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Sociocultural Aspects of Small-scale Fisheries

Development in West Africa

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Table 1: Artisanal fisheries sector<sup>1</sup>

	Marine Artisanal Landings '000t <u>2/</u>	Percent of Total Production	Percent of marine production	No. of canoes	% of motorisation	No. of fishermen
Mauritania	21.0	65	75	300	50	1,750
Senegal	194.0	75	80	4,104	55	24,900
Gambia	11.0	80	100	1,044	..	2,362
Cape Verde	8.0	75	75	980	20	2,670
Guinea Bissau	1.0	15	15	650	25	3,000
Guinea	18.0	90	100	1,700	20	7,500
Sierra Leone	32.5	65	95	(3,000)	10	(5,000)
Liberia	5.0	40	60	800	20	4,200
Ivory Coast	21.0	30	35	3,000	..	(15,000)
Ghana	142.0	60	75	7,000	58	84,000
Togo	5.0	50	85	235	70	2,300 <u>4/</u>
Benin	4.0	15	90	339	20	2,500
Nigeria <u>3/</u>	95.0	60	85	(10,000)		(50,000)
Cameroon	20.	35	50	3,500	..	12,000

1/ Adapted from Lawson and Robinson 1983b.

Figures in parenthesis CECAF estimates

2/ Artisanal landings include also semi-industrial fisheries, canoes and fishermen exclude data for semi-industrial sector.

3/ Only the numbers of powered canoes is indicated, because the unpowered canoes (amounting to some 100,000 according to official estimates) include a very large number of small canoes used only for occasional subsistence fishing in brackishwater areas. The rate of motorisation for fishing canoes is however believed to be high.

4/ out of which 1,500 Ghanaian fishermen.

## PREFACE

This report is a revision of the social and cultural section of The Fisheries of West Africa and Prospects for Development (Sutinen, Polinac, and Josserand 1981). A version of this paper was presented in a panel on "West African Maritime Fishing Societies: History, Technology, and Development" at the Annual Meeting of the African Studies Association, Boston, Mass., December 1983.

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INTRODUCTION The focus of this paper is on the role of social and cultural variables in the development of the small-scale fishery in West Africa. The small-scale marine fisheries of West Africa provide approximately 70 percent of the total marine production of West Africa (Lawson and Robinson 1983 a,b), ranging from a low of about 30 percent in Ivory Coast to 99 percent in Guinea (Table 1.). Practically all of the small-scale fishermen's catch is consumed locally, thus providing an important, high quality protein input to a population where the overall per-capita consumption of fish is about twice as much as that for red meat (Sutinen, Pollnac, and Josserand 1981). Further, the small-scale fishery provides employment for about one-quarter of a million fishermen<sup>1</sup> not including the many women and men involved in processing, distribution, and retailing of the catch.

Although the present availability of reliable data on the small-scale fishermen of West Africa does not permit one to provide definitive statements about their economic status, some (e.g., Lawson and Robinson 1983a,b) have written that preliminary information suggests that they are not at present suffering from economic difficulties--a conclusion that is both hard to

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<sup>1</sup>As will be seen further on in this report, statistics regarding the numbers of fishermen involved in the small-scale fishery are of varying quality.

support or criticize given the present state of information concerning this sector. Despite this relatively positive evaluation, there appears to be much room for improvement in the fishery of West Africa. Changes in the small-scale sector are ongoing and are being planned. Many of these changes involve social and cultural considerations -- the topic of this paper. Among these changes are; (1) proposed improvements in harvesting and processing technologies, (2) exploitation of new or under-utilized species, (3) management of the fishery, including small-scale/industrial conflicts, and (4) institutional changes proposed to facilitate other "improvements" in the small-scale fishing sector.

#### BACKGROUND

The Harvesting Sector Small-scale fishing vessels vary a great deal in both size and complexity. Many are dugout canoes constructed from a single log, ranging in length from about 20 to 30 feet. Larger canoes (35-40 feet), most of which are patterned after the famous Ghanaian (Fanti) canoes, are traditionally constructed of a single log with sides extended upward by the addition of planks. In areas where large trees are becoming scarce, the canoes are constructed entirely from planks. Many of these small-scale vessels are powered by oar and sail, but an increasing number were motorized during the late 1960's and early 1970's. (Table 1). For example, in Togo the percentage of motorized small-scale fishing vessels increased from 16 to 79 percent during the ten year period from 1967 to 1977 (CECAF 1979). There are some indications of a reversal in this trend, however. Statistics published in 1979 (Everett 1979) indicate higher levels of motorization than Table 1. In the six cases where comparable data are available, five show decreases in

percent motorized. In some cases the decrease is minor (e.g., Guinea where percent motorized dropped from 23 to 20 percent), but in others it is major (e.g. Ghana where percent motorized dropped from 87 to 58 percent). The average decrease is 12 percent (see Table 2). Lawson and Robinson (1983a,b) attribute the changes in Ghana to a lack of foreign exchange which has resulted in a lack of spare parts and replacement motors. At present this type of information is not available for other countries manifesting apparent decreases in motorization; thus, it is difficult to determine whether the observed changes are real or the result of changes in data collection techniques. Nevertheless, no matter what the cause of the apparent changes, the trend should not be ignored.

