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86/87-001

LESSONS FROM FISHERIES DEVELOPMENT IN WEST AFRICA

OVERVIEW

by

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ICMRD Working Paper #9

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July, 1986

## I. INTRODUCTION

This paper is the first in a series of five working papers. The geographic area covered is the East Central Atlantic (CECAF) region (Figure 1). The purpose is: (i) to present the trend in the development of the marine fisheries in the region from 1970-1982, (ii) to present a summary of the principal results of the evaluation of four fisheries development projects undertaken in the region, and (iii) to identify lessons to be learned for planning and implementing future projects from the systematic evaluation of fisheries development projects. Working Papers Nos. 10-13 present detailed analysis of four fisheries development projects using a standard benefit cost framework.

Fish production in the CECAF region increased considerably from the mid-1960's to the mid-1970's, due partly to the implementation of a number of fisheries development projects. Everett (1975) indicated that most of the important commercial fish stocks have reached their upper limit of exploitation. The most abundant fish resources are concentrated off a relatively low populated coastline stretching from southern Morocco to Sierra Leone. The per capita consumption of fish in the region is generally higher in urban than in rural areas, and expenditure on fish as a percentage of food expenditure is higher for low income groups. This indicates the importance of fish to the nutritional intake of poorer people in the region.

Total fish production increased from 2.8 metric tons in 1970, peaked at 3.8 metric tons in 1977, and has since declined to 3.2 metric tons in 1982. During the same period, West African production (artisanal and industrial) increased from 1.0 metric tons in 1970 to 1.4 metric tons in 1982, with slight decreases in some years. Approximately 65 percent of the total production was taken by foreign-based vessels during this period (Table 1 and Figure 2). The increasing trend in total catch can be attributed, in part, to the various fisheries development projects in the region and to the declaration of 200-mile Exclusive Economic Zones by coastal countries which enabled these countries to regulate both domestic and foreign fishing activities in their EEZs.

Given the nature of the marine resources in the region, there are added potential economic benefits to be derived if efforts are made to manage and develop the resources efficiently. However, the coastal countries in the region are at various stages of development, and they are faced with overcoming several obstacles in their development efforts. The outcome of all these development efforts will partly be decided by the choices made in the development process. This paper provides some background information on the development of the fisheries in the CECAF region through discussing trends in catches, imports, exports, and case studies, and finally concludes with some thoughts on prospects for future development of the fisheries.

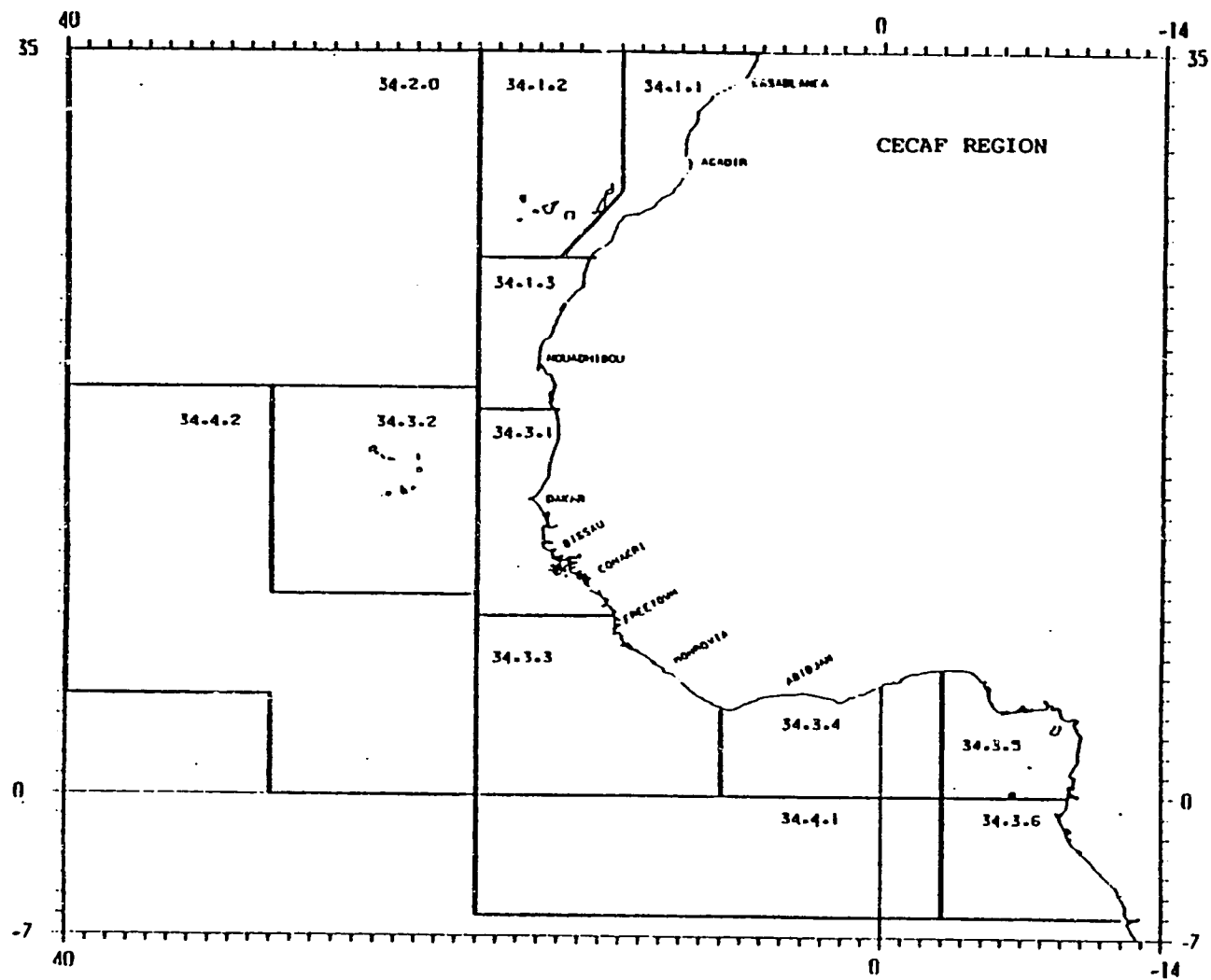


Figure 1. Map of CECAF Region showing Major Fishing Statistical Areas and Coastal Capitals

Table 1.

## CECAF REGION: CATCHES BY COUNTRY GROUPS 1970 - 1982

(METRIC TONS)

COUNTRY GROUPS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Northern Sector	475500	513500	513279	728052	645991	602611	646788	557566	599765	550468	416380	625100	605080
Southern Sector	519200	578600	608659	528915	573294	616098	642858	715630	714253	675337	671791	727237	762445
U.S.S.R.	612500	789800	848830	942660	1142510	1165744	1315430	1134433	769500	526011	942334	780597	955801
W.EUP	344200	323300	335746	445312	509768	471240	506112	528306	572463	445191	534497	491680	515257
ASIA	142900	154500	168100	164553	202075	183896	170329	196840	156989	137568	110477	144709	122185
O.E.EUR	160100	165200	104984	99309	135792	217901	198129	349138	138181	155845	293235	200101	186098
O.W.EUR	192400	308700	270644	245996	139275	66206	50391	53172	38306	48467	54702	30664	35221
OTHERS	377400	191400	200980	228794	152988	229042	109964	268256	216149	213654	215422	215694	9759
TOTAL	2764200	2965000	3050622	3393591	3501293	3552738	3640001	3803341	3205606	2752541	3438838	3215782	3191846
TOTAL OTHER	1769500	1872900	1928684	2126624	2282008	2334029	2350355	2530145	1891588	1526736	2150667	1863445	1824321

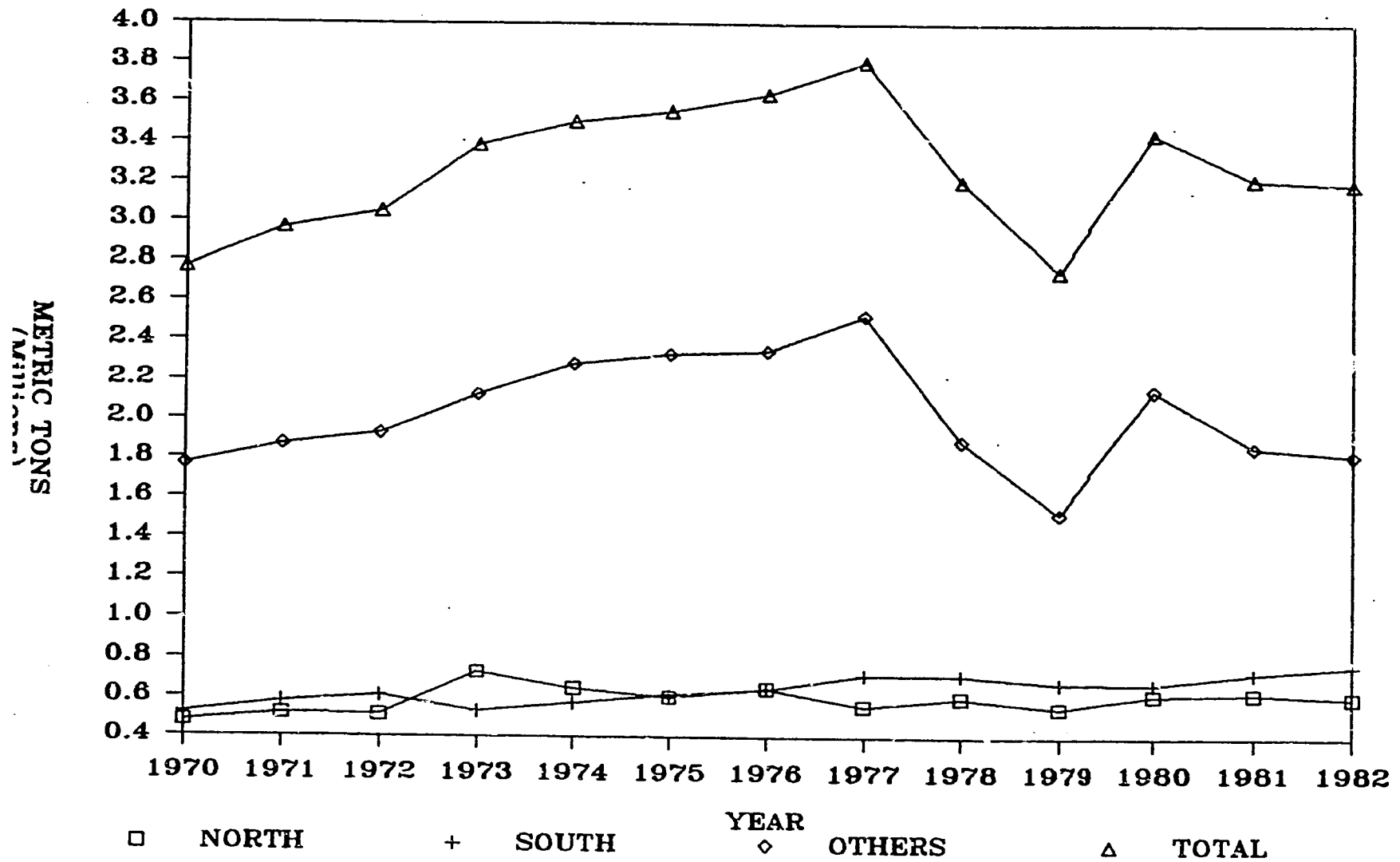
## SOURCES:

