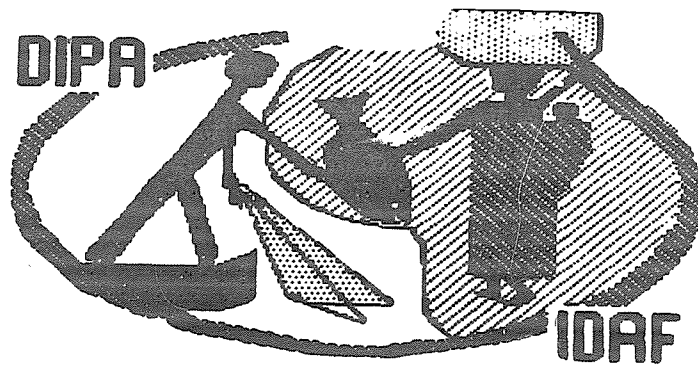


IDAF/WP/34

March 1991

COST AND EARNINGS AND CREDIT STUDIES ON  
GHANAIAN CANOE FISHERIES





March 1991

Cost and Earnings  
and Credit Studies on  
Ghanaian Canoe Fisheries

by

E. Callerholm Cassel

Programme de Développement Intégré  
des Pêches Artisanales en Afrique  
de l'Ouest - DIPA

Programme for Integrated Development  
of Artisanal Fisheries in West  
Africa - IDAF

GCP/RAF/192/DEN

With financial assistance from Denmark and in collaboration with the Republic of Benin, the Fisheries Department of FAO is implementing in West Africa a programme of small scale fisheries development, commonly called the IDAF Project. This programme is based upon an integrated approach involving production, processing and marketing of fish, and related activities ; it also involves an active participation of the target fishing communities.

This report is a working paper and the conclusions and recommendations are those considered appropriate at the time of preparation. The working papers have not necessarily been cleared for publication by the government (s) concerned nor by FAO. They may be modified in the light of further knowledge gained at subsequent stages of the Project and issued later in other series.

The designations employed and the presentation of material do not imply the expression of any opinion on the part of FAO or a financing agency concerning the legal status of any country or territory, city or area, or concerning the determination of its frontiers or boundaries.

IDAF Project  
FAO  
Boîte Postale 1369  
Cotonou, R. Benin

Télex : 5291 FOODAGRI  
Fax : (229) 313649

Tél. 330925/330624

Mrs. E. Callerholm Cassel is an Associate Professional Officer-Economist with IDAF at Cotonou. The report was prepared for and presented at the FAO/IDAF Subregional Workshop on alternatives to the large dugout canoe for use by small-scale and artisanal fishing communities, held on 26-29 November in Accra.

IDAF also assisted in the following reports prepared for the same meeting : (i) Sheves, G.T. (1990), A report on the Ghanaian dugout canoe and the canoe carving industry in Ghana, 109 p., (ii) Gulbrandsen, O. (1990), Report on visit to Ghana 6 May - 2 June 1990, 63 p., (iii) Ampong, F.F.K. (1990), Alternative boat-building timbers with special reference to Ghana, 34 p.

In September 1990 the approximate (Forex) exchange rate was 350 cedis to US \$ 1, and 1300 cedis to 1000 F CFA. The petrol price increased (150 %) from 400 cedis to 1000 cedis per gallon (approx. 227 cedis per litre) over the period July to November.

IDAF is most grateful to staff of the Department of Fisheries Ghana, for assistance in gathering data for this work.

## Contents

	Page
Objectives	1
Methodology	1
<u>I. COST AND EARNINGS STUDIES FOR BIG DUG-OUT CANOES IN GHANA</u>	
0. INTRODUCTION	3
1. INVESTMENT COST - LIFE SPAN - FIXED COSTS	5
1.1 The Canoe	5
1.1.1 Factors influencing the investment costs and the life span	5
1.1.2 Assumptions and approximations	6
1.2 The Engine	7
1.2.1 Factors influencing the investment costs and the life span	7
1.2.2 Assumptions and approximations	7
1.3 The Gear	8
1.3.1 Factors influencing the investment costs and the life span	8
1.3.2 Assumptions and approximations	8
2. VARIABLE COST - VESSEL EXPENSES	9
3. VARIABLE COST - OPERATION EXPENSES	10
3.1 Fuel, Oil, Food, Ice and Bait Costs	10
3.2 Fishing Trips per Year	11
4. VARIABLE COSTS - CREW EXPENSES	12
5. REVENUES	13
5.1 Fish Prices	13
5.2 Catches	14
5.3 Fishing Trips	15
6. CONCLUSIONS AND A WORD OF WARNING	16
TABLES	
<u>II. CREDIT ARRANGEMENTS IN CANOE FISHERIES OPERATIONS</u>	29
7. INTRODUCTION	29
8. FINANCING WITHIN THE FAMILY	30
9. INFORMAL FINANCING OUTSIDE THE FAMILY	31
9.1 "Fish Mammies"	31
9.2 Professional Money Lenders	33
9.3 Canoe Carvers	33
9.4 Crew	33
10. SUSU	34
11. FORMAL LENDING - BANKS	36
12. CONCLUDING REMARKS	37



### Objectives:

In connection with a possible canoe replacement programme information about the required investments as well as the costs involved in fisheries operations with big dug-out canoes are needed. A better understanding of the roles performed by the different agents financing these operations are also important. This study, based on fieldwork in Ghana, is meant to contribute to this end.

### Methodology:

With the objective of obtaining data from various types of canoe fisheries, cost and earnings recording booklets were distributed in February to the secretary of the Gbese Fishermen's Association in Accra. For different reasons, however, the records have not been maintained and it was decided to abandon this approach and replace it with interviews with canoe owners, chief fishermen, village elders and other persons involved in fisheries related activities. The interviews were carried out during two trips to Ghana (24/6 - 4/7 and 9/7 - 18/7 1990). The following cost and earnings figures thus date from that period. Later developments and changes in prices, notably the increase in fuel prices in September has not been incorporated in the study, but has been taken into account in the sensitivity analysis.

The fishermen interviewed were by no means chosen through a random sampling method, but chosen amongst those at hand at the landing sites by the Fisheries Officers.

The answers given can thus not be regarded as representative for the whole population. On the contrary, amongst the interviewed one can assume a high proportion of canoe owners / fishermen picked out due to their ability to answer the questions clearly (hence might be more aware of the economics of their operations and maybe more successful than their colleagues).

The presence of a high proportion of fishermen, that for one reason or another (problems with the motor etc), were not as busy as the others that day can reverse the bias for exceptionally successful fishermen.

In an attempt to correct these biases the interviews were followed up by discussions about their validity with the Fisheries Officer covering each landing site.

Concerning the revenue side of the operation, aggregate data in form of catch and price statistics from the Fisheries Research and Utilisation Branch were used to cross-check the sometimes doubtful answers obtained from the fisherfolk themselves.

As for the study of the credit arrangements in the canoe fisheries operations, informal interviews were held, both with

the "creditor" and the "debtor" side, during the two field trips mentioned above. During a third trip in October complementary information about the credit facilities in the formal bank sector was collected.

It goes without saying that an investigation in such a complex matter as cost and earnings for different types of canoe fisheries in a limited timeframe is necessarily incomplete and that certain elements in the calculations will be incorrect. However, the findings do provide a useful indication of the economics of canoe operations.



## I. COST AND EARNING STUDIES FOR BIG DUG-OUT CANOES IN GHANA

### 0. INTRODUCTION

It was decided to concentrate the efforts on five types of gears used by the big canoes namely fisheries operations with "Ali" (sardinella drift / encircling net) "sieve" (purse-seine; "Poli" and "Watsa"), and Hand-line and Drift Gill Net canoes.

In tables 1 to 5, cost and earnings figures for fisheries operations with canoes using these five different types of gear are presented.

For each type of gear a financial analysis has been made. The yearly operation expenses (fuel, oil etc), the crew's share, the maintenance and repair costs and the fixed costs are deducted from the yearly revenues in order to give the reader an idea of the magnitude of the owner's earnings.

In the sensitivity analysis that follows, certain key assumptions have been altered and the following absolute and relative change in the owner's earnings have been calculated and presented. The five central factors manipulated this way are; the number of fishing trips (both for the whole year and only during the peak season), the catch volumes, the fuel price, the canoe price and the life span of the canoe.

In table number 6 the cash flows for the five types of gear are given. In the same table the Net Present Value (the difference between the discounted benefits and the discounted costs of the operation) and the Internal Rate of Return (the discount rate which would make the discounted costs equal the discounted benefits) are calculated. These two figures should however, be interpreted with great caution.

It should also be borne in mind that to calculate the net revenue for a canoe using only one single type of gear is a simplification. Many canoe fishermen operate in fact with two or more gear. For example a fisherman can operate an Ali for the sardinella fishery and switch over to a Poli for the rest of the year. Thus many canoes are in reality of dual purpose.

In the 1989 canoe survey the occurrence of what is called mixed net (a combination of Poli and Watsa, and sometimes Ali) is for the first time recorded and it is noted that pure Poli or Watsa are becoming rare. It is, therefore, increasingly difficult to separate the gear as done in this report.

The various costs as well as the revenues are often influenced by other factors than the gear used.

Some of the most important of these factors, as well as the assumptions and approximations that have been made in the study, are pointed out in the text.

Table 0.