The small-scale fishery in some countries (e.g., Ghana) is beginning to merge with the industrial fishery in a way not seen in other West African countries. This is due to the introduction of small (10 meter and under) trawlers. This small trawler fishery contrasts with the traditional small-scale fishery in that the trawlers are too large to land their catches at most of the coastal fishing villages and towns, a fact that is of considerable importance with respect to plans to increase the size of this fleet.

Number of crew in the various vessels used in West Africa varies according to vessel size and fishing gear. For example, small non-motorized vessels fishing with lines operate with an average of three fishermen. The traditional, unmotorized Ghanaian canoe, which is operated all along the West African coast, carries a crew of from five to seven when net fishing. The larger, motorized canoes carry crews as large as 14 (12 is the average) for net fishing. Some fishermen (e.g., the Anglo (Ewe) of Ghana and Togo) fish principally with beach seines which are operated by about 30 adult men (Nukunya 1969).

Table 2. Apparent changes in percent of artisanal fleet motorized as reflected in statistics published in 1979 and 1983.

<u>COUNTRY</u>	<u>% MOTORIZED TIME ONE*</u>	<u>% MOTORIZED TIME TWO**</u>	<u>CHANGE</u>
Senegal	63	55	-08%
Guinea	23	20	-03%
Sierra Leone	22	10	-12%
Ghana	87	58	-29%
Togo	79 <sup>a</sup>	70	-09%
Benin	20	20	00

\*From Everett (1979).

\*\*From Lawson and Robinson (1983b).

<sup>a</sup>From "La peche au Togo et la planification de son developpement" in CECAF/TECH/79/14 (1979).

Available data suggest that in many West African countries fishing is a seasonal occupation for many fishermen. For example, in Guinea Bissau the majority of the fishermen are also farmers, and the planting and harvesting seasons affect the timing of fishing (Hochet 1979). In some areas of Sierra Leone men fish during the peak period and engage in other activities such as farming and petty trading during the off-season. Some recently published statistics from Sierra Leone may serve to indicate the magnitude of this phenomena. During the peak fishing season of 1981, Tombo (one of the largest fishing villages in the country) had more than 7000 inhabitants. This population fell to about 5300 during the off season (Kotnik 1982). It is important to note that about 90 percent of the inhabitants of Tombo are

engaged in the fishery. This seasonality of fishing makes it difficult to arrive at accurate estimates of numbers of fishermen. The most recent unpublished FAO statistics, where available, allow one to estimate that approximately one-third of the fishermen are part-time, ranging from only eight percent in the Gambia (1977) to a full 45 percent in Sierra Leone (1979). Ghanaian fishermen are difficult to enumerate because of the traditionally high number of fishermen who migrate to the shores of other countries to fish. The author has encountered Ghanaian fishermen as far north as the Gambia (January 1982), and others report them as far south as the Congo (Lawson and Robinson 1983b). In many cases they return to Ghana (Berron 1977; Nukunya 1969), but some settle in their adopted country (Lawson and Robinson 1983). It is important to note that some of these "Ghanaian" fishermen are Ewe who reside in southern Togo as well as southeastern Ghana. Sierra Leone forced the Ghanaian fishermen to leave their country in the early 1970s to open up opportunities for their own people.

The fishermen of Sierra Leone also migrate. This has resulted in problems determining the exact number of active artisanal fishermen. Some fishermen establish a home with a wife in each fishing area, but the majority maintain only one home and live with friends while fishing away from home. Senegalese fishermen seasonally migrate to both Mauritania and Guinea Bissau (Hochet 1979; Epler 1983).

Throughout West Africa the small-scale fishing fleet is characterized by owner-operators. These owner-operated vessels are often crewed by a group of kinsmen. Cost of small-scale vessels, motors, and gear is such that individual fishermen can realistically expect that with proper planning they will be able to own a vessel of their own some day. As the boats, motors, and



gear become more sophisticated, however, moneylenders play an increasingly important role in financing the fishermen. In many cases, successful female primary buyers assume the additional role of moneylender; thus, increasing their control over the fishermen and insuring themselves a steady supply of fish. It is reported that in some areas, especially close to major towns, the incidence of non-fishermen owners is increasing. This is to be expected as profits as well as costs of equipment increase. This phenomena was clearly evident in the Ghanaian semi-industrial, small-trawler fleet (10 meters and under) during the 1970s where it was reported that the majority of vessels were not owned by fishermen (Christensen 1977). There has been a reversal of this trend in Ghana, however. As the industrial and semi-industrial fishery was hurt by a lack of imported inputs, a sellers' market for fish emerged resulting in improved economic status among the artisanal fishermen and a concurrent decrease in the status of the middleman/financier (Lawson and Robinson 1983b).

