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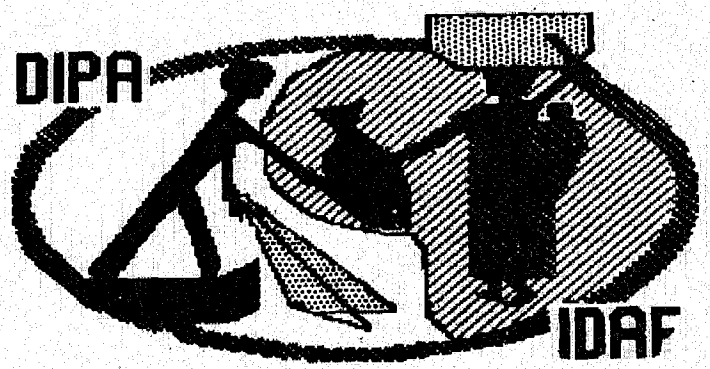
SMALL - SCALE FISH PRODUCTION AND MARKETING IN SHENGE, SIERRA LEONE



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Small-scale fish production and marketing in Shenge, Sierra Leone

based on the work of

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

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With financial assistance from Denmark and Norway, and in collaboration with the Peoples 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, in particular, an active and full 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.

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C O N T E N T S

Objectives of the study

The study undertaken by the professional assistant is part of a survey, carried out by the professional assistant and the project's sociologist, which should give the project staff a base line framework for their activities.

In order to carry out the study discussions were held at the headquarters of the regional project and with staff of SIL/82/015 to establish the main objectives of the study. Discussions held during the first week of the study in Shenge with staff and FAO consultant led to the emphasis on the marketing side of the fishing operation.

Methodology

To get acquainted with the area, the people and the fishing operation the professional assistant and the sociologist visited the 13 villages included in the project. In every village a conversation was held with the local headman and other dignitaries, after which a group discussion was held with the dignitaries, fishermen and processors. During the discussion the purpose of the study was explained and the problems of the fishing operation, as perceived by the villagers were discussed.

After this acquaintance period, 4 and a half months of investigations were conducted on the three distinct groups of actors in the fishing business: fishermen, processors, traders/retailers. The approach chosen was to have interviews, guided by a check-list of questions, prepared for every group of actors. During the interviews sufficient time was reserved for free, unstructured discussions with the informants. Since the whole set up of the study had a qualitative rather than a quantitative character informants were not selected at random.

In addition to this qualitative interviews more quantitative information was gathered with the assistance of the project's enumerators. Forms, developed by the professional assistant, were handed over to the enumerators who then were gathering data on fish prices, expenses of fishermen and processors and the like.

For the first two groups of actors, fishermen and processors, check-lists were developed. The third group, consisting of traders and retailers, was approached during market visits up country without the use of a check-list, as it was felt that a formalized interview would hamper the free information transfer. Therefore free conversations, with the interviewer often acting as potential buyer of processed fish, were used. More formalized interviews were held with market-and product leaders in the different markets, and these leading people were always interviewed before conversations were held with other traders and retailers.

0. SUMMARY

This report is the result of a study of the environment of the artisanal fishing communities in the Shenge area of Sierra Leone. Its purpose is to give a description of that environment to serve as part of a base line framework for future activities in the area.

In chapter 1 a general outline is given of the situation of fisheries in Sierra Leone, the larger environment in which the artisanal fishing communities and the marketing system of fish landed and processed by artisans has its place.

In the chapters 2 to 5 a description is given of the groups of actors operating in the environment of the artisanal fishing communities and the relationships between the actors on several levels of the marketing system. An analysis of the constraints faced by the various groups of actors is given in each chapter.

1. INTRODUCTION

1.1 Fisheries in Sierra Leone

Sierra Leone, one of the smallest states of Africa, is situated on the west coast of the continent. The country is situated just above the equator between 7 and 10 degrees North latitude and 10 and 13 degrees west longitude. The capital Freetown has some importance for international shipping due to her natural harbour. The country has a surface of approximately 72,400 sq Km and is circular shaped. Although no place in the interior is located more than 290 km. off the coast, the natural conditions of the country impose constraints on communication: mountains, rivers and swamps make the hinterland not easily accessible.

The approximately 570 km long coastline is indented by many islands, lagoons and estuaries. The continental shelf, with an estimated surface of 24,800 sq Km., varies in width from 140 Km at the nordern border with Guinea to 32 km at the southern border with Liberia.

The climate of Sierra Leone is determined by two alternating air currents: the Harmattan with dry air from the Sahara and the Monsoon with humid air from the Atlantic Ocean. In the dry season, from December until April, the Harmattan prevails often bringing dust from the interior. The transition from the dry period to the rainy period is characterized by thunderstorms and occasionally a rain shower. In May the real rainy season starts with heavy, longlasting rainshowers with bright periods occuring for not more than a day. The rainy season lasts long in comparison with the dry season, with the highest amount of rain falling in a relatively short period in the coastal area. Due to the large outflow of rainwater from the many estuaries that starts during the rain months, the coastal waters vary considerably in salinity.

1.1.1 Fish species

The most commonly caught species in Sierra Leone waters are the small pelagics, Bonga, Sardinella, Mackerels, demersal fish of the Croaker fauna, Grunters, Spadefish, Threadfin, and Soles. Snapper fauna caught on the rocky areas of the continental shelf mainly consists of Sea breams, Snappers, Groupers and Gurnards.

1.1.2 Fish resources

FAO estimates maximum sustainable yield for pelagic species at 80,000 tonnes annually. A fish assessment programme in Sierra Leone is organised by the Fisheries Division in Freetown at the moment. There are plans to upgrade the section dealing with statistics since uptill today this section is ill equiped and unable to monitor the fieldwork of its staff. Fish catch statistics are therefore irregular and generally regarded as

indicative.