FAO (1979) YEARBOOK OF FISHERY STATISTICS, VOL. 46 CATCHES AND LANDINGS, 1978, P. 221

FAO (1983) YEARBOOK OF FISHERY STATISTICS, VOL. 52 CATCHES AND LANDINGS, 1981, P. 242

FAO STATISTICS (1984)

Fig.2. CEEAF CATCHES



## II. BACKGROUND INFORMATION

This section discusses the state of the marine fisheries in the CEEAF region, pointing out some of the physical characteristics and peculiar features. The trends in catches from 1970 to 1982 are presented with special reference to the shares of the total catches accounted for by West African countries and non-West African countries and the major fishing nations in the region. A brief review of the types of fishing operations, including vessel types, gear types, etc., and their distribution is also presented. The section concludes with a comparison of some of these factors for the four countries in the case studies.

### The State of West African Marine Fisheries

The resources consist of a number of migratory species which are constantly moving across national boundaries. Thus, most of these migratory stocks are shared by several countries, and their efficient exploitation depends on the policies adopted by the various countries involved. This is also complicated by the fact that there are often several species occupying the same ecological niches, making it unrealistic to design management schemes directed at single species.

Physical and oceanographic factors are also important determinants to the nature and distribution of the resources. Two factors of considerable importance in this respect are: (a) the size of the continental shelf. Basically, the continental shelf is narrow throughout the region. However, in areas north of Freetown, Sierra Leone, it extends out to 160 kilometers. (b) Two upwelling areas are prevalent in the region. The major upwelling area is off the coasts of Morocco, Mauritania and Senegal in the north, and a less significant upwelling area exists in the Gulf of Guinea between Ivory Coast and Benin. Upwelling activities go on practically year-round but are more evident during certain seasons. These characteristics account for the fact that the most abundant fish resources lie off the coasts of the countries in the north of the region. These countries are also relatively less populated than countries in the south of the region.

Basically, two types of fleets are competing for the resources in the region: national and foreign fleets. The national fleet consists of artisanal (small-scale) and industrial vessels. The artisanal vessels operate up to 20 kilometers off the coastline, while the industrial vessels operate much further out. Some countries in the region have a third category of vessels known as semi-industrial vessels. The foreign fleet consists only of industrial vessels ranging from small freezer trawlers to factory and motherships. The foreign fleet is considered as vessels operated by non-West African countries, although vessels from some West African countries fish in the territorial waters of other West African countries.

In both the northern and southern sectors of the region, coastal pelagic species account for the bulk of the catches in weight. The principal pelagic species in the north include sardine, off the coasts of Morocco and Mauritania, sardinella, mackerel and horse mackerel off

the coast from Mauritania to Sierra Leone. In the southern sector, the volume of coastal pelagic species is relatively low compared to that in the northern sector. This is mainly due to the narrow continental shelf and the poor primary productivity in this sector. Demersal species are less important in terms of weight but account for over half the value of the total catches. In the north, demersal species account for less than 20 percent of the total catch. The major species are sea breams, hakes and croakers. Demersal species account for up to 40 percent of total catches in the south.

One of the most important fisheries in the north in terms of value is the cephalopod fishery. Species which include octopus (about 70 percent), cuttlefish (about 20 percent), and squid (about 10 percent of cephalopod catches) occur off the coasts of Morocco, Mauritania and Senegal. The crustacean fishery is also another important fishery, particularly for its export potential. The pink shrimp found mainly near the mouths of rivers and lagoons is the most important. The tuna fishery consisting of ocean pelagic species such as skipjack, yellowfin and bigeye is of considerable importance to some coastal countries.

Estimates of the annual potential yield for the three fisheries are provided in Everett *et al.* (1980). They indicate that the cephalopod fishery is likely at a state of overexploitation and that the crustacean and tuna fisheries are being fully exploited. Gulland (1971) earlier estimates the total biological potential for the whole region between 3.5 and 5.0 million tons. However, Everett *et al.* (1980) put this figure at a possible maximum catch of 4.2 million tons. The reported catch for the region is between 3.2 and 3.8 million tons. When one allows for discards at sea and unreported catches, it is likely that the fish resources are close to full exploitation. However, biologists believe that there are fish resources that are still underexploited. With increased knowledge of the fish resources in the region, the total potential yield may likely rise.

#### Fishing Operations in the CECAF Region

There are basically three categories of fishing vessels operating in the CECAF region: 1) West African artisanal (small-scale) vessels, 2) West African industrial vessels, and 3) non-West African industrial vessels.

The West African artisanal vessels are important to most countries in the region, particularly for domestic consumption. Landings of the artisanal vessels account for a large percentage of the total catches for most coastal countries. These range from 25 percent for Mauritania to 75 percent for Senegal where landings are still showing an increasing trend. In some countries, landings of artisanal vessels have leveled out or declined. The numbers of artisanal fishermen and vessels vary considerably according to various reports. Sutinen *et al.* (1981) report estimates of the number of fishermen at 600,000 and the number of vessels at 100,000. Nigeria has the largest artisanal fishery in terms of fishermen and vessels.

With the exception of Senegal, the majority of artisanal vessels are concentrated in countries in the southern sector. There has been considerable success in the adoption of new technology by artisanal fishermen in the region. Notable is motorization with outboard engines and purse seines, which is in common use in Ghana and Senegal and gradually being adopted in other coastal countries. The vessels are open, with wooden hulls which are planked or dug out. Planked vessels are commonly used now because of the increasing scarcity of trees that can be carved into canoes. Some dug-out canoes have planks added to the sides to increase their capacities. The artisanal vessels range in size from 6 to 12 meters, the smaller ones powered by sails or oars and the larger ones by outboard engines. Recently, there have been some efforts to introduce sails to the larger vessels as an auxiliary means of propulsion to reduce the expenditure on fuel. The rate of motorization ranges from 10 percent to 70 percent, with Senegal having the highest rate of motorization.

The fishing gear utilized in the artisanal fishery include hand lines, longlines, gillnets, beach seines, purse seines and traps. The predominant ones are gillnets and purse seines. These are used to capture pelagic species including sardinella and bonga (*Ethmalosa sp.*). Both species account for the bulk of the landings of the artisanal fishery. Other major species that are captured by this fishery include croakers, groupers and sea breams.

The West African industrial vessels consist mainly of inshore trawlers and purse seines. Morocco, Ghana, Ivory Coast, Nigeria and Senegal have a number of long distance freezer trawlers. The long distance vessels from Nigeria are reported to be collecting fish from other vessels rather than fishing. Morocco has the largest number of industrial vessels dominated by purse seiners. These vessels fish mainly for sardines. Mauritania, Senegal, The Gambia, Ivory Coast, and Ghana also have purse seiners that fish mainly for sardinella. Most of the countries in the southern sector operate trawlers.

Everett et al (1980) report that there were over 1,500 inshore West African industrial vessels in 1979. There is no recently published figure available, and it is difficult to determine whether the number of inshore vessels has increased or decreased. Some countries have increased their inshore vessels in recent years due to the expansion of their industrial fishery, but others have seen a decline in the number of these vessels for various reasons.

Most of the inshore West African vessels range in size from 9 to 15 meters and are powered by inboard engines. Both wood and steel hulls are present, with the latter becoming dominant. The West African long-distance vessels are up to 35 meters in length with steel hulls only. The fishing gear utilized by the inshore vessels are purse seines and trawls, and the latter is utilized by the long-distance vessels.

The non-West African industrial vessels include purse seiners, trawlers, pole and line, longlines, factory and motherships. The principal non-West African fishing nations in the CECAF region are USSR, France, Spain, Japan, South Korea, and Italy. Although the catches of



non-West African vessels have declined in recent years, these vessels still account for about 65 percent of the total catch in the region. Their share in value terms is even higher. The sizes of these vessels range from over 200 GRT for purse seiners and side trawlers to 10,000 GRT for factory and mothership. The main species fished by these vessels include cephalopods, sardine, Sardinella, horse mackerel, mackerel, tuna, hakes and seabreams. There are also a number of fish meal factory vessels operating off the coasts of Mauritania, Senegal and Sierra Leone.

The declaration of Exclusive Economic Zones by coastal countries in West Africa has affected the activities of the non-West African vessels to a considerable extent. Before the EEZ regime, these vessels operated freely in the region. Now, they have to obtain fishing licenses from the coastal countries and operate under the regulations in force. This new regime has brought a number of changes, notably joint venture agreements between coastal countries and foreign (non-West African) fishing nations, landing of catches in coastal countries for transshipment, and landing a proportion of their catches in coastal countries for domestic consumption.

#### Trends in Catches, Trade and Consumption in the CECAF Region

Coastal countries in the northern sector of the region accounted for between 40 to 48 percent of West African catches between 1970 and 1977, while coastal countries in the southern sector accounted for the remainder. The slightly higher percentage of total catches taken by countries in the southern sector partly reflects the fact that some of these countries, notably Ghana and Ivory Coast, have vessels fishing in the territorial waters of countries in the northern sector. Three countries in the northern sector accounted for between 90 and 95 percent of the total catches taken by countries in the north during this period (See Table 2).

In the southern sector total catches were more evenly distributed between most of the countries, although Nigeria, Ghana and Ivory Coast accounted for over 70 percent of the total catches. Liberian catches dropped considerably between 1972 and 1977. The catch figures showed increases from 1978, but these still fall short of the 1970-71 levels. Other countries in the southern sector with significant total catch figures include Sierra Leone, Cameroon and Congo (See Table 3).

The total catch of non-West African countries increased from 1.8 million tons in 1970, peaked at 2.5 million tons in 1978, then declined to 1.8 million tons in 1982. Between 1970 and 1977 the total catch of non-West African countries increased at an average annual rate of 5.4 percent. The major non-West African fishing nations include the USSR, which increased its share of non-West African catches from 35 percent to 55 percent between 1970 and 1976; France, Portugal and Spain, together taking 20 percent; other Eastern European countries, increasing their share from 6.0 percent in 1970 to 14 percent in 1977; and Japan and Korea, taking 8 percent of the non-West African catches.