In other West African countries however, the increase of non-fishermen owners as seen in Ghana in the 1970s continues. For example, in Sierra Leone, especially in the more urban area close to Freetown, a system of ownership is developing which is referred to as the "sleeping fisherman". "Sleeping fishermen" are owners who do not fish--they hire crews. As fishing grows more profitable, it is expected that these non-fishermen owners will increase in number resulting in a "new class" of person in the fishing industry as well as increasing social stratification in the fishing communities. Kotnik (1982) writes that in the herring and bonga fishing sector in Tombo, boat owners possess between one and five vessels. Some 14 percent of these owners are mostly widowed women, over 50 years of age, who own one or two boats (Kotnik 1981).

Distribution of ~~catch~~ among fishermen varies somewhat from society to society, but the primary determinant of the lay system appears to be the ~~scale~~ of the technology. With respect to the simpler, unmotorized canoes, the shares are divided equally with one share going to the boat, one to the net (if used), and one each to the crew of fishermen. As the technology becomes more costly, larger shares are allocated for equipment replacement and repair. For example, the Fanti using the large motorized canoes first deduct expenses (Petrol, etc.), give one share to each of the 9 to 14 crew members, one-half to one share to non-fishermen owners, one to two shares to the boat, two to three to the net, and three to four to the motor. The larger shares for equipment are from the most recent report (Christensen 1982), suggesting that equipment shares are increasing. There are, however, some deviations from this type of share system. For example, Epler (1983) reports that the most prevalent system in Guinea Bissau is payment of a monthly wage. Kotnik (1982) describes an unusual variation on the share system for Tombo (Sierra Leone). There she reports that owners are responsible for feeding and lodging the workers and that the crew is free to dispose of Saturday's catch. In most areas of West Africa, irregardless of equipment type, a small share of the catch (e.g. several fish for home consumption) is given to women or children who help unload the vessel.

Small-scale Marketing and Distribution CECAF Project estimates indicate that the small-scale fishermen produce some 60 to 70% of the total weight of the fish landed by locally based vessels in West Africa. One of the great problems, however, is the lack of adequate fish handling facilities at small-scale fish landing places. In most areas fish are handled, processed, and marketed at beach locations which frequently lack basic facilities such as hygienic areas

for cleaning, washing, and sorting of fish, as well as running water and ice supplies. It has been estimated that problems in handling due to lack of facilities cause losses as high as 20 to 40% of landings prior to reaching the consumer.

Due to this shortage of adequate landing and processing facilities, most fish landed by the artisanal fleet have been traditionally processed by smoking. Some drying and salting also occurs as well as other infrequently used preservation techniques. In some countries such as Sierra Leone, a raised platform is used which is less effective than the improved smoking ovens with six or seven racks which are used in Nigeria and Ghana (Linsenmeyer 1976). A relatively large number of fish smokers, often family firms composed of fishermen's kin, handle the catches of the isolated small producers. Other middlemen (usually females) collect these small-scale catches and distribute them to inland markets where they are purchased by either retailers for local sale or other who will distribute the product to more remote areas. In most areas smoked fish are preferred for their taste and role in traditional recipes.

The general method for marketing the artisanal catch in almost all West African countries is that upon landing, the fish are sold to middlemen, usually a woman who is either the fisherman's wife, kin, or an unrelated entrepreneur. These women are frequently referred to as fish mummies. Akerele (1979) writes that there is one fish mammy for every two fishermen, roughly the same ratio reported for Ghana. Unrelated female entrepreneurs are beginning to dominate the wholesale and retail trade as a result of their

role in financing the more expensive motorized technology that is beginning to dominate the small-scale fishery. In Sierra Leone it is reported that the proportion of male middlemen is beginning to increase. In Liberia, Lebanese merchants gained control of the fish cold storage depots as the industrialized fishery began to supply more frozen fish (Akerele 1979) and in Nigeria men already play a dominant role in fish marketing (Lawson 1980). In Senegal, and to a limited extent in Ghana and Sierra Leone, some buyers are organized into marketing cooperatives.