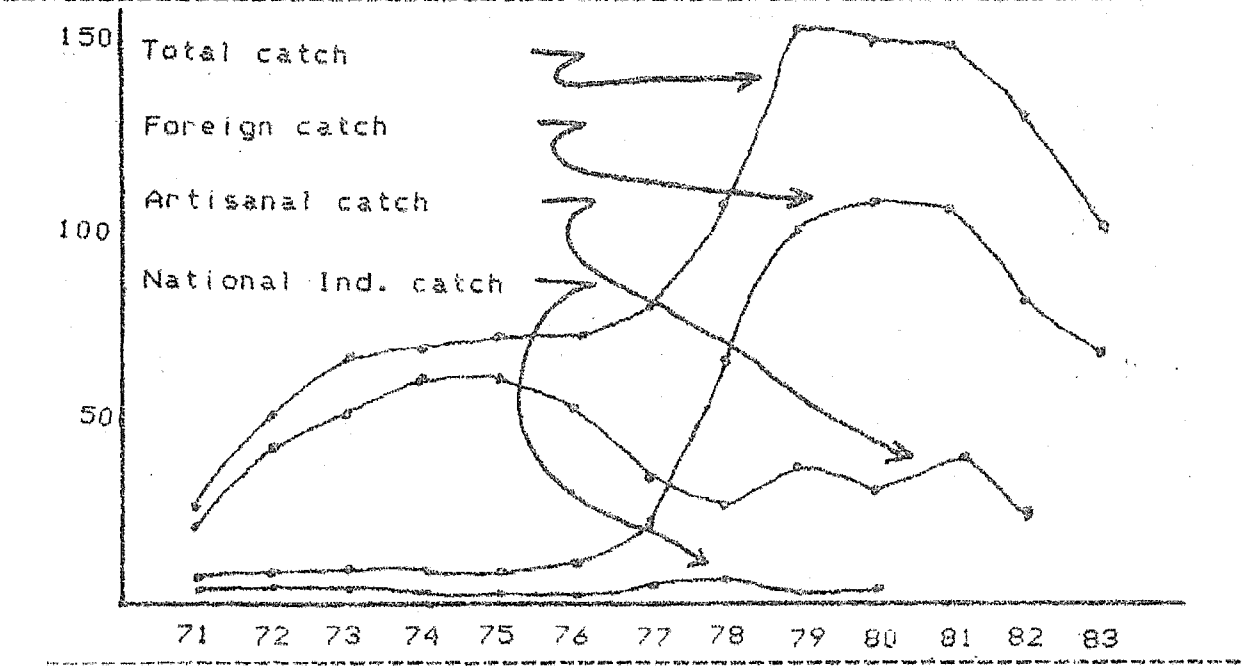
1.1.3 Fish landings

It is estimated that 80-85% of the total amount of fish landed is brought ashore by artisanal fishermen (Van der Meeren 1981). From this total amount landed by artisans the most abundant species are Bonga which accounts for 54% of the catches, Herring accounting for 20% and Lati accounting for 4% (McEachern 1982).

Bonga is the most important species caught, not only constituting the greatest portion of the catch but also representing the greatest overall value. Small Bonga of less than 210 mm, locally known as Awefu, are nowadays forming a larger proportion of total Bonga landings than in 1981. Seasonal migrations of Bonga are associated with changing salinity of coastal waters. During the rainy season Bonga is spread out over wide areas and low catches, mainly consisting of Awefu, are recorded. The concentration of the fish in schools in the dry season allow greater catches.

Fish landings overall have shown a declining trend in recent years, as indicated in figure 1.

Figure 1: Total fish catch in Sierra Leone territorial waters 1973-1983 (catch in 1,000 tonnes)



SOURCE : Fisheries Department statistics

1.1.4 Fishing techniques

The artisanal fisheries consists of small-scale, inshore fisheries based largely in villages along the coast. Vessels range from one man dug out canoes to 18 men planked canoes. The dug out and smaller size planked canoes are propelled by paddle and sail whereas the bigger planked canoes are propelled by outboard engines. The fishing gear used for the dug out canoes consists of hook and line and drift and gill nets. The fishermen operating a smaller planked canoe use mainly bottom set and drift gill nets, while the bigger planked canoes are operated with encircling nets. In addition to this gear, cast nets and beach seines are used.

The industrial fleet consists of trawlers, purse seiners shrimpers, longliners and carrier motherships, owned by several fishing companies of which Sierra Fishing Company Ltd., with her daughter companies is the largest. The Soviet fleet, operating under a Sierra Leone-Soviet Union fisheries agreement is obliged to land 10% of the catch in Sierra Leone.

1.1.5 Marketing

Much of the catch made by artisanal fisheries in the more densely populated areas is sold fresh, but in isolated fishing communities the catch is preserved by smoking for later distribution and sale to the inland areas. Fish and other fishery products (accounting for approximately 75% of the total animal protein intake of the population) is transported from the coast to remote centres in the north and east of the country. The link between producer and consumer is usually made by fishmammies who pack and transport the fish from the production sides to the market centres, and often serve as middlemen to other women who retail the fish.

The bulk of the fish caught by the industrial fleet is for export. The fish landed for the local market is normally frozen, although small amounts are being smoked, and sold retail in several market centres. Sierra Fisheries Company, the market leader, has a private distribution system of cold stores, fish shops and retailers although the company also sells frozen fish to fishmongers.

1.2 Integrated Development of Rural Fishing Villages, Shenge area SIL/82/015

The project started in February 1985 as a one year pilot project. After seven months it was extended to a three year project which aims at the improvement of the standard of living of fishermen and the fishing communities, through an integrated approach, in the Shenge area of the Kargboro chiefdom.

The project is based in Shenge, the traditional administrative centre of the area with a police station, court clerk and residence of the Paramount Chief.

Shenge is situated in a remote and isolated part of Sierra Leone, 190 km. from Freetown. The first 110 km. from Freetown are paved road, the last 86 km. from Moyamba to Shenge are in very bad condition and receive little maintenance. The trip to Moyamba is made several times a week by a 1.5 ton vehicle, the only passenger transporter on that road, and once a week by a number of trucks which transport fish to the market centres of the interior. During the rainy months the road is often not passable except to four wheel drive vehicles. Additional transport is by sea. Twice a week three small transport boats make a trip across Yawri bay to Tombo.

The area in which the project operates consists of 14 communities with an estimated population of 5,500 people. They are Baoma, Bompetoke, Mano, Somway, Thumba, Bendu, Tisana, Patti, Shenge, Plantain Island, Katta, Debia and Shengebole all based mainly on artisanal inshore fisheries.

2. FISHERMEN AND THEIR PRODUCTION SYSTEM

2.1 Historical view

In 1932 the first truck came to Shenge. Until that time, and even after, the fish caught in the area was transported by carrying it on the head to nearby communities or even to Moyamba. It took the people two days to cover the 86 km to Moyamba.

The fishermen, then only a few,were mainly Sherbros using hook and line and cast nets from their one man Kru canoe, or a so called 'drag net', a two men operated beach seine. In those days, according to Mr. Tower a former teacher, the fish was abundant:' "you would catch enough fish in three drags (with the beach seine) to get some money, hand out some fish and have enough for yourself for the rest of the week."

The fishermen were subsistence oriented. The fish that would not be consumed immediately would be smoked. Part of the catch would be sold to other (farming) communities or even sent to Moyamba, depending on cash needs.

In those days only a few Temne fishermen with their dug out canoes and their cast nets were present in the area. Bonga was not really appreciated, fishermen tried to catch bottom fish species. At the end of the 1930's the number of Temne fishermen increased. Communities like Plantain Island, Katta and Tisana existed already, founded by the Sherbros, but grew under the influence of the influx of Temnes. The Temnes using the same fishing techniques as the Sherbros were easily accepted by the Sherbros, the owners of the land. But the Temne were (and still are) regarded as being strangers to the area who cannot acquire land titles; even the Temne themselves see their stay as being temporary and regard themselves as strangers to the area.

