SOCIAL AND PRODUCTION RELATIONSHIPS IN THE ARTISANAL MARITIME FISHERIES OF WEST AFRICA
A Comparative Analysis

By

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ABSTRACT

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Sea-based activities and marine fishing communities have long been ignored by sociological inquiry. Only recently did a new body of literature in the social sciences start to deal significantly with fishermen, their history and social organization. In West Africa and Senegal, in particular, more attention has generally been given to other aspects of fisheries organization than to a systematic investigation of the labor process in fishing units and its dynamic.

This thesis is designed to fill this gap. It organizes and interpret a largely scattered and unrelated literature on West African fishing into one single frame of comparative analysis. It locates fishing communities in the political economy of precolonial states in West Africa and looks at their position in the social processes of exchange, appropriation and conflicts in the area.

This thesis finds that the production systems of fishing communities in modern times, their ethnic characteristics, their patterns of economic specialization, social division of labor and migrations are determined by differing sets of constraints and determinants among which ecological constraints and market penetration

play a prominent role. The analysis goes to the roots of fish production in coastal West Africa, i.e., its mode of production. This latter is broken down in its constitutive elements and various technological developments in the means of production are assessed. One of the most fundamental findings, based on the elaboration of a mathematical formula describing the share system, is that, as technology moves from the simpler to the more complex, individual fishermen's share of the surplus declines steadily while the return to capital increases.

In addition, ownership of fishing units is increasingly individualized and concentrated and the production sphere increasingly penetrated by market forces. These changes equally affect technical relations of production within which labor is increasingly separated from the means of production, socially and economically hierarchized and fragmented. An initial attempt toward the modelization of the production process in artisanal fishing summarizes the thesis.

ACKNOWLEDGEMENTS

This project was started eight months ago without a full awareness of the whole range of difficulties lying ahead. Today, it is with a sense of great relief that I feel that this whole intellectual and learning experience was worthwhile. A tremendous amount of thanks is owed to all those who helped make it possible.

First of all, I extend my sincere gratitude to Chris Vanderpool for his constant, straightforward and patient professional support throughout my stay at MSU. Above all, I thank him for sharing his works, ideas and references, for caring and for his friendship.

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This work is dedicated to my friends and beloved, Yacine, Souleymane and Abdoulaye. They have been an irreplacable and loving source of joy and support through the very difficult campus life. Yacine, in particular, has been part of this research process from its inception by sharing ideas on various aspect of the subject and by spending nights typing part of this work.

Without the deep and touching friendship of many, this whole training process would have been meaningless as a human and social experience. For that, I want to thank each and everyone of my Senegalese friends and colleagues in the United States and their families, the dearest personal friends earned in Lansing, be they American or Afro-American, from Asia, the Middle East or from the African community in Lansing.

I hope that this little piece of work will be useful to the working people of West Africa.

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I. Introduction

> "My personal preference is for a technocentric approach, with the fish first, the economics second, and the social problems a distant third." ...A fisheries biologist (Larkin, in Emmerson, 1980:7).

It is generally acknowledged today that most of the world resources are concentrated in the oceans which represent more than 70% of the earth surface. They include living and non-living resources; the latter ranging from hydrocarbons, minerals (gold, manganese nodules, sulphur, bromine, etc...), gravel and sand to sources of energy such as thermal gradients (based on temperature differences between top and bottom layers of ocean waters), waves, current and tides (Vanderpool, 1981).

Despite centuries of exploitation of the ocean living resources by human populations, only recently did mankind as a whole, gain a full awareness of marine potential. This growing awareness of the importance of both biotic and abiotic ocean resources is best highlightened by the worldwide attention, accorded by 'big' and 'small' nations alike, to the Third United Nations Conference on the Law of the Sea (UNCLOS III)[1]. For the first time in history, in a radical departure from the implicit 'rule of capture' upon which was based the era of colonial expansions, the status of 'common heritage of mankind' has been given to a resource - the deep sea - second only to land in the life of societies. Among other outcomes of the Conference, the adoption of 200 nautical miles Exclusive Economic Zone by most of the coastal states involved, appears as an important development; full of

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1 As an outcome of UNCLOS III, the United Nations Convention on the Law of the Sea was adopted in April, 1982.

consequences for the development in particular of fisheries and associated living resources of the sea. These new developments are indicators of the broad context of which sociological research in the marine area must remain aware. Marine resources, in general, and fisheries, in particular, can generate a variety of benefits to 'developing' countries. These benefits include increasing the supply of food and improving nutrition, generating an important source of foreign exchange earnings, increasing employment opportunities, and raising the standard of living of communities dependent upon income from the sea (Gulland, in Vanderpool et al., 1983).