Little information is available concerning prices paid to fishermen. It is reported that in Ghana each village or town along the coast has a head fish buyer who is elected by the others. She meets the first vessel to reach the beach and bargains with the captain concerning the price to be paid. The price decided upon becomes the base price for the day. The decision is based upon factors such as size of catch, species of fish, and size of catch on previous days (Christensen 1982, Quinn 1978). Price per pan (selling units are tin pans) decreases late in the day due to restricted time for selling and processing. Additionally, if subsequent landings are much larger or smaller than the initial landing, prices can vary as much as 50 percent in either direction. Nevertheless, the base price is usually honored. This pattern of basing prices for the day on initial landings is also practiced in Sierra Leone where drops in prices near the end of the day were also recorded. Other levels of middlemen (e.g., in the wholesale and retail markets) set prices based on an evaluation of the state of the market in the various towns where they sell their fish (see Quinn 1978).

In Senegal the recently organized marketing cooperatives set the prices. Fishermen selling outside the cooperatives are at the mercy of market forces.

It is reported that the Offices des Pêches Maritimes holds a monopoly over wholesale fish marketing in Guinea where the national government sets prices and profit margins (Guinean Country Paper, 1978). One informant, however, reported that traditional middlewomen can still be found buying and selling fish in Guinea. In Benin, the Societe Nationale d'Armement et de Pêche attempts to enforce fish prices set by the Minister of Commerce. It is important to note that as many as seven trading functionaries can be involved in the marketing chain in West Africa (Lawson 1980).

The best available information concerning the distribution and marketing of marine fish at inland locations is from Ghana. There, coastal buyers travel to inland towns where they sell to retailers. In some cases the inland retailers are coastal people who have been set up in the business by the coastal buyer (Schwimmer 1979) and thus form distinct ethnic groups in the inland locations. The introduction of frozen fish technology has not completely eliminated this traditional system. In one town close to an inland terminal for frozen fish distributed by the Ghana Fishing Corporation, the fish wholesalers smoke the thawed frozen fish and sell it through the traditional retailers. Further, the traditional coastal supply system still accounts for a good proportion of the fish distributed to inland locations (Schwimmer 1979). In other West African countries (e.g. Sierra Leone, Togo, and Ivory Coast) frozen fish from the industrial fleet are also bought and smoked by middlemen for further distribution suggesting that the traditional processing industry can readily adapt to the new technology while at the same time provide a product preferred by the consumer. In Liberia, head fish mammals buy fish from depots scattered around the country and distribute it through sub-mammies who retail the fish in local markets. Each

head mammy deals with between 5 and 15 sub-mammies (Akerele 1979).

### SOCIAL AND CULTURAL ASPECTS OF DEVELOPMENT

Various aspects of the society and culture of the small-scale fishermen of West Africa are discussed in the previous section. The purpose of this section is to highlight social and cultural factors which may either facilitate or impede development efforts.

Ethnic Diversity The small-scale fishermen in West Africa come from a wide variety of ethnic groups. In each country two, three, or more ethnic groups are involved in the coastal fishery (Sutinen, Pollnac and Josserand 1981). In some cases (e.g. Tombo, Sierra Leone) up to four distinct ethnic groups are involved in the fishery in a single fishing community (Kotnik 1982). An examination of Murdock's map of ethnic groups of Africa (1959) indicates that there are some 47 distinct ethnic groups living along the West African coastline from Mauritania to Cameroon. If we take into consideration all groups living within a fifty-mile wide band along the coast, we could easily double this number. This diversity has many implications for development. Project design is often influenced by intergroup differences, and the identification of these differences during the early stages of planning can help reduce potential problems and make it possible to arrive at more realistic cost estimates (cf. Cochrane 1979).

It has been noted that ethnic factors are related to "...preference for certain species, certain fishing techniques, a certain type of vessel, a certain type of relation among fishermen and between fishermen and traders" (CECAF 1980:3). This type of variability occurs within specific countries as well as throughout the region.

The most important implication of this diversity is that no single, unitary approach to fishery development can be applied with a reasonable chance for success along this coastline--it will not be possible to develop a package that can be applied to all regions. This restriction is valid not only for the region, but also for specific countries, as there is also intra-country ethnic diversity.

### COMMUNICATION

Turning to potential project impacts it is important to consider the operationally relevant aspects of ethnic diversity. Of primary concern in a development project is the establishment of communication with the target group as a means of obtaining grass-roots input to project design--a critical factor in project success (Morss, et al 1976; Mickelwait et al 1979). Most ethnic groups along the coast speak mutually unintelligible languages; thus, establishment of communication will be a difficult process. Use of acceptable lingua francas is possible in some areas, but care must be taken due to regional variations in lingua francas and differential attitudes towards available languages. Many studies have indicated that the most effective communications are conducted in the native tongue (cf. Pollnac and Sutinen 1980).

