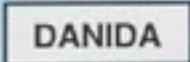
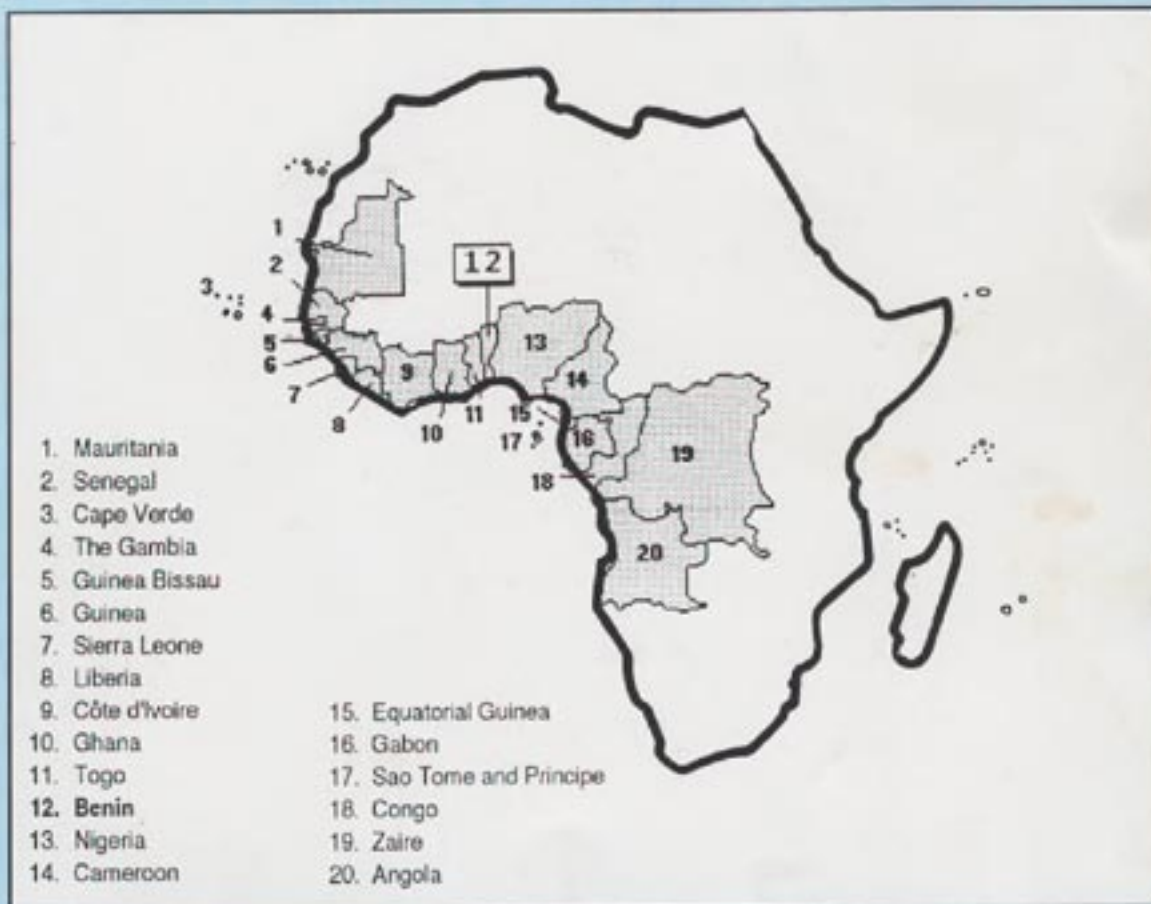
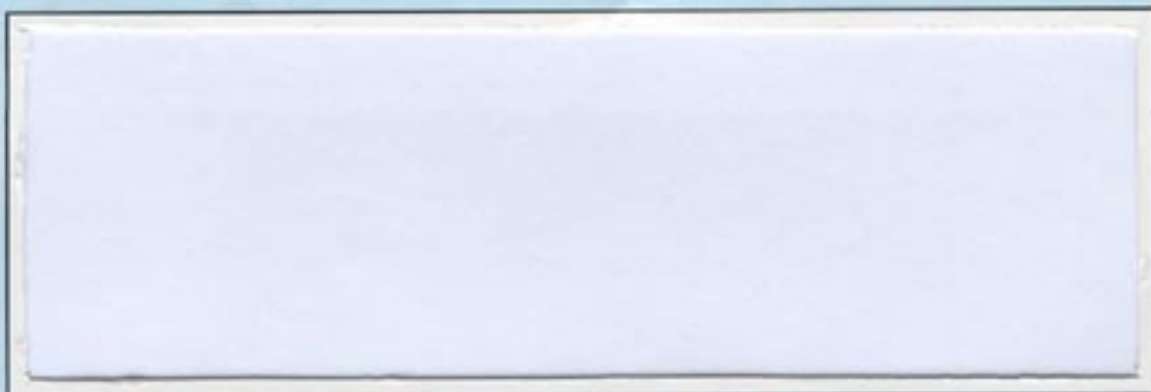




PROGRAMME FOR INTEGRATED DEVELOPMENT OF
ARTISANAL FISHERIES IN WEST AFRICA

IDAF PROGRAMME



DEPARTMENT OF INTERNATIONAL DEVELOPMENT COOPERATION OF DENMARK



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**Working Group on Capital Needs and Availability
in Artisanal Fisheries:
Methodology and Lessons Learned from Case Studies**

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EXECUTIVE SUMMARY

The existing way of financing of artisanal fisheries in West Africa is an element which has received so far few attention during the preparation of development policies. Unfortunately, this lack of knowledge has led to field actions of which the results have often be disappointing. Moreover, the informal sector continues to be the main source of financing of artisanal fisheries and the repayment rate of loans granted by the institutional sector is generally low.

On this basis; the Programme for Integrated Development of Artisanal Fisheries in West Africa (IDAF) set up a Working Group on capital needs and availability in artisanal fisheries. Its objectives are:

- (i) to elaborate a simple but efficient methodology likely to facilitate the identification of capital requirements in the artisanal fishery sector in West Africa;
- (ii) to design a methodology to identify the availability of capital according to the different sources of financing;
- (iii) to analyze the results of the two case studies that will be carried out in Senegal and Ghana;
- (iv) to prepare a document indicating to what extent the lack of capital could hinder the sector's development;
- (v) to formulate a methodology for the study of fiscal policies in favour of the sector.

The present report reviews the results of the activities undertaken in relation with the first three objectives.

The members of the Working Group are economists having experience and interest in the field of artisanal fisheries development, and, in particular, in its financing. They work in research institutes (Côte d'Ivoire, Ghana, Senegal), in national banks of savings and credit (Sao Tome and Principe, Senegal) as well as in international development banks (AfDB, BDEAC).

The first meeting of the Working Group was held in Cotonou, Benin, from 8 to 10 March 1994. The participants elaborated a typology of capital needs for the different operators in the sector and made an inventory of the various sources of financing in both the formal and informal sectors.

When preparing the case studies to be undertaken in Senegal and Ghana, the Working Group reviewed the information available in the two countries. It selected also the fishing sites to be surveyed, classified the observation units, defined a sampling strategy and listed the different elements to be included in the questionnaire.

During the case studies which were carried out in August and September 1994, a total of 190 boat owners/managers were interviewed in Senegal and 177 in Ghana. In Senegal, the survey enabled the assessment, for the first time, of capital availability, the updating of capital

requirements after the devaluation of the CFA franc that took place in January 1994 and to test the reliability of the data that are regularly gathered at the landing sites. In Ghana, the survey enabled the updating of the 1986 capital requirements survey, the analysis of the profitability of the different types of fishing unit and the assessment of capital availability in the sector. The results of these case studies were analysed by the Working Group during its second meeting held in Cotonou from 18 to 20 October 1994.

An important lesson learned from this exercise is that this type of survey can only be associated with a constant monitoring activity that shall provide the essential data on catches, fishing effort and incomes. As for the present survey, it helps identify the financing sources, the profitability of the investment and the distribution of incomes between the different factors of production.

It appeared also that the information on capital requirements should be collected according to a different procedure. An annual survey of the main importers and manufacturers of fishing material and equipment seems to be the most appropriate. It will allow to estimate the present value of the investments on the basis of the year of purchase, a standard rate of depreciation for each component of the fishing unit and their replacement cost.

The capital itself is not a fixed element, it changes regularly and a spot survey cannot give a picture of this dynamic aspect. Therefore, the Working Group recommended to monitor during one year some fishing units to better appraise the capital flows.

In future surveys, supplementary information should be collected. This is particularly advisable for the measure of risk, the membership of the boat owner/manager in a group which could provide a guarantee, the saving capacity and its role in the replacement of investment.

The study is static in the sense that it provides at a certain moment a picture of the capital invested in the sector. But, the primary banks need some forecasts to assess the opportunity, or not, to loan money. However, the results of the survey present a reliable picture of the economic and social reality of the artisanal fishery sector. It is hoped that this can help the banks in having a better understanding of the context in which the individual credit applicants operate.

Some follow-up actions, complementary to the case studies, have been recommended by the Working Group. These include the monitoring of all capital flows of some 50 fishing units in Senegal; the study, in Senegal also, of the financing of artisanal fisheries by the institutional sector; the inclusion of elements related to the financing of artisanal fisheries in the socio-economic survey requested by the Department of Fisheries of Sao Tome and Principe.

The study of the fiscal policy applied to the artisanal fishery sector, fifth objective of the Working Group, will be undertaken early 1995. A first case study will be conducted in Ghana in order to help assess the impact at short term of the removal of the subsidies. A second case study, based on the results obtained in Ghana, will be conducted in Senegal.

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1. Introduction

1.1 Justification

The actual financing of artisanal fisheries in West Africa is an element which has received so far few attention during the preparation of development policies. Unfortunately, this lack of knowledge has led to field actions of which the results have often be disappointing.

On the other hand, the informal sector continues to be the main source of financing of artisanal fisheries and the repayment rate of loans granted by the institutional sector is generally low.

This is why it appeared necessary to address the issue of identification of capital needs and availability. Indeed, it on this basis that specific support to artisanal fishermen - equipment supply, adoption of fiscal incentives, setting up of a credit line - could be implemented with good chances of success.

1.2 Objectives

The Programme for Integrated Development of Artisanal Fisheries in West Africa (IDAF) took, therefore, the initiative to set up a Working Group whose objectives are:

- (i) to elaborate a simple but efficient methodology likely to facilitate the identification of capital requirements in the artisanal fishery sector in West Africa;
- (ii) to design a methodology to identify the availability of capital according to the different sources of financing;
- (iii) to analyze the results of the two case studies that will be carried out in Senegal and Ghana;
- (iv) to prepare a document indicating to what extent the lack of capital could hinder the sector's development;
- (v) to formulate a methodology for the study of fiscal policies in favour of the sector.

1.3 Members of the Working Group

The Working Group is composed by specialists hailing from different backgrounds and having experience and interest in the field of artisanal fisheries development, and, in particular, in its financing.

In accordance with the strategy of the Programme, the Working Group is also intended to promote linkages between Fisheries Departments, Research Institutions, National Savings and Credit Banks and International Development Banks. The participants are representative of these different institutions and were invited by the Programme in their personal capacity.

The list of participants is given in annex.

2. Proposed methodology

The first meeting of the Working Group was held in Cotonou, Benin, from 8 to 10 March 1994. The Working Group agreed on the definition of various concepts, proposed a methodology for the identification of capital needs and availability, and, on the basis of information available in Senegal and Ghana, specified the scope of the case studies.

2.1 Identification of capital requirements

In economical terms, capital can be defined as the assets created through investment and which can yield economic wealth. It can be further sub-divided into two categories: fixed assets and working capital¹.

A fixed asset is any asset acquired for retention in an enterprise for the purpose of providing goods or services and not held for resale in the normal course of trading.

Working capital is the capital available for conducting the day-to-day operations of the enterprise; it is normally the excess of current assets over current liabilities. In artisanal fisheries current assets can be constituted by cash, stocks and debtors. Current liabilities are usually creditors. Therefore, in most cases, working capital will simply be cash.

It is important for the purpose of the work, to have a comprehensive picture of the sector. Indeed, artisanal fisheries are often characterized by a high level of integration and relationships among the different operators. However, to facilitate the analysis, the artisanal fisheries sector can be sub-divided into different groups of operators, each of them having distinct capital requirements. They are in the production process itself (fishermen), those upstream (boatbuilders, mechanics and suppliers of goods and services) or downstream (processors, transporters, middlemen, wholesalers). Another important actor in the fishery system is the State which has specific needs of capital for fisheries development and management. However, the State is only mentioned here to be complete because a study of this kind of capital requirements is obviously out of the scope of the Working Group.

A typology of capital needs for the different groups of operators is shown in Tables 1 and 2.

¹ In fact, the analysis of capital needs cannot be limited to fixed assets. In some artisanal fisheries the requirements for working capital are even more important than for fixed assets.

Table 1.- Typology of capital needs in artisanal fisheries

Operator	Fixed assets	Working capital for:
Fishermen	Canoe Fishing Nets Mode of propulsion Other equipment	Fuel Ice Bait Food Other fishing gear
Fish processors	Racks Oven Driers Shelter Tank Other equipment	Energy (wood) Salt Fresh fish Labour (casual)
Fish traders	Means of transport Means of preservation (cold storage rooms, etc.)	Packing material Labour (casual)
Boatbuilders/ Mechanics	Shelter Tools	Material Labour (casual)
Suppliers of goods and services	Shop/Store room Equipment	Miscellaneous

Table 2.- Capital needs for the State

	Fixed assets	Working capital for:
Development	Infrastructures: -landing site -auction hall -fishing harbour -roads -Community Fishery Centre -training centre	Budget of operation
Management	-Monitoring, Control and Surveillance -Research centre	Budget of operation

2.2 Identification of capital availability

This section aims at analyzing how the capital requirements already identified and quantified are satisfied.

Artisanal fisheries activities can be financed by private or public funds. The private funds themselves can be provided by the owner of the fishing unit (internal) or by other operators (external). A typology of the different sources of financing of the fishing units is given in Table 3

Table 3.- Sources of financing of artisanal fishing units²

Private internal	Private external	Public
<ul style="list-style-type: none"> - self-financing¹ - personal contribution² 	<ul style="list-style-type: none"> - informal credit - institutional credit - share holding - aid/donation 	<ul style="list-style-type: none"> - institutional credit - subsidies - aid/donation
<ul style="list-style-type: none"> - Savings and credit associations (rotating savings associations, mutual benefit associations, etc.) 		

¹ self-financing: the whole equipment is financed by the operator

² personal contribution: only a part of the equipment is financed by the operator

Special attention should be paid to the informal credit sources. Its origin, depending on whether it comes from operators working or not in the fisheries sector, should be identified.

Within the fisheries sector, one can find:

- fishmongers/wholesalers
- relatives involved in fishing
- savings and credit associations

Outside the fisheries system are:

- relatives
- moneylender
- businessmen / civil servants
- NGOs
- savings and credit associations.

2.3 Basic information available

The Working Group reviewed the basic information available in Ghana and Senegal.

2.3.1 in Ghana

2.3.1.1 Frame surveys

Frame surveys were undertaken in 1979, 1981, 1986, 1989 and 1992. The surveys give information on:

- name and number of the fishing villages and landing beaches

² The typology of the sources of capital for fish processors, fish traders, boatbuilders, mechanics, suppliers of goods and services will not differ. Only credit provided by suppliers should be added as private external source of funding.