For the time being, the prime interest remains with the study of artisanal fisheries, particularly in Senegal and West Africa. As a partial requirement for the M.A. in Marine (Rural) Sociology, a Comparative Analysis of the Social and Production Relationships characterizing selected Artisanal Maritime Fisheries of West Africa will be the focus. Particular emphasis will be put on the small-scale fisheries of Senegal and also Ghana, examined from the perspective of the producer - the artisanal fisherman.

Statement of the Problem

Historically, sociologists in general, and human ecologists in particular, have largely ignored the marine area as a focal point of inquiry (Vanderpool, 1981). The field of marine science being largely dominated by 'pure' scientists, fish production was perceived essentially from a biological perspective - 'through the eyes of the fish, not those of the fisherman'. 'Study the fish' was the motto' and

sophisticated catch equations to maximize present and future returns from the living aquatic resource were elaborated. The concept of Maximum Sustainable Yield (MSY), that is the largest quantity of fish, by size, weight and species that can be continuously caught in a given fishery, was at the center of the intellectual developments of that time (Emmerson, 1980). Starting in the 1950's, the biological concept of MSY became challenged by fisheries economists and opposed to the concept of Maximum Economic Yield (MEY), that is the difference between total cost over total value production in a fishery (Ibid). Instead of maximum sustainable yield, 'maximum sustainable profit' became the credo in resource management circles, underlying the growing influence of neo-classical resource economists in the field of maritime science. Only in the mid-70's did a new approach, backed by the concept of Optimum Sustainable Yield (OSY), try to integrate social considerations and the interests of fishing communities in management objectives based on biological and economic considerations[2]. As a whole, however, research in marine fisheries has, so far, been largely dominated by management-related issues. In Emmerson's ranking of four disciplines according to their respective share of the scholarly literature on fisheries (1980), biology comes first, resource economics second, international law third, anthropology and community studies, a distant fourth. Sociology is not even mentioned.

The recent development of a significant body of literature in maritime Anthropology and Sociology has been centered on the conviction

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2 For an in-depth discussion of intellectual developments in resource management circules, see the excellent 'state-of-the-art paper of Emmerson (1980).

that "a concern for the environment, for food, for productivity, for the economy, cannot exclude man" (Smith, 1977). Such a literature has been largely independent from management issues without ignoring however, the weight of ecology and of the biological dimension of the marine eco-niche (See Charest, 1981; Harris, 1978; Faris, 1977; Pollnac, 1976).

Boosted by the official recognition in North America of maritime anthropology as a subfield of social anthropology at the beginning of the 1970's, several studies have been done, since then, by scholars attracted by this new, wide-open field of investigation. So far, the foci of such research have varied considerably and have been characterized, to some extent, by a certain 'theoretical eclectism' (Breton, 1981). Ranking high among the problems tackled by marine anthropology, is the question of kinship and systems of descent (Quinn, 1971; Faris, 1971; Andersen & Wadel, 1972), articulated sometimes to the question of ethnicity (Verdeaux, 1981).

The issue of social change in fishing communities appears also as an overwhelming concern of scholars coming from a wide array of theoretical perspectives. Some, from the standpoint of occupational sociology/anthropology, have abundantly discussed the issues of technological and cultural change (Pollnac, 1976, 1982; Pollnac & Littlefield, 1981) or have looked at labor 'as being deprived of control over its product and over the conditions of its work' (Harris, 1978). Technological change has also been the focus of Christensen's research efforts in Ghana (1977, 1982) and, interestingly enough, of Pi-Sunyer in a Catalan fishing community (1977). In some instances, the concern for the necessity to understand patterns of maintenance and

change in marine communities had lead to the advocacy of Social Impact Assessment modeling (Vanderpool, 1983b). Finally, as part of this larger discussion on social transformations in maritime communities, a number of scholars, largely inspired by the French school of Marxist anthropology[3], have been attempting to highlight the specificity of coastal fishing as 'a process of labor' and to relate it to the question of the breaking up of peasant societies and to the debate about market exchange in economic anthropology (Breton, 1981). To reach this end, several of these scholars have made the concept of 'mode of production', developed earlier in France and Africa, instrumental in the study of fishing communities and their social relations of production.