## SUMMARY of annual Cost and Earnings of major operating gear (C 000)

	Ali	Poli	Watsa	Line	DGN
Revenues	4.732	7.830	7.632	9.150	6.356
Variable Cost:	1.394	1.557	1.557	6.182	1.958
Trip.Exp.					
Variable Cost:	1.669	3.136	3.038	1.484	2.199
Crew share					
Variable Cost:	290	668	518	225	420
Vessel Exp.					
Total Variable Cost	3.353	5.361	5.113	7.891	4.577
Fixed Cost	706	1.460	1.350	425	985
Total Costs	4.059	6.821	6.463	8.316	5.562
Owners Earnings	673	1.009	1.169	834	794
Investment Cost	3.550	6.900	7.200	2.020	3.750
Crew Size	10	14	13	8	9
Fishermen average wage per month	14	19	19	15	20
NPV (disc.rate 26%)	(129)	(849)	(495)	1.158	51
IRR	24,0%	19,1%	22,7%	52,9%	26,7%

SUMMARY - Sensitivity Analysis;  
decreases in the canoe owner's earnings (%)

	Ali	Poli	Watsa	Line	DGN
Base Case					
10% decr. fishing trips	24,8%	31,1%	26,0%	17,8%	27,7%
10% decr. in catch(or price)	35,2%	<u>38,8%</u>	32,6%	<u>54,9%</u>	40,0%
20% decr. fishing trips peak	20,2%	20,4%	24,9%	26,0%	28,5%
10% incr. fuel price	10,4%	7,7%	6,7%	7,3%	12,3%
50% incr. fuel price	<u>51,8%</u>	38,6%	<u>33,3%</u>	36,3%	<u>61,6%</u>
10% incr. canoe price	1,8%	2,0%	1,9%	2,4%	2,2%
20% incr. canoe price	3,6%	4,0%	3,7%	4,8%	4,4%
50% incr. canoe price	9,0%	9,9%	9,3%	12,0%	11,0%
25% decr. Lifespan canoe	6,0%	6,6%	6,2%	8,0%	7,3%
NPV (in the "worst" case, disc.rate 26%)	(1.089)	(2.108)	(1.565)	(101)	(1.296)
IRR (in the "worst" case)	5,7%	6,1%	15,2%	23,3%	2,7%
Sensitivity indicator:	1,5	6,8	0,7	5,6	1,8
150% incr. fuel price Decrease in canoe owner's earnings:	155,5%	115,7%	99,8%	109,0%	184,9%
NPV:	(3.005)	(2.102)	(3.707)	(1.342)	(3.988)

## 1. INVESTMENT COST - LIFE SPAN - FIXED COSTS

It might be worth mentioning that all the questions concerning investment costs were put in the form; how much would it cost you to replace your canoe/engine/net today, thus avoiding the problem with inflation.

The absence of expenses for interest payments must also be explained. Although normally a common feature in cost and earnings calculations for big industrial investments the interest rate charged for financial services in the small scale artisanal sector is not so straight forward.

Few of the interviewed fishermen had financed their investments via the formal banking system and thus few could give a precise answer about the costs for capital. Some of the investments are financed by the canoe owner and/or his family, that is to say that the canoe owner's interest costs are nil. Other investment costs are covered by loans from fish mummies. In these cases the interest charged is seldom explicit but paid in kind or more often, by selling the fish to preferential prices. Obviously it is difficult, in an interview survey like this, to separate the two prices from each other and the risk is high that the costs for borrowed investment funds will be double counted if the preferential price is taken and an estimated cost for interest is added on top of that (see further discussions about the financing arrangements). Therefore even if it is undoubtedly not the truth in all cases, the cost for the canoe owner to finance his investment may be zero.

### 1.1 The canoe.

#### 1.1.1 Factors influencing the investment costs and the life span

The differences in canoe prices noticed for similiary sized canoes can be attributed to the negotiation skill of the fisherman vis-a-vis the canoe carver/agent.

The cost of transporting the hull down to the beach can also be somewhat higher for the landing sites far away from the carving sites.

However, the most dramatic variations noticed between different landing sites concerns the life span of the canoe.

The very rough landing conditions in some places and the relatively protected sites in others influence the life span profoundly.

A comparison of the average life spans for Poli canoes in the Greater Accra region for example, indicates that the average life span for a Poli canoe in Tema is 10 years, at the Light House Beach in Accra 6 years--and only 4 years at the rough beach in

Chorkor. Consequently the depreciation costs felt by the canoe owner will vary widely along the coast. However, migration of fishermen can, on the other hand, somewhat diminish these variations.

Apart from the difference in the life span due to different kinds of landing conditions, the life span of a canoe can be shortened by a low quality of wood in the hull.

A surprisingly high proportion of the interviewed had had problems with the wood quality which had meant that they were forced to buy new canoes after only 1.5 - 2 years.

#### 1.1.2 Assumptions and approximations

It was decided to focus the study on canoes at least 13 meters long and with a width of at least 1.65 meters.

It must be pointed out that for certain types of canoes, especially the Line fishing- and Drift Gill Net canoes, this size is substantially bigger than the average size for these canoes.

The 1986 canoe survey, which contained information about the measures of the canoes, showed that the mean length of Ali/Poli/Watsa (APW), Line fishing and Drift Gill Net canoes were; 13.7, 9.3 and 9.3 meter respectively.

For the canoes included in this cost and earnings study the following mean length were noted; Ali 13.0 meter, Poli 15.0, Watsa 16.5, Line fishing 13.5 and Drift Gill Net 14.5 meter.

The results in this study will therefore be representative for the big canoes in each group, not necessarily for the various canoe types as such.

The investment cost for a new canoe strongly correlates with the size of the canoe, with the smallest one, the Ali canoe, averaging 850 0000 cedis and the biggest - the Watsa canoe - 1 300 000.

Since this study is done in connection with a possible canoe replacement programme, special attention has been given to the possible impact of an increase in the canoe price.

The sensitivity analysis made for each type of canoe shows that moderate increases in the canoe price (10-20%) do not alter the result to any larger extent.

Not even an increase of the investment cost of 50% appears to be totally negative for the profitability of the fisheries operations. The decrease in the owner's earnings after such an increase will range from 9-12%.

The approximate average life span for the studied canoe types range from 5 to 7 years.

The difference between the canoes is partly caused by a different intensity in fishing.

The life spans are also affected by considerations of security at sea.

For the Line fishing canoes the life span is lower than for the other canoes due to the fishermen's unwillingness to use too old a canoe as the fishing trips often last for several days. At some landing sites the line fishermen used to sell their canoes, still in good conditions, to other types of canoe fishermen that do not go away so far to fish.

An example of that are the Watsa fishermen in Sekondi that claim that they use these second hand canoes for 5 to 10 more years.

A sensitivity analysis made shows that a 25% decrease in the approximate life span only results in a 6-8% decrease in the owner's earnings.

## 1.2 The engine.

### 1.2.1 Factors influencing the investment costs and the life span

The price paid for the engines varies depending on where they are bought.

Generally the prices tend to be up to 5-15% higher for landing sites far away from Accra, due to the sometimes high transportation costs.

The landing conditions as well as the availability of spare parts are two important factors in determining the life span of the motor.

Although the supply of spare parts is much better now than some years ago, with two pick-ups from Japan Motors going up and down the coast, to help service the engines, it can still be difficult to get spare parts in some areas.

If and when the fishermen use wrong parts they can shorten the life span of the engine considerably.

A wrong mixture of petrol and oil can also shorten the life span.

Most of the interviewed were aware of this and underlined the importance of choosing a reliable person as responsible for these operations to avoid being cheated.

### 1.2.2 Assumptions and approximations

The Yamaha outboard engines are enjoying almost a monopoly situation in Ghana and for bigger canoes the 40 horse power outboard engines are preferred.

Some years ago, when fisheries inputs were in very scarce supply, different schemes were introduced to allocate outboard motors, bundles of nets, floats, leads, mending twine, rope etc. The fishermen fortunate enough to profit from these arrangements obtained their engines and gear at government set prices, at that time up to three to four times lower than the prevailing price on the open market. With the introduction of the foreign exchange auction system and other other dramatic changes in the

economy the disparity between the government set prices and the prices on the open market has become less marked. Still, it must be noted that the gap between the two prices increase during the very peak of the peak season when the demand for fisheries inputs are higher than the supply.

At present the Japan Motors sells 40 horse power outboards for 760 000 cedis. Due to imperfect information and/or high transport costs of the motors to the landing site, the actual price paid can be substantially higher. The average price for the interviewed fishermen was 900 000 cedis.

The lifespan of the outboard engines surveyed averaged between 2 and 4 years.

### 1.3 The gear.

#### 1.3.1 Factors influencing the investment costs and the life span

At some landing sites far away from Accra the fishermen have problems finding the right gear, especially nets with the mesh size they want. In these places middlemen, buying the required equipment in Accra or in neighbouring countries, operate and their services increase the costs.

As for the canoes and the engines the life span for the gear depends on the geographical setting. Difficult bottom conditions, careless trawlers in the fishing area, etc, shorten the life span.

#### 1.3.2 Assumptions and approximations

The big variations in the sizes of the gear pose a special problem.

The general trend in the last few years has been towards bigger and bigger gear but there are still a lot of fishermen that, due to financial constraints or other reasons, do not have very big gears even if they operate from big canoes.

In general the investment cost for the gear (except for Line fishing canoes) is by far the most important investment cost, with its share of the total investment ranging from approximately 50 to 70%.

The question about the estimated life span and hence the estimated fixed costs per year poses a lot of problems since the nets are constantly replaced and repaired. Therefore it is difficult to talk about the fixed costs for gear in the same way as for the motor and the canoe.

During the interviews, for example, many fishermen insisted that their nets were more than twenty-five years old although they were well aware that "the net" had been replaced in bits and pieces many times since they bought it.

However, in the calculation the concept of fixed cost has been utilised in all cases except for the Line fishing canoe. For this canoe all expenses are included in the repair costs. For the other canoes the utmost care had been taken to avoid double counting fixed costs and yearly repair and replacement costs for gear.

In any case, when it comes to the relative share of the revenues between the canoe owner and the crew, it does not make any difference whether one puts the expenses under the headline fixed costs or variable costs, since the two are both expenses born by the owner (see 2.0).

For a discussion about the development of government set vis-a-vis open market prices for gear the reader is referred to 1.2.2.

## 2. VARIABLE COST - VESSEL EXPENSES

The factors that influenced the life span of the canoes, the engines and the gear will naturally influence the costs for maintenance and repair for them, and are already discussed at length above.

Since it is very difficult for the fishermen to quantify how much they spend on repair and maintenance during a "normal year", a series of questions like "How much do you spend if you are lucky /unlucky during a year?. How much did you spend last year?" etc were used. The answers then constituted the base upon which a rudimentary average for each vessel were calculated.

The average costs for repair and maintenance for the canoes range from 35 000 (Line fishing canoe) to 60 000 cedis (Watsa canoe). The former type is, for safety reasons (see 1.1.2), used for a shorter period than the other canoes.

