SAMUDRA Monograph

The State of World Fisheries from a Fishworker Perspective: The Ghanaian Situation

M. A. Mensah, K. A. Koranteng

A. Bortey and D. A. Yeboah

International Collective in Support of Fishworkers
www.icsf.net

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CHAPTER 3 SOCIAL DYNAMICS OF FISHING COMMUNITIES

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Acronyms

ADB	Agricultural Development Bank
ADRA	Adventist Development and Relief Agency
AFRC	Armed Forces Revolutionary Council
AgSSIP	Agricultural Services Sub-sector Investment Programme
CBFMC	Community-based Fisheries Management Committee
CBLMC	Community-based Lake Management Committee
CCT	Continental Christian Traders
CF	Chief Fisherman
CUA	Credit Union Association
DA	District Assembly
DAA	Development Action Association
DCE	District Chief Executive
DFID	Department for International Development
DOC	Department of Co-operatives
DOF	Department of Fisheries
ECU	European Currency Unit
EDF	European Development Fund
EPPL	Expanded Polyethylene Products Limited
EPA	Environmental Protection Agency
ERP	Economic Recovery Programme
EU	European Union
EEZ	exclusive economic zone
FAD	fish aggregating device
FCUBE	Free Compulsory Universal Basic Education
FDF	Fisheries Development Fund
MCS	monitoring, control and surveillance
FSCBP	Fisheries Sub-sector Capacity-building Project
MDAs	ministries, departments and agencies
MEST	Ministry of Environment, Science and Technology
MESW	Ministry of Employment and Social Welfare
MFRD	Marine Fisheries Research Division
MLGRD	Ministry of Local Government and Rural Development
MOE	Ministry of Education

MOFA	Ministry of Food and Agriculture
MOH	Ministry of Health
MP	Member of Parliament
MSY	maximum sustainable yield
NADMO	National Disaster Management Organization
NAFAG	National Fisheries Association of Ghana
NCCE	National Commission on Civic Education
NGO	non-governmental organization
NRC	National Redemption Council
PNDC	Provisional National Defence Council
PPAG	Planned Parenthood Association of Ghana
RMA	Regional Maritime Academy
SFLP	Sustainable Fisheries Livelihoods Programme
SSNIT	Social Security and National Insurance Trust
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
VAT	value-added tax
WID	Women in Development

Ghana Interbank Exchange Rate (Cedi/Us Dollar)

Year	Exchange Rate
1985	54.37
1986	89.21
1987	162.37
1988	202.34
1989	270.01
1990	326.28
1991	367.73
1992	437.09
1993	648.98
1994	956.71
1995	1200.40
1996	1637.24
1997	2050.29
1998	2314.15
1999	2647.32
2000	5420.10
2001 (up to April)	7062.01

Source: Bank of Ghana

The State of World Fisheries from a Fishworker Perspective: The Ghanaian Situation

INTRODUCTION

The artisanal fishery in the west African subregion, like any other industry, has gone through a chequered history of development. Post-independence, in the late 1950s to mid-1960s, governments of the west African countries adopted a policy of industrialization for the development of all the relevant sectors of the economy, including fisheries. Unfortunately, attempts to industrialize the fishery sector did not positively contribute to the socioeconomic development of fishers.

The artisanal fishery was characterized by neglect and misplaced policies by governments and international donor agencies. Upon this realization, governments attempted to rectify the situation by paying more attention to the artisanal fishery. The initial interventions took the form of making artisanal fishery subcomponents of capital-intensive projects or as part of rural development projects. These failed to achieve the objectives of governments[1].

Development priorities shifted to the integrated approach, where the needs- and assets-based approach to developing fishermen were combined. This took cognisance of their strengths and assets as well as their constraints and needs. It also considered developing all facets of their livelihoods, including education, health, water, sanitation, etc. This approach calls for generation of data from the perspective of the fishworker, to explain his circumstances and help development planners come up with realistic programmes to develop the artisanal fisheries sector.

This study is an attempt to bring to the attention of policymakers, researchers, planners and academics, information that would help explain the circumstances of fishworkers. The study falls within the expanded phase of an earlier pilot phase conducted in Sri Lanka (Asia), Senegal (Africa), Brazil (Latin America), Iceland (Europe) and Canada (North America) to document the state of the world's fisheries from the perspective of fishworkers.

OBJECTIVES

The study has a number of objectives – long-, medium- and short-term — which are as follows:

LONG-TERM OBJECTIVES:

(i) to better understand the status of artisanal/small-scale fisheries and fishworkers;

(ii) to establish the pre-eminence of artisanal over industrial fisheries; and

(iii) to promote more equitable and sustainable fisheries based on artisanal models.

MEDIUM-TERM OBJECTIVES:

(i) to provide baseline information on the status of artisanal/small-scale fisheries and fishworkers, especially with regard to technical, social and economic aspects;

(ii) to establish the intrinsic advantages of artisanal fisheries with regard to equity and sustainability;

(iii) to establish the main threats to artisanal fisheries; and

(iv) to provide information to facilitate the ongoing work of fishworker organizations and to help build up new fishworker organizations.

SHORT-TERM OBJECTIVES:

(i) to document the economic and social status of fishworkers;

(ii) to document the status of artisanal/small-scale fisheries;

(ii) to develop reliable guidelines to understand artisanal fisheries;

(iii) to study the impact of industrial fisheries on the artisanal sector;

(iv) to explore the inshore fishers' potential to harvest fisheries resources, which are currently harvested by industrial fisheries; and

(v) to explore the prospects, potentials and problems for sustaining and developing artisanal fisheries.

METHODOLOGY

The study comprised primarily a desk search of secondary data from research reports, scientific publications, laws and regulations and journals, supported

by field data collection. The field data collection was entirely qualitative. The data was generated through focus group discussions with fishermen, fish processors, fishing crews, helpers and other ancillary workers such as carvers, boat builders and mechanics. It was also supported with qualitative data from secondary sources. The primary data was collected from samples of communities in all the four coastal administrative regions of Ghana. The communities were selected to reflect high concentration of fishing methods and operations and any special peculiarities.

DEFINITION OF A FISHWORKER

In this study, a 'fishworker' stands for all men, women and children who derive their livelihood from fisheries. Thus, the term includes fishers (active fishermen and fisherwomen, comprising equipment owners and crew), together with other individuals who are indirectly involved in fisheries.

CHAPTER 1 AN OVERVIEW OF FISHERIES IN GHANA

1.1 THE COUNTRY CONTEXT

1.1.1 Ghana: Its Location, People and Climate

Ghana is located between the Republics of Togo on the east, Côte d'Ivoire on the west and Burkina Faso on the north; on its southern boundary is the Gulf of Guinea. The coastline, which measures about 536 km long, stretches from longitude 3° 06'W to 1° 10'E, and lies between latitudes 4°30' and 11° 6' N.

Ghana had a population of approximately 18 mn in the year 2000, with an annual growth rate of 2.6 per cent. It is a multi-ethnic State, with a literacy rate of 50 per cent. Ghana is secular and multi-religious, with Christianity (72 per cent) and Islam (12 per cent) as the most popular [2] religions.

As Ghana lies within the tropical equatorial belt, it experiences high temperatures of between 25°C and 35°C, with minimum variation throughout the year, and, for this reason, the difference in climatic conditions is due mainly to the amount and distribution of rainfall [3,4]. In southern Ghana, there are two distinct wet seasons in the year — a major one in May-June and a minor one in August-September[4, 5]. Annual rainfall averages between 82 mm in the southeast and 215 mm in the southwest [3,4,5].

The dominant wind in Ghana is the southwesterly monsoon, which is a relatively weak wind, reaching a maximum speed of only 5 ms^{-1} during the boreal summer [4, 6].

1.1.2 THE MORPHOLOGY OF THE COASTAL ZONE OF GHANA

Along the coast are long stretches of sandy beaches, interspersed with rocky shores, estuaries and lagoons. There are also two large capes (Cape Three Points on the west, and Cape St. Paul on the east), which are important landmarks along the Ghanaian coastline [4,7]. Most of the coconut trees that fringed the coastline and served as windbreakers, have been killed by the Cape St. Paul wilt disease in the last two decades, leaving long stretches of the shoreline rather bare. This situation has contributed to the problem of coastal erosion, which is characteristic of the west African coast [3]. Coastal erosion affects the fishing industry through the destruction of fish-landing sites.

There is a sustained government effort to protect the shoreline by constructing various sea defence structures.

Situated along the coast are 92 lagoons, some of which are described as 'closed' and others, 'open' [4,7,8,9]. There are also a number of rivers that enter the sea through estuaries; these estuaries, together with the lagoons and wetlands associated with them, serve as nursery grounds for many marine fish and crustacean species [4,10,11].

Ghana ratified the United Nations Convention on the Law of the Sea (UNCLOS) III in June 1983 and has therefore jurisdiction over 200 nautical miles (322 km) of exclusive economic zone (EEZ). The continental shelf varies in width between about 13 km off Cape St. Paul and 80 km off Takoradi [11,12]. The shelf narrows towards Togo and also Cote d'Ivoire. The area of the continental shelf of Ghana (to the 200-m depth contour) is 23,700 sq km [13, 14].

1.1.3 THE COASTAL OCEANOGRAPHY OF GHANA

The coastal oceanography of the western Gulf of Guinea (that is, the area between Côte d'Ivoire and Benin) is generally divided into four regimes; a short cold season in December-January of approximately three weeks duration (minor upwelling), a long warm season between February and June, a long cold season between July and September (major upwelling), and a short warm season in October- November [4, 16, 17].

During the major upwelling season off Ghana, sea surface temperatures, which are usually about 27-29°C fall below 25°C, surface salinities increase, and dissolved oxygen values generally fall. The upwelling of cold, nutrient-rich, sub-thermocline water drives the biology of the shelf waters. During the upwelling seasons, high biological activity takes place, phytoplankton and zooplankton production rise considerably, and most fishes spawn, resulting in the availability of rich fisheries resources [16,17].

1.2 THE IMPORTANCE OF MARINE CAPTURE FISHERIES

1.2.1 THE DEVELOPMENT OF THE FISHING INDUSTRY

Over the ages, Ghana has had a tradition of a very active fishing industry. It started as an artisanal fishery, with very simple and low-efficiency gear and methods, operating in very near coastal waters, lagoons, estuaries and rivers. It continued to improve over the years with the development of new gear, equipment (outboard motors, purse-seine nets, synthetic netting materials, inshore and industrial vessels) and methods, which have been more efficient than the earlier ones. Now the industry is a complex and sophisticated system of several fisheries reaching far out to sea and exploiting rivers, lagoons, lakes

and other impoundments; aquaculture development is also being vigorously pursued [18].

Together with the improvements in the fisheries have been developments of more efficient systems of handling, distribution, marketing, preservation and processing the fish, including canning. Further, modern infrastructures for handling the fishing vessels and gear have been established [18]. Ghana is a leading fishing nation in Africa, and Ghanaian fishers may be seen in several fishing communities in countries bordering the eastern Atlantic [4].

1.2.2 Contribution of the Fisheries Subsectors to Total Fish Production

The marine fishing industry provides over 87 per cent of all fish produced in Ghana [25]. The importance of each subsector within the marine fishery sector, by way of its contribution to fish availability or production in Ghana, is shown in Tables 1 and 2.

Of the three main subsectors, the artisanal subsector contributes between 60 and 80 per cent of the total annual Ghanaian marine fish production, followed by the industrial subsector. Furthermore, within the industrial subsector, the tuna division is most important, followed by the trawling and shrimping divisions, in descending order of importance.

1.2.3 Contribution of the Fisheries Sector to Overall Employment, Food Security and the National Economy

The fisheries sector plays a major role in the national economy. In addition to its contribution to the gross domestic product (GDP), which currently stands at 3 per cent, the sector provides employment to the labour force, and contributes to the foreign exchange earnings of the country. Further, it is a major source of animal protein consumption, and assists in the alleviation of rural poverty [25].

1.2.4 Employment

The fishing industry is one of the major sources of employment in Ghana. The industry is dominated by private-sector initiative, with local entrepreneurs offering job opportunities to several thousands of the labour force in fishing operations, fish handling and processing, fish distribution and marketing. Over 150,000 fishers are engaged in marine capture fisheries. It is estimated that another 1.5–2 mn people rely directly on these fishers as their wives, children and other close relatives [25]. There are also others engaged in ancillary or

Table 1: Total Quantities of Fish (tonnes) Landed by Ghanaian Fishing Vessels (1989-2000) and Percentage Share by the Various Fleets. (Only Fish Caught in Ghanaian Waters and Landed on the Country's Beaches are Included in This Table.)

Year	Artisanal Fleet		Inshore Fleet		Industrial Trawlers		Shrimping Fleet		Tuna Fleet		Total
	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	Quantity	Per-cent	
1989	220,878	76.4	12,657	4.4	23,073	8.0	380	0.1	32,294	11.2	289,282
1990	242,020	75.8	9,250	2.9	26,589	8.3	726	0.2	40,803	12.8	319,388
1991	215,847	74.5	7,357	2.5	27,892	9.6	785	0.3	37,795	13.0	289,676
1992	307,931	83.0	10,768	2.9	20,933	5.6	386	0.1	30,776	8.3	370,794
1993	257,237	80.6	5,230	1.6	18,323	5.7	1,548	0.5	36,856	11.5	319,194
1994	211,747	76.7	6,037	2.2	18,966	6.9	2,442	0.9	36,973	13.4	276,165
1995	210,659	77.0	6,371	2.3	20,049	7.3	2,689	1.0	33,905	12.4	273,673
1996	298,249	80.3	8,353	2.2	25,104	6.8	2,590	0.7	37,255	10.0	371,550
1997	215,125	72.9	7,294	2.5	17,528	5.9	1,652	0.6	53,625	18.2	295,224
1998	189,459	68.0	6,137	2.2	16,848	6.0	653	0.2	65,568	23.5	278,664
1999	164,829	61.3	5,150	1.9	13,945	5.2	1,410	0.5	83,552	31.1	268,886
2000	275,965	77.8	8,668	2.4	15,455	4.4	1,224	0.3	53,255	15.0	354,567

Source: Marine Fisheries Research Division, Tema

related occupations such as canoe carvers, input suppliers, office workers for industrial fleet, etc. In addition, other various estimates add up to about 500,000 people engaged in processing, distribution and marketing of fish throughout the country [25].

1.2.5 FOOD SECURITY

Of the various sources of foods, fish stands out as the most important in terms of food security in Ghana because it is the only source of high-quality protein whose shelf life can be readily enhanced through low-cost, sustainable technologies like smoking, drying, etc. It is not uncommon to encounter smoked fish that has been stored for 3–6 months in the remotest markets in Ghana. Other animal protein sources do not store to that extent. Its price relative to the price of other high-quality protein sources like milk, meat and eggs is very competitive.

The consumption of fish in Ghana ranges from 20–30 kg per capita (Table 3), making it one of the highest fish-consuming countries in Africa [24]. The per capita fish consumption of 30 kg/year occurred in the 1970s, while the 20 kg/year rate of consumption has been occurring in recent times.

Table 2: Numbers of Vessels and Catch in the Shrimp Fishery in Ghana

Year	Numbers of Vessels	Fin-fish Landed (tonnes)	Shrimps Landed (tonnes)	Total Landing (tonnes)
1989	5	187.2	193.0	380.2
1990	8	539.7	186.0	725.7
1991	11	637.3	147.6	784.9
1992	5	253.6	132.5	386.1
1993	8	1,447.8	100.0	1,547.8
1994	14	2,165.2	277.1	2,442.3
1995	17	2,371.5	317.3	2,688.8
1996	16	2,323.3	266.8	2,590.1
1997	13	1,495.9	155.8	1,651.7
1998	9	530.7	121.8	652.5
1999	12	1,280.4	129.3	1,410.0
2000	12	1,051.8	172.2	1,224.0

Source: Partly extracted from [4].

The trend of consumption, therefore, indicates a decline, which is attributable to rapid population growth and declining real incomes[24]. However, on average, the total fish production of Ghana from national waters is about 350,000 tonnes per annum (Table 1). In 2000, a fish catch of 467,700 tonnes was made by Ghanaian fishing vessels, consisting of 355,000 tonnes from marine waters, 87,500 tonnes from inland waters, and 25,200 tonnes caught by Ghanaian vessels fishing in foreign waters (Tables 1, 3). This production, just like others in previous years, falls short of Ghana's fish requirement, which is estimated to be about 600,000 tonnes per annum [26]. Thus, the level of Ghanaian fish production is below what should provide complete food security.

Table 3: Contribution to Domestic Fish Supply ('000 tonnes) and Consumption Rate

Year	Marine	Inland *	Foreign Waters**	Imports	Less Exports	Total Consumed	Consumption Rate (kg)
1990	319	58		23	33	367	23
1991	290	57		27	30	344	23
1992	371	57		34	23	432	28
1993	319	52		37	37	371	24
1994	276	54	11	19	19	328	20
1995	274	65	85	2	2	339	22
1996	372	78	77	1	1	446	24
1997	295	76	101	-	32	339	24
1998	279	76	98	17	41	331	22
1999	269	81	64	52	52	350	22
2000	355	88	25	64	53	453	25

* Volta Lake, rivers, dams and aquaculture

* * Marine catches made by Ghanaian vessels fishing outside Ghanaian waters

Source: Directorate of Fisheries

1.2.6 Foreign Exchange Earnings

The fishing industry contributes to the foreign exchange earnings of Ghana; fish constitutes the country's most important non-traditional export commodity. The most important constituent of the fish exports is tuna, which is exported largely canned and in loins and, to a lesser extent, as whole. Out of a total

51,651 tonnes and 53,060 tonnes of fish and fish products exported in 1999 and 2000, tuna (whole, canned, loins) contributed 42,503 tonnes and 40,710 tonnes, respectively. These exports earned the industrialists as much as US$ 82,911,430 in 1999 and US$ 83,844,460 in 2000. The tuna exports alone fetched the operators US$ 70,605,874 in 1999 and US$ 70,538,275 in 2000 (Table 4).

1.2.7 POVERTY ALLEVIATION

The fisheries sector in Ghana is largely rural in character, as artisanal fishers dominate the industry, contributing over 80 per cent of the total marine production. The industry, therefore, plays a major role in rural poverty alleviation, as most of the poverty is found in rural Ghana. Thus, the importance of the marine fishing industry is not so much at the aggregate macroeconomic level, but rather at the rural and regional levels [24]. The economy of the rural and coastal areas is heavily dependent on fishing, the more so because most of the trade and artisanal processing is carried out by people belonging to the fishing communities. Since fishing offers good employment opportunities locally, it can be safely assumed that the fishing communities do not belong to the really poor strata of the population in Ghana [24].

However, the fortunes of the fishing communities fluctuate with the vagaries of the fishing industry, which depend on the availability of the fisheries resources. Currently, the marine fishing industry is plagued with declining fish stocks and so the contribution of the sector to poverty alleviation is waning.