To be cited are the work of the Laval Department of Anthropology in Quebec, as well as overseas, in Mexico, Venezuella (Breton, 1973, 1977) and Brazil (Giasson, 1981), scholars from the Afrika Studie Centrum of Leiden, who worked in Ghana (Vercruijsse, 1980) and Senegal (De Jonge, 1980), individual contributors such as J. Faris (1977), Hendrix, (1983) and young researchers such as (Sene, 1982). So far, this new body of work has been still stammering and has been characterized by a few discrepancies remaining at the level of the theory as well as the adequacy of that latter to the reality it purpots to describe and interpret. Nevertheless, within the new theoretical

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3 Among the most prominent proponents of this school of thought are scholars such as Meillassoux, 1965; Godelier, 1963; Bettelheim, 1968; Terray, 1969; Althusser, 1965; Rey, 1973; Fossaert, 1977; Pallnix, 1973; Ballibar, 1974; Amin, 1973 (who is more often associated with the 'dependency' school). This body of work entered the English language around the 1970's through the work among others of Hindess and Hirst (1975, 1978).

framework, fundamental epistemological issues raised by a scholar such as Firth (1946) some thirty years earlier, have been revived and given a new shedlight.

In particular, how are fishermen and fishing communities different or similar to farmers and rural peasant communities? What is the peculiarity of the resource in marine fishing and what effect does it have on social and economic processes in the area? What are the forces of labor cooperation in fishing crews and what are the corresponding distributional arrangements? What are the structure of ownership and the relations of production and appropriation between capital and labor? What is the nature of the 'share system' in fishing? Who owns what and how is the social product and the surplus value distributed among the actors of the production process? What is the mode of production in maritime fishing and what are the effect of technological change on this latter and on social relations of production?

Half a century of anthropological and social research in maritime communities - particularly in Asia and Latin America - legitimate such producer-centered interrogations. These concerns are further justified, insofar as the present study is concerned, by the fact that with a ten year lag, West African artisanal maritime fisheries are undergoing the same technological transformations observed earlier in Asia and Oceania. Available information overwhelmingly show that in those fisheries, the infusion of new performing technologies (outboard motor, purse seine...) has led to dramatic changes in the social relations of production and in the economic standing of ordinary fishermen. The pioneering work of British anthropologists in Melanesia (Malynowski, 1922), Polynesia and Malaysia (Firth, 1939, 1946) -

literally 'forgotten' by generations of social scienctists - is in that perspective, being reevaluated today as offering a highly pertinent frame of interpretation (Emmerson, 1980; Pollnac, 1981; Breton, 1981).

Raymond Firth in particular, by covering and following social events in the Malaysian area of Kelantan over a period of 23 years, provide a yet-to-be-matched scientific experience. During that period, Firth could see how, the introduction of outboard motors and purse seines (both of which became particularly significant in the early 1960's), had triggered radical changes in the fishing community. From lift-netting in 1940, to purse seining in 1963, the share of catch value going to labor had decreased from approximately 3/5 to 2/5. Given that purse seiving required a larger crew than lift-netting, the decline in the individual fisherman's share was even greater. Correlatively, the gross return to capital and management had increased for 2/5 to 3/5 of the take (Emmerson, 1980). Moreover, in the 23 year period, the number of fishermen dispossessed of any capital went up both absolutely and proportionately, a new class of fish dealers arose who controlled not only marketing but productive equipment as well; the system's center of gravity had shifted from sea operations to land-based dealer-owner-managers; "the Malay (fishermen) had become, in effect, a wage earner at a piece rate for a Chinese financier-owner-dealer" (Emmerson, 1980; Pollnace, 1981; Firth, 1946). Similar changes have also been observed in Grenada, Peru, Brazil, Venezuela, Japan, Southern Thailand.[4] There, increased sophistication of fishing equipment has had the effect of increasing social distance

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4 See Epple (1977) and Sabella (1974) cited by Pollnac (1980); Giasson (1981); Breton (1977); Norr and Norr (1974); Vanderpool (1981); Norbeck (1954) and Fraser (1960) cited in Emmerson, 1980.

and social inequality among the actors of the production process and of creating conditions for the relative, if not absolute, pauperisation of ordinary fishermen.

The present study is rooted in the intellectual tradition initiated by Firth and which is still in a process of defining and refining its epistemological tools, after a theoretical gap that lasted nearly thirty years.

Its aim is to grasp the social dynamic at work in artisanal maritime fisheries and to reveal the driving force behind the changes taking place in coastal communities of fishermen. As such, it claims to be a contribution to the general literature on fisheries, from the standpoint of sociological research. By centering its focus on fishing communities and their social relations of production, it stands also as a contribution to sociology in general, by examining an area of primary production largely neglected by this discipline.