The repair and maintenance costs for outboard engines range from an average of 190 000 cedis for the Ali and Line fishing canoes to 315 000 cedis for the Drift Gill Net canoes.

The problems involved in separating the repair and replacement costs for gear from the yearly depreciation rate has already been discussed in 1.3.2.

For Line fishing, where all costs are included under variable costs, the replacement costs, for new hooks, are substantial at nearly 1 million cedis, whereas for an Ali net, with less need for repair, the replacement cost is only 60 000 cedis.

It must however be remembered that for the estimations of repair and maintenance costs for canoes as well as for motors and gears, the variations around the average are substantial.

In case of the canoe for example, a good year can mean outlays only for painting whereas other years with major accidents can

imply expenses many times the mean value.

### 3. VARIABLE COSTS - OPERATION EXPENSES

#### 3.1 Fuel, oil, food, ice and bait costs

The expenses during a fishing trip consist of several outlays, above all fuel and oil.

For the Line fishing, where the trips can last many days, costs for the crew's food, ice and bait must also be added.

The fuel expenses are of course a function of how far the fishermen have to go to catch the fish. This is a factor that varies considerably from one landing beach to another.

After the first "pilot interviews" where all the interviewed, without being asked, made a clear distinction between the trip expenses during the lean and the peak season, it was decided to treat these costs separately.

Although this treatment has the advantage that it shows the sometimes remarkable variations in cash flows for each vessel during the different seasons - a feature that is inseparable from the complex credit systems found in connection with the canoes operations - it is difficult to get a clear picture when one aggregates the answers.

While some fishermen, who follow the fish during the the herring season reported higher trip expenses during the peak season, other fishermen at other landing sites had to go very far to get fish during the lean season (that is to say they then experienced higher fuel costs than during the peak).

The latter, however, were a minority of those interviewed.

Due to the limited number of interviews it is, however, difficult to draw any general conclusions.

As already mentioned, the cost and earnings in this study date from June-July 1990. Thus it is upon the fuel prices at that time; petrol 400 and oil 2,500 cedis per gallon, that the figures in the tables are based.

In the sensitivity analysis the effects of a 10% as well as a 50% increase of the fuel and oil prices have been calculated.

The former manipulation leads to a decrease in the boat owner's earnings of around 7-12%. The reader might find the latter manipulation (with a decline in the owner's earnings with around 13-60%) more interesting since it equals the real price increase this autumn. It must however be born in mind that in a simple sensitivity analysis like this, where one variable is manipulated at a time, all others being equal, no account is taken of the effects the change undoubtedly will have on the other variables. It is highly unlikely that the other costs and earnings will remain the same if the fuel prices are increased by 50%.

Finally, it might be worth mentioning that although the fuel



price in Ghana has increased it is still low compared with those in the neighbouring countries. The cost of petrol and oil for a fisherman in Côte d'Ivoire, for instance, is twice as high as for his Ghanaian colleague. This could mean that, if Côte d'Ivoire fuel prices were introduced to Ghana, the overall returns from fishing would be drastically reduced.

### 3.2 Fishing trips per year

To obtain the yearly operation expenses the average cost for each trip must be multiplied by the total number of trips made during the year.

It must be born in mind that we are here discussing fishing trips not fishing days.

For Line fishing the fishing trips can last many days and for the other types of canoes the fishermen try to make more than one trip per day during the peak season.

As for the numbers of trips per week during the respective season all the interviewed reported fewer trips during the lean season. Those who did not live from "hand to mouth" preferred to stay at the beach mending the nets and doing needed repairs before the start of the season.

It was, however, a surprisingly high number of fishermen who said that they went out even if they had strong indications that the fish supply was meager. These fishermen, forced to get some fish to feed their families, spend nearly as many days at the sea during the lean- as during the peak season.

As already mentioned, the APW-fishermen are, during the peak season when fish is abundant, eager to go out two or sometimes three times a day.

However, the intensified fishing and the sometimes abnormally high catches can cause problems in places without cold store facilities.

In one of these places - Sekondi - they had decided to forbid the second and third trip per day during the peak season because of the depression of prices and waste of resources that the enormous catches caused.

The most common rest day is Tuesday, with some villages using other weekdays as a non-fishing day. In some places they also respect Sunday as a non-fishing day.

As for the days spent at the beach due to bad weather, lack of spare parts, funerals etc. the answers given are ambiguous.

Generally the fishermen seem, for one reason or another, to overestimate the number of trips they do per year, and the inflated figures given were reduced with assistance from fisheries officers with long experience.

To conclude, the number of fishing trips are not only a function of the fishing gear used but also of the availability of spare parts, the conditions of the landing site, the supply and demand for fish, the access to storage facilities etc.

It goes without saying that the number of fishing trips differs widely within each gear group and that the approximate figures presented in the tables shall be handled with caution.

#### 4. VARIABLE COSTS - CREW EXPENSES

At a first glance the sharing system does not look too complicated, at least if one should believe the interviewed and as long as we here are interested only in how big the total crew's share is - not the division between the crew members themselves.

All those interviewed, both canoe owners and ordinary fishermen, said that they more or less practiced the fifty-fifty share system. That is to say that after the deduction of the operational trip expenses (notably fuel and oil), the catch is divided into two - more or less - equal parts, one going to the crew - one to the canoe, engine and gear owner(s). In the case of Line fishing other operational expenses like bait, ice and food for the crew as well as replacement costs for hooks and lines are added to the fuel costs before the catch can be shared.

If the owner takes active part in the fishing he first gets half of the catch and then his crew share.

The deviations from this fifty - fifty share system noticed were to the canoe /engine/gear owners' (often the same person and will hence forward be called the canoe owner for convenience) favour. But their shares were never said to be substantially higher than that of the crew.

At a second glance the sharing systems practiced are more complicated than that.

The owner has certain obligations to the crew members and is often expected to help them in case of distress. Some canoes deducted a share for emergencies that could be used in case of death, sickness etc, but also for repairs like major damage to the net etc. If not utilized, the fund is used for festivities.

In many cases the crew is not paid, except for some pocket money and fish for food, until the end of the season. In the meantime the accumulated revenue gives the owner an interest free loan and thus increases his share (see further the chapter about financing arrangements). Further more, one should not underestimate the difficulties the crew has to know how big their proper share actually is. It is highly probable that in the end the canoe owner's share exceeds the crew's, sometimes substantially so.

Finally, some words about the estimates behind the calculations of the fishermen's average earnings. The size of the crew does not only vary considerably within each gear group, it also varies over the year, with more members during the peak- than during the lean season. The figures used here are estimates of the yearly average.

Some of the crew members (eg the apprentices) do only receive a very minor part of the crew's total share. The numbers of fishermen used in the calculations in this report do not necessarily correspond to the actual number of fishermen on board, but are estimates of the number of fishermen that actually share the crew's share.

## 5. REVENUES

It tends to be particularly difficult to get reliable information about the revenue side of the canoes operations through interviews of this type.

This is partly because the fishermen have an understandable scepticism towards the interviewer and do not want to give away their business secrets, partly because they, even if they wanted to, can not be very precise in their answers.

In most of the cases the Ghanaian fishermen sell their catch by crates. The crate does not, however, contain a fixed amount of fish but varies with the supply and demand. During the lean season the crates might be only half full, but the more abundant the catches are the fuller the crates will be. Thus, although the price per crate remains the same, the quantity will go up and hence the price per kilo down. Eventually when the supply is considerably higher than the demand the price per crate will go down.

Aggregate data compiled by the Research Unit in Tema has been used as a background and as a "check up" when the approximations in the study were made.

### 5.1 Fish prices

To approximate an average price for the fish captured is very difficult due to the high variations in price between landing sites and fluctuation in price over the year and during the day. In general the prices noted early in the morning are higher than the prices later in the day.

The price for some of the species that are particularly abundant during the peak season are considerably lower during this period. This is reflected in the approximations used in this study, where the peak season's prices are around half of the prices during the lean season.

But the prices for different species are of course different and

since the relative importance of different species in the catch changes over the year, the final average prices used in the calculations reflects not only the development of the prices for each species over the year but also the change in catch composition.

This explains for instance why, in the case of the Drift Gill Net canoe which catches much more high value species during the peak season, the average price for the species actually caught during the peak season are nearly twice as high as the lean season price.

During the interviews the fishermen were asked to estimate the maximum and minimum price respectively, obtained during the lean and the peak season.

The spans between the maximum and minimum tended to be very wide and it seemed that the fishermen tended to overestimate the prices for the fish. The approximation finally used in the calculation are nearer the minimum price indicated by the fishermen rather than the maximum.

For the Line fishing only the revenue (the price multiplied with the quantity) per trip was given, therefore only the aggregate can be shown for this canoe type.

As it is very difficult to arrive at the "correct price" it is important to see how the revenues are affected by changes in the price assumptions.

The sensitivity analysis made shows that a 10% decrease in fish price hurt the profitability of the canoes operations profoundly, with a resulting decrease of the owner's profit around 35-55%. A decrease in the price like this naturally hurts the canoes that catch high value species, like the Line fishing- and Drift Gill Net canoes the most.

Finally, some comments must be made about the price we have been dealing with, that is to say the price that the fishermen are given as they are selling the fish from the canoe.

This price is affected by a lot of factors not least by the kind of credit relations that exist between the fisherman and the women that buy his fish.

These kinds of liaisons are dealt with in the chapter of financing facilities. Here it shall just be noted that the price given to the fisherman do not necessarily reflect the fish's real value for the whole family.

## 5.2 Catches

Naturally the catch and the composition of the catch varies between different landing sites and during the year.

Generally the catches are much more plentiful during the peak season (that is to say from around July to October and around December-February). The kind of species that are caught also differs as discussed under 5.1.

The difference in the volumes caught during the peak and the lean season are much more noticeable for some gear types than for others.

Amongst the the canoes studied, the Watsa- the Line and the Drift Gill Net canoes were noted to be heavily dependent on the captures they get during the peak season.

This can be seen in the sensitivity analysis made where the effect of a 20% decrease in fishing days during the peak season are calculated (see further 5.3).

