children	0-10 years			
	3-6 months	7.00	13.00	1.85
	6-9 months	8.50	14.00	1.65
	9-12 months	9.50	14.00	1.50
	1-2 years	11.00	13.50	1.20
	2-3 years	13.50	15.50	1.15
	3-5 years	16.50	17.50	1.10
	5-7 years	20.50	21.00	1.00
	7-10 years	27.00	27.00	1.00

[a] Protein requirement expressed as the biological valency of egg protein

Source: FHO/WHO/UNU. Energy and protein requirements. Geneva 1985

Table A3: Additional protein requirement during pregnancy and lactation

	Additional protein requirement[a] (g/day/capita)
Pregnancy	6.00
Lactation:	
Up to 6 months	17.50
after 6 months	13.00

[a] Protein requirement expressed as the biological valency of egg protein

Source: FHO/WHO/UNU, Energy and protein requirements, Geneva 1985

Annex II:

The problem of estimating stocks in marine fisheries

Models still widely used to estimate fish stocks describe the aggregate growth of a fishery as a function of the current stock and fishery yield:[76]

$$Z = rB - \frac{rB^2}{k} - E$$

mit:

Z	=	absoluter Zuwachs in Periode n
B	=	absoluter Bestand zu Beginn der Periode n
E	=	absoluter Fischereiertrag in Periode N
r	=	Zuwachsrate des Bestandes
k	=	Bestand in unbefischtem Zustand

On the basis of this simple aggregate production function fishery biologists and economists have developed more efficient models capable of taking account of the following aspects:

- the age structure of the stock,
- interaction with other species and environmental variables,
- the development of the fishing fleet and fishing methods,
- the spatial breakdown of the fishery.

Extensive data are required for fairly informative models. Specifically, information on at least the following is needed:

- the biomass of the fishery at the beginning of the period considered,
- the assigned age composition of the biomass,
- coefficients for the transfer of age brackets of one year to the next higher age brackets of the following year,
- the fishery yield by age composition and its costs and economic benefits.

For practical purposes, (linear) process-analytical models (e.g. dynamic or recursive programming) are highly suitable for multi-period analyses, especially where economic aspects of the arrangement of a fishery are concerned. Curvilinear transfer coefficients should be taken into account as linear segments in this context.

The main empirical problem arises when it comes to estimating reliable stock data and transfer coefficients. The latter vary with the environment, the pressure of pedation, the incidence of disease and the availability of food, and they usually demonstrate curvilinear dependence on the biomass in the various years.

A key role is played by the transfer from the biomass of the ripe stock to the biomass of the yearlings of the following year, since it largely determines the subsequent development of the stock and the possible future

76 The following is essentially based on Hilborn, R. / C.J. Walter, Quantitative Fisheries Stock Assessment, New York 1992.

fishery yield. Empirical biological data show, however, that the biomass of the yearlings in a fishery is usually a curvilinear yield function of the biomass of the ripe stock: as the ripe stock increases, the transfer coefficient or reproduction coefficient falls degressively.

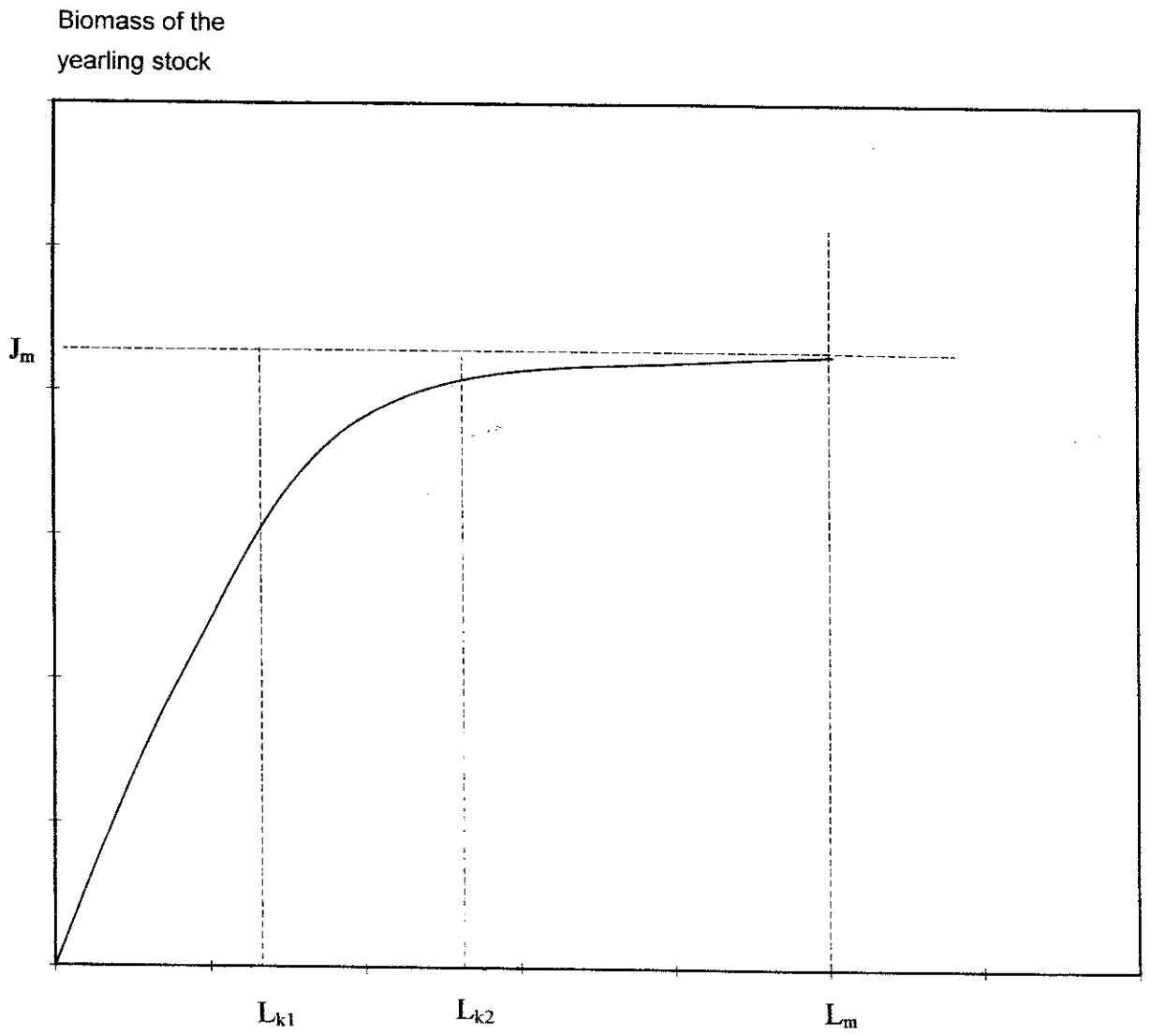
In the population dynamics of a fished stock there are thus two possible causes of overfishing: firstly, the harvesting of underweight young fish, which destroys the growth potential (model: young salmon processed to fish meal); secondly, the reduction of the ripe stock below a critical minimum level (see Figure A1). "Any fishery manager who acts as if recruitment will remain constant as a fishery increases is foolish."[77]

A rational fisheries policy must therefore protect stocks of young fish and ensure the preservation of at least some stocks of ripe fish. Although coefficients need to be estimated correctly in practice in view of a whole range of intervening variables that influence a fish stock besides fishing and of the difficulties referred to above - "You cannot predict MSY (maximum sustainable yield) without exceeding it"[78] - it is to be hoped that on the second occasion greater caution or wisdom will be shown. For a rough estimate of the productivity of a fishery, its biomass, age distribution and reproduction function must at least be known. In many cases, it cannot be said for certain whether a stock is declining because of overfishing or, for example, a change in natural variables, but it is far easier to recognize a decline below critical stock parameters.