Since it came to a start, in 1979, the main thrust of the socio-economic section of the Oceanographic Research Center of Dakar-Thiaroye (CRODT) in Senegal, has been to work toward a global, holistic understanding of the fish 'circuit' in that country, from the hunting-production stage of the process to the marketing, processing, distribution and consumption of the product. In its emphasis on Senegalese as well as other West African fisheries, this thesis must be considered as an integral part of the on-going body of work being realized by CRODT. In that respect, it strives to be innovative in three different ways:

1) This study intends to fill a void in the literature on Senegalese fisheries. This literature, so far, has made very valuable

breakthroughs in the study of fishing communities and their history (Chauveau, 1981, 1982a, 1982b, 1983a, 1983b; Van Chi, 1967a, 1967b, 1977), wholesale and retail marketing (Cornier, 1981; CRODT, 1982)[5], artisanal and industrial processing (Duranc, 1981; Deme, 1982), artisanal and semi-industrial fishing (Kebe, 1981) and in the study of the overall connections among the various elements of the fish chain as well as their significance in terms of research and policy making (Weber, 1980; Weber and Freon, 1981; Weber, 1982b). However, n systematic anaysis has been provided so far, with regard to production relationships, patterns of ownership and catch sharing and more generally, on the various transformations taking place in the sphere of direct fish production.[6]

2) By focusing on fish production and producers in West Africa and not merely in Senegal, this study develops a comparative dimension which has been seriously lacking, not only in Senegal but in the region as a whole. Apart from a 5-year project of the comity on Eastern Central Atlantic Fisheries (CECAF) submitted for funding in 1980 and which earlier results - if approved - should come around 1985 ("Projet de Recherche sur la Peche Artisanale en Afrique de l'ouest" Lawson - COPACE, 1980), no attempt has been made up to now, toward a study of coastal fishing from a regional perspective. While fish stocks and fishermen have largely ignored the national boundaries inherited from

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5 Chaboud's, 1981-study of wholesale marketing ('mareyage') had not been published by March 1983 (see Weber, 1982a).

6 Diaw (1981) addresses those issues, but on a limited scale, within the framework of a monograph on bgeach seini fishing. Weber's economic monitoring of 80 fishing units is based on an interesting agenda, but its results were not published as of March, 1983 (see Weber, 1982a).

colonization, the state of scientific research, and marine research in particular, it still marked by its recent colonial past and by artificial divisions along linquistic and colonial lives. This work is therefore a first attempt to move beyond those divisions and to identify and interpret, from the literature, the social processes relevant to a theoretical perspective on West African fishing communities.

3) As such, this thesis intention lays a foundation for further field investigation in the region, by verifying conceptually a literature characterized by the diversity of its object as well as its theoretical support. Out of this work, significant variables will eventually come out. They could then, be built up into a sociological model of West African fishing with primary focus on social relations of production. A first attempt toward sociological modeling relevant to artisanal fishing in West Africa, such a model - by definition a reduction of reality - is meant to be a working model.

Primarily concerned with production, for the integration of all the 'moments' of the fish 'circuit' is largely beyond the scope of a M.A. thesis, it could provide a basis for a social impact modeling of the sector as a whole. From the standpoint of oceanographic research at large, it can be an instrument toward the establishment of a sociological framework which, articulated to other economic and biological information, would help understand, assess and even forecast the impact on the system of any of the initiatives - planned as well as spontaneous - which are in the process of shaping the very future of canoe-fishing in Senegal and in the region as a whole.

Summary of Objectives and Methodological Aspects

Overall, this study of West African fishing communities and of the various social forces through which these communities have organized their productive activities, is concerned with the 'problematique' present in two sets of dynamics:

- The analogies and specifities among West African production systems.
- The internal dynamic of the mode(s) of production in fishing, and the evaluation of this latter in response to the changes - both technological and social - which have been taking place in the sector.[7]

More specifically, the thesis objectives can be summarized by the following points:

1) To identify, locate and organize the available literature on West African fishery communities relevant to their history, social organization and production relationships; 2) To undertake, on the basis of this literature, a comparative analysis of the major trends and critical linkages that can be identified in West African fishing and enhance the perspective on Senegalese and other national fisheries by looking at the organization of sea fishing at the scale of the region; 3) To identify the critical variables at work in maritime fishing; adequately describe the labor process in major forms of sea fishing; analyze the overall dynamic of production relationships and

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7 By production systems, it is meant the concrete, multidimensional societal organization of production. This latter concretely situates sea fishing per se within broader social and economic conditions, and dimensions including other economic strategies, ethnic and national dminisions, migration, history, etc... In contradistinction, the mode of production is a more theoretical concept aimed at isolating the abstract variables operating in fish production. More elaboration will be done later.

the changes in the social and economic position of fishermen, and labor as a whole, as opposed to capital; 4) Build a sociological model of artisanal fish production as a basis for further investigation in the artisanal sector as a whole and contribute to the development of a sociological theory on fish production, by integrating the findings of the study into a coherent frame of interpretation based on the instrumentalization of the concept of mode of production.