The effects of a general 10% downfall in the captured volumes over the whole year are the same as a fall in the price for fish with the same percentage and are discussed under 5.1.

It must also be noted that the catches can fluctuate enormously from one day to another. For some types of gear this feature is more distinct than for others.

The Ali canoe is generally regarded as a canoe that gives regular and certain catches. In a Watsa canoe on the other hand, the fishermen can fail to catch anything for days, but if they are lucky they can earn as much money in a few days as to allow them to pay for a new engine.

Therefore many fishermen prefer to fish with differnt types of gear so as to diminish the risks involved in operations with high yield, but uncertain catches.

### 5.3 Fishing trips

The problems involved in estimating the number of fishing trips per season and over the whole year have already been discussed under 3.2. In the same chapter the approximations used in the calculations were also presented.

Given all the uncertainties surrounding the average number of fishing trips made, it is important to see how changed assumptions about trips alter the results.

Fewer trips reduce not only the revenues but also the expenses for fuel, oil etc (that is to say the operational expenses).

The combined result of these two changes is however a reduction in the owner's earnings.

Sensitivity analysis, for each type of canoe, have been made where the effects of 10% decrease in fishing trips over the whole year as well as a 20% decrease in the fishing trips during the peak season are displayed.

The calculations clearly shows how vulnerable the canoe operations are for events that diminish the number of fishing days, especially during the important peak season.

A 20% decrease in trips during the peak season reduces the canoe owner's earnings by 20-30%.

A 10% decrease in the trips during the whole year results in a

reduction of the canoe owner's earnings in the same range; around 20-30%.

Since the crew's share also will be reduced it is easy to understand why in some cases, the crew, although not formally their responsibility, helps the canoe owner to finance key spare parts or cover other repair costs to assure themselves not to miss the opportunity to go out fishing during the major season. It also explains why certain fishermen think it is worth while to have an extra outboard motor for their canoes. The additional cost is more than offset by the revenues earned through fewer than average undesired non-fishing days.

## 6 CONCLUSIONS AND A WORD OF WARNING

The above made comments have hopefully drawn the reader's attention to the shortcomings and difficulties to derive from a limited number of one-time interviews with fishermen; a general picture of the financial viability of fishing operations with different types of gear used by big dug-out canoes.

Consequently it is very difficult to have a precise idea of the canoe owners' capacities to finance a new type of canoe.

The Cash Flow Analysis for each type of canoe in table 6. should be interpreted with caution.

In calculating the Net Present Values (NPV) a discount rate of 26% (the present lending rate for unsecured loans in Ghana) has been used.

The resulting NPVs and Internal Rate of Returns are not very high, only the Line fishing operations (its investments needs are considerably less than for the other canoes) shows an IRR substantially higher than the prevailing lending rate. The NPVs for the Ali-, Poli and Watsa canoes are even negative at a discount rate of 26%. Had the canoe owner's management effort been estimated and properly costed for, the result should have been even more negative. One should also remember that the results are heavily dependent on the factors that are the most difficult to estimate, namely the number of fishing trips per year and the fish prices. A 10% decrease in each of these estimates alter the picture substantially (see again the sensitivity analysis).

The striking feature of the operations, however, are the wide fluctuations in the net revenues over the year and the concentration of profits in a limited period.

Among other things this fact has important implications for the financial side of the operations.

Since this study is done in connection with a possible canoe

replacement programme, it might be appropriate to once again point out an interesting feature of the sensitivity analysis made, namely that moderate increases in the canoe investment prices do not appear to alter the profitability of the fisheries operations to any larger extent.

As a last remark it must be underlined how interesting it would be to confront the above discussed result with findings obtained through a totally different approach - base line studies of a small number of big canoes over a year.

Table 1  
 Financial Analysis  
 Costs and Earnings for big Ali canoes  
 (Sardinella Drift/Encircling Net)

0. Investment Costs, Lifespan

	Cost	Exp.lifespan
Canoe	850.000	7
Engine	900.000	4
Gear	1.800.000	5
Tot.Inv.Cost	3.550.000	

1. Fixed Costs - Depreciation

Canoe	121.429
Engine	225.000
Gear	360.000
Tot.Fixed Cost per year	706.429

2(a). Variable Costs - Vessel Expenses (Repair and Maintenance)

Canoe	40.000
Engine	190.000
Gear	60.000
Tot.Rep.and Maint.Costs per year	290.000

2(b). Variable Costs - Trip Expenses

	Lean	Peak	Total
Fuel and Oil	6.720	7.840	
Number of trips	155	45	200
Tot.Trip Expenses per year	1.041.600	352.800	1.394.400

2(c). Variable Costs - Crew Expenses

Crew share per year	1.669.050 *
---------------------	-------------

3. Revenues

	Lean	Peak	Total
Aver.Price (crate)	3.900	1.900	
Aver.Catch (crate)	5	20	
Rev./trip	19.500	38.000	23.663
Number of trips	155	45	200
Tot.Revenue	3.022.500	1.710.000	4.732.500

SUMMARY - Annual costs and Earnings - Ali Canoe:

Revenues	4.732.500
Var.Costs (trip exp.)	1.394.400
	3.338.100
Var.Costs (crew share)	1.669.050
	1.669.050
Var.Costs (vessel exp.)	290.000
	1.379.050
Fixed Costs (depr.)	706.429
Owner's Earnings	<u>672.621</u>



SENSITIVITY ANALYSIS:  
Ali Canoe

	Total Revenues	Total Costs	Profit	Percent. Changes
Base Case	4.732.500	4.059.879	672.621	
10% decr.fishing trips	4.259.250	3.753.534	505.716	-24,8%
10% decr.in catch (or price)	4.259.250	3.823.254	435.996	-35,2%
20% decr.fishing trips peak	5.671.000	5.134.099	536.901	-20,2%
10% incr.in fuel price	4.732.500	4.129.599	602.901	-10,4%
50% incr.in fuel price	4.732.500	4.408.479	324.021	-51,8%
150% incr.in fuel price	4.732.500	5.105.679	(373.179)	-155,5%
10% incr.in canoe price	4.732.500	4.072.021	660.479	-1,8%
20% incr.in canoe price	4.732.500	4.084.164	648.336	-3,6%
50% incr.in canoe price	4.732.500	4.120.593	611.907	-9,0%
25% decr.lifespan canoe	4.732.500	4.100.355	632.145	-6,0%

\* With 10 crew members, their average earnings will be:

Yearly: 166.905  
Monthly: 13.909

Table 2  
Financial Analysis  
Costs and Earnings for big Poli canoes  
(Purse-Seine nets)

0. Investment Costs, Lifespan

	Cost	Exp. Lifespan
Canoe	1.200.000	6
Engine	900.000	3
Gear	4.800.000	5
Tot. Inv. Cost	6.900.000	

1. Fixed Costs - Depreciation

Canoe	200.000
Engine	300.000
Gear	960.000
Tot. Fixed Cost per year	1.460.000

2(a). Variable Costs - Vessel Expenses (Repair and Maintenance)

Canoe	55.000
Engine	237.500
Gear	375.000
Tot. Rep. and Maint. Costs per year	667.500

2(b). Variable Costs - Trip Expenses

	Lean	Peak	Total
Fuel and Oil	7.800	11.200	
Number of trips	135	45	180
Tot. Trip Expenses per year	1.053.000	504.000	1.557.000

2(c). Variable Costs - Crew Expenses

Crew share per year	3.136.500
---------------------	-----------

3. Revenues

	Lean	Peak	Total
Aver. Price (crate)	3.900	1.900	
Aver. Catch (crate)	10	30	
Rev./trip	39.000	57.000	43.500
Number of trips	135	45	180
Tot. Revenue	5.265.000	2.565.000	7.830.000

SUMMARY - Annual costs and Earnings - Poli Canoe:

Revenues	7.830.000
Var. Costs (trip exp.)	1.557.000
	6.273.000
Var. Costs (crew share)	3.136.500
	3.136.500
Var. Costs (vessel exp.)	667.500
	2.469.000
Fixed Costs (depr.)	1.460.000
Owner's Earnings	<u>1.009.000</u>

## SENSITIVITY ANALYSIS:

Poli Canoe

	Total Revenues	Total Costs	Profit	Percent. Changes
Base Case	7.830.000	6.821.000	1.009.000	
10% decr.fishing trips	7.047.000	6.351.650	695.350	-31,1%
10% decr.in catch (or price)	7.047.000	6.429.500	617.500	-38,8%
20% decr.fishing trips peak	5.671.000	4.868.100	802.900	-20,4%
10% incr.in fuel price	7.830.000	6.898.850	931.150	-7,7%
50% incr.in fuel price	7.830.000	7.210.250	619.750	-38,6%
150% incr.in fuel price	7.830.000	7.988.750	(158.750)	-115,7%
10% incr.in canoe price	7.830.000	6.841.000	989.000	-2,0%
20% incr.in canoe price	7.830.000	6.861.000	969.000	-4,0%
50% incr.in canoe price	7.830.000	6.921.000	909.000	-9,9%
25% decr.lifespan canoe	7.830.000	6.887.667	942.333	-6,6%

\* With 14 crew members, their average earnings will be:

Yearly: 224.036

Monthly: 18.670

Table 3  
 Financial Analysis  
 Costs and Earnings for big Watsa canoes  
 (Purse-Seine nets)

0. Investment Costs, Lifespan

	Cost	Exp.lifespan
Canoe	1.300.000	6
Engine	900.000	3
Gear	5.000.000	6
Tot.Inv.Cost	7.200.000	

1. Fixed Costs - Depreciation

Canoe	216.667
Engine	300.000
Gear	833.333
Tot.Fixed Cost per year	1.350.000

2(a). Variable Costs - Vessel Expenses (Repair and Maintenance)

Canoe	60.000
Engine	237.500
Gear	220.000
Tot.Rep.and Maint.Costs per year	517.500

2(b). Variable Costs - Trip Expenses

	Lean	Peak	Total
Fuel and Oil	7.800	11.200	
Number of trips	135	45	180
Tot.Trip Expenses per year	1.053.000	504.000	1.557.000