77 Hilborn, R. / C.J. Walters, Quantitative Fishery ..., op. cit., p. 242.

78 Ibid., p. 537.

Figure A1: The reproduction function of a fishery



L_m, J_m: average maxima of an unfished stock

L_{k1} L_{k2}: range of the minimum stock of ripe fish that is critical for a fishing industry

Source: R. Hilborn / C.J. Walters, Quantitiative Fisheries Stock Assessment, New York 1992, pp. 241 ff.

Annex III - Tables and figures referred to in the study

Table A4: World trade in fish and fishery products, 1983 - 1992 ('000 tonnes, US$ '000,000)

Year	Gross exports ('000 tonnes)	Gross value of exports (US$ '000,000)
1983	24,998	15,879
1984	27,499	16,196
1985	30,719	17,249
1986	32,937	22,943
1987	33,955	27,944
1988	35,114	31,821
1989	37,964	32,075
1990	36,420	35,752
1991	37,526	38,892
1992	37,700	40,276

Source: FAO, Fishery Statistics, Yearbook 1992, Vol. 75, Rome 1994

Table A5: Various fish prices compared,1985 - 1991 (US$/kg of catch weight)

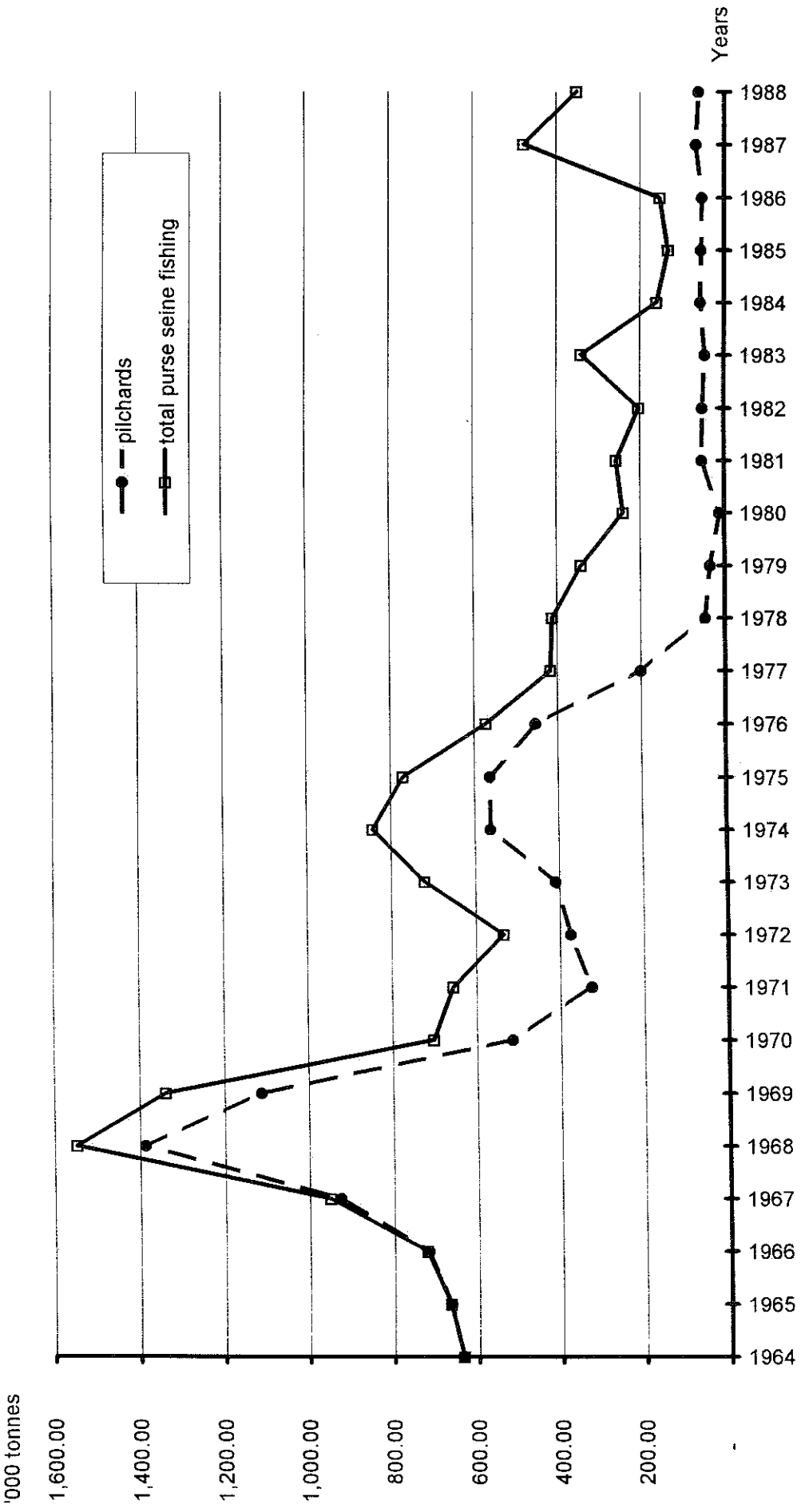
Year	Export prices of Norwegian Atlantic cod[a]	Producer prices of German Atlantic cod[b]	Producer prices of German herring, green[b]	Producer prices of fish in Côte d'Ivoire[b]
1985	2.19	4.30	1.24	1.22
1986	2.81	6.33	1.69	1.86
1987	3.78	7.84	2.25	2.87
1988	3.67	8.33	2.39	4.49
1989	3.35	7.99	2.23	4.49
1990	4.07	10.65	2.62	4.52
1991	4.99	11.91	2.62	5.68