Table 4: Quantity and Value of Tuna and Other Fish Exported by Ghana

	1997		1998		1999		2000	
	Quantity (tonnes)	Value (US $)	Quantity (tonnes)	Value (US $)	Quantity (tonnes)	Value (US $)	Quantity (tonnes)	Value (US $)
Tuna (whole, loins, canned)	22,998	57,333,334	31,488	84,300,829	42,503	70,605,874	40,710	70,538,275
Other Fish and Seafood	8,710	11,225,304	9,828	16,011,038	9,148	12,305,554	12,350	13,306,188
Total	31,709	68,558,638	41,316	100,311,867	51,651	82,911,428	53,060	83,844,463

Source: Export Promotion Council of Ghana, Accra

1.2.8 THE IMPORTANCE OF INLAND FISHERIES

Inland fisheries comprise fisheries from lakes, rivers, dams, dugouts and aquaculture. They contribute significantly to the total production, employment, food security, nutrition and foreign exchange earnings. The inland fisheries account for 15 per cent of total annual fish production in the country. The Volta Lake is the backbone of the inland fisheries, accounting for about 85 per cent of inland fish production annually. Lake fish has a higher premium and it is preferred to marine fish. Revenue from the fish markets contributes significantly to the internal generated revenue of the District Assemblies along the Volta Lake. The sector provides safety benefits to the poor. Such benefits may be difficult to quantify but from the perspective of the poor, they are crucial. The fishing industry, therefore, plays a major role in rural poverty alleviation in Ghana.

1.2.8.1 The Development of the Volta Lake Fisheries

The Volta Lake was created in 1964 and is the largest man-made lake in Africa. It has a shoreline of 52,000 km, along which lie 1,232 fishing villages, from where 71,861 fishermen operate in 24,035 fishing canoes. The main fishing gear are gillnets, spears, traps, cast-nets, winch nets, beach-seines, bamboo *nifa-nifa*, *wangara*, and hook-and-line. The open-access system of fisheries management led to an increase in fishermen from the lower Volta and the marine sector. There has been a drastic decrease in yield, as the average has dropped from 46.8 kg/ha in 1976 to 32.6 kg/ha in 1998. At present, the number of canoes actively fishing is 17,274, which far exceeds the 11,731 required to produce fish at the maximum sustainable level.

1.2.8.2 The Development of Aquaculture

Aquaculture has been in operation in Ghana for over three decades and its practice is becoming widespread in the country, especially in the Ashanti, central, eastern, Greater Accra and western regions. It is the only credible option to increase fish production in Ghana. This is because fish production from the marine sector and the Lake Volta appears to have reached the maximum possible levels. Though aquaculture has immense potential with the necessary technical support, the rate of its development in Ghana has been much slower than expected.

There are about 1,000 fish farmers working in over 2,000 ponds, with a total surface area of 350 ha. Both extensive and semi-intensive cultures are practised. Extensive culture is associated with dugouts and small reservoirs,

which are fished and restocked. Fish are cultured semi-intensively in earthen ponds either as monoculture of tilapia or polyculture of tilapia (especially *Oreochromis niloticus*) and catfish. There is one fish-cage culture facility operating at Dodi Asantekrom in the Asuogyaman District.

1.2.8.3 Contribution of the Inland Fisheries Subsector to Total Fish Production

The inland fishing industry contributes about 15 per cent of total fish production annually. Annual inland fish landings for the last ten years are shown in Table 5 below. The top ten species, in terms of landings, are as follows: tilapia (38.1 per cent), *Chrysichthys* spp. (34.4 per cent), *Synodontis* spp. (11.4 per cent), *Labeo* spp. (3.4 per cent), mormyrids (2.0 per cent) and *Heterotis* spp. (1.5 per cent). Other species of commercial importance are *Clarias* spp., schilbeids, *Odaxothrissa* spp. and *Bagrus* spp.

Table 5: Inland Fish Landings

Year	Lake Volta	Aquaculture	Total
1993	40,000		40,000
1994	42,000		42,000
1995	52,000	400	52,400
1996	60,000	500	60,500
1997	62,000	700	62,700
1998	62,000	1800	63,800
1999	79,000	2900	81,900
2000	75,000	7500	82,500
2001	75,000	6000	81,000

1.2.8.4 Employment in Inland Fisheries

The Volta Lake supports the livelihoods of 300,000 people, of whom nearly 80,000 are fishermen and 20,000, fish processors/traders. There are 1,000 people involved in the aquaculture subsector.

1.2.9 Demand for Fish

Currently, the fisheries subsector supplies over 70 per cent of the domestic animal protein intake, and inland fishing contributes about 16 per cent of the total domestic fish supply, of which Lake Volta alone provides 90 per cent. The total domestic national requirement for fish is about 600,000 tonnes

annually, of which supplies from the marine sector is 300,000 tonnes and some 80,000 tonnes from inland fisheries. This leaves a shortfall of nearly 220,000 tonnes, which are imported by individuals and organizations. Past governments' calls for a step-up in fish production led to the development of aquaculture, especially backyard fish farming, to augment supply from the capture fisheries. The rush by individuals and institutions was not supported by the necessary technical services, leading to a failure of the programme.

1.3. THE FLEET STRUCTURE OF THE MARINE CAPTURE FISHERIES

The marine fishing industry in Ghana consists of three main sectors, namely, the small-scale (or artisanal or canoe), semi-industrial (or inshore) and industrial sectors. The numbers of vessels in each sector for the period 1989-2000 are summarized in Table 6.

1.3.1 THE SMALL-SCALE OR ARTISANAL OR CANOE SECTOR

The artisanal sector uses the dugout canoe as the fishing craft. The canoe is symmetrical and double-ended in design and is carved out of a single log of a soft species of wood, *Triplochiton scleroxylon*, known locally as the *"wawa"* tree. The canoes range in size from about 3 m to 18 m long and from 0.5 m to 1.8 m wide, depending on the type of fishery that it is used for [19, 20]. The canoe is propelled by an outboard motor of up to 40 hp, or sail and oars, depending upon the fishing operation that it is used for.

The number of canoes operating actively in Ghanaian marine fisheries in the last two decades has been estimated at various times as between 6,000 and 8,000 units [20]; 8,610 were counted in the census conducted in 1997 [21]. These canoes operated out of 309 sites in 191 fishing villages. In the census conducted in 2001, 9,981 canoes were found to be operating out of 304 landing beaches in 185 fishing villages [22].

1.3.2 THE SEMI-INDUSTRIAL OR INSHORE SECTOR

The semi-industrial or inshore fleets are locally built wooden vessels fitted with inboard engines of up to 400 hp, and have lengths ranging from 8 m to 37 m. They operate from places with harbour or semi-harbour facilities, namely, Tema, Winneba, Apam, Mumford, Elimina, Sekondi, Takoradi and Axim. The number of semi-industrial vessels increased rapidly from 2 in 1949 to over 380 in 1967 [44]. In recent times, the number of operating vessels has decreased gradually, from 300 in 1992 to 169 in 2000.

Table 6: Numbers of Canoes Operational Inshore and Industrial Vessels in Ghana, 1989-2000

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Canoes,of which:	**8,052**			**8,688**			**8,641**		**8,610**			
Beach-seine	852			775			790		769			
Others	7,200			7,913			7,851		7,841			
Inshore vessels	**183**	**169**	**153**	**160**	**155**	**164**	**153**	**165**	**149**	**173**	**173**	**169**
Industrial vessels, of which:	69	71	73	63	65	75	81	83	97	91	89	88
Trawlers	29	30	30	29	32	35	34	34	48	47	38	46
Shrimpers	5	8	11	5	8	14	17	16	13	9	12	12
Tuna boats, of which:	35	34	29	28	25	26	29	35	34	31	33	34
Pole-and-line (Baitboat)	35	34	29	28	25	26	29	33	29	24	24	24
Purse-seiners	-	-	-	-	-	-	-	2	5	7	9	10

Sources: Marine Fisheries Research Division (MFRD), Tema and Directorate of Fisheries Accra

These vessels are multipurpose and are used for both purse-seining and bottom trawling. They operate as purse-seiners during the upwelling periods and switch to bottom trawling for the rest of the year. The purse-seiners target the sardinellas, chub mackerel and other carangidae. They fish in the same coastal waters as the artisanal fleet during the upwelling seasons.

The small-sized trawlers targeted *Balistes capriscus*, while the others exploit sea breams (mainly *Pagellus bellottii*, *Pagrus caeruleostictus* and *Dentex canariensis*) snappers (*Lutjanus fulgens* and *L. goreensis*), red mullet (*Pseudupeneus prayensis* cassava-fish (*Pseudotolithus senegalensis*), burrito (*Brachydeuterus auritus*), and groupers (*Epinephelus aeneus*). Bottom trawling is done in waters deeper than 30 m. The semi-industrial vessels use ice for preserving fish at sea, and a fishing trip usually varies between 3 and 5 days. The disappearance of *B. capriscus* from Ghanaian waters in the late 1980s has affected greatly the performance of the sector. The species was the main resource base for many of these vessels.

1.3.3 THE INDUSTRIAL SECTOR

The industrial sector comprises large, steel-hulled foreign-built trawlers, shrimpers and tuna baitboats and purse-seiners. They operate only from Tema and Takoradi, where there are suitable berthing facilities. The first industrial trawlers were acquired about four decades ago principally for fishing in the more productive distant waters (mainly off Angola and Mauritania).

From the mid-1970s these vessels started fishing in home waters when countries claimed 200 miles of exclusive economic zone (EEZ) in accordance with relevant provisions of the Third United Nations Convention on the Law of the Sea (UNCLOS III) [4]. In the last decade, the numbers of industrial trawlers varied between 29 and 48 (Table 6).

Between 1969 and 1975, a shrimp fishery operated mainly in the Anyanui estuary and adjacent sea in the Volta region of Ghana [4, 23]. In 1970, as many as 18 shrimp vessels were in the fishery, which eventually collapsed for various reasons including overexploitation and the impact of the Volta dam at Akosombo on the hydrology of the Anyanui estuary and the Keta lagoon [4, 23]. In 1986, commercial shrimping was resumed with two vessels. The numbers of vessels increased rapidly thereafter, reaching a peak of 17 vessels in 1995 and declining to 9 in 1998 (Table 6).

The numbers of tuna fishing vessels that operated in Ghanaian waters during the last decade fluctuated between 25 in 1993 and 35 in 1996 (Table 6).

1.3.4 CAPTURE OF JUVENILE FISH (MARINE)

All fleets of the marine fishing industry exploit juvenile fish in one way or the other. The artisanal purse-seine (*poli*) and beach-seine gear exploit juvenile sardinellas during certain periods of the year. The *poli* gear exploits adult sardinellas and chub mackerels during the upwelling periods when these species move into coastal waters to spawn. During the non-upwelling periods, the *poli* gear targets the anchovies and juvenile sardinellas, which are in coastal waters. The beach-seines operate from the beach and exploit adult sardinellas during the upwelling periods, and anchovies, juvenile sardinellas and juvenile demersal fishes during the non-upwelling periods.

The Fisheries Act of 2002 has created an Inshore Exclusive Zone (IEZ), that is, waters of depth less than 30 m. The Act forbids trawling in the IEZ. However, the industrial trawlers, in a bid to exploit cephalopods for export, operate in the IEZ and, in the process, catch a lot of juvenile demersal fish. Industrial shrimpers also operate in the IEZ and catch a lot of juvenile demersal fish.

The equatorial part of the Gulf of Guinea is the spawning grounds of commercially important tuna species such as yellowfin and bigeye tuna. Thus, there are a lot of juvenile tuna fish in Ghanaian waters. The tuna vessels, especially baitboats that operate in coastal waters, exploit a mixture of juvenile and adult tuna species.

1.3.5 CAPTURE OF JUVENILE FISHES (INLAND)

In the inland fisheries, especially in the Volta Lake, excessive fishing effort is carried out, as fishing is the mainstay of the communities. The fishermen fish throughout the year and use various types of illegal gear. Some of these are bamboo pipes, beach-seines, purse-seines, mosquito nets, traps, poisoning and *nifa nifa* to harvest juveline fish. Some of the species thus caught are chrysichthys (local name, *bolovi*), tilapia (local name, *akpa*), clupeids (*Sierra thrissa*, common called locally "one man thousand").

1.4 GEAR COMPOSITION AMONG THE DIFFERENT FISHING FLEETS AND THEIR RELATIVE IMPORTANCE

The three main sectors of the marine capture fisheries operate different types of gear, and within each sector, several different gear are utilized, each subsector being known or identified by the type of gear it operates or species of fish it exploits.

1.4.1 GEAR DISTRIBUTION

1.4.1.1 The Small-scale or Artisanal Sector

In the artisanal fishery, several different gear are used. These include a wide variety of gilling and entangling nets, seine-nets, hooks-and-line and cast-nets, which are well adapted to the dugout canoe and the local fishery conditions. The fishing gear designs differ, often from village to village and from fisher to fisher [19]. Furthermore, since marine artisanal capture fishery is essentially a full-time occupation all year round, the fishers design and operate different gear for exploiting different species of fish available during different times of the year and at different depths. The artisanal fisheries also specialize in the use of certain gear.

The initial development and utilization of an artisanal fishing gear depend on the immediate environment of the fishers. For example, fishers living in fishing villages located close to rocky areas in the sea are more likely to use line gear than nets. This is because the rocks would interfere with the operation of the nets [15]. This environmental consideration, coupled with tradition and the fear of the unknown, contributes to the specialization of artisanal fishers in certain types of operations, including the use of certain nets [15].

Types of Artisanal Fishing Gear Used in Ghana

(a) Cast-nets: These conically shaped nets, with or without inverted pockets around the lip, are operated in the lagoons and the shallow areas of the sea. They are thrown from the shore, the water or a canoe to catch fish swimming close to, or on, the water surface, by enclosing them by pulling taut the throwing line [19].

(b) Gillnets and Entangling Nets: These nets catch fish by entangling or enmeshing them in the netting. They operate as set or anchored gillnets, drifting nets and encircling gillnets. Several types of gillnets are operated in shallow waters [18]. There are also several types of driftnets, some of which are operated offshore.

(c) Seine-nets: These are surrounding nets known as purse-seines, which are used to surround schools of fish sighted inshore or to sweep an area of the seabed very close inshore (beach-seines). There are two types of beach-seine in Ghana, one with a bunt and the other without a bunt. The purse-seine nets, of which there are no less than three types, are characterized by the use of a purse line at the bottom, which enables the net to be closed like a purse and thus retain most of the fish surrounded [19].

(d) Hooks-and-lines: There are various types employed, including several kinds of handlines, trolling lines and set longlines.

(e) Traps: There are various types of indigenously designed traps to catch the target fish species. They are made in several forms and shapes with various materials (wood, wicker, metal rods, netting, bamboo and palm leaves [19]).

1.4.1.2 The Semi-industrial or Inshore Sector

At present, the inshore fleet operates only two types of gear, namely, trawl nets and purse-seines. However, other types of gear and fishing methods had been tried without success. These are drifting gillnets, set nets, traps of various kinds and hooks-and-line [24].

Some Possible Fishing Alternatives for the Inshore Fleet

(i) Improved Purse Seining

The present purse-seine net for the small inshore vessels can be made bigger using lighter material similar to the canoe purse-seine called *watsa*. With this type of net, these vessels can do purse-seining after the sardinella season as well as fish during daylight hours just like the canoes.

(ii) Drifting Gillnet Fishing

The drifting gillnet fishing by inshore vessels can be improved by using a small canoe or dinghy to stay on the net with the boat resting alongside it. The boat will just set and haul the net.

(iii) Set-net Fishing

The use of lobster set-net will be an alternative method but fishers will require echo sounders to help them locate the right fishing grounds.

(iv) Hook-and-line Fishing

The method can be improved upon by the use of echo sounders (to explore new grounds) and the replacement of iceboxes with insulated fish holds.

(v) Echo Sounder as a Fishing Aid

As already suggested, if the echo sounder is properly utilized, it can enhance trawling, purse-seining and other fishing operations.

1.4.1.3 The Industrial Sector

The gear operated by the industrial fleet comprise bottom trawls, shrimp trawls, tuna purse-seines and poles-and-line with live bait of anchovy; the tuna pole-and-line fishery uses small purse-seines to catch the anchovies.

1.4.2 The Relative Importance of the Different Gear

1.4.2.1 The Artisanal Sector

The relative importance of the different artisanal gear is assessed on the following bases:

(a) the extent of wide and common usage in the fishing communities, that is, distribution of use along the coast;

(b) the length of the period within a year in which they are employed, and

(c) whether the target fish is of prime value or not.

(i) On the basis of common and wide usage, the most important gear are cast nets, beach-seines, *watsa-poli*, hooks-and-line and traps (Table 6). The next group of gear of importance comprise some set gillnets (*toga, tengirafo*) and driftnets (*nifa-nifa*, *flikilo-yaa*). The next in importance are the set gillnets (lobster nets), other driftnets (*obue-man ali* nets, *libias*) encircling gillnets (*kokole-yaa*). The least widely distributed are the other set gillnets (*ashoo* and *solu-yaa*).

(ii) Based on the length of period of use within a year, the most important gear are the cast nets, *toga, ashoo, nifa-nifa,* beach-seine, *obue-man ali, libias, watsa-poli*, hook-and-line and traps (Table 6).

(iii) A number of gear exploit prime fishes and are, therefore, considered to be of relatively greater importance than others whose catches are of low value. Such gear that catch prime fish are the set gillnets, including lobster nets and hooks-and-line, especially the *lagas*.

1.4.2.2 The Semi-industrial Sector

In the semi-industrial sector, which deploys only two types of nets, there are more purse-seine nets than trawl nets; both types of nets are operated throughout the year. Thus the purse-seine nets are considered to be of higher relative importance than the trawl nets. The operators feel that trawling exerts far greater strain on the engines than purse-seining, and so they prefer purse-seining to trawling. However, the trawl catches are prime products (for example, sea breams and shrimps).

1.4.2.3 The Industrial Sector

All gear employed in the industrial sector are deployed throughout the year and all operate from only two ports, namely, Tema and Takoradi. The target fish species exploited are all of prime value. The relative importance of the gear is, therefore, based on numbers of gear in use (Table 6). On this basis, the trawl nets are relatively most important, followed by the tuna hook-and-line (baitboat) and the shrimp net, in that order, with the tuna purse-seine gear being the least important. However, considering the gradual build-up of the purse-seine gear in the industry since 1996 (Table 6), it is likely that the tuna purse-seine would soon overtake the shrimp net in relative importance.

1.5 THE RELATIVE DEPENDENCE OF ARTISANAL AND INDUSTRIAL FISHERS ON FISHERIES RESOURCES

Fish production in Ghanaian coastal waters is driven by the seasonal coastal upwelling, which consists of a major upwelling of approximately three months duration (July-September) and a minor upwelling of about three weeks duration (December-January or February-March) each year. It is the production resulting from this four-month upwelling that supports the total fisheries of the Ghanaian waters.

The marine fishing industry is essentially a full-time occupation for the fishers engaged in it, whether artisanal or industrial. Up to about the early 1960s, there were some artisanal fishers who had small farms not far from the landing beaches or their homes, which they operated on a part-time basis. But with the rapid increase in population around the coastal towns and urban areas, these farmlands have been gradually built into recreational and residential communities. Thus, most of the few fishers who used to do part-time fishing have turned full-time fishers. Therefore, all marine fishers – artisanal, semi-industrial or industrial- do full-time fishing and so they depend entirely on the availability of fisheries resources for their livelihoods.