2(c). Variable Costs - Crew Expenses

Crew share per year	3.037.500
---------------------	-----------

3. Revenues

	Lean	Peak	Total
Aver.Price (crate)	3.900	1.900	
Aver.Catch (crate)	8	40	
Rev./trip	31.200	76.000	42.400
Number of trips	135	45	180
Tot.Revenue	4.212.000	3.420.000	7.632.000

SUMMARY - Annual costs and Earnings - Watsa Canoe:

Revenues	7.632.000
Var.Costs (trip exp.)	1.557.000
	6.075.000
Var.Costs (crew share)	3.037.500
	3.037.500
Var.Costs (vessel exp.)	517.500
	2.520.000
Fixed Costs (depr.)	1.350.000
Owner's Earnings	<u>1.170.000</u>

SENSITIVITY ANALYSIS:  
Watsa Canoe

	Total Revenues	Total Costs	Profit	Percent. Changes
Base Case	7.632.000	6.462.000	1.170.000	
10% decr.fishing trips	6.868.800	6.002.550	866.250	-26,0%
10% decr.in catch (or price)	6.868.800	6.080.400	788.400	-32,6%
20% decr.fishing trips peak	5.671.000	4.792.600	878.400	-24,9%
10% incr.in fuel price	7.632.000	6.539.850	1.092.150	-6,7%
50% incr.in fuel price	7.632.000	6.851.250	780.750	-33,3%
150% incr.in fuel price	7.632.000	7.629.750	2.250	-99,8%
10% incr.in canoe price	7.632.000	6.483.667	1.148.333	-1,9%
20% incr.in canoe price	7.632.000	6.505.333	1.126.667	-3,7%
50% incr.in canoe price	7.632.000	6.570.333	1.061.667	-9,3%
25% decr.lifespan canoe	7.632.000	6.534.222	1.097.778	-6,2%

\* With 13 crew members, their average earnings will be:

Yearly: 233.654  
Monthly: 19.471

Table 4  
Financial Analysis  
Costs and Earnings for big Line fishing canoes

## 0. Investment Costs, Lifespan

	Cost	Exp.Lifespan
Canoe	1.000.000	5
Engine	900.000	4
Gear	120.000	
Tot.Inv.Cost	2.020.000	

## 1. Fixed Costs - Depreciation

Canoe	200.000
Engine	225.000
Gear	
Tot.Fixed Cost per year	425.000

## 2(a). Variable Costs - Vessel Expenses (Repair and Maintenance)

Canoe	35.000
Engine	190.000
Gear	950.000
Tot.Rep.and Maint.Costs per year	1.175.000

## 2(b). Variable Costs - Trip Expenses

	Lean	Peak	Total
Fuel and Oil	32.000	21.000	
Food for crew, Ice, Bait	90.000	110.000	
Tot. Cost per trip	122.000	131.000	
Number of trips *	30	12	42
Tot.Trip Expenses per year	3.660.000	1.572.000	5.232.000

## 2(c). Variable Costs - Crew Expenses

Crew share per year	1.484.000
---------------------	-----------

## 3. Revenues

	Lean	Peak	Total
Aver.Price			
Aver.Catch			
Rev./trip	135.000	425.000	217.857
Number of trips *	30	12	42
Tot.Revenue	4.050.000	5.100.000	9.150.000

## SUMMARY - Annual costs and Earnings - Line fishing Canoe:

Revenues	9.150.000
Var.Costs (trip exp.)**	6.182.000
	2.968.000
Var.Costs (crew share)	1.484.000
	1.484.000
Var.Costs (vessel exp.)***	225.000
	1.259.000
Fixed Costs (depr.)	425.000
Owner's Earnings	<u>834.000</u>

\* one trip last for three days \*\* incl.gear repl. \*\*\* excl.gear repl.

## SENSITIVITY ANALYSIS:

## Line Fishing Canoe

	Total Revenues	Total Costs	Profit	Percent. Changes
Base Case	9.150.000	8.316.000	834.000	
10% decr.fishing trips	8.235.000	7.549.400	685.600	-17,8%
10% decr.in catch (or price)	8.235.000	7.858.500	376.500	-54,9%
20% decr.fishing trips peak	5.671.000	5.054.194	616.806	-26,0%
10% incr.in fuel price	9.150.000	8.376.600	773.400	-7,3%
50% incr.in fuel price	9.150.000	8.619.000	531.000	-36,3%
150% incr.in fuel price	9.150.000	9.225.000	(75.000)	-109,0%
10% incr.in canoe price	9.150.000	8.336.000	814.000	-2,4%
20% incr.in canoe price	9.150.000	8.356.000	794.000	-4,8%
50% incr.in canoe price	9.150.000	8.416.000	734.000	-12,0%
25% decr.lifespan canoe	9.150.000	8.382.667	767.333	-8,0%

\* With 8 crew members, their average earnings will be:

Yearly: 185.500  
 Monthly: 15.458

Table 5  
Financial Analysis  
Costs and Earnings for big Drift Gill Net canoes

0. Investment Costs, Lifespan

	Cost	Exp. Lifespan
Canoe	1.050.000	6
Engine	900.000	2
Gear	1.800.000	5
Tot. Inv. Cost	3.750.000	

1. Fixed Costs - Depreciation

Canoe	175.000
Engine	450.000
Gear	360.000
Tot. Fixed Cost per year	985.000

2(a). Variable Costs - Vessel Expenses (Repair and Maintenance)

Canoe	45.000
Engine	315.000
Gear	60.000
Tot. Rep. and Maint. Costs per year	420.000

2(b). Variable Costs - Trip Expenses

	Lean	Peak	Total
Fuel and Oil	9.000	12.500	
Number of trips	155	45	200
Tot. Trip Expenses per year	1.395.000	562.500	1.957.500

2(c). Variable Costs - Crew Expenses

Crew share per year	2.199.000
---------------------	-----------

3. Revenues

	Lean	Peak	Total
Aver. Price (crate)	3.800	5.700	
Aver. Catch (crate)	6	11	
Rev./trip	22.800	62.700	31.778
Number of trips	155	45	200
Tot. Revenue	3.534.000	2.821.500	6.355.500

SUMMARY - Annual costs and Earnings - Drift Gill Net Canoe:

Revenues	6.355.500
Var. Costs (trip exp.)	1.957.500
	4.398.000
Var. Costs (crew share)	2.199.000
	2.199.000
Var. Costs (vessel exp.)	420.000
	1.779.000
Fixed Costs (depr.)	985.000
Owner's Earnings	<u>794.000</u>



SENSITIVITY ANALYSIS:  
Drift Gill Net Canoe

	Total Revenues	Total Costs	Profit	Percent. Changes
Base Case	6.355.500	5.561.500	794.000	
10% decr.fishing trips	5.719.950	5.145.850	574.100	-27,7%
10% decr.in catch (or price)	5.719.950	5.243.725	476.225	-40,0%
20% decr.fishing trips peak	5.671.000	5.102.900	568.100	-28,5%
10% incr.in fuel price	6.355.500	5.659.375	696.125	-12,3%
50% incr.in fuel price	6.355.500	6.050.875	304.625	-61,6%
150% incr.in fuel price	6.355.500	7.029.625	(674.125)	-184,9%
10% incr.in canoe price	6.355.500	5.579.000	776.500	-2,2%
20% incr.in canoe price	6.355.500	5.596.500	759.000	-4,4%
50% incr.in canoe price	6.355.500	5.649.000	706.500	-11,0%
25% decr.Lifespan canoe	6.355.500	5.619.833	735.667	-7,3%

\* With 9 crew members, their average earnings will be:

Yearly: 244.333  
Monthly: 20.361



## II. CREDIT ARRANGEMENTS IN CANOE FISHERIES OPERATIONS

### 7. INTRODUCTION

Over time the canoes and the gear used by the canoe fishermen have grown in size. This trend has been particularly noticeable for the Ali, Poli and Watsa canoes as well as canoes used for line fishing. Consequently the capital needed for investment in new canoes and gear has become more and more substantial. This fact coupled with the sometimes high maintenance and repair costs makes the canoe owner more or less dependent on loans from formal and/or informal sources.

The wide fluctuations in net revenues over the year with a concentration of profits in a limited period of the year are other features of the canoe fisheries operations that often makes the canoe owner heavily dependent on borrowed funds.

As is well known, the fisheries operations involve high risks, both in terms of physical losses and uncertain catches. Another factor that complicates the process of granting credit is the migration of fishermen that, amongst other things, renders the recovery of the loans difficult.

The fishing communities in Ghana are also very spread out with many canoe owners living and working in remote areas. The high risks connected with lending operations towards fisherfolk coupled with the problems and the high costs involved in reaching them thus limits the bank's interest to penetrate the fishery sector. However, compared with its neighbouring countries, the Ghanaian banking facilities for fisherfolk are relatively well developed with a history dating back to the 1950s.

As savings are the other side of the investment coin and in fact often inseparable from the investment activities, they will also be dealt with in this chapter.

The susu systems and other traditional saving and credit systems are well described elsewhere; the author will here only briefly describe the two main types of susus that can be found in Ghana and the problems they encounter in an inflation ridden economy.

It must be remembered that we here only deal with the canoe / gear and engine owner's financing activities. The crew's need for private loans for food, hospital fees, funerals etc. are of another nature and lies outside our aim in this chapter.

It must also be borne in mind that normally the loan taken by the canoe owner is serviced only from his own proper share. That is to say if he pays an interest and/or repays his debt through selling fish to the creditor to a preferential price, it is only his share that is affected by this agreement. The other crew members sell to their own wives/fish mammies (that of course in some cases can be the same person as to whom the canoe owner

sells his fish).

Finally, it must be underlined that it is very difficult - not to say nearly impossible for an outsider who visits the fishing communities only during a short period, to get a clear picture of the informal financial arrangements. Not only unwillingness to give away business secrets obscure the picture - often the respondents have genuine difficulties to answer the questions. The multitude of forms that the repayment and the interest on loans in the informal sector can take makes it hard to calculate the cost of financing. By necessity then, the description of the formal and informal credit facilities found here will be more qualitative than quantitative in its character.