[a] Export prices of frozen fillets

[b] Producer prices of fresh fish

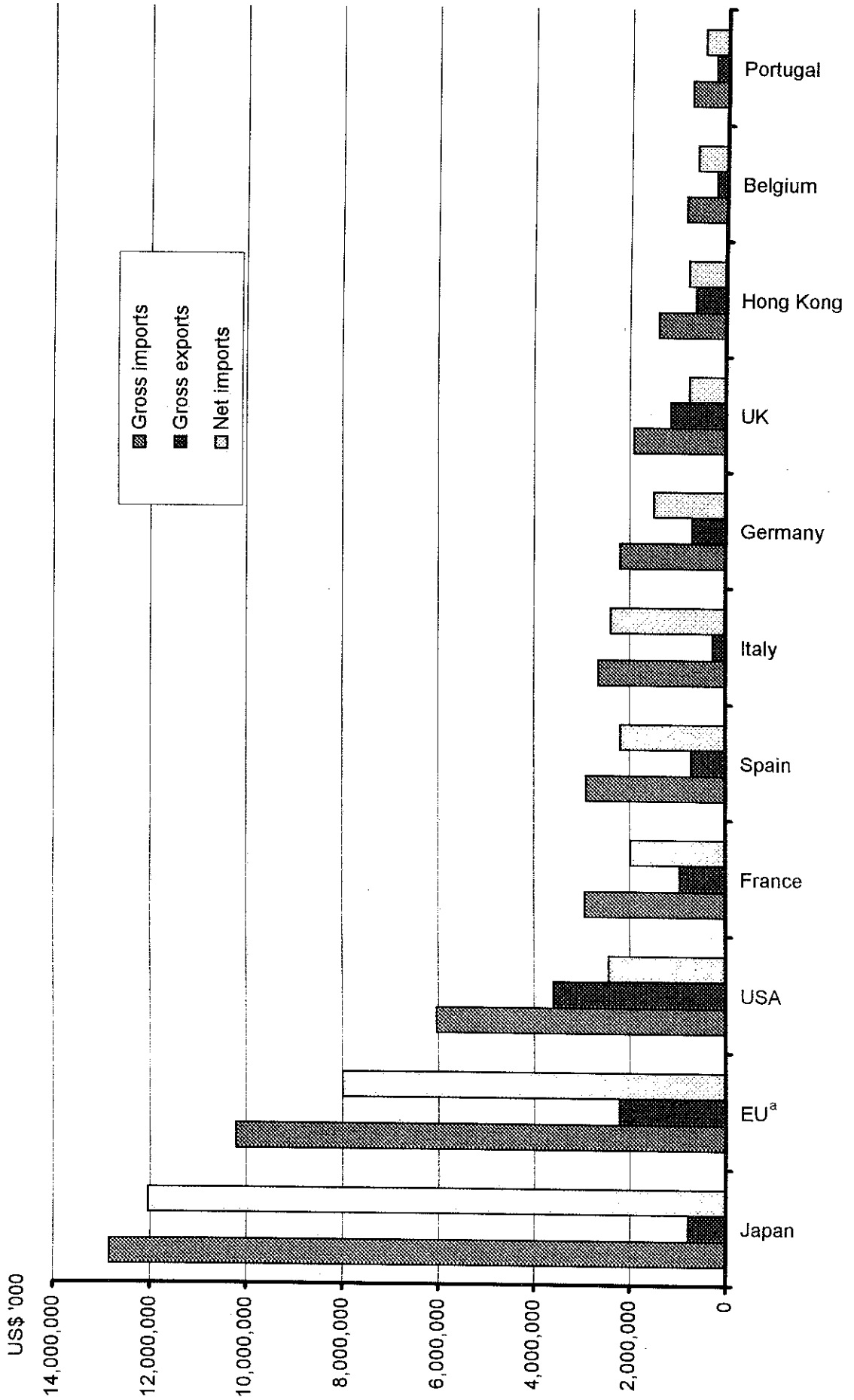
Sources: Institut für Landwirtschaftliche Marktforschung, Fischwirtschaft in Zahlen, Brunswick 1994; FAO, Report of the study on exploitation and use of small pelagic species in West Africa, FAO Fisheries Circular No. 880, Rome 1994; Rögnvaldur Hannesson, The Supply of Groundfish Products in Norway: A Simultaneous Equations Model, Norwegian School of Economics and Business Administration, Working Paper No. 76/1993, Bergen 1993; IMF, International Financial Statistics, Yearbook 1992 and March 1995, Washington D.C. 1992 und 1995

Figure A2: Namibia's purse seine fishing, pilchards and total purse seine fishing compared, 1964 - 1988 ('000 tonnes)



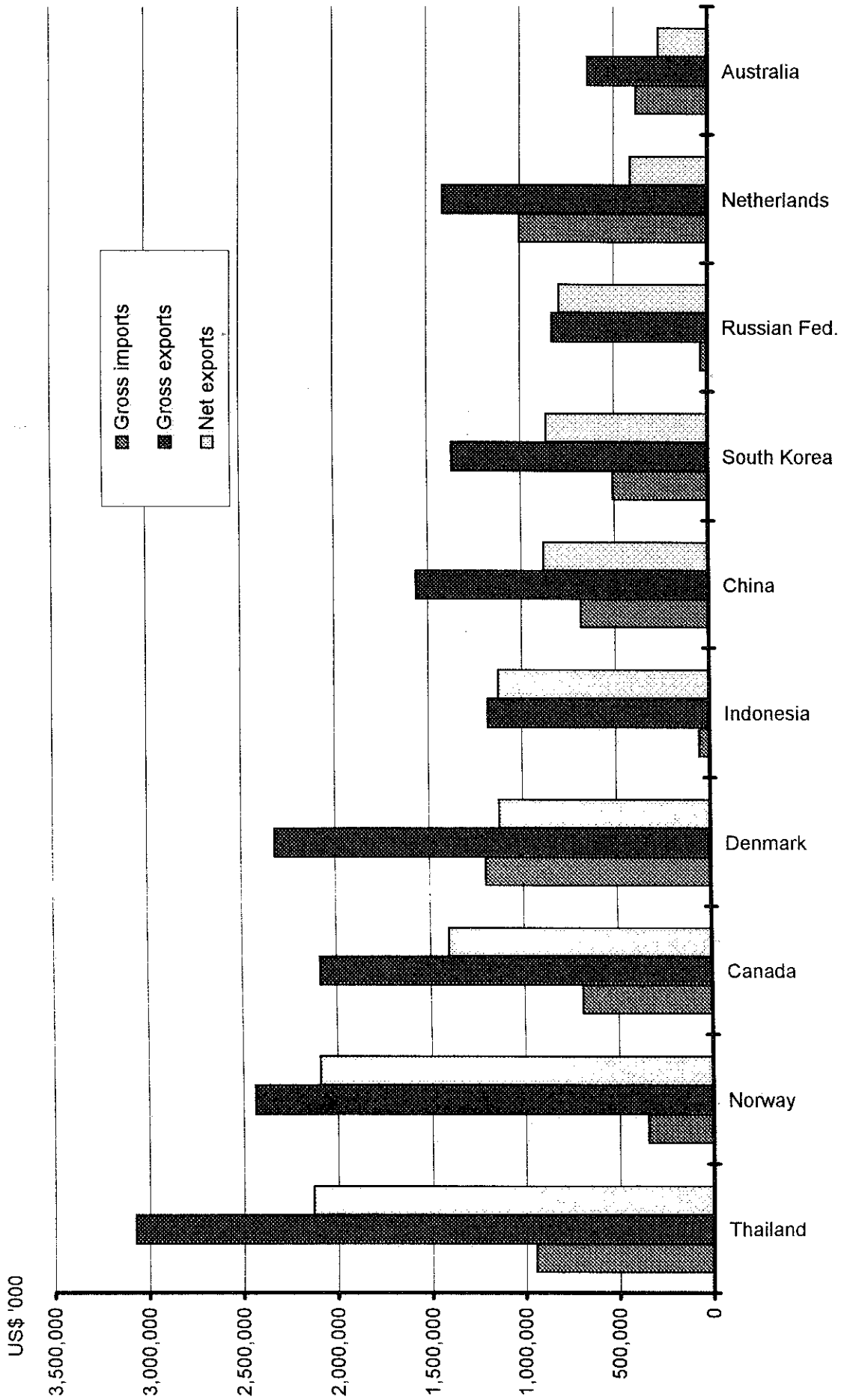
Source: Institut für Landwirtschaftliche Marktforschung, Grundlagenstudie Namibia, Vol. 7: Sektorstudie Fischerei, Brunswick/Munich 1989

Figure A3: The largest net importers of fish and products, 1992 (US$ '000)



[a] Member States of the European Union in 1991, excluding Luxembourg; 1991 data.
Source: FAO, Fishery Statistics, Yearbook 1992, Vol. 75, Rome 1994.