### SOCIAL ORGANIZATION

Property Rights The ethnic diversity of the West African coast is also reflected in its variability in social organization. Of primary concern to development project planners are aspects of social organization influencing rights to property or group membership. In general, rights to property or

group membership descend through females (matrilineal), males (patrilineal), or both (bilateral). Along the West African coast there are groups which manifest all three of these patterns in addition to one other: duolineal, where different rights are held by the patrilineage and matrilineage. Several studies (e.g., Poewe 1978; Douglas 1971) have demonstrated the differential receptivity to economic development manifested by societies which vary in terms of inheritance patterns. For example, matrilineal societies are ill-adapted to some conditions of economic development, and the shift to a patrilineal or bilateral system is often accompanied by resistance on the part of the group losing power (the matrilineage). Many West African social groups are matrilineal, but these strains may not develop due to the predominant form of division of labor--another social variable related to ethnic diversity.

Division of Labor As discussed above in the section on the artisanal fishery, in West African fishing communities males generally fish and females process and distribute the product. Some authors (e.g. Christensen 1982) suggest that the female role of fish trader results in their being the primary element of economic stability in some fishing societies. Males fish intermittently while females work year-round. Lawson (1980) notes that the pivotal role of women in the functioning of many artisanal fisheries in West Africa is due to the fact that they are so involved in the industry not only at the whole-sale, retail, and processing levels, but are also the main financiers of fishermen and other traders. She further notes that women play a crucial socially cohesive role in many fishing communities--a role that is particularly important in societies where the fishermen are migratory and absent from home for extended periods of time. Kotnik (1982) emphasizes the important



role played by women in the small-scale fishery of Tombo, Sierra Leone. . Programs which maintain this division of labor will probably encounter less resistance than programs which reduce the economic role of females. In many countries female processors and distributors have adapted to the industrialized fishery by purchasing frozen fish, smoking them, and distributing them through the traditional network. In part, this was made possible by the fact that cold stores are not as wide spread as the traditional trade networks. Perhaps a larger contribution to this adaptation, however, was made by the fact that smoked fish plays a large role in traditional diets. Changes in traditional diets and/or increasing efficiency in the distribution of industrial catches may displace these women in the future. One very real threat to their future, however, is the fishermen's cooperative.

The fishermen's cooperative is given an important role in small-scale fishery development by most West African governments (Lanning & Hotta 1980). The fishermen's cooperative is often viewed as a technique for eliminating exploitation by middlemen. If this becomes the goal of the cooperative movement in West Africa, female fish processors and vendors could be displaced. In areas where fishermen are related to the middlemen, the movement would probably be resisted; but in other areas, the effects on a relatively large, economically productive sector of the population would be disastrous.

Some development programs (e.g., in Senegal and Sierra Leone) are coping with this potential problem by encouraging the establishment of women's marketing and processing cooperatives. In Sierra Leone the Tombo Women's Cooperative Society, founded in 1981, has increasing membership, significant savings, and is involved in the introduction of improved processing and marketing techniques (Kotnik 1982). One can only speculate concerning the

disaster that would have followed an attempt to introduce a male-centered fishermen's marketing cooperative into this area. Such foolish attempts have been made in development programs in other areas in the past, and they still occasionally occur.

Distribution of Wealth and Power The distribution of wealth and power differs within and between the various ethnic groups along the coast. Some societies are relatively egalitarian with little differences between individuals with respect to wealth and power. Other societies, with a tradition of hierarchical organization and social stratification manifest marked variance with respect to access to wealth and power among individuals. Development programs targeted at helping the poorest of the poor must be differently structured in these different societies. In communities where there is differential access due to tradition, procedures should be developed which will equalize access without arousing resistance on the part of the traditional elite. This is not necessary in the more egalitarian societies.

Development projects may also have an effect on the distribution of wealth between ethnic groups in a single country's coastal region. For example, Lawson and Robinson (1983a) report that in Ghana different ethnic groups use specific gears and nets; e.g., the Ewe use beach seines, the Ga lines, and new entrants, Fanti, and Ga practice poli/ali netting. Epler (1983) reports that in Guinea Bissau, the Manjaco use traps and nets but no boats; the Felupe use cast nets, longlines and dugouts, while the Senegalese migrant fishermen (Nhiominka) use nets and large motorized boats. In Liberia the Fanti migrant fishermen are full-time and use relatively large vessels with motors while the local Kru, Grebo and a few Vai and Bassa are part time fishermen who use small, unmotorized vessels (Akerele 1979).

Finally in Sierra Leone Krabacher (1983) reports that along the Sherbro Coast the modern "Ghanaian style" fishing technology is used almost exclusively by Temne who migrated from other areas of the country while the local Sherbro fishermen use unmotorized dugout canoes which are smaller and employ fewer crew members. The Temne tend to be full time fishermen in contrast to the Sherbro who often practice small-scale farming. In these multi-ethnic settings changes which would improve or restrict the use of specific gears or types of fishing would thus differentially impact different ethnic groups--a result that could lead to or further exacerbate inter-group tensions.