#### 8. FINANCING WITHIN THE FAMILY

Often the wife of the fisherman or other female relatives lend the money needed for the investments in a canoe, gear and engines and/or for operational costs. The canoe owner then sells the fish at a preferential price and/or gives fish to the women. The women might then process the fish or sell it directly to retailers. The difference between the price the woman gives to the canoe owner and the price she later on gets for the processed or unprocessed fish can be substantial. In fact to such an extent that certain people have described the relation between the canoe owner and the woman as outright exploitative. It must be remembered however, that in these cases the profit margin earned by the woman stays in the family where she is, more often than not, responsible for expenses like school fees for the children, etc.

Self-financing within the family has numerous advantages, for both the borrower and the lender. As for most types of informal lending it tends, compared with formal lending, to be more timely, lacking complicating application procedures, be better adapted to the fluctuation of the fishermen's incomes etc. (see further on the disadvantages of bank lending). The interest (implicit or explicit) tends to be higher though, than for formal lending. In this case however, this extra cost borne by the canoe owner will profit the family as a whole. For the other types of lending from informal sources this is a great disadvantage and many of the interviewed underlined this. The fishermen without debts to outsiders were very proud of this fact and many of them who owed money to people outside the family said that they liked to diminish this reliance.

As for the lender she profits, apart from the preferential price arrangement, from having secure access to fish to process or to retail even during periods when the fish is in relatively short supply. The risks connected with the lending are of course less than when the women lend to fishermen outside the family but are

not, as one may think, negligible, certainly not in the extended family. Some of the interviewed women remarked that for them the family liaisons were not that crucial - it was the character of the borrower. The same women had numerous stories about relatives not fulfilling their obligation in their lending arrangements.

## 9. INFORMAL FINANCING OUTSIDE THE FAMILY

As already pointed out, the gear as well as the canoes have grown in size over time and it has become increasingly difficult for the owner and his family to finance the new investments all by themselves. Even if the family manage to rise the capital needed they might be obliged to use financial sources outside the family in occurrences of unpredicted and substantial expenses.

### 9.1 "Fish mummies"

This form of financing is very much like the above described lending by a relative in the family. As in that case the woman seldom receives interest payments regularly in cash but gets fish or could buy fish at preferential prices. Some of the fish mummies then process the fish, others sell it directly to retailers. In this case, however, the sometimes rather high profit margins charged by the women do not stay in the canoe owner's family.

As already pointed out, it is nearly impossible to approximate the implicit interest rates charged by the women. An interesting and a characteristic feature of the financing activities is however, their strong seasonality. The informal creditors' incomes and the demand for their services varies inversely with the canoe owners' incomes. The demand for credits are at its peak just before the major season starts. At that time the fishermen are short of money but a number of expensive repairs and replacements may have to be made to put the canoe in good condition before the start of the intensive fishing period. The often abundant catches during the peak season allows the canoe owner's debt servicing to reach its height. This seasonality of the fishermen's incomes explains to a great degree their sometimes substantial reliance on borrowed money. The big seasonal variations also oblige the women to save important sums of money during the peak season to make sure that they will be able to finance the canoe owners during the lean season.

The savings can take a variety of forms, and it is often a delicate balance between a secure and profitable way to save the money and the need to have them readily accessible. The latter factor means that a lot of money is simply kept at home. For primary security reasons however, the women do not like to have

too much cash at home and like to deposit part of the money in some sort of susu club (see further below) or in a bank. The latter allows the women to earn interest on the deposited money but restricts also the women's access to them since many banks only allow their saving account holders to take out money once a week. For the women which have to be able to provide their customers with loans in short notice this is obviously a major disadvantage.

The inflation rates have been quite high in Ghana during the past years (see table 7, p. 36) and pose a problem for those involved in lending transactions. If one looks at the real instead of the nominal interest rates charged by the women they do not look as exploitative any more.

One way to avoid the effects of the inflation is to buy goods for the excess money and sell them later on. Some of the women interviewed did buy motors, bundles of nets etc during the peak season and then sold the goods, either on credit or for cash, before the start of the next herring season

As for actual repayments of the debt to the fish mummies the customs varies, and so does the meaning of the word repayment. One interviewed fish mummy said that she never obliged her clients to repay their debts but acknowledged that the profit margin she earned equalled the capital after only three to four months.

Some fishermen are very eager to repay their debt and terminate the costly dependence on the fish mummy. The woman is for obvious reasons not as interested in ending the relation and do only demand the fisherman to repay his loan if he does not fulfill his obligations (i.e. sell/give a certain amount of the catch to her).

Even after the repayment of the loan the fisherman often continues to sell part of his catch to the woman as a goodwill gesture and as a precaution if he once again needs her help.

When discussing the interest charged by the women, the not negligible risk they run must be acknowledged. As already mentioned the fisheries operations are risky ones and on top of that the fishermen are highly mobile having a lot of opportunities not to fulfill their obligations. It is undoubtedly so that the possibilities for the fish mummies to monitor the fishermen are better than for, for example the banks but they do encounter problems with fishermen that sell some of the catch to other women at other beaches and/or who neglect to give them the fish agreed. To evade this the women spend a lot of time supervising the fishermen's activities and take immediate action if mismanagement is evident. The measures can range from a demand of immediate repayment of the loan (if the canoe owner has misbehaved seriously) to, in some cases, hiring and firing of key crew members (for example the captain and the accountant).

If a number of financing agents are involved in the same canoe operation the allocation of the landed fish for sale at preferential prices and the repayment in kind might become a source for endless quarrels. For this reason the majority of the

interviewed women (and the borrowing canoe owners) preferred to be the sole financier (have only one woman involved) but regretted that it is often outside their possibilities to finance the whole operation themselves. The interviewed women did obviously not think that the advantages with risk sharing compensated the inconveniences of being with many creditors.

Some of the advantages for the canoe owner to go to a fish mammy for financing investments and repairs instead of a bank have already been mentioned; the services rendered by the women are timely, flexible, easily accessible and they do not demand guarantors or collaterals.

The disadvantages are of course the somewhat high cost of the loan. Another drawback for the indebted fisherman is that he sometimes is not entitled to get paid directly by the fish mammy, but has to wait some days until she has sold the fish. If she does not manage to sell it at a good price she has the right to reduce the price already agreed with the fishermen. This inconvenience was mentioned by many fishermen as the major drawback when indebted to a fish mammy.

### 9.2 Professional money lenders

The professional money lenders seem to be in decline and it was only possible to get scattered information of their activities. Most of the interviewed canoe owners regarded the money lender as a creditor of last resort and tried to avoid him as long as possible. The reason is that the money lender's interest rates are much higher than for instance the fish mummies' and the conditions attached to their loans can be very harsh. In the case of very big investments/replacements, however, their contribution might be unavoidable.

The canoe owner himself seldom approaches the money lender directly, instead he first goes to the fish mummies and asks them for help. The women might then, if they can not manage to cover all the financing needs themselves, go to the money lender. The canoe owner's credit rating is often much lower than the fish mammy's and therefore the money lenders prefer to lend them money indirectly. The money lender's main interest is in the recovery of the loan and not in receiving fish for sale.

### 9.3 Canoe carvers

For the investment in a new canoe the canoe carver/canoe agent can give the canoe buyer a credit and a part of the cost for the canoe is allowed to be paid after the delivery of the canoe. However, the liaisons between the buyer and the seller can often be more complicated.

### 9.4 Crew

Sometimes the canoe owners do not pay the crew, except for some

pocket money and food, until the end of the season. That is to say, the crew gives the owner an interest free loan during that period. One of the interviewed canoe owners, who had put this money in a bank account, saw the interest thus generated as a way to increase his share of the catch.

#### 10. SUSUS

The susus, the traditional savings and loans associations, are an important mean to get hold of a larger amount of money which can, among other things, be used to finance fisheries operations. There are two main types of susus in Ghana; rotating savings and loans associations and private deposit collectors.

In the rotating type of susu each member pays a fixed amount at regular intervals. Part of the contribution is allocated to one member at a time in a rotating order. Although such credit associations are self-help banking arrangements that involve no fee or extra cost, the order in which members receive the funds is a source of unequal advantage. Those earliest in the cycle of distribution receive, in effect, an interest-free loan that they repay over time. This advantage is financed by those at the cycle's end, for whom the system works in a manner little better than simply storing their savings under a mattress. This feature of the rotating susu can create tensions and uncertainties within the group, even more so under a period of high inflation (as the case has been in Ghana during the past years). Take for example a big rotating association consisting of 50 members. If they contribute to the susu once a week, it takes nearly one year before the time comes to the last member to get its allocation. In the meantime the value of the money might have declined substantially.

A solution to this dilemma is, like some of the clubs have done, to make the turn-around periods shorter. This can be done either through operating with fewer members or through making them contribute more often.

Sometimes this type of association also provides their members with other services; like letting them borrow money from a general fund, created from part of the member's savings.

An advantage of this type of saving club is, according to some of the interviewed women, that the group pressure makes them more inclined to save than with the other types of susus.

The other, more popular type of saving system, is the one with private deposit collectors. Here the fisherfolk can give their money to either an ambulatory deposit collector (often known as a susu-man) or to one of the susu stalls that can be found in the bigger cities in Ghana.

The clients can either deposit a fixed amount at regular basis or pay whatever they can afford at irregular intervals ranging from a couple of times per day to once a month. The possibility



to pay in accordance with their daily incomes is obviously very popular with the fisherfolk with highly fluctuating incomes.

The amount deposited is entered on a card, one for each depositor. By the end of the month the saver can take out the accumulated sum, the collector keeping one deposit as a fee for his services.

The clients can also often, if they have proved to be reliable, obtain short term loans from the deposit collector. This loan is generally interest free.

The susu collector often puts the deposited money in an interest bearing bank account and thus earns money both on the commission and the interest.

An absolute prerequisite for this type of system is that the savers have confidence in the deposit collector. Lack of confidence were the major reason for some of the interviewed fisherfolk not to use susus. The absence of interest on the saved money was not regarded as an important disadvantage.

In some places where susu collectors had run away with all the deposited money, the interviewed fisherfolk were obviously very hesitant to trust any new collector.