It is largely for this reason that the artisanal fishers, in particular, have designed different types of gear that they operate at different times of the year to exploit every ecological niche in the sea to catch every available fishery resource in the course of the year (Table 7). The industrial fishers, including the semi-industrial fishers, depend completely on the availability of the relevant fishery resources throughout the year. The semi-industrial purse-seine fishers depend on the availability of the small pelagic species, while the industrial trawling and shrimping fishers rely on the demersal species. The tuna baitboat fishers

exploit tuna all year round using anchovy as the bait, which is also available throughout the year. Similarly, the tuna purse-eine fishers operate all year round.

1.6 THE STATUS OF FISHERIES RESOURCES ON WHICH FISHERS ARE DEPENDENT

The status of the fisheries resources is assessed from time to time through stock assessment surveys, which have been carried out in Ghanaian waters with the objective of determining the quantity and/or distribution of the demersal and pelagic resources.

In Ghana, there are fisheries for small pelagic species of the families *Clupeidae* (sardinellas), *Scombridae* (chub mackerels) and *Engraulidae* (anchovies), large pelagic species of the family *Thunnidae* (tunas); there are also fisheries for demersal species of the families *Sparidae, Lutjanidae, Mullidae, Pomadasydae, Serranidae, Polynemidae* and *Penaeidae.*

1.6.1 THE SMALL PELAGIC RESOURCES

One of the most important economic activities in the small pelagic fisheries is the sardinella fishery. Large variations in landings of the sardinella are experienced and between 1973 and 1978, the fishery reached points of near collapse. From the mid-1980s, there was a remarkable increase in the abundance of sardinellas in the western Gulf of Guinea [26]. Landed catches increased over the period, and in Ghana, an all-time high of 140,000 tonnes was recorded in 1992. Since then, landings have declined and reached about 64,000 tonnes in 1997. In spite of this, there appears to be no cause to suspect that the resources are not healthy. On the contrary, the resources appear to be going through a phase of decline that most pelagic resources worldwide experience from time to time and which is linked, *inter alia*, to changes in the marine environment [26].

The abundance of the chub mackerel (*S. japonicus*) is so variable from year to year that it is almost impossible to predict its abundance. Mainly artisanal fishers catch anchovies, with landings ranging between 19,000 tonnes in 1986 and 82,700 tonnes in 1996, with an all-time high of 93,000 catch anchovies in 1987. At present, anchovy resources do not appear to be threatened.

1.6.2 THE LARGE PELAGIC RESOURCES

The main commercial tuna resources that occur in Ghanaian waters are the yellowfin, skipjack and bigeye. Assessment of tunas in the whole Atlantic is

Table 7: Principal Characteristics of Artisanal Fishing Gear, Their Areas of Use and Target Species

Fishing Gear	Principal Mesh Size (mm)	Yarn Size	Crew Size (tex)	Sea Area of Use	Regional Area of Use	Period of Use	Target Fish Species
Cast net	25 - 45	R75–100	1 - 2	Shallow waters of sea and lagoons	All coastal areas	Jan.- Dec.	Tilapia, mullet, *Bonga*
Set gillnet (*toga/tenga*)	40 - 50	R 75	2 - 6	Bottom	All coastal regions, except Volta Region	Jan. – Dec.	Threadfins, grunts *ilisha*
Set gillnet (*tenga adado*)	50 - 55	R 75	4 - 6	Bottom	Central Region	Mar. – May Oct. – Jan.	Sea breams, grunts, sardinella
Set gillnet (*ashoo*)	30 - 40	R 75-100	2 - 4	Bottom	Restricted to Nungua in Greater Accra Region	Jan. – Dec.	Juvenile of threadfin, bigeye, grunter, *mojara*s
Set gillnet (*tengirafo*)	75	R310-390	4 - 6	Hard bottom	All coastal regions, except Volta Region	Oct. – Mar.	Catfish, common sea bream, croakers tongue sole, dogfish molluscs
Set gillnet (*solu-yaa*)	60	R 310	4 - 5	Shallow waters	Accra area	Oct. – Mar.	Sole, red pendora, blue-spotted sea bream, molluscs
Set gillnet (*nyaa-yaa/ kotorboa*, lobster net)	80 - 125	R310-390	3 - 4	Hard rocky bottom	Parts of Greater Accra and eastern parts of Central Region	Nov. – Mar.	Lobster, sharks, rays, molluscs

Table 7 (contd...)

Table 7 (...contd.)

Fishing Gear	Principal Mesh Size (mm)	Yarn Size	Crew Size (tex	Sea Area of Use	Regional Area of Use	Period of Use	Target Fish Species
Driftnet (*obue-man ali* net)	45 - 50	R75-100	7 - 12	Surface inshore	Greater Accra and Central Region	Jan- Dec.	Sardinella
Driftnet (*flikilo-yaa*)	50	R 100	4 - 6	Surface inshore	Parts of Greater Accra, Central and Volta Regions	Oct.- Mar.	African half bleak, flat needlefish, Atlantic flying fish, sardinella, Chub mackerel
Driftnet (*nifa-nifa*)	100 - 200	R 390 or 620	4 - 6	Surface offshore	Parts of Greater Accra, Central and Western Regions	Jan.-Dec.	Shark, ray manta, tunas (yellowfin, bigeye, skipjack), Atlantic little tuna, sailfish, swordfish
Driftnet (*libias*, *sika-ye-abrantie*)	31	R 75	3 - 5	Surface inshore	Central Region	Jan.-Dec.	Juvenile sardinellas
Encircling gillnets (*aborketeo/ kokole-yaa/ kokore-boa*, Shad net)	55 - 60	R 75	3 – 5; 8 - 10	Surface inshore	Parts of Greater Accra and Central Region	Nov.-Dec. Mar.- April	*Bonga*

Table 7 (contd...)

Table 7 (...contd.)

Fishing Gear	Principal Mesh Size (mm)	Yarn Size	Crew Size (tex)	Sea Area of Use	Regional Area of Use	Period of Use	Target Fish Species
Seine net (Beach-seine)	50 – 60 (main body) 12 – 18 (bag)		30 - 50	Surface to bottom	All four coastal regions, especially Volta Region	Jan.-Dec.	Horse mackerel, grunt, *ilisha*, threadfin, anchovy, sardinellas, mackerel scad
Purse-seine net *(watsa-poli)*	38 – 50 18-25 (in the bunt); 10-13	R75-100	18 - 25	Surface inshore	All four coastal regions	Jan.- Dec.	Sardinella, anchovy, Chub mackerel,
Hooks-and-line	-	-	1 – 2; 5 - 6	Rocky bottom, surface, inshore and offshore	All four coastal regions	Jan.- Dec.	Groupers, sea breams, snappers, horse mackerels, scad, pandora, yellowfin tuna, skipjack, sailfish, sharks, Spanish mackerel, *wahoo*, Atlantic bonito, dolphin fish, barracuda
Traps	-	-	-	Bottom of lagoons, shallow estuaries	All four coastal regions	Jan.-Dec.	Shrimps, crabs, tilapia other small pelagics

co-ordinated by the International Commission for the Conservation of Atlantic Tunas (ICCAT) whose recent assessments indicate that yellowfin and bigeye tuna resources in the Atlantic are being optimally exploited, while skipjack is underexploited. A Tuna Task Force set up by Government of Ghana in 1989 recommended that the country's tuna production be increased from an average of about 36,000 tonnes to 60,000 tonnes annually [25]. In 1999, the total catch was over 83,000 tonnes but it came down to about 53,000 tonnes in 2000 (Table 1).

1.6.3 THE DEMERSAL RESOURCES

Estimates of the biomass of demersal species through bottom-trawl surveys show that the potential yield of the total demersal biomass on Ghana's continental shelf is between 36,000 tonnes and 55,000 tonnes per annum, with an average of about 43,000 tonnes [4, 25, 27]. However, in the last decade, landings (about 50,000 tonnes annually) exceeded the potential yield, which, therefore, clearly demonstrate the stress under which the fishery has been operating [25].

1.6.4 SHRIMP RESOURCES

In Ghana, shrimps are caught by all fleets (except tuna fishing vessels), mainly from shallow waters and close to estuaries. Artisanal operators catch shrimps mainly in beach-seines; these are normally juvenile shrimps of very low commercial value. Through a modelling approach, the maximum sustainable yield (MSY) of shrimps is estimated to be 350 tonnes per annum, excluding catches of artisanal fishers [26]. Although catches have never exceeded the MSY (Table 2), the industry showed signs of decline in the last five years.

1.7 STATUS OF FISHERIES MANAGEMENT

The status of fisheries management in Ghana cannot be said to be satisfactory in spite of the many laws and regulations that have been promulgated over the years. These are:

(i) Fisheries Regulations LI 364 of 1964;

(ii) NRCD 87 of 1972;

(iii) Fisheries (Amendment) Regulation 1977;

(iv) AFRCD 30 of 1979 (Fisheries Regulations) and the accompanying regulation, Fisheries Regulation 1979 LI 1235;

(v) Fisheries Regulation 1984 (LI 1294);

(vi) PNDC Law 256 of 1991; and

(vii) The Fisheries Development and Management Act, 2001.

There are two important management regimes. These are:

(i) limiting fishing effort of industrial vessels (especially trawlers and shrimpers) by limiting entry into the fishery through licensing the vessels for fishing; and

(ii) prescribing the mesh sizes to be used in any particular fishery in order to limit the exploitation of juvenile or immature fishes (including shellfishes and molluscs).

Generally, the management regimes include ensuring responsible fishing. A Monitoring, Control and Surveillance (MCS) Division of the Directorate of Fisheries was established under the Fisheries Subsector Capacity Building Project (FSCBP). The mandate of the Division is to enforce the fisheries laws.

The MCS Division, with the collaboration of the Ghana Navy, conducts sea patrols, to ward off industrial fishing vessels from the 30-m depth Inshore Exclusion Zone reserved for artisanal fisheries. The Division also carries out quayside inspections of industrial vessels at the fishing ports of Tema and Takoradi for valid fishing licences, fishing gear, skipper's certificate, logbooks and crew composition.

Currently, a co-management regime to strengthen management of the artisanal fishery at the local level is being established in fishing villages in all the four coastal regions of Ghana. This is through a community–based fisheries management committee (CBFMC). Out of a total of 189 fishing communities along the marine coast, 126 had formed CBFMCs by the end of 2001. Each CBFMC has a constitution and has prepared byelaws. By the end of 2001, 38 committees had their constitution and byelaws passed and adopted by their respective District Assemblies (the local-level political administration).

According to the current fisheries laws, all fishing craft require a licence to operate in Ghanaian waters. In practice, the canoe fleet operate under an open-access regime and no canoe has ever been licensed to fish in Ghanaian waters. As regards the semi-industrial and industrial fleets, the limitation by licensing is not adequately enforced, resulting in overcapitalization of the industry, and depletion of fish stocks.

There are a few traditional management systems, which tend to regulate access to marine fisheries in Ghana and thereby conserve the fish stocks. These include the following:

(i) In every fishing village, one day of the week is observed as a non-fishing day, which the fishers use to maintain gear and equipment, rest and carry out other social activities.

(ii) In some fishing communities there is a total ban on fishing activities for various periods (up to two weeks) prior to and during annual festivals.

(iii) In other areas, there is a ban on a particular fishery for a period. For instance, in the Greater Accra Region, there is a ban on fishing for *Dentex* spp. for a period (about one month) before the *Homowo* festival of the Ga people of Accra.

(iv) In addition to limiting access to the resources, other legal provisions also help to conserve the stocks, though the intensive fishing pressure exerted when the ban is lifted, tends to defeat the purpose of the ban.

CHAPTER 2 DEVELOPMENTS IN THE MARINE CAPTURE FISHERIES

2.1 TRENDS IN ACCESS TO, AND UTILIZATION OF, FISHERIES RESOURCES

The marine fishing industry in Ghana began as a one-sector activity — an artisanal or canoe fishery. It had a free or open access to the fisheries resources except for paying some prescribed annual fees to the local head of the fishing community or landing beach (the Chief Fisherman) as well as honouring some taboos or traditional practices which forbid fishing on certain days in the week or periods in the year as described above. As of today, the situation remains essentially the same in the artisanal fishery.

Though the government promulgated a fisheries law (PNDC Law 256, 1991) mandating canoes to be registered and licensed (Section 3 sub-section 1(e)), this legal provision is not being observed. Currently, attempts are being made to enforce this regulation, in which case the age-long system of free access to the fisheries resources by the artisanal fishery would cease.

With the advent of semi-industrial and industrial fisheries came the need to manage the fisheries through, among others, controlled access to the resources. The semi-industrial and industrial vessels have to be licensed and pay prescribed fees for fishing. Thus, the inshore and industrial sectors do not have free and automatic access to the fisheries resources unlike the canoes.

The fleets operate around the same areas and target similar species but there is no evidence that species caught by the artisanal sector include any previously exploited by the inshore or industrial sector. Neither is there any evidence that the artisanal fishery raditionally exploits the inshore and/or industrial fisheries.

2.2 TRENDS IN SPECIES- DEPENDENCY OF DIFFERENT FISHING FLEETS

Except for the tuna fleet, all fleets operate in the same general area on the shelf, and the gear are designed to operate in particular areas (surface/bottom) and target particular species or groups of species. There have been a few instances when the operations of the fishing fleets had been ill affected by the unavailability of the target species.

Owing to a combination of changes in environmental conditions and fishing effort over the last three decades, some changes have occurred in the fishery resources in the Gulf of Guinea, including the continental shelf waters of Ghana. A near collapse of the *Sardinella aurita* stock occurred in Ghanaian waters in the early 1970s, which badly affected the fortunes of the sardinella fleets consisting of the *ali/poli/watsa* artisanal fleet and the inshore purse-seine fleet that target the sardinella and so depend on it. A substantial recovery of the stock occurred in the mid- to late-1980s [6, 27]. Around the same period, there was a dramatic increase in the abundance of triggerfsh (*Balistes capriscus*), which became the most abundant species in Ghanaian waters in the 1980s [27, 28], and a fishery for it was developed by the small-sized inshore fleet [25]. The stock declined towards the end of the 1980s, and the fishery collapsed, making the fleet idle or waste away.

However, results of two surveys conducted off Ghana in 1999 showed that triggerfish was among the top 20 species encountered in some areas off Ghana. If this could be considered as a sign of recovery of the triggerfish, then one can expect a rejuvenation of the small-sized inshore fleet fishery and the once-vibrant salting and sun-drying industry that existed for this species in the Central Region of Ghana [15].

An important trend observed over the years was the development of the fishery for the juvenile or immature stages of the same target species of a particular gear. When the adult sardinella fishery nearly collapsed in the early 1970s, the *poli* net was developed to exploit the small and immature sardinellas. Also, for cost effectiveness, *watsa-poli* gear has been developed to fish both the juvenile sardinella and the adult (if available) throughout the year. Since 1996, the *libias* fishery for juvenile sardinella has been developed and adopted.

2.3 TRENDS IN TECHNOLOGICAL INPUTS INTO FISHERIES

A number of changes have occurred in the technology of fisheries, which have tremendously improved efficiency in fishing, leading to much greater economic returns for the fishers. These include:

i. mechanization of the canoe fleet by the introduction of outboard motors. With an outboard motor, the mobility of the canoes is greatly enhanced and the fishers are able to fish anywhere on the continental shelf. Also the operation of the canoe purse-seine fleet (*poli-watsa*) is tremendously enhanced, with the canoes moving faster and setting the gear in a much shorter time.

ii. use of synthetic material, instead of cotton, for the gear. The synthetic netting material is stronger than the cotton one and does not need as much drying and mending as the cotton material requires. The nets are, therefore, left in the sea for as long as the fishers find it convenient, thereby increasing effective fishing time.

iii. introduction of monofilament netting for gear construction. The monofilament netting is more efficient in gilling than the multifilament netting.

iv. introduction of purse-seine gear to the fishery. This has revolutionized the surface fishery of both the artisanal and the semi-industrial fleets.

v. use of ice-box by the hook-and-line fishers. This has enabled them to stay at sea for four to six days in one fishing trip (in the *lagas* fishery).

2.4 TRENDS IN THE USE OF DIFFERENT FISHING GEAR AND TECHNIQUES

2.4.1 MARINE GEAR

As indicated earlier, the marine capture fishery in Ghana is a full-time occupation for the fisher. However, fish production is at the optimal level for only four months in the year, during which the fishery operates largely on the adult fish using the standard gear. But the fisher has to fish all through the year for sustenance. The Ghanaian artisanal fisher has, therefore, been modifying existing gear, and designing new ones to enable him to fish every ecological niche during different times of the year. The trends in the use of different fishing gear thus lie in modifying the existing gear by applying a combination of different mesh sizes of the appropriate twine sizes in one and the same gear in order to catch both the adult and juvenile stages of the same target species.

The following are some examples of the changes in the use of different fishing gear and techniques in the fisheries subsectors:

(a) *Ali* net

There were two separate forms of the *ali* net: *obue-ali* and *man-ali*. The main difference between the two forms was in the sizes of the meshes – the *obue-ali* net had a smaller mesh of 45 mm than the *man-ali* net (50 mm). Also, the *obue-ali* was operated mainly in the night and targeted the round sardinella (*Sardinella aurita*) during the cold upwelling period of the year, while the *man-ali* was operated in the day as an encircling gillnet for catching the flat sardinella (*Sardinella maderensis*) during the warm periods of the year. Currently, the use

of the *obue-ali* net and the *man-ali* net separately is minimal. The artisanal fishers have combined *obue-ali* and *man-ali* mesh and twine sizes in one and the same gear to catch both the round and flat sardinellas. This gear is, therefore, used throughout the year.

(b) *Poli-watsa*

The *poli* and *watsa* used to be separate purse-seine nets – the *poli*, with a smaller mesh size, was used to catch anchovy, while the *watsa,* with a bigger mesh size, was applied in exploiting other small pelagic species such as sardinella and chub mackerel, *Scomber japonicus*. Now, the separate uses of *poli* and *watsa* are almost out of fashion. The *poli* and *watsa* features are combined in one and the same gear so that the adult sardinella, its juvenile and the anchovy are caught by one and the same *poli-watsa* net. The gear is, therefore, operated throughout the year and in all four coastal regions.

(c) *Libias*

This is a new development of driftnet for catching juvenile fishes using monofilament netting with small mesh size. It is highly patronised by the youth in the Central Region; a few *libias* nets are operated in the Greater Accra Region and are used all year round.

(d) Hooks on Gillnets

In recent years, there have been some changes in the design and mode of operation of some gillnets. Some of these nets have hooks tethered to their lead lines, making them function also as hooks-and-line [20].

Semi-industrial and Industrial Fishery

For the past two decades or so, no significant changes of any wide application in the use of different fishing gear and techniques have been observed in the semi-industrial and the industrial demersal fisheries, except the following instances:

(i) An industrial vessel tried Danish seining for a period; the operation has folded up.

(ii) Currently (2001), two industrial vessels are trying pair trawling.

(iii) In the tuna purse-seine fishery, fish-aggregating devices (FADs) have been in use for the past four or five years.

2.4.2 INLAND GEAR

The open-access system is posing a threat to fishing in the inland fisheries, resulting in the introduction of illegal fishing methods to increase catch.

