

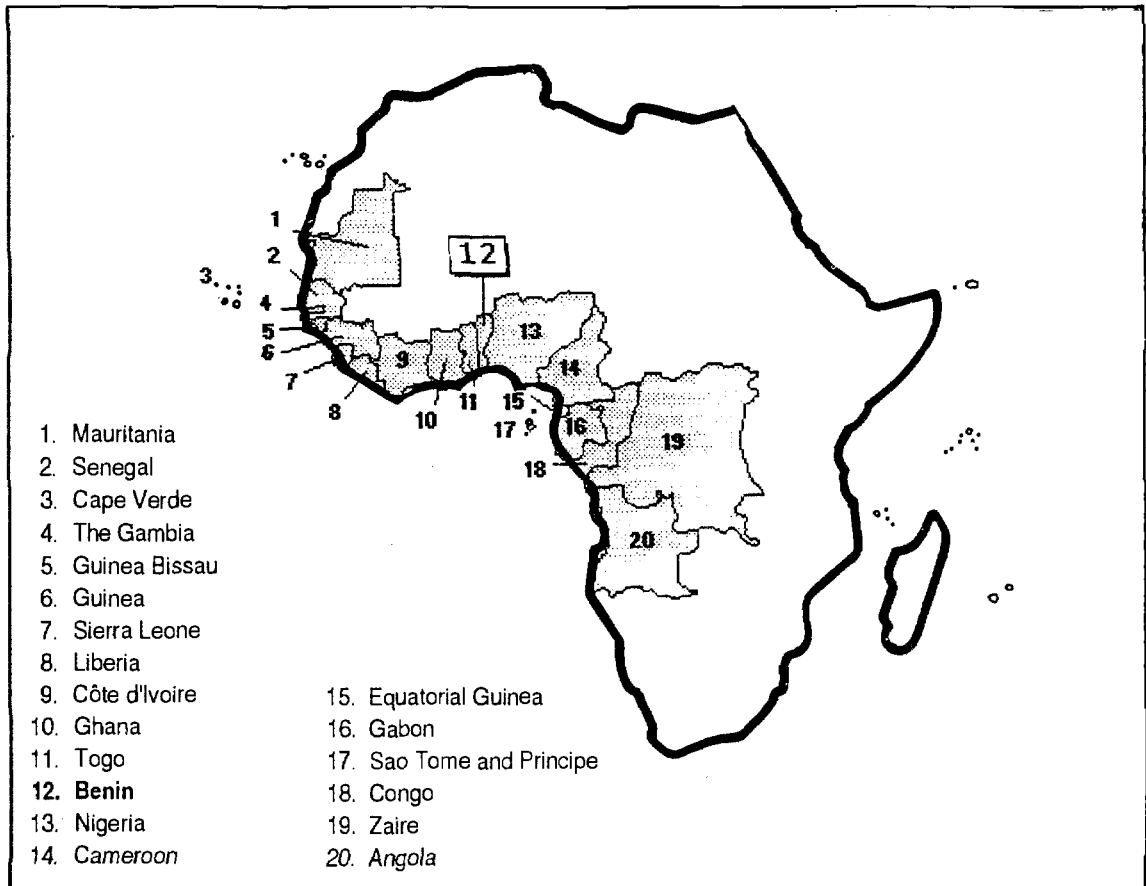
PROGRAMME FOR INTEGRATED DEVELOPMENT OF  
ARTISANAL FISHERIES IN WEST AFRICA

**IDAF PROGRAMME**

Technical Report N° 92

October 1996

**Use of Capital Income in Artisanal Fisheries:  
the Case of Boat-Owners in Hann, Senegal**



**DANIDA**

DEPARTMENT OF INTERNATIONAL DEVELOPMENT COOPERATION OF DENMARK



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS



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**Use of Capital Income in Artisanal Fisheries:  
the Case of Boat-Owners in Hann, Senegal**

by

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# **THE VISION FOR IDAF PHASE III**

## **INTRODUCTION**

Development strategy during the 1960 and 1970s was based on the philosophy that developing countries lacked improved technology and capital for speeding up their development. Industrialization was promoted in order to capitalize on the abundant fish resources. However, the anticipated expansion of the economy did not happen and the development approach shifted towards an integrated rural strategy where emphasis is put on the community as a whole to upgrade incomes and the quality of life through technical assistance and the active participation of fisherfolk and the community.

In this context, emphasis was initially placed on the Community Fishery Centre (CFC) concept as a means of promoting artisanal fishery development. But it became apparent that the presence of a complex of facilities and services tailored to meet local needs was no guarantee that the structures/facilities would be used or that development would occur. The active participation of fisherfolk and the mobilisation of local and community resources was imperative in order to assure sustainability of initiatives undertaken by development projects and/or the community.

So far and in general terms, the IDAF Programme has worked under the context of abundant or seemingly adequate fishery resources with moderate population pressure. The scenario is however changing (and very fast for that matter) and we would soon face the triple constraints of reduced or depleting fish stocks, degrading environment and increasing population pressure. Like in other sectors, it must be anticipated that just to survive, parts of the population surplus in the fishing communities will enter the artisanal fisheries, which will increase the competition for the resources among the small scale fisherfolk in addition to the prevailing competition between the artisanal and industrial fisheries, with their attendant effect on the environment.

This scenario calls for a continuation of the integrated participatory strategy which remains relevant to the development of artisanal fisheries in West Africa. However, the emphasis needs to be placed on the elements and mechanisms that favour the sustainability of initiatives: responsible fishing, the empowerment processes that ensure the devolution of major resource management and development decisions to the local community, the strengthening of national human and institutional capacities at all levels for a sustainable and equitable fisheries resources management and development, as well as in the follow-up and consolidation of past achievements.