Around 1950 the first Ghanaians with their long dug out canoes came to Shenge and settled in the area. With their ring nets (encircling nets) they were the first to fish Bonga on a large scale. In those days Shenge was a lively village with a blooming trade: fish, especially Bonga going out and commodities like cassava (the stapelfood of the Ghanaians) coming in. The fish was transported to Moyamba by truck and often further on by train, for example to Kono, the diamond dig area. On their way back the trucks would pick up commodities to be sold in Shenge.

Since there were no appropriate trees to make 16-18 m. long dug out canoes the Ghanaians, together with local craftsmen, started building planked canoes. Gradually the Temne started to immitate the Ghanaians, who were very successful fishermen, by using a small planked version of the Ghana planked canoe (the so called Yellefufu) and by using drift nets. With the introduction of the outboard engine in the late 1950's another change in the Ghana system occured; no longer propelled by paddles the boats were faster and could go out to sea more frequently.

The Ghanaians with their crews of 14 and more people started to hire local labour, mainly Temne fishermen, to work on their boats, thus introducing hired labour in a society that was based on unpaid family labour. The Temne that were part of the crew had a chance to learn the new fishing techniques from the Ghanaians.

When the Ghanaians were expelled in the 1960's they preferred to sell their boats and gear rather than to take it with them on their ways back to Ghana. The boats and gear were taken over by the Temne fishermen who are still operating that system nowadays. The most innovative and skilled fishermen have been the Ghanaians and their influence on fishing methods and boat design and construction is still wide spread in the region.

2.2 Today's production system

2.2.1 Kru canoe

The Kru canoe, or one man canoe, is a 5-6 metres LOA dug-out canoe made from a log. This type of canoe, only used by Sherbro fishermen, is used to do hand and longlining 1.5-3 km from the shore in areas with rocky bottoms for demersal fish. The Kru canoe fishermen are mainly subsistence directed, going out to fish only two or three times per week, using paddle or sail.

2.2.2 Standard 1-3 men canoe

The STD 1-3 men canoe is also a dug out canoe but with its 6-7 metres LOA bigger than the Kru canoe. In some occasions a planked version can be found. The boat is normally engaged in set or drift net fishing, although some fishermen use the vessel as a one man canoe for hook and line fishing.

The average crew when engaged in drift net fishing (locally Know as Yellefufu chain fishing) is three men. The nets are generally 400 metres long and 6 metres deep with mesh sizes varying between 2.5 and 4 cm stretched mesh. Paddled or sailed the canoes go between 3 and 6 Km off shore to set their nets. Catches with the drift net consist mainly of Bonga and vary between 20-100 Kg per day.

A significant difference in operating the drift net exists between Katta and the villages south of Shenge. The fishermen of Katta leave late afternoon to set their nets in Yawri bay. The nets are left until dark, usually less than one hour, then hauled and cleared on return to the beach. The fishermen of Bendu, Mano and other villages operate a similar system but also do daytime fishing with longer nets (800-900 metres) using them as encircling nets.

The bottom set net (locally known as Lego chain) is not very common. Some fishermen are specialised in using the set net but most fishermen are drift net fishermen with a few that use both set and drift net. Generally the set net is 600 metres long and 3 metres deep with a stretched mesh size of 10 cm. Most commonly caught species are Catfish (Arius) and Skate (Raja spp.). The net is normally set in the afternoon and hauled after several hours.

2.2.3 Standard 3-5 men canoe

The STD 3-5 men canoe started as an immitation of the planked Ghana type canoe. It is generally engaged in drift net fishing in the same way as the STD 1-3 canoe, although the average length of the net used seems to be slightly bigger. The STD 3-5 canoe, with an average legth over all of 7-8 metres, is paddled or sailed by her crew of an average of 3 men. Occasionally the canoe is motorized with an outboard engine.

2.2.4 Ghana boat

The Ghana type canoes are planked canoes of 10-18 metres LOA. The Ghana boats operate in coastal waters using a ring net of 850 metres long and 28-35 metres deep. The stretched mesh size varies from 1.2-5 cm usually different mesh sizes pannels joint in one net. The ring net is used to catch the pelagic species like Bonga. The canoe is operated by a crew of 14-20 men, usually all Temne fishermen. The Ghana boats, originally paddled by their large crews, are now all being propelled by outboard engines ranging from 25-40 Hp.

In the Ghana boat crew several different functions can be distinguished. If the boat/gear owner does not go out with his boat himself, which occurs on many occasions, he is represented by a boson. The boson gives account of the fishing operation to the owner and is responsable for the sales of the catch. The captain is the leader of the crew, in charge of the entire fishing operation. Even when the boatowner goes to sea with his boat the captain is in charge. The legoman is in charge of the boat. He has to make sure that the boat is properly anchored, water bailed out during rains or leaks and that the boat is ready to sail when it has to go out. The operator is in charge of the outboard engine. He operates the engine during the fishing trip and does minor repairs. The pullman, with two or three assistants is in charge of the shooting of the net. While the boat is encircling a school of fish at full speed he leads the net from the boat seperating head-and leadline. In some cases there is a fishspotter in the crew, a man in charge of spotting schools of Bonga. But even when there is a fishspotter all crew members try to spot fish and try to direct the boaat in the direction in which they expect to encounter fish. The tasks of the remainder of the crew is to haul and clear the net after shooting.

The whole operation of spotting Bonga, shooting, hauling and clearing the net can take several hours and is strenuous work. In addition fish catch patterns are not very stable. In times of poor catches boats may look for fish all day without shooting the net, or shoot the net and have a very poor catch, burning expensive fuel for little or no reward. The average catch can be estimated at 400 kg.

2.3 Daily operation

Since 95% of the fish landed in the Shenge area consists of Bonga this study shall be focused on those fish production systems that mainly deal with Bonga. These are the STD 1-3 and STD 3-5 canoes as far as they use drift nets, and the Ghana boat using the ring net.

Bonga occurs in fairly shallow coastal waters and estuaries. The fish spawns troughout the year in the sea and estuaries, with a peak off Sierra Leone from July to December. The juvenile fish spends its first year in low salinity waters and migrates to the sea in its second year. The mature Bonga is spread over wide areas during the rainy months due to the changing salinity of the coastal waters. The concentration of Bonga in schools is much greater in the dry season.

FAO (1984) estimates total Bonga catches in Sierra Leone waters in 1983 at 21,127 tonnes. From these catches approximately 48% consisted of Awefu, the juvenile Bonga, mainly caught during the rainy months. According to the Fisheries Department Statistics Awefu is now forming a larger proportion of total Bonga landings than in 1981. Overall Bonga catches are much bigger during the dry season due to the concentration of Bonga in schools. Bonga catches peak in the period February - June.