Figure A4: The largest net exporters of fish and fishery products, 1992 (US$ '000)



Source: FAO, Fishery Statistics, Yearbook 1992, Vol. 75, Rome 1994.

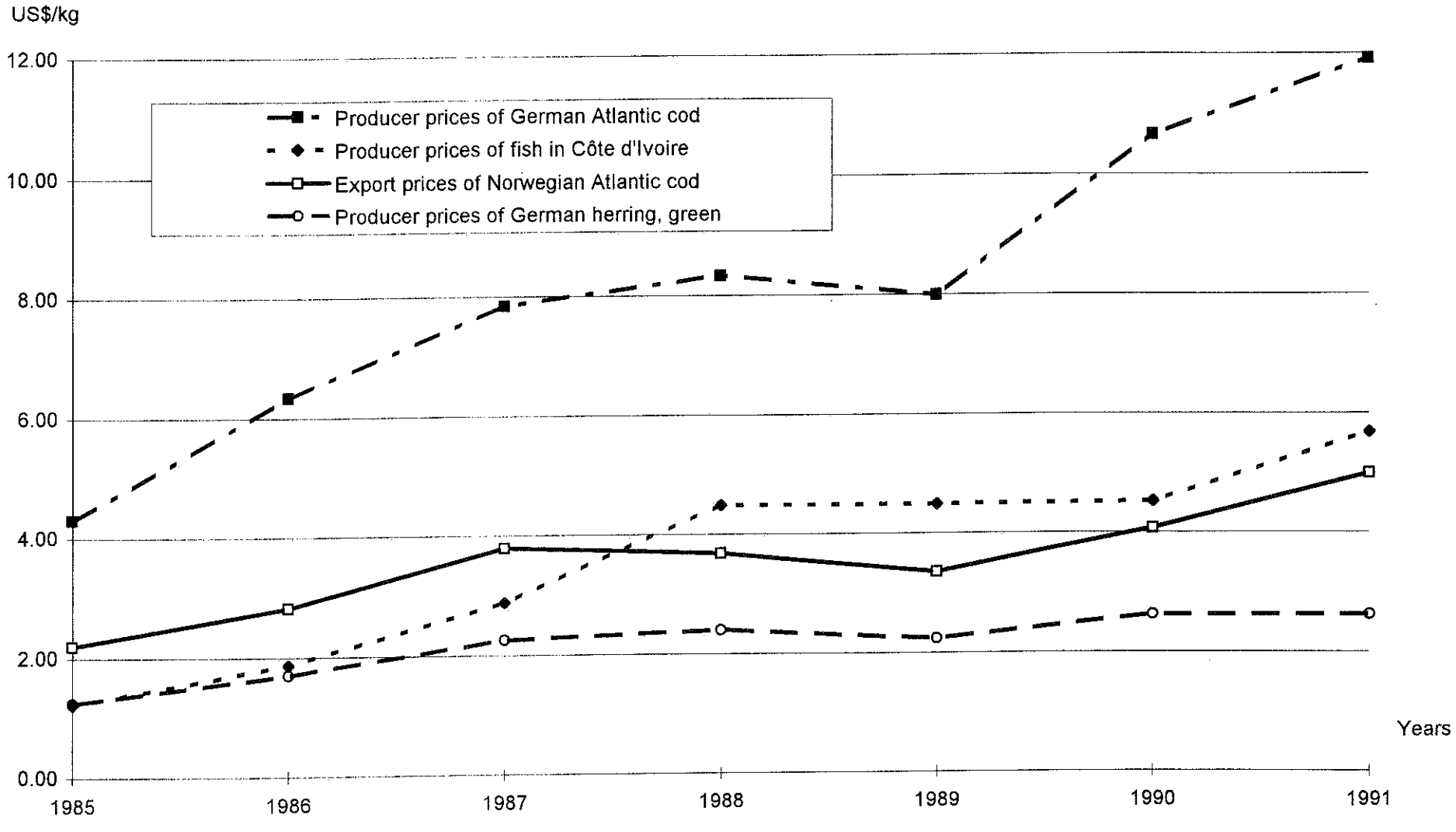
Table A6: The largest net importers and exporters of fish and fishery products, 1992 (US$ '000)

Net importing countries	Gross imports	Gross exports	Net imports	Net exporting countries	Gross imports	Gross exports	Net exports
Japan	12,831,762	792,369	12,039,393	Thailand	942,090	3,071,780	2,129,690
EU[a]	10,210,947	2,216,870	7,994,077	Norway	346,048	2,436,832	2,090,784
USA	6,024,064	3,582,545	2,441,519	Canada	686,876	2,085,495	1,398,619
France	2,934,589	955,379	1,979,210	Denmark	1,197,370	2,319,917	1,122,547
Spain	2,898,232	712,729	2,185,503	Indonesia	56,145	1,178,552	1,122,407
Italy	2,643,440	258,525	2,384,915	China	680,844	1,559,961	879,117
Germany	2,190,892	692,952	1,497,940	South Korea	504,853	1,365,867	861,014
UK	1,906,861	1,147,686	759,175	Russian Fed.	34,854	826,467	791,613
Hong Kong	1,398,181	622,891	775,290	Netherlands	999,484	1,409,669	410,185
Belgium	837,343	217,694	619,649	Australia	378,877	639,223	260,346
Portugal	734,928	257,525	477,403				

[a] Member States of the European Union in 1991, excluding Luxembourg; 1991 figures.

Source: FAO, Fishery Statistics, Yearbook 1992, Vol.75, Rome 1994; OECD, Review of Fisheries, 1992 Statistics, Paris 1994.