## **DEVELOPMENT OBJECTIVE**

Thus the development objective of the Programme in the present phase III which started on 1 July 1994 is to ensure twenty coastal West African countries a sustainable development and management of their artisanal fisheries for maximum social and economic benefit of their fishing communities in terms of employment, proteins and earnings. This will be done through an integrated and participatory approach in which emphasis will be laid on equity, gender issues, the transfer of technology for development, environment protection, as well as the strengthening of human and institutional capacities.

**The immediate objectives are:**

1. To identify, assess and disseminate strategies and mechanisms for sustainable management and development of the artisanal fisheries in fishing communities,
2. To improve the competence of national Fisheries Departments staff in development and management planning of artisanal fisheries;
3. To enhance regional technical competence in the fisheries disciplines, particularly in fishing and fish technology;
4. To improve information and experience exchange related to artisanal fisheries within the region;
5. To promote regional and sub-regional collaboration for the development and management of artisanal fisheries

**In this context, IDAF will among other things tackle the following major aspects in its work :**

- assisting in the elaboration and implementation of a clear and coherent national development policy for the artisanal fishery sector;
- providing advice on management and allocation of resources between artisanal and industrial fishing fleets, both national and foreign,
- involving users in the design and management of on shore infrastructures;
- monitoring the sector's evolution by the setting up of an economic indicator system for the sector adapted to the financial and human availabilities;
- improving fishing technologies in accordance with the available resources;
- increasing the final product's value by improvement in processing and marketing;
- promoting community development in accordance with the lessons learned from Phase I and II and oriented towards the sustainability of actions undertaken;
- reinforce the Programme's information/communication system.

It is anticipated that by the end of the third phase of the Project, the region will have a nucleus of field oriented experts capable to respond to the challenges of the artisanal fisheries sector and to spur development in their individual countries in keeping with the aspirations and needs of fisherfolk.

## SUMMARY

During the deliberations of the IDAF Working Group on Capital Needs and Availability in the artisanal fisheries sector (IDAF/WP/65), participants observed that in most cases capital income covers maintenance and repair costs as well as investment depreciation. However, it was also observed that boat-owners hardly had enough money to meet their needs when the investment has to be renewed. There is, therefore, a problem which seems to be associated with capital income allocation.

This study aims at identifying and analysing capital income expenditure channels in fishing operations on one hand, and in satisfying the other needs of the boat-owner on the other. The study was carried out from 20 to 30 May 1996 in the Hann fishermen village in Senegal.

Analysis of the performance of the various selected fishing units indicates that artisanal fisheries constitutes a profitable activity, whatever the technique of capture used. Each type of fishing unit generates a cash flow high enough to cover operation costs, depreciation of invested capital and payment of debts. It is also observed that the return on investment in artisanal fisheries is very much higher than the opportunity cost to capital.

However, in artisanal fisheries, the periods of good catch alternate with lean season periods during which boat-owners dip into their savings to meet needs other than the renewal or expansion of their capital. Returns on capital are mixed up with the personal income of the boat-owner and contributes to meeting the major needs of the family:

- the family's feeding expenses
- family ceremonies (baptisms, funerals, marriages)
- religious ceremonies
- education and health.

It is observed that except for the purse seine, the expenditure declared by boat-owners is much closer to the cash flow generated by the fishing unit than to net income. This tends to indicate that on the average, boat-owners make no provision for depreciation and probably very little savings. On the contrary, in the case of purse seines, they would consume only their income which one way or the other permits them to save up the amount equivalent to depreciation.

Finally, the boat-owner who considers the depreciation of capital as personal individual income does not take into account the risk to which he exposes his operation by not reserving funds for the renewal of his equipment. Some of the fishermen in the sample are aware of the need to renew production inputs by saving up accordingly. However, domestic expenditure often leaves very little margin to operators.

In concluding his paper, the author makes some recommendations to improve the methodology.

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## INTRODUCTION

During the deliberations of the IDAF Working Group on Capital Needs and Availability in the artisanal fisheries sector, participants observed that in most cases capital income covers maintenance and repair costs as well as investment depreciation. However, it was also observed that boat-owners hardly had enough money to meet their needs when the investment has to be renewed.

Consequently, there is a problem which seems to be associated with capital income allocation.

Studies undertaken by the IDAF Working Group on Costs and Earnings in artisanal fisheries could not answer this question since they concern investment profitability and returns on production factors, not capital income allocation.

This study aims at identifying and analysing capital income expenditure channels in operations on one hand, and in satisfying the other needs of the boat-owner on the other.

The study was greatly inspired by the methodological approach developed at the end of the first meeting of the working group. This methodology was tested in the case study undertaken by Mr. M. Kebe on the theme "Capital needs and availability in the artisanal fisheries sector: the case of Senegal" (August 1994).

The results presented below were obtained after a study carried out from 20 to 30 May 1996 in the Hann fishermen village in Senegal.

The study's terms of reference included the following aspects:

1. Presentation of a survey questionnaire.
2. Sensitization of boat-owners.
3. Training of interviewers on data collection on the spot.
4. Data analysis.
5. Elaboration of the methodological recommendation to improve the survey.
6. Write up a 20 - 25 page report presenting results and methodology.

## 1. METHODOLOGY

### 1.1 Questionnaire

Data collection from boat-owners was carried out through a detailed questionnaire based on the terms of reference proposed comprising the following four major parts:

1. General data on the Fishing Units (FU) surveyed.
2. Identification of FUs' incomes.
3. Remuneration of production factors.
4. Capital income management.

Moreover, observation of and discussions with boat-owners and non-owners made the collection of very interesting additional data on the use of capital income possible.

## **1.2 Presentation of the study zone**

### **1.2.1 General information on fisheries in Dakar.**

The city of Dakar, capital of the Republic of Senegal, is situated on the extreme West of the African continent, on the "Cap Vert" peninsula with an area of 550 km<sup>2</sup>. It is bordered on the North-West and South-West by the Atlantic Ocean and on the East by the Thies region.