During the rainy months less days are spent at sea and catches made tend to be smaller than during the dry period. The input of labour in the fish operation parallels this catch pattern with a distinct peak in the dry season.

Two major factors seem to account for this pattern in Bonga catches and input of labour. The first factor is weather and sea conditions, determining whether the canoes can go out to sea or not. In a rough sea not only the smaller canoes are very unstable, it also is very difficult for the Ghana boat crew to spot the fish. The second factor accounting for the catch pattern is the schooling behaviour of Bonga. Although individual catches in the rainy season of more than one ton made by Ghana boats are recorded such quantities are not very common.

In the months September and October close observations were made in several fishing communities to observe actual days spent at sea and average catch per trip per type of canoe. The results are presented in table 1.

Table 1 : Average number of days spent at sea and average catch per trip type of vessel per month for the months September and October 1985.

Vessel	September Days at sea	Average catch	October Days at sea	Average catch
STD 1-3	19	67 kg	21	74 kg
STD 3-5	17	83 kg	13	86 kg
Ghana	18	435 kg	16	528 kg

From these data and observations from others it seems realistic to take an average of 170 fishing trips per year.

Several constraints affect the fishing operation, limiting the number and the efficiency of fishing trips of the artisanal fishermen.

WEATHER: The annual precipitation (355-406 cm) is concentrated in the period July to September. Although off-shore winds usually range from 4-12 knots and rarely exceed this speed, during the rainy months in heavy rain showers windspeeds can for short periods reach gale force. Especially in the early and late period of the season line squalls do occur, generally accompanied by thunder, lightning and heavy rain. During the rainy months the weather imposes major constraints on fishing by affecting safety and comfort of the fishermen, by restricting the number of days a vessel can go out to fish and by imposing limits on the distance canoes can safely travel from the shore.

During the dry period the North East trade wind reaches Sierra Leone waters. This wind blows off shore bringing dust from the interior which severely reduces visibility. During this period fishermen may lose their way on the water and get lost at sea.

NETS: The price of fishing gear like nets, twine and rope is extremely high in Sierra Leone and as a result very often not available. Due to this factor fishermen cannot acquire optimal gear and prefer to buy second hand nets and to patch frequently rather than to replace a damaged net.

day; the credit normally given by one of the boatowner's customers is usually repaid in kind. From the remaining catch part goes to the boatowner, part goes to the important men in the boat (captain, boson, operator, pullman, legoman) and the remainder goes to the crew. Boatowner and important men usually get their share in kind whereas the crew share is sold by the boatowner and given to the captain to divide among the crew members.

The money for the crew is given to the captain who divides the sum according to the status of the crew members. Overall the captain gets a far bigger share than the other four important men, and from the remaining crew members the ones that mend the nets (usually not all crew members know how to mend nets) get a larger share than crew members who do not have this skill. See table 3.

Table 3: Example of share in catch in the daily share system operational in Ghana boat system as recorded at Plantain Island

	boatowner	captain	boson	operator	pullman	legoman	rest
% of total catch	40-65	5-6	5-6	2-3	2-3	1-2	7-15

In case of poor catches it can happen that after paying off debts (e.g. for fuel) and giving a share to the boatowner including a part for the household maintenance, and most likely a share to the five important men, there is no remainder to "share with the crew. However crew members with own responsabilities, not relying on feeding by the boatowner and the five important men will always get a share, after the boatowner has taken his.

The two systems described above are the ones that prevail in sharing the catch. However every possible mix of the two systems does occur, from neither a daily share nor a crew day, with the boatowner taking care of all expenses faced by the crew (found in a situation in which a major part of the crew were relatives of the boatowner) to both a daily share and a crew day.

The overall tendency in the catch sharing systems seems to be that, due to increasing prices for fishing gear which puts a strain on the boatowner, the boatowner gets a substantial daily

share in the catch even on the crew day. In return the number of crew days per week increases, resulting in a system with a small crew share every day in combination with one or two crew days and a reduction of responsabilities of the boatowner with regard to the maintenance of the crew.

2.6 Obtaining money for investments

Several ways are open to a boatowner to obtain money to finance investments and operating costs. Most boatowners save a small part of all catch proceeds to have money at hand. The purpose of these savings are to have money available to maintain the household and for the maintenance of the production system, i.e. the maintenance of boat and gear. These savings usually form the basis for future investments.

A formalized way of these savings are the several saving clubs, or Osusus that operate in the area. The Osusus operate as a rotating saving and credit association, collecting the contribution on a two weekly basis and giving loans for a period of three months. Most fishermen are a member of such an Osusu.

In addition to the money saved,and in case of membership of an Osusu the credit obtained from this organisation, the boatowner can obtain informal credit, either from his wife(s) or his customers. Normally the boatowner shall first try to get a loan from his wife(s). If she does not have sufficient means the boatowner shall go to his customers.

In addition to the credit given, the customers can also give financial assistence to the boatowner. This non-repayable gift is not demanded by the boatowner but is usually given by the customers when they hear that for example the boatowner is building a new boat.

Usually the fishermen do not have a problem to obtain credit from their customers when small amounts are required (e.g. for fuel or twine). Only when larger sums are involved it can take some time to acquire the needed amount. Very often women give the fishermen small day credits to ensure that they will get fish on that day.

3 WOMEN PROCESSORS

3.1 The system of processing

The processing of fish is in Sierra Leone's artisanal fisheries, just as anywhere else in West Africa, an activity mainly handled by women. Generally in West Africa the seperate male and female activities in the artisanal fisheries include independent financial authority of the sexes over their undertakings. In the Shenge area however, with 95% of the population being Temne, a muslim ethnic group, this situation is slightly different. In muslim family organisation the male family head has authority over all family members and all family property. All the women in the household work for the family head, under supervision of the head's first wife.

3.1.1 Processing

Practically the only form of processing Bonga used in the Shenge area is smoking. The fish is smoked on a 'Banda', the traditional smoking oven. The Banda consists of a rectangular wooden rack, with a surface of 1-10 sq.m., placed on wooden poles 50-70 cm above the ground. The rack can be covered with wire netting and also the rack can be placed on 50-70 cm high mud brick walls, but both features are optional and not very commonly used due to increase in construction costs.

The Banda racks are placed in a Banda house, usually a mud wall hut with a thatched roof, containing 2-4 Banda racks. The average smoking capacity of a Banda rack can be estimated at 220 kg. With approximately 1,250 women operating as fish processors the total potential smoking capacity of the Shenge area can be estimated at 55 tonnes.

After a woman has bought sufficient Bonga the first step in the processing is to wash the fish to remove dirt. After the washing the processor puts sand on the fish to make the fish less slippery, so it can be put more easily on the Banda rack, and to prevent the Bonga from sticking together during the actual smoking.