Social Organization of Work The traditional social organization of work varies from society to society and has great potential influence on the success of fishery development programs (cf. Pollnac 1982). For example, crew size, which is traditionally large in some West African societies (e.g. Ghana) can be influenced by technological changes. If technological improvements are made which can eliminate some crew members, there may be social forces which will keep the crew at its traditional level; thus, reducing the efficiency of the new technology. This is especially true in areas where crew are usually kinsmen as in much of West Africa. For example, one report notes that the strength of the family structure has resulted in a preference for labor intensive systems in some regions (CECAF 1980). In these regions crews are reported to be about twice as large as necessary with only a little over one-half the crew working on a given day. Participants in these systems note that the procedure supplies an income to a maximum number of men of the "family". Introduction of changes which would reduce the numbers of crewmen in areas of scarce alternative employment would increase unemployment, a phenomena which has other negative implications such as increasing tendencies to move to urban areas..

In some regions (e.g. parts of Ghana and Ivory coast), traditional systems of leadership once served ( and in some cases still serve) to control and manage the fishery, even to the extent of controlling entry and setting seasons (CECAF 1980; Lawson 1980; Lawson and Robinson 1983a,b). Although these systems are decreasing in importance, an analysis of their past and present structures may be of use in designing systems of management that would be locally acceptable. In some cases it may be determined that the traditional system can be rejuvenated and used without alteration. It is important to note, however, that the influence of the "Chief Fisherman" declined along with the introduction of motorization due to the fact that motorized vessels can travel farther and land catches at sites where the traditional leader has little or no power. Recent evidence, however, suggests that the "Chief Fisherman" is once again playing an important role (Lawson and Robinson 1983a,b), but not without some problems (Lawson 1980).

Another aspect of the social organization of work which can be influenced by technological change in West Africa is the owner-worker relationship. In most of West Africa's small-scale fishing communities the owner is also a fisherman, and he usually uses kinsmen as crew members. As technology becomes more sophisticated and expensive, small-scale owner-operators are usually not in a position to be able to finance the new technology, and the number of non-fisherman owners increases. These new ownership patterns result in greater social stratification which can result in social unrest. Sometimes the new technology is rejected when fishermen foresee its potentially negative effects. These problems, where present, can be overcome through the use of financing techniques which will allow the industry to stay in the hands of traditional fishermen (e.g., producer cooperatives, subsidized loans from development banks, etc.).

### BELIEF SYSTEMS

Ideological systems often determine specific aspects of the types of development opportunities that will be acceptable to the target population (cf. Cochrane 1979). The belief systems vary considerably among the ethnic groups fishing the coast of West Africa, and prior to project development, a preliminary assessment should be made of attitudes, beliefs, and values relevant to project parameters (cf. Pollnac 1976, 1982). Failure to account for these cultural differences can result in the failure of technologically well conceived projects. For example, Lawson and Robinson (1983a) write that in the period from 1952 to 1954 fishermen in a number of communities along the coast believed that motorized fishing vessels were not approved by the sea gods; thus, they feared the consequences of using motors, hindering their introduction for a brief period of time. Statistics show that mechanization overcame this obstacle, but other innovations lacking the immediate and clearly demonstrable economic benefits of mechanization may not be able to cope with this type of opposition.

### DISTRIBUTION OF FISHERMEN IN RELATION TO INFRASTRUCTURE

The present distribution of fishing communities along the West African coastline is adapted to existing technology and infrastructure (e.g. landing facilities, processing and distribution networks). Technological improvements, such as increased vessel size, may be restricted to areas with adequate facilities (as with the semi-industrial trawlers in Ghana). If the new technologies are so effective that they can respond more efficiently to demand, they may replace the older, less efficient technologies. Although this is desirable in most situations, these changes may result in under-

employment in rural areas which lack adequate infrastructure (this includes most of the coastline) and stimulate increased rural to urban migration. Rural to urban migration is a factor recognized as having a negative impact on food production in Africa, and development programs should reverse not exacerbate this phenomena. Table 3 indicates that the level of rural to urban migration is already excessive in West Africa.

### MOBILITY PATTERNS

Some ethnic groups in West Africa are already well known for the geographic mobility of their fishermen (e.g., the Fanti and the Anglo (Ewe)). Other fishermen are not as extensively mobile, but many do migrate from area to area in response to availability of resources. Some migrate from fishing to farming areas depending on the season. These mobility patterns affect access to fishermen as well as development of adequate data gathering systems (e.g., as basic as determining the number of fishermen); thus, knowledge of the specific mobility patterns of different ethnic groups must be taken into account in designing fishery development programs. These migratory patterns also are important considerations for planning the development of processing and storage methods, as well as the construction of feeder roads. Cold storage facilities, ice plants, and feeder roads may prove uneconomic in settlements where they will be utilized only during a brief fishing season (Brainerd 1983).