Table 2. CECAF REGION: NORTHERN SUB-AREA CATCHES 1970 - 1982

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(METRIC TONS)

COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
CAPE VERDE	5100	4500	4100	8200	3428	3902	2065	8331	8331	7476	8351	10647	9931
GAMBIA	4800	5000	5184	9594	9995	9995	9995	15392	11998	6651	10556	11055	8628
GUINEA	5000	5000	12288	14658	17445	12370	8920	8120	9000	17453	17453	17453	17453
GUINEA-BISSAU	1500	1400	1700	1700	1700	1649	3442	3758	3653	2013	3729	2800	1824
MAURITANIA	50200	62900	32400	29400	21170	24600	22500	28000	27000	25000	23900	27400	27000
MOROCCO	239700	213700	226653	377342	264528	209693	259768	226202	260335	249392	302205	349017	327349
SENEGAL	169200	221000	230954	287158	327725	340402	340098	267763	279448	242483	250186	206728	212875
SUBTOTALS	475500	513500	513279	728052	645991	602611	646788	557566	599765	550468	616380	625100	605080

SOURCES:

FAO (1979) YEARBOOK OF FISHERY STATISTICS, VOL. 46 CATCHES AND LANDINGS, 1978, P.221  
 FAO (1983) YEARBOOK OF FISHERY STATISTICS, VOL.52 CATCHES AND LANDINGS, 1981, P. 242  
 FAO STATISTICS (1984)

Table 3.

CECAF REGION: SOUTHERN SUB-AREA CATCHES 1970 - 1982

(METRIC TONS)

COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
BENIN	8500	5600	10400	8700	7502	5673	4954	4378	4079	3765	3390	3566	3566
CAMEROON	20800	24500	37317	37550	35736	36280	40397	40167	38867	39002	39283	40302	43061
CONGO	9900	11000	11481	15200	15717	15103	17869	15364	16297	19630	19570	17415	17934
EQ. GUINEA	4000	4000	4300	4300	4000	4000	4000	4000	4000	4000	2500	2500	2500
GABON	2500	3500	4500	4500	4486	5638	5638	5638	13042	13203	26417	38675	50003
GHANA	141500	177100	178842	85391	122918	176876	163088	234878	220417	185693	176253	192902	183948
IVORY COAST	66500	70600	72679	58246	66048	60280	81753	79307	76649	71613	61896	64880	77469
LIBERIA	10700	11800	6700	5300	6064	6046	6132	6190	6812	9484	7791	9004	9553
NIGERIA	217000	231700	222942	233872	233870	226208	255824	263850	272581	275803	292390	313070	323435
SAO TOME PRN	800	900	800	800	600	377	646	1754	1175	1618	1847	2158	2688
SIERRA LEONE	29600	29600	50051	66017	67503	67497	52692	51452	47580	46237	34205	35300	36558
TOGO	6400	7600	7947	8339	8150	11420	9470	7497	12013	4596	5634	6825	11030
ZAIRE	1000	700	700	700	700	700	395	1155	741	693	615	640	700
SUBTOTALS	519200	578600	608659	528915	573294	616098	642858	715630	714253	675337	671791	727237	762445

## SOURCES:

FAO (1979) YEARBOOK OF FISHERY STATISTICS, VOL. 46 CATCHES AND LANDINGS, 1978, P.221

FAO (1983) YEARBOOK OF FISHERY STATISTICS, VOL. 52 CATCHES AND LANDINGS, 1981, P. 242

FAO STATISTICS (1984)

The region started as a net exporter of fish and fish products and gradually became a net importer. Imports of fish and fish products increased from U.S. \$56 million in 1970 to U.S. \$415 million in 1981. This is an average annual increase of 53 percent during the period (See Table 4 and Figure 3). In 1975 the region became a net importer of fish and fish products.

The coastal countries in the southern sector accounted for almost 95 percent of the imports into the region. Four countries, Ghana, Ivory Coast, Nigeria and Zaire, increased their share of imports from 67 percent in 1970 to 82 percent in 1981. Nigeria, which imported only U.S. \$4.0 million fish products in 1972, suddenly increased its imports to U.S. \$11.0 million in 1973, and even more dramatically from 1974 to 1981. In 1981, Nigeria accounted for 58 percent of the region's total imports. This sudden increase in imports of fish products could partly be attributed to the increase in demand after the civil war ended in Nigeria. Recent statistics (not included in Table 4) indicate that the value of imports of fish products into Nigeria has experienced some decline. Countries in the northern sector do not import fish products to any significant extent.

Exports of fish and fishery products increased from U.S. \$58 million in 1970 to U.S. \$391 million in 1981. This is an average annual increase of 49 percent. Countries in the northern sector are the major exporters in the region, accounting for almost 90 percent of fish exports. Three countries, Morocco, Mauritania, and Senegal, are the principal exporters. These three countries accounted for 85 percent of the region's exports. Mauritania has increased its value of fish exports considerably. However, part of these exports are reported to be due to transshipment from its ports (See Table 5 and Figure 4).

With the exception of Mauritania, fish is an important item in the diets of West African countries. Most household survey reports in the region indicate that consumption of fish is much higher in areas adjacent to the coastline than in inland areas. Also, expenditure on fish as a percentage of total food expenditure is higher for low income than for high income groups.

The average per capita consumption of fish in the region from 1970 to 1980 does not indicate a definite trend. However, the average per capita consumption of fish in the northern sector showed a general upward trend, with the exception of 1971. Also, the average per capita consumption in the northern sector was much higher than in the southern sector. The average per capita consumption of fish in the southern sector increased between 1970 and 1973, fluctuated between 1973 and 1978, and then experienced a decline (See Table 6 and Figure 5).

Table 4. CECAF REGION: VALUE OF IMPORTS BY COUNTRY 1970 - 1980

(00S USD)

NORTHERN SUB AREA	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
CAPE VERDE	46	75	115	185	150	148	125	99	363	425	425	425
GAMBIA	32	55	67	105	96	238	238	238	255	280	280	280
GUINEA												
GUINEA BISSAU	308	395	428	589	364	173	461	140	159	260	298	298
MAURITANIA	534	253	253	253	253	67	123	123	120	121	151	151
MOROCCO	103	144	109	306	111	74	113	127	80	73	80	44
SENEGAL	3148	4430	4019	6186	8510	6670	6670	6260	9693	13646	19888	22964
SUB TOTALS	4171	5352	4991	7624	9484	7370	7730	6987	10670	14805	21122	24162
SOUTHERN SUB AREA												
BENIN	649	817	817	1598	2050	3418	3067	2978	3378	3571	3599	3599
CAMEROON	2502	2762	3609	3250	3342	3597	3387	5575	5669	10054	7477	7477
CONGO	2486	2228	3453	2828	1443	5142	4285	4231	11104	13812	15079	15079
EQ. GUINEA	746	746	746	746	746	746	746	746	593	675	675	675
GABON	1041	1209	1584	1470	1470	3852	3295	6187	5715	6052	6052	11240
GHANA	15711	14188	17899	18663	29190	25668	25668	25668	17057	9405	9397	9397
IVORY COAST	3332	5277	9033	13306	24256	33577	29562	31731	42831	58602	58602	58602
LIBERIA	2199	3359	2469	3696	4933	5326	5970	7463	7417	7894	8427	7574
NIGERIA	2047	1858	4019	10738	11615	62660	122846	75052	222719	239790	239790	239790
SAO TOME PRN	119	113	65	53	53	53	53	53	49	50	50	50
SIERRA LEONE	2484	2672	1868	3103	2739	1859	1404	1358	1617	1606	1708	1708
TOGO	1445	1259	1270	1961	2852	3521	3364	3267	3163	3349	3349	3349
ZAIRE	16540	17262	24824	26538	38048	38048	38048	22201	31993	31993	31993	31993
SUB TOTALS	51301	53750	71656	87950	122737	187467	241695	186510	353305	386853	386198	390533
TOTAL	55472	59102	76647	87950	132221	194837	249425	193497	363975	401658	407320	414695

SOURCES: FAO (1979) YEARBOOK OF FISHERY STATISTICS, VOL. 47. FISHERY COMMODITIES, 1978, PP. 13 - 17  
 FAO (1982) YEARBOOK OF FISHERY STATISTICS, VOL. 53 FISHERY COMMODITIES, 1981, PP. 31&32