Usually the fish is smoked for 1 and a half to 3 hours on one side after which the the fire slowly dies out and the Bonga is left to cool down. The Bonga only smoked on one side is usually referred to as fresh dried and still has a relatively high water contents allowing only a short period of preservation. Therefore the fish is, after it has cooled down, turned using the same technique of packing the fish as described above, and smoked again. This second smoking results in a product being 95% dry with a much longer shelf life than the fresh dried Bonga, normal-

ly refered to as strong or hard dried Bonga. Almost all the Bonga processed in the Shenge area is hard dried.

After the second smoking the dried Bonga are put on one side of the Banda rack in a big pile for storage. During the storage period, ranging from 2-7 days, the Bonga is regulary resmoked by a small fire to prevent spoilage.

3.1.2 Processing capacity

The processing capacity of a woman (e.g. number of Banda racks and capacity per rack) is determined by her social and marital position. The most important factor in this is access to fish.

Since in muslim family organisation the highest ranked wife of the household head controls the fish processing, with the other wives assisting her, she usually forms the main link with the fishermen. The other wives usually do not have their own Banda rack, or only have a small rack, and are only allowed to process fish for themselves when the first wife does not need their assistance.

The processing capacity of an entire household is determined by the possibility of that household to get fish and by the number of women within the household. The number of women, forming the labour supply in the smoking process determines the number of Banda racks that can be efficientiy operated. Especially the packing and restacking of the Bonga is a very labour intensive operation. As a result a household that operates a Ghana boat has a relatively large supply of fish and due to the number of people involved in the household a large processing capacity. A household that only operates a 1-3 men canoe has a much smaller supply of Bonga.

3.1.3 Processing losses and constraints

Three forms of post harvest losses do occur during the stage of processing. The first type of losses occur when raw fish spoils due to the time lag between actual time of catching, landing and processing the fish. Although the women processors check the freshness of the fish (by examining the gills, which should be red not white, and examining eyes and nose of the Bonga, which should be white not red) sometimes the fish spoils either immediately during the processing or soon after smoking. A (semi) spoiled Bonga that is being smoked gives an inferior product that breaks easily while packing or restacking the fish.

Usually when raw Bonga spoils the fisherman who sold the fish is responsible for the losses. He has to replace the fish or

Table 4: Estimated price range off-village per dozen Bonga per size after smoking compared with average price off-boat for raw Bonga per size for the period September-October 1985. Prices in Leones.

	Small	Medium	Large
Raw Bonga	0.80	1.55	3.25
Smoked Bonga (hard dry)	0.60-1.40	1.20-3.00	1.50-6.50

All processors have an idea of the minimum difference that should be between buying and selling price to make sufficient money to cover all costs and continue the business. For example at a buying price of Le 0.30 per dozen raw Bonga (Awefu) the processor will start negotiations at Le 0.70 per dozen smoked Awefu. In the negotiations the processor can drop the price to Le 0.50 and still know that it would be profitable. We can calculate that at this price of Le 0.50 per dozen processed Awefu the processor will cover all costs and still has a profit margin of 8% (see table 5).

Table 5:Breakdown of costs of processing for 1 dozen of small Bonga (Awefu) in Leones.

Item	Costs
1 dozen Awefu raw	Le 0.30
firewood	" 0.08
Kerosine	" 0.03
labour	" 0.02
spoilage	" 0.03
depreciation Bands	p.m.
Total costs	" 0.46

In the negotiations the processor can decide not to sell the fish to the trader since the price offered is regarded as being too low. This would mean that the Bonga has to be stored for another week with increased costs of (re)smoking and storage losses. Therefore, and because deciding not to sell would put a strain on the customer relationship, the processor may sell even at a price considered to be unprofitable.

Whether processed fish is well smoked or not, is detected by the smell, structure and colour of the fish. The dried Bonga should be golden brown (not light brown) and feel firm without breaking. Fish that is not properly smoked will be sold at a lower price.

In addition to selling the processed Bonga to the Bo traders there also exists the possibility of selling the fish on markets outside the Shenge area. This trade, done by the processors themselves, can be either wholesale or retail.

The main aim of the processor-trader is to process enough fish to make a trip to the outside market profitable. The minimum quantity of smoked Bonga a processor-trader needs to make the trip viable is 2 boxes with approximately 160 kg. each.

Most of the processors-traders go to market centres on a fairly irregular basis, intervals between trips ranging from 2 to 12 weeks, in general depending on the amount of smoked Bonga produced. A minority of the processor-traders only sell the fish on markets outside the Shenge area. Usually the processor trader sell to the Bo traders in addition to sometimes going to a market centre themselves.

The matter of processor-traders shall be discussed in more detail in the next chapter.

4 TRADERS AND PROCESSOR-TRADERS

4.1 General market structure

Fish processed in the Shenge area is taken to several market centres upcountry, either by traders or processor-traders. The main market centres for the Shenge area are in the south and east of the country and are Bo, Kenema, Sefadu and Koindu. Fish is taken from the area on a regular basis to this market centres. The 4 centres are all a combination of wholesale and retail fish markets, each serving the population of the centre and a large number of surrounding communities.

All market centres are general produce day markets with a separate section for the fish market. The fish market has a product leader, a person who is in charge of that section. This product leader allocates places on the market section to traders, settles disputes between traders and in general has to ensure that the market operation runs smoothly. There is also a formal government market regulation, in the form of a market fee every trader that wants to sell in the market has to pay. Government involvement is reflected by the infrastructure: the allocation of the market site and in some occasions the building of a market hall.

Usually smoked fish is brought to the market centres by wholesalers. In the early morning hours the fish is sold by the wholesalers to other (smaller quantity) wholesalers who take the fish to other markets and to retailers who will sell the fish in the market itself. Each retailer has a fixed spot allocated by the product leader. This can either be a table under a shed or just a piece of ground, sometimes under a shed, but usually out in the open.

Although some form of market organisation among the retail market women does occur, it is usually not as strict as among the wholesalers. The market women that already have a spot in the market (and a table) allocated by the product leader will sell every day. Additional marketers, like for example processor-traders that come from a production side to sell in the retail market on an irregular basis, have to ask permission to the product leader to sell fish and permission from a table owning market woman to sell from her table. Usually the processor-trader will get this permission. To enter the market as retailer is therefore very easy. The wholesale trade is more strictly organised, resulting in a regulated flow of smoked fish to the market centres.

Besides smoked fish, sold in a seperate part of the market, there is also a fresh fish trade done in the fresh fish part of the market. These two seperate fish markets carry several fish products. In the smoked fish part the main products are hard and fresh dried Bonga and Herring. In addition about 10% of the

smoked fish trade consists of high quality fish like Skate, Catfish and Gwangwa (Pseudolithus elongatus). There is also a frozen fish trade. Sometimes frozen Bonga or Herring is sold, but normally the frozen fish supply consists of Skate, Catfish, Snapper, Grouper and Shinose (Galeoides decadactylus), all landed by the industrial fleet.