Another important aspect of mobility patterns is migration both in and out of the fishery. It has been noted that there is a tendency for people to drift in and out of artisanal fishing depending on the season and profits to be had from other occupations (CECAF 1980). Lawson (1980) reports that throughout the region fishermen tend to move from the artisanal to the

industrial fishery whenever the opportunity to do so arises. She attributes this to either better earnings or the attraction of the urban setting where most industrial fisheries are located. In Ghana, for example, migration of the young out of the artisanal fishery has resulted in a relatively high average age for artisanal fishermen (45 years). This contrasts with Senegal where the more remunerative fishery has attracted the young, resulting in a fishery where most participants are under thirty years of age (CECAF 1980). Studies need to be conducted throughout the region to assess factors contributing to movement in and out of the fishery, especially since this movement appears to be related to the more general problem of urbanization.

#### COMPETING DEMANDS OF FARMING AND FISHING

Available data suggest that fishing is a seasonal occupation for about one-third of the fishermen in most West African countries. Depending on the region and traditional practices, they either prepare the land and/or plant during the planting season, and fish when the agricultural work is completed. In some areas (e.g. as reported for Sierra Leone) the sowing season quite fortunately coincides with the slack fishing period. In others, such as the Ivory Coast (CECAF 1980), there is an age structure to fishing and farming. Young men fish using gear provided by older men who farm. The catch is shared with the older farmer, and as young fishermen become older, they eventually obtain fishing units of their own and inherit the elder's land. They then allow younger men to use their fishing gear under the same arrangement. Thus, fishing and farming is integrated by an age structured system. It is reported, however, that out-migration of the young to other occupations and urban areas is in the process of destroying this system (CECAF 1980).

Generally, it appears that fishermen from the more rural areas spend more time farming than those near or in more urban areas. Nevertheless, fishermen residing in towns are reported to practice some subsistence agriculture (e.g., in Guinea Bissau, Hochet 1979). There also appears to be a relationship between migrant status, scale of the technology (e.g., level of capital investment), and full-time fishing. In Liberia the Fanti migrants, who use larger scale technology are the full-time fishermen in contrast to the local fishermen (Akerele 1979). Likewise along the Sherbro Coast of Sierra Leone the migrant Temne employ the more capital intensive gear full-time while the local Sherbro use unmotorized dugouts and fish only part-time (Krabacher 1983).

Krabacher (1983) notes that in Sierra Leone full-time fishermen become closely tied to the purchase economy for food; thus, when shortages occur in the marketplace they do not have the farm or household gardens to fall back on that the part-time fishermen frequently rely on. He notes that this could result in a dietary disadvantage in areas subject to shortages--a phenomena that occurs frequently in West Africa. It is also important to note that changes in fishing patterns (e.g., fishing further out at sea) which will alter the seasonality of fishing may have a negative impact on the time devoted to agriculture. Twelve of the thirteen coastal countries (excluding Cape Verde) we are concerned with here had negative average annual growth rates of total agricultural production per capita during the decade 1969-1979 (World Bank 1981). It is therefore suggested that prior to project implementation distributions of fisherman/farmer combinations be determined and analyses conducted to determine national impacts of proposed changes.



# SMALL-SCALE VERSUS INDUSTRIAL FISHERY DEVELOPMENT

A question frequently arising in most fishery development programs involves the advisability of developing the small-scale fishery at the expense of the industrial. Everett (1979) presents a comparison of costs and benefits of small-scale and industrial fishing development which was prepared by CIDA. His table is reproduced here (Table 3).

Everett (1979) indicates that the overall benefits of the small-scale fishery in Table 3 are to a certain extent exaggerated, but admits that small-scale fisheries do deserve a high priority in fishery development. In some cases, e.g., fishing great depths or rough waters or supplying large urban areas or processing facilities, the industrial fishery is clearly more efficient. In setting development priorities, however, factors such as those discussed above should be weighed, in a cost benefit analysis, to arrive at the best mixture for the country involved.

Table 3. Subjective Assessment of Benefits to Annation of Small-scale  
Rather Than Industrial Fisheries

Small-scale	Industrial
creates: employment	unemployment
uses: modest local investment	substantial foreign investment
are: decentralized, in villages	centralized in towns
uses: simple technology	complicated technology
exploits: abundant coastal resources	poor offshore resources
produces: high quality fresh fish	poorer quality stored fish
provides: products for local markets	for export
consumes: little energy	much export
causes: little pollution	substantial pollution
affects: beneficially social habits	detrimentally social habits

Source: Everett (1979) adapted from an unpublished CIDA document.