The 65 km long coast of "Cap Vert" (from Cambérène to Toubab Dialaw) harbours considerable production potentials associated with the rather dense population of artisanal fishermen and the abundance and diversity of ichthyological fauna.

In 1995, the Dakar region had 10,000 artisanal fishermen using a canoe fleet of 1,315 being 13% of the artisanal fishing fleet. It is by far the most populated region in Senegal (3 million inhabitants, i.e. 33% of the total Senegalese population).

The region's relatively significant population is a result of a high concentration of economic activities, infrastructures and equipment in Dakar and its suburbs on the one hand, and on the other hand, the massive exodus of the rural population to the capital.

Dakar has 8 landing centres totalling 27,000 tons of fish and other species landed in 1995.

Hann village is one of such centres classified as traditional villages just like the other villages inhabited by mainly the Lebou, recognised as great fishermen.

### **1.2.2 The Hann fishing village: socio-economic data**

Situated on the east of "Cap Vert" peninsula, 6 km from the centre of town, Hann village is 2.8 km long with an average width of 0.5 km. Its area is about 1.4 km<sup>2</sup>.

The **traditional village** of Hann was founded in 1912 by an old fisherman from Walo (north of Senegal).

The village comprises 9 wards with a population of 40,000 inhabitants in 1995.

This population has practically doubled in twenty years due to a rather high growth rate (3.8%) and development in economic activities, especially those related to fisheries.

The **original village population** consisted of the Lebou and Walo-walo (63%). These two Wolof ethnic groups are the majority. However, significant groups of Serere, Toucouleur and Diola exist. This ethnic diversity shows the village's openness to others.

Moreover, Hann is one of the most densely populated areas in the Dakar region, with 200 inhabitants/ha.

It is important to note that the Lebou and Walo-walo continue to live in groups on plots of land of 5 to 10 households.

**They are mainly Moslems** even though many traditional cultural practices are still kept very much alive. The population is relatively young: 28% are between 25 - 50 years.

**Village space** is, to a small extent, occupied anarchically. There is no possibility of extending or relocating. Accomodation is tending towards a certain modernisation. About 56% of the houses are in concrete while 44% are in wood. Moreover, overpopulated compounds raise serious problems of sanitation and frequent cases of endemic diseases.

Various **economic activities** are practiced. However, fishing and its related activities are the most important and consequently, occupies most of the population.

Residents develop a wide variety of activities around actual fishing: **fish trading and processing**, as well as many small production and service trades. Exploitation of all these outlets explains the very high occupation rate of the active population: 78% for women and 70% for men.

The local artisanal fisheries dynamism is not a matter of accident. The influence of this almost unknown small village is associated to many factors, the most important of which include the following aspects:

- \* easy landing, eliminating capsizing risks;
- \* fish is sold per species, by cash and at any time of the day or night;
- \* supply and demand of products are almost permanent;
- \* the village is located not far from big consumption and marketing centres (industry, central market, airport, port, etc...).

Hann village has 1,500 fishermen. Apart from the natives, migrant fishermen come from Saint-Louis, Rufisque, Bargny, Mbour, Joal and other coastal areas of Dakar.

In practice, all types of fishing are practiced at Hann: purse seine, set gill net, simple line, ice-carrying long liners, and long line fishing.

Landing relates mainly to pelagic species with round and flat sardinella dominating; the following production data show the importance of fishing (p.4).

Apart from fishing and these related activities, economic activities are reduced to craftsmanship, petty trade and services. All these activities are generally centered around the Hann landing site.

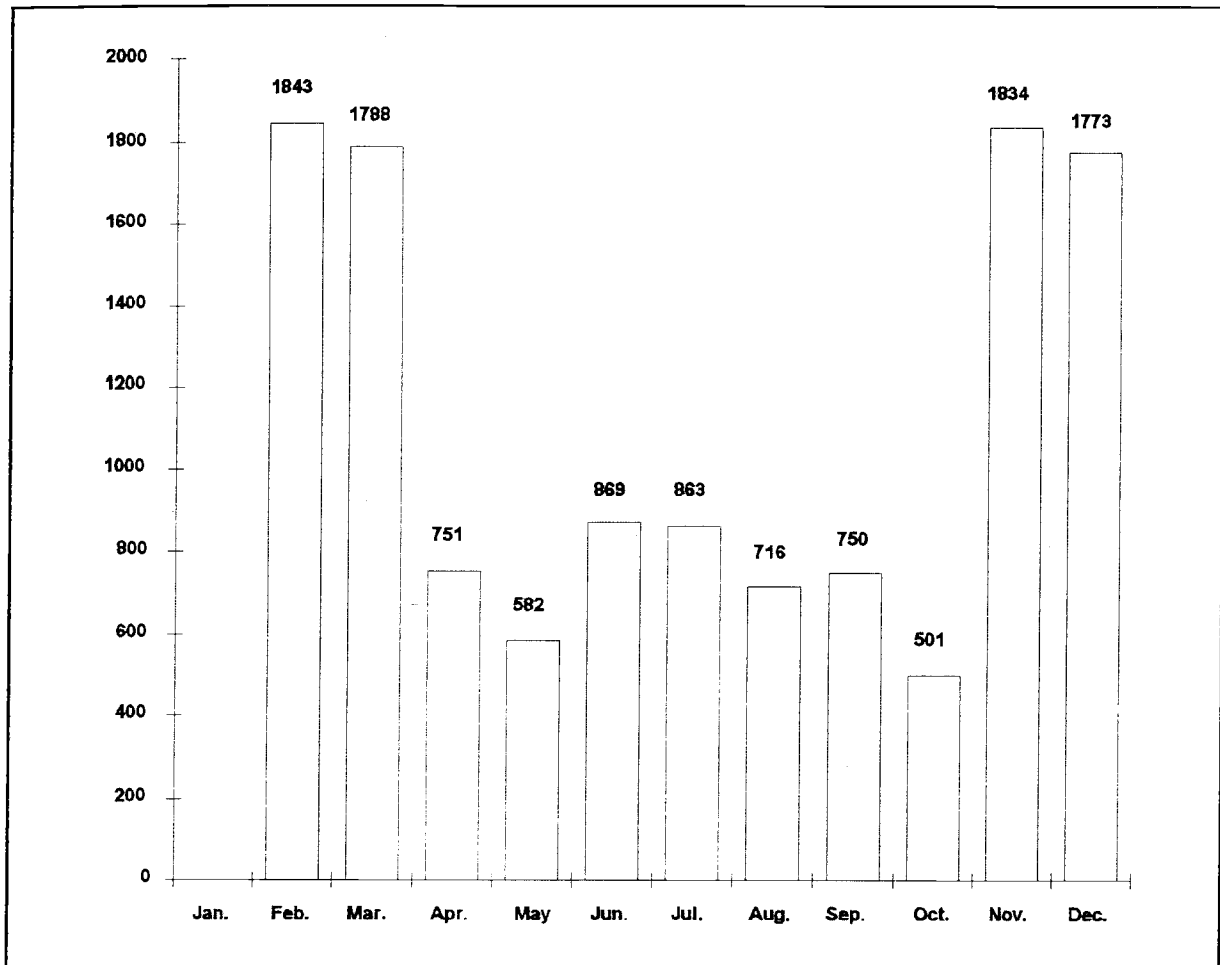
With regard to agriculture, outstripped by the main occupation, it continues on the edge of the Rufisque road as floral horticulture.