- size and types of the canoes
- level of motorization
- types of fishing gear
- number of artisanal fishermen

2.3.1.2 Catch assessment surveys (CAS)

On the basis of the frame survey, a sampling strategy is applied to conduct CAS. The field enumerators collect data on:

- fish landings
- fishing effort
- fish prices
- catch composition

2.3.1.3 Cost and earnings study (CES) of small-scale fishermen

The profitability of various fishing units, i.e. poli, longlines, set gillnet, beach seine, drift gillnets, were determined in 1986. In 1990, another spot survey was undertaken (IDAF/WP/34). Almost four years after, it is however necessary to update the information.

2.3.1.4 Socio-economic study of credit available to Ghanian migrant fishermen in 1989

Institutional credit is delivered through the Agricultural Development Bank, rural banks established by the people themselves and the fishermen associations.

Informal credit is typically provided by relatives, moneylenders and fishmammies recommended to the migrant fisherman by the Chief Fisherman of the village where he arrives.

2.3.2 in Senegal

2.3.2.1 Frame surveys

The frame surveys are conducted twice a year since 1981. They give information on:

- number of canoes
- type of fishing gear
- level of motorization
- migration inside the country
- infrastructures and services involved in the fishing sector (boatbuilders, mechanics, employees at filling stations, etc.)

2.3.2.2 Cost and earnings surveys

The first study took place in 1981 and since that year the following information is updated on a yearly basis:

- fishing income
- revenues of labour and capital
- rate of profitability

- pay-back period
- value-added
- crew size

2.3.2.3 Marketing and processing

Contrary to Ghana, the marketing and processing sector is regularly investigated. The following information is collected:

- fish prices at landing site (minimum 3 times a day for each specie)
- typology of the operators involved in marketing and processing
- quantities of fish bought at landing site and sold at the market
- artisanal processing: processing centres, number of persons involved, production prices, cost and revenues for some processors at selected places (Petite Côte).

2.3.2.4 Financing

Some basic information related to the financing of the fishing units are available:

- analysis on informal financial system in the artisanal fishery sector
- information on credit lines domiciled at the Caisse Nationale de Crédit Agricole du Sénégal (CNCAS).

It is interesting to note that in Senegal all data on institutional credit to artisanal fishermen are centralized at the level of the CNCAS.

Migration of fishermen is a common characteristic in the region. The choice of Ghana and Senegal is slightly biased in the sense that they are emigration countries. Generally speaking the recipient countries receive know-how and fish. The working capital is provided by operators in the recipient country. The fixed assets are bought in the home country. Some developments in the fishery sector like in-built ice-chest in Senegal tend to favour long fishing trips (8 - 15 days) instead of long term migrations. A special attention will be paid during the study to migrant fishermen, but it seems already necessary to undertake another survey in the host countries to get a good idea of the financing of migrant fishermen.

As much more information is available in Senegal than in Ghana, the Working Group decided to take the situation prevailing in Ghana as the base case to design the methodology. It is expected that a survey which is feasible in Ghana will also be in Senegal.

2.4 The questionnaire

To collect the information, a detailed questionnaire will be prepared by the persons in charge of the field surveys. It will contain three parts related to (i) general information, (ii) capital needs and availability and (iii) remuneration of capital and labour. To standardize the questionnaires, the participants prepared a list of data which have to be collected during the surveys.

2.4.1 General Part

- Identification of the owner
- Age

- Ethnicity
- Educational level
- Number of years in the fishing industry
- Former job, if any
- Additional jobs and revenues
- Kind of ownership
- Crew size
- Migration pattern
- Fishing season
- Destination of fish
- Relations with boatbuilders (upstream linkages) and traders (downstream linkages)
- Type of management

2.4.2 Information on Capital

2.4.2.1 Needs

Fixed assets:

- Purchase price of equipment
- Year of purchase
- Way of payment
- New or second-hand
- Supplier
- Economic life of equipment
- Cost of renewal of equipment

Working Capital:

- Operational cost per trip, per month, per year
- Number of trips per month, per year

2.4.2.2 Availability

- Amount and origin of funds
- Starting date
- Interest rate
- Repayment period
- Amount repaid and to be repaid
- Identification of creditors
- Special agreements between mongers and fishermen (payments in kind, etc.)

2.4.3 Remuneration of the production factors

- Type of remuneration (fixed, shares or combination of both)
- Description of the sharing system
- Sales (average catch per trip, fish price, number of trip per month, year)
- Cost of insurance, repairs and maintenance
- Revenue of labour

- Revenue of capital
- Allocation of the revenue of capital (savings, debt payment, etc.)

2.5 Observation units

At that stage and because of time and financial constraints, the Working Group recommended to limit the case studies to the production sub-sector. Once the methodology will be considered adequate, it is expected that it could be used similarly in any other sub-sector.

The unit of observation of the case studies will therefore be the artisanal fishing economic units (FEU). A FEU is defined as a particular combination of capital (fishing equipment such as boat, gear, means of propulsion), labour (crew) and management or mode of production (the sharing system which determines the remuneration of the production factors: capital and labour).

A first classification of the FEU's based on the mode of propulsion and the crew size can be made (Table 4).

Table 4. Typology of FEU based on mode of propulsion and crew size

Mode of propulsion	Average crew size	Category
not motorized	1 - 3	A
	4 - 7	B
motorized	4 - 7	C
	> 7	D

To allow for a better stratification of the FEUs, these categories are combined with the fishing gear used. This gives the typology which will be used to organize the sampling (Table 5). No special reference is made to the sharing system because it is quite similar among each category of FEU. However, a sixth category is added: beach seining which is not really dependent on the type of boat or mode of propulsion.

Table 5. Main types of gear, category and number of FEU types

Type of gear	Category	Types of FEU
Purse Seine	D	1
Hook and lines	A, B and C	3
Encircling gillnet	D	1
Bottom set gillnet	A	1
Long lines	D	1
Beach Seine	E	1
6	5	8

It has been agreed to take a sample of 10 FEU's of each type in each fishing site what means 80 FEU's in each landing place.

The possible sites for the field survey have been discussed and selected. Among the 4 regions where fishing activities take place, two were chosen: Greater Accra and the Central region. In both regions two fishing sites were selected depending on the level of the fishing activities.

<u>Region</u>	<u>Intensive fishing activity</u>	<u>Not-intensive fishing activity</u>
Greater Accra	Tema	Osu
Central Region	Elimina	Saltpond

The FEU's will be randomly selected but will be those that have been in continuous activity for at least one year. In case where the number of FEU's is less than 80 in a particular landing site, a neighbouring site will be included to reach 80 FEU's. In case where some types of FEU's comprise less than 10 units, the sample from the other types will be increased to ensure that 80 FEU's are sampled in each landing site. In that way information on 320 FEU's will be collected in both countries.

Every attempt will be made to interview the owner, or one of them. When this is not possible the person in charge of the day-to-day operation will be interviewed provided he is informed about the financing of the fishing unit.

3. Summary of case studies

During its second meeting which was held in Cotonou from 18 to 20 October 1994, the Working Group reviewed the results of the case studies. The present section summarizes some of these results, for more detailed information the reader is referred to the case studies themselves in annex 2 and 3.

Due to the problems associated with the gathering and processing of the data, the results of the case study in Ghana are less precise than those obtained in Senegal. Despite the different socio-economic conditions that are prevailing in either of the countries, there is a certain coherence in the collected information.

3.1 **Socio-economic data**

In both countries there is a big gap between the average age of the sampled fishing unit owners. It is 43 years in Senegal and 50 years in Ghana. In Senegal, 61% of the fishermen are under 46 whereas in Ghana they are only 37%.

In Senegal, most of the inquired people descend from a fishing set : 66% spent more than 20 years in the fishing sector. For most of them (about 60%) fishing is their first occupation. However, some old farmers (18%) can be found in the sector. For 76% of them, fishery is the only professional occupation.

In Ghana, 55% of the fishermen have over 25 years of work experience in fisheries. The others, who are, in general, trained people, started as teachers, clerical worker, carpenters etc. The majority does not have another occupation and find all their incomes only from the fishing sector. A very limited number of them resort to retail trade or agriculture to complete their

incomes.

In Senegal, one can distinguish between sole fishing unit ownership (83%) and family-owned one (14%). The majority of the units belongs to people that do not go to sea.

Migrations are an essential component of the life style of the artisanal fishermen in Senegal. In their large majority (64%), the fishing units carry out regular migrations during the cold period (from December to May) along the coastline and even in the neighbouring countries. It is interesting to mention that in Ghana, emigration is nowadays less attractive than before. This situation is said to be due to the introduction of credit systems by the rural banks, the setting up of fishermen associations, a wider use of outboard motor and ice, on one hand and to the liberalisation of foreign exchanges resulting in an increased availability of inputs on the other hand.

3.2 Capital requirements

Capital requirements have been assessed according to the method suggested by the working group. The collected information is an updating of the former information which was not any more relevant on the account of the important changes that had lately affected the economy of both countries in general and the fishing sector in particular.

There has been a high rising of the investment and operation costs since a year. In Ghana, the cost of the outboard engine went up considerably because of the discontinuance of the subsidy. In a year time this has increased from 900,000 to 2,300,000 cedis³. At the same time the cost of the premixed fuel has raised from 500 to 1,900 cedis a gallon.

In Senegal, the 50% devaluation of the CFA franc that happened in January 1994 has caused a corresponding increase in the price of the imported inputs. Moreover, the combined effect of the devaluation of the CFA franc and the privatisation of the "Centre d'Assistance à la Motorisation des Pirogues (CAMP)" have tripled the price of the outboard motors.

Given this situation, the fishing unit owners brought various strategies into operation. Delayed equipment renewal is the most common strategy used in both countries. This appeared during the field survey on the average age of the assets and at a bank level by a break in loan consumption.

An additional strategy used by some fishing unit owners in Ghana is to reduce the distance to the fishing grounds in order to save fuel. This strategy leads to a decrease of the catches and an increase in the price. They also purchase by-catches at sea from the industrial trawlers and resell them at landing sites. As to the units of line fishing equipped with insulated boxes they would rather operate for 7 days trips in order to save fuel. In Senegal, the devaluation of the CFA franc has increased exports of fish arising from artisanal fishery. This situation is becoming more and more serious in so far as it is creating a quality fish scarcity on the local market.

³ exchange rates in August 1994: US\$ 1 = 970 cedis
 US\$ 1 = 520 CFAF

Table 6 gives a summary on the comparison of capital requirements for three types of fishing units in both countries.

Table 6.- Capital requirements

in US\$	Purse seining		Ice/line fishing		Gillnet fishing	
	Senegal	Ghana	Senegal	Ghana	Senegal	Ghana
Canoe	3,904	3,000	1,602	1,200	681	350
Motor (s)	2,371	2,300	1,150	1,200	742	-
Fishing gear	6,494	6,500	320	400	790	200
Other materials	361	-	270	-	60	-
Fixed assets	13,130	11,800	3,342	2,800	2,273	550
Operating capital/trip	133	20	263	200	12	-
Number of trips/year	250	200	40	30	250	200
Working capital year	33,250	4,000	10,520	6,000	3,000	-
Depreciation	1,744	2,260	1,124	600	468	70
Maintenance/repair	2,642	1,960	436	260	410	65
Other items	300	-	230	-	100	-
Total fixed costs	4,686	4,220	1,790	860	978	135
Total	51,066	20,020	15,652	6,960	6,251	685

As it appears, capital requirements for the selected units are obviously more important in Senegal than in Ghana. This is mainly due to the big gap that exists between their working capital requirements. As far as the gillnet is concerned, this situation is due to the fact that the fishing unit in Senegal is motorized whereas, the Ghanaian canoe uses sail and oars.

3.3 Capital availability

In general, canoes and fishing gear are paid in cash whereas motors are imported in bulk by projects, as is the case with Senegal, or by development banks as it appears in Ghana. The borrower can then buy those motors on credit on the basis of a personal contribution.

Migrant fishermen in Senegal show that there is an increased integration between production and marketing. It is also the case with the purse seine units that represent an important investment. This last example is mainly concerned with a risk-lowering strategy for the fishmonger, who, thereby, makes sure of the existence of a reliable source of supply.

In Ghana, it appears that there is a combination of the sources of financing on the account of the increase in costs and requirements of the banks. Formerly, a fish monger could, by herself, acquire a fishing unit whereas nowadays they have to join or resort to a bank for a partial funding.

A point that the survey did not help clarify is the mechanism through which a sole operator succeeds, in practice, to renew his capital. Indeed, it is not enough to have a return on investment that in theory, helps cover maintenance and repair costs as well as depreciation. It is necessary to put, at regular intervals, a part of the owner's income aside for this purpose, that is to save money in one way or the other. One of the means likely to help analyse this saving strategy is to carry out on an annual basis a follow up of the flows-in and flows-out of the fishing unit assets. Another possibility is to resort to the surveys on household budget conducted at regular intervals at national level. Moreover, a familiarity with the contents of these routine surveys could possibly help include certain specific elements of the fishing sector.

3.4 Remuneration of production factors

The estimation of the incomes and their distribution between capital and labour for more or less three comparable types of fishing units are presented below (table 7).

Table 7.- Remuneration of factors of production.

in US\$	Purse seining		Ice/line fishing		Gillnet fishing	
	Senegal	Ghana	Senegal	Ghana	Senegal	Ghana
Annual sales	50,000	10,400	22,000	9,450	7,500	1,400
General expenses	33,188	4,000	10,520	6,000	3,033	-
Net profit	16,812	6,400	11,480	3,450	4,467	1,400
Income per fisherman	467	116	975	240	638	233
Fixed charges	4,684	4,220	2,060	820	978	135
Boat owner's net income	7,004	-380	810	865	936	565
Average invested capital	13,130	11,800	3,350	2,800	2,270	550
Return on investment	53%	-3%	24%	31%	41%	103%

First of all it appears that the income of the crew members is three to four times higher in Senegal than in Ghana. In Senegal in the case of line fishing with a canoe equipped with ice-box, it can reach 1,000 US\$.

The opportunity cost, based on the interest rate of the bank saving, is estimated at 12,5% in Senegal and 27% in Ghana. It is always below the profitability rate of the invested capital in Senegal (from 24 to 53%) and offers a margin for the remuneration of the particular risk associated with the investment in the sector. The situation is not the same in Ghana : Indeed, Ghana has a far lower sales figure. The profitability rate is even negative for the purse seine, it is close to the opportunity cost for the ice/line and is only interesting for the gillnet, for which the invested capital is by far lower (550 US \$).

As far as the distribution of income between capital and work is concerned, it appears that the more the capital intensity increases, the more the sharing system tends to standardize and to favour capital. In these circumstances, the fishing unit owners awareness of the social

importance of the factor 'labour' results sometimes in the increase in size of the crew beyond the bare necessities but never in the modification of the sharing system at the expenses of the capital. Thus, in Senegal, the introduction of the purse seine enabled the determination and acceptance by the fishermen of a sharing system more likely to insure the remuneration of the capital. This is why the profitability rate of the invested capital goes up to 53%. The case of the 'ice' canoes is an *a contrario* example. Indeed, it is all concerned with the improvement of an existing fishing technique. As a consequence, the system of remuneration could not be modified and the profitability rate is not very attractive (24%).

In Senegal, a major part of the artisanal fishery sector is driven towards export, either directly or indirectly as suppliers for the processing factories. In Ghana, it is the industrial sector which exports, mainly tuna and shrimps, whereas the artisanal sector essentially supplies the local markets. The economic results obtained partially indicate that with very close landed quantities (about 300,000 tons) the contribution of artisanal fishing sector to the national economy is quite different in both cases (11 to 12% of the GNP in Senegal and 2 to 3% in Ghana).