Currently, there are 11 different fishing gear being used in the inland fisheries. These are *atidja* (brush pack), bamboo pipes, *adrayi* (beach-seine), winch nets (purse-seine), hooks-and-line, spears, traps, gillnets, cast nets and *wangara* (a combination of gillnet and traps). The use of poisonous chemicals (insecticides and herbicides) is becoming a norm, as they are easily accessible. These low-cost chemicals, which give higher returns, are on sale in the fish markets.

2.5 FREQUENCY OF ADOPTION OF NEW FISHING GEAR AND TECHNIQUES

The frequency of adoption of new fishing gear and techniques is seen mainly in the development of the artisanal and inshore fisheries.

2.5.1 THE ARTISANAL FISHERY

The Ghanaian artisanal fishery has adopted a number of new fishing gear to exploit the virgin fishery. Initially, the adoption rate could be described as high since new gear were introduced quite often to fish a number of untapped species, pelagic as well as demersal (see Table 7 for list of artisanal gear). It is estimated that after the introduction and adoption of the *poli* net in the mid-1970s, scarcely has any new gear been adopted. Adoptions since then have been mainly modifications to existing gear to exploit mainly the juveniles of target species, the adults of which have been almost depleted.

Examples of such new and/or modified gear adapted since the early 1980s are the *libias*, *obue-man ali* and *poli-watsa* as described above.

2.5.2 THE INSHORE FISHERY

In the course of its development to the present level, the inshore fishery has had to adopt a number of new gear and techniques. Initially, the vessels used *ali* gillnet for the sardinella fishery because their engines were not strong enough for trawling. Later, the vessels were fitted with the Kelvin J2 engine, which had a higher horsepower that enabled the fishers to adopt otter trawling to exploit the demersal stocks, in addition to the *ali* gillnetting for the surface fishery.

In the early 1960s, the inshore fishers adopted handlining, using compasses that greatly enhanced navigation to the fishing grounds. Thus, the inshore fishers made more progress in their operations by alternating the three fishing methods, namely, gillnetting, trawling and handlining [24].

At about the same time, Mankoadze Fisheries Co. Ltd. of Ghana introduced purse-seining, and the boatyards at Sekondi also introduced the 29-footer

vessel to replace the 27-footers. This larger vessel, with more space at the stern, enabled the inshore fishers to adopt the purse-seine net for the sardinella fishery. This operation was found to be more successful than the use of the *ali* net by the inshore vessels in the sardinella fishery [24]. The other gear and techniques adopted but without much success were:

(a) drifting gillnet fishing;

(b) set-net fishing;

(c) trap fishing for lobsters; and

(d) hook-and-line fishing with ice-box on board.

2.5.3 THE INDUSTRIAL FISHERY

This fishery has been operating with large vessels imported with the relevant gear, namely, trawl net, shrimp net, tuna pole-and-line and purse-seine net. No new gear and techniques have been introduced for this fishery, except the use of FADs in the purse-seine fishery since about 1996.

2.6 TRENDS IN FISHING OPERATIONS

As mentioned earlier, fishing operations of all fleets, except the tuna fleet, take place on the continental shelf and in about the same general area. The fishing operations occur from the beach to approximately 75-m depth, which is generally close to the edge of the continental shelf.

2.6.1 THE ARTISANAL SECTOR

The artisanal fishery operates from the beach, in the case of the beach-seine fishery, to almost the edge of the continental shelf, in the case of the *nifa-nifa* driftnet and *lagas* fisheries. Initially, the artisanal fishery was limited, in range, to very close inshore and not far from the landing beaches, because the canoe was propelled only by sails and paddles. However, with the adoption of outboard motors, the fishery expanded in range and depth of operations. The limit of the range and depth is now determined by the type of fishery and the location of the fishing grounds.

Generally, the artisanal fishery used to be a day/night operation. This was necessary in order to frequently dry the cotton net to prolong its life span. But with the change from cotton to synthetic material, there was no need to dry the net daily. Since then, set and drifting nets can remain in the water to anything up to one week. The canoe either stays on the net (*nifa-nifa* fishery) or returns ashore (set-net fishery) and goes back the following day to collect

the fish from the net, and sets the net again. In the *kokole-yaa* and *libias* fishery (drifting gillnet fishery) two fishing expeditions could be carried out a day. The surface fishery with the seine-net still continues to be a day/night operation, owing to lack of freezing or cold-storage facilities on board.

In the hook-and-line fishery, one fishing expedition takes up to five to seven days (*lagas* fishery), thanks to the use of the ice-box to preserve the fish. However, a one-day trip type ("Go-come-Line") in the hook-and-line fishery still operates.

2.6.2 THE SEMI-INDUSTRIAL SECTOR

The semi-industrial sector has still been limited in its operations by the lack of blast freezing and cold-storage facilities on board to preserve the catch. The use of ice to preserve the catch limits the fleet's stay at sea to not more than one day. The range of trawling operation continues to be limited by the lack of trawl winch or the size and length of cable on the winch, where it is available.

2.7 TRENDS IN DEPENDENCE ON FISHING SKILLS

The Ghanaian fisher is generally described as highly skilled, efficient and experienced. This skill has been reflected, over the years, in designing and modifying fishing gear to exploit every ecological niche on the Ghanaian continental shelf and elsewhere in the west African region. The Ghanaian fisher is the originator of most of the fishing gear and techniques in operation in Ghana.

Though the *ali* net was introduced into Ghana from Nigeria [29], its modification to the present state of efficiency is due to the skill of the Ghanaian fisher. The *poli-watsa*, *nifa-nifa* and *libias* are some of the creations of the Ghanaian artisanal fisher, as are the several set and encircling gillnets (Table 6). The fishing skills, however, are leading to too efficient exploitation of the fisheries resources. Lately, these gear, particularly *libias*, *toga* and *poli-watsa*, have been exploiting the juveniles of the fishes, to the detriment of the fishing industry.

2.8 TRENDS IN CAPITALIZATION AND INVESTMENT

Capitalization and investment in all sectors of the marine fishing industry, except the tuna subsector, show a downward trend. It continues to become increasingly more difficult for fishers to acquire capital equipment for fishing operations. This is due to the soaring cost of such equipment, vis-à-vis low catch returns, and thus fishers are unable to break even for most operations.

2.8.1 THE ARTISANAL SECTOR

The capital equipment for the artisanal sector comprises the dugout canoe, the gear, the outboard motor and the premix fuel for the motor. Except the canoe, which is locally made, the rest are imported, and so there is the problem of foreign exchange availability and the corresponding local currency (cedis) to pay for them. The depreciation of the cedi over the years has compounded the problem.

Furthermore, there is shortage, in the forest, of the right size of the local wood, *wawa* (*Triplochiton scleroxylon*) from which the canoe is dug out. There are other users of *wawa*, especially in the construction and furniture sectors, and so the canoe-carvers compete with these other users, making the mere availability of the wood very difficult. It is, therefore, becoming more difficult to invest in the artisanal sector.

2.8.2 THE SEMI-INDUSTRIAL SECTOR

The situation in the semi-industrial sector could be said to be even worse than in the artisanal fishery. Again, except the wood for constructing the hull, which is locally available, the other capital equipments (engine, gear and fuel) are imported. The situation is worse than in the canoe fishery because since about the mid-1990s, there has been no functional boatyard in Ghana to build new vessels or repair broken ones. Thus, there has been no investment in the inshore fishery, and there is no indication that the situation would change in the foreseeable future.

2.8.3 THE INDUSTRIAL SECTOR

All the capital equipments (the complete vessel, gear and fuel), including some personnel of the officer grade, are imported. In the trawling and shrimping subsectors, it is doubtful if the Ghanaian owners are not 'fronting' for some foreigners. The fisheries law requires that Ghanaians should wholly own the trawlers and shrimpers. In any case, since the Ghanaian demersal fishery is overcapitalized, further investment in the sector is being discouraged.

In the tuna subsector, where there is room for further investment and the fisheries law allows joint ventures with non-Ghanaians, it is again doubtful if the Ghanaian partners of most of the fishing companies have any shares in the business. Since 1996, there have been some investments in the subsector with the entry of tuna purse-seiners into the fishery (Table 6).

2.9 TRENDS IN ACCESS TO TECHNOLOGY OF DIFFERENT SUBSECTORS

At the beginning of the marine capture fishery, when it was only artisanal, access to technology was free and uncontrolled; any technology would be applied. But when the fishery developed into a semi-industrial and industrial nature, the need was felt compelling to control access to technology so that only the right technology be applied to sustainably exploit the fisheries resources. This was done by enacting fisheries laws and regulations, the first of which was promulgated as the Fisheries Ordinance and Regulations Cap 165 of 1946 (see Section 1.7). This ordinance, and its accompanying Regulations, allowed, among others, the use of the technology of motor fishing vessels under licence, and prohibited the application of explosives or poisonous matter in fishing [31].

In subsequent years, improvements were made in the fisheries laws and regulations by stipulating the technologies that should not be applied in the Ghanaian marine fishing industry. The focus has been on the appropriate mesh sizes to be used in the marine waters as well as in the freshwater bodies.

The new Fisheries Bill enacted by Parliament in December 2001 emphasizes the need to apply appropriate technology as well as enhances, significantly, the management of the fisheries resources through MCS systems. These technologies and regulations are designed, *inter alia,* to:

(i) avoid catching too much juvenile fin fishes and shellfishes (crustacea);

(ii) catch the right quantities of adult fishes and shellfishes on a sustainable basis;

(iii) avoid destroying juvenile and mature fishes, including shellfishes and molluscs, through the use of harmful technologies; and

(iv) enhance responsible fishing.

Unfortunately, these laws and regulations are not efficiently and effectively implemented and so the desired objectives are not achieved.

CHAPTER 3 SOCIAL DYNAMICS OF FISHING COMMUNITIES

3.1 DEMOGRAPHIC PROFILE OF FISHERS

3.1.1 ETHNIC GROUPINGS IN THE COASTAL FISHING COMMUNITIES

Socioculturally, seven distinct ethnic groups inhabit the coastal zone [32]; these are presented in Table 8.

Table 8: Ethnic Groups in the Coastal Zone of Ghana

Region	Ethic Groups	Coastline (km)	No. of Fishermen
Western	Nzema	105	6,750
	Ahanta	80	10,990
Central	Fante	150	28,300
	Awutu-Effutu	25	6,450
Greater Accra	Ga	45	16,150
	Dangbe	70	13,370
Volta	Ewe	75	14,355

Source: Coastal Zone Profile of Ghana

The Nzemas are found from the border with Côte d'Ivoire to Axim, and the Ahantas from Dixcove to Sekondi. The Fantes occupy the coastal zone from Shama to Mankoadze, the Awutu-Effutu from Winneba to Nyanyano, the Gas from Kokrobite to Kpone, the Dangbes from Prampram to Ada and the Ewes from Anyanui to Aflao at the Ghana - Togo border [32]

There seems to be a high degree of specialization by the various ethnic groups. The Fantes and Gas specialize in the purse-seine and drifting gillnet (*ali*) fishing, targeting round and flat sardinella and mackerels. The Dangbes and some Gas specialize in line fishing with ice, (*lagas* or *awame sea*) and the Ewes are well known for beach-seining. With time, the fishing methods have diffused across the cultural settings due to internal migration; for example it is possible now to find Fantes, Gas and Dangbes operating beach-seines, which have long been the tradition of the Ewes.

3.1.2 AGE STRUCTURE IN FISHING

There is no age limit to enter fishing, but young men between the ages of 25 and 55 mostly carry out fishing. A combination of physical energy and

experience is needed to undertake the strenuous task of fishing. The youth among the crew perform the task of pushing the canoes from the beach into the sea and back, braving through the rough and turbulent waves, casting and dragging nets, and carrying fish from the canoe to the beach. Older fishermen are mostly involved in management and supervisory roles, organizing logistics for the crew, mending nets and supervising fishing expeditions.

It is also common to see children between the ages of eight and 12 as crew members. This practice of child labour is rather prominent among some communities in the Greater Accra and Central Regions. In the communities where there are no schools located close to the beaches, the tendency for the children to enter into fishing at that tender age is very high. To address the problem of child labour and delinquency along the beaches, the CBFMCs have made provisions in their byelaws to prohibit the loitering of children on beaches during school hours.

Mostly the older women in the communities carry out fish processing. They are assisted by younger women (daughters and other relatives) or hired labour and, in the process, they transfer processing skills and the intricacies of the fish trade to younger generations. The younger women also engage in other occupations such as petty trading, dressmaking, hairdressing and food vending.

3.1.3 HOUSEHOLD SIZE AND COMPOSITION

On average, the household size in the fishing communities is large. Due to the demands for labour and the high interdependency of both sexes in harvesting and post-harvest operations, large households are of economic importance in fishing communities.

Typically, a household comprises a canoe owner, his immediate family of one to three wives and children, members of his extended family (parents, cousins, nephews and nieces) and, sometimes, crew members. The definition of household was a subject of interesting discussion in most areas. Beyond living and eating together from the same plate, a household could comprise people working together in fishing or fish processing and staying together. Every member of the household is a worker in the fishing unit, performing various jobs from feeding fishers, fishing, carrying fish, mending nets, household chores, fish processing and guarding the home. These intricate economic relationships are the bases of high inter-dependency amongst fishworkers.

3.2 ACCESS TO SOCIAL SERVICES

Poverty alleviation, and the ability to improve living conditions of rural communities, depend, to a large extent, on the availability and access to basic

socioeconomic infrastructure facilities and services. These include good drinking water, health services, roads and schools, among other things.

3.2.1A HOUSING IN THE MARINE SECTOR

In the marine sector, about 54 per cent of houses found in rural coastal areas are made of mud and roofed with either thatch or zinc sheets[33]. But going through fishing communities, one cannot fail to observe the gradual shift from these landcrete houses to modern concrete dwellings. It is also common to find beautiful architectural edifices in fishing communities such as Elmina, Moree and Kromantsi. The type and ownership of housing are important indicators of social and wealth status in fishing communities. Most of the houses found in fishing communities are of the compound type, consisting of a number of different families living together in the household [34].

Fishing communities, as in any rural community in Ghana, lack spatial planning and basic utilities. Overcrowding of dwellings, and a lack of drainage and access roads are prominent in the communities. In the opinion of fishers, they tend to dwell closer together for ease of resource mobilization and better access to the landing sites. Over time, this has resulted in overcrowding and unsanitary conditions in the communities.

3.2.1B HOUSING IN THE INLAND SECTOR

Residential structures in the inland fisheries, especially along the lake, are in very poor conditions. They are mostly constructed with mud and palm fronds, and are roofed with thatch. The few fishermen who are better off live in cement block houses in the semi-urban communities. Some fishermen regard their communities as temporary residences, as they often migrate to better fishing grounds when catches decline. Others still put up permanent houses in their home towns, thus compelling them to put up the temporary structures. Overcrowding is not a common feature in the fishing communities along the lake, though the population growth rate of 5.1 per cent is far above the national average of 3.1 per cent

3.2.2A ACCESS TO SAFE DRINKING WATER AND SANITATION FACILITIES IN THE MARINE FISHERIES

The main water sources for the fishing communities are wells and natural sources (mainly rivers, streams, rain, and so on). Forty-seven per cent of the drinking water for the rural communities is from wells, and 34 per cent from natural sources. Most of the wells are fitted with pumps [33]. In the urban

fishing communities, pipe-borne water could be obtained from standpipes, which are metered. The main constraints faced by the urban communities are irregular flow and the high cost of the water.

Sanitation is a major problem in the fishing communities. Most of the communities do not have access to any toilet facilities and have to use the bushes and the beaches popularly known as "free range". Rubbish is mostly dumped at the beaches and at designated refuse dumps in the urban towns. The indiscriminate refuse disposal and the resultant insanitary conditions lead to several diseases in the communities.

3.2.2B Access to Safe Drinking Water and Sanitation Facilities in the Inland Fisheries

There is no potable water in most of the rural communities in the inland fisheries sector. Lakes, rivers, ponds, dams and dugouts are the sources of water for drinking and domestic needs. Along Lake Volta, very few wells exist, and collection of water from the lake is by women and children. Apart from some few villages, most villages do not have proper solid-waste disposal systems. The pit latrines available in some of the villages are in very poor condition and not safe for patronage. Defecation is done in the open, and the faeces normally wash back into the lake during the rainy season. In addition, the lake is heavily polluted with agrochemicals used by farmers and cow dung from numerous cattle grazing along the banks of the lake.

3.2.3A Access to Health and Medical Facilities in the Marine Fisheries

A wide spectrum of formal and informal options of health care is available to the rural coastal communities. These include public/private hospitals, clinics, health centres, herbalists, spiritual healers, private maternity houses and chemical shops. In most of the urban fishing communities, sophisticated government health facilities and private pharmacy shops exist. However, most fishers cannot access these health facilities because they cannot afford the cost of treatment and drugs. They believe that the current policy of cost recovery, popularly known as "cash and carry", operated by public health institutions, has been the main contributory factor. They resort to self-medication, herbalists, spiritual healers, private maternity houses and chemical shops for healthcare [35].

According to the community members, the main diseases prevalent in the fishing communities are malaria, diarrhoea, anaemia and upper respiratory tract infections. Most of these diseases are largely preventable and could be

attributable to the poor nutrition, quality of water and sanitation and fatigue associated with long working hours. The prevalence of the diseases was observed to be seasonal, with most diseases occurring during the major rainy season from June–August [35].

3.2.3B Access to Health and Medical Facilities in the Inland Fisheries

Health facilities are woefully lacking and sick people have to wait until market days to obtain transport (by boat) to major towns for treatment. Therefore, fishing communities depend, to a large extent, on quack drug peddlers for their health needs. The Volta River Authority operates a mobile health services to some of the communities, using a boat called *Onipa Nua*. The medical personnel undertake both preventive and curative treatment to communities not accessible by road. The communities supplement this with the services of herbalists and traditional healers.

In the Kpando District, the District Health Administration also operates two boats donated by the World Health Organization (WHO) and the United Nations International Children's Fund (UNICEF) to inaccessible areas, especially the islands.

3.2.3C Awareness Creation on HIV/AIDS

The issue of HIV/AIDS in the fishing communities must be of grave concern to all stakeholders in the fisheries sector. They are unfortunately socially and politically marginalized in the society. They are mostly young and active men and women between the ages of 15-35 years. There is limited influence of family and village authority over their lifestyles. The women are de facto heads of households due to the absence of the men (migration). They provide services for the fishermen, including food, drinks, lodging, credit, sex, and so on. The fish-landing sites are cash-rich economies, especially during the fishing seasons from June to September. Migration is very high during this period, resulting in very high sexual promiscuity. The Ghanaian fisherman can be found along the coast of the subregion, from Mauritania to Angola. The fishermen's lifestyles expose them to the HIV/AIDS pandemic. The vulnerability of the fishing communities to HIV/AIDS has been grossly overlooked. Almost all the fishing communities are aware of the HIV/AIDS but the level of knowledge is very limited.

In Ghana, the National Aids Commission has been mandated to carry out all programmes on HIV/AIDS. It implements its activities through, NGOs,

socio-professional organizations and other stakeholders. There has been no conscious effort to target the fishing communities for special HIV/AIDS programmes.