Methodologically, this study is from the outset, a comparative one. It acknowledges the merit of a comparative approach of social phenomena, when backed by appropriate theoretical tools. Because the 'logic' of comparative inquiry is, in the last instance, the logic of inquiry itself (Schwarzweller, 1968), it is expected that a comparative analysis of the similarities and variations across and within marine fishing communities will give 'important insights into the general process of artisanal fishery development' (Vanderpool, 1983b). The significance of a sociological model of the social and production relationships in fishing appears clearly in that light, as a valuable methodological inroad into a much neglected area.

Data for the study are gathered from secondary sources; in that sense, the study is based on historical documentation. Given the material conditions of a training undertaken away from West Africa and the unavoidable scope of any field research on the topic, the use of documentary research is, in one way, a matter of necessity. On the other hand, it constitutes a wise choice with regard, in particular, to the large number of scattered, unrelated, unexploited studies dealing with the social dimension of fisheries in West Africa. Knowledge is, in a sense, accumulated social experience and it seems sound to capitalize on the work already done in the relevant field of study.

Several problems are foreseen in the organization and interpretation of those data. They have been collected by different researchers, at different times and places, using different methodologies and motivated by different objectives and theoretical concerns. While some are based on observational techniques and qualitative data, others rely more heavily on statistical and quantitative techniques. Almost as a rule, there has been no replication of previous studies dealing with identical or even dissimilar communities; in any case, none of the type of Firth's studies, has been reported, so far. Nevertheless, the best use possible will be made of data, which are, otherwise, rich and varied. The area covered by the study ranges from Mauritania in the North to Nigeria in the south. However, the analysis of data from Ghana and Senegal is expected to be more systematic given the greater availability of studies made on these two countries. In some way, this also reflects the important role played by fishermen from these two areas in the fisheries of the entire region.

Statement of Thesis Outline

The fish chain in West Africa, as in most of the Third World, is generally long and complex and involves a network of intricate social and economic relationships at all the stages of the process; namely, the production, processing, distribution, parts of the system. While male fishers are the exclusive operators at the hunting - production level, a decisive role is played by women, non-fishermen operators and society at large, in the land-based segments of the system.

In his attempt to define the small scale fisherman, Ian Smith (1979) identifies two categories of small-scale fishermen - the artisanal and the subsistence - which together should be considered as "traditional". Departing from Kesteven's distinction among industrial, artisanal and subsistence fishermen, he retains only one distinction, the one between industrial fishermen and traditional fishermen. To him, "the distinction between industrial and traditional fishermen is...primarily one of scale and management and income levels, rather than of market orientation".

This last point is well taken. Smith's concept of "traditional" fishermen, however, is non-legitimate and reproduces a time-long stereotypic perception of non-Western societies. In constant mutation, fully integrated into a market economy, constantly undergoing technological changes, artisanal fisheries around most of the Third World and West Africa are often at a distance from subsistance fishing at least as great as their distance from industrial fishing. The main differences among those categories are related to their scale and management, but also and more importantly, to the type of production relationships involved (wage labor/share system etc...), the methods used in the production as well as processing activities, the distribution of the surplus extracted (or the absence of significant surplus as in subsistence fishing) etc.

Throughout the study the concepts of small-scale, artisanal, canoe, will be used interchangeably as qualifying those fishermen, fisheries and fishing activities characterized by both the relatively small, scale of their productive activities and the use of a system of catch sharing as a basic modality of labor and capital renumeration.

Chapter II will open the study by presenting the biological and oceanic conditions determining fishing endeavor in the region. The fisheries of West Africa are characterized by highly migratory and multinational fish stocks and are influenced by a number of bio-ecological and hydro-climatic factors of great importance. Together, these factors which have a dynamic of their own right, impact upon the social and economic features of the artisanal fisheries. They determine the highly reasonable character of marine fishing in the region and influence greatly migration patterns. They play a role in the differential organization of fishing communities, they explain the basic discrepancy between human population and fishery resources in the region. Understanding the resource base and its determinants is therefore essential to portraying the structure of fishing communities in West Africa. Two overlapping geographical regions will be considered in the study and should be distinquished: on one side, the East-Central Atlantic (or CECAF) region, upon which is based the work of the Food and Agricultural Organization (FAO) and that of most oceanographers in the area; on the other hand, West Africa proper which is an historically defined region well known by historians, geographers and social scientists.

Biology, socio-economy and history are different aspects of the same problem. Because "industrial and artisanal fishing have an history, which is the history of their social and political structure as well as their techniques" (Chauveau, 1982b), and because the whole dynamic of production systems cannot be fully appreciated without reference to the past, the historical dimension of West Africa fishing societies will be fully integrated into the study. The history of

marine fishing cannot be understood outside of the early development of the activity in the inland states and the lagoons. Therefore, the entire West African region, from the Savanna states to the Niger Delta, will be covered up to the end of the middle ages.