4. Methodological problems

4.1 Data gathering

In both cases the time allocated to field data gathering was found too short. In Senegal, the survey took place in the compounds of the owners or managers of the fishing units. In general, each interview lasted an hour or an hour and a half. This is due to the fact that it was necessary to explain the aims of the survey to the persons and also to discuss with them so as to find the answers to the sensitive questions. Moreover, Mr. Kébé who is the supervisor of the survey, thought it worthwhile to work he himself as the interviewer so as to avoid problems that might arise from interpretation or misunderstanding. The total number of working days in the field was 20.

In Ghana, the supervisor of the study, W. Odoi Akersie, employed field investigators, but much time had to be eventually spent on it to test the validity of the results. The survey was conducted during the high fishing season. This has resulted in limited availability of interviewees.

Rather than thinking of a reduction of the size of the suggested sample (10 fishing units per technique and per landing site), it is recommended, in future, to arrange for a longer period for the gathering of the data.

Another point influenced the course of the survey: the expectations of the inquired people. Indeed, both studies took place in a particular context. In Senegal, it started 6 weeks after the strong devaluation of the CFA franc. As to Ghana, the study took place just after the end of the tax rebate on the premixed fuel used by artisanal fishermen. An effort has been made to explain this situation to the inquired people in order to avoid any misunderstanding relating to the aims of the survey.

Generally speaking, the questionnaire itself was clear enough. However, the presence of well-

trained investigators who knew the set, as was the case with Senegal, is undoubtedly an advantage. In many West African countries like Ivory Coast for instance, investigators have to be recruited and trained whenever such a survey is necessary. Even in Ghana the same problem arose.

For this type of survey, it seemed important to assure the interviewee, give him a clear explanation of the objectives of the study and interview him at home and not in public at the landing site.

Finally, it has been found out that the questionnaire is not an end in itself. Personal and informal contacts are necessary for a good understanding of the financing mechanisms of the sector. Problems of ownership are, in particular, intricate enough. An approach that consists of open questions would probably be more efficient.

4.2 Data processing

In Senegal, computer data inputting of the 150 questionnaires was completed in a week's time while the processing with the software SAS and Excel took a day. A computer scientist from CRODT assisted M. Kébé. In Ghana, many problems arose from the subcontracting of the data inputting and processing. Moreover, the software used, Lotus 1-2-3, does not match well with this type of data processing.

One might say that the use of computer is essential in the field of data processing. If the institution that intends to conduct this study lacks the required computer competence, it is advisable that it calls, temporarily, upon a computer-specialist. Such a specialist can be generally found in another institution (research institute, ministry of plan, direction of statistics etc).

4.3 Analysis of the results

4.3.1 Socio-economic aspects

Ownership seems to be a difficult element to grasp. In Senegal, for instance, the wife is often the actual owner. However, it is the husband who is declared. Intricate family relationships are reflected in the structure of ownership.

Some elements of the questionnaire seem to be unnecessary or redundant. This is the case with questions such as 'since when has the owner been involved in the fishing sector?'. The answer given to this question by the large majority is 'since childhood'. As a matter of fact, Senegal and Ghana are long known for their intensive fishing activities. In other countries of the region the answers can vary a great deal. In particular, this is true for those who are trying recently to interest the local population to enter the fishing sector.

As concerns the observation unit, it seems enough to stick to the different components of the invested capital and not to take into account the mode of production of each unit. Indeed, the latter approach seems to be inadequate in this type of survey.

In Senegal, beach seining was not, unlike the case in Ghana, concerned with the survey. This is due to the fact that it is a collective fishing unit belonging to a community, a quarter or a village, henceforth making any approach difficult to the owners. In addition, in the inquired parts of Senegal, this fishing technique corresponds more to a social activity than to a truly economic one. In fact, it is mainly used for social manifestations: needs of cash for some rituals, fund raising for the mosque, financial support in case of a funeral, etc. In both parts where the survey took place in Ghana, it is a fishing technique like the other ones, generally used on a family basis. But in other regions this technique could be found far more complex to analyse. This is the case in the Volta Lake region where organisation rests upon 'companies' or village basis.

The profile of the borrower also counts for much, particularly for the banks. It is therefore advisable to include in coming surveys a question such as whether the borrower belongs or not to a group or an association likely to provide a moral guarantee or a group guarantee in case he wants to resort to an institutional loan.

4.3.2 Capital requirements

The answers to the questions dealing with the purchase price and date vary enormously. Very often, the life cycle declared by the inquired people for certain components of the capital is quite unreliable. It seems that a 10 years old purse seine does not really have any more original components. In Senegal, however, much consideration should be given to the life cycle declared for the engines. Indeed, there is a big gap between the theoretical life expectancy which is 2 or 3 years and the average of the answers which is 7 years.

Nevertheless, it is obvious that capital requirements are better appreciated through a parallel survey on the replacement cost of the equipment and other inputs. This survey will be easily conducted on the main importers of fishing equipment (outboard motors, fishing nets, etc) or producers (canoe, fishing nets) .

Other problems are associated with the fishing nets. Their declared costs content the one of the materials for mending. Now, the latter is sometimes difficult to assess and to include. It is now quite common for young fishermen to pass this kind of work on the old men, whose remuneration is an essential element to be considered while assessing the financing requirements.

The estimation of the depreciation cost and of the maintenance and repair of equipment is another type of problem. This is especially true for the purse seines, which have 25% of their netting renewed each year. Therefore, entering both the depreciation and the maintenance in the accounts means a double counting. In the same way, fishing gear with a short life cycle like lines should be considered as operation costs. As a result, they should be replaced at regular intervals but not depreciated. As concerns the canoe and the engine the estimation of the depreciation is necessary.

4.3.3 Capital availability

Self-financing by fishermen is difficult to grasp. Often, when the interviewee makes accounts of it, he refers in fact to family contribution. Family savings as a financing source shall therefore be given more consideration while it, undoubtedly, influences incomes distribution. Another financing source exists in Senegal, however, it was not met during the survey : the professional money-lenders.

The survey did not enable the determination of either the savings or the debt. This element is, however, very important and as a consequence should be considered in future surveys.

There is no doubt that this type of survey only gives information on the funding of the existing fishing units. The equation indicates that the identified needs equal the available capital. Thus, the needs were satisfied. One may wonder about the future of those who are willing to step in the fishing sector. The survey enables to appreciate those newcomers' needs but does not help to determine their possible capital availability. The survey also provides a sound assessment of the capital invested in the sector and that of the financing requirements for the renewal of the fleet. Given, the expansion of the fleet which is due to the entrance of the new operators, other questions will arise. Those questions will have to do with the country's development policy, the assessment of the resource and with its capacity to sustain a fishing sector exerting more intensive activities than the current one.

Provided other data from the assessment of the catches are available, this type of study can give way to quite a precise idea on the profitability of the fishing units. This analysis really interests both the persons responsible of planning and the development banks. However, it does not say much about the individual capacities, which are of utmost importance for the primary banks.

4.3.4 Remuneration of production factors

The survey is now concerned with a very sensitive question : the one on incomes and their distribution. It appears that a constant follow-up of both catches and fishing effort is absolutely necessary for the assessment of the incomes of the fishing units. In the best cases, data collected from punctual surveys always give rough information. In most cases these data are deliberately or unintentionally biased. Catch assessment surveys should, therefore, include the price list of the fish. For example, in order to take into account the great variations that characterise the price of fish in Senegal, at least three prices are collected every day for the same species.

Risk is an essential element in the sector. It can be concerned with partial or total loss of the equipment. But, it is also linked to the periodical variations of the catches, which influence the refunding capacity of the borrower. Finally, the risk is linked to the temporary or definite tying up of capital. Now, the risk assessment was not taken into account during the survey. This can be considered for future surveys by including questions relating to the loss of equipment, the idle components of the fishing unit or still more by analysing the periodical variations of the production.

5. Conclusions and recommendations

In Senegal, the survey enabled the assessment, for the first time, of capital availability, the updating of capital requirements after the devaluation of the CFA franc that took place in January 1994 and to test the reliability of the data that are regularly gathered at the landing sites.

In Ghana, the survey enabled the updating of the 1986 capital requirements, the analysis of the profitability of the different types of fishing unit and the assessment of capital availability in the sector.

An important thing to learn from this exercise is that this type of survey can only be associated with a constant monitoring activity that shall provide the essential data on catches, fishing effort and incomes. As for the present survey, it helps identify the financing sources, the profitability of the investment and the distribution of incomes between the different factors of production. Thus, the development of the fishing sector should start with the creation of a good environment and therefore of adequate supporting permanent structures.

The question on the exchange of information between the different actors was also raised. A good coordination and cooperation is necessary between fishery department, research institutions, funding institutions and the different departments concerned such as planning, statistics, etc. This coordination should help rationalize the information production taking into account the needs of the different users. It is in this sense that the working group intends to be a forum of exchange between information producers and users.

As an example, it is only recently that CNCAS has started including socio-economic data in its analyses. But, truly speaking, a great deal of the outstanding payment is due to the failure to appreciate the customers operating conditions. The lack of information is a serious handicap for the banks willing to intervene in the sector. In Sao Tome and Principe, the National Savings and Credit Bank is reluctant when it comes to financing the artisanal fishery. Several reasons explain this reluctance : their former bad experience, the lack of basic information, the high rise of the costs and the low purchasing power of the population and the lack of guarantees from the part of the fishermen. The Bank has to pass by the fishermen association to grant the loans that IFAD placed under its control.

Of course, the study is static and for the banks it is important to dispose of forecast data. However, the results present to these banks a reliable picture of the economic and social reality of the artisanal fishery sector. It is hoped that this can help them in having a better understanding of the context in which the individual credit applicants operate.

6. Follow-up actions

The Fisheries Department of Sao Tome and Principe made an official request to IDAF to help in conducting a socio-economic study in the artisanal fishery sector. Due to the needs of information expressed by the National Savings and Credit Bank, important elements concerning capital requirements and availability will be included in the survey. It will then be the first application of the conclusions of both case studies.

It is suggested that a follow up of capital flows over a year be carried out in Senegal for 50 fishing units (10 per main technique). This work will be carried out by the existing field investigators, who will receive a financial compensation for the surplus of work fulfilled and will be supervised by M. Kébé. In order not to overwork the investigators, five different places will be selected and in each of them ten units of the same type will be followed up. Since CNCAS is interested in this exercise, the units that will be prioritized will be the ones that benefit from a current loan from the bank.

In order to take advantage of the existence of a centralized data bank of all the loans of the formal sector to the Senegalese artisanal fishery, a case study will be conducted in cooperation with IDAF and CNCAS with the view to assess the extent to which the formal sector participates in the funding of artisanal fishery in Senegal.

The study of the fiscal policy applied to the artisanal fishery sector will be undertaken early 1995. A first case study will be conducted in Ghana in order to help assess the impact at short term of the removal of the subsidies. A second case study, based on the results obtained in Ghana, will be conducted in Senegal. This latter will help better forecast the possible consequences that will arise from an eventual removal of the subsidies in Senegal.

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ANNEX 2

CAPITAL NEEDS AND AVAILABILITY IN THE ARTISANAL FISHERY SECTOR

THE CASE OF SENEGAL

by

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AUGUST 1994

INTRODUCTION

A working group on the study of capital needs and availability in artisanal fishery in West Africa was established by the IDAF program. It is composed of specialists from different countries with a good experience in the area of artisanal fisheries development.

A methodology was developed at the end of the first meeting of the Working Group. This methodology had to be applied in the case studies on the financing of artisanal fisheries in Senegal and Ghana. The production sub-sector was the first targeted.

This report presents the findings of the study conducted in Senegal between June and July 1994.

The terms of reference were defined as follows:

- to prepare a survey questionnaire and a sampling strategy according to the framework proposed by the Working group.
- to collect the information on the field
- to analyze the information by seeking particularly to (i) identify capital needs and availability and (ii) estimate capital and labour remuneration
- to prepare a 15-20 page report presenting the findings of the study with recommendations for improving the methodology.

1. METHODOLOGY

1.1. Questionnaire

On the basis of the terms of reference and the framework proposed by the Working Group, a detailed questionnaire was developed (see annex). It consists of four major sections: (i) general overview of the surveyed fishing unit; (ii) capital needs and availability (fixed assets and working capital); (iii) remuneration of production factors; (iv) observations on any other useful information which are not included in the previous sections.

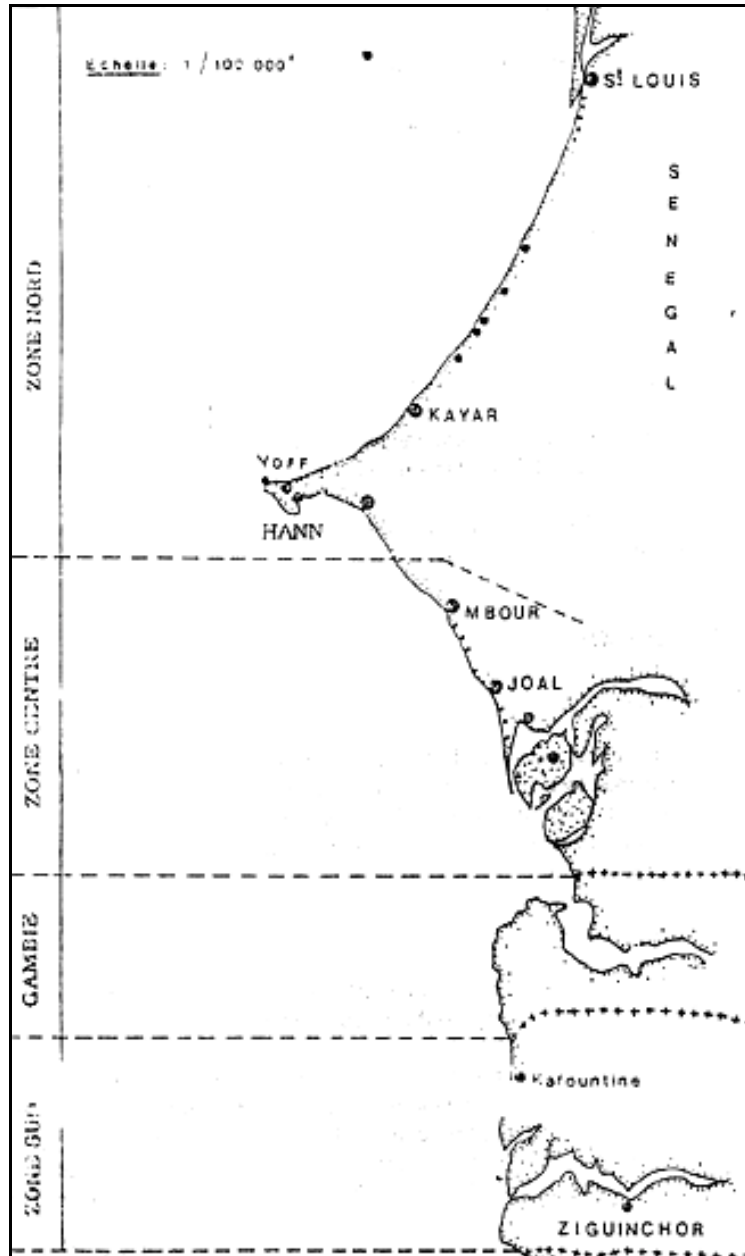
1.2. Maritime regions

The Senegalese coastline is 700 km long from Saint-Louis to Cape Roxo. It can be divided into three main geographical areas from the North to the South (see map):

- 1) the northern region or 'Grande Côte' is located between Dakar and the Senegal-Mauritania border. Due to fish migrations and to the fact that it is difficult to cross the tidal during certain periods, fishing is seasonal in the region. More than 1000 boats are involved in this activity between Saint-Louis and Kayar. Saint-Louis fisherfolk who move all year long along the Senegalese coastline, are found in Kayar during the fishing season (from December to June):
- 2) the central zone or 'Petite Côte' located between Dakar and the northern Gambian

border. The fishing season is permanent in this region with 2,500 to 3,000 units (70% of the entire fleet) concentrated at Mbour, Joal and Hann;

- 3) the southern zone or Casamance, between the Gambian border and the Senegalese border. Fishing activities there are intense during the dry season (October to May) with the arrival of migrant fisherfolk from other maritime areas;



Main fishing zones in Senegal
(Source: CRODT/ISRA)

1.3. Description of fishing units

The type of fishing unit which constituted our unit of observation and analysis is defined by five elements: target species, fishing gear, boat(s), mean of propulsion (motor or paddles), labour force (individual fisherman, crew or company).