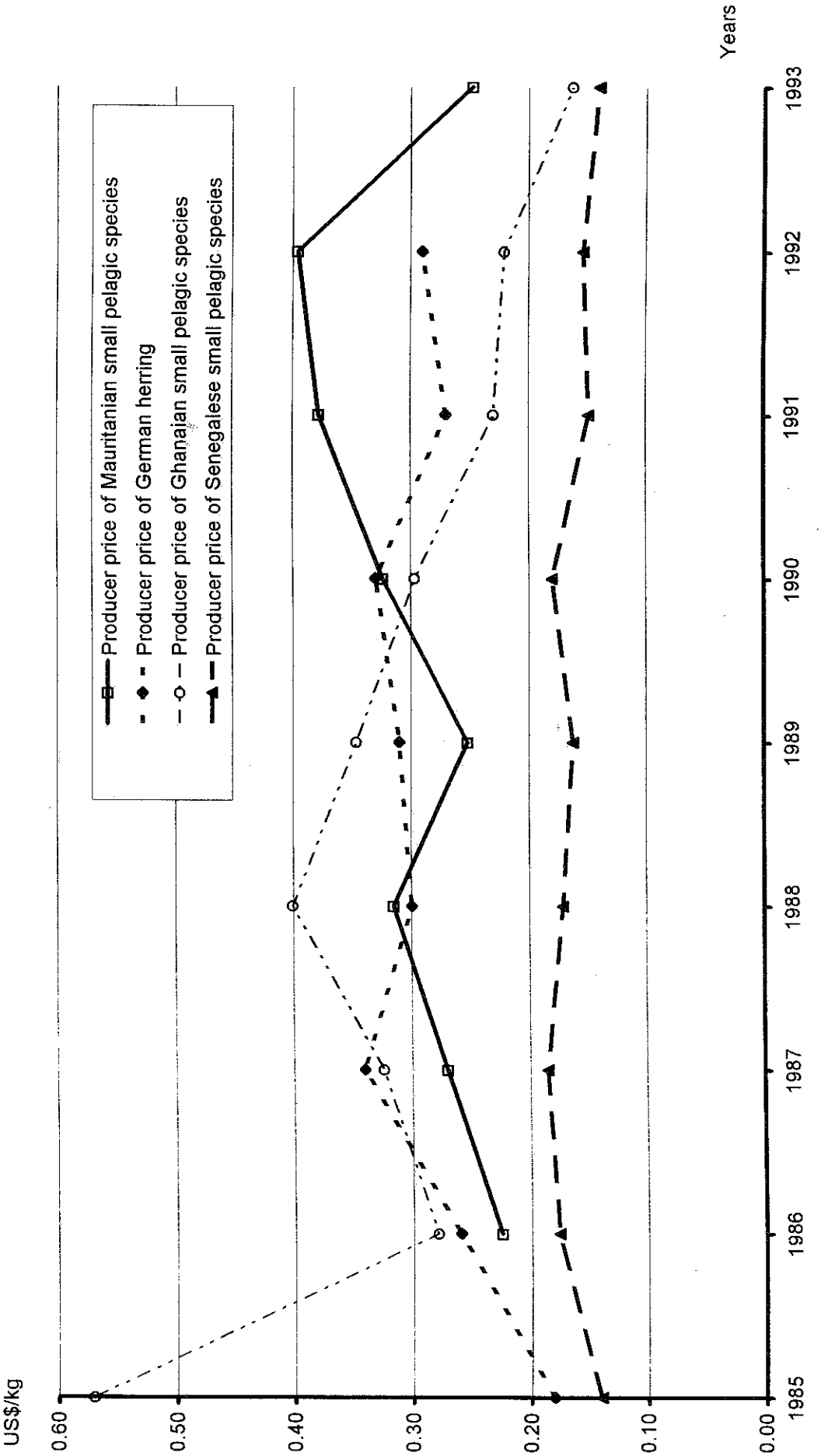
Figure A5: Various fish prices compared, 1985 - 1991
(US$/kg of catch weight)



Data on Norway: export prices of frozen fillets
Data on Germany and Côte d'Ivoire: producer prices of fresh fish

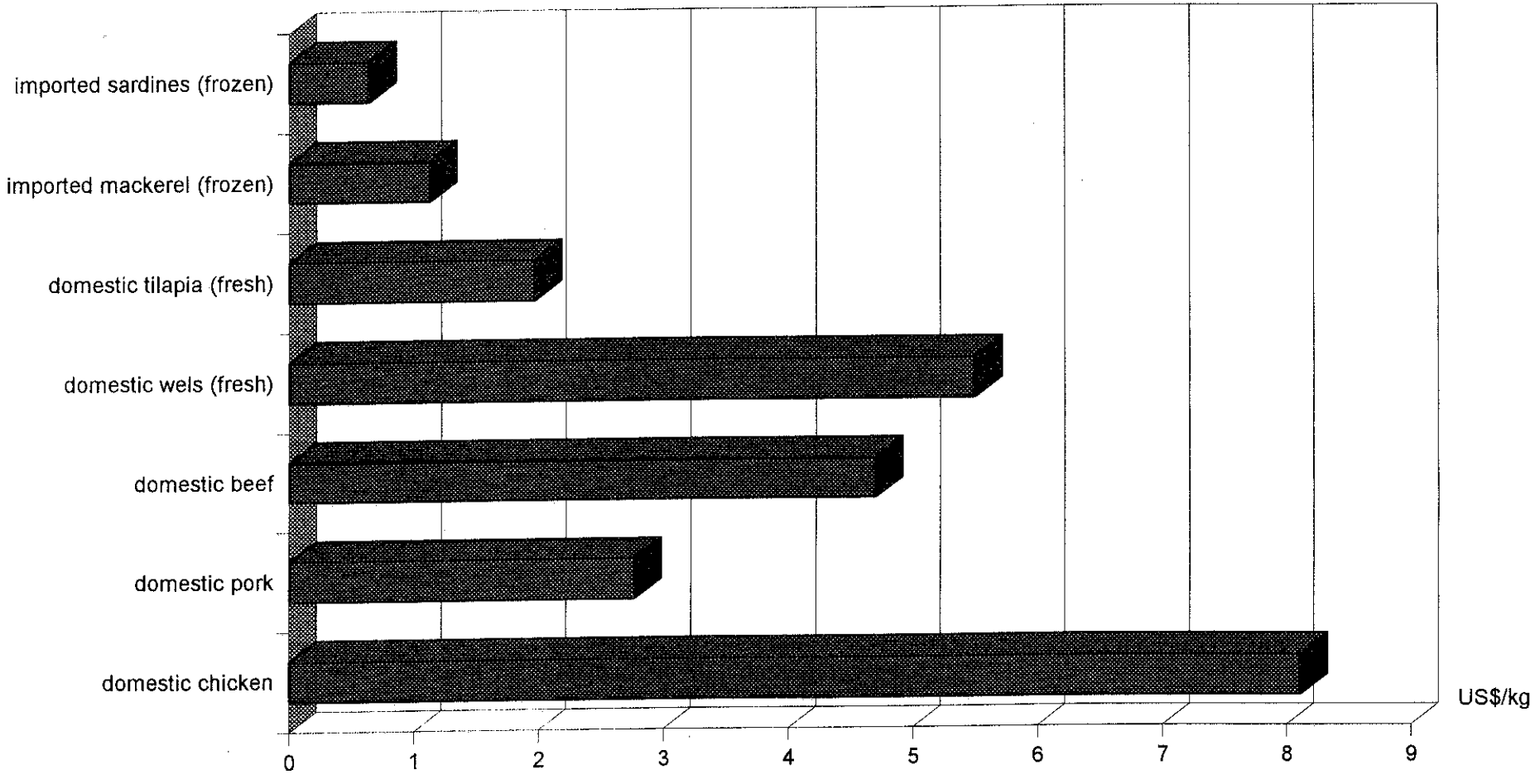
Sources: see Table A4 and A5

Figure A6: Nominal prices for small pelagic species and industrial fish in various countries, 1980 - 1992 (US$/kg of catch weight)