Industrial and commercial valorization of sea products has led to massive establishment of packaging industries and cold rooms using significant manpower recruited mainly from the village women.

### **1.3 Sampling strategy**

Boat owners selected in the sample are owners and/or users of fishing unit types used at Hann namely, purse seine, set gill nets, simple line, and ice-carrying long line canoes.

**Fig. 1.- Monthly trend of fish production at Hann - 1995**

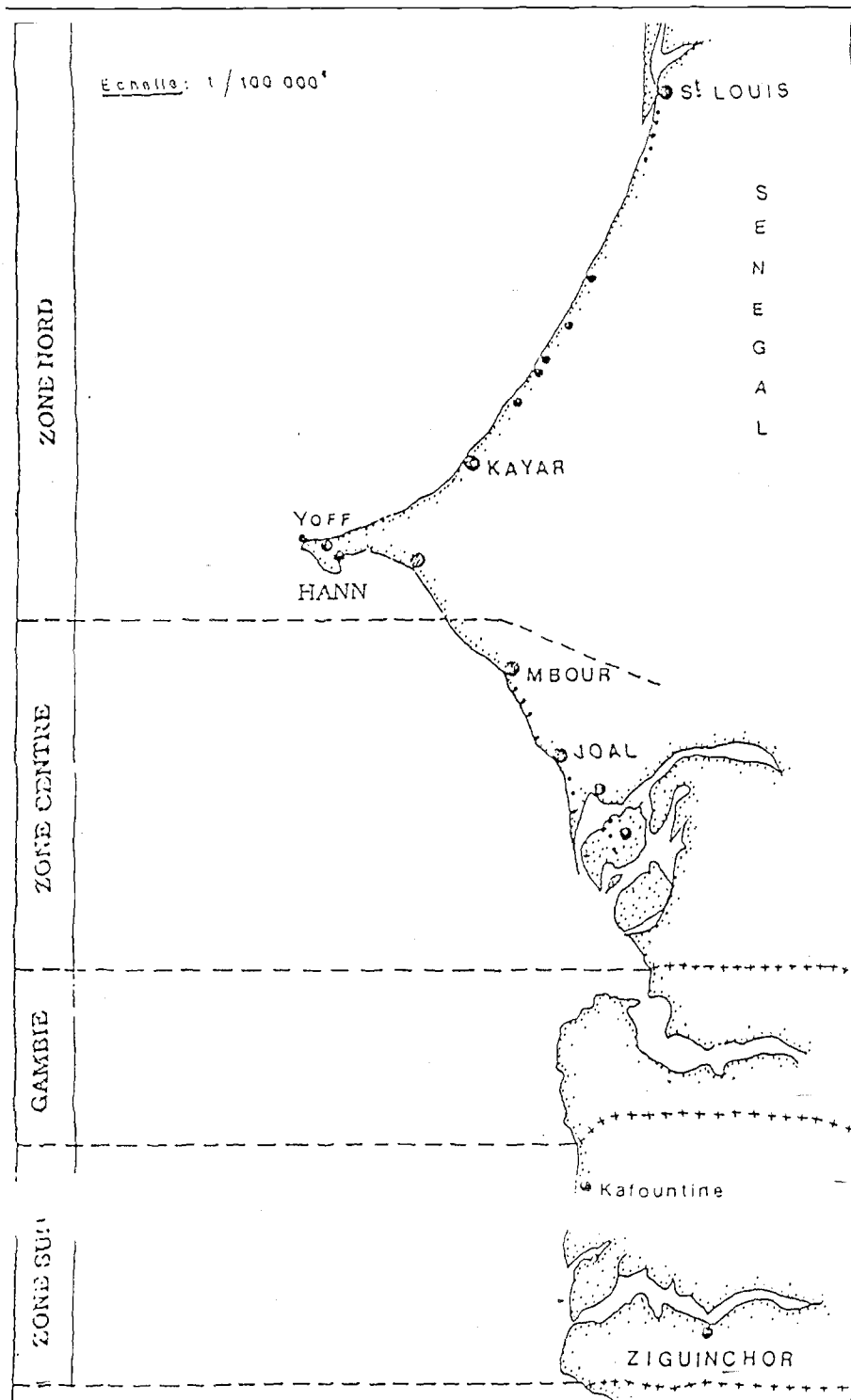


These 4 fishing types are responsible for 95% of landings recorded at Hann and represent 90% of the total canoe fleet.