Five main fishing units were identified: (i) units using gillnets and/or line and/or fish traps, (ii) ice boats using lines or long lines; (iii) purse seine units, (iv) units using encircling gillnets and (iv) beach seines.

1.3.1. Units using gillnets, handlines and/or fish traps

In general, the same sail or motorized boat is used for gillnets and/or line and/or fish traps fishing. The units which practice only one type of fishing are scarce. The boat leaves early in the morning to draw and cast nets or traps, comes back to land and returns for line fishing. According to the April 1994 survey, there are about 3,500 units of this type.

The classical fishing handline is made up of a nylon thread with variable diameter and length. In general it carries four to five branch lines with hooks. The thread is weighted with lead. In accordance with the target species the following types of line can be distinguished: (i) longlines used for demersal fish, (ii) trolling lines used for small tuna species, (iii) drift longlines for sword and (iv) jigging lines.

The gillnets are made of several sheets. The length and the depth as well as the mesh size depends on the target species. The variations, particularly those related to the meshing are due to the fisherfolk who, in most cases, make their own nets. Thus we can distinguish between: fixed gillnets for surface fish (sardinellas, mullets) and deep water fish (soles and guitar rays); (ii) *Cymbium sp.* (yeet) fixed gillnets and (iii) lobster gillnets.

The most currently used fish traps have a parallelepipedic iron frame which is about 120 cm long, 80 cm high and 80 cm wide; they have one circular opening on both side of the trap. Traps are used for fishing cuttlefish.

1.3.2. Ice boat fishing with handlines or longlines

These are 10 to 15 m long boats equipped with removable ice boxes which are adapted to the shape of the boats. These boxes allow 3 to 8 days fishing expeditions in farther areas. They use handlines or longlines. The latter are about 500 m long and consist of a main line made of rope or tarred braids and weighted at each end; between it ends, the longline carries branchlines with hooks. The distance between the branchlines as well as the size of the hooks depends on the target species. More than 300 ice boats are currently operating along on the Senegalese coastline.

Some ice boats operating in Saint-Louis are contracted Korean or Spanish factory boats; they regularly carry out an average of 45 day fishing trip outside the Senegalese EEZ on behalf of these factory boats.

1.3.3. Purse seine units

The purse seine is the most elaborate artisanal fishery device which is closest to the ones used in

industrial fishery. It is 250 to 300 metre long with a 40 m depth. Two motorized boats are generally used for this type of fishing. The smaller which is 12 to 15 m long carries the net. The second boat which is the larger (18 to 20 m) carries the catch. The current trend is to use only one 40 horsepower boat to carry the crew, nets and catches. 300 units are currently operating.

1.3.4. Encircling gillnets units.

Encircling gillnets are floating panels of nets which are 250 to 450 m long with a depth of 10 to 12 m. The fishermen circle the shoals of fish located at the surface of the water. The fish is caught in the net meshes while attempting to escape from the narrowing of the circle. The net is then hauled into the boat and the fish are removed one by one from the meshes. In 1994 there were about 65 encircling gillnets units.

1.3.5. Beach seines

The beach seines are probably the oldest types of collective nets, because they can be handled from the beach without any other energy source than the muscular strength of the fisherfolk of a village or a community. They are about 300 to 400 m in general, but the largest ones can reach 1 km or even 1.5 km. They generally use non motorized boats.

1.4. Sampling strategy

The first two maritime regions were targeted (Northern zone and 'Petite Côte'). They gather more than 80% of operating fishing units. The sampling strategy was developed essentially by considering the time constraints and the availability of the fisherfolk. In fact, the survey period (June-July) coincides with the beginning of the rainy season; artisanal fishery is at its lowest activity level and most of the fisherfolk are in their own location either working in the farms or resting.

On the Northern coast we selected Kayar which is an important fishing place of Saint-Louis fisherfolk during the fishing season (December to June 1994). The survey focused on indigenous and non indigenous fishing units. They were extended to the Guet Ndar landing site (Saint-Louis), particularly for the sedentary units and those which regularly migrate to Mauritania.

On the 'Petite Côte', we selected Mbour, Joal and Hann ports for which fishing does not have equal importance.

Beach seines were not surveyed. In fact, they represent a collective fishing unit belonging to a whole community, a district or a village, which makes it difficult to approach the owners.

Table 1 presents the composition of the sample. Overall, the eight main types of fishing units were surveyed, i.e. 190 fishing units.

Table 1.- Size of fishing units sample

PLACES SURVEYED	FD/L/C	LGL	LM	LR	PAL	STC	FME	TOTAL
Mbour	10	10	10			10		40
Joal	10	10			10	10	10	50
Hann	10	10				10		30
Total of Southern Coast	30	30	10		10	30	10	120
Kayar	5		18	10		10		43
Saint-Louis	5	10	2		10			27
Total Northern Coast	10	10	20	10	10	10		70
Grand total	40	40	30	10	20	40	10	190

- LGL : Fishing unit equipped with ice hold (ice boat) using line or longline
 LM : Motorized unit fishing with line
 LR : Rowing unit fishing with line
 FD/L/C : Fishing unit using gillnet and/or line or traps
 PAL : Motorized unit fishing with longlines
 STC : Fishing unit using purse seine
 FME : Fishing unit using encircling gillnet.

1.5. Data processing and analysis

The collected data were processed with SAS and Excel computer statistical software.

2. **SOCIOECONOMIC CHARACTERISTICS OF THE PRODUCERS**

2.1. Identification

The majority of the persons surveyed (90%) are boat owners. The other 10% are only responsible for managing the units.

2.2. Age

The average age of the surveyed persons is 43. More than half of them (61%) are less than 46 years old (figure 1).

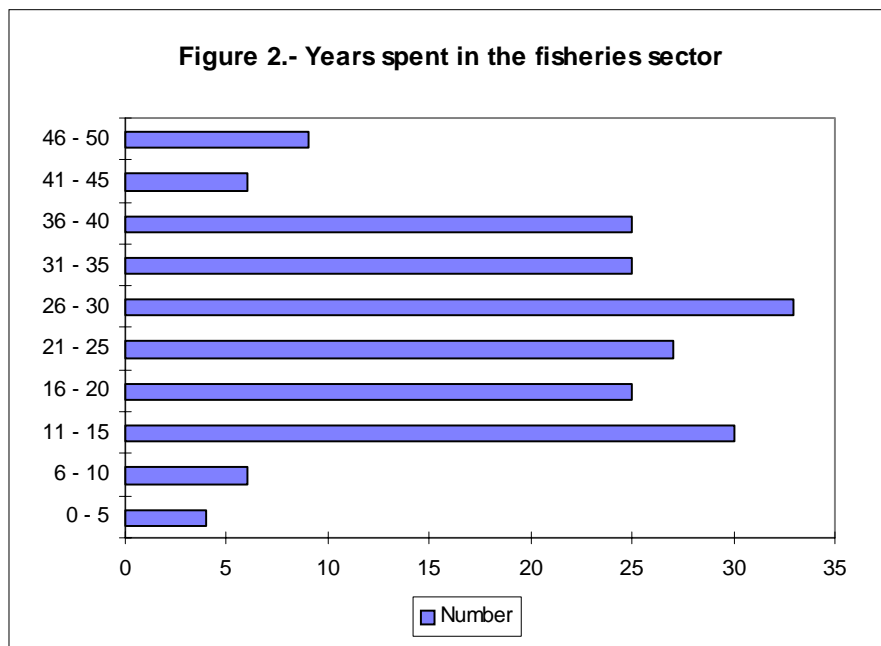
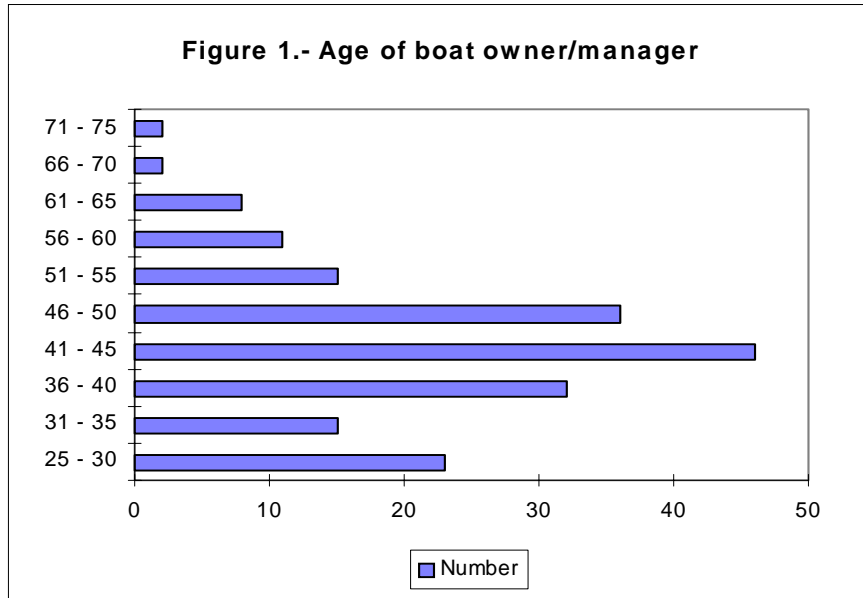
2.3. Number of years in the fishing activity

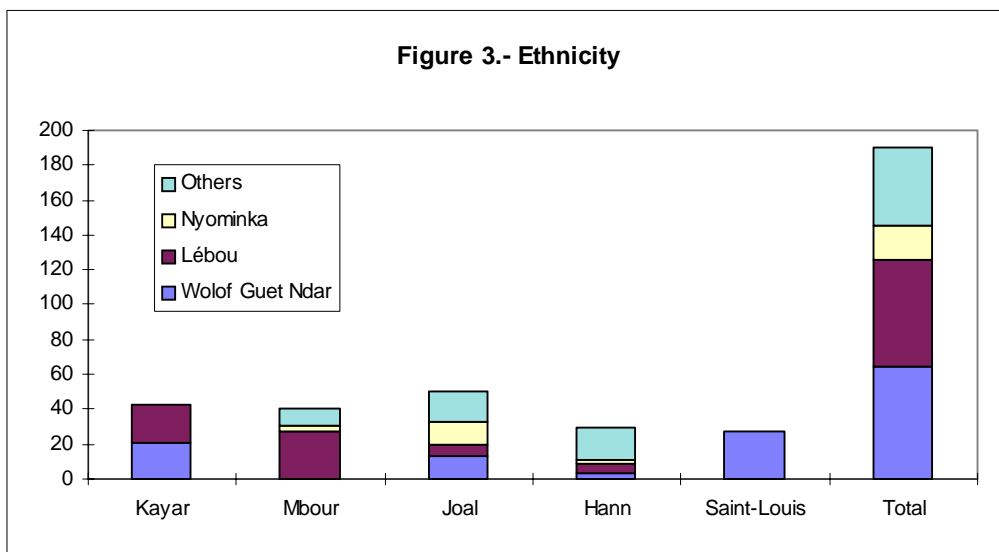
Most of them come from a fishing community and have been involved in this sector since their childhood. The numbers of years spent in the fishing activity varies between 2 and 50 years, i.e. 26 years in average. Thus, 66% of them have spent more than 20 years in the sector (figure 2).

2.4. Ethnic group

Four major ethnic groups were surveyed: *wolof* from Guet Ndar (Saint Louis) and from other regions of Senegal, *lebou* from Dakar region, *sérère-nyominka* from Saloum islands and *toucouleur* from the Fouta. Their importance varies from one region to another (figure 3). Fishing

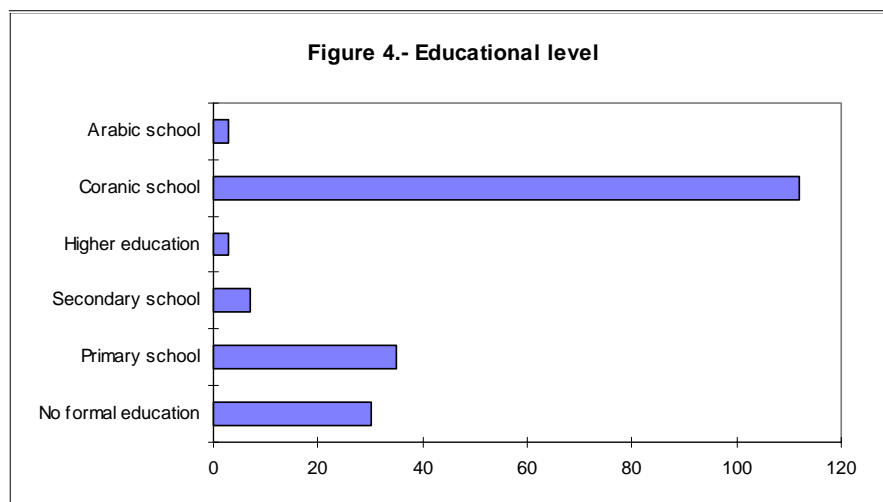
units belonging to Guet Ndar and to *lebou* people can be found all along the Senegalese littoral. The combination of type of fishing unit and ethnic group reveals a clear specialization: the *nyominka* for the encircling gillnet, people from Guet Ndar for lines on boat equipped with ice boxes or not, *lebou* for gillnet. Purse seines belong to *lebou* and *wolof* people.





2.5. Level of education

The level of education of the surveyed persons is relatively low. A majority of them (59%) attended coranic school (figure 4). Only 25% can be considered as illiterate who find it difficult to monitor the management of the fishery unit in a regular way.



2.6. Previous occupation

Most of the owners or managers of fishing unit have had no occupation before entering the fishery sector (60%). The group includes former farmers (18%) (table 2).

Table 2.- Previous occupations held

	Kayar	Mbour	Joal	Hann	St-Louis	Total
Farmer	18	6	9	1	1	35
Stock breeder	1	2	2	3		8
Student			2	3		3
Crewman			3	3	3	9
Craftsman/Workman		3		11	4	18
Trader		3				3
None	24	26	34	11	19	114
Total	43	40	50	30	27	190

2.7. Other occupations

Fishing is the main activity for the majority of the people surveyed (76%). It must be noted that the rare fishmongers and other traders surveyed (7%) own purse seine units (table 3).