Sources: see Tables A4 and A5

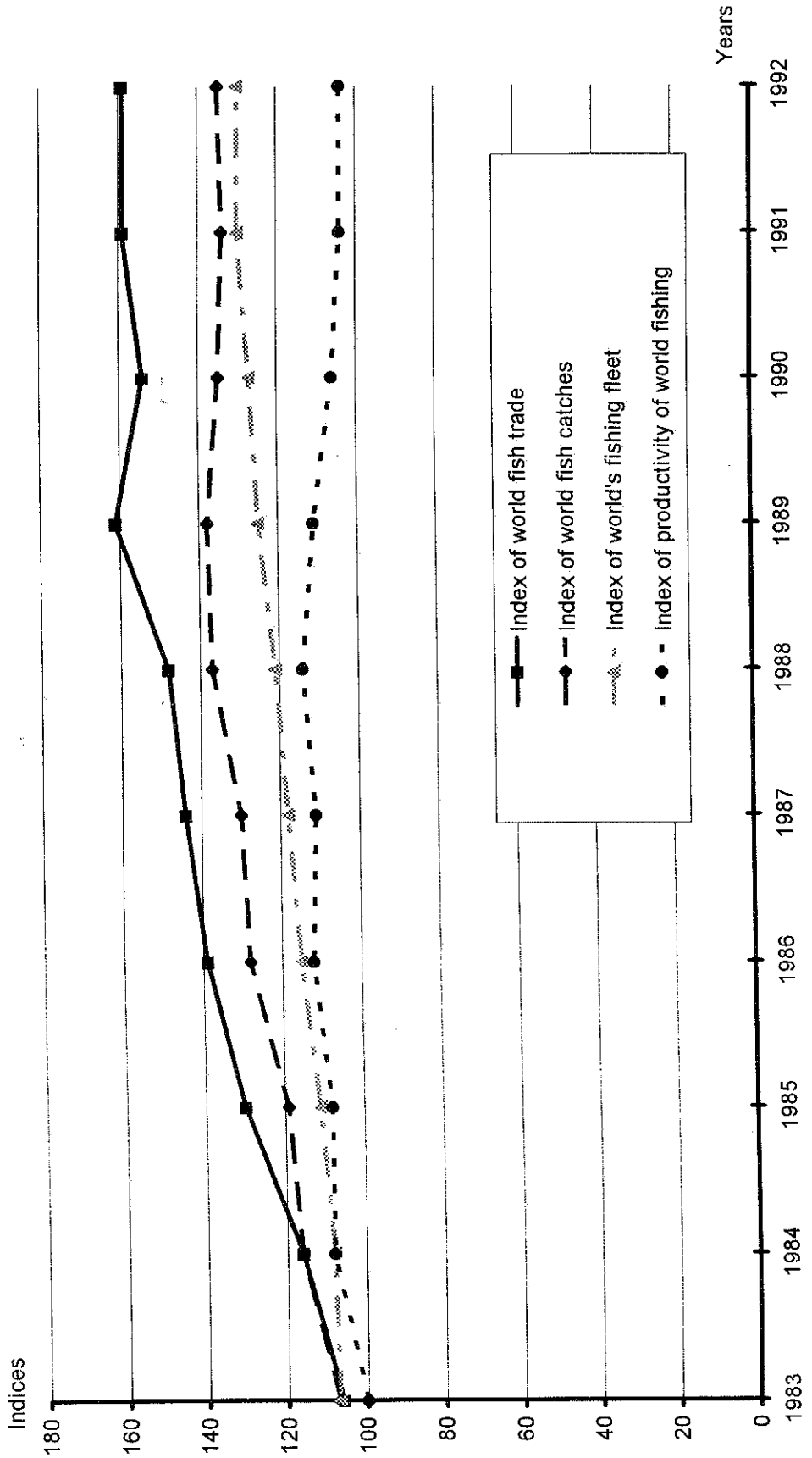
Figure A7: Retail prices[a] of imported small pelagics and competing domestic products in Nigeria, 1994 (US$/kg)



[a] data transferred from graph

Sources: FAO, Report of the study on exploitation and use of small pelagic species in West Africa, FAO Fisheries Circular No. 880, Rome 1994; IMF, International Financial Statistics, March 1995, Washington D.C. 1995

Figure A8: Indices[a] for world fish catches, world fish trade, world fishing fleet and productivity[b] of world fishing, 1983 - 1992