Fig.3. VALUE OF IMPORTS - CEEAF REGION

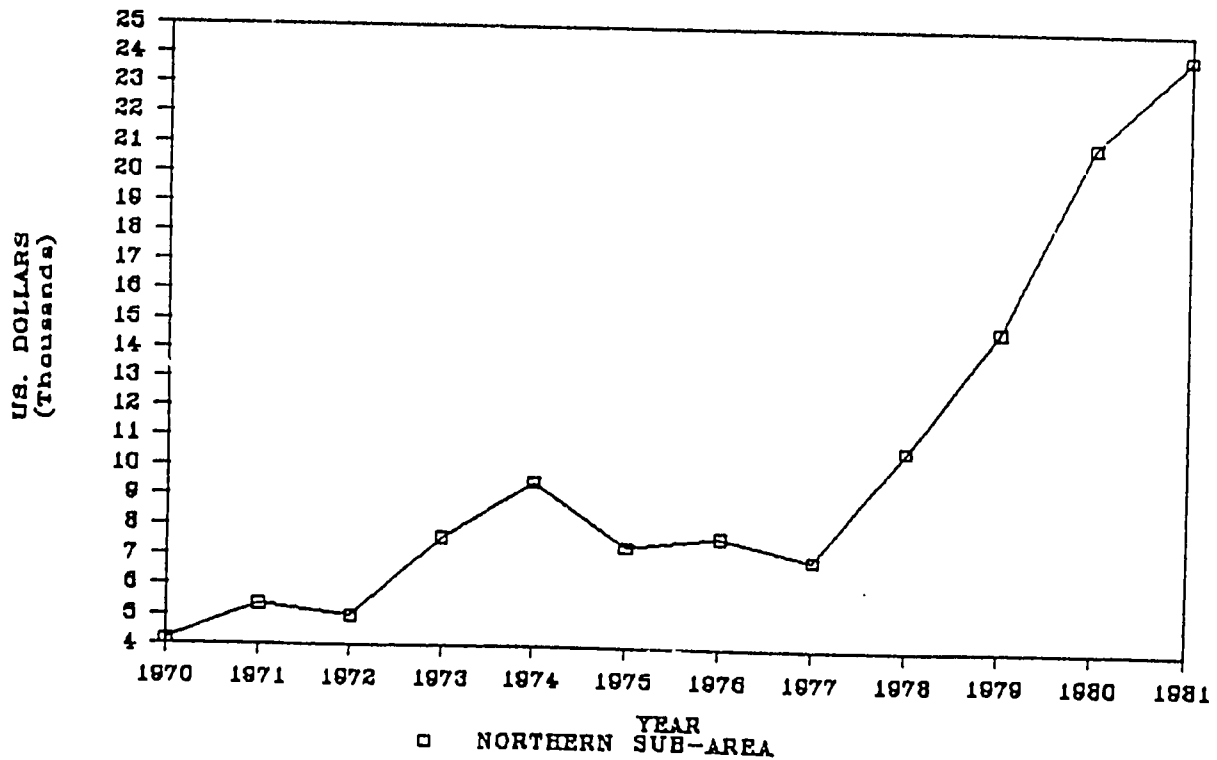
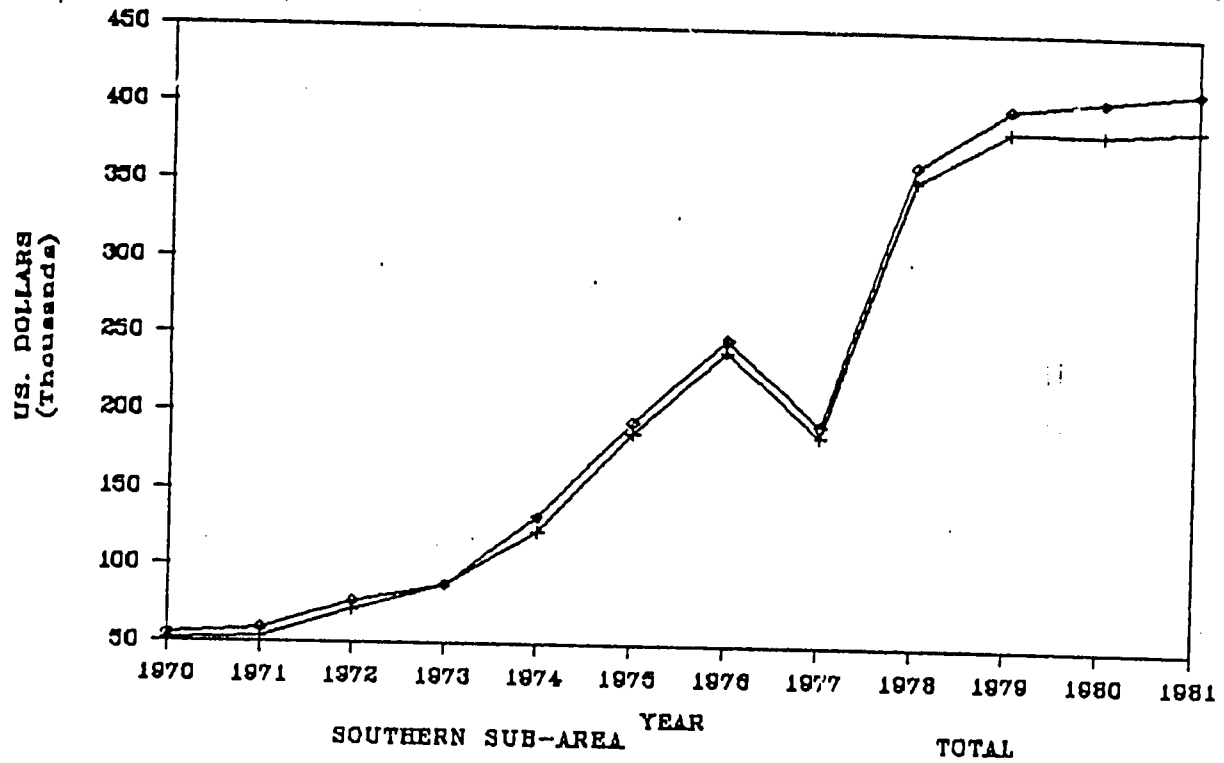


Table 5.

## CECAF REGION: VALUE OF EXPORTS BY COUNTRY 1970 - 1981

(000S USD)

NORTHERN SUB AREA	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
CAPE VERDE	705	620	754	1063	980	582	659	702	552	1173	1094	1094
GAMBIA	116	110	204	585	956	918	1468	1869	2247	2136	4336	4336
GUINEA												
GUINEA BISSAU						0	548	1543	856	467	3964	3964
MAURITANIA	7361	7691	7691	10225	15275	15786	16696	20170	25544	12713	42787	42767
MOROCCO	34706	37884	38710	80247	78830	64350	80069	70923	90167	107947	118639	189737
SENEGAL	8445	12893	17247	21728	30906	55415	52609	63435	75532	111417	154080	97283
SUB TOTALS	51333	59198	64606	113848	126947	137651	152049	158642	194898	235853	324960	339201
SOUTHERN SUB AREA												
BENIN	222	270	270	722	702	985	884	859	22	24	24	24
CAMEROON	1116	2430	2745	5420	4693	4454	3660	4420	3662	3662	3972	3972
CONGO									28	636	854	854
EQ. GUINEA	742	742	742	742	742	742	742	742	582	663	663	663
GABON	66	40	0				51	759	829	878	630	630
GHANA	0	1	25	293	335	637	637	637	4885	2694	2692	2692
IVORY COAST	2567	3094	3598	7341	10590	12810	14527	22100	25241	39493	39493	39493
LIBERIA	1810	1901	2448	1520	1896	2243	2809	2433	2574	2093	1634	61
NIGERIA	104	84	96	2154	4211	4087	1946	1891	2137	3616	3616	3616
SAO TOME PRN												
SIERRA LEONE	7	11	0	5	5	24	3	3	24	24		
TOGO	39	40	64	60	117	38	6	6	26	27	27	27
ZAIRE	8	22	74	70	200	200	200	117	42	42	42	42
SUB TOTALS	6681	8635	10062	18327	23491	26220	25465	33967	40052	53852	53647	52074
TOTALS	58014	67833	74668	132175	150438	163271	177514	192609	234950	289705	378547	391275

SOURCES: FAO (1979) YEARBOOK OF FISHERY STATISTICS, VOL. 47. FISHERY COMMODITIES, 1978, PP. 13 - 17  
 FAO (1982) YEARBOOK OF FISHERY STATISTICS, VOL. 53 FISHERY COMMODITIES, 1981, PP. 31&32

Table 6.

## CECAF REGION: PER CAPITA CONSUMPTION OF FISH BY COUNTRY 1970 - 1980

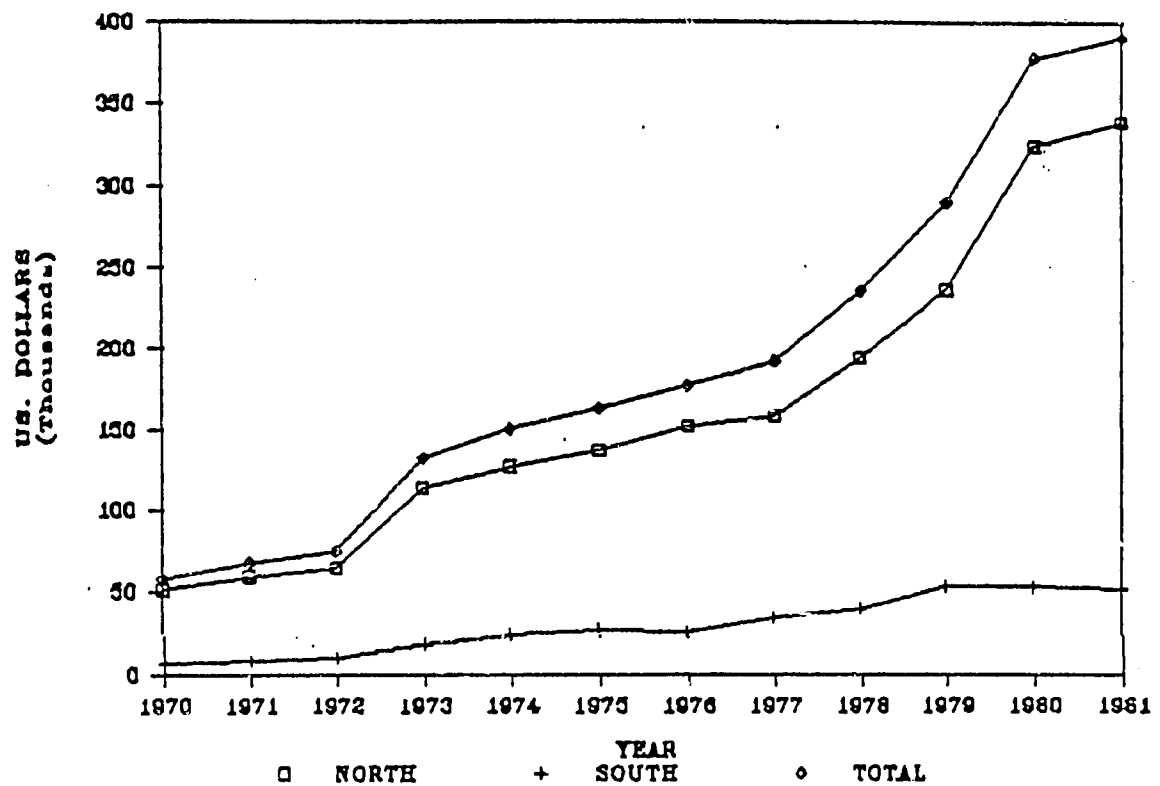
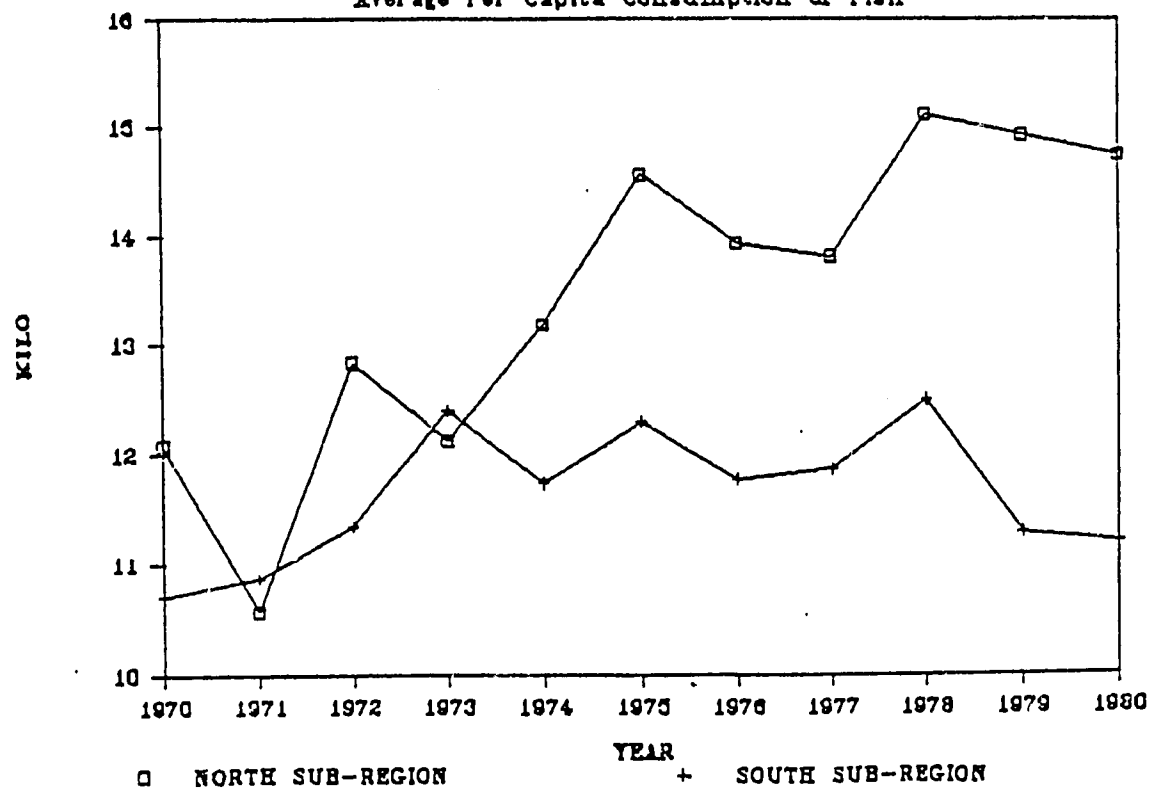
(IN KILOGRAMS)