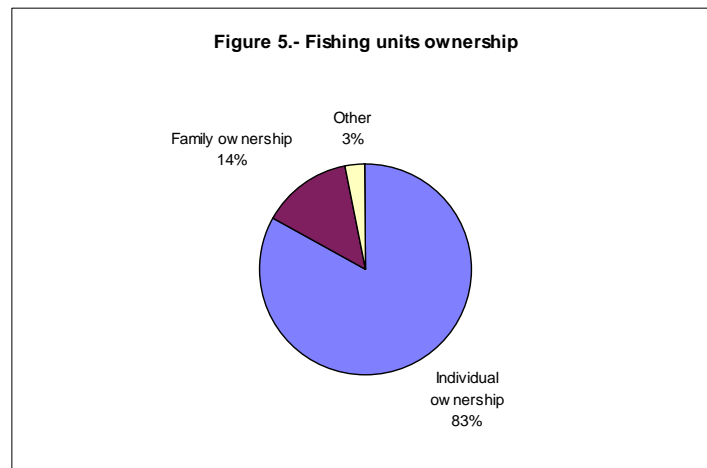
Table 3.- Other economic activities performed

	Kayar	Mbour	Joal	Hann	St-Louis	Total
Farming	18	6		1		25
Craftsmanship		1	1		3	5
Trade/fishmongering		1	7	3	2	13
Fish processing		1				1
Boat construction			2			2
None	25	31	40	26	22	144
Total	43	40	50	30	27	190

2.8. Type of ownership

Fishing units are owned by an individual (83%) or a family (14%). In Hann a few units belong to persons forming a corporation (higher education graduates) or Economic Interest Groups or

were borrowed from friends (figure 5)



2.9. Migrations

Migrations are an essential component of the way of life of Senegalese artisanal fisherfolk. The majority (64%) of fishing units do regular migrations during the cold period (December to May) all along the Senegalese littoral (Dakar, Kayar, Mbour, Joal and Casamance) and even to neighbouring countries (Mauritania, The Gambia and Guinea Bissau). The reasons for these movements are biological, economic and social. Since the landed products are for fishmongering and artisanal processing, the fisherfolk are permanently looking for profitable markets. Migration is not just a simple moving in space to follow the fish. It also necessarily implies a change in condition and socio-economic status; which highlights the dynamic and creative relationship which links the variations of the resource and its natural environment and the social practices they engender and which in turn have an effect on them.

3. **CAPITAL NEEDS**

3.1. Fixed assets

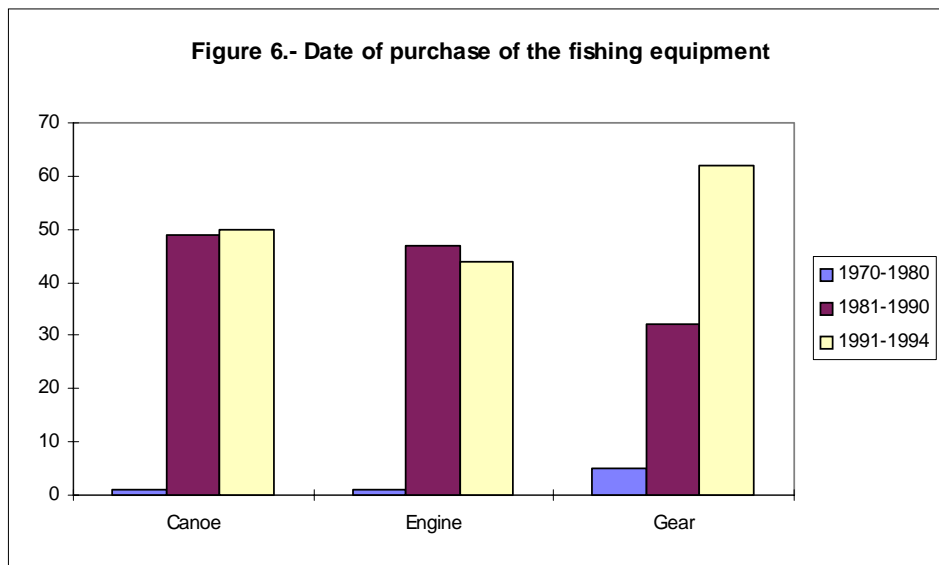
The investment in an artisanal fishing unit include mainly the purchase of boat(s), motor(s), fishing gear and accessories.

The diversity of fishing units, both by types of fishery and by geographic origin leads to a variation of the capital invested in each fishing unit (table 4). The size of a boat, its carrying capacity, shape, age, the nature and the quality of the materials used, the size of the planking, the location of the motor, the size of the rams, the number of fishholds... are some of the factors which make it difficult to know with precision what it cost actually to make a boat.

3.1.1. Boats

The boats used are between 5 and 18 m long; most of them were purchased new and cash.

They are made by local carpenters. Almost half of them (49%) were purchased between 1970 and 1990 (figure 6), the average age being 8 years.



On the basis of the information provided by owners and/or heads of fishing units, the average costs of boats are as diverse as the types of those boats: they vary between CFA 42,500⁴ (for a rowing boat of 5 to 6 m with longlines) to CFA 800,000 (for a boat of 14 to 16 m equipped with an ice hold, with line). For a purse seine unit, the average investment for boats is about CFA 1,950,000. These figures are close to those provided by local carpenters.

3.1.2. Motors

The outboard engines are purchased duty free and on credit (46% of the cases) through primary supply cooperative (now dissolved) and economic interest groupings (GIE) or in cash. Most of them (96%) were purchased new. The driving power used by the surveyed fishing units is between 8 and 40 horsepower. The units with lines or gillnets are usually the ones using low power (8 to 15 horsepower); those equipped with ice holds, encircling gillnets and purse seine often use more powerful motors (25 to 40 horsepower). The average prices vary, according to these different elements, between CFAF 343,000 and 1,200,000 (table 4).

⁴ exchange rate: US\$ 1 = 520 CFAF (August 1994)

Table 4.- Capital needs of Senegalese artisanal fisherfolk: fixed assets (in CFAF)

		Boat(s)	Engine(s)	Fishing gear	Other material	Average fixed assets
Fishing units with gillnet and/or line and/or traps (FD/L/C)	Mbour	260800	321700	411000	30000	1023500
	Kayar	450000	448700	487500	25000	1411200
	Hann	310400	342200	298800	35000	986400
	Saint-Louis	450000	430600	430000	89600	1400200
	Joal	318200	376900	372200	28200	1095500
	Average	340400	370867	399100	30000	1140367
Iceboat with longline (LGL)	Mbour	300000	475800	135000	88700	999500
	Hann	1412500	583750	116700	272500	2385450
	Joal	690000	665400	229000	56250	1640650
	Saint-Louis	750000	421000	75800	274000	1520800
	Average	800833	574983	160200	139150	1675167
Motorized units with line	Mbour	204400	301700	31600	12000	549700
	Kayar	230700	381900	24100	15400	652100
	Saint-Louis	456700	347500	28100	29900	862200
	Joal	311400	341800	90000	17500	760700
	Average	297267	343700	27900	19100	687967
Rowing units with line (LR)	Kayar	42500		16700	9100	68300
	Average	42500		16700	9100	68300
Motorized units with longline (PAL)	Joal	265000	470000	151000	29000	915000
	Average	265000	470000	151000	29000	915000
Units with purse seine	Mbour	1828000	971500	4256600	156000	7212100
	Kayar	2555800	1297000	4270800	201000	8324600
	Hann	1286100	1244500	2390000	249400	5170000
	Joal	2138300	1229000	2069700	115000	5552000
	Average	1952050	1185500	3246775	180350	6564675
Units with encircling gillnet	Joal	941700	680800	1420000	70000	3112500
	Average	941700	680800	1420000	70000	3112500

Just like the boats, the motors belong in their majority to persons who are not on board the units. The average age of the motors (7 years) is far beyond the economic lifetime which is estimated at two years given the intensive use. In fact, 66% of the outboard motors were purchased before 1992 (figure 6).

3.1.3. Fishing gear

Various types of fishing gear are used in accordance with the target species. Moreover, the nets are assembled either by companies which sell them or by the fisherfolk themselves. In the latter case, it is difficult to assess the cost of labour which must be included in the overall price of the fishing gear; the surveyed people just give the price of the material bought (nettings).

The average age of the fishing gear is relatively advanced (11 years) because of the relatively long lifetime of the encircling gillnets and purse seines (figure 6). But, it can be easily noticed that the current net has nothing in common with the original one, since the netting are regularly changed.

Two types of nets are carried by the fishing units with encircling gillnets operating in Joal: one for bonga and one for sardinellas. One fishing unit can have up to twenty gillnets for different target species: soles, groupers, threadfin, sharks, grey mullets, rays.

Most longlines are owned by captains whereas lines belong to the crew. They are renewed every year and constitute the fishing gear with the most recent procurement date (63% ; figure 6).

In average the fishing unit embarks 2 longlines assembled by the fisherfolk. Every fisherman on board has 2 types of line for each fishing trip according to the species: one for larger fish and one for smaller ones.

3.1.4. Other equipments

The accessory equipment of the fishing units consists mainly of water and fuel tanks, anchors, ropes, buoys, lamps, raincoats (owned by individual fishermen), life jackets (in some cases), knives, buckets and paddles. The overall investment varies between CFAF 9.000 and 180.000 according to the type of unit. In addition to ice holds, the ice boats are equipped with rudders, sounders, compasses, covers, 12-volts batteries, radio sets, clocks, cooking utensils... worth an average of CFAF 274,000.

3.1.5. Summary of fixed capital needs

The investment necessary to purchase an artisanal fishery unit varies in average between CFAF 68,000 (rowing unit with handline) and 6.500.000 (purse seiner). Most boat owners belong to economic interest groupings (75%), which permitted them to obtain part of the fishing equipment on credit and duty free (motors and nets). The relatively limited financing capacity for institutionalized credit certainly accounts for the emergence of a new category of boat owners for the fishing units with purse seines which require an important investment.

3.2. Working capital

The working capital needs include mainly common expenses borne by the fishing unit for each trip.

3.2.1. The nature of common expenses

Common charges or variable costs of the fishing units consist of fuel, food for the crew (and sometimes for people on shore), bait, minor maintenance of fishing equipment. For the ice boats, the other items of operating expenses are ice, beach fees and the remuneration of the person responsible for the catch. These last two items concern migrant the fishing units which have come to operate in Hann.

Fuel consumption depends on the time spent at sea by the fishing unit, of the state and the

power of the motor used. In all cases, it has an important weight in the operation cost because of the long distance from the fishing sites and the rhythm to which the motor is submitted.

The size of the crew and sometimes that of the family on shore as well as the duration of the expedition determine the cost of food related expenses.

The bait is mainly made of sardinella. The cost of bait and ice related expenses is function of the time spent at sea and the state of isothermal boxes used (airtightness).

Beach charges concern gifts of fish expressed in monetary units, made by the head of the fishing unit to the old fishermen present when the fish is being landed. The woman responsible for selling the catch of the fishing unit receives a commission on the sales. The amount allocated to these two items (beach charges and remuneration of the dealer) is about CFAF 10,000 by fishing trip.

Overall the daily working capital needs vary between CFAF 500 (for a rowing fishing unit with line) to CFAF 66,000 (for a purse seiner) (table 5).

Table 5. Capital needs of Senegalese artisanal fisherfolk: working capital by trip (CFAF)

	Gillnet	Iceboat with longline	Line Motor	Line Rowing	Longline	Purse seine	Encircling gillnet
Mbour	4900	118000	5400			60600	
Kayar	7800		7500	500		70000	
Hann	5500	145000	6500			60900	
Joal	11000	107000	7800		9500	74000	40000
Saint-Louis	4500	115000	5200				
Average	6067	131500	6467	500	9500	66375	40000

3.2.2. Assessment of annual working capital needs

Calculations were made on the basis of the number of times each fishing unit goes to sea every month. This number depends on the duration of the trip and the time spent on shore to sell the catch as well as input supply (fuel, ice and mainly bait). The survey results give the following monthly averages: 4 five-days trips for ice boats and 25 one-day trips for the other fishing units. Considering that there are ten months of activity in the year (the other two months being used for resting and making major repairs), we obtain respectively 40 and 250 fishing trips a year.

Table 6 shows that the producers' working capital needs are very considerable, particularly as regards purse seine, encircling gillnets and ice boats (between CFAF 5 and 17 millions).

Table 6. Capital needs of the Senegalese artisanal fisherfolk: annual working capital

	Gillnet	Iceboat with longline	Line Motor	Line Rowing	Longline	Purse seine	Encircling gillnet
Mbour	1225000	4720000	1350000			15150000	
Kayar	1950000		1875000	125000		17500000	
Hann	1375000	5800000	1625000			15225000	
Joal	2750000	4280000	1950000		2375000	18500000	10000000
Saint-Louis	1125000	4600000	1300000				

Average	1516667	5260000	1616667	125000	2375000	16593750	10000000
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3.3. Fixed costs

These cost which do not vary with the activity level of the fishing units include the depreciation of the boat and the motor, the insurances and the rents for the rooms. Costs of equipment maintenance and repair (boats, motors and nets) can also be included.

3.3.1. Depreciation

The fishing equipment currently used is undervalued. It is particularly the case of the net which is often practically renovated by constantly changing entire netting. This is why calculated depreciation is accounting related and not economic (table 7). However, it is necessary to take into consideration the rise in prices for the renewal of the equipment particularly in this CFAF post-devaluation period. Taking into account the intensity of use, the way maintenance norms are followed as well as the indications of the fisherfolk, the economic lifetime has been estimated at 7 years for the boats and 2 years for the motors.

Lines and longlines are renewed every year by the fisherfolk. For the nets, repair and depreciation are mixed.

Table 7. Annual depreciation of the equipment (CFAF)

	Gillnet	Iceboat with longline	Line Motor	Line Rowing	Longline	Purse seine	Encircling gillnet
Boat(s)	48629	114405	42467	6071	37857	278864	134529
Engine(s)	185434	287492	171850		235000	592750	340400
Fishing gear		160200	27900	16700	151000		
Total	234062	562096	242217	22771	423857	871614	474929

3.3.2. "Insurances"

Within the context of their traditional beliefs, the heads of fishing units make some expenses during the whole fishing season to assure a successful season and protection against accidents at sea. We have only taken into account the actual expenses made by the fishing units and declared by the surveyed persons. The amount spent on insurances varies in average between 10,000 and 150,000 every year according to fishing unit.

3.3.3. Costs of rent of rooms

While operating in Hann, the heads of fishing units with lines equipped with ice holds generally rent one or several rooms for the crew during the fishing expedition. The average cost of the rent is estimated at CFAF 150,000 a year.

3.3.4. Maintenance and repair costs

Maintenance and repair costs include all expenses made to keep the fishing equipment in good operating order. It was not possible to obtain precise information on the cost of these expenses. Therefore we did estimates of the maintenance and repair costs for a year.

According to fisherfolk, the routine maintenance of the motors consists only in one weekly change of oil and change of spark-plugs. Besides the motor is subjected to intensive use during its economic life. Thus we estimated these costs at 10% of the cost of the outboard motor.

For the boat, these operations consist in changing the planking and rams, painting them and renovating the watertightness. Considering the intensity of the use of the boat and the quality of the wood used, one can estimate that these costs at 20% of the overall cost.

Fisherfolk constantly renovate the nets either by changing entire cloths or pieces of cloth, or repairing the torn cloths. These costs are estimated at 25% of the value of the net.

Table 8 summarizes the overall capital needs of boat owners to face the annual fixed costs

Table 8. Capital needs: annual fixed costs (CFAF)

	Gillnet	Iceboat with longline	Line Motor	Line Rowing	Longline	Purse seine	Encircl-ing gillnet
Depreciation	234062	562096	242217	22771	423857	871614	474929
'Insurance'	50000	100000	50000	10000	50000	150000	100000
Rental		150000					
Repair & maintenance	204942	217665	93823	8500	523000	1320654	611420
Total	489004	1029761	386040	41271	996857	2342268	1186349

4. AVAILABILITY OF CAPITAL

The numerous previously identified and quantified capital needs are essentially met by personal funds, institutional credit and informal credit.

4.1. Personal funds

Activities are largely implemented by self-financing (60% of cases). In general, the boats are bought on personal funds. Actually, the future owner buys in instalments the material necessary for the construction of the boat (tree trunk for the keel and wood for the watches), then places his order to the carpenter.