Chapter IV will briefly locate the respective place of large- and small-scale fishing in the modern developments of the activity.

Chapter V will be dedicated to the analysis of the systems of production and to the human dimension of West African fisheries. The general social characteristic of the sector will be described. The ethnic dimension, patterns of specialization and complementarity, the division of labor and migration patterns will be analyzed.

The mode(s) of production will be the focus of the sixth and final chapter of the study. Concepts will be defined and the theoretical status of the resource investigated. The means of production (canoes and boats, motorization, fishing gear technology) will be described and their evolution (technological change and diversification) assessed. The technical process of labor corresponding to different types of fishing will be examined as an integral part of the production relationships in fishing. The analysis of this latter will be completed by a look at the forms of appropriation and ownership characterizing different production units. The nature of the share system and the role of market forces in the production sphere will finally be investigated against a background of profound technological changes affecting social relations in fish production.

The conclusion will summarize the findings of the study and illustrate these latter by a model that will, visually, present the interactions among the variables identified. Potential areas of further ivestigation will be presented.

I. THE RESOURCES OF THE OCEAN: Life Processes in the Eastern Central Atlantic (CECAF).

> "L'idee de vie suppose constamment la correlation necessaire de deux elements indispensables: un organisme approprie et un milieu convenable. C'est de l'action reciproque de ces elements que resultent inevitablement tous les phenomenes vitaux." Auguste Comte.

Ecology is crucial to our understanding of marine societies. By living off the resources of the ocean, man - probably the most important predator - becomes vitally dependent on the general eco-system of the ocean. This ecological system inlcudes both ocean organisms and the non-living environment, each influencing the properties of the other and both necessary for the maintenance of life in the sea.

At large, the size and distribution of the fishery resources of the Eastern-Central Atlantic are largely a function of oceanographic and physical characteristics. Of prime importance are the size of the continental shelf and the extent of upwelling in the region. Also important from a biological standpoint are major river streams, estuaries, and lagoons as well as various atmospheric and oceanic conditions which determine the very extent, location and seasonality of the upwellings themselves. The sum-total of these factors form a basis for understanding not only the characteristics of fishery resources, but also various patterns of social organization among artisanal fishermen such as the long-distance search for fishing grounds, certain fishing techniques, etc...

1. THE CONTINENTAL SHELF

As a whole, the Atlantic Ocean is relatively shallow and has an abundance of continental shelf. The West African self however, is in general rule narrow (less than 20-30 miles) except for some remarkable exceptions.[8] Because open ocean food webs are typically long and complex, and since food to support an abundant fish stock is scarce in open ocean, most major fisheries are located on continental shelves. Nutrient concentration, in particular nitrogen and phosphorus, is much higher on continental shelves and slopes and upwelling areas (Gross, 1981). This is particularly true of West Africa where resources are largely concentrated over the continental shelf. In areas where the continental shelf is wide (which happen to be also upwelling areas), exploitation accessibility is facilitated while coastal pelagic and demersal resources are abundant. Demersal species are particularly abundant in muddy, sedimented parts of the shelf's bottom (drums, croakers...), but valuable species such as sea breams and the senegalese "thiof" (grouper) are found on hard or sandy parts of the shelf (Domain, 1979).

Also important to the biological features of the region, are the important river systems (Congo, Niger, Senegal, etc...) which carry diverse nutrients into the sea and create a variety of biological processes at the point of contact between the two water masses. In the