In principle all susu collectors should be registered at the Internal Revenue Service Department. Apart from the aim to collect taxes the registration can serve as a security for the savers in case of mismanagement of their money. All the registered susu collectors get a badge that identifies them as officially approved collectors. It is difficult though, for those responsible to trace down all the susu collectors, especially those operating in the countryside. At present (July 1990) 104 collectors are registered in the Greater Accra region and 60 in Kumasi. Outside these places no susu collectors are registered. Unfortunately, the Department does not have any information about how many clients each collector has or how much his clients pay for his services. Thus the tax that the collectors have to pay on their commissions are not calculated individually but fixed at 24 000 cedis per collector and year.

Popular as they may be, the amounts possible to raise from saving and/or taking loans from a private susu collector or from a rotating saving club are not substantial enough for larger investments. In the Gbese Women Association's saving club the members contribute 5 000 cedis per week, which makes around 250.000 cedis per woman and year. Taking the not negligible costs for new canoes, large nets etc (see the chapter on cost and earnings) into account, it is evident that this is not enough. Many of the interviewed fish mammies did, therefore, contribute to a whole lot of susu clubs/collectors thus managing to raise more money and at the same time spreading the risk of losing their money because of fraud.

## 11. FORMAL LENDING - BANKS

The formal credit facilities for fisherfolk is relatively well developed in Ghana if compared with other West African countries. A number of banks; the Rural Bank, the Agricultural Development Bank, the Cooperative Bank, National Savings and Credit Bank of Ghana and Ghana Commercial Bank offer special credit schemes for fisherfolk.

The two first mentioned banks; the Rural Bank (RB) and the Agricultural Development Bank (ADB) have been especially active in the fisheries sector and have similar procedures for granting credits to fisherfolk. Normally the applicants are asked to form a group of 5-20 persons. The banks seldom ask for collaterals but require that at least one of the members of the group is a customer in the bank with a working account for the last six months.

On the basis of an estimation of the financial viability of the project it is decided whether, for how much and on what conditions a loan can be given.

Contrary to the beliefs of many fishermen the banks do not restrict their lending to outboard engines and fishing gears, although these items have been very popular in the past. The banks seldom give credits less than 300-400,000 cedis and the upper limit has been around 2 million.

The credits in question are short term loans and the repayment period varies depending on the size and nature of the project. The instalments are spread out over the whole period and the fisherfolk have often great freedom to chose when to do their amortizations.

The lending interest rate is 26,5% at present but will, if all the different types of fees the banks charge (commitment fees etc), rather be around 30%. This nominal rate must, however, be related to the present high inflation rate in Ghana (unofficial estimations put the yearly inflation rate for 1990 at around 40%). Table 7 shows the development of the nominal and the real interest rates during the past six years.

Table 7

	1984	1985	1986	1987	1988	1989	1990***
Consumer Prices * index 1985=100	90,7	100,0	124,6	174,2	228,8	286,5	400
Nominal Interest Rates Deposit Rate *	15,00%	15,75%	17,00%	17,58%	16,50%	15,50%	
Nominal Interest Rates Lending Rate *	21,17%	21,17%	20,00%	25,50%	25,58%	26,00%	26,50%
Real Interest Rates Deposit Rate **	-24,75%	5,50%	-7,60%	-22,23%	-14,84%	-9,72%	
Real Interest Rates Lending Rate **	-18,58%	10,92%	-4,60%	-14,31%	-5,76%	0,78%	-13,12%

\* Source: IMF, International Finance Statistics, June 1990  
 \*\* Deflated with help of the IMF Consumer Price Index  
 \*\*\* unofficial projections of the 1990 inflation figure

Both the RB and the ADB have in the past performed a role beside their ordinary banking role - the trading one. During the late seventies and the early eighties fisheries inputs were in scarce supply and the banks started to allocate outboard engines and fishing gear received through different arrangements with aid from donors like the African Development Fund and the European Development Fund. The inputs were sold at government set prices, at that time considerable higher than the prevailing price on the open market. Today, the disparity between the two prices is less important but increase during the "peak" of the peak season when the demand for some of the fisheries inputs are higher than the supply. The changed economic and political landscape in Ghana will, however, effects the banks' way of working and in the future it is not likely that they will continue to provide fisheries inputs in the way they used to do.

Of the interviewed canoe owners, those with a substantial size of their fisheries operations (two big canoes or more) were more inclined to use the formal banking system, both for savings and credits, than the small scale fishermen.

The main interest of the interviewed fishermen to utilize the banks' services were to get hold of relatively cheap fisheries inputs. Other advantages mentioned by the interviewed canoe owners was that the banks charged a relatively low interest rate (see above).

The reasons given by the others interviewed, for not using the banks, are well known and already partly touched upon; difficultes for the fisherfolk to understand the banking procedures, inconvenient locations and opening hours of the banks, long waiting periods between the application and the disbursement of the loan etc. Among the fisherfolk a genuine mistrust towards the banks is also prevalent.

## 12. CONCLUDING REMARKS

It must once again be underlined that the possibilities to get an accurate picture of the complex financing activities in the canoe fishery sector are very restricted for an outsider with a limited time for field work. To estimate how much the creditors in the informal sector actually charge their clients are next to impossible. The question whether the financing sources, that the fishermen have access to today, can finance a new, maybe more expensive, type of canoe is equally difficult to answer. Some interesting features of today's informal and formal systems might, however, be noted.

- The behavior of the creditors and debtors have changed over time due to changed macro- and micro economic factors.
- The rather high inflation rates creates special problems, both for savers and creditors and has been one of the factors behind

the decline in popularity of the rotating type of susu.

- The increased investment costs for canoes and engines caused by the growth in their size have made it more difficult for the family to self finance their canoe operations. Also for the fish mummies it has become increasingly difficult for one sole woman to finance a whole canoe. Although co-financing causes a lot of problems, it seems to be more and more common as the canoes and the gear get bigger and more costly.

It does thus seem likely that a possible increase in the investment cost for the canoe can be borne by the present financing agents through co-financing.

It must finally be pointed out that the sensitivity analyse done in connection with the cost and earnings studies indicate that the fall in profitability and the rise in cost would not be dramatic in the case of moderate increases in the canoe price.

LISTE DES RAPPORTS DIPA - LIST OF IDAF REPORT  
Documents de travail/Working papers

- De Graauw, M.A., Etude de préfactibilité technique de l'aménagement d'abris pour la pêche maritime artisanale au Bénin. Cotonou, Projet DIPA. 55 p., DIPA/WP/1.
- Black Michaud, M.J., Mission d'identification des communautés littorales de pêcheurs artisans au Bénin. Cotonou, Projet DIPA, 24 p., DIPA/WP/2.
- Gulbrandsen, O.A., Preliminary account of attempts to introduce alternative types of small craft into West Africa. Cotonou, IDAF Project, 51 p., IDAF/WP/3.
- Gulbrandsen, O.A., Un compte-rendu préliminaire sur les tentatives d'introduire des types alternatifs de petites embarcations en Afrique de l'Ouest. Cotonou, Projet DIPA, 53 p., DIPA/WP/3.
- Jorion P.J.M., The influence of socio-economic and cultural structures on small-scale coastal fisheries development in Bénin. Cotonou, Projet DIPA, 59 p., IDAF/WP/4.
- Jorion P.J.M., L'influence des structures socio-économiques sur le développement des pêches artisanales sur les côtes du Bénin. Cotonou, Projet DIPA, 59 p., DIPA/WP/4.
- Tandberg, A., Preliminary assessment of the nutritional situation of subsistence fishermen's families. Cotonou, Projet DIPA, 31 p. IDAF/WP/5.
- Wijkstrom, O., Recyclage des personnels pêche en gestion et compétence. Cotonou, Projet DIPA, 25 p. DIPA/WP/6.
- Collart, A., Development planning for small-scale fisheries in West Africa, practical and socio-economic aspects of fish production and processing. Cotonou, IDAF Project, 34 p., IDAF/WP/7.
- Collart, A., Planification du développement des pêches artisanales en Afrique de l'Ouest ; production et traitement du poisson, ses aspects matériels, techniques et socio-économiques. Cotonou, Projet DIPA, 67 p. DIPA/WP/7.
- Van der Meeren, A.J.L., Socio-economic aspects of integrated fisheries development in rural fishing villages. Cotonou, IDAF Project, 29 p., IDAF/WP/8.

- Haling, L.J., et Wijkstrom, O., Les disponibilités en matériel pour la pêche artisanale. Cotonou, Projet DIPA, 47 p., DIPA/WP/9.
- Akester S.J., Design and trial of sailing rigs for artisanal fisheries of Sierra Leone. Cotonou, IDAF Project, 31p., IDAF/WP/10.
- Vétilart, R., Rapport d'étude préliminaire sur l'aménagement d'un abri pour la pêche maritime artisanale à Cotonou. Cotonou, Projet DIPA, 31 p., DIPA/WP/11.
- Van Hoof, L., Small-scale fish production and marketing in Shenge, Sierra Leone. Cotonou, IDAF Project, 36 p., IDAF/WP/12.
- Everett, G.V., An outline of West African small-scale fisheries. Cotonou, IDAF Project. 32 p., IDAF/WP/13.
- Black-Michaud, J., et J. Johnson, Participation communautaire aux projets intégrés des pêches artisanales. En cours de préparation (DIPA/WP/14).
- Anon., Report of the second IDAF liaison officers meeting; Freetown, Sierra Leone (11 - 14 November 1986). Cotonou, IDAF Project, 66 p., IDAF/WP/15.
- Anon., Compte-rendu de la deuxième réunion des officiers de liaison du DIPA. Cotonou, Projet DIPA, 27 p., DIPA/WP/16.
- Campbell, R.J., Report of the preparatory technical meeting on propulsion in fishing canoes in West Africa (Freetown, 15-18 November 1986). Cotonou, IDAF Project, 88 p., IDAF/WP/17.
- Davy D.B., Seamanship, Sailing and Motorisation. Cotonou, IDAF Project, 85 p., IDAF/WP/18.
- Anum-Doyi, B., and J. Wood, Observations on fishing methods in West Africa. Cotonou, IDAF Project, 53 p., IDAF/WP/19.
- Anon., Report of the third IDAF liaison officers meeting (Cotonou, 2 - 4 December 1987). Cotonou, IDAF Project, 88 p., IDAF/WP/20.
- Anon., Compte-rendu de la troisième réunion des officiers de liaison du DIPA (2-4 Décembre 1987). Cotonou, Projet DIPA, 85 p., DIPA/WP/20.