4.2. Institutional credit

Motors were first bought thanks to the loans granted by the Boat Motorization Support Centre (CAMP) through primary supply cooperative associations which became Economic Interest Groupings (GIE). With the establishment of artisanal fishery development projects on the Small Coast (PAPEC) in 1988, in the Ziguinchor region (PAMEZ) in 1987 and on the Large Coast (PROPECHE) in 1989, the Senegalese National Agricultural Bank (CNAS) began providing financing to economic agents in the sub-sector. Some surveyed owners benefitted from loans through the GIEs for the purchase of motors (30%). Their own contribution to the financing represents only 20% of the expressed needs. The interest

rate is 15.5%. For some GIE which reimbursed regularly the loans granted them through PRO-PECHE, this rate was actually 10.5%, the 5 points being a rebate to assure that the debtors have minimal savings.

Only a few owners of purse seine units benefitted from a bank loan to finance the entire fishing unit. One unit based in Hann was entirely financed by CNAS in 1993 for an amount CFAF 4 millions (one boat, one motor and a second-hand net). Two units which were financed in 1986 by Société Nationale de Garantie du Sénégal (SONAGA) within the framework of the non salary employment project for new higher education graduates ("Masters degree holders" project) are still operating in Hann and Joal.

4.3. Informal credit

Informal credit as a sort of integration between fishing and fishmongering operates at three levels: some surveyed persons benefitted from the financial contribution of parents and friends to complete the fishing equipment (5%). But the majority of producers declare that they have no special relations with the fishmongers.

With the establishment of joint Japanese-Senegalese fishing ventures in 1972, there are now integrated industrial units with trawlers which buy product on the beach. These companies have permitted the development of artisanal exploitation of demersal species for export (soles, shrimps, cuttlefish, octopuses, groupers, snappers,...). Some fishmongers who represent these industrial fishing companies have provided adapted fishing material (fixed nets and polystyrene boxes in general) to the fisherfolk to ensure that regular supply in quality fishery products.

It was also noted that there are practices of advance between traders and producers. Thus, fishmongers grant loans to fisherfolk to help them meet everyday expenses (fuel, food, bait), small ceremonies (christening, wedding) and equipment. Guet Ndar fisherfolk are followed in their migrations by Saint-Louis fishmongers who finance in advance the expenses related to the beginning of fishing campaign. In general, these practices do not generate interest revenues. The benefit derived is in the form of preferential prices offered by the fisherfolk and, above all, a purchasing priority which reduces breaks in supply for the go-between.

Upstream, producers have only limited relations with the boat constructors. Some carpenters offer credit facility. Others take care of the routine maintenance of the boats.

5. REMUNERATION OF PRODUCTION FACTORS

5.1. The sharing system

The surveyed fishing units are organized according to modalities identical to the ones identified on the entire littoral. In all cases the remuneration is based on a share system according to the generated revenues. Thus the crew members are involved in the risks associated with the fishing trip.

The sharing takes place after returning from a trip or by the end of the season. The general

principle is the following: the charges borne together by the owner and the crew (fuel, food, routine maintenance, ice, bait) are deducted from the value of the catches; the remaining amount (net product of the fishing unit) is distributed on the basis of variable modalities according to the type of fishery and to the landing place.

For line fishing, the produce is divided into equal shares: one for each fisherman, one for the boat, one for the motor. Most of the surveyed fishing units use this technique. For an average crew of 4 persons, we have 6 shares in total. However, in case of family exploitation, sharing does not take place. The needs of the fisherfolk on board are regularly satisfied by the common funds resulting from fishing and managed by the head of the family.

Concerning longlines fishing, we have the same sharing system as the one mentioned above, i.e. 6 shares. It must be mentioned that in rare cases, the fishing gear receives a share until its is depreciated.

For the ice boats, the isothermal and the sounders (if they do exist) receive each one share, which gives 12 shares with 9 fishermen on board.

The sharing system can be considered as being the same for the gillnets of our sample: one share is allocated to each element of the unit, including the fishing gear.

The importance of the capital invested for the purse seine has caused the introduction of a new sharing system which is more favourable to capital remuneration. The third of the net product is allocated to the fishing net whereas the remaining two thirds are divided into equal shares for boats, motors and crew (20 fishermen), i.e. 24 equal shares

5.2. Labour and Capital revenues

We have estimated the value of the revenues per trip of each fishing unit by giving each landed species the average price at which the fisherman sold it during the last few months. The results obtained were compared to the statements made by the survey fisherfolk. The gross annual revenue of each fishery unit, thus calculated (table 9), is distributed between owners of equipment and the crew.

Labour is better remunerated than capital, in all cases. Table 9 shows that the overall share of the fishermen varies between 56 and 91% of the net added value generated by the unit. One fisherman on board a purse seine unit earns 233,500 CFAF a year.

Overall, one can consider that capital remuneration does not cover its opportunity cost. The internal rate of return varies between 16 and 53% for the motorized units. Moreover, owners can recover the invested capital within a period ranging from 29 to 66 months. The self-financing capacity of the owners based on the revenues generated by the fishing unit seems to be assured at least for capital renewal. This points out the fact that it is important to be interested in aspects related to savings. Producers must be encouraged to save part of the economic surplus made by the unit. Effort must be made to re-invest the mobilized savings in equipment.

Table 9.- Estimation of annual revenue of labour and capital (CFAF)

	Gillnet	Iceboat with longline	Line + Motor	Line Rowing	Longline	Purse seine	Encircling gillnet
Sales	3750000	11000000	3250000	625000	6250000	25000000	12500000
Common expenses	1516667	5260000	1616667	125000	2375000	16593750	10000000
Revenue to share	2233333	5740000	1633333	500000	3875000	8406250	2500000
Number of share	7	12	6	1	6	24	11
Gross return							
Capital	957143	1435000	544444	250000	1291667	3736111	681818
Labour	1276190	4305000	1088889	250000	2583333	4670139	1818182
Fixed costs	489004	1029761	386040	41271	996857	234268	118349
Net return							
Owner	468139	405239	158404	208729	294810	3501843	563469
%	27	9	13	46	10	43	24
Crew	1276190	4305000	1088889	250000	2583333	4670139	1818182
%	73	91	87	54	90	57	76
Fisherman annual income	319048	478333	272222	250000	645833	233507	227273
Average investment	1140367	1675167	687967	68300	915000	6564675	3112500
Internal Rate of Return (IRR)	41	24	23	306	32	53	18
Payback period (month)	29	50	52	4	37	22	66

6. RECOMMENDATIONS

The survey was conducted during the humid season when all the fisherfolk are home either farming or resting. Due to the fact that this period also coincided with the football World Cup, fishing activities were reduced and most targeted boat owners and fishermen were not available. The field work has been disturbed and the planned duration of the study (1 month) was found too short for data collection, processing and analysis and for preparing the report. In the future, it would be necessary to consider longer periods since the surveys are conducted in the home of the producers, after their working hours.

Due to variations in resources in the coastal area (abundance and availability), Senegalese artisanal fisherfolk have adopted a number of strategies since many years. Thus much effort is devoted to the species to be exported. On the Small Coast, most fishing units look for cuttlefish and octopus between June and September to supply the factories. Many boats which use line during this period, use sole nets during the rest of the year (October to May). During the rainy season some fishing units operating with purse seines divide themselves up into two: the smaller boat is used with the beach seine whereas the larger one is converted into ice boat. Moreover, some fishermen most often move close to the ships to

recover what they throw out or to purchase fishery products at low price and sell them on the beach. Fixed duration contracts are signed between the fisherfolk using canoes and boat owners. This type of association is frequent in Saint-Louis; ice canoes are hauled by boats to the appropriate fishing grounds where they fish during 40 days to sell their catch to the boat owner. These various reactions have a considerable impact on the profitability of the fishing units.

Even if the methodology used turned out to be appropriate, one must admit that surveys conducted in one round only give a snapshot of the situation.

It was rather easy to identify capital needs. However, problems emerged quickly as regards the appreciation of the available capital. Information provided by the producers on the origin of the capital are not very neat, particularly the funds related to other fishery activities (artisanal processing, trading) or to extra-fishery activities (agriculture, market gardening...). Moreover, it is difficult, even impossible to identify the real owners of fishing units. Some registered owners are just figureheads for various reasons. The person in charge of the unit identifies himself with the owner particularly when it is a family unit. In this case, the owner joins a bigger production unit which makes a considerable surplus with which the unit is financed. It is even possible that production unit members mobilize savings from the lineage which is reinvested to increase the capital.

All these considerations lead us to recommend the monitoring of a few well targeted production units on an annual cycle for a more refined analysis of the capital, the structure and financing modalities. In fact, the seasonal nature of fishery activities induces a changing mobility of the necessary capital. Regular recording of all monetary receipts and expenses at the level of the production unit will permit to have an accurate idea of new investments and capital renewal.

Besides, the complexity of the informal financial market requires a monographic study of creditors and debtors for the reconstitution of financing mechanism. The case of the Saint-Louis fisherfolk followed in their migrations by the fishmongers who finance their campaigns is likely to be edifying. These studies will permit to reveal the determinants of relationships between the different actors at all levels of the system.

As for the institutional credit, all information is centralised at the level of the CNCAS. This institution has an important data bank on the financing of artisanal fishery which can be used for a refined analyse of capital availability in the sector

Annexe
Questionnaire UNITES DE PECHE
ARTISANALE en activité au Sénégal

Lieu enquêté : _____ Date de l'enquête : /_/_/_/_/_/

I. PARTIE GENERALE

Nom du propriétaire : _____

Age : _____ Ethnie : _____

Niveau d'instruction : _____

Ancienneté dans la pêche : _____

Activités antérieures : _____

Autres activités pratiquées et revenus : _____

Type de propriété : _____

Taille de l'équipage : _____

Migrations (lieu, saisons, intérêt): _____

Saisons de pêche : _____

Destination des produits pêchés : _____

Relations en amont (avec les constructeurs de bateaux) : _____

Relations en aval (avec les commerçants) : _____

Type de gestion : _____

II. INFORMATIONS SUR LE CAPITAL

Besoins Immobilisations

Immobilisations	Pirogue(s)	Moteur(s)	Engin(s) de pêche	Autres matériels
Prix d'achat				
Date d'acquisition				
Mode de paiement				
Etat d'acquisition				
Fournisseur				
Durée de vie économique				
Coût de remplacement				

Besoins Fonds de roulement

Coût de fonctionnement	Montant par sortie
Carburant	
Nourriture	
Appât	
Glace	
Petit entretien	

Nombre de sorties par mois (selon la saison): _____

Disponibilité

Montant et origine des fonds : _____

Date de démarrage : _____

Taux d'intérêt : _____

Période de remboursement : _____

Montant remboursé : _____

Montant restant à rembourser : _____

Identification des créiteurs : _____

Accords spéciaux entre mareyeurs et pêcheurs : _____

Rémunération des facteurs de production

Type de rémunération : _____

Description du système de rémunération : _____

Capture moyenne ou revenu brut moyen par sortie : _____

Charges fixes	Montant
Assurance	
Réparation/maintenance	

Revenu de la main d'oeuvre : _____

Revenu du capital : _____

Allocation du revenu du capital (épargne, paiement dette...) : _____

OBSERVATIONS

ANNEX 3

CAPITAL NEEDS AND AVAILABILITY IN THE ARTISANAL FISHERY SECTOR

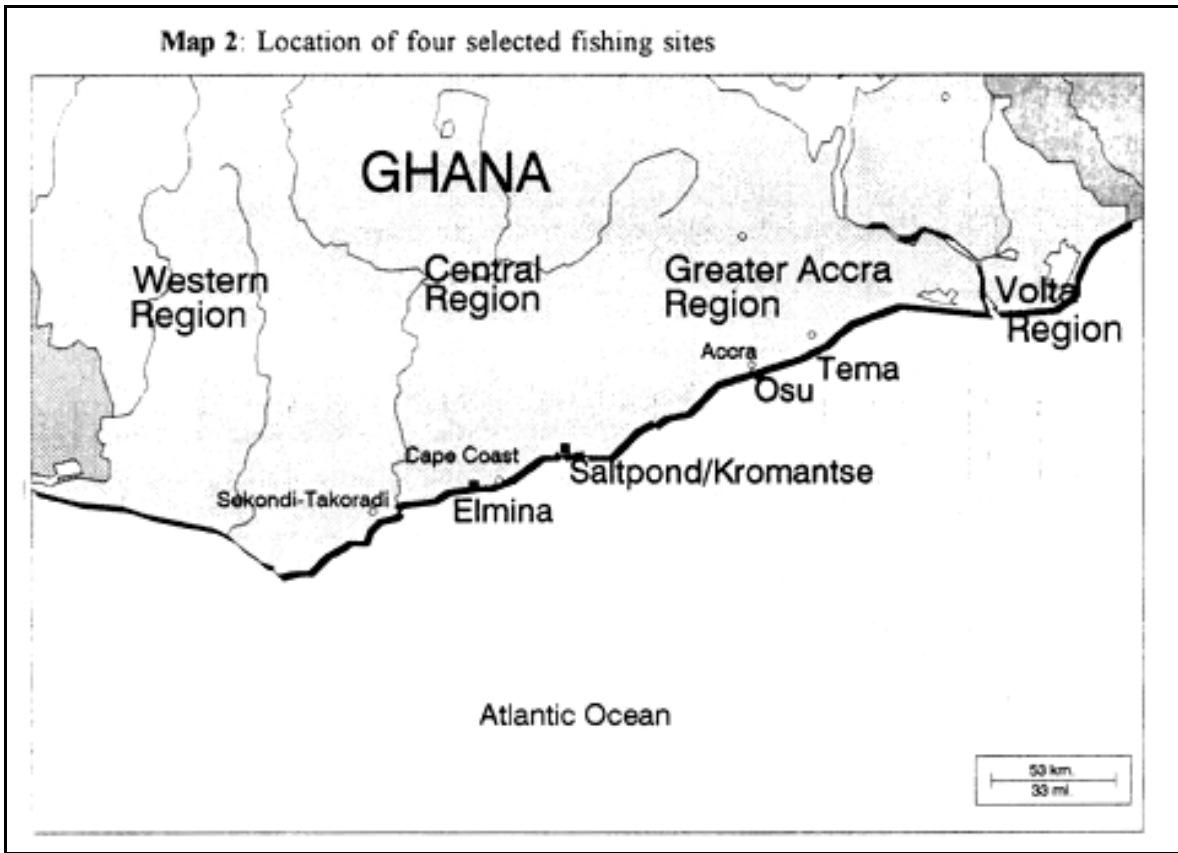
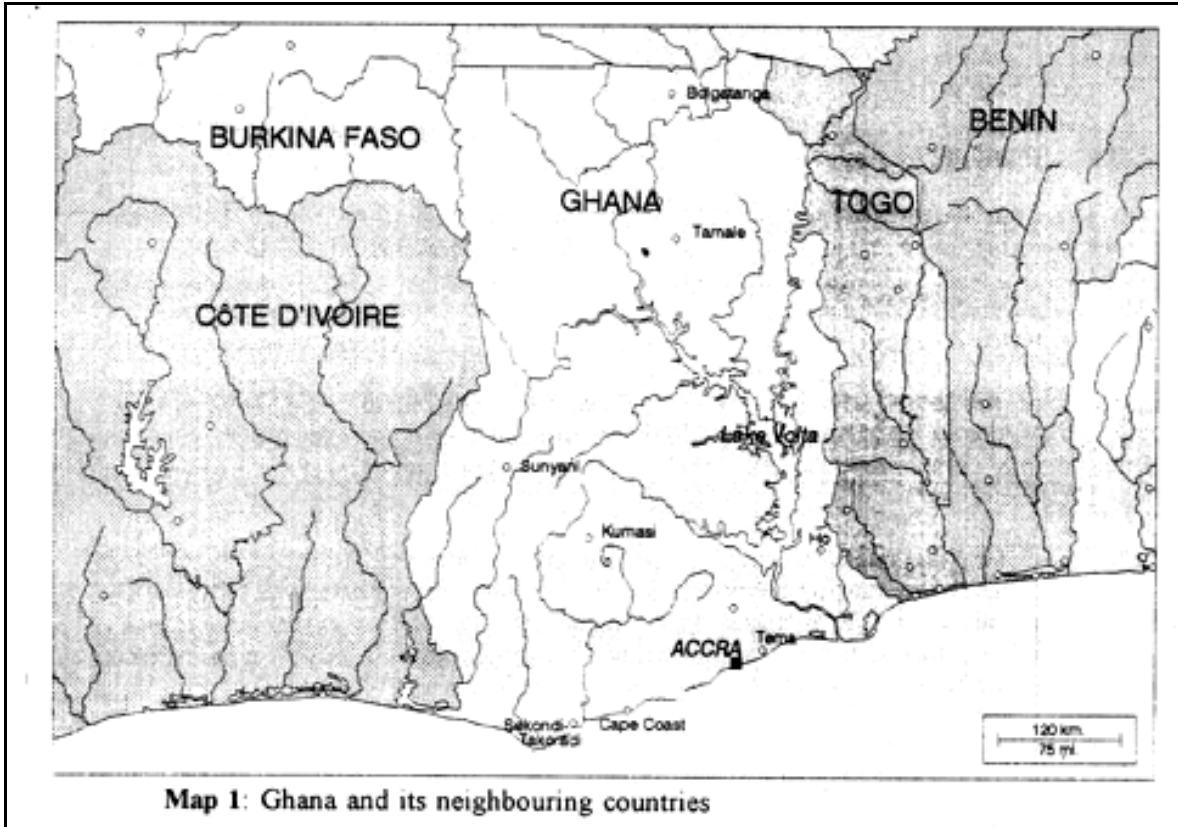
THE CASE OF GHANA