If we look at consumer preferences, we see that the frozen high quality fish, sold at a relatively high price, is preferred. Smoked fish, however, is sold in larger quantities. Fresh dried fish is preferred to hard dried fish and the quality fish is preferred to Bonga and Herring. The consumer prefers a dried fish that has a golden brown shining colour. In order to achieve the shine on the product the dried fish is regulary coated with groundnut oil. The smell of the fish is used by the consumer as an indicator of freshness of the fish.

4.2 Market characteristics

The main market centres supplied by Bonga from the Shenge area all have their own characteristics.

The market of Bo is one of the markets that receive smoked Bonga from the Shenge area. When the lorries leave Shenge loaded with fish Bo is the first market they call on. Part of the fish is sold wholesale in the early morning hours of Friday while another part is destined for other markets. The fish is sold to retailers that will sell in Bo market and in other communities surrounding Bo.

Bo market receives smoked fish on a number of days; fish from Shenge on Friday and fish from Tombo on Saturday. In addition fish is brought to Bo from other areas like Dema and Freetown, but these areas do not have their own special day reserved for them. They can supply Bo every day they want to come except for the days reserved for Shenge and Tombo. This wholesale supply regulation prevents a glut in the market due to a large supply in a short period of time. Only Shenge and Tombo ares are restricted to special days because they, in comparrison with the other areas, bring large quantities of fish at one time. If a lorry comes to the market supplying fish from for example Shenge on another day than Friday the market regulations will prohibit the wholesale traders to sell the fish untill it is their appointed day.

A large part of the smoked fish will be sold to the trader's customer in the market who will buy the fish wholesale and sell retail. Very often the customer of a trader is a relative (either wife, sister or daughter). Usually the trader gives the fish on credit to the retailer who will after selling repay the credit. A striking point in this transaction between wholesaler and customer (relative) retailer is that the retailer does not count the fish bought. The wholesaler has counted the Bonga when, (s)he

bought the fish from his/her customer processor. When the fish is given to the customer retailer a price is being agreed upon per unit of selling (ranging from 5-12 Bonga) but the retailer does not know how many units exactly the wholesaler gives her. On asking, the retailers could not or would not give the price per box or basket, the unit in which they receive the Bonga. On repaying the credit usually the retailer shows the amount of money made during the period of selling and the trader claims part of these proceeds, the remainder being the proceeds for the retailer.

Usually the retailer sells the Bonga for a price determined by the buying price agreed upon by the retailer and the wholesale trader and the amount of fish in the market. It seems that especially for Awefu the price a retailers offers is rather fixed: the consumer can take it or leave it. For the larger sized Bonga little bargaining is possible although in a lot of cases the price was fixed as well.

In addition to this weekly price fluctuation, which usually results in a low price level over the week-end when Shenge and Tombo distribute Bo and an upgoing price trend during the rest of the week, there is also a daily price fluctuation. In the morning hours with a large number of suppliers and buyers the price for Bonga is relatively high compared with the afternoon. This lower price by the time the market closes derives from the fact that the number of buyers drops more steeply during the day than the number of suppliers. In addition there are several suppliers who in the afternoon try to empty a box, by offering a low price to the consumer, in order to make a saving on storage fees.

If we compare Bo market with Sefadu market we can see that the latter is a much bigger market centre. In the smoked fish section of Sefadu an estimated 200 marketers operate, this means about 50% more retailers and vendors than in Bo.

Sefadu is mainly supplied with smoked Bonga from the Waterloo Freetown areas. These two areas bring the fish in a two days alternating system; for example if Waterloo sells fish on Monday, Freetown sells on Wednesday, Waterloo again on Friday and Freetown starts the next week on Monday. Between those semi-fixed days for Waterloo and Freetown other areas like Port Loko, Yellebuya and Shenge can bring smoked fish.

If we look at the price level for smoked Bonga at Sefadu market compared with Bo market (table 6) we see that the price level is almost the same. This seems a little odd since the distance between production site and market centre is much bigger for Sefadu. One reason for this price level seems to be that due to the very regular supply of smoked Bonga to Sefadu market together with a large number of consumers, the market has a large daily turn over. Although transport costs make up a larger part of the selling price compared with Bo, due to the larger turnover the profit made by Sefadu retailers as a whole, although at a lower margin per sold unit, is comparable with the profit level

of Bo marketers.

Table 6: Price observations for hard dried Bonga per size per dozen in Sefadu compared with the average price level for hard dried Bonga in Bo market and buying price off lorry. November 1985.

	Price per dozen			
date	large	medium	small	remarks
19-11	Le 3.50-4.00	Le 3.00	Le 1.50	Sefadu market
20-11	" 6.00-8.00	" 5.00	" 2.50-3.00	"
21-11	" 8.00	" 2.00	" 1.50	"
----	" 3.00	" 1.50	" 1.00	Buying price off lorry
14-11/ 17-11	" 8.00	" 2.00	" 1.25	Average selling price Bo retailer
14-11/ 17-11	" 6.00	" 1.50	" 1.00	Wholesale price Bo

Shenge smoked Bonga plays a minor part in Sefadu market due to the fact that the road Shenge-Bo-Sefadu is in a very bad shape, resulting in higher costs of transportation, compared with the tarmac road that connects Freetown and Waterloo with Sefadu.

One of the smaller retail markets served by Sefadu market is Yengema, 5 km. from Sefadu. In Yengema market approximately 8 retailers operate. These retailers purchase their smoked Bonga either from a wholesale trader as customer or from a retailer as vendor. The quantity they bring to the market is limited to one or two small baskets (25 kg per basket dried weight). The retail price level for smoked fish is a little higher in the community market compared with the distribution centre due to additional transport costs.

Yengema market is a typical example of a retail market served by a nearby distribution centre. The smoked fish is transported to the retail market by local transport; the retailers travel to the distribution centre to purchase fish and sell it over a number of days after which they return to the centre to purchase additional fish.

Smoked Bonga from the Shenge area is taken to several distribution centres like Sefadu and Bo on a weekly basis, with Bo being one of the main centres and Sefadu being more of an additional centre. Another category of market centres is represented by Koindu market. Koindu is located in the extreme east of Sierra Leone and due to its location, close to the Guinean and Liberian border, of importance to the international processed fish trade.

Every Sunday an international market is held in Koindu. Traders from Liberia and Guinea travel on that day to Koindu to buy fish (especially Bonga, Herring and Lati). The market is supplied by the Tombo area (Tombo, Mama beach, Shenge) and the Freetown area (Funkia, Bullum, Samu, Bandebu) on a two weekly alternating basis. Most of the fish is sold on the Sunday market, wholesale to the international traders who transport the smoked fish to market centres in Guinea and Liberia. The remainder of the fish that is not sold on the Sunday market is sold retail during the rest of the week.