NORTHERN SUB AREA	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
CAPE VERDE	21.8	20.6	18.9	14.9	20.4	26.1	23.2	29.9	31.5	30.2	29.7
GAMBIA	7.2	7.4	8.4	10.7	11.1	13.1	11.1	9.6	11.7	12.0	12.3
GUINEA	0.9	1.5	2.5	2.9	3.2	3.5	3.7	3.7	3.7	3.6	3.5
GUINEA BISSAU	3.9	3.9	4.4	4.4	3.7	5.4	4.3	3.6	5.8	5.9	6.2
MAURITANIA	20.6	13.7	20.1	20.0	18.9	20.2	18.5	17.3	19.9	18.6	17.4
MOROCCO	2.1	4.5	4.5	4.7	4.3	3.3	4.3	5.0	5.1	5.9	5.7
SENEGAL	28.0	22.4	31.0	27.2	30.7	30.3	32.3	27.5	28.1	28.3	28.6
TOTAL NORTH	84.5	74.0	89.8	84.8	92.3	101.9	97.4	96.6	105.8	104.5	103.2
Average North	12.1	10.6	12.8	12.1	13.2	14.6	13.9	13.8	15.1	14.9	14.7
SOUTHERN SUB AREA											
DENIN	8.8	7.7	7.9	7.7	7.5	7.6	7.2	6.7	6.5	6.3	6.1
CAMEROON	7.7	7.7	7.7	7.6	7.3	6.8	6.9	7.5	7.1	7.4	7.4
CONGO	11.8	13.0	15.0	13.1	12.8	15.4	16.0	16.3	18.5	11.8	11.6
EQ. GUINEA	13.7	13.5	13.2	12.9	12.7	12.4	12.1	11.8	12.0	12.1	12.3
GABON	11.8	12.1	14.0	21.8	12.7	19.1	16.8	16.7	24.2	12.4	13.2
GHANA	16.3	21.3	21.7	18.1	16.9	19.0	17.2	19.1	17.7	17.5	17.4
IVORY COAST	10.8	11.1	11.9	13.5	19.1	18.0	16.9	13.7	13.0	16.8	16.2
LIBERIA	15.8	17.3	15.0	17.5	17.4	17.3	17.4	16.9	17.2	15.9	15.4
NIGERIA	4.3	4.7	4.9	5.7	5.6	6.1	6.8	6.0	7.3	7.8	7.6
SAO TOME PRN	14.3	12.7	13.0	9.5	10.1	10.0	9.9	9.8	9.9	10.0	10.1
SIERRA LEONE	11.8	11.1	14.1	21.9	19.8	17.1	16.5	22.0	21.6	21.3	21.0
TOGO	4.4	4.7	4.5	6.0	5.7	7.2	5.6	4.8	4.4	4.4	4.5
ZAIRE	7.6	4.4	4.5	5.8	4.9	3.7	3.6	2.9	2.9	2.9	2.8
TOTAL SOUTH	139.10	141.30	147.40	161.10	152.50	159.70	152.90	154.20	162.30	146.60	145.40
Average South	10.70	10.87	11.34	12.39	11.73	12.28	11.76	11.86	12.48	11.28	11.18
TOTAL NORTH & SOUTH	223.60	215.30	237.20	245.90	244.80	261.60	250.30	250.80	268.10	251.10	248.60

SOURCE: FAO



Fig.4. VALUE OF EXPORTS - CECAF REGION

Fig.5. CECAF REGION  
Average Per Capita Consumption of Fish

A Brief Comparison of Catches, Trade and Per Capita Consumption  
of Fish for Senegal, Guinea-Bissau, Sierra Leone and Ghana

This Working Paper is one in a series of five Working Papers. The others (Brainerd, June, 1984: 002/005) present case studies of fishery development projects undertaken in the four countries above. This section compares some major aspects of their fisheries. The fishery development projects evaluated are not of the same nature and magnitude, and no attempt is made to discuss their effects on the stages of development of the fisheries in the four countries in this section.

Senegal recorded the highest total catch figures from 1970 to 1982, followed by Ghana, Sierra Leone and Guinea-Bissau. Total catches for Senegal increased considerably from 1970 to 1978 before declining. With the exception of a significant decrease in 1973, catches for Ghana showed a generally upward trend during this period. Sierra Leone had modest increases in total catches in the early years and then experienced a decline after 1975. Total catch figures for Guinea-Bissau indicate slight increases in the latter years (Tables 3 and 4 and Figure 6).

Various factors are likely responsible for these trends in total catches for the four countries. Senegal expanded its artisanal fishery with the introduction of purse seines and motorization in the early to mid-1970's. Ghana suffered from unavailability of spare parts for fishing vessels in the early 1970's due to lack of foreign exchange. A number of vessels were laid up. In Sierra Leone, the rate of motorization increased from the early to mid-1970's. This led to increases in the total catches of artisanal vessels. Guinea-Bissau experienced some development of its fisheries only in recent years.

Of the four countries, Ghana is the major fish importer. However, its imports have been declining since 1977. Senegal appears to be second to Ghana for value of imports. It is believed that most of the imports are fish landed in Senegal for processing and eventual export that are included as imports, particularly the considerable increases since 1977. Imports of fish for Sierra Leone increased in the early years and have remained relatively constant since 1976. Imports of fish for Guinea-Bissau is negligible compared to the other countries (See Table 4 and Figure 7).

Senegal is by far the most important exporter of the four countries. Exports of fish products increased dramatically up to 1980 before experiencing a decline. Ghana only showed significant export figures from 1978 onwards. Exports for Sierra Leone and Guinea Bissau are minimal compared to Senegal (See Table 5 and Figure 8).

Senegal also has the highest per capita consumption of fish. This is relatively constant throughout the period except for a decrease in 1971. Ghana's per capita consumption of fish was higher than Sierra Leone up to 1972, then declined, remaining relatively constant but lower than that for Sierra Leone. Guinea-Bissau has a much lower per capita consumption of fish compared to the other three countries (See Table 7 and Figure 9).