3.2.4 ACCESS TO EDUCATION

There is at least a primary school in every fishing community in Ghana [35]. Some secondary and tertiary institutions are located in some of the urban fishing towns. With the government's programme of Free, Compulsory, Universal, Basic Education (FCUBE), more schools have been built to improve access to education, but some parents in the fishing communities complain of lack of funds, and prefer to use their children as labour in their fishing business. A common argument raised in favour of this preference is that they have to ensure that there is a successor for the business who should be an experienced fisherman. The fishing villages in the inland fisheries sector lack adequate schools and equipment, and, in most cases, teachers refuse postings to such places due to their remoteness.

3.3 EDUCATIONAL ATTAINMENT IN FISHING COMMUNITIES

3.3.1 FORMAL EDUCATIONAL LEVELS

Educational levels amongst fishers have been found to be low, as consistently documented in several publications on Ghana[34, 36]. The literacy level estimated amongst fishermen through group discussions was between 5 and 50 per cent. Even then, a greater proportion of those that had been through first-cycle institutions had dropped out of school and were unable to read or write. The highest rates of literacy were found in the Volta Region, where some of the fishermen could communicate in English.

Among processors and fish traders, the picture is quite grim. Most of them had never been to school, and their educational level was expressed as between 0 and 20 per cent. The low and marked contrast in educational attainment between genders is reflected in the national statistics as well, where 32 per cent of the population and twice as many females as males have never been to school [33].

Lack of appreciation of the value for education, high demands for unskilled labour and lack of finances were cited as the main constraints that tended to discourage fishers from sending their children to school, even though most coastal towns are icons of education in the country. Another causal factor

that discourages formal education was the early recruitment and long years of apprenticeship for succession in the fishing industry.

Very committed to turning the tide, most fish processors are now investing in their children's education, to the highest possible levels to meet the challenges in employment. Some women's groups are investing in infrastructure for schools in their communities. The government FCUBE policy is also encouraging the education of children, especially girls.

3.3.2 TRADITIONAL APPRENTICESHIP TRAINING

Training to be a fisherman or a fish processor is a socialization process that starts from early childhood, and it is the responsibility of parents and the extended family [36]. Generally, sons follow their fathers, and daughters, their mothers. Most of the fishermen start their career early as apprentices and spend all their life in fishing. Thus fishing is the only skill acquired through the long years of traditional apprenticeship. In the last 10 – 15 years of economic reforms of retrenchment and redeployment, it appears a lot more people from the public sector have also entered fishing as another employment avenue.

Due to the low educational levels and lack of employable skills among fishers, other job opportunities are limited. However some abandon fishing and take to farming and other vocational jobs such as masonry, carpentry and driving during the lean fishing season. Fishers do pride themselves as very experienced in their chosen profession and rightly so due to the long years of training and the fact that they have been resilient to the adversities of the environment.

3.4 THE ROLE OF WOMEN IN FISHING

The women in fishing communities are very well integrated into the fishing business, carrying out their professional responsibility of disposal of fish in an efficient manner to prevent spoilage and losses. By the signals of demand and supply, the women, some of whom are wives of the fishermen, set fish prices and distribute to others in the fish-marketing chain (mostly other fish processors and customers). The women are also important financiers of fishing operation, and fishermen regard the credit from processors as efficient and reliable[37].

The women process the fish mainly by smoking, and send them to nearby markets or store them for the minor season. Between August and December,

the processors smoke and store fish, especially juvenile sardinellas, anchovies and shrimps, and release them for sale between March and April.

3.5 DYNAMICS OF MIGRATION OF FISHERS

3.5.1 PATTERNS OF MIGRATION

Many authors[44, 45, & 46] have documented the migration of fishermen from Ghana. The survival of fishermen in the traditional setting is very dependent on their ability to exploit the sea successfully at all times. The migration in pursuit of migratory fish stocks is therefore an essential back-up activity for the subsistence of fishermen.

The main cause of migration is economic. Fishermen migrate to be able to accumulate capital. In addition to economic attraction, some fishermen migrate to gain recognition in the society. They believe that the cultural change and experience during migration brings enlightenment and refinement. Others migrate in order to escape family obligations.

3.5.1.1 Artisanal

Artisanal fishermen in Ghana are highly migratory; migration is both internal and external. The push factors of migration are mainly economic. It is a coping mechanism for making lumpsum savings and avoiding lean-season poverty. Some fishermen travel with their wives on their expeditions, and some fish processors are motivated by profits to migrate on their own to buy fish and process it.

Internally, fishermen follow the migratory pattern of the sardinella during the main fishing season from July to October. In Ghana, the sardinella starts migrating from the Western Region and moves eastwards towards the Volta Region.

At the beginning of every fishing season, fishermen from the Central Region migrate to towns in the Western Region, notably Axim, Half Assini, Abuesi and Shama. They follow the fish eastwards and congregate in Moree, Elmina, Apam, Winneba and Nyanyano. Fishermen in the Greater Accra Region, especially those from Jamestown to Kokrobite, also move westwards to Apam, Winneba and Nyanyano in the Central Region.

During the latter part of the fishing season (from August to December), fishermen move from the Western and Central Regions to congregate in Tema and Jamestown. Around the same period the *lagas* fishermen from Kpone, Ningo, Prampram, Osu and Tema migrate to Sekondi.

Permanent migration among fishers is common among beach-seine operators. From the Volta Region, the fishermen have permanently settled in the Central and Western Regions with their families. They go home during funerals and festivals.

External migration is mainly to neighbouring West African countries like Côte d'Ivoire, Togo and Benin. Drifting gillnet (*nifa-nifa*) and purse-seine fishermen from the Western, Greater Accra and Central Regions are found along the west coast of Africa, from Senegal to Cameroon.

Some artisanal fishermen from the coastal communities have been compelled by the declining fish landings to move to the Volta Lake, which is one of the largest manmade lakes in the world. They carry with them the purse- and beach-seine nets, which are prohibited in inland water bodies.

3.5.1.2 Migration in the Inshore Fishery

Two main types of migration patterns have been observed among inshore fishermen and these are migration within or outside the country. There are two types of migration within the country. The first is the seasonal movement of fishermen in pursuit of fish during the sardinella season from July to September, when the fish leave their normal localities. The fishermen move from their bases of operation to stay for up to four months at other places in Ghana. The second pattern of migration within Ghana lasts longer than one fishing season, and the fishermen only go home for annual festivals or important funerals. For instance, due to poor landing facility at Mumford, inshore fishermen at Mumford have moved to Elmina and only come home during the two-week Gomoa festival. Again, the creation of the Volta Lake offered opportunity for coastal fishermen. In the face of dwindling fish catches, marine fishermen from the Volta, Greater Accra and Central Regions migrated to settle in villages along the Volta Lake, and only visit home during annual festivals. Migration outside the country concerns migration to other West Africa towns. In this pattern, migrants tend to stay for longer periods, culminating in permanent residency, in some cases.

3.5.1.3 Movement from Small-scale to Large-scale/Industrial Fisheries and Vice Versa

The small-scale fishers who are trained in navigation and seamanship and certificated by the Regional Maritime Academy (RMA) move to work in the industrial vessels, where they are better remunerated. They are guaranteed stable incomes and other incentives, including free medical services, insurance and "fish bonuses".

A few fishermen have moved from the industrial vessels to the artisanal, especially with the collapse of the State Fishing Corporation, which was an industrial fishing entity owned by the Ghana government. Some have been able to establish their own fishing units from their savings and end-of-service benefits.

3.5.1.4 Movement from Fisheries to Non-fisheries Activities and Vice Versa

Fishers in the artisanal and semi-industrial sectors do not have the requisite skills to move into other sectors. Likewise, it is very difficult for others without the necessary skills and experience to move into the fisheries sector. After undergoing training in navigation and seamanship, some fishers from the industrial vessels have moved to work in ocean-going cargo vessels. Due to high illiteracy level and lack of skills, mobility into other non-fisheries sectors, which may require rigid qualification and working experience, is difficult.

3.5.1.5 Migration in the Inland Fisheries

Migration in the inland fisheries is vivid along the Volta Lake. Almost all the fishermen in the Volta Lake are migrants from the lower Volta (below the Kpong and Akosombo dams) and the marine coast. The creation of the dam seriously affected fishing at the lower Volta (North and South Tongu and Keta Districts). The fishermen in those areas migrated to the Volta Lake to exploit the fisheries resources. Similarly, fishermen from the west, especially Dangme East and West, Accra, Ewutu Efutu Senya, Gomoa and Mfantsiman Districts, also moved to the Volta Lake as a result of the dwindling fish stocks from the sea. The fish resources of the lake attracted around 72,000 fishermen, which increased the pressure on the resources available for exploitation. Some of the fishermen move their settlement/camps when they do not get sufficient fish or have developed new fishing methods, which they cannot operate in their present location.

3.5.2 Links Between Migration of Fish and Labour

The major fish-landing centres mentioned in Section 3.5.1.1 experience a high influx of migrant labour during the major fishing season. The migrant labour engages in various activities such as carrying of fish from the canoes, loading of fish onto vehicles, pushing trolleys of fish, and retailing of fish, among others. In addition, there is increase in other supporting but brisk trading activities in secondhand clothes, foodstuffs, cooked food and fishing inputs.

At the Tema fishing harbour, labourers migrate from the northern part of the country to work as security, discharging gangs and dock workers. With no skills in fishing, they operate ashore, carrying out the arduous task of removing iced fish from the hatches, usually without safety equipment.

3.6 INSTITUTIONAL FRAMEWORK OF FISHING COMMUNITIES

3.6.1 THE TRADITIONAL STRUCTURE: THE CHIEF FISHERMAN AND HIS ELDERS

The traditional head of the community or township is the chief, who is usually assisted by a council of elders to administer the town. However, the fishing area/community is under the jurisdiction of a Chief Fisherman who is, in some areas, also a council member of the traditional authority. The Chief Fisherman, locally known as *Apofohene* (Fantes), *Woleiatse* (Gas and Adangbes) and *Dortorwofia* (Ewes), is assisted by a council of elders (usually seven in number) to settle disputes and ensure social order in the fishing community[30]. This social structure provides a hierarchy of conflict resolution, especially involving fishing matters, in the community.

The chief fisherman resolves tensions and conflicts in the coastal area. Other more serious issues are referred to the Assemblyman of the area, the traditional head, the paramount chief and then the law courts, in that order. The Chief Fisherman also acts as a link between the government and the fishermen, helps to source and distribute fishing inputs fairly, and gives shelter and support to migrant fishermen.

3.6.2 THE ADMINISTRATIVE STRUCTURE OF THE FISHING COMMUNITIES

The governing authority at the district level is the District Assembly (DA), backed by the Local Government Law of 1988 (PNDC Law 207), Chapter 20 of the 1992 Constitution, and the local Government Act of 1993 (Act 462).

The DA consists of the District Chief Executive (DCE), assembly members, two-thirds of whom are directly elected by universal adult suffrage and one-third are appointed by the President in consultation with chiefs and interest groups in the district, and the Members of Parliament (MPs) representing the constituencies within the district. The DA has a Presiding Member who is elected from among its members by a two-thirds majority.

In the community, the Assemblyman, who is the community's representative on the DA, channels the needs of the community to the DA, and information

from the DA to the community. The basic developmental planning and management unit in the community is the Unit Committee (UC), consisting of elected dedicated members of the community, who, together with the Assemblyman, are very important facilitators of development in the community. The UC is linked to the DA through the Area Councils, which identify and plan development programmes and sources of funding. These programmes are submitted to the DAs through the Area Councils.

The DA offers technical services to fishing communities through the decentralized departments of local government. Some institutions and services rendered are presented in Table 9. The DAs also generate revenue from market tolls, basic tax, and district border tax for development programmes in the communities.

Table 9: Technical Departments of Local Government and Services Rendered

Departments	Services Rendered
Public Health Unit, Ministry of Health	Child immunization, education on communicable diseases, improved sanitation and family planning
Ministry of Food and Agriculture	Agricultural extension, animal health, fisheries management
Ministry of Education	Literacy and numeracy and functional training in alternative income generation
Department of Co-operatives	Formation of groups to access credit
Social Welfare and Community Development	Child custody, counselling and community mobilization
National Disaster Management Organization (NADMO)	Organize the communities for disaster preparedness
National Commission on Civic Education (NCCE)	Education on civic rights and responsibilities

3.6.3 Directorate of Fisheries

For effective administration of the fisheries in Ghana, the Directorate of Fisheries has established other Divisions. One such Divisions is the Monitoring,

Control and Surveillance (MCS) Division. The main duty of the MCS Division is to enforce the fisheries law. The MCS Division carries out its duties through surveillance and patrol at sea and on land. The Division collaborates with security agencies such as the Navy in their land and sea operations. The police prosecute offenders of the fisheries law.

The Directorate of Fisheries has the power to withdraw or suspend the licence of any vessel whose operations go contrary to the fisheries law and the laid-down fisheries regulations. It also has the power to refuse licensing of new vessels if there is scientific evidence that the fishing effort being exerted by vessels already in operation is enough for sustainable exploitation of the resources.

It must be admitted that the MCS is a new Division and it is also inadequately resourced, both in logistics and personnel to effectively and efficiently carry out its duties. For instance, the Fisheries Act of 2002 prohibits the use of fishing vessel of 50 gross registered tonnage or more to use bottom trawl in waters of depth less than 30 m. It has also created the Inshore Exclusive Zone for the exclusive use of the artisanal fisheries. However, other sectors of the marine fishing industry operate in these areas, resulting in conflict between the artisanal sector and the other operators.

Officials of the Directorate of Fisheries in the communities collect catch statistics and socioeconomic data, conduct canoe census, sit in arbitrations and educate communities on government policies and the fisheries law. There is a weak linkage in feedback from the communities to the larger socioeconomic level.

3.6.4 Community-based Fisheries Management Committees (CBFMCs)

In response to the state of decline of the fisheries resources and resultant effects on communities depending on the fishery, the Government of Ghana in 1995, with financial and technical support from the World Bank, initiated a five-year capacity-building project, known as the Fisheries Subsector Capacity Building Project (FSCBP), to manage the sector. The project focused on capacity building for;

- formulating policy and management plans and their implementation;
- MCS and enforcement; and
- promotion and development of inland fisheries.

The project adopted the strategy of co-management and facilitated the formation of Community Based Fisheries Management Committees (CBFMCs) in all the fishing villages along the coast of Ghana. It is important to note that the committees are at various stages of development.

The CBMFCs are expected to prepare byelaws as empowerment and management tools. In addition to issues on resources management, the byelaws should address landing area sanitation and development and the maintenance of social order in the fishing community.

3.6.5 SOCIO-PROFESSIONAL FISHERIES ASSOCIATIONS

The artisanal fishers are organized into several professional associations, notable among them are:

(a) Ghana National Canoe Fishermen Council (GNCFC)

The Ghana National Canoe Fishermen Council (GNCFC) was formed in February 1982 as a national body with the objective of promoting the welfare of all canoe fishermen in the country. The structure of the Council comprises District and Regional executives and a National Executive Committee, which forms the Supreme Body of the Council.

Membership is open to all Chief Fishermen, canoe owners and fishermen in the marine coastal regions of the country. The fishermen are organized from the grassroots level, that is, landing beaches, where the Chief Fsherma and his council of elders constitute the local-level executives and focal points of mobilization. The GNCFC is the link between artisanal fishermen, government agencies, NGOs and other organizations that have an interest in the fishing industry. It helps source for inputs for its members, and collaborates with government to provide premix fuel at a subsidized price for artisanal fishermen.

It spite of its scare resources, the GNCFC has provided social amenities at some landing beaches for the fishing communities, notable among them is a clinic at James Town Beach in Accra and a 10-unit school block for the Vodza Roman Catholic Primary and Middle Schools in the Volta Region.

(b) Ghana Co-Operative Fisheries Association (GCFA)

The GCFA was registered as a co-operative organization with the Department of Co-operatives in 1975 and operates under the Ghana Co-operative Council. Membership is open to both artisanal and inshore operators. At its peak in the 1980s, the GCFA had 10 secondary unions and 147 primary societies in the country. The Association became a member of the International Co-operative

Alliance (ICA) based in Switzerland and, in 1985, the ICA assisted the GCFA to obtain a credit of US$1 mn to construct a cold store of 1000-tonnes capacity.

In 1980, the Agricultural Development Bank (ADB) financed the GCFA to purchase four inshore vessels to be used for fishing and training of fishers in modern methods of fishing. ADB also imported outboard engines and other fishing equipment for the Association for distribution to both inshore and artisanal fleets.

In 1986, the Association became dormant when the Ministry of Food and Agriculture (MOFA) directed that all fishing inputs should be channelled through the Regional Administrations. After that, the Association was given a grant of C54 mn by MOFA for its re-organization. The association is assisting its co-operative societies to invest in premix fuel distribution.

(c) Western Region Fishermen Co-operative Service Centres

This union of 14 primary societies in fishing communities is localized in the Western Region. It is a mutual benefit organization and was formed in 1985 as a credit union. The main source of income is monthly contributions by fishermen. The government distributes fishing inputs through the union. It has also invested in the sale of premix fuel to fishermen.

(d) Ghana National Association of Farmers and Fishermen (GNAFF)

Formed in February 1993, the GNAFF is an umbrella organization for farmers and fishermen in the country. The MOFA played a leading role in its formation and provided office space for its secretariat. The functions of the association include:

- advocacy on issues related to farmers and fishermen;
- acquisition and distribution of fishing inputs at relatively cheaper prices; and
- education of fishermen on government policies related to the fishing industry.

(e) National Fisheries Association of Ghana (NAFAG)

Formed in 1971, membership of NAFAG is open to all Ghanaian registered fishing companies and fisheries associations. The functions of NAFAG are to:

- promote, develop and protect the fishing industry in Ghana;
- represent and give effect to the views and opinions of the members;

- promote or oppose legislation or other measures which might affect members; and
- settle cases by arbitration.

(f) Ghana Inshore Fisheries Association (GIFA)

The GIFA (formerly, the Fishing Boats Owners Association) was founded in 1972. It is the association that oversees the organization and operation of the inshore fisheries in Ghana. GIFA has aims to:

- promote orderly development of the inshore fisheries;
- foster unity among all stakeholders of the inshore fishing;
- guarantee uniformity and good quality of members' products;
- collaborate with other institutions/organizations in matters affecting the fishing industry;
- mobilize credit and fishing inputs for recognized and registered members of the Association;
- help individual members acquire fishing vessels through the administrative machinery of the Association;
- organize training courses for human resources of the inshore fishery development; and
- undertake any charitable activities that would be in conformity with the objectives of the Association.

The GIFA is the communication link between its members and institutions and organizations such as National Marine Fisheries Association of Ghana, the Marine Fisheries Research Division of the Directorate of Fisheries, the Fisheries Directorate of the Ministry of Agriculture, and the Ghana Ports and Harbours Authority.

The Association has three regional branches, namely, the Greater Accra GIFA, the Central Region GIFA and the Western Region GIFA. There are also district branches of GIFA in Apam, Mumford and New Takoradi. Each regional body has its own Executive Council Members who administer the affairs of the region.

Six Executive Council Members of each region come together to form the National Executive Council of GIFA, with its headquarters at the Fishing Harbour Secretariat, Tema. The National Executive Council of GIFA is headed by a National President. The presidency is rotated among the regions for a period of four years.

(g) National Inland Canoe Fishermen Council (NICFC)

The NICFC was formed to champion the just cause of all individuals and institutions involved in inland fisheries.