- Haakonson, J.M. (Ed.) Recent developments of the artisanal fisheries in Ghana. Cotonou, IDAF Project, 69 p., IDAF/WP/21.
- Everett, G.V., West African marine artisanal fisheries. Cotonou, IDAF Project, 41 p., IDAF/WP/22.
- Everett, G.V., Les pêches maritimes artisanales en Afrique de l'Ouest. Cotonou, Projet DIPA, 44 p. DIPA/WP/22.
- Coackley, A.D.R., Observations on small fishing craft developments in West Africa. Cotonou, IDAF Project, 22 p., IDAF/WP/23.
- Zinsou, J. et W. Wentholt, Guide pratique pour la construction et l'introduction du fumoir "chorkor". Cotonou, Projet DIPA, 33 p., DIPA/WP/24.
- Zinsou, J. and W. Wentholt, A practical guide to the construction and introduction of the chorkor smoker. Cotonou, IDAF Project, 29 p., IDAF/WP/24.
- Chauveau, J.P., F. Verdeaux, E. Charles-Dominique et J.M. Haakonson, Bibliographie sur les communautés de pêcheurs d'Afrique de l'Ouest - Bibliography on the fishing communities in West-Africa. Cotonou, Projet DIPA - IDAF Project, 220 p., DIPA-IDAF/WP/25.
- Everett, G.V., Small-scale fisheries development issues in West Africa. Cotonou, IDAF Project, 47 p., IDAF/WP/26.
- Haakonson, J.M., et W. Wentholt, La pêche lacustre au Gabon. Cotonou, Projet DIPA, 36 p., DIPA/WP/27.
- Anon. Report of the ad hoc technical meeting on artisanal fisheries craft, propulsion, gear and security in the IDAF region ; Cotonou, 25 - 26 September 1989. Cotonou, IDAF Project, 111 p., IDAF/WP/28.
- Anon. Report of the fourth IDAF liaison officers meeting (Dakar, 21 - 23 November 1989). Cotonou, IDAF Project, 135 p., IDAF/WP/29.
- Anon. Compte-rendu de la quatrième réunion des officiers de liaison du DIPA. Cotonou, Projet DIPA, 121 p., DIPA/WP/29.
- Houndekon, B.R., D.E. Tempelman et IJff A.M., Report of round table meeting on women's activities and community development in artisanal fisheries (projects) in West Africa. Cotonou, IDAF Project, 12 p., + annexes, IDAF/WP/30.

- Houndekon, B.R., D.E. Tempelman et IJff A.M., Rapport du séminaire sur les activités féminines et le développement communautaire dans les projets de pêches artisanales en Afrique de l'Ouest. Cotonou, Projet DIPA, 14 p., + annexes, DIPA/WP/30.
- A.M. IJff, Socio-economic conditions in Nigerian fishing communities - Based on studies along the Benin and Imo river estuaries. Cotonou, IDAF Project, 113p., IDAF/WP/31.
- M.O. Okpanefe, A. Abiodun and J.M. Haakonson, The fishing communities of the benin river estuary area: Results from a village survey in Bendel State, Nigeria. Cotonou, IDAF Project, 75 p., IDAF/WP/32.
- Anon., Compte-rendu du cours "Analyse Quantitative des Aspects Sélectionnés de Développement". Cotonou, Projet DIPA, 6 + xlv1 p., DIPA/WP/33.
- Anon., Report of the course on "Quantitative Analysis of Selected Aspects of Fisheries Development". Cotonou, IDAF Project, 6 + xlv p., IDAF/WP/33
- Liste des documents de travail du Projet Modèle, Bénin/  
List of working papers of the Model Project, Benin
- Coackley, A.D.R., Report on installation of a diesel inboard motor in a Ghana canoe. Cotonou, Model Project, 7 p. + annexes, PMB/WP/1 (En).
- Coackley, A.D.R., Installation d'un moteur diesel "inboard" dans une pirogue ghanéenne. Cotonou, Projet Modèle, 9 p. + annexe, PMB/WP/1 (Fr).
- Zannou, L.H., Etudes technico-économiques des fours améliorées pour le fumage de poisson en République Populaire du Bénin. Cotonou, Projet Modèle, 8 p. + 6 tableaux, PMB/WP/2.
- Atti-Mama, C., et M. Rais, Etude démographique des communautés cibles du projet Modèle Bénin. Cotonou, Projet Modèle, 20 p. + 10 annexes, PMB/WP/3.
- Jorion, P., Non-monetary distribution of fish as food in Beninois small-scale fishing villages and its importance for auto-consumption. Cotonou, Model Project, 26 p., PMB/WP/4.
- Tanimono, P.F., Catalogue des engins de pêche maritime artisanale du Bénin. Cotonou, Projet Modèle, 46 p. + 3 annexes, PMB/WP/4, PMB/WP/5.

- Tanimomo, P.F., Rapport de consultation sur la formation des jeunes pêcheurs de l'UNICOPPEMA à Lomé. Cotonou, Projet Modèle, 17 p. + 6 annexes, PMB/WP/6.
- Atti Mama, C., Impacte Socio-économique de la piste Pahou-Kpota. Cotonou, Projet Modèle, 10 p. + 3 annexes, PMB/WP/7.
- Ahouanmenou, C., C. Atti-Mama, B. Hourndékon, D. Tempelman et D. Turcotte, Animation, gestion et planification, séance de travail avec les agents de terrain. Cotonou, Projet Modèle, 142 p. + annexes, PMB/WP/8.
- Atti-Mama, C., D. Turcotte, et W. Wentholt, Evaluation interne des activités du projet modèle Bénin dans le secteur de Guidah. Cotonou, Projet Modèle, 36 p. + 7 annexes, PMB/WP/9.
- Tempelman, D., The participatory approach in an integrated artisanal fisheries project ; structuring community development - womens activities. Cotonou, Model Project, 43 p. PMB/WP/10.
- Landry J., Cours d'alphabétisation fonctionnelle en caloucal. Cotonou, Projet Modèle, 59 p. + 3 annexes. PMB/WP/11.
- Landry J., D. Tempelman, Functional literacy, Training Guide for a numeracy course. Cotonou, Model Project, 55 p. + 3 annexes. PMB/WP/11.
- Atti-Mama, C., Systèmes traditionnels et modernes d'épargne et de crédit en milieu pêcheur au Bénin. Cotonou, Projet Modèle, 41 p. + annexes, PMB/WP/12.
- Sénouvo, P., Statistiques de pêches des villages du Projet Modèle Année 1987. Cotonou, Projet Modèle, 33p. PMB/WP/13.
- Sheves, G.T., Holler P.T. and Tanimomo P.F., Report on demonstration with echosounders, compasses and multimono gillnets in Ghana. Cotonou, Model Project 22p. PMB/WP/14.
- Coackley, A.D.R., and G.T. Sheves, A review of the experimental introduction of diesel inboard motors to Ghana canoes. Cotonou, Model Project 41 p., PMB/WP/15.
- IJff, A.M. et D.E. Tempelman, Etude sur les relations entre les captures de poisson et l'état nutritionnel des communautés de pêcheurs dans la province du Mono, au Bénin. Cotonou, Projet Modèle, 27 p., PMB/WP/16.

Sénouvo, A.P. et Gbaguidi, A.A. Recueil des données statistiques

- 1991 des pêches maritimes au Bénin. Période de 1984 à 1989. Cotonou, Projet Modèle, 134 p., PMB/WP/17.
- Rapports techniques et des documents choisis/ Selected list of technical reports and documents
- Direction Nationale du Projet Modèle Bénin, Mise en place et plan d'exécution. Cotonou, Projet DIPA, 43., + 3 annexes.
- Sheves, G.T. Integrated small-scale fisheries projects: principles, approaches, and progress in the context of the Benin prototype project. Paper presented at the workshop on Small-scale Fisheries Development and Management, Lomé, 20-29 November 1985, 33 p.
- Sheves, G.T. Projets intégrés de pêches artisanales : approches et évolution dans le contexte du projet pilote. Document présenté à l'atelier régional sur le développement et l'aménagement des pêches artisanales, Lomé, 20-29 Novembre 1985, 36 p.
- IDAF Newsletter/Lettre du DIPA, 1, October/Octobre 1985, 4 p.  
 IDAF Newsletter/Lettre du DIPA, 2, January/Janvier 1986, 14 p.  
 IDAF Newsletter/Lettre du DIPA, 3, June/Juin 1986, 40 p.  
 IDAF Newsletter/Lettre du DIPA, 4/5, Sept./Dec. 1986, 76 p.  
 IDAF Newsletter/Lettre du DIPA, 6, September 1987, 58 p.  
 IDAF Newsletter/Lettre du DIPA, 7, June/Juin 1988, 84 p.  
 IDAF Newsletter/Lettre du DIPA, 8, June/Juin 1989, 74 p.  
 IDAF Newsletter/Lettre du DIPA, 9, October/Octobre 1989, 84 p.  
 IDAF Newsletter/Lettre du DIPA, 10, AUGUST/Août 1990, 84 p.  
 IDAF Newsletter/Lettre du DIPA, 11, January/Janvier 1991, 6 p.
- Paraiso F-X., rapport sur stages de recyclage en identification des poissons Cotonou, GCP/RAF/192/DEN 24 p.
- Collart, A. et M. Guidicelli, Développement des pêcheries maritimes et continentales de la pisciculture au Gabon. Rome, FAO (GCP/RAF/192/DEN) 77 p.
- Johnson, J.P. et M.P. Wilkie, pour un développement intégré des pêches artisanales ; du bon usage de participation et de la planification. Cotonou Projet DIPA, 157 p. + annexes, Manuel de Terrain N° 1.
- Meynall, P.J., J.P. Johnson, and M.P. Wilkie, Guide for planning monitoring and evaluation in fisheries development units. Cotonou, IDAF Project, 116 p. IDAF Field Manual N° 2.