Fig.6. TOTAL CATCHES

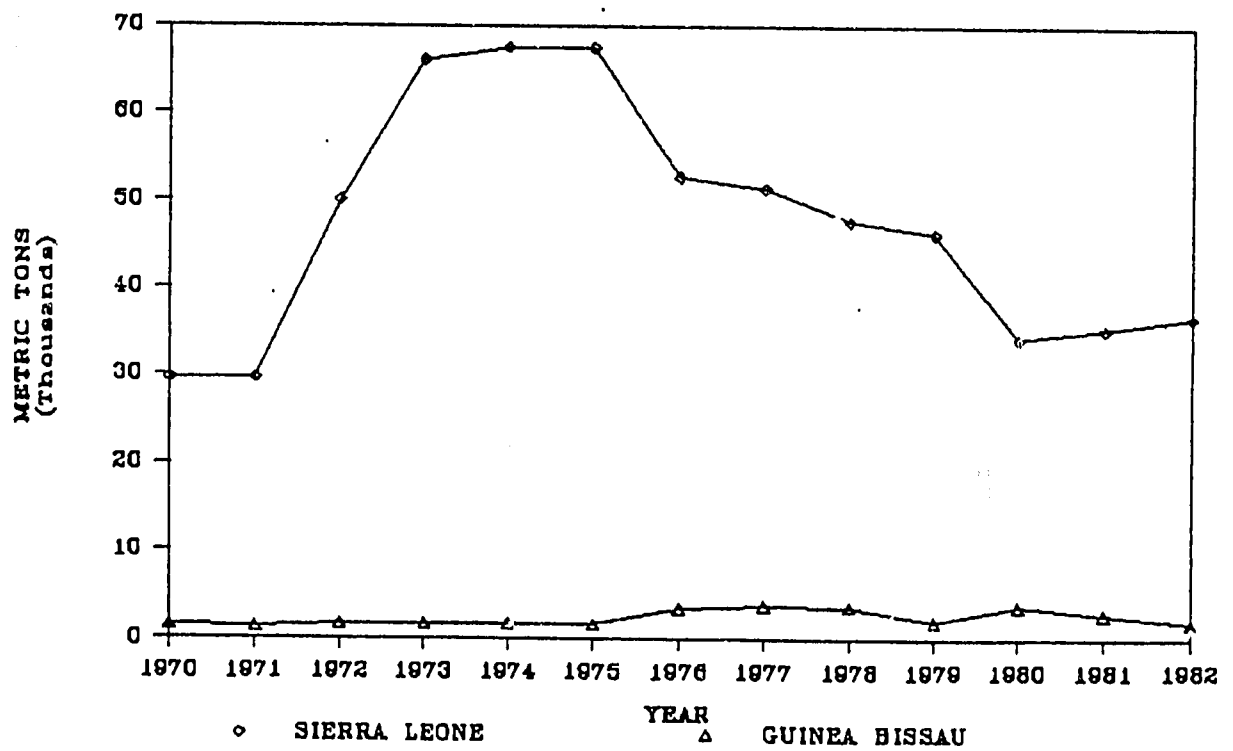
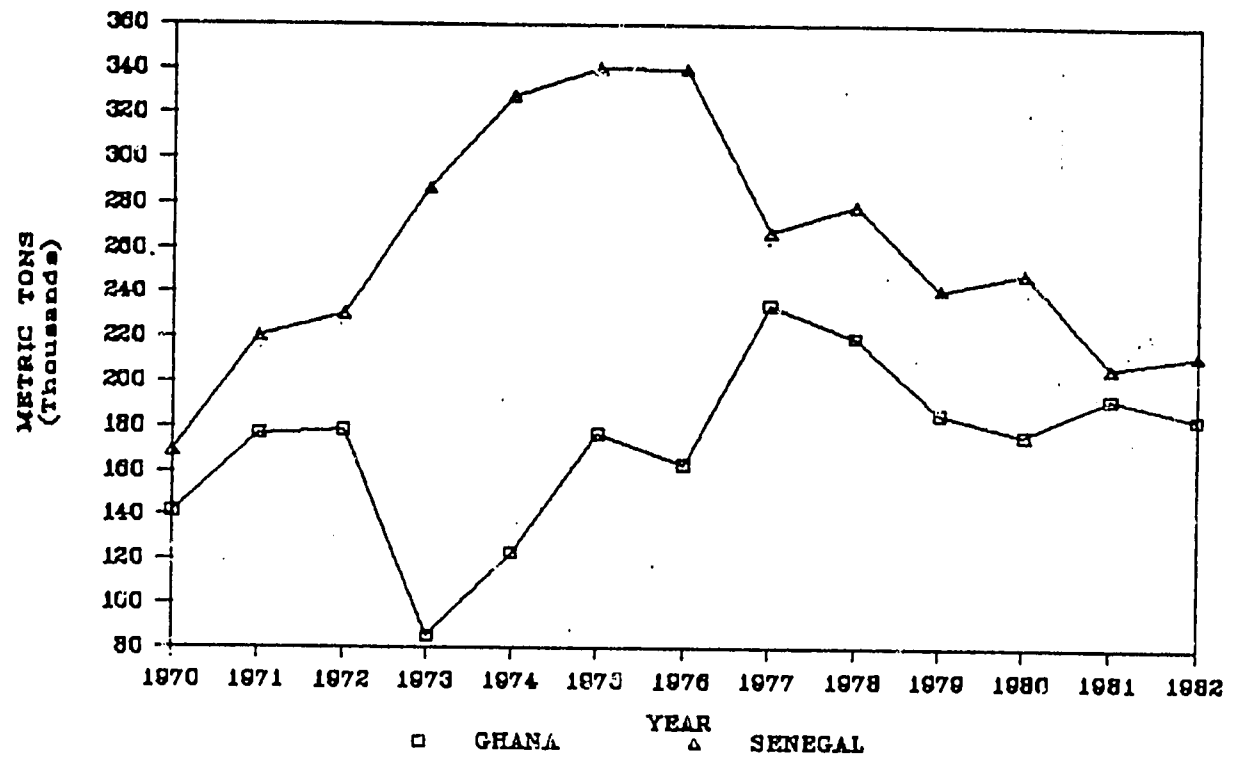


Fig.7. VALUE OF IMPORTS

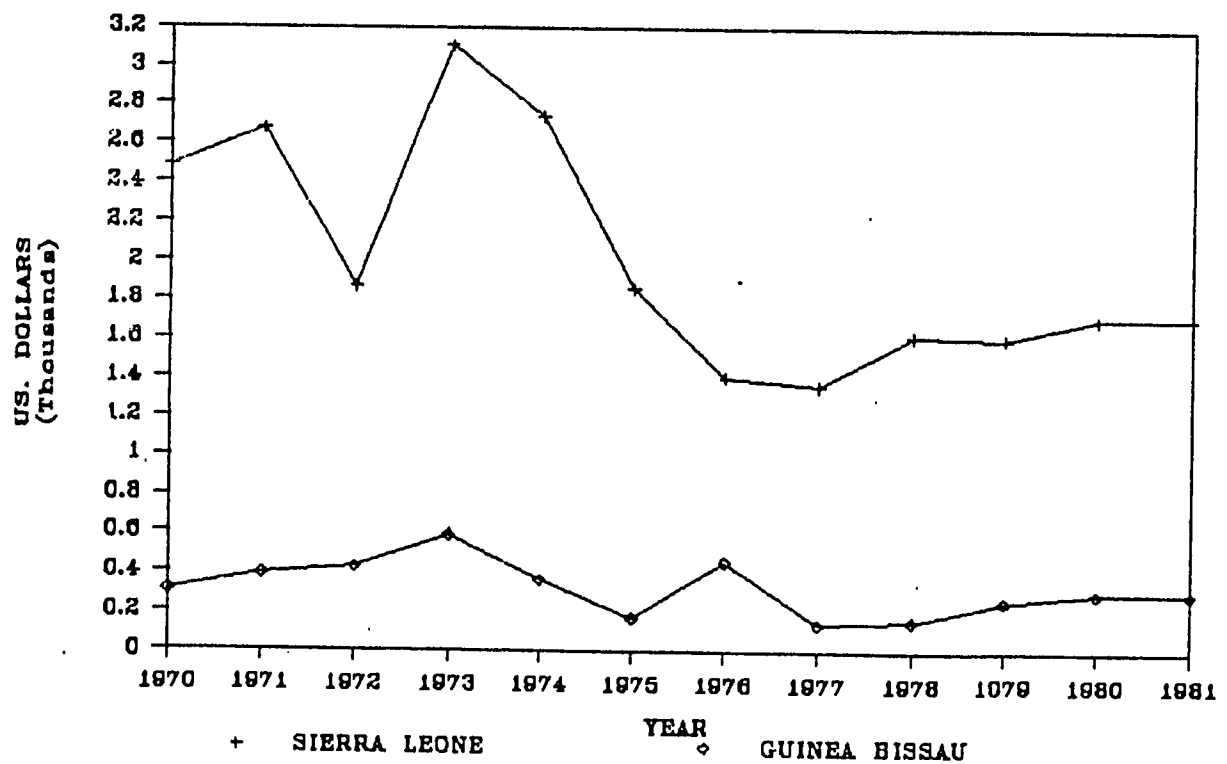
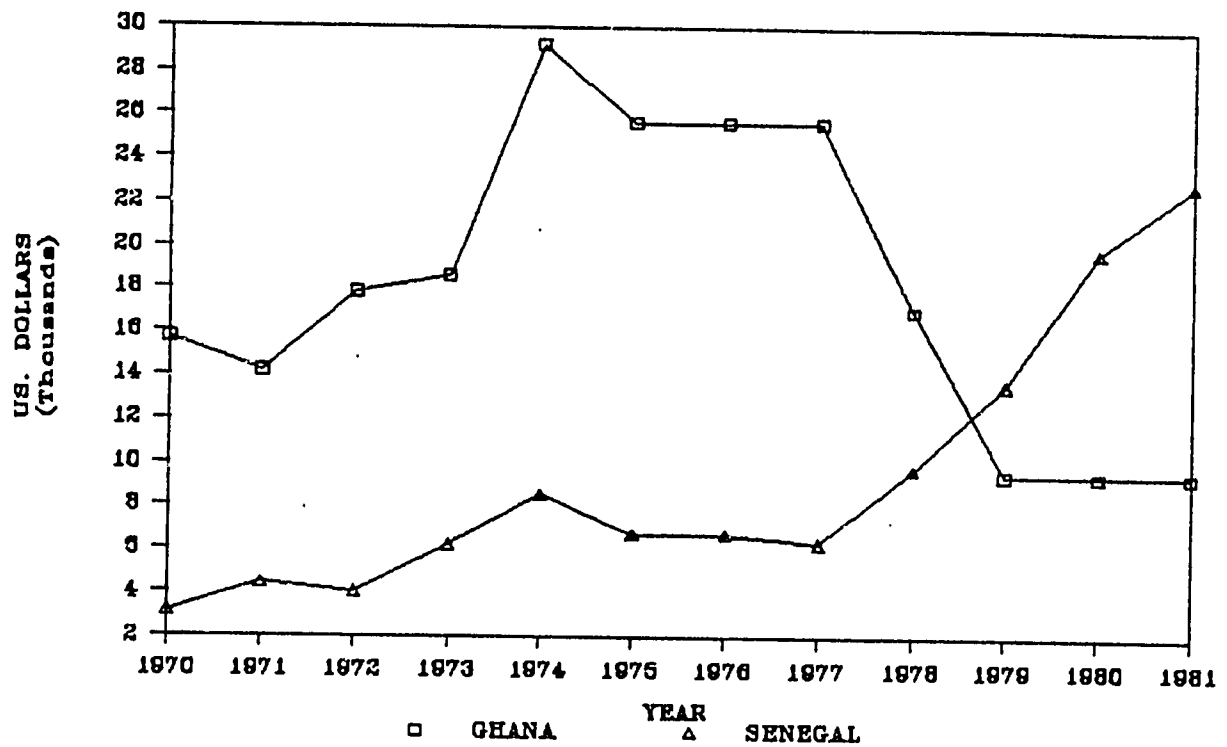