by

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SEPTEMBER 1994



1. INTRODUCTION

1.1 Background to the study

Artisanal fisheries in West Africa is considered as a relatively dynamic economic sector. It represents an essential component of national economy, considering the amount of money invested in the sector, the volume of catch landed and marketed, the number of direct and indirect jobs created and in some cases hard currencies obtained through fish exports. Because of this dynamic nature, any serious social, political or economic disturbances, adversely affect the activities of the artisanal fishermen.

Before planning a specific support to the artisanal fishermen - equipment supply, adoption of particular fiscal measures, setting up of a credit line - and in order to avoid repeating some mistakes of the past, the identification of capital needs and availability should be a major component in the preparation of development policies.

For this purpose, the Programme for Integrated Development of Artisanal Fisheries in West Africa (IDAF) took the initiative in setting up a Working Group composed of specialists principally Fisheries Economists, Socio-Economists, Economists, Agro-Economists with wealth of experience and having interest in the field of artisanal fisheries development. The working group which can also be seen as an embryo of an African expertise network on capital held its first meeting in Cotonou in the second week of March 1994.

The objectives of the working group were :-

- i. to elaborate a simple but efficient methodology likely to facilitate the identification of capital requirements in the artisanal fisheries sector in West Africa.
- ii. to design a methodology to identify the availability of capital according to the different sources financing.

After exchange of views, experience and information, the Working Group came out with a methodology for identification of capital needs and availability in the artisanal fisheries. Ghana was selected for a case study to test this methodology and make recommendation.

1.2 Objectives

The main objective is to carry out a case study on the financing of artisanal fisheries in Ghana. The tasks included :

1. The preparation of a questionnaire as well as sampling strategy in accordance with orientation's provided by the Working Group on the Capital needs and Availability at its first meeting.
2. The data collection in the field.
3. The analysis of the information trying particularly :
 - i. to identify the capital needs and availability and
 - ii. to estimate the remuneration of capital and labour.

4. Preparation of a report on the results of the survey and make recommendation for improvement of the methodology.

1.3 Methodology

The Working Group suggested the following classification of the Fishing Economic Unit (F.E.U.) as the basis for selecting the sample size for the survey. The classification is according to main types of gear, category and number of F.E.U. types (see table 1).

Table 1.- Main types of gear, category and number of F.E.U. type

TYPE OF GEAR	CATEGORY	TYPES OF F.E.U.
Purse seine	D	1
Hook and line *	A,B,C	3
Encircling gillnet	D	1
Bottom set gillnet	A	1
Long line	D	1
Beach seine	E	1
6	5	8

* according to crew size and mode of propulsion.

It was agreed that a sample of 10 F.E.U's of each type in each fishing site, be taken, which means 80 F.E.U's in each landing centre. Among the 4 Regions in Ghana where fishing activities take place, two were chosen: Greater Accra and the Central Region. In both regions, two fishing sites were selected depending on the level of the fishing activities.

<u>Region</u>	<u>intense fishing Activity</u>	<u>non-intense fishing activity</u>
Greater Accra	Tema	Osu
Central Region	Elmina	Saltpond

In effect 80 F.E.U. are to be sampled in each landing centres thus making a total of 320 F.E.U's from which information is to be collected.

Accordingly a detailed questionnaire (see annex 1) was prepared for the collection of information from the field. The questionnaire contained three parts related to :

- i. general information;
- ii. capital needs and availability;
- iii. remuneration to capital and labour.

To enable field work to be undertaken a current Canoe Frame Survey (1992) was consulted. On the basis of the Frame Survey, sample size for each of the operating fishing gears in the Fishing Economic Unit was chosen for the 4 selected landing centres namely Tema and Osu in the Greater Accra Region and Elmina and Saltpond/Kromantse in the Central Region.

From the Frame Survey, it is observed that Long line is no longer in operation so this limits the current fishing gears to five instead of the six originally listed. It is also to be noted that hook and line consists of two main operators, namely "Lagas" under which ice, bait and food are taken for the fishing expedition which lasts between three and seven days and then "ordinary line" which makes daily fishing trips and are called "Go Come". Tables 3 and 4 below depict the sampling schemes employed in the data collection for the two regions.

There are differences in the gear operation in the two regions. For example encircling gillnets are not popular in Greater Accra but are concentrated in the Central Region.

Table 2.- Sampling scheme - Greater Accra region

FISHING GEAR	TEMA			OSU		
	1992 FRAME SURVEY (CANOE)	SAMPLE	%	1992 FRAME SURVEY	SAMPLE	%
1. Purse seine (D) Poli/Watsa	77	20	26	-	-	-
2. Hook & Line						
i. Lagas (C)	9*	0*	-	-	21	73
ii. Ordinary (B)	35	10	28	56	20	
3. Encircling Gillnet	-	Nil	-	-	-	-
4. Bottom Gillnet (A)	6	10	16	-	-	-
5. Long Line	-	-	6	-	-	-
6. Beach Seine (E)	6	4	-	-	-	-
			66			
TOTAL	133	44	33	56	41	73

* The Canoes have migrated.

Table 3.- Sampling scheme - Central region

Fishing Gear	ELMINA			SALTPOND/KROMANTSE		
	1992 FRAME SURVEY	SAMPLE	%	1992 FRAME SURVEY	SAMPLE	%
1. Purse seine/ Poli/Watsa	63	27	42	-	-	-
2. Hook & Line						
i. Lagas (C)	12	10	83	-	-	-
ii. Ordinary (B)	21	10	48	-	-	-
3. Encircling Gillnet	22	9	41	22	10	45
4. Bottom Gillnet	21	10	48	-	1	-
5. Long Line	-	-	-	-	-	-
6. Beach seine	-	10	-	6	5	83
TOTAL	139	76	55	28	16	57

Thus, overall sample of 85 out of 198 (FEU) are observed in Greater Accra as against 92 out of 167 (FEU) in the Central Region. These represent 45 percent and 55 percent respectively. Apart from data collected from the field surveys, post censal checks were made through interviews with popular canoe owners as well as Bank Officials who are responsible for grant of loans to fishermen.

2. SOCIO-ECONOMIC DATA

2.1 The Artisanal Fisheries Sector

The artisanal fisheries sector makes vital contribution to the economy of Ghana. It contributes about 75 percent of the annual total marine fish landings of 295,000 tonnes (see annex 2), thus providing significant animal protein requirement of the population. In value terms it generated about 200 billion cedis out of 240 billion cedis⁵ for fishing industry in 1993 (Fisheries Department Report "The Fisherman, June 1994").

According to latest 1992 Canoe Frame Survey, the artisanal canoe fleet stand at 8,683 of which about 50 percent are motorized. The fleet are based at 189 fishing villages operating from 306 landing beaches. It is estimated that there are about 98,385 artisanal fishermen with approximately 1.5 million dependants as fisherwives, children or traders.

⁵exchange rate: US\$ 1 = 970 cedis (August 1994)

2.2.1 Fisherman/Owner:

The returns indicate that the artisanal canoe fisherman has been operating as the sole owner sometimes with assistance from the wife or relative in the management of the business.

He adapts his operations to suit changing conditions in fishing. For example, in the case of purse seine fishing, Ali used to be popular ten years back, but currently the fishermen are combining poli/watsa for fishing pelagic stocks almost through out the year.

Again because of the recent government removal of subsidy on premix fuel from c500 to c1,900 per gallon, the line fishermen from Osu have adopted a strategy to minimise the operational cost. About seven days fishing trip normally requires 75 gallons of fuel but with the fuel price increase the fishermen now purchase 50 - 60 gallons and these are supplemented by use of sails to maintain the same number of days per fishing trip. Thus they save between 15 and 25 gallons of fuel by using sails as supplement.

2.2.2 Age and Experience

Age specification of the fishermen in Greater Accra and Central region is shown in percentages in table 5. The average age in Greater Accra and Central region are 52 and 49 respectively. 58% of the owners/fishermen in Greater Accra region are older than 50. This figure is for Central region 39%.

Table 4.- Age structure of owners/fishermen in the two regions (in %)

Age groups\Region	Greater Accra (N=85)	Central Region (N=92)
25-30	5	7
31-35	5	12
36-40	15	10
41-45	8	11
46-50	9	21
51-55	20	5
56-60	16	12
61-65	12	11
66-70	6	4
71<	4	3
	100	100

52% of the fishermen in Greater Accra and 58% of the fishermen in Central region have more than 25 years experience in fishing. Some especially the illiterate began their fishing career from infancy. Others (mainly literate) have former jobs, such as Bank Cashiers, teachers, civil servants, filters, drivers, carpenters, farmers and one women fish monger

before entering the fishing industry. Majority of them have no alternative jobs and derive their livelihood almost entirely from fishing. There are few of the fishermen who supplement their incomes with petty trading and farming.

2.2.3 Tribe

Fishermen in the Central Region are predominantly Fanti's and those In Greater Accra are Gas. However, there are Ewe fishermen who specialize in beach seine fishing and young Ga fishermen operating "Lagas" who are permanently based in some of the fishing villages in the Central Region. There are also Fanti fishermen who operate ordinary hook and line which undertakes daily fishing trips.

2.2.4 Crew size

The crew size varies according to the type of canoe and fishing gear used as shown below:

Gear	Purse seine/ Poli-watsa	Ali	Hook & line Lagas	Hook & line ordinary	Encircling gillnet	Bottom set gillnet	Beach seine
crew size	20-24	8-10	6-8	4-6	2-3	2-3	30-40

2.2.5 Migration

The returns confirm the observation made by Odoi-Akersie⁶ that migration (internal and external) for artisanal fishermen is less attractive now than it was a few years ago. Several reasons have been given notable among which are the following. The introduction of Group Credit Schemes by the Rural Banks, formation of Fishermen Councils and Associations at fishing village level, increasing use of outboard motors and ice on board canoes, fishermen operating two or more gears, foreign exchange liberalization resulting in availability of substantial quantities of fishing inputs on the market.

The artisanal fishermen therefore operate at fishing grounds close to landing of centres or where they fish far off for days, because of use the outboard motors and ice, they return to their operational base.

2.2.6 Fishing season

The main fishing season is between July and October in which about 55 percent of the fish landings, take place. The minor season is between November and January. The lean season is between February and June.

¹ Refer to 'Socio-Economic Study of Credit Facilities available to Ghanaian Migrant Fishermen' January, 1989, Odoi-Akersie.

3. CAPITAL NEEDS

3.1 Investment costs of the Fishing Economic Units

Investment costs of canoe, outboard motors and gear depend on a number of factors, namely the time and place of purchase, whether it is new or second hand. In the case of canoe, the size of the canoe and negotiation skill of the fisherman determine the cost.

The problem of costing is made more complicated by high inflationary rate in the country. Imported fishing inputs such as outboard motors, fishing gear, corks floats, are heavily dependent on availability of foreign exchange. With the foreign exchange liberalisation in place and removal of price control there is adequate fishing input supply but the costs of these inputs keep rising as a result of persistent depreciation of external value of the cedi currency. For example a 40 HP Yamaha which was selling for c950,000 in 1993 is now c2.3 million. It has been estimated that the cedi value has depreciated by 4.5 times within a period of six years i.e. between mid 1988 and mid 1994.

Notwithstanding these cost variation problems, some average investment costs estimates for the five major fishing gears of the Fishing Economic Units have been made, taking into consideration the current input prices. Tables 6 & Table 7 give details of Capital Needs and Depreciation of F.E.U units respectively. Investment requirement for each of the Fishing Economic Units are as follows:

- | | | | |
|----|---|---|--------------------|
| 1. | Poli/Watsa | - | 11.8 million cedis |
| 2. | Hook & Line | - | - |
| a. | Lagas | - | 2.80 million cedis |
| b. | Ordinary | - | 2.65 million cedis |
| 3. | Encircling Gillnet Local Names-Anteboa/Ntitawdo | - | 1.10 million cedis |
| 4. | Bottom Set Gillnet Local Name-(Tenga) | - | 0.55 million cedis |
| 5. | Beach Seine (with motor) | - | 6.30 million cedis |
| | (without motor) | - | 4.00 million cedis |

Table 5.- Investment cost (cedis million)

FISHING GEAR	CANOE	MOTOR	GEAR	TOTAL
1. Poli/Watsa	3.0	2.3 (40 HP)	6.5	11.8
2. Hook and Line				
(i) Lagas	1.2	1.2 (25 HP)	0.4	2.8
(ii) Ordinary	1.2	1.2	0.25	2.65
3. Encircling Gillnet	0.200	-	0.90	0.11
4. Bottom Set Gillnet (Tenga)	0.35	-	0.20	0.55
5. Beach Seine				
With outboard	1.5	2.3	2.5	6.3
Without outboard	1.5	-	2.5	4.0

3.2 Depreciation costs

These costs are computed on the lifespan of the fishing equipment as follows:

Canoe: 10 years

Motor: 3 years

Gear: 5 years

Table 6.- Annual depreciation cost

	COST	LIFESPAN (YEARS)	DEPRECIATION	DEPRECIATION COST (MILLION)
1. Poli/Watsa				
Canoes	3.0	10	10%	0.30
Motor	2.3	3	33_%	0.76
Gear	6.5	5	20%	<u>1.2</u>
				2.26
2. Hook and Line				
Canoe	1.2	10	10%	0.12
Motor	1.2	3	33_%	0.40
Gear	0.4	5	20%	<u>0.08</u>
				0.60
(b) <u>Ordinary</u>				
Canoe	1.2	10	10%	0.12
Motor	1.2	3	33_%	0.40
Gear	0.3	5	20%	<u>0.06</u>
				0.58
3. Encircling				
Gillnet	0.20	10	10%	0.02
Canoe	0.90	5	20%	<u>0.18</u>
Gear				0.20
4. Bottom Set				
Gillnet	0.35	10	10%	0.03
Canoe	0.20	5	20%	<u>0.04</u>
Gear				0.07
5. Beach Seine				
(a) <u>Motorized</u>				
Canoe	1.5	10	10%	0.15
Motor	2.3	3	33_%	0.76
Gear	2.5	5	20%	<u>0.50</u>
				1.41
(b) <u>Non-Motorized</u>	4.0			0.65

3.3 Repair and maintenance

Because of unrealistic figures given by the fishermen, it is decided to use the following percentage of the cost of inputs in calculating the repair and maintenance of fishing equipment: canoes 5%; engine 10% and gear 5%.