Jarrold and Everett (1978) conducted an economic and socio-political analysis of the returns of unmotorized canoes (handliners), and semi-industrial handliners, purse seiners, and trawlers in Senegal. The analysis indicated that the semi-industrial trawler and purse seiner gave the most favorable returns in terms of overall benefits to the nation. Nevertheless, as Everett (1979) points out, canoe motorization does provide benefits to both the fishermen and the nation. It maintains employment in rural areas with a modest investment and increases both the income of the small fishermen and the supply of fresh fish. Further, semi-industrial vessels often need landing facilities found only in urban areas; thus, resulting either in underemployment in the rural area or the migration of fishermen to urban centers. As noted elsewhere in this report, employment in rural areas is a positive factor due to the problems associated with increasing urbanization in Africa. Further, rural fishermen often grow at least some subsistence crops, thus contributing to the availability of plant food as well as animal protein in an area of the world suffering from food deficits.

#### KEY SOCIAL INDICATORS

Table 4 was prepared to provide a general summary of important social indicators for West African coastal countries. The table clearly indicates the extreme poverty of the region. A recent calculation of the Physical Quality of Life Index for 150 countries placed all countries in Table 4, except for Ghana and Cape Verde, in the lower 20 percent. Ghana was ranked 39th and Cape Verde 62nd (Morris 1979). This index, which captures the essentials of "basic needs", is based on infant mortality, life expectancy, and basic literacy--three variables related to a host of factors associated with economic development.

Returning to Table 4, although it was determined on the basis of country-wide statistics, it is possible to make some inferences concerning relationships between items in the table and fishery development. First, it is clear that the low literacy rate impacts on fishery development programs. There is some evidence to suggest that fishermen may actually be below the national average with respect to literacy. Gladwin (1970) notes that Ghanaian fishermen tend to be less Westernized than other Ghanaians. Noting that while over 50 percent of the individuals over 15 years of age in Cape Coast can speak English, only one of the 200 fishermen he interviewed could. He suggests that this may be due to the fact that fishing is not considered a suitable occupation for the educated, thus the occupation selects against English speakers. This low literacy rate indicates that communications aimed at fishermen will have to be oral, not written, indicating the need for development of an extensive extension service. Further, it will be necessary to locate credible, literate fishermen to act as record keepers where necessary (e.g. in fishermen's associations).

Road density is another social indicator that will impact development programs. Low road density suggests that there will be relatively isolated fishing villages which will be hard to reach with development programs. Further, road density is an aspect of infrastructure that impacts the distribution of fish. Regions with low densities can probably absorb less product than those with high densities. Projects planned for countries with low densities should therefore make sure that transportation links to major markets are adequate.

Finally, with respect to Table 4, it is clear that the rate of urbanization is relatively high in most of the countries. This trend has been noted

as part of the problem negatively affecting food production in Africa.

As noted above, fishery developments which introduce technologies that are restricted to areas with well developed infrastructures (usually urban areas) tend to exacerbate the urbanization problem. Nevertheless, since many of the larger urban areas in West Africa are located in coastal regions, development of the marine fishery could help provide animal protein to the urban dwellers with a minimum of infrastructure for distribution. More careful analyses need to be conducted, however, to determine the relative balance between these conflicting needs.

Table 4: Key Social Indicators in Coastal West Africa

Country	Per Capita <sup>3</sup> GNF 1979 US \$	Percent Literate (age 15 and over) <sup>2</sup>	Life Expectancy At Age One (years) <sup>2</sup>	Infant Mortality Rate Per 1000 Live Births <sup>2</sup>	Km of Roads Per Km <sup>2</sup> of Total Land (Percent) <sup>1</sup>	Percent of Total Population Urban (1980) <sup>3</sup>	Percent Avg. Annual Growth Rate of Urban Areas <sup>3</sup> (1970-1980)
Mauritania	320	11	45.7	187	.6	23	8.6
Senegal	430	8	51.3	159	7.1	25	3.3
The Gambia	250	10	51.7	165	-	-	5.0
Cape Verde	180 <sup>1</sup>	37	53.3	79	-	-	-
Guinea Bissau	170	5	46.9	208	8.9	-	4.3
Guinea	280	9	48.7	175	3.1	18	5.5
Sierra Leone	250	10	49.9	136	10.3	25	5.6
Liberia	500	10	52.5	159	7.2	33	5.6
Ivory Coast	1,040	20	51.6	164	14.2	38	8.5
Ghana	400	25	55.8	156	13.5	36	5.1
Togo	350	16	45.9	127	12.5	20	6.6
Benin	250	20	49.3	185	2.4	14	3.9
Nigeria	670	25	49.0	180	11.6	20	4.7
Cameroon	560	19	46.5	137	6.1	35	7.5

<sup>1</sup>Source: Food Problems and Prospects in Sub-Saharan Africa: The Decade of the 1980's, U.S.D.A. (1980).

<sup>2</sup>Source: M.S. Morris, Measuring the Condition of the World's Poor, Pergamon Press (1979).

<sup>3</sup>Source: Accelerated Development in Sub-Saharan Africa, The World Bank (1981).

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