The sampling strategy consisted of carrying out an on-the-spot poll on 1/10th of the total canoe fleet recorded in 1995, i.e. 17 canoes out of 173.

In the choice of boat owners, three differentiation criteria were considered in determining the best possible representative situation.

- \* The 4 fishing unit types surveyed have rather different operation conditions and income sharing systems.
- \* Purse seine and ice-carrying line fishing require a relatively substantial investment compared to simple line and gill net fishing.
- \* The number of fishing units retained for each type of fishing corresponds to its value in the total "population statistics".



**Map 1 - Large fishing zones on the Senegalese coast**  
 (Source : CRODT/ISRA)



Map 2.- Dakar and the Bay of Hann

The composition of the sample is given in the following table:

Table 1.- Sample size and composition

Type of fishing	No. of total F.U.	Relative value	No. of F.U. retained in the sample
Purse seine	31	18	5
Gill net	46	27	6
Ice carrying long line	47	28	4
Simple line	12	7	2
Beach seine	4	2	-
Cast net	3	2	-
Long lines and pots	25	15	-
Total	168	100	17

## 2. SOCIO-ECONOMIC CHARACTERISTICS OF BOAT-OWNERS

**Identification:** Boat owners interviewed are mainly owners of their production unit. 95% are owners whilst 5% are "captains" managing the F.U. Of the 17 boat owners interviewed, 3 no longer go to sea even if they still manage the F.U. from the beach.

**Age:** The average age of those interviewed is 46 years. However, it was observed that 47% of them are less than 40 years old. This could be a sign that the young are now having greater access to ownership. The youngest boat owner interviewed is 26 years old while the oldest is 70.

**Seniority in fishing:** All the boat owners have been fishing from the age of between 10 and 15 years. They are professional fishermen with 48% having more than 25 years experience in marine artisanal fishing.

**Ethnic group:** The fishermen met at Hann are generally Wollof from the following sub-groups: Walo-walo (35%), Lebou (53%), Saint Louis migrants (6%). The Niominkas ethnic groups hardly carry out fishing in Hann. The Toucouleur are practically unknown on the Hann beach.

The specialisation of ethnic groups according to types of fishing is remarkable. 3 out of 4 ice carrying canoes retained in the sample are managed by Guet Ndariens. While set gill net and simple line fishing seems to be the Lebou's occupation (86%), the Walo-walo own 80% of the purse seines used in the sample.

**Instruction level:** Relatively low. 64% of those interviewed are totally illiterate despite the existence of a French school since 1957. 4% had coranic education. About 35% of those interviewed know how to read and write in Arabic and/or French.

**Previous employment:** Many of the fishermen interviewed are former sailors or fish industry workers who converted to artisanal fisheries (47%).

This practice occurs frequently among active persons in Hann who go to sea every time schooling is compromised, for the young or in the case of loss of employment or resignation, for the adults.

**Other activities:** the integration level of other activities in the sector is very low. Boat owners only carry out fishing activities (76%). Other activities identified by the boat owners consist of operating fishing service stations (2 boat owners) or are registered fish suppliers (1 fisherman).

### 3. PROFITABILITY OF FISHING UNITS

#### 3.1 Investment and related costs

The basic investment common to all the fishing units surveyed comprises:

Canoe: measuring from 4 to 22 metres depending on the type of fishing practised. Economic life is 5 years for purse seine, 6 years for set gill nets and simple lines and 7 years for ice carrying long lines canoes.

Outboard engine: canoes using set gill nets or those fishing with simple lines are equipped with 8 and 15 HP engines, while purse seines and ice carrying lon line canoes are powered by 40 HP engines. The life span of an outboard engine depends to a large extent on maintenance and the type of fishing practised. It varies from 24 to 48 months.

Fishing gears: concerns nets, lines, and long lines. Theoretically, the estimated lifespan is 24 months for purse seines and 1 year for set gill nets.

Other assets: comprise insulated boxes, navigational instruments, whose investment costs require their being taken account of in the constitution of technical capital.

Table 2 recapitulates the average cost of assets according to the type of fishing.

Table 2.- Investment costs (in FCFA<sup>1</sup>)

	Canoe	Engine	Fishing gear	Others	Total
Purse seine	1,620,750	1,297,300	2,775,000	199,125	5,892,175
Set gill net	236,250	403,250	562,500	16,125	1,218,125
Long line (ice)	750,000	558,750	162,500	371,375	1,842,625
Simple line	310,000	347,500	15,250	71,250	744,000

<sup>1</sup> US\$ 1 = 520 F CFA (June 1996)



Table 3.- Fixed assets depreciation (in FCFA)

	Canoe	Engine	Fishing gear	Others	Total
Purse seine	324,150	648,600	1,387,750	49,780	2,410,280
Set gill net	39,375	100,812	266,250	-	406,437
Long line (ice)	107,145	279,375	162,500	185,690	734,710
Simple line	51,670	86,875	15,250	17,800	171,595

Table 4.- Fixed assets depreciation (in years)

	Canoe	Engine	Fishing gear	Others	Deprec./ Invest.
Purse seine	5	2	2	4	41%
Set gill net	6	4	2	-	33%
Long line (ice)	7	2	1	2	40%
Simple line	6	4	1	4	23%

### 3.2 Operating expenses

Variable costs: These concern fuel whose consumption depends on the distance to fishing zones, the power and condition of the engine and the time spent on actual fishing.

Fuel is sold duty-free at 260 FCFA per litre and represents the highest cost element. The purse seine consumes 175 litres/trip on the average, 10 litres per trip for set gill nets and 600 litres for ice carrying long line canoes.

\* The cost of ice, bait, twines, and ropes for maintenance of the nets make up the miscellaneous. These expenses are deducted daily from the gross product.

\* Fish donated on the beach and the commissions paid to middle men on the beach delegated to sell fish, are also chargeable to production. These expenses vary from 5 to 10% depending on the type of fishing, especially for purse seine and the ice carrying long line canoes.