As mentioned above the trade in processed fish in Koindu is mainly wholesale. Fish brought to the market in baskets and boxes are sold by the container from wholesaler to wholesaler. This trade is concentrated on Sunday, when upto 200 sellers can operate in the market. The rest of the week, although some wholesale trade can occur, the bulk of the trade is retail with Koindu operating as a distribution centre for surrounding communities.

The price level of the trade is dominated by the wholesale trade . In table 7 an indication is given of the price per dozen processed Bonga sold wholesale and retail.

Table 7 : Price per dozen processed Bonga per size, wholesale and retail traded at Koindu market. November 1985.

	large	medium	small
Wholesale	Le 4.00	Le 3.20	Le 2.00
Retail	" 6.00	" 3.50	" 2.40

Koindu international wholesale market is a well organised operation with firm rules. The bulk of the turn-over stems from this wholesale trade, the retail trade being of secondary importance. Due to the fact that all the traders come from one area at a time there is one price level on the market per selling day.

If we compare this situation with the system in Kenema market, than we can see that this market is less firmly organized. Kenema market is supplied on a weekly basis with processed fish from the Shenge area. After the lorries have off loaded part of their load, destined for Bo market, they go to Kenema market.

Kenema does not have one specific fish market but has a number of small markets on which fish is sold. The supply of fish is not regulated as strictly as in all the other markets. Traders from several areas like Shenge, Tombo, Waterloo come to supply Kenema from which Shenge supply is the largest.

In table 8 a summary of some market characteristics of the markets supplied by processed Bonga from the Shenge area are given.

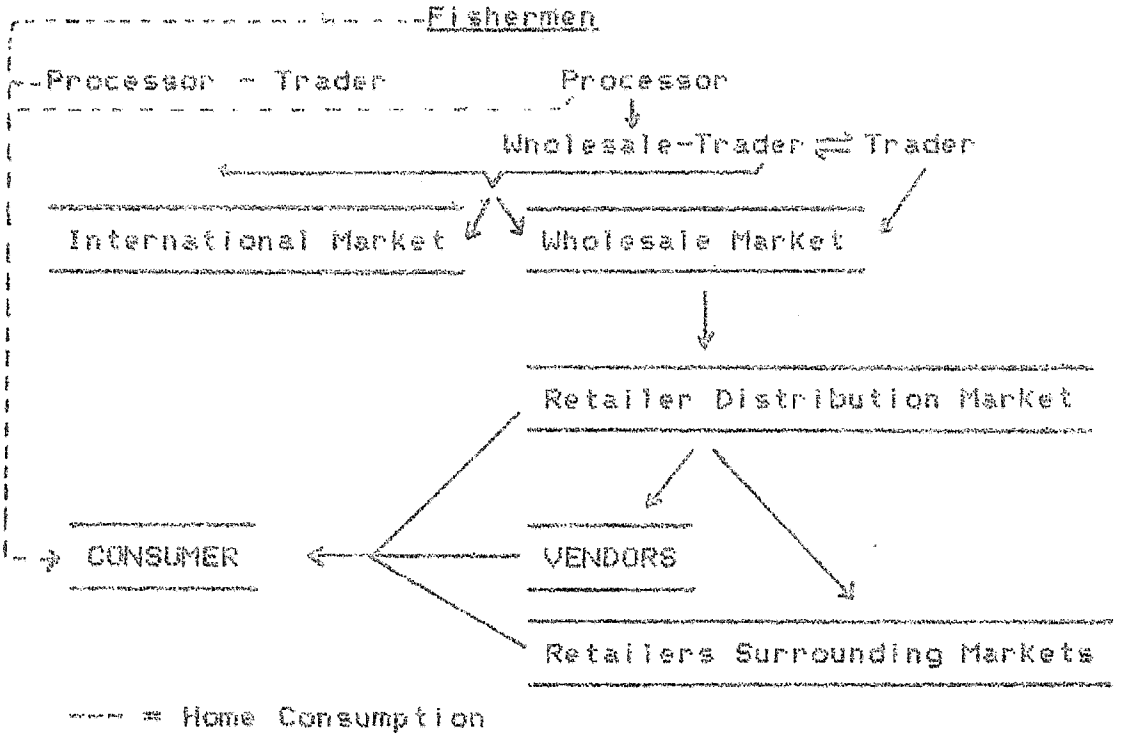
Table 8 : Some characteristics of the main markets supplied with processed Bonga from the Shenge area.

	Bo	Kenema	Sefadu	Koindu
estimated number of retailers operating in the market	100	75	200	20
character of the market	supply centre	supply centre	supply centre	international wholesale
areas with fixed supply days	Shenge Tombo	Shenge	Waterloo Freetown	Tombo/Shenge Freetown
price differences on the market	small	large	small	small

4.3 The processed Bonga marketing chain

In figure 2 a structure outline of the marketing chain of processed Bonga, as in operation from the Shenge area, is given. As we have seen in previous chapters all links between persons in the chain mainly consist of customer relationships. The trade from the producer to customer is financed by (short term) credit given from up the line, with the consumer on the end, to succesive levels of trade. The credit being repaid after the processed Bonga has reached the consumer.

Figure 2: Outline marketing chain processed Bonga



If we put this marketing chain in a broader perspective we have to take other, competing, products and their channels in consideration. As mentioned earlier the processed Bonga has to compete with other smoked fish, like Herring, that is being marketed through the same channel. This channel also carries the more higher quality dried fish. Marketed through a different channel, but competing on the market of fish products, is the fresh frozen fish marketed by the industrial fishing companies.

5. DISCUSSIONS, CONCLUSIONS AND RECOMMANDATIONS

Increasing the number of days fishermen could go out to sea, as a result of improved gear (outriggers, sails, larger boats etc.), could result in an extra quantity of fish landed. Improved processing, like with the already tested Chorkor oven, can reduce the costs of processing tremendiously, while improved storage facilities would reduce post harvest losses substantialy.

If the amount of landed and processed fish increases one has to take the entire marketing as well as the marketing structure in consideration. Although more detailed study is required to answer the question whether the market can absorb additional processed Bonga, there are strong indications that the retail market can handle additional fish. Main constraint on the whole marketing channel is lack of adequate means of transport. Increased fish production should be accompanied by improvements of the marketing channel, especially with regards to the transportation side of it.

However, there are strong indications that the Bonga stock is being over fished. Especially during the rain months when Bonga landings mainly consist of the juvenile fish (Awefu) catches are a threat to the Bonga stock. A stock assessment program is highly recommended to get definite answers about the Bonga stock and especially about maximum and economical sustainable yield of Bonga.

Since the stock of high quality bottom fish seems underexploited, it is suggested that hand lining and long lining be introduced, to be used during the rainy months, to the fishermen that mainly catch Bonga. A bottom set net, especially for the large Ghana boats, could be an alternative but the high investment costs, compared with those for hand- and long lining, limit the viability of this option.