Fig.8. VALUE OF EXPORTS

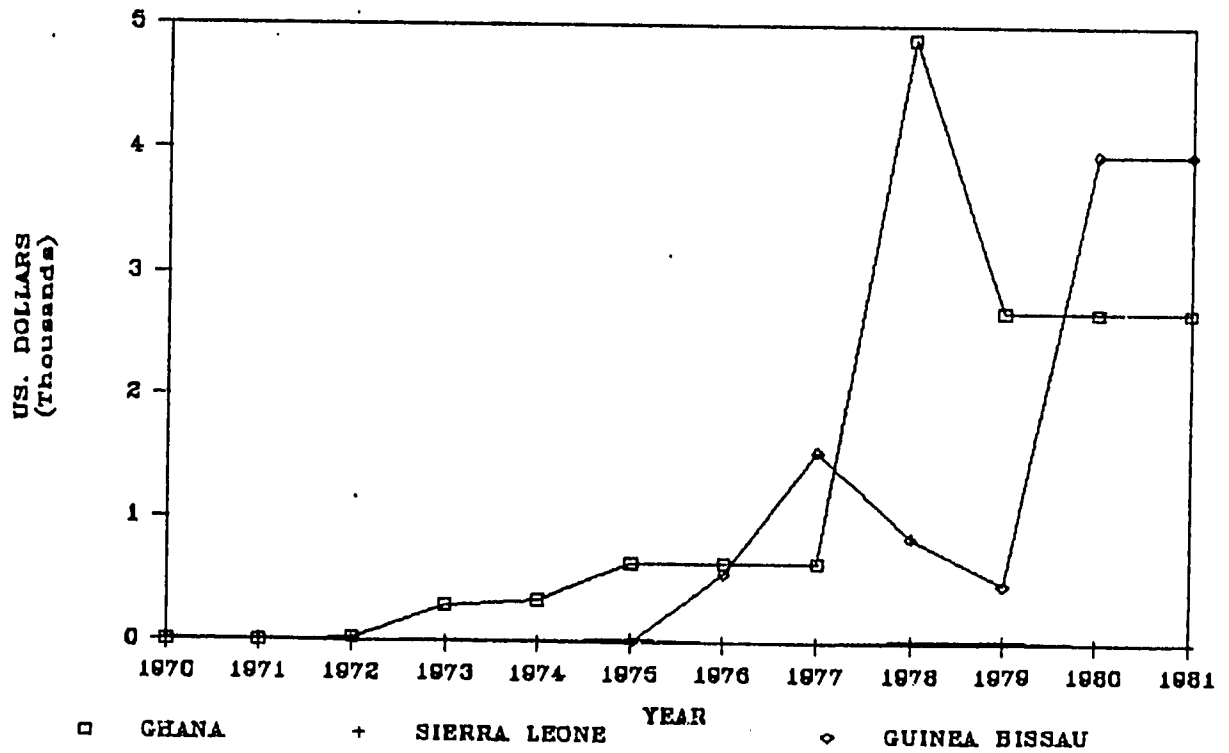
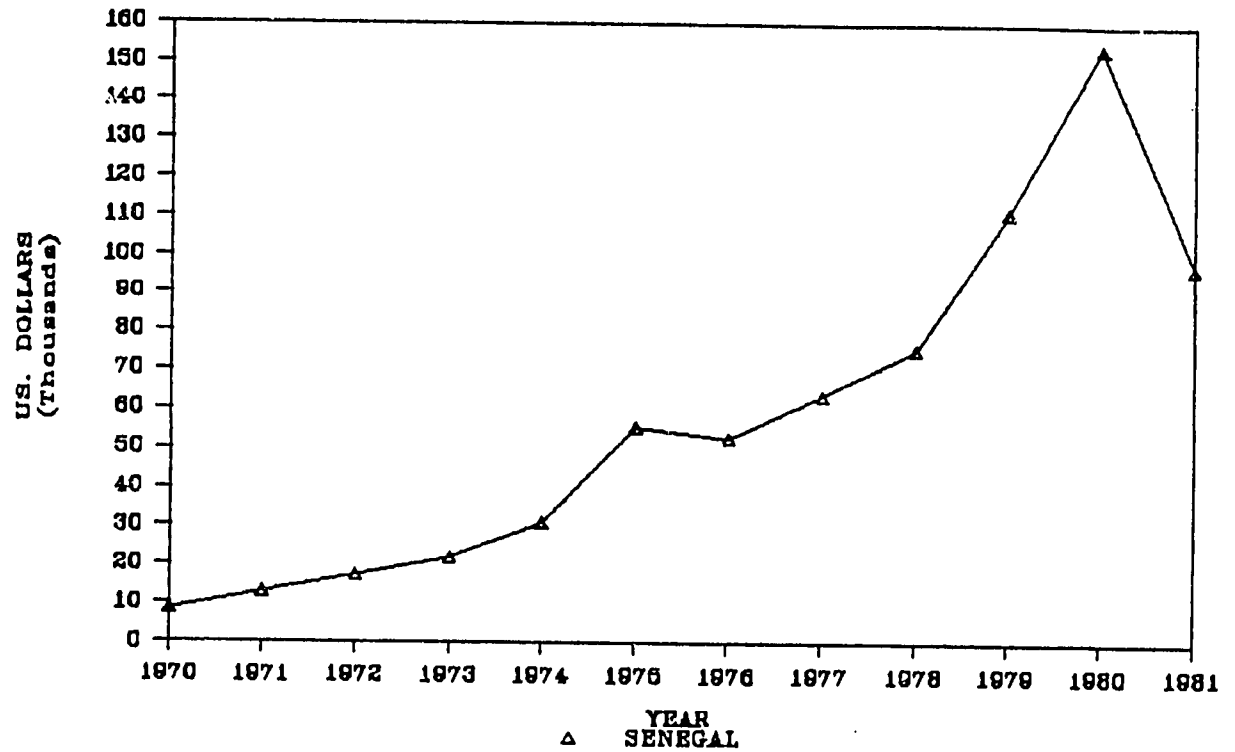


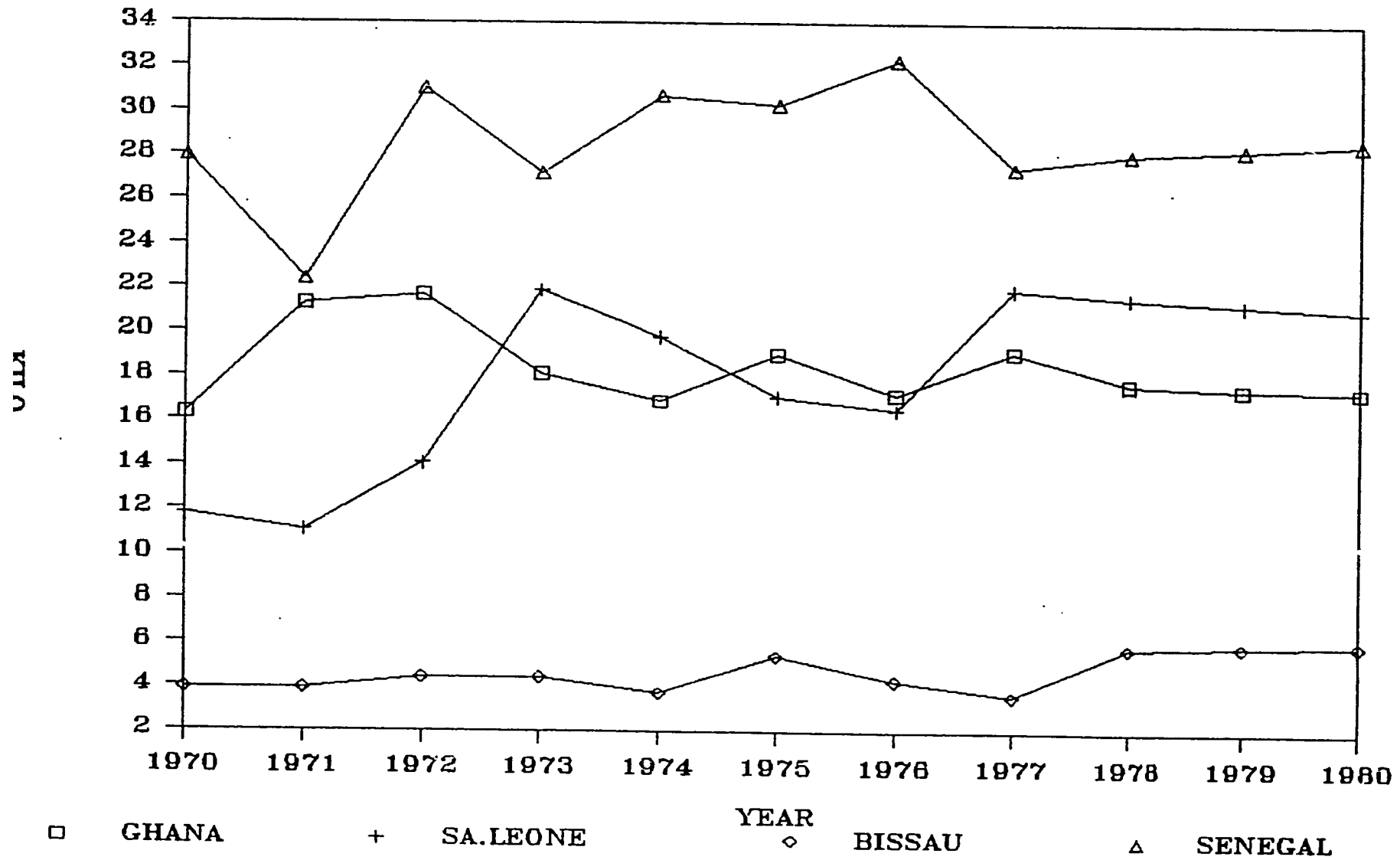
Table 7. PER CAPITA CONSUMPTION OF FISH 1970 - 1980  
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(KILO/YEAR)

COUNTRY	1970	1971	1972	1983	1974	1975	1976	1977	1978	1979	1980
GHANA	16	21	22	18	17	19	17	19	13	17	16
SIERRA LEONE	12	11	14	22	20	17	17	22	22	21	21
GUINEA BISSAU	4	4	4	4	4	5	4	4	6	6	6
SENEGAL	28	22	31	27	31	30	32	28	28	28	29

SOURCE: FAO

Fig.9. PER CAPITA CONSUMPTION OF FISH



### III. CASE STUDIES OF FOUR FISHERIES DEVELOPMENT PROJECTS

One of the major constraints on fisheries development is the lack of economic data on the fisheries in the region. This section presents a summary of the evaluation of selected fisheries development projects implemented in four countries in the region. This evaluation outlines some of the critical areas and discusses some of the important results of these projects, thus indicating the sort of information and experience that could be gained by systematic evaluation of fisheries projects. Such information and experience are essential for planning future development activities to avoid repetition of mistakes and for more effective planning. Further details on these projects can be found in Brainerd (June, 1984: 002/005).

The four fisheries development projects share two broad objectives: to improve nutritional standards by increasing the quantity and quality of animal protein, and to save foreign exchange by reducing imports through increased domestic production. There are some basic similarities in the design of these projects. For example, to increase fish production, each project is designed to introduce new technology and to expand the number of production units or firms. (For the oyster culture project, this is in the form of developing aquaculture techniques for increasing the yield of oysters.)

#### Ghana Fisheries Project

The objectives were to expand the fishing industry, to save foreign exchange by reducing imports of fish, and to contribute to the improvement of nutrition in Ghana.

The project originally called for constructing forty purse seine vessels of about 15 meters, providing credit to fishermen to enable them to buy the vessels and procuring spare parts for the vessels.