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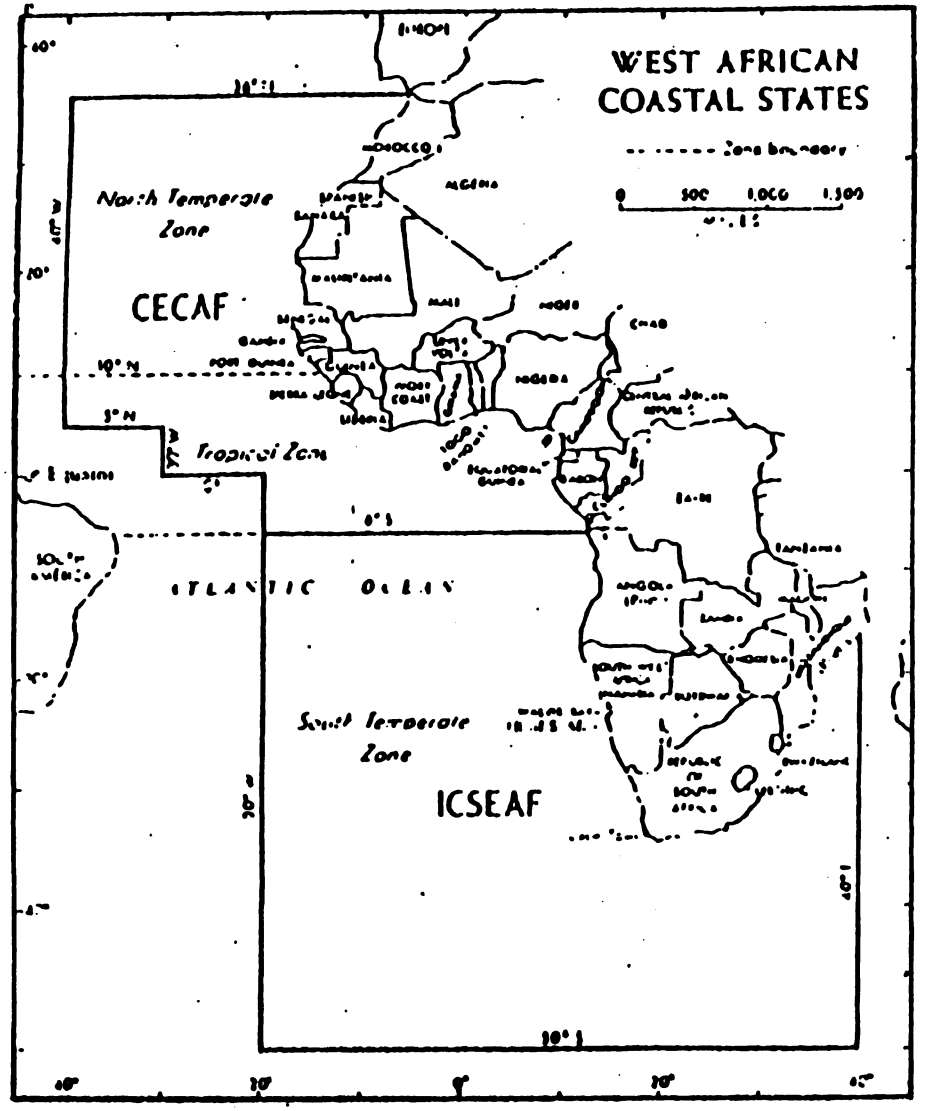
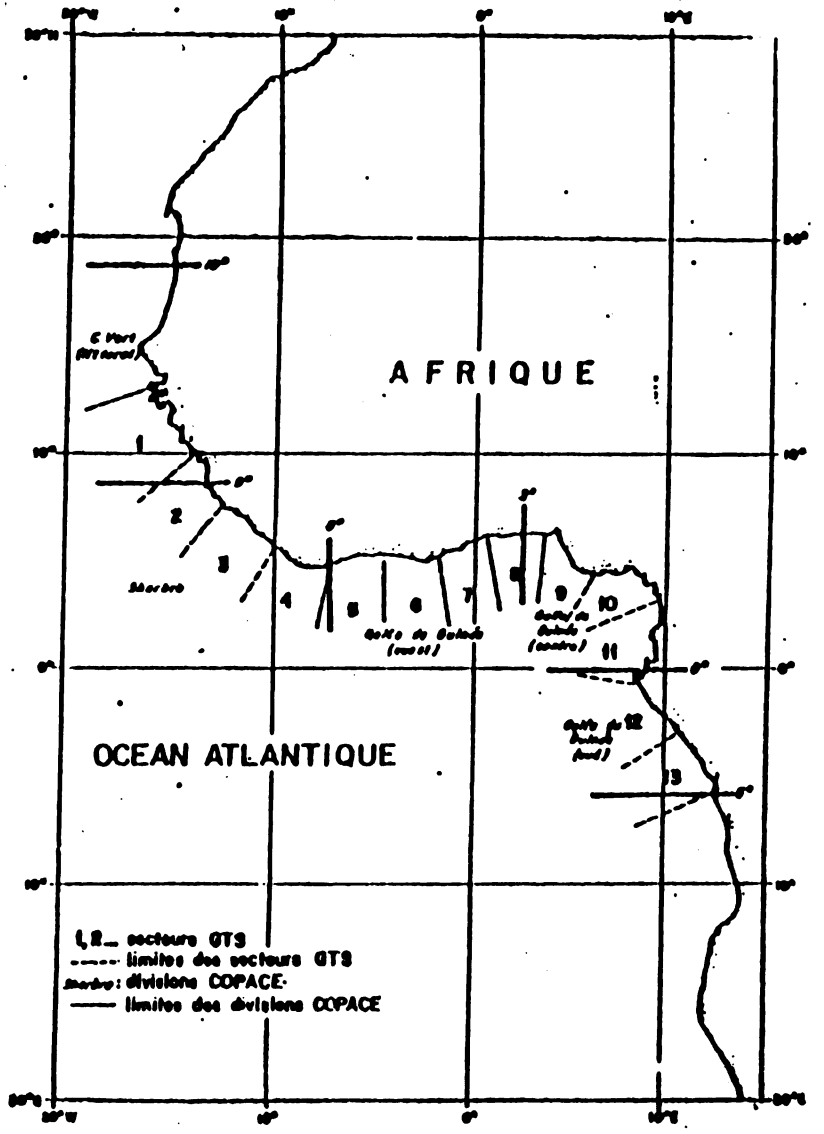
8 For example, the area between Dakar, Senegal (16 N) to Freetown, Sierra Leone (8 N) whre the shelf is up to 100 miles wide or over (around the Bissagos islands) and the are off Rio de Oro (24 N) and off Northern Mauritania (20 N). Areas of shallower waters exist also around the oceanic island: Cape Verde, Sao Tome... (Gulland, 1971).