It has a nine-member Council of Elders and a 21-member National Executive Committee. It has 17 zonal offices located at the major fishing communities and fish markets in the Volta, Brong Ahafo, Northern and Eastern Regions. The Head Office is located in Accra. Currently, it has a membership of about 50,000.

The objectives of the NICFC are to:

- provide a forum for consultation and information sharing among members;
- protect the image of the fishermen and safeguard the interests of members in accordance with the relevant laws of Ghana;
- protect the integrity of the Volta Lake ecosystem and those of other inland water bodies; and
- ensure the health, safety and sustainable livelihoods of its members by liaising with relevant agencies.

The main activities being undertaken are:

- distribution of premix fuel to the zonal centres;
- liaising with relevant institutions and resource persons to build the capacity of its members;
- facilitating the availability of credit and other inputs for members, and provision of places of convenience, primary schools and offices in the fishing communities;
- advocacy by making representations to relevant institutions on national issues; and
- collaborating with relevant agencies/institutions to create awareness and educate the members on policies and issues of national importance.

3.6.6 Non-governmental Organizations (NGOs) in Fisheries

NGOs in the artisanal fisheries sector mainly work with women's groups. Some of the NGOs found in the sector are discussed below.

3.6.6.1 Development Action Association (DAA)

The DAA is a federation of grassroots associations of 13 participating communities registered as an NGO in 1998. It emerged out of the Freedom

From Hunger Campaign (FFHC) as a development programme of the NGO division of the Food and Agriculture Organization of the United Nations (FAO). Initially, the FFHC supported women's groups to reduce poverty levels by the introduction of improved smoking and storage technology. A credit component was also added to provide financial assistance. FAO provided administrative and technical support, while international agencies, including Christian Aid, provided financial assistance to the groups.

As well as building small enterprises for themselves, the group members also support community development projects. Notable among the achievements are the establishment of a nursery and a primary school at Chokomey, a public place of convenience at Bortinanor and a water tank at Kokrobite, all in the Greater Accra Region.

After 13 years in existence as a community association, an apex grassroots NGO was formed. The main aim is to reach out and promote self-reliant, participatory and sustainable development among communities.

3.6.6.2 Central and Western Regions Fishmongers Improvement Association (CEWEFIA)

The CEWEFIA is a non-profit organization formed in 1990, with a membership of 1,500 women (70 per cent in the Western Region and 30 per cent in the Central Region). The objectives of the Association are to:

- improve fish processing and increase incomes of rural women and assure food security in Ghana; and
- facilitate the improvement of reproductive health among members, in particular, and protect the communities as a whole;

Since its inception, CEWEFIA has implemented several developmental projects, including construction of processing sheds, capacity building in financial management, development of woodlots and provision of vehicle to transport processed fish to market centres. CEWEFIA collaborates with the District Assemblies, the Ministry of Health, MOFA, and the National Board for Small-scale Industries, and others.

3.6.6.3 Adventist Development and Relief Agency (ADRA)

ADRA is the humanitarian development and relief agency of the Seventh Day Adventist Church. It is an internationally recognized NGO that works to create better conditions for people. The agency, which has been active in Ghana since 1983, has its world headquarters in Maryland, USA. The Ghana headquarters is located in Accra.

ADRA provides integrated community development solutions to its rural partners by embarking on creative, innovative and needs-driven projects, thus improving the social and economic well-being of the people it works with.

Its current programme areas are:

a. Agriculture: Crops production, agro-forestry processing, storage and input credit and marketing
b. Natural Resource Management: water shell management, medicinal plants, conservation and cultivation, and amenity planting
c. Health and Nutrition: Boreholes and hand-dug wells, water and sanitation, education and school health (Malaria and HIV/AIDS) education
d. HIV/AIDS: Prevention, education, counselling, referral, care and support
e. Education: School health education and provision of books and other educational materials to schools and colleges
f. Micro-finance: Small credit lending savings culture development and business skills building
g. Relief: Emergency supplies in the event of a disaster

ADRA operates in all the ten regions, except the Western Region, and has offices in seven regional capitals and six sub-regional centres. ADRA accomplishes its development programme objectives by working with strategic partners such as MOFA, the Peace Corps, the Forestry Department, the Ghana National Fire Service, DA and other NGOs and research institutions.

3.7 THREATS/CONFLICTS IN FISHING AREAS

3.7.1 THREATS

Coastal areas have varied resources such as fish, forests, beaches, land and sea. Consequently, today they face stiff competition from commercial operators in the allocation and use of coastal and marine resources.

3.7.1.1 Private Ownership of Coastal Lands

Private investors, especially in the tourism industry, have taken over large stretches of sandy beaches, and prevented the communal and public use or access to these coastal resources. Local fishermen have been crowded out to only small portions of landing sites. Some areas affected by this area are Ada, Nungua and Goi near Ningo in the Greater Accra Region and Fetteh in the Central Region. Security guards and equipment are placed on these private

properties, and artisanal fishers look helpless as lands for the whole communities are taken over by individuals. In some areas, that has resulted in violent clashes between the local fishermen and landowners, and the Chief Fishermen and their elders as well as some of the fishermen themselves who sold the lands out.

3.7.1.2 Coastal Erosion

Shoreline erosion is a critical issue on the Ghanaian coastal landscape, with as many as 25 serious eroding points. A rate of erosion of 2–4 m per year in critical areas has been recorded [32]. Illegal sand and pebble extraction from beaches for building purposes has enhanced the rate of shoreline erosion in most areas. Some communities under threat include Ada, La, Bortianor Jamestown, Tema, Prampram and Kokrobite in the Greater Accra Region, Princess Town, Nkontompo and Essipong in the Western Region, and Keta in the Volta Region.

3.7.2 CONFLICTS IN THE MARINE SECTOR

3.7.2.1 Patterns of Conflicts

The relatively small area of the Ghanaian continental shelf and the large numbers of different fleets (Table 6) exploiting the fisheries resources of the shelf, make the situation favourable for inter-gear and territorial conflicts. Furthermore, the intensification of fishing due to dwindling fish stocks, gives rise to increasing conflicts. Ghana does not practice the quota allocation system; thus the determination of each fishing craft to catch as much fish as possible in a situation of dwindling fish stocks, has given rise to such conflicts [30, 39].

3.7.2.2 Territorial Conflicts

As both a management measure and an attempt to avoid physical conflicts between artisanal fishers and other users of the sea, the fisheries law forbids the use of towing gear in coastal waters less than 30 m deep. Canoes are allowed to fish in this zone since they do not tow their gear.

Territorial conflicts include motor fishing vessels running through the laid nets of the canoe fleet and sometimes hitting the canoes in the night. The fisheries law provides that at night the submerged or drifting gear must carry lighted markers at intervals of 25 m along the full length of the net. Commonly, this law is violated because the light markers are not locally available and the makeshifts that the artisanal fishers provide are neither suitable nor adequate.

The conflicts occur more often between the canoes and merchant ships, and the trawling and shrimping fleets than the semi-industrial fleets. The conflicts occur more often during the major upwelling season when fishing activities are at their peak. It is the general observation that conflicts at sea are occurring more often in recent times than previously.

In some parts of the coast, the operations of some artisanal gear have been greatly reduced because of the high rates of damage of the gear by motor fishing vessels, especially trawlers and shrimpers running through them. Some of the gear badly hit by these conflicts are *toga, tengirafo* and *papansuade,* some of which have ceased to operate because the operators cannot afford the financial cost of constructing new gear every now and then. There have been instances in recent times when the conflicts have resulted in physical fights between the canoe crew and the crew of the small-sized inshore vessels.

3.7.2.3 Inter-gear Conflicts Among Canoe Fishers

Three scenarios are possible for conflicts to occur among canoe fishers:

- crafts struggling to shoot their purse-seine nets around the same shoal of fish;
- setting a gillnet (*ali*) in front of another *ali*, net resulting in entangling of nets; and
- encircling a purse-seine net around another that has been set earlier.

3.7.2.4 Other Forms of Conflicts

(a) Struggle Between Workers and Owners of Fishing Units

The main struggle between the operatives and vessel owners occur in the following areas:

- Fishing crew insist on going fishing almost every day, except the traditionally declared non-fishing days, while the owner would prefer to wait till the season when catches can be assured. As a result of this, huge debts are accumulated and fishing inputs are put under excessive pressure; and
- There is no established welfare and social security system for the crew, but owners are obliged to cater for the fishermen in case of injury, hospitalization and death, which is burdensome for the owner and sometimes becomes a source of conflict. The fishworkers are not willing to contribute to any welfare schemes.

(b) Conflicts Between Indigenes and Migrants

Conflicts arise between the indigenes and migrants during the fishing season over the purchase of premix fuel, pricing of fish, landing space, non-payment of fish levies to the Chief Fisherman and flouting local non-fishing days by migrants.

(c) Conflicts Between Fisheries Administrators and Stakeholders

The DOF and the inshore vessel operators clash on non-payment of fishing licence fees and harvesting of juvenile sardines and tunas. The Fisheries Administration is in conflict with canoe operators over the use of undersized meshes, explosives in fishing and non-compliance with the dictates of the law such as registration of canoes and fishing around estuaries. Also, the DOF is in conflict with industrial operators for fishing in the 30-m depth zone, non-conformity with legal mesh size of the cod ends, non-submission of returns on landings and non-payment of licence fees.

3.7.2.5 Conflict Resolution Mechanisms

There are some mechanisms laid down for solving conflicts among fishers and between fishers and operators of merchant ships.

Traditional or Informal Methods

(a) Chief Fisherman

Traditionally, the Chief Fisherman, whose main function is to ensure that peace reigns among the fishers, solves conflicts between artisanal fishers. The fishers respect settlements by the Chief Fisherman.

(b) Fisheries Associations

Fisheries Associations of various kinds are used to settle disputes or conflicts among themselves, in addition to other activities for their benefit.

(c) Outside Arbiter

With the coming into being of inshore and industrial fisheries, the settlement of conflicts or disputes between artisanal fishers and the inshore and industrial fishers has been modified from the purely traditional system. This has become necessary because inshore and industrial fishers do not owe allegiance to the Chief Fisherman. In this case, the Fisheries Administration takes on the function of an arbiter assisted by a Chief Fisherman in settling the conflicts. This arbitration is not legally binding on the disputants. However, usually, the arbitration holds, especially where the conflict is between artisanal fishers and the inshore fishers.

Formal Methods

(a) Fisheries Commission

The Fisheries Commission, established by the Constitution of the Republic of Ghana, has a Settlement Committee whose functions include settling all disputes occurring in the fishing industry. When the settlement mechanisms mentioned in (a), (b) and (c) above fail to hold, such conflicts are brought to the attention of the Settlement Committee for arbitration.

(b) Settlement in Courts

In a very few instances, the arbitration does not hold, and resort is made to the courts, especially where one of the disputants is an industrial company or a merchant shipping company. When the artisanal fishers feel they cannot waste their working time in law courts, coupled with the high expenditure in obtaining legal aid, they just drop the case. This situation arises quite often where the alleged offender is an ocean-going liner.

3.7.3 Conflicts in the Inland Fisheries

(a) Conflicts Among the Tribes

Fishing methods, fishing rights and rearing of animals in the villages have been identified as the main causes of conflicts among the various tribes of fishermen in the fishing villages. Ga Adangbes use winch nets (purse-seines) and beach-seine nets, which destroy the stationary gillnets of the Ewes, the dominant tribe on the Volta Lake. The Ewes also accuse the Ga Adangbes of fishing in the old channel of the lake, which has led to decline in catches Conflicts exist between the Ewes and Fantes (Effutu and Senya) who use small-meshed gillnets, and between Ewes themselves, some of whom use beach-seines with mesh sizes below 5.08 cm. The Ewes complain they have been relegated from the main fishing grounds (the old channel) to areas where their nets are being destroyed by submerged tree stumps.

(b) Territorial Conflicts

Quarrels over territorial use rights occur between Ewe *nifa-nifa* operators in shallow inshore areas of the lake. Confusion exists over the apportioning of the areas. There are territorial use rights conflicts between *nifa-nifa* operators and *atigya* operators, who require permanent areas for long periods of time. Another source of conflict between fishermen is from draw-down farming areas in the catchment, as the lake recedes. There is a cry for equitable distribution of both fishing grounds and draw-down areas by the youth.

(c) Conflicts Over Payment of Levies

The conflict between the settler tribes and host tribes is on the weekly collection of fish, and frequent and excessive levies imposition by the host tribes' leaders. Levies are charged by the chiefs on the type of fishing method being used by the settler tribes. The chiefs insist that tradition demands that fishermen contribute one day's catch in a week to them and that the tradition has been going on for years even before the formation of the lake. However, dwindling catches have resulted in the inability of fishermen to comply with the tradition, which sometimes lead to quarrels and assault battles between the host tribes and settler communities.

(d) Conflict Resolution

These conflicts are arising and inhibiting fish production because the Fisheries Dispute Settlement Committee of the Fisheries Commission has not extended its operations to the lake. However, it is doubtful whether its influence on inland fisheries would be felt due to logistics and the overwhelming problematic nature of the marine fishing industry. The possibility of legitimizing the Community-based Lake Management Committees (CBLMCs) to settle disputes of this nature needs serious consideration. The enactment of byelaws by the CBLMCs stating clearly, fines for gear theft, poisoning, pollution of water and use of unauthorized fishing methods would help minimize conflicts. It is essential that parts of the fines should be retained by the CBLMCs for administrative expenses, travelling costs and miscellaneous expenses.

3.8 SUCCESSION

Artisanal fisheries in Ghana have developed as a family business due to the polygamous nature of the fishermen. In case of the death of the head of a household or family the eldest child will take care of the rest of the family or children. Where the real owner has two or more children, the fishing activity will be operated as a family business headed by the eldest son. This encourages the owners to have at least one of their children in the fishing business. Children or family members are encouraged to work together in the business so that they can easily take it over. There are few instances when the management of the family business becomes a nightmare, especially where the property has to be shared among children of different mothers or among different family members. Only limited cases have landed at the law courts.

CHAPTER 4 DYNAMICS OF LABOUR AND MOBILIZATION IN FISHERIES

4.1 TRENDS IN EMPLOYMENT AND REMUNERATION SYSTEMS

4.1.1 EMPLOYMENT

According to fishermen, the number of new entrants into the fishing industry has increased over the years as a result of increase in population and high unemployment rates in the country, which was caused by the privatization of public institutions and mass redeployment of workers.

As seen in Table 10 below, the number of canoe fishermen enumerated in the censuses, increased from 91,000 in 1987 to 103,430 in 1997 [22]. Increases in size of crew has become necessary due to the bigger canoes and fishing gear constructed by mostly purse- and beach-seine units in their quest to increase their production capacity and maximize their return on investments. Other supporting occupations such as processing, fuel-dump operations, canoe carving, outboard-engine mechanics, carrying fish and helping in fish handling have also increased.

Table 10: Number of Canoe Fishermen Enumerated in Canoe Frame Surveys, 1989 to 1997

Year	1989	1992	1995	1997
Number of Fishermen	91,400	96,400	101,700	103,340

Source: Directorate of Fisheries

4.1.2 REMUNERATION AND SHARING SYSTEMS

4.1.2.1 Artisanal Fishery

Along the entire coast, the proceeds from fishing are usually shared between the owner of the capital equipment and the crew, after the deduction of all expenses. Formerly, the catch was shared in a proportion of 40 per cent for the crew, 20 per cent for fuel and 40 per cent for inputs and maintenance; hence, a large portion of the cost was borne by the owner [41]. But due to the high costs of fishing inputs, the system has changed over the past 20 years and the proceeds are divided equally between capital and labour, after deduction of operational costs, as shown in the table below.

The sharing system varies slightly from community to community and the type of fishery as indicated in Table 11. There appears to be an attempt by artisanal fishermen to have a uniform sharing system along the coast. With the current system, the ordinary fisherman makes less as the crew size increases, and is getting more and more impoverished.

Table 11: Sharing of Proceeds from Fishing Operations

Fishing Region	Volta Region Method	Greater Accra	Central Region Region	Western
Ali		*½ crew* *½ canoe/net/ motor*	*½ crew* *½ canoe/net/ motor*	*½ crew* *½ canoe/net/ motor*
Poli / Watsa	*½ crew* *½ canoe/net/ motor*	*½ crew* *½ canoe/net/ motor*	*½ crew* *½ canoe/net/ motor*	*½ crew* *½ canoe/net/ motor*
Beach-seine Set-net	½ crew ½ canoe/net	½ crew ½ canoe/net 1/3 crew 1/3 canoe 1/3 net	½ crew ½ canoe/net 2/3 crew 1/3 canoe/net	½ crew ½ canoe/net 2/3 crew 1/3 canoe/net
Nifa-nifa		*½ crew* *½ canoe/net/ motor*	*½ crew* *½ canoe/net/ motor*	
Line		½ crew ½ canoe/net/ motor	½ crew ½ canoe/net/ motor	

Source: Canoe Frame Survey 1995

4.1.1.2 Remuneration in the Inshore Fishery

The inshore fishery operates a "no catch, no pay" system. The revenue is shared equally amongst the operating expenses, boatowner, crew members and boat. During the lean and offseason periods, when the fishers do not go to sea, they receive neither wages nor compensations.

4.1.1.3 Remuneration in the Industrial Fishery

The crew in the industrial vessels are paid wages and, in addition, "fish bonuses", depending on the landings. The wages and fish bonuses and other conditions such as gratuity, annual leave, medical facilities and End of Service

Benefits (ESB) are incorporated in the Collective Bargaining Agreement between the fishing company and the National Union of Seamen of the Trades Union Congress. This agreement is reviewed every year and becomes effective when all the parties have appended their signatures.

4.2 LABOUR HOURS

4.2.1 ARTISANAL

There are no specific working hours for artisanal fishers; the working hours depend on the type of gear and season. The hook-and-line ("go, come") fishery is a day's trip, while hook-and-line (lagas) fishers carry ice and so stay at sea for five to seven days. The purse-seine (poli/watsa) fishing hours vary from season to season. During the main sardinella season, fishing is usually carried out in the night and the duration of work varies between six to 15 hours. During the minor season, fishing is usually carried out in the mornings. Some gear and their working hours are presented below.

Type of Gear	Working Hours
Drifting gillnet *(ali)*	6 p.m. - 6 a.m.
Purse-seine *(poli/watsa)*	5 a.m. - 2 p.m.; 6 p.m. - 6 a.m.
Drift gillnet (nifa-nifa)	5 p.m. - 7 a.m.
Hook-and-line ("go, come")	7 a.m. - 4 p.m.
Hook-and-line (lagas)	5 days - 7 days
Set-net (multifilament)	4 a.m. - 11 a.m.
Set-net (monofilament)	3 p.m. - 8 a.m.

4.2.2 INSHORE

The inshore purse-seiners operate between 5 p.m. and 10 a.m. during the sardinella season. In the offseason, both the purse seiners and trawlers operate between 5 a.m. and 1.00 p.m.

4.2.3 INDUSTRIAL

The industrial fishery operates from 14 days to 60 days on a trip. During this time at sea, the crew on the trawlers fish day and night, depending on the availability and size of each haul. The crew takes rest during the towing of the net.

As regards the tuna baitboats, the working hours also depend on the size of the shoal of tuna. The hooking varies between 5 minutes and 3 hours on a shoal.