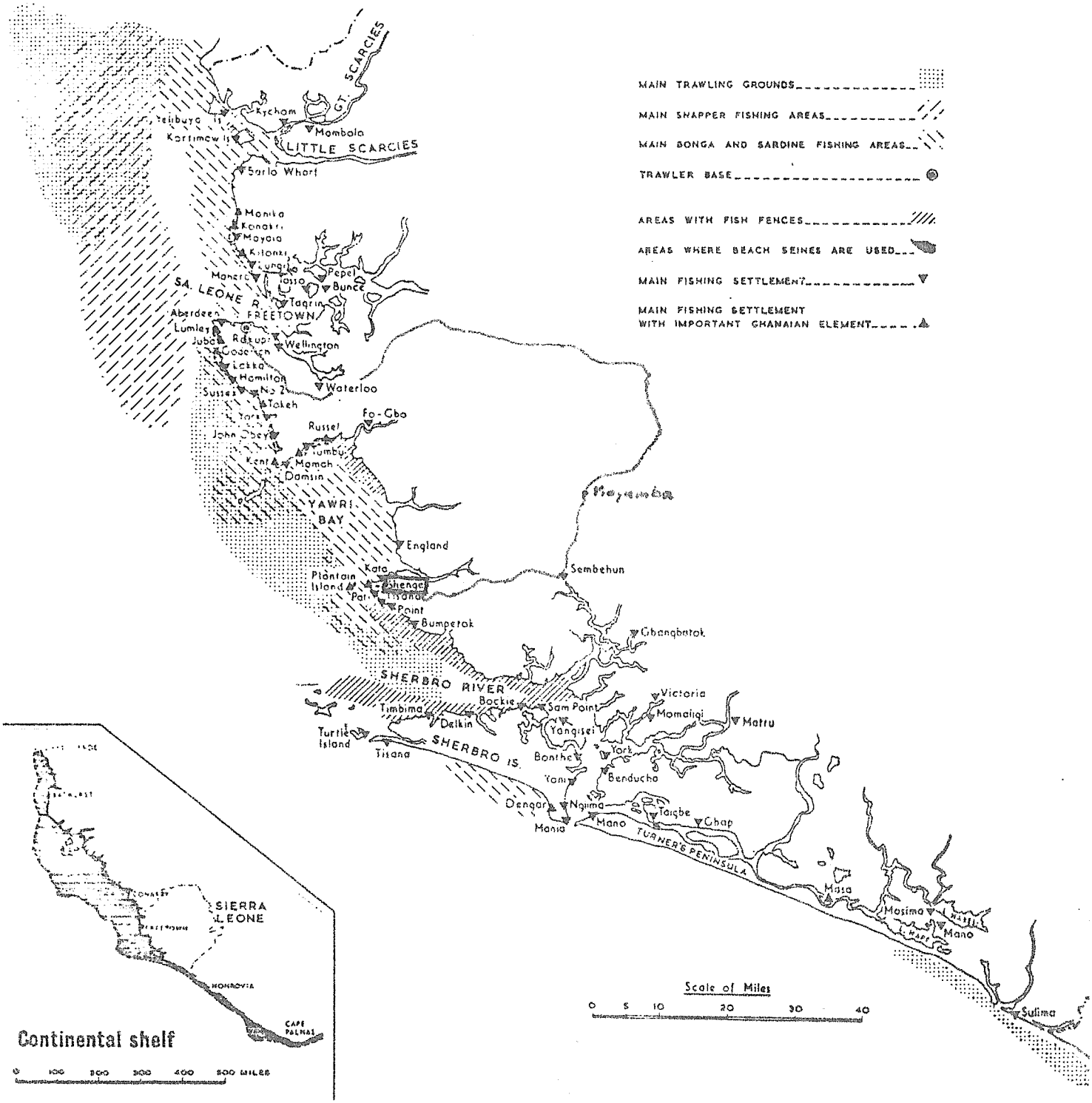
Transport, is a major constraint on marketing fish. Creating additional means of transport would be of great advantage to the area. Additional transport would further open the area, which in combination with possible increased fish production would lead to increased trade to and from the area.

Additional transport, would also create the possibility of establishing new market outlets. These new market outlets could either be to new markets, not yet being distributed with fish from the Shenge area, or to an already supplied market but with a new product or by a combination of the two: a new product to a new market. Creating an alternative marketing line could however improve the whole marketing system and as a result improve income in the fishing communities.

In addition it has to be investigated whether it is social and economically viable to change processing of bottom fish from smoking to freezing. Freezing the fish creates a higher valued product than smoking. A market for frozen fish already exists especially for the high quality fish.

However, in order to create a new marketing structure more insight in the total system is required. It is very important is gain more insight in the structure of the household income in the fishing communities. A picture of the totality of income derived from the fishing operation and side activities, like horticulture and agriculture, salt and oil production and trade, is required to enable the project to better understand the structure in which the fishing operation takes place and to better predict effects and spin-off of proposed changes. Therefore it is suggested that there be a follow up on the baseline survey, possibly by a profesional assistant, whose mission should comprise a study of the household income and a more detailed market survey investigating new marketing possibilities.

FISHERIES


MAIN TRAWLING GROUNDS
MAIN SNAPPER FISHING AREAS
MAIN BONGA AND SARDINE FISHING AREAS
TRAWLER BASE
AREAS WITH FISH FENCES
AREAS WHERE BEACH SEINES ARE USED
MAIN FISHING SETTLEMENT
MAIN FISHING SETTLEMENT WITH IMPORTANT GHANAIAN ELEMENT
GT. SCARCIES
LITTLE SCARCIES
Kychom
Mambolo
Sorlo Wharf
Monika
Konakri
Moyola
Kalonki
Lungalo
Moneri
Tasso
Pepel
Bunce
Tagrin
SA. LEONE R.
FREETOWN
Aberdeen
Lumley
Juba
Rokupr
Wellington
Waterloo
Hamilton
Sussex
Yorke
Russel
Fo-Gbo
Mamah
Damsin
YAWRI BAY
England
Kata
Plantain Island
Shenge
Point
Bumpetok
Sembehun
Gbangbatok
SHERBRO RIVER
Victoria
Timbima
Bockie
Sam Point
Momaligi
Matru
Dalkin
Yangisei
Turtle Island
Tisana
SHERBRO IS.
Bonthe
York
Yoni
Benducha
Dengar
Ngima
Taigbe
Gbap
Mania
Mano
TURNER'S PENINSULA
Masa
Mosima
Mano
Sulima
Scale of Miles
0 5 10 20 30 40
SIERRA LEONE
MONROVIA
CAPE PALMAS
Continental shelf
0 100 200 300 400 500 MILES

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