\* Expenditure on food is estimated to be between 8,000 and 15,000 francs for purse seine crew living with the vessel owners and 35,000 for ice carrying long line operators who make 8 day trips.

Fixed costs: this concerns capital depreciation (canoe, engine, net, ice boxes, navigation instruments), monthly interests for F.U's acquired on credit and the sums of money paid to sorcerers ("insurance"), maintenance and repair costs.

Table 5.- Annual income statement of fishing units

	Simple line	Long line (ice)	Purse seine	Set gill net
<b>I- Revenues from operations</b>	<b>4 700 000</b>	<b>18 850 000</b>	<b>30 500 000</b>	<b>3 900 000</b>
II- Operating expenses				
-Fuel	780 000	5 616 000	10 920 000	780 000
-Ice	90 000	2 358 000	0	0
-Bait	180 000	813 600	0	0
-Food	912 500	1 260 000	2 920 000	912 500
-Gifts and commissions	125 000	974 000	1 440 000	111 000
-Miscellaneous (twines, etc.)	22 500	360 000	150 000	25 000
<b>Total variable costs</b>	<b>2 110 000</b>	<b>11 381 600</b>	<b>15 430 000</b>	<b>1 828 500</b>
III- Value added (I-II)	2 590 000	7 468 400	15 070 000	2 071 500
in % of revenues	55%	40%	49%	53%
IV- Crew remuneration	1 295 000	4 978 930	8 433 084	1 035 750
V- Gross operating surplus	1 295 000	2 489 470	6 636 916	1 035 750
-Depreciation	171 595	734 710	2 410 280	406 437
-"Insurance"	26 000	375 000	225 000	32 000
-Maintenance and repairs	68 000	250 000	249 970	75 000
<b>Total fixed costs</b>	<b>265 595</b>	<b>1 359 710</b>	<b>2 885 250</b>	<b>513 437</b>
VI- Net result	<b>1 029 405</b>	<b>1 129 760</b>	<b>3 751 666</b>	<b>522 313</b>
VII- Cash Flow	<b>1 201 000</b>	<b>1 864 470</b>	<b>6 161 946</b>	<b>928 750</b>

### 3.3 Sharing systems

Revenue sharing is done on return from every long duration fishing trip for indigenes and at the end of the fishing season for migrants.

The principle of sharing which has become classic is effected as follows:

Common operating expenses borne by the owner and crew (fuel, food, ice, bait, etc.) are deducted from the value of landings, the balance is divided into three parts: 1/3 for the payment of capital for the net and 2/3 is taken up equally by the canoe, engine and fishermen. This sharing formula is practiced generally by purse seine managers.

For other F.U's, the value added is divided into as many shares as there are fishermen. Each element of the equipment capital (engine, canoe) also receive a share.

This practice has undergone many changes due to the rise in the cost of investment.

Some owners of ice lines apportion two shares to the canoe and two shares to the engine.

Moreover, detection and navigation instruments such as echosounders and insulated boxes are also paid for.

The Guet Ndariens on fishing campaigns in Hann, who generally operate ice carrying long line canoes, create a "fund" where fishing proceeds are kept after deducting common expenses. The sharing is done at the end of the campaign.

Table 6.- Annual income and return on investment

	Simple line	Long line	Purse seine	Set gill net
Average annual turnover	4 700 000	18 850 000	30 500 000	3 900 000
Common expenses	2 110 000	11 381 600	15 430 000	1 828 500
Revenue to share	2 590 000	7 468 400	15 070 000	2 071 500
Number of shares	6	12	25	6
Crew income	1 295 000	4 978 933	8 439 200	1 035 750
Capital income	1 295 000	2 489 467	6 630 800	1 035 750
Fixed costs	265 595	1 359 710	2 885 250	513 437
Owner's net income	1 029 405	1 129 757	3 745 550	522 313
Average invested capital	744 000	1 842 625	5 892 175	1 218-125
Return on investment (ROI)	138%	61%	64%	43%
Payback period of invested capital (months)	9	20	19	28
Opportunity cost of capital (6%)	44 640	110 558	353 531	73 088

### 3.4 F.U's profitability and use of income

Analysis of the performance of the various selected fishing units appears to indicate that artisanal fisheries constitutes a profitable activity, whatever the technique of capture used.

Each type of fishing sets off a capacity for self-sufficiency, enough to cover operation costs, depreciation of invested capital and payment of debts.

The purse seine generates a gross value added of 15,070,000 FCFA for an average capital investment of 5,892,175. The ratio of returns on investment capital (owner's net profit/invested capital) stands at 64%.

Despite the profitability of this type of fishing, the share of income allocated to capital is the lowest (44%), like for ice carrying long line (33%).

In the system of allocating value added described above, the share that pays for the various elements of the capital is allocated to the owner and also constitutes his share because generally, in practice, the owner is not part of the team, therefore, he is not included in deductions from the number of shares.

Should the need arise, the owner's share is awarded the captain which amounts to a subtle means of doubling the latter's share.

The use of carrier canoes is being progressively abandoned to limit some types of operation cost at this post-devaluation period when the price of fuel and spare parts burdens the profitability of fishing campaigns.

Results of the study indicate that the simple line yields the highest profitability ratio (138%) than the three others. This situation is definitely due to the fact that these units capture fish with high commercial value. The trade in demersal species has been improving steadily since devaluation and there is an acute demand from factories for exports.

The purse seine is the fishing method that requires the highest investment.

The set gill net and simple line use relatively limited means. Invested capital, i.e. 1,218,125 FCFA and 744,000 FCFA respectively, hardly attracts a gross annual value added of not less than 2,071,500 FCFA and 2,590,000 FCFA.

The 43% profitability ratio for set gill net and 138% for simple line confirms the interest of these techniques especially for the poorest artisanal fisherman.