By the time the funding became available (August, 1971 - one and a half years after the initial approval), new information and conditions led to a revision of the project's dimensions. First, the levels of stocks were now believed to be less abundant than originally estimated; second, the construction costs of the vessels rose considerably. The number of vessels to be constructed was reduced to ten, and they were to be fitted for trawling as well as purse seining. Nine vessels were operational by September 1973, and the tenth by July 1975. The World Bank provided U.S. \$2.3 million for the project as loan, and the Government of Ghana provided U.S. \$1.0 million.

For the first three years of operation the project did not significantly expand the fishing industry. The ten vessels made up 10 percent of the industrial fleet and contributed less than 0.3 percent to the total domestic production. The per capita fish consumption fell during this period. The number of jobs created was probably only about 100. (It was originally estimated that the project would create 800 jobs.)



The financial analysis showed that the internal rate of return (IRR) for most vessels was less than 1.0 percent, and some vessels experienced losses. The actual catches were between one-third and one-fifth of what was expected. This probably reflects low resource abundance. Returns from the vessels' operations were also low due to lower prices in real terms, and costs rose much faster than revenues during this period due partly to the energy crisis.

#### Oyster Culture Project

The project was planned to have three phases. Phase I (1974 -1978) had as its objectives to increase the yield of local mangrove oysters and to establish a practical and economic system for oyster culture. Phase II's (1978-1981) objective was to conduct an extension program to include local individuals in oyster culture. Phase III's (1981-1984) objective was to extend the oyster culture operation along the country's coastline.

Coastal fishermen and their families, consumers, and aquaculture research are listed as the beneficiaries. The International Development Research Center (IDRC-Canada) provided U.S. \$318,500, and the Government of Sierra Leone provided U.S. \$514,600 for the project.

Four sites were established during Phase I, and the raft method was determined to be most suitable. Growth rates of raft cultured oysters were three to four times greater than wild oysters. The biological studies began in Phase I were completed during Phase II, but the extension activity was not undertaken. Phase III was never implemented.

The financial analysis shows that the raft culture method is not profitable. Even though it is more productive than the wild oysters in terms of growth rate and meat weight, the method cannot produce a kilogram of oysters for a lower price than the wild oysters. The rafts were simply too costly; they required imported drums (for flotation) and nylon ropes. Since raft culture was not profitable, no private individual could be induced to adopt the method. Hence, an extension effort was futile.

#### Guinea-Bissau Fisheries Project

The objectives were to upgrade nutritional standards by increasing the amount of fish available and distributing it among the population. Fishermen in Cacheu and consumers in the area are listed as beneficiaries.

The inputs include a retail store to sell outboard engines, spare parts, gear and equipment, fuel, a revolving credit fund, an engine repair shop, a cold store, and an insulated truck to handle the distribution of fresh fish. The United States Agency for International Development (USAID) provided U.S. \$500,000, and the Government of Guinea-Bissau provided U.S. \$187,000.

The project was successful in increasing the production of fish by motorizing nineteen boats. The per capita fish consumption was up by 2.0 kilograms in the Cacheu region. The cold store was never built, and the added fish was not widely distributed. The engine repair shop was never established. Both failures were due to the lack of a building. The credit fund worked well, and repayment was good.

The retail store quickly ran out of engines and spare parts. A problem with foreign exchange precluded restocking the inventory. Without access to hard currency, the store could not go on operating for long. The European Economic Commission (EEC) took over the project at the end of USAID funding.

### Artisanal Fishery Development Projects in Senegal

Three projects to develop artisanal fisheries in Senegal are described in this section:

1. Motorization of canoes (1972-1977)
2. Introduction of purse seine (1972-1975)
3. Marketing and distribution of fresh fish (1981-1986)

#### Motorization

The objectives of this project are to increase production and consumption of fish and to increase incomes of fishermen.

The inputs include: provision of 3,500 outboard engines with spare parts, establishment of "stations" for maintenance and repair of engines, extension of credit to fishermen to buy the engines, and provision of extension service to advise fishermen. The Government of Canada contributed Canadian \$2.7 million, and the Government of Senegal, staff, buildings, etc. (exact amount not known).

The project succeeded in expanding production. Over 50 percent of the existing fleet was motorized between 1972 and 1977. The project was not self-sustaining, however, and the stations for servicing the engines stopped their services at the end of Canada's contribution. Gifts of engines and spare parts by the governments of Belgium and Japan respectively later allowed the project to continue.

#### Purse Seine

The objectives are to provide more efficient methods for exploiting small pelagics (herrings), to increase production, and to supplant the surrounding gill net.

The inputs include purse seine gear, extension program (training, etc.), and credit to fishermen to acquire the gear. The United Nations Development Programme (UNDP) and the Government of Senegal provided funding. Their contributions are not known.

The high initial investment in equipment (two engines, two boats, and the gear) meant that only fishermen with substantial savings were at

first able to engage in purse seine operations. However, since purse seining was profitable, others were soon able to obtain funds and purchase the equipment. The number of purse seine fishermen is still growing.

Both the motorization and purse seine projects significantly increased production, employment and fishermen's incomes. The increased production realized in the mid and late 1970's depressed prices, especially during the peak fishing seasons, and created a lot of waste. The traditional marketing and distribution system at the time was not able to efficiently handle this larger flow of fish.

#### Distribution and Marketing

The objectives are to: provide facilities for handling and storing fish, to stabilize prices (i.e., avoid serious drop in prices during peak periods), to increase consumption, and to provide training for members of fishermen's cooperatives in the maintenance and operation of the facilities.

The planned inputs include an administrative and technical center, four distribution centers in major fishing areas, and a possible four additional distribution centers in other fishing areas depending on the success of the first four centers. Each center should be provided with ice plants, cold rooms, and refrigerated trucks for the distribution of fresh fish. The project is planned to last for five years (1981-1986). At the end of the five-year period, the fishermen's cooperatives are expected to take over all of the distribution and marketing operations. The Governments of Canada and Senegal provided funding for this project. Their exact contributions are not known.

Because of increased costs, the number of centers constructed was reduced to three, and no additional center is envisaged during the planned project period. The data used in the analysis are only for 1982-83. One center recorded a net profit of U.S. \$26,500, another a net loss of U.S. \$20,000, and the third a net profit of U.S. \$1,000. The latter only operated for three months during this period.

The operating ratios were high, indicating high operating expenses and low returns. This indicates that the centers may not be financially viable in the long run. (One of the centers had a negative value for its operating ratio.) The return on sales ratios were low for each center. This ratio need not be high if the inventory (in this case, fresh fish) turns over fast.

#### IV, SUMMARY AND CONCLUSIONS

The state of the fisheries in the CECAF region indicates that: (a) the northern sector has more abundant fish stocks and is less populous, and (b) the southern sector with a higher population density has much less fish resources. As a result, the fish stocks in the southern sector are heavily exploited by the coastal countries. Even at this high rate of exploitation, production falls short of domestic demand,

and countries in the southern sector are net importers of fish. The northern sector is characterized by production exceeding domestic demand, thus making countries in the northern sector net exporters of fish.

Coastal countries would stand to benefit more from the exploitation of their fish resources by further developing their capacity to both increase production and reduce the level of foreign fishing activity. This is particularly true for countries in the northern sector. Countries in the southern sector could benefit by entering into fishing agreements with countries in the north and developing their long-distance fleet to fish in the northern sector. Intra-regional trade in fish should be promoted. This would help countries in the southern sector make up their deficits. Of more importance is the fact that this kind of activity will assist in enhancing overall development in the region. There are already a number of regional and sub-regional economic groupings that could facilitate this activity.

One of the major constraints to the development of the fisheries in the region is the inadequate information on the fisheries. There is still not enough information available on the state of some of the commercial fish stocks in the region. Statistics on catches and trade are not reliable for some coastal countries in the region. With limited and sometimes unreliable data, it is difficult to plan and implement fisheries development projects successfully. Some coastal countries have institutions that collect data on the fisheries on a systematic basis, and in others, international organizations carry out similar activities, but the nature of the resources is such that more effort should be concentrated in this area to yield better and long-term results.

There is also a need for coastal countries to coordinate their management and development efforts. This is particularly important for countries that share pelagic stocks like sardinella, sardines, mackerel and horse mackerel. Such efforts should be geared towards the long-term efficient exploitation of the fish resources for all in the region, rather than short-term gains for a few countries. To this end, regional and sub-regional management and development programs should be promoted by coastal countries.

The case studies highlighted a number of points which could be useful to fishery development planners. Two common features of the four projects are briefly discussed here. All four projects were implemented during the period of rapid global inflation in the 1970's resulting from increases in oil prices. Some of these projects were designed before the inflationary trend began. However, even if inflation was envisaged during the planning stages, it would have been impossible to predict the cost increases that took place. Thus, this factor should be borne in mind in assessing the results of these projects.

Another common feature was the lack of foreign exchange in the four countries concerned, which had varying effects on the projects. Given the state of the economies of most coastal countries in West Africa, it is unrealistic to assume that foreign exchange would be readily

available for such projects. Even when foreign exchange is available, allocation is not often made on a merit basis. The designers of fisheries development projects should consider this reality and have contingency plans for dealing with it. Also, projects should not be designed to be heavily dependent on imported equipment.

The Ghana project suffered setbacks even before implementation started because of the lack of relevant information during the design phase. Lack of institutional coordination, management skills and cost overruns during implementation resulted in its failure. The Guinea-Bissau project emphasizes the need for support services for artisanal fishermen. Lack of institutional support and foreign exchange affected the level of success achieved by the project. The Senegal projects show considerable success but lack management skills for maintaining facilities and providing services. The biological results of the Sierra Leone oyster culture project provided useful information, but because little or no economic consideration was given in project design, it was not realized that cultured oysters would be more expensive to produce than wild oysters. Thus, the extension phase of the project was never implemented.

Three important lessons emerged from these case studies. It is evident that training should be provided at various levels to meet the manpower requirements for fisheries development activities. Already, there are a number of institutions in the region providing training in various aspects of fisheries, but such institutions are not being utilized efficiently for various reasons. With better cooperation between coastal countries, these institutions can fulfill some of the training needs. Another issue is that target groups are often not part of the decision process in project design. Some projects were imposed on the target groups. This should be avoided if projects should succeed. Lastly, the reporting and dissemination of information on fisheries development activities in the region is very limited. In some cases the reports only contain operational matters and do not provide technical information. The need and usefulness of providing readily available information on fisheries development activities in the region cannot be overemphasized. This could prevent repetition of mistakes and allow for better planning and implementation of future fisheries development projects.

In conclusion, the fisheries of the countries in the CECAF region have gone through various stages of development over the last decade. With more information on the fish resources and better coordination of management efforts by the various governments, there are possibilities for coastal countries to obtain added economic benefits from the exploitation of their fish resources.

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