4. **WORKING CAPITAL**

4.1 Operational Cost/Trip

Except for Hook and Line-"Lagas" which undertakes 7 days fishing trip, the rest namely Poli/Watsa, encircling gillnet, bottom set gillnet and beach seine fisherman provides his own food for the day's trip. The major operational cost is the fuel for the outboard motor users. Additional expenditure is incurred by "Lagas" fishermen in terms of bait, ice and food. Table 8 gives detailed breakdown of operational cost per trip.

Poli/Watsa c20,000; Lagas c30,000 trip or c200,000 for trip of seven days, ordinary line c30,500. For Encircling gillnet, bottom setnet, expenditure is negligible. These are mainly food and cigarettes provided by the fishermen themselves.

Assuming that two months are used as "fishing holidays" for resting, social obligations and for repair and maintenance of equipment, ten months are effectively used for fishing per year. According to the survey, Lagas fishermen make 30 trips a year and the other fishermen operate 200 days per year.

Table 7.- Working capital/operation cost/trip

	FUEL	ICE	BAIT	FOOD	OTHERS	TOTAL
1. Poli/Watsa	20,000	-	-	-	-	20,000
2. <u>Hook & Line</u> Lagas (7 days)	130,000	17,000	30,000	23,000	-	200,000
Ordinary (1 day)	24,000	-	5,000	-	-	30,500
3. Encircling Gillnet	-	-	-	500	-	500
4. Bottom Set Gillnet	-	-	-	-	-	-
5. <u>Beach Seine</u> Motorized	6,000	-	-	-	-	6,000
Non-motorized	-	-	-	-	-	-

5. FISH LANDINGS AND PRICES

5.1 Landings

Volume of fish landing fluctuates according to fishing season and between landing centres. By far the greatest catches are concentrated during the peak season, (that is from July to October) and to some extent during the minor season around December and February. Fish catches vary from one landing centre to another and from one day to another at the same landing centre.

The composition of species also differs with type of fishing gear employed. For Poli/Watsa gears predominant species are anchovies, round and flat sardines and mackerels. For line fishery, the predominant species are grouper, sea breams, (Dentex, pagrus and pagellus) which are high valued and therefore fetch more money. For encircling set gillnet main species caught include shad, ribbon fish, frigate mackerel. For bottom set gillnet predominant species are threadfin, cassava fish, long fin herrings. For beach seines predominant species caught are mainly burrito, moon fish, shrimps ribbon fish. In arriving at total landing for each operating gear account has been taken of the average landings for the major and the lean seasons.

5.2 Prices

Prices of fish are much more complicated to analyze considering the wide price fluctuations which occur daily, weekly and monthly. Prices for the same fish species for the same day at one landing centre can fluctuate depending on the time of landing. For example, during the peak season, fishermen who land their catches early in the morning obtain higher prices than those who land later in the day when there is abundant fish at the same landing centre.

Being highly perishable product and in the absence of cold storage facilities at the artisanal sector level, fish prices fluctuate in accordance with supply and demand situation. In general, in the lean period when demand for fish exceeds supply of fish, prices of fish arise; fish prices tend to fall with increase volume of fish during the peak of the main fishing season. To simplify things, average prices of fish are therefore used in calculating the total revenue.

5.3 Sales

An estimation of sales per type of fishing unit is given in table 8.

Table 8.- Average annual sales per type of fishing unit (cedis)

	Purse seine	Lagas	Encircling gillnet	Bottom set gillnet	Beach seine
Average price (cedis)	111/kg	21,000/crate	111/kg	7,000/crate	2,500/crate
Average catch per trip	468 kgs	15 crates	64 kgs	1 crate	10 crates
Trips per year	200	30	200	200	200
Annual sales	10,400,000	9,450,000	1,420,000	1,400,000	5,000,000

6. SHARING SYSTEM

In general, after deducting all expenditures from the gross proceeds for each fishing trip, the net income is split into two equal parts i.e. 50 percent goes to owner of canoe, motor and gear, and 50 percent goes to the crew members. Fishermen may agree to collect their shares after a month of operation; sometimes this is done at the end of the main fishing season. However, in cases of emergency, a fisherman may obtain an advance which will be deducted from his earnings at the end of the fishing season. This applies to poli/watsa, encircling gillnet, bottom set gillnet fisheries. For poli/watsa beach seine and line fisheries the sharing system is slightly different.

6.1 Poli/Watsa

For Poli/Watsa, after deducting all expense from the gross proceeds, the net income is shared as follows: Canoe, motor and gear receives 20 percent each and the crew members get 40 percent.

6.2 Beach Seine

In both Greater Accra and Central Regions, beach seine operates on family basis. Daily proceeds are shared into two with one going to owners of fishing inputs who are normally family members. The remaining 50 percent are further split into four parts, one for the fishermen setting the net, one for the fishermen mending and repairing the nets, one for those who sell the fish and one for the general crew members.

The casual labourers who occasionally assist in the dragging of the nets are given some fish in kind for home use but are not entitled to the share of the proceeds.

6.3 Hook and Line

Each crew member uses his own hook and line for the fishing trip. At the end of each fishing trip, all expenses are deducted from the proceeds. The net proceeds are split into (13) thirteen equal units, with the distribution as follows; 2 units for the canoe, 3 units for outboard motor, 1 unit for the icebox, and 1 unit for each of the 7 crew members.

7. REMUNERATION OF PRODUCTION FACTORS

Table 9.- Remuneration of production factors by type of fishing unit (cedis)

	Poli/watsa (purse seine)	Lagas (line +ice- box)	Encircling gillnet	Bottom gillnet	Beach seine
Sales	10.400.000	9.450.000	1.420.000	1.400.000	5,000,000
Common costs	4,000,000	6,000,000	100,000	----	1,200,000
Cash flow before payment to crew and owner	6,400,000	3,450,000	1,320,000	1,400,000	3,800,000
Crew size	22	7	3	3	5
Gross revenues					
Capital	3,840,000	1,725,000	660,000	700,000	1,900,000
Labour	2,560,000	1,725,000	660,000	700,000	1,900,000
Fixed costs	4,220,000	860,000	435,000	135,000	2,340,000
Net revenues					
Owner	-380,000	865,000	225,000	565,000	-440,000
%		33%	25%	45%	
Crew member	2560,000	1,725,000	660,000	700,000	1,900,000
%		67%	75%	55%	
Average investment costs	11,800,000	2,800,000	1,100,000	550,000	6,300,000
Return rate of investment	-3%	30.9%	20.4%	103%	-7%
Annual income of crew member	116.364	246.429	220.000	233.333	380.000

8. AVAILABILITY OF FINANCIAL RESOURCES

Artisanal fisherman obtain funds for their fishing operations from two major sources namely the Informal Sector and the Formal or Institutional Sector.

8.1 Informal sector

Most beach seine operators interviewed claim to obtain funds for their operations from their own resources, that is, their savings and those of family members. This might be so in view of the fact that they are using family old canoes, most of which are not motorised and operational expenses are

minimal. Many beach seine operations are organised along family lines.

Poli/Watsa on the other hand requires heavy Capital outlay as well as high maintenance and operational costs. Therefore these operators obtain loans from both fishmammies and the banks.

Fishmammies provide funds to enable the fishermen put their canoe and gear in good condition before the start of the major season. They also provide credit to meet the operational cost of fuel, food and other miscellaneous items. They are prepared to assist the fishermen financially when catches are poor and they face economic hardships. The fishmammies have established such good working relationship and mutual trust with the fishermen that repayments of credit is made elastic depending on the catches. There is no interest charge on the credit facilities but the fishermen are under obligation to hand over the catch to the fishmammies at mutually agreed price normally lower than the beach prices. The fishmammies perform additional function as salesman for the fishermen.

The other informal credit to the artisanal fishermen is through money-lenders. However, the survey return shows that no fisherman approached money-lenders for loan. This may be due to harsh conditions and high interest rates imposed by the money-lenders.

In Greater Accra, 85% of the poli/watsa fishermen use their own resources to buy gear, canoe and engine. The remaining 15 % need assistance from the family.

The 80% poli/watsa fishermen in Central region finance the canoe and gear with own and family money. The engines are for 60% bought with assistance from family and mongers (30%) or from family, mongers and bank assistance (30%).

The 50% of the Lagas fishermen in Central region are completely self-financing. The other 50% need assistance from mongers (20%), bank (20%) or family (10%).

The fishermen from Greater Accra region who operate the encircling net, are for 30 % self-financing. The other 70% borrow money from family and mongers.

Only 20% of the fishermen in Greater Accra region who operate Come and Go and bottom gillnets, have their own canoe. The canoes are bought by mongers (70%) or by money lenders (10%).

8.2 Formal sector

8.2.1 Rural Banks

In recent times, the Rural Banks have been playing useful role in providing credit facilities in the area of farming, fishing and cottage industries. It is community based oriented, with local shareholders providing the bulk of the capital while Bank of Ghana provides counterpart funds and staff. The Rural Banks are under instruction to channel 45 percent of the loan portfolio into agriculture (including fisheries), 30 percent for cottage industries and 25 percent for others. Fishermen can benefit from the loan facility on condition that they have account with the Bank. From the returns some fishermen obtain loan for outboard motor from the Rural Banks.

Some changes have been made in the operation of rural banks in recent times. The control exercised by the Bank of Ghana has been transferred to the Association of Rural Banks which acts as co-ordinating and executive body. Due to financial restructuring and liberalised policies, the Rural

Banks determine their own interest rate which can range between 20 and 30 percent. Apart from the commitment fee of 5%, the ceiling for the loan does not exceed 500,000 cedis. Any loan above the ceiling will require approval from the Association and the Bank of Ghana. The Association of Rural Banks have been involved in the training of Rural Bank staff to improve efficiency in credit financing and management.

8.2.2 Agricultural Development

Recently Agricultural Development Bank received line of credit from the African Development Bank which enabled them to import 300 pieces of 40 HP outboard motors and bales of fishing gear for sale to the artisanal fishermen.

Because of past experience, A.D.B has specified conditions for sale of the fishing inputs to the fishermen. The fishermen must belong to recognised Fishermen Association because the Association would guarantee for members. For the outboard motor the fisherman is required to pay 50 percent of the cost (the repayment of the 50 percent is spread over a period of two season i.e. two years. Interest rate is 27 percent. Fishermen are however required to pay cash for the fishing nets.

Non-payment of loan because of poor catches and monitoring the activities of the fishermen are the major problems facing the A.D.B officials.

9. RECOMMENDATIONS

The information required on the questionnaire is quite comprehensive and time consuming but the time allocated for collection and analysis of the data is too short. Most fishermen provide unreliable information especially on the operational costs and repair and maintenance as well as volume and value of their catches.

It is being recommended that a few selected progressive fishermen who are literate are given simple log book to record their daily transactions over a period of one year, to take care of seasonal variations of catches, prices and operational costs. These fishermen must be representative of the various Fishing Economic Unit.

APPENDIX I

CAPITAL NEEDS AND AVAILABILITY IN THE
ARTISANAL SECTOR IN GHANA

QUESTIONNAIRE

REGION: LANDING BEACH:
ENUMERATOR: DATE:

GEAR IN USE:.....

- =====
1. GENERAL PART
-
- i) NAME OF OWNER:
- ii) AGE:
- iii) TRIBE:
- iv) EDUCATIONAL LEVEL:
- v) NUMBER OF YEARS IN THE FISHING INDUSTRY:
- vi) FORMER JOB, IF ANY:
- vii) ADDITIONAL JOBS & REVENUE:
- viii) KIND OF OWNERSHIP (SOLE OR PARTNER):
- ix) NUMBER OF CREW:
- x) DO YOU MIGRATE? YES. NO
- IF YES, TO WHERE:
- HOW LONG.....
- xi) FISHING GROUNDS:
- xii) FISHING SEASON: MAIN LEAN
- xiii) WHERE DO YOU SELL YOUR FISH? BEACH: ELSEWHERE.....
- xiv) RELATIONS WITH THE YOUR FISH TRADER:BOATBUILDER.....
- xv) TYPE OF MANAGEMENT:

2. INFORMATION ON CAPITAL

2.1 NEEDS

A) FIXED ASSETS	CANOE	MOTOR	GEAR
a) Purchase Price of Equipment			
b) Year of Purchase			
c) New or second-hand			
d) Way of Payment-, (Cash or Credit)			
e) Economic. Life of Equipment			
f) Supplier (From whom)			
B) WORKING CAPITAL:	FUEL	ICE	BAIT
OPERATIONAL COST PER TRIP	FOOD	OTHERS	
NO. OF TRIPS PER MONTH			
NO. OF DAYS PER FISHING TRIP:			

2.2 AVAILABILITY

----- CANOE MOTOR GEAR FUEL ICE BAIT -----
 AMOUNT & ORIGIN OF FUNDS ----- OTH -----

OWN RESOURCE -----

CREDITORS -----

- A) Family -----
- B) Fishmonger -----
- C) Money Lender -----
- D) Bank (specify) -----
- E) Saving & Credit Ass. -----

IF BY CREDITORS

A) Starting Date -----

B) Interest Rate (% or Kind) -----

C) Repayment Period (if any) -----

D) Amount Repaid -----

E) Balance to be Repaid -----

F) Special arrangement between
 mongers & fishermen
 (payments in kind etc) -----

3. PAYMENT OF PRODUCTION FACTORS

a) Type of Renumeration: Fixed..... Shares..... combination.....

b) SHARING SYSTEM:	CANOE	CREW	BAIT
	MOTOR	FUEL	FOOD
	GEAR	ICE	OTHER

c) Description of Sharing System:

d) Sale- Ave. Catch per Trip: Kg. Fish Price/kg

e) Main Species of Catch:

f) Cost of Insurance, Repairs and Maintenance per year

CANOE:..... MOTOR:..... GEAR:

g(i) How much Revenue/Income goes to Savings

g(ii) How much Revenue/Income goes to debt payment

h) OTHER REMARKS

APPENDIX 2

CONTRIBUTION TO ARTISANAL SECTOR TO MARINE FISH
LANDINGS IN GHANA (1984 - 93) (000 TONNES)

YEAR	PPRODUCTION UNITS				TOTAL
	CANOES	INSHORE	INDUSTRIAL	GHANA TUNA	
1984	171.2	14.7	16.4	31.3	233.6
1985	159.8	17.9	21.9	34.4	234.0
1986	190.1	21.8	22.3	34.7	268.9
1987	262.0	14.9	20.8	33.4	330.4
1988	244.0	7.4	16.0	35.4	302.8
1989	220.8	12.6	23.0	32.2	288.6
1990	242.0	9.2	26.5	40.8	318.5
1991	215.8	7.3	27.8	37.7	288.6
1992	307.9	10.7	20.9	30.7	370.2
1993	257.2	5.2	19.8	36.8	319.0
AVERAGE .	227.0	12.1	21.4	34.7	295.2
% OF TOTAL	76.8	4.3	7.2	11.7	100

Source: Fisheries Research Branch of the Fisheries Department, Tema.