4.3 SOCIAL SECURITY/WELFARE SYSTEMS

4.3.1 ARTISANAL

The artisanal fisheries sector is informal and is not covered by any formal social security schemes. The fishers have evolved informal welfare systems that cater for the elderly, the poor, the sick and the handicapped in their communities. Boatowners are obliged to give fish to these vulnerable groups when present at the beach at the time of landing. Fish is also sent to the homes of elderly and sick relations and former crew members.

To prepare for retirement in the communities, fishermen construct their own nets, put up buildings, educate their children and re-invest in other businesses such as transport and corn-mill operations to support them in their old age. Boatowners lend money to crew members, support them in times of bereavement, illness, and so on. It is apparent that the canoe owners have more livelihoods opportunities and are better able to plan for the future than the ordinary fishermen. These fishermen could neither save nor make enough money to reinvest in other businesses.

Some canoe owners support long-serving and dedicated members of the crew to acquire their own fishing units, by selling old nets at concessionary prices to them. This action is primarily done to retain the crew and help build a future for them.

4.3.2 SEMI- INDUSTRIAL

The crew on the semi-industrial vessels do not have any welfare and social security systems. In case of death, injury and/or hospitalization, members make voluntary contributions to support their colleague or his family.

4.3.3 INDUSTRIAL

The crew contributions are registered in a social security scheme. Payment for the scheme is made up of 5 per cent personal and 12.5 per cent employers contribution. The personal contribution is deducted from the wages and paid to the Social Security and National Insurance Trust (SSNIT), a Government social security institution.

4.4 STATUS OF SAFETY AT SEA

The DOF in collaboration with the Regional Maritime Academy (RMA) and the Ministry of Roads and Transport set up the Technical Advisory Committee to enhance the efficiency and safety of fishing by providing training and technical advisory services for fishermen and mechanics in the inshore and artisanal fisheries. Fishers are trained in basic seamanship and navigation, safety and life at sea, basic fire fighting at sea, maintenance of outboard and inboard engines in local languages at the landing beaches. Certification is done by the RMA and from 1992 to 1997 a total of 1,124 fishermen were trained.

The Fisheries Law 256 of 1991 stipulates the categories of certified personnel that should man inshore vessels. Unfortunately, most people manning inshore fleet are not certified. In the past, the Directorate of Fisheries had training schools at Elmina and Takoradi to train personnel to man inshore vessels. These schools are no more operating, resulting in high number of uncertified persons manning inshore vessels. This has increased the rate of accidents at sea involving the inshore fleet. The entry requirements prevent them from gaining admission into the RMA. The government should revive these fisheries schools and re-negotiate with Ministry of Roads and Transport and the RMA to re-introduce the training scheme under the Technical Advisory Committee.

The Chief Fishermen have attested that the training had contributed to the reduction in the cases of accident at sea. The fishermen in both the artisanal and inshore fisheries are more aware of inherent dangers at sea, and are now adopting some minimum safety measures. Generally, however, the following safety systems apply in the various fleets.

4.4.1 SAFETY SYSTEMS FOR THE ARTISANAL SECTOR

The fishermen are now taking higher risks by going further offshore due to the scarcity of fishery resources in inshore waters. However, they operate with minimum regard to safety standards. Contrary to the provisions in the Fisheries Law that requires that all submerged or drifting gear be marked with lights (see section 3.7.2.2), fishermen carry only one or two hurricane lamps on board the canoes for night expeditions, leading to various accidents at sea, mainly with the industrial vessels, and resultant damage of canoes, nets and sometimes loss of lives. Fishermen do not carry life jackets.

Fire hazards do occur on fishing expeditions. There are occasions when canoes have caught fire during cooking and from makeshift wick lamps during the

night. Fishermen do not carry first aid kits for injuries or sudden illness. On some occasions, fishermen have landed with some of the colleagues seriously ill or even dead. Due to the high tidal waves at the landing beaches, deaths do occur during landings or going to sea when the canoes capsize. The hook-and-line fishers have started using sails in addition to outboard engines to conserve fuel and sail to the nearest landing site in the case of engine failure.

4.4.2 Safety Systems for Inshore Vessels

The basic safety requirements for an inshore vessel are as follows:

- life jacket for each person on board the vessel
- small life raft (inflatable)
- navigational aids (port and starboard lights); communication equipment (a two-way radio)
- first aid equipment
- fire fighting equipment

In practice, none of the vessels meets any of the basic safety standards. It was after an accident at sea on 21 September 2000, when 12 of the 22 fishers perished on the high seas, that some of the vessels have been equipped with life jackets, and yet they do not cover all the crew members.

4.4.3 Safety Systems for Industrial Vessels

The Shipping and Navigation Division of the Ministry of Roads and Transport certifies the seaworthiness of a vessel before the DOF issues a fishing licence, based on the safety certification. The industrial vessels are expected to carry the following equipment to ensure safety of crew:

- life rafts within specified expiry dates; this could be one or two depending on the number of the crew
- life jackets to cover all crew members
- buoys
- fire extinguishers within specified expiry dates

In addition to the safety equipment, the vessel should have the basic navigational equipment to move safely. These are radar, very high frequency (VHF) communication equipment and echo sounders.

To ensure compliance with the safety standards, the MCS Division of DOF carries out quayside inspection of the vessels to check safety equipment,

composition and certification of crew, type of fishing gear, fish on board, fishing licence and communication equipment on board.

4.5 CREDIT SYSTEMS IN THE FISHING INDUSTRY

Access to credit is one of the major difficulties faced by all the three sectors of the marine fishing industry. This limits the ability of fishermen in Ghana to realize their full potential. Since fishing is a capital-intensive venture, canoe or vessel owners must have a combination of sources from which to raise the huge capital for the purchases and replacements of outboard engines, gear and canoes.

The DOF facilitates access to credit to the fisheries associations and fishermen by linking them to financial institutions for credit. Currently, the Agricultural Development Bank, and other commercial banks and rural banks are mandated to grant credit facility to the agricultural sector, including fisheries.

4.5.1 SOURCES OF CREDIT

4.5.1.1 The Artisanal Sector

The artisanal fishery began in Ghana when there were no banking facilities. The fishers have, therefore, a tradition of depending on their own resources for their operations. When in difficulty, the owner of the operational unit borrows from relatives and fish mongers (called "fish mammies"). In fact, the fishmongers constitute the principal traditional source of financing for the artisanal fishery sector.

In the 1950s, the government introduced the Charter Party Loan Scheme, to provide outboard motors for the canoe fleet. Since then government has also supported artisanal fishermen in various ways [40]. Current sources of finance to the artisanal fisheries sector are both formal and informal. These sources range from institutionalized systems such as banks, credit unions, and traditional savings and credit systems to local sources of funds.

4.5.1.1.1 The Agricultural Development Bank (ADB)

The ADB is the State institution that provides credit for agriculture, including the fisheries sector. Most fishing inputs imported by the government are channelled through ADB. The Bank also imports and distributes fishing inputs, especially outboard motors, to the fishermen on credit.

About two to three years ago, such credit facility was granted to artisanal fishermen who were expected to pay 50 per cent of the cost of the fishing

input and the balance spread over a period of two years. The system was grossly abused, resulting in heavy indebtedness to the Bank. Consequently, the Bank reviewed the system in 2000. Information available at the ADB shows that as on 30 June 2001, the outstanding outboard motor loans granted by some coastal branches of the Bank stood at ¢310,816,441 out of a total of ¢756,115,000 granted. This gives a recovery rate of 58.9 per cent. Since then, there has been a significant recovery in loans granted by ADB to the artisanal fisheries. This was partly due to the threat of court action initiated by some branches of the Bank and the pressure put on the fishermen by the Chief Fishermen who guaranteed the loans. The loan default affected the reputation of the Chief Fishermen and the community in accessing further inputs from the Bank.

In the year 2000 ADB sold 262 outboard motors at a cost of US$2,100 each. The Bank did not grant any credit facilities to the artisanal fishermen, and all fishermen were obliged to pay outright the total cost of the outboard motor before collection. Due to the favourable fishing season that year all, the outboard motors were paid for.

4.5.1.1.2 Rural Banks

The rural banking system started in Ghana in 1976 with 31 banks; by mid-2001, there were 127 banks operating. The objective of the rural banks is to mobilize savings in rural communities and to provide credit and other services to the customers within a 32-km radius. It is usually established at the initiative of the community.

The rural banks do not run schemes that specifically focus on the fishworker, but they are by statute expected to give 45 per cent of the total credit to agriculture, including fisheries. Rural banks operating in the coastal communities have been supporting the artisanal fisheries sector. Between 1997 and 1999, for example, the fisheries component of credit to the agricultural sector by the rural banks averaged between 38.1 and 43.1 per cent. Information obtained from the Bank of Ghana indicates that over the same period, the Nzema Manle and Union Rural Banks in the Western Region, granted all their agricultural loans to the fisheries sector.

In 1989, the European Development Fund (EDF) granted an 8.5 million European Currency Unit (ECU) line of credit to the Bank of Ghana for the import of outboard motors, fishing nets, floats and other agricultural equipment for use by the rural communities [(40)]. The rural banks along the coastal areas were in charge of the distribution of these equipment.

Formal lending by the commercial and rural banks has declined considerably due to the high indebtedness of the fishworkers. Indeed, the banks prefer lending to women's groups who have demonstrated some creditworthiness over the years. The fishermen have attributed this trend of events to declining fish stocks and increasing costs of capital equipment. This has left them with no option but source for credit to finance their operations from fish processors and moneylenders.

4.5.1.1.3 The Ghana Co-operative Credit Union Association (CUA)

CUA is a voluntary, self-help organization of people united by a common purpose, who agree to save their money together and give loans to one another at low rates of interest for both productive and provident purposes. People living in the same community, belonging to the same profession or church group may form a credit union. The advantages of a credit union include regular savings, access to loans, financial counselling, relatively low rates of interest, dividend rebate and access to loans/savings insurance schemes. According to the constitution of CUA, the group must have a minimum membership of 50 and a potential membership of 200.

The experiences of the CUA scheme operated in some fishing communities are presented below:

- The Chorkor Fish Mongers Co-operative Society had 64 members and were granted a loan of ¢1 million in 1991 each, and another loan of ¢900,000 in 1993. These loans were never repaid and the Society has collapsed. CUA has written off the loan.
- The Great Kormantse Fish Processors Co-operative Union was formed in 1993 with an initial membership of 43 women. After meeting the conditions of CUA, they were given a loan of ¢2.4 mn in 1993 and a further ¢6.0 mn in 1996. These loans were not repaid on schedule and the Society was refused further assistance.
- Simpa Co-operative Fish Processors Society, based in Winneba, started operation in 1993 with a membership of 45. In 1994, each member had a loan of ¢500,000. This amount was increased to ¢600,000 in 1996. Since 1999, a balance of ¢9.0 mn has been outstanding [(42)].

The only creditworthy group of CUA in the fishing community is the Progressive Women's Group (PWG) at Cape Coast, which includes fish processors and traders. The PWG was started in 1990 with a membership of 50. Members mobilized around ¢250.0 mn in savings. In the year 2000, each member was given a loan of between ¢6-7 mn and the PWG received an

additional loan of 20.0 mn from Women in Development (WID), an NGO. The loan has since been repaid.

4.5.1.1.4 Personal Savings, Profits from Business

Boatowners use savings made over the years to finance the purchase of new nets and canoes. Sometimes, the business is handed down from generation to generation. It is estimated that close to 30 per cent of the fishing businesses have been handed down from older generations. As indicated above, the eldest son in the family inherits the fishing apparatus from his father and supports the household with the proceeds.

4.5.1.1.5 Loans and Advances from Friends, Relatives, Moneylenders and Fish Processors

Moneylenders, dealers of fishing inputs, family members and friends often provide fishermen with credit for the procurement of fixed assets such as canoes and gear. Whereas family members would not require collateral, moneylenders demand collateral in the form of landed property or existing craft, with high interest rates of between 100 and 200 per cent for three months. Though reliable, it is expensive. When boatowners obtain credit from the fish processors to purchase parts of nets and other accessories, they are obliged to sell their catch to the processor at a discounted rate. In spite of the conditions attached, loans from fish processors seem to be the most reliable source of credit. It is, however, being undermined by the declining fish stocks [37].

4.5.1.1.6 Informal Savings and Credit Schemes

There exist in the communities various informal savings and credit schemes patronized mainly by the women. Some of the fishermen save with these schemes during the fishing season. The common schemes encountered were:

- the daily savings susu scheme; fishermen make daily or weekly savings to a scheme and collect the accumulated capital at the end of the month less a day's contribution as payment to the susu operator; and
- the rotational susu scheme, which is more popular among the fish processors. In this scheme, a group of women make monthly contributions to capitalize one beneficiary. This is done till every member of the group is capitalized.

4.5.1.2 The Semi-industrial and Industrial Fisheries

In the semi-industrial and industrial fisheries, the major source of financing capital equipment purchases and operations is institutional borrowing from

the banks. The ADB operated an inventory credit for the industrial fisheries between 1998 and 2000. The Bank provided bunkering services for the fleets in lieu of sales of fish. The value of stock was used to cover the credit. The system was stopped due to the high interest rate charged by the Bank vis-à-vis the poor fish landings and the consequential non-payment of loans. Hence, it is becoming more difficult for the banks to grant loans to the sub-sector. The result is that many of the vessels are not operating for lack of funds for maintenance or rehabilitation or outright purchase of new vessels.

It is felt that the lack of adequate credit appears to be the cause of considerable "fronting" by Ghanaians for foreign vessel owners in the industrial fishery.

4.6 MARKETING OF FISHING INPUTS AND FISH

4.6.1 SUPPLY AND DISTRIBUTION OF FISHING INPUTS

The main inputs used by the artisanal fisheries are lead, float, twines, ropes, netting outboard motor, canoe and premix fuel. With the exception of the canoe, all the others are imported. The fishermen procure the outboard engine mainly from the ADB, a government financial institution. As discussed above, the Ghana National Canoe Fishermen Council procures and distributes some of the outboard motors for the fishermen. All other fishing inputs are procured from the open market. Premix fuel is formulated by the government and distributed to the fishing communities through the Chief Fishermen at a subsidized price.

Most inputs of fishing are imported. The main importers of nets, ropes and twines are Continental Christian Traders (CCT), AFKO Imex and Planet Marketing Enterprises Ltd. The companies have wholesale and retail outlets in Accra and Tema. The CCT has a mobile retail unit, which distributes fishing inputs in the communities. There are also numerous small-scale importers who supply inputs to the market. The main retail market for fishing inputs in Accra is Cow Lane, located in the central business area. African Industries Ltd. is the main manufacturer of multifilament netting materials in Ghana. Expanded Polyethylene Products Limited (EPPL) produces floats for the local market.

Outboard motors and marine engines are imported and distributed by Japan Motors Co. and Reiss and Co. Due to the high cost of marine engines, the inshore vessel owners have resorted to the use of non-marine engines, which are cheaper but not very reliable. Such non-marine engines are motor vehicle engines, for example used Caterpillar and Deutz engines. Fishing inputs like

all agricultural inputs, are exempted from customs duty, sales tax and value-added tax (VAT). Importers apply to the DOF to be recommended for the exemption.

4.6.2 Fish Marketing and Distribution

Marketing of fish is carried out mostly by women. Fresh fish is traded at the beaches at the wholesale, retail and consumer levels. The landed fish is sorted and graded according to sizes and species. The unit measure of sale is either a plastic or wooden crate or a basket. The weight of fish in the unit measure of sale varies from 20 kg to 33 kg, depending on the type of fish.

The first point of the marketing chain from the fisherman is the wholesalers, who are usually the wives and family members of the fisherman. They set fish prices and distribute to others in the fish-marketing chain (mostly other fish processors and customers). In some cases, fish processors who have pre-financed the replacement of equipment are also given priority attention in the sharing of the produce. If the wholesaler herself is a fish processor, she arranges for the bulk of the fish to be smoked and sells the rest to other retailers who intend to smoke or sell fresh to consumers. About 80 per cent of fish landed is smoked and the rest either fried or sun-dried for retailing.

Fish trade is very informal and carried out in an unrestricted manner and dictated by the signals of demand and supply. There are small- and large-scale operators who distribute fish all over the country. Smoked fish is carried to nearby markets or stored for the minor season. Between August and December, the processors smoke and store fish, especially juvenile sardinellas, anchovies and shrimps, and release them for sale between March and April.

Anchovy trade is very important for meeting the protein requirements of people in the rural and northern parts of Ghana. It is also a crucial feed ingredient in the poultry industry. The main wholesale markets for anchovy in Ghana are the Tuesday market in Accra, Denu in the Volta Region and Mankesim in the Central Region. Others are Abuesi in the Western Region, Akplabanya and Tema New Town in the Greater Accra Region, and Ankaful and Kormantse in the Central Region. The main destinations of fish traded in these markets are Kumasi, Tamale, Techiman, Togo and Burkina Faso.

Catches from the industrial vessels are landed frozen in cartons between 20 kg to 25 kg in weight. They are sold to wholesalers and stored in cold stores for retailing. About 70 per cent of the tuna landed from the industrial vessels are sold at export price to the Pioneer Food Cannery Ltd. in Tema for canning or production of tuna loins.

The marketing and distribution of fish in the inshore sector is similar to other sectors of the fishing industry. Women dominate the fish marketing trade. They are deeply involved in fish marketing and even go to the extent of financing the boatowners and therefore control the sale of the produce. At the end of the fishing trip, the fish landings are handed over to the fish mammies, who sell them fresh to their customers or store them in cold stores for sales later.

4.6.2.1 Fish Marketing and Distribution in Inland Fisheries

There are no marketing facilities along the lake, except at the 32 major fish-marketing centres. These markets have their own market days—once and twice per week—and the 1,232 fishing villages along the lake have to adapt to them. These markets serve as the first leg of the fish distribution chain, with the urban markets of Accra, Kumasi, Techiman, Nkawkaw, Tamale, Koforidua and Ho serving as the second leg of the distribution and marketing chain. The fish from the Volta Lake are available in all the rural and urban markets in the country. Transportation of processed fish from the fishing communities to the fish markets is by transport boats. The lake transport is beleaguered with myriads of problems, notably submerged tree stumps causing accidents, overloading of boats, unavailability of life jackets and other navigational equipments, lack of protection from the rains, poor condition of boats, lack of appropriate licensing and supervisory body.

Fish from the Volta Lake is also exported to Togo, Burkina Faso, and Cote d'Ivoire. The traders from these countries prefer the fermented fish to the smoked fish as there is a high demand for the fermented fish in their countries.

4.6.3 Fish Prices

Prices of fish at local markets vary from day to day and even within the day. The final price on a day depends on th evolume of fish traded at the time, species of fish available for trading, quality of the fish, production costs, transportation charges, number of traders available, and profits or losses made by the fishmongers during the previous market day.

Between 1989 and 1998, the average price (per kilogram, in Ghanaian cedis) for the various grades of fish increased severalfold. In US dollars there was no significant change, with the exception of shrimps, as shown in Table 12. The price of shrimps increased sharply from US$5.884 per kg in 1989 to US$27.485 in 1993, followed by a gradual decrease to US$9.070 in 1996. Since then, the price of shrimps has risen again.