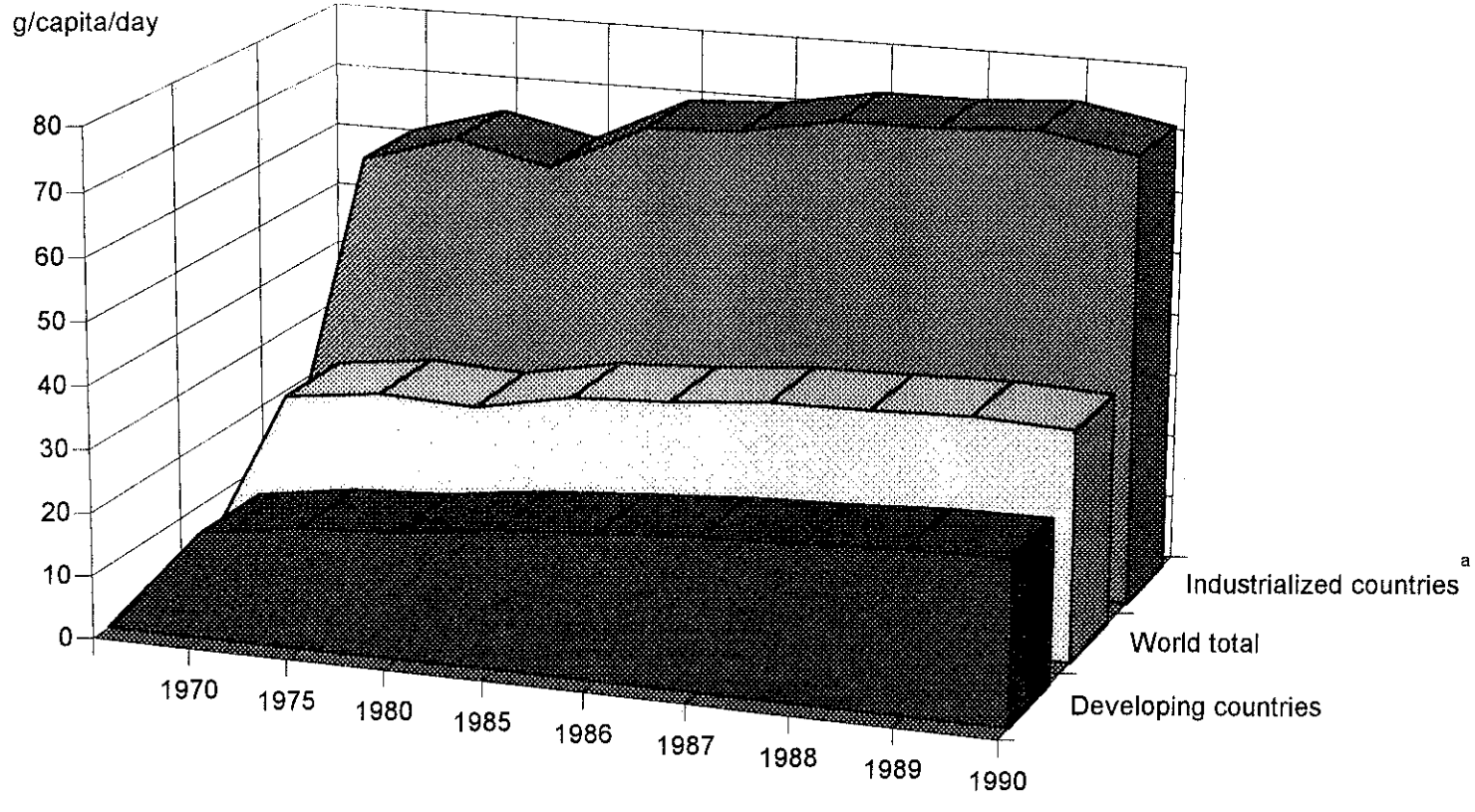


[a] World fish catches and world fish trade are based on the period 1979-1981, world's fishing fleet and world fishing on 1980.

[b] Productivity of world fishing as quantity caught per GRT

Sources: FAO, Fishery Statistics, Yearbook 1992, Vol.75, Rome 1994; FAO, The State of World Fisheries and Aquaculture, Rome 1995

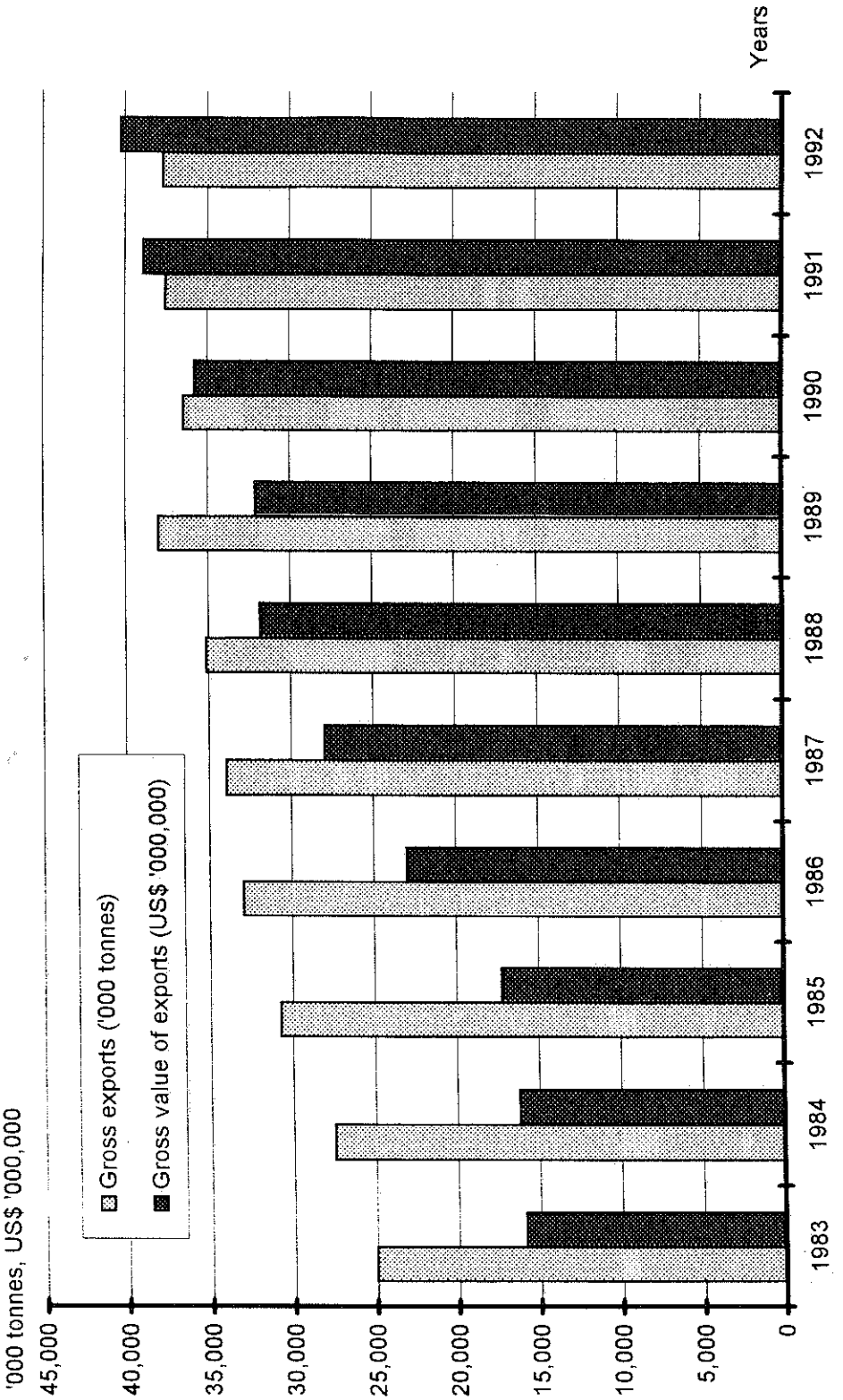
Figure A9: Average per capita fish consumption, 1970 - 1990 (g/capita/day catch weight)