The opportunity cost in capital corresponds to the return the investor would receive, i.e. 6%, if he placed his capital in a long term deposit account. It is observed that the return on investment in artisanal fisheries is very much higher than the opportunity cost of capital. The profitability of Hann fishing units has been slightly altered by the system of trading in force.

The characteristics of this beach lies in the fact that intermediaries, usually female members of the canoe owner's family, are delegated the duty of selling the landed catch. Consequently, they are in a position to fix prices for the producers depending on demand and supply on the beach.

The seller, who is generally a woman, sells off all or a considerable amount of the catch to middlemen (at preferential prices) with whom they share the same "bana" or group. The latter without spending a penny, mark up the price and re-sell to wholesale fishmongers, who in this virtually generalised plan on Hann beach, have no direct access to the catch.

Theoretically, the disadvantage of this practice is that it lowers the price from producers and their turnover but enriches the sellers and middlemen on the beach.

However, the profit from these operations consolidates the family budget within which wives play a decisive role.

#### **4. CAPITAL INCOME MANAGEMENT**

##### **4.1 Definition and sources of financing**

Capital represents all the goods used during the activity of production units (Flouzat) and intended to produce other goods and services.

Within the context of artisanal fisheries, canoe, gears and engines constitute technical capital.

New investment elements have appeared with the change in fishing techniques, i.e. insulated boxes, echosounders fitted on ice carrying long line boats.

The initial capital required for artisanal fisheries is relatively high (2,400,000 FCFA on the average).

This investment is financed through the boat owners' savings or loans from financial institutions or informal credit. It is common practice to combine these various sources of financing. Women also contribute to equipping boat owners by giving their personal savings.

The Hann savings and loan fund, a mutual benefit structure belonging to local people, collected about 85,000,000 FCFA by April 30 1995, of which 35% came from canoe owners and fishermen.

This financial package services the maintenance of Fishing Units and other domestic expenses but very rarely used in establishing or enlarging production capacities.

Concerning institutional credit, the National Agricultural Credit Fund of Senegal has, since 1990, granted a total amount of 107 million FCFA to 25 Economic Interest Groups with each group having an average of 15 fishermen.

This amount provided the complete equipment of 8 purse seines, the acquisition of 40 outboard engines and other materials.

However, the bulk of the source of financing is still in the informal sector. Family solidarity and inter-personal relations, to a large extent, facilitates the fulfilment of capital needs.

#### 4.2 Allocation of capital income

Capital receives the least amount of income to be shared by fishing units with a huge capital outlay, 44% and 33% for purse seines and ice carrying long lines respectively.

In this type of fishing, the canoe owner receives the amount considered as payment for the capital. The situation is as follows:

Table 7.- Cash Flow analysis

	Purse seine	Set gill net	Simple line	Long line (ice)
Boat owner's share	6 630 800	1 035 750	1 295 000	2 489 467
Boat owner's net income	3 745 550	-522 313	1 029 405	1 129 757
Cash Flow	6 151 946	928 750	1 201 000	1 864 470
Capital	5 892 175	1 218 125	744 000	1 842 625
C.F./Capital	104%	76%	161%	101%

Apart from set gill nets, cash flow generated by fishing operations covers investment cost, enough to renew production inputs.

However, the boat owner's income for his work must be taken into account. It is quite difficult to find an adequate base to calculate the opportunity cost of work. But, the income of a crew aboard an industrial fishing unit can be used as reference. This varies between 65,000 and 90,000 FCFA per month, corresponding to an annual income of about 780,000 to 1,080,000 FCFA which is very close to the earnings of the owner of a simple line or ice carrying long line canoe. It is appreciably higher than what accrues to the owner of a set gill net fishing unit. However, the net income of the owner of a purse seine canoe is more than three times higher than the opportunity cost of labour.

At this point, it is proper to mention that the balances referred to are actually income flows collected from one period to another by boat owners. The periods of good luck follow "Kaya" (poor catch) periods during which boat owners dip into their savings to meet needs other than the renewal or increase of their capital. All the problems they encounter over the use of returns on capital are due to this inability of the boat owner to manage the cash produced by his operation.

Capital incomes are used to satisfy domestic needs after a transitional phase of savings whose duration depends on the level of catch and their periodicity.

Returns on capital are mixed up with the personal income of the boat owner and contributes to meeting the major needs of the family:

- the family's feeding expenses
- family ceremonies (baptisms, funerals, marriages)
- religious ceremonies
- education and health.

It is not easy to quantify these various items due to the diversity of the systems of operations encountered.

Thus, boat owners possessing set gill nets or simple lines manage family operations. The crew is mainly family members. Common family costs (religious ceremonies, wedding, family ceremonies...) are borne by the boat owner from capital incomes that are hoarded/saved (more and more) at the Mutual Credit Fund of Hann.

On the contrary, purse seine crew are less stable, the movement of fishermen is more frequent and production relations between the boat owner and fishermen are simpler: the fisherman is paid according to the size of the catch and the percentage allocated to earned income.

However, a large number of the owners of Hann purse seines lodge and feed fishermen irrespective of the shares paid.

Therefore, it is important to take into account the various expenditures made by the boat owner. In the framework of family management, the results of the survey are given in Table 8.

Table 8 - Household expenditures

	Purse seine	Set gill net	Long line (ice)	Simple line
Feeding	2 000 000	730 000	500 000	730 000
Religious / family ceremonies	1 000 000	400 000	2 000 000	400 000
Health / education	60 000	30 000	400 000	30 000
Clothing	200 000	150 000	500 000	150 000
Total	3 260 000	1 310 000	3 400 000	1 310 000

Thus, it is observed that except for the purse seine, the expenditure declared by boat owners is much closer to self-financing capacity and cash flow than to net income. This tends to indicate that on the average, boat owners make no provision for depreciation and probably very little savings. On the contrary, in the case of purse seines, they would consume only their income which one way or the other permits them to save up the amount equivalent to depreciation.