Table 12: Prices per Kg of Fish at Cold stores in Tema

	Grade A Fish		Grades B & C Fish		Shrimps	
Year	Cedis (¢)	US$	Cedis (¢)	2 US$	Cedis (¢)	US$
1989	382.55	1.416	324.03	1.200	1,589	5.884
1990	436.00	1.336	370.00	1.134	3,794	11.628
1991	530.00	1.441	452.00	1.229	5,105	13.882
1992	661.20	1.513	535.00	1.224	4,439	10.160
1993	620.51	0.956	776.71	1.197	17,836	27.485
1994	1,220.00	1.275	1,063.00	1.111	19,081	19.943
1995	1,380.00	1.150	1,345.00	1.121	19,295	16.080
1996	2,300.00	1.391	1,993.70	1.205	15,000	9.070
1997	2,500.00	1.219	2,082.16	1.015	28,800	14.047
1998	3,200.00	1.445	2,727.63	1.232	37,728	17.036

Source: Marine Fisheries Research Division, Directorate of Fisheries

Grade A: Croakers, Sea breams, Cuttlefish

Grades B & C: Sardinellas, Anchovy, Mackerels, Moonfish, Burrito, Bumper

Shrimps: Pink and Guinea Shrimps

4.6.4 Dependency on Middlemen for Credit and Marketing

The role played by the middlemen and fish mongers (fish mammies) in the artisanal fisheries in the areas of production and marketing cannot be overemphasized, as discussed in Section 4.5.1. The artisanal fisheries sector relies heavily on the fish processors and fishmongers. The credit from the middlemen is extended to known and trustworthy fishermen and fish traders, with no collateral requirements. As discussed above, the credit is repaid in kind (in the form of fish) at a discounted rate. This puts the fishermen at the mercy of the traders as they dictate the price of the fish. The repayment depends on landings. The indebtedness of the fishermen to the fish mammies becomes cyclical unless there are major landings.

CHAPTER 5 RECENT STATE ASSISTANCE TO FISHERIES AND FISHWORKERS

With increasing demand for fish as a result of increase in population, the government decided to modernize the fishing industry in order to produce more fish. Government assistance to the industry is diverse but mostly centres on the facilitation of input acquisition and provision of safe landing facilities. Support is given to all categories of fishermen, as summarized below.

5.1 ASSISTANCE FOR PURCHASE OF FISHING INPUTS

5.1.1 FUEL

5.1.1.1 Artisanal Fishermen

The premix fuel was introduced in 1992. The price of fuel had risen astronomically because of the removal of subsidies on all sectors of the economy due to the implementation of the Economic Recovery Programme (ERP). Following persistent petitions from the fisheries associations, the government in 1992/93 granted a 100 per cent subsidy on the price of premix fuel[43].

The high price difference between the premix fuel for the outboard engines and petrol for automobiles led to gross abuses which led to the withdrawal of the subsidy. Later, the government reintroduced the facility and established a Ministerial Committee for Premix Fuel Administration and Distribution to oversee the distribution of the premix fuel. The premix fuel is sold through fisheries associations on a commission basis.

The quantities of premix fuel sold between 1996 and 2000 totaled over 183 mn l, or an average of nearly 40 mn l per annum[43]. In 1998, nearly 51 mn l of the fuel were sold. A levy of ¢22 per litre of premix fuel is collected by the community for community development projects. From mid-1996 to end of 1997, a total of ¢546 mn was collected by the associations/communities as commission from the sale of the fuel[43].

5.1.1.2 Marine Diesel for the Semi-industrial and Industrial Sectors

The government has stabilized the price of marine gas oil for the inshore and industrial vessels. Hitherto, the price of marine diesel was indexed to the dollar, and the industry had to accommodate price fluctuations for the bunkering services, which depended on the world market prices for crude oil.

The new price, which is in cedis, is slightly lower than the price of diesel for motor vehicles.

5.1.2 FISHING NETS

Over the years, the government has been assisting the fishing industry by importing fishing nets and selling them directly (at no profit) to the fisheries associations. Between 1993 and 1994, the MOFA imported 8,700 bundles of nets, 24,300 spools of twines and 1,300 coils of rope under the World Bank-funded Agricultural Services Rehabilitation Project. These were sold to the fisheries associations at no profit to the government.

In 1997, the Chinese government gave a grant of US$5 mn to the Government of Ghana for the purchase of fishing nets and ropes for the artisanal sector. Through the ADB, these fishing inputs were sold to the fisheries associations.

5.1.3 OUTBOARD MOTORS AND MARINE ENGINES

Since the introduction of the outboard motor to the canoe fleet, the government has been assisting the industry by importing the motors through the ADB. The latter has been giving out the outboard motors to the fisheries associations on credit. In 2001, the government imported 300 pieces of outboard motors and quantities of netting materials for the artisanal fisheries. The fishermen were requested to pay up to 60 per cent of the cost of items to rural banks and ADB branches in the fishing communities before collection.

The inshore fleets were built to do both trawling and purse-seining. Due to weak engines, they are not able to undertake trawling activity. It is to address this situation that the Government of Ghana in 1985 obtained a European Development Fund Line of Credit of US$4 mn to the ADB for inshore fisheries development. The project objective was to increase the number of operating fleet of mechanized inshore trawler/seiner fishing fleet from 250 to 380.

The programme involved supply and installation of new marine engines, improvement of fishing gear and strengthening of maintenance facilities of the fleet on credit. Over 100 engines were installed and fishermen adopted the trawl net that was introduced. At the end of the project, many boatowners were indebted to ADB due to, among others, the disappearance of the triggerfish, the resource base of the inshore fishery and high interest rates and bank charges.

Although credit facilities exist for the fishers, the high interest rates and bank administrative charges and cumbersome bank procedures make them unattractive for the fishermen and boatowners.

In an attempt to revitalise the distressed inshore fleet, the Social Security Bank, in the early 1990s, imported 25 marine engines for the fleet. The MOFA advanced ¢12.0 mn from the Fisheries Development Fund in 1992 to the Tema Boatyard for the cost of operations that would enable the company to offer continued assistance to the inshore fleet, including replacement of vessel engines.

5.1.4 CONSTRAINTS IN THE ARTISANAL FISHERIES

The main problem of the fishermen, both marine and inland, is the high cost of fishing inputs, fuel and canoes. Fishermen, as a result, are unable to purchase adequate and necessary inputs to match their expected efforts. The inland fishery, in particular, is plagued by a scarcity of smaller-horsepower (8-12 hp) outboard motors on the market, damage caused to nets by submerged tree stumps, scarcity of working partners, and wind storms, especially during the rainy season. There is also an acute the right size of wawa trees, the wood from which is used for the dugout canoe. Furthermore, transport is poor for the fishers and their products in the inland fisheries.

5.2 SUPPORT FOR RESTRUCTURING OF FISHING VESSELS

5.2.1 ARTISANAL

The first attempt at modernizing the canoe fleet was made in the early 1950s. Before then, the artisanal fishers were using sails and oars. Through a charter party scheme, which was a government credit scheme, the Directorate of Fisheries introduced the outboard motors in 1955 that made fishing less laborious and also increased the range of fishing and as well as catches.

With increasing shortage of logs of wawa due to high competition from the construction and furniture industries, and the cumbersome process it takes to bring the dug-out canoes to the landing beaches, it has always been the government's wish to get canoe makers to employ a technology which requires the use of less wood in the production of canoes. In 1996, the Danish International Development Agency (DANIDA), through its Private Sector Development Programme, sponsored the construction of two prototype canoes using the epoxy-glued construction method. In this method of construction, strips of wood are glued together with high strength waterproof glue (epoxy). The canoe is further coated with epoxy to strengthen the components and the hull. The development was through collaboration between a Danish company (Nexoe Shipyard A/S) and a Ghanaian company (Voltagate Boatbuilding Works).

One of the canoes was equipped with an outboard motor and the other with an inboard engine. The artisanal fishers did not accept the canoe that was developed because they found it to be very expensive and also not suitable for the rocky beaches and the strong surf. The programme could not be continued.

5.2.2 INSHORE FLEET

In 1950, the Directorate of Fisheries also introduced the first motor surf boat or the 27-footer inshore vessel equipped with an inboard engine. The success of the operation of these vessels led to the establishment of the Sekondi Boatyards in 1952 and the Tema Boatyards in 1962 to construct and repair these vessels. Loans were given to individuals and co-operative societies under the charter party system to buy the 27-footer fishing boats. The loans were initially administered by the Directorate of Fisheries but later transferred to the Agricultural Development Bank (ADB). The inshore fleet benefited a lot from credit facilities granted by the ADB. A Branch of the Bank was opened in Mumford, a fishing community that had the largest concentration of the 27-footer inshore vessels, to facilitate credit delivery and loans recovery. The Branch was closed down with the near-collapse of the inshore fishery.

The dwindling fish landings, coupled with the high cost of fishing inputs, have caused the near-collapse of the inshore fishery. The boatyards located at Tema and Sekondi for the construction of the inshore vessels have all closed down. Other privately owned boatyards in Accra and Elmina have also closed down. Repairs of the few inshore vessels left have been a major concern to the inshore fishing industry.

5.3 DEVELOPMENT AND MANAGEMENT OF LANDING FACILITIES

The Ghana Ports and Harbours Authority (GPHA) is the statutory body with the mandate to plan, build, manage and control ports and harbours in Ghana. Currently, GPHA is providing port/handling facilities at Tema, Sekondi and Takoradi for the artisanal, inshore and industrial vessels. Artisanal fisheries operate at these ports free of charge.

5.3.1 THE TEMA CANOE BASIN

In 1960, the first President of the Republic of Ghana donated the canoe basin (developed as part of the Tema harbour complex) to the Chief Fisherman and the fishermen of Tema Manhean [39]. This was part of the resettlement

package for people of the town whose lands had been taken for the development of the modern Tema township.

The canoe basin has a discharging shed and a net-drying area[39]. The management of the canoe basin is entrusted to the two Chief Fishermen (Awudum and Ashaman) and their Council of Elders. Sources of funds for the administration of the canoe basin are fish tolls from local and migrant fishermen and fines from arbitration of cases.

5.3.2 THE TEMA FISHING HARBOUR

The Tema fishing harbour consists of a landing berth for inshore and industrial vessels, a tuna-landing bay, net-mending sheds, fish-discharging sheds, a fish market, offices and a boatyard. In the mid-1990s, the fishing harbour was renovated and expanded with a concessionary loan of US$10.5 mn from the Japanese government. The outer fishing harbour (New Tuna Wharf) for the berthing of bigger vessels was completed in 1996.

5.3.3 THE OLD SEKONDI FISHING HARBOUR

The old fishing harbour at Sekondi was constructed with the advent of the inshore vessels in Ghana. It has a jetty for inshore vessels and canoes, a fish market, boatyard (which is now defunct) and a cold store. Some inshore vessels also anchor in the sea and discharge their catch through the use of canoes.

5.3.4 THE ALBERT BOSUMTWE SAM FISHING HARBOUR

In 1999, a new fishing harbour was constructed at Sekondi with a loan of US$13.mn from the Japanese government. It has modern facilities such as a cold store, an ice-making plant, offices, a berthing bay for inshore vessels, a jetty for canoes, and a net-drying area.

5.3.5 THE TAKORADI FISH-LANDING FACILITY

Takoradi has a relatively safe bay in which the small inshore vessels anchor and discharge their catch through the use of canoes. The Directorate of Fisheries operates a workshop there for repairs of marine engines and outboard motors and training of marine engine mechanics. The Takoradi harbour also has berthing facilities for larger semi-industrial and industrial fishing vessels.

5.3.6 THE ELMINA FISHING HARBOUR

Elmina is the most important fish-landing centre for inshore vessels in the Central Region of Ghana. The Elmina fishing harbour, used by both canoes

and inshore vessels, is situated on the Benya River. There is a landing quay on both sides of the river and a fish market (the Mpoben fish market). There are boat repair facilities around the port, and the Directorate of Fisheries has built a net-mending shed and a workshop for the repair and maintenance of outboard motors and marine engines. The Komenda-Edina-Eguafo-Abrem District Assembly manages the harbour.

5.4 SUPPORT FOR POST-HARVEST HANDLING OF FISH

From January 1999 to September 2000, the Directorate of Fisheries, in collaboration with Mike Dillon and Associates of UK, acting on behalf of the Natural Resources Institute (NRI), also of the UK, undertook a field-based experiment on the use of ice by the hook-and-line (lagas) fishery. The study was funded by the Department for International Development (DFID) of UK. The purpose of the project was to improve the quality of fresh landed fish through the use of insulated boxes.

The lagas fishermen use insulated wooden fish boxes to ice fish. Most of the wooden boxes were poorly insulated and could not keep the fish in the best condition. The project tried to improve the boxes by using aluminium as lining material. The results from these experiments showed that the aluminium sheets improved the insulation and hygiene, and hence, the quality of fish landed.

5.5 THE FISHERIES DEVELOPMENT FUND

The MOFA has established and is administering a Fisheries Development Fund (FDF) for the development of the inland and marine fisheries sectors. The source of money for the fund is ¢20 charged on every kilogram of fish imported into Ghana. In August 2001, the MOFA released an amount of ¢1.08 bn from the Fund to purchase 60 outboard engines for sale to the artisanal fishermen.

5.6 MAINTENANCE AND REPAIR FACILITIES FOR INSHORE FLEET

The Tema and Sekondi Boatyards Division of GIHOC were established to build and offer maintenance and repair facilities for the inshore vessels. The Tema Boatyard was to service inshore vessels in the Volta and Greater Accra Regions, while the Sekondi Boatyard was to handle vessels in the Central and Western Regions. However, these organizations have collapsed since the early 1990s. The collapse of these organizations means that all the inshore fleet has to rely on the Tema Shipyard and Drydock Corporation. The corporation

was established to handle industrial fishing vessels and merchandise vessels and has not got adequate facilities to handle over 200 inshore vessels. This has put a lot of pressure on the boatowners as they do not have appropriate places that they can carry out regular maintenance works on their old boats that need regular servicing. It is, therefore, important that the government rehabilitates the two boatyards for use by the inshore fleet.

CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

The present study has covered a broad scope and generated data and information that can contribute to resolving some of the macro-, meso- and micro-level constraints that affect fishworkers. After an interactive analysis of the data and information, the following key issues stand out.

6.1 CONCLUSIONS

Resource Depletion

This study has shown that Ghana's marine and inland fishery resources have declined significantly. This is the result of poor management of the fishery resources, the open-access nature of artisanal fisheries, the use of unapproved fishing gear and methods, the weak enforcement of laws and non-compliance of resource users to all forms of management measures. These have resulted in overcapitalization, unhealthy competition among fishers and fishing fleets and inequitable use of resources.

Lately, efforts are being made to improve the management of the fishery and the fishery resources through the acceptance of a comprehensive fisheries management plan, the establishment of a MCS system by the Directorate of Fisheries and the passage of a new pro-active, conservation-oriented fisheries law. These actions were facilitated by the implementation of a World Bank-assisted Fisheries Sub-sector Capacity Building project in 1996-2001.

The Socioeconomic Impact of Resource Depletion

The marine artisanal fishers operate in a highly seasonal fishery (with perhaps only three good months a year), and survive in the offseason primarily through migration, borrowing from the canoe owners and fishmongers, and the livelihood strategies of the wives (women) who store fish during the peak periods for sale during the offseason.

The depletion of the resources has aggravated the high poverty and low literacy levels in the fishing communities, and increased child labour in both artisanal and inshore fisheries. Fishing is the main predominant activity of fishers who have limited skills for other occupations. This restricts the mobility of fishers into other areas, thus resulting in limited access to other livelihoods options.

Fisheries in Ghana operate under various associations whose main objective is to seek the welfare of the members who are mainly the Chief Fishermen

and owners of canoes and other fishing vessels. The ordinary fisherman is voiceless, works in uncertain and difficult conditions, with minimum or no social security, and his welfare is not adequately catered for by any of these bodies.

6.2 RECOMMENDATIONS

Resource Management

In order to arrest the depletion of the fishery resources, enhance their regeneration, and conserve and exploit them sustainably, the following actions are recommended:

- The fishing pressure should be significantly reduced as prescribed in the Marine and Inland Fisheries Management Plans; these need to be reviewed from time to time, based on the results of comprehensive research.
- The new Fisheries Law (2001) should be seriously implemented and no effort should be spared to make the MCS System function maximally in both the marine and inland waters (Volta Lake).
- The CBFMCs should be made to function effectively and should be supported through a strong District Assembly commitment to sustainable resource use and enforcement of byelaws.
- The Regional Maritime Academy should be encouraged to initiate a course of study leading to the training and certification of Ghanaian officers for the tuna vessels. This will enable Ghanaians to reap higher benefits from the exploitation of the tuna resource.
- In order to encourage responsible fishing, the government should institute mechanisms to link investments in fishing communities with responsible fisheries, providing tangible benefits for the communities that practise responsible fishing.

Reducing Poverty and Other Consequential Negative Impacts on the Fishing Communities

- The National Co-ordinating Unit of the FAO/DIFID Sustainable Fisheries Livelihoods Project (SFLP) should foster partnerships with relevant organizations to help reduce poverty and the vulnerability to poverty in fishing communities by developing social infrastructure and processes such as awareness of good health, adult reproductive health, and population control practices, and education for communities to overcome poverty easily.

- The government should focus on developing options for alternative income-generating activities in fishing communities during the lean fishing season.
- The Directorate of Fisheries needs to become more aggressive (proactive) in the promotion of the value and needs of the fisheries subsector to the District Assemblies (DAs) and other stakeholders. This will enable the DAs to become more aware of the importance of the fishing industry and so give fisheries matters the necessary due consideration.
- The inshore (semi-industrial) fleet should be considered for modification to enable it operate actively in both tuna and sardinella fisheries.
- Faced with dwindling fish stocks, the marine fishing industry should continue to receive subsidies on inputs.
- The Tema and Sekondi Boatyards should be rehabilitated to support the semi-industrial fishery.
- The government should continue with the afforestation programme but with special emphasis on the wawa trees and timber for planked canoes.

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This study attempts to better understand the status of artisanal/small-scale fisheries and fishworkers in Ghana. It aims to establish the pre-eminence of the artisanal sector, with the ultimate objective of exploring the prospects, potentials and problems of sustaining and developing artisanal fisheries.

The study aims to promote more equitable and sustainable fisheries. It provides baseline information on the status of artisanal/small-scale fisheries and fishworkers, especially with regard to technical, social and economic aspects. It analyzes the impact of industrial fisheries on the artisanal sector. It also identifies the main threats to artisanal fisheries, as well as the inshore fishers' potential to harvest fisheries resources that are currently harvested by industrial fisheries. The information provided in this study will help fishworkers build and strengthen their organizations. It will also be useful for policymakers, researchers, planners, academics and anyone else interested in fisheries and fishing communities.

ICSF is an international NGO working on issues that concern fishworkers the world over. It is in status with the Economic and Social Council of the UN and is on ILO's Special List of Non-Governmental International Organizations. It also has Liaison Status with FAO. Registered in Geneva, ICSF has offices in Chennai, India, and Brussels, Belgium. As a global network of community organizers, teachers, technicians, researchers and scientists, ICSF's activities encompass monitoring and research, exchange and training, campaigns and action, as well as communications.

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