[a] Industrialized countries including the former USSR

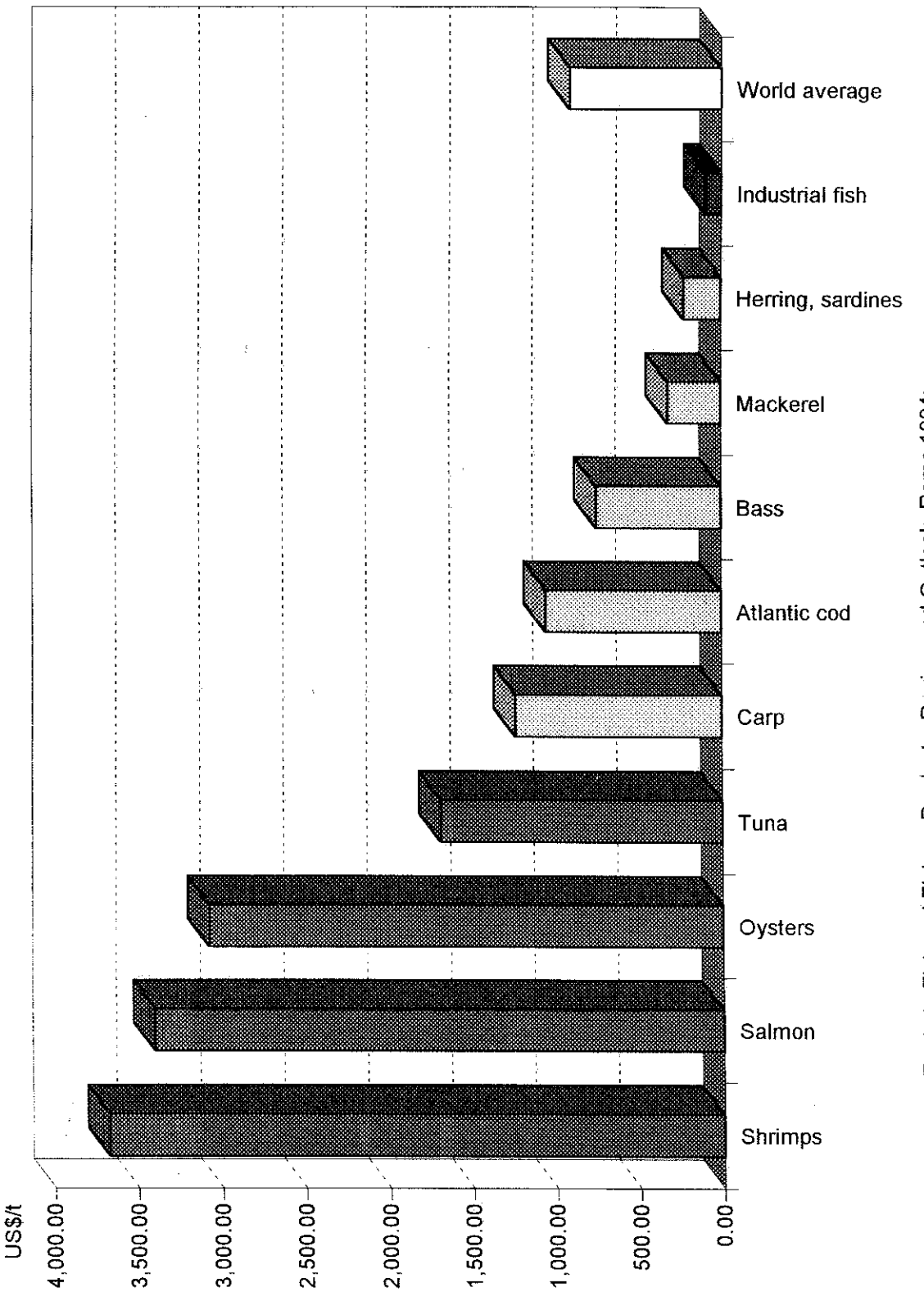
Source: FAO, Fish and Fishery Products, Rome 1992

Figure A10: World trade in fish and fishery products, 1983 - 1992 ('000 tonnes, US$ '000,000)



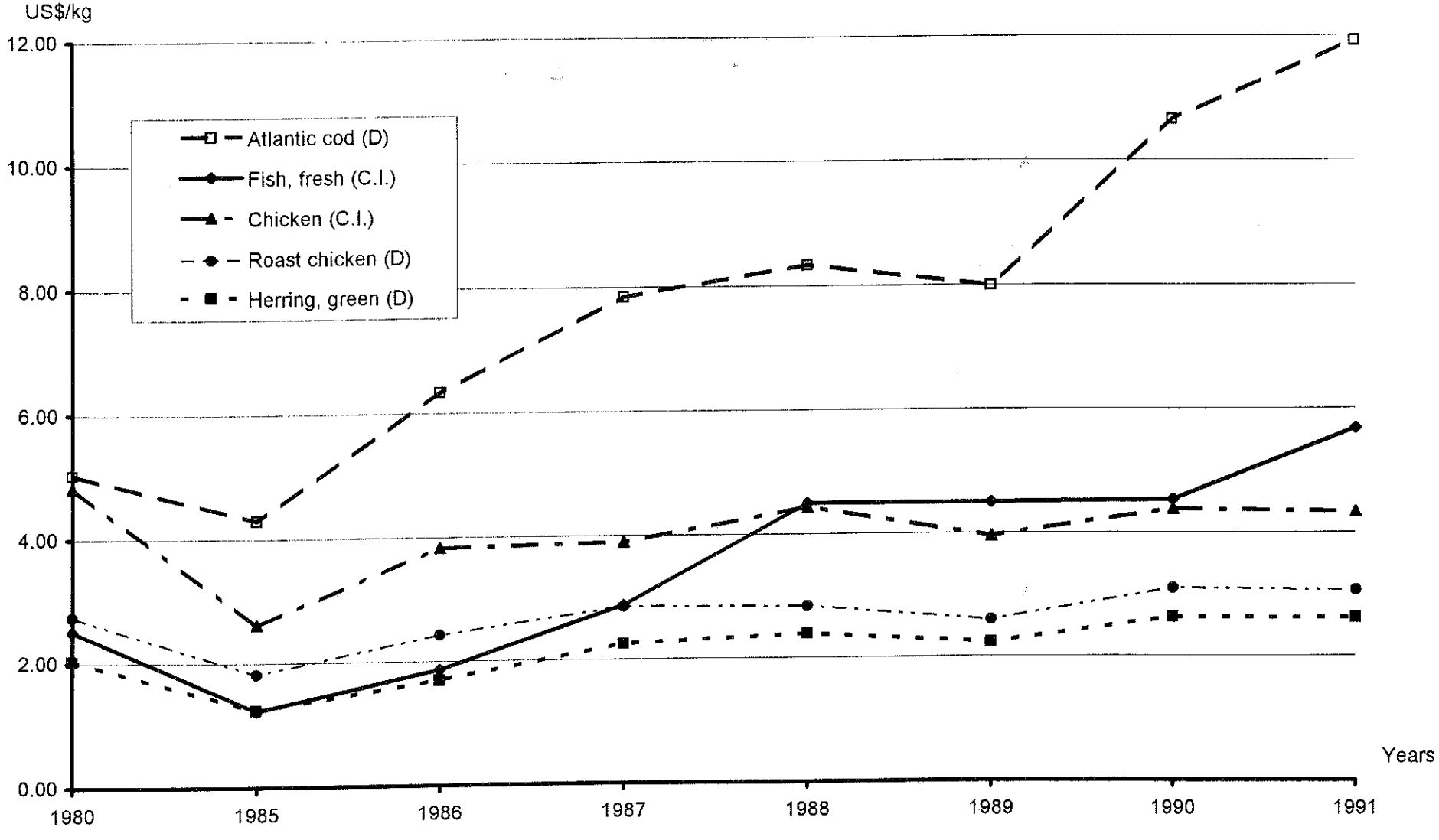
Source: FAO, Fishery Statistics, Yearbook 1992, Vol. 75, Rome 1994

Figure A11: Estimated landed prices of fish of various categories, four-year average, 1989 - 1992 (US$/tonnes)



Sources: FAO, World Trade in Fish and Fishery Products: Review and Outlook, Rome 1994;
FAO, Fishery Statistics, Yearbook 1992, Vol. 75, Rome 1994

Figure A12: Nominal retail prices of fishery products and competing protein sources in Côte d'Ivoire (CI) and Germany (D), 1980 - 1991 (US$/kg)



Sources: Institut für Landwirtschaftliche Marktforschung, Fischwirtschaft in Zahlen, Brunswick 1994; Hartmut Brandt, DIE, Auswirkungen von Exporterstattungen der EU auf die Rindfleischsektoren westafrikanischer Länder, Berlin 1995; IMF, International Financial Statistics, Yearbook 1992 and March 1995, Washington, D.C. 1992 and 1995

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