A consumption budget survey would definitely allow a more reliable comparison of resources (boat owners' incomes) and allocation of resources (domestic expenditure and savings) in order to draw up the final balance of operation and the boat owner's account.

In the final analysis, the boat owner who considers the depreciation of capital as personal individual income does not take into account the risk to which he exposes his operation by not reserving funds for the renewal of his equipment.

Some of the fishermen in the sample are aware of the need to renew production inputs by saving up accordingly.

However, domestic expenditure often leaves very little margin to operators.

The returns on operating incomes have made many boat owners sceptical.

## 5. RECOMMENDATIONS

The major problem of methodology is, undeniably, in the sensitivity of the issues connected to income and its application. The collection of this type of information through an already drawn up questionnaire is a major constraint: the absence of consecutive reliable data, the failure of the boat owner to keep an account showing incomes and expenditure of fishing units (only one boat owner was able to provide data recorded on an old diary).

The single visit paid to boat owners does not also permit the recording of seasonal income flows and variations. Entries usually concern current statements or those from the recent past. Consequently, interpretations can introduce significant biases in the assessment of the elements of analysis.

Finally, it is useful to devote a longer time to the study to enable the elaboration and

administration of a questionnaire on revenues and expenditure outside the operation. A consumption budget survey carried out on the same targets would boost the questionnaire provided in the annex and help in understanding the micro economic reality of the boat owner, especially the allocation of capital incomes.

The surveys took place during the Tabaski (Id-el-Kebir) holiday which is an "annual holiday" for fishermen. This holiday usually mark the end of fishing campaigns when many boat owners take a break.

A longer time frame (one complete fishing campaign) would be needed for this type of study which involves much trust between the researcher and the interviewee.

The determination of returns on capital was easier than a knowledge of allocation mechanisms.

Boat owners state with a lot of estimation the expenditure made within the framework of production activities and outside operation.

The main point of the performance concerning this chapter are the results of cross-checking. From this initial study, it is possible to attempt a systemization of knowledge of this mechanism, based on the following recommended steps:

1. collect information on a complete fishing campaign based on a very representative sample with a view to determining the profitability of the fishing units reserved;
2. determine the mode of sharing operation income and, especially, return on capital;
3. conduct a consumption budget survey among the fishermen constituting the sample with a view to defining the main capital incomes in detail;
4. establish a relationship between the boat owner's net income after the deduction of operation and family costs;
5. analyse the mode and sources of financing investments based on residual capital incomes and additional resources requested.



# ANNEX

**Étude sur l'affectation des revenus  
du Capital - Pêche artisanale  
Hann**

**QUESTIONNAIRE**

**Village de Hann**

Date de l'enquête : ...../...../1996

**I - Données générales sur les Unités de Pêche enquêtées**

- 1.1 N° d'identification de l'U.P. : \_\_\_\_\_
- 1.2 Type de pêche pratiqué : \_\_\_\_\_
- 1.3 Nom du propriétaire : \_\_\_\_\_
- 1.4 Age : \_\_\_\_\_ Ethnie : \_\_\_\_\_ Niveau d'instruction : \_\_\_\_\_
- 1.5 Situation de famille : \_\_\_\_\_
- 1.6 Personnes à charge : \_\_\_\_\_
- 1.7 Ancienneté : \_\_\_\_\_
- 1.8 Activité(s) antérieure(s) : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 1.9 Autres activités : \_\_\_\_\_
- 1.10 Taille de l'équipage : \_\_\_\_\_

## II- Détermination du revenu d'exploitation

### 2.1 Charges fixes : (immobilisations)

	Moteur(s)	Pirogue(s)	Engins de pêche	Autres matériels
Coût à l'achat FCFA				
Date d'acquisition				
État à l'acquisition				
Mode de paiement				
Durée de vie				
Valeur résiduelle (déclarée) FCFA				
Valeur résiduelle (calculée) FCFA				

### 2.2 Charges d'exploitation :

	Coût	Montant par sortie
Carburant (y compris huile)		
Réparation / entretien		
Glace		
Nourriture		
Ficelle - Rémunération / équipe		
Lignes + hameçons - Appât		
Autres charges d'exploitation		
Coût total		

- 2.3 Produit d'exploitation
- Nombre de sorties par mois : \_\_\_\_\_
  - Produits pêchés : \_\_\_\_\_
  - Espèces pêchées : 

	Poids (kg)	Valeur
_____		
_____		
_____		
  - Recettes moyennes / sortie : FCFA \_\_\_\_\_
  - Destination des produits pêchés : \_\_\_\_\_

- 2.4 Disponibilités :
- Origine : \_\_\_\_\_
  - Montants : FCFA \_\_\_\_\_

2.5 Dettes (exigibles) ≤ 1 an : FCFA \_\_\_\_\_

2.6 Créances ≤ 1 an : FCFA \_\_\_\_\_

2.7 Identification des débiteurs : \_\_\_\_\_

2.8 Identification des prêteurs : \_\_\_\_\_

2.9 Autres revenus :

<u>Nature</u>	<u>Montant</u>
_____	
_____	
_____	

2.10 Dons aux parents et amis :

Espèces	Poids (kg)	Valeur
_____		
_____		
_____		
_____		

### III- Affectation du revenu d'exploitation

3.1 Rémunération des facteurs de production

- Type de rémunération : \_\_\_\_\_
- Description du système de rémunération : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3.2 Rémunération du travail :

Montant : \_\_\_\_\_

3.3 Rémunération du capital : \_\_\_\_\_

	Moteurs	Pirogues	Filets	Autres
Montant				

3.4 Diverses affectations : \_\_\_\_\_  
\_\_\_\_\_

## IV - Affectation du revenu du capital

4.1 Épargne : \_\_\_\_\_

4.2 Paiement de dette : \_\_\_\_\_

4.3 Réinvestissement : \_\_\_\_\_

4.4 Nourriture : \_\_\_\_\_

4.5 Autres : \_\_\_\_\_

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