Figure 1 : The Western Coast of Africa and the CECAF Region



Source : Sutinen et al.,1981

Figure 2 : Geographical Limitations of CECAF Subdivisions



Source : Troadec and Garcia, 1979

heavily sedimented river mouths, lagoons, deltas and other protected estuarine systems, a blooming of primary and secondary production takes place. They constitute an ideal location for shrimp fisheries in particular and harbor the major fish nurseries of the CECAF region.[9]

2. THE COASTAL UPWELLING

Around the world, the most productive fisheries are located in continental shelves waters, particularly upwelling areas. At a global scale, upwelling areas account for more than half of the world fish production (Gross, 1981). Compared to these high production areas, coastal areas where upwelling is not common have only intermediate productivity.

In the CECAF region, upwellings have been found to be the single most important factor determining the high biological productivity of the richest coastal areas off the coasts of Senegal and Mauritania in the North and off the coasts of Congo and Angola in the South. These two symmetric areas boarder a much poorer gulf of Guinea where less rich and less regular upwellings do take pace between Ivory Coast and Benin (Gulland, 1971; Troadec & Garcia, 1979; Sutinen et al., 1981; cf also, Figure #4).

Two key elements controlling biological productivity and upwelling phenomena in the region are, n one hand, the rate of nutrient renewal

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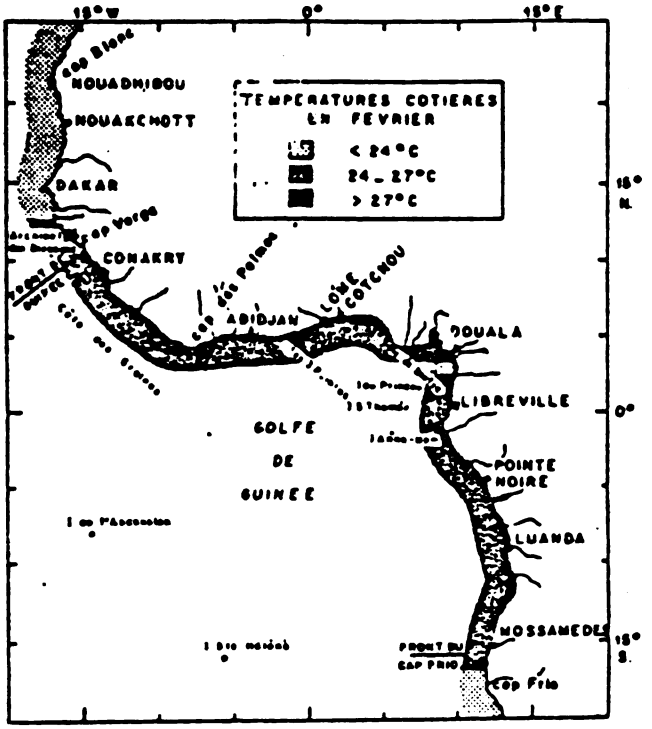
9 In the Northern zone of CECAF alone, important spawning grounds are reported between Cape Vert (14 N) and Cape Timiris (19 N) and between the Bissagos island and Cape Vert. The species concerned include the flat sardinella, the round sardinela, the ethmalosa, the Spanish mackerel as well as several demersal species (Boelly & Freon; Domain, 1979).

linked to the quantity of light absorbed by plants and, on the other hand, the relationship between atmospheric and hydrospheric circulation.

In the oceans as on land, the only life able to live directly off mineral matters are plants. With the support of solar light, they use their chlorophyle to synthesize the organic matter present in the ocean by photosynthesis. These microscopic plants, phytoplankton, live at the surface of the ocean in zones reached by solar radiation and constitute the primary, necessary element of the ocean food chain. They provide food to the zoo-plankton, the mostly herbivorous animal form of plankton which, after a minimal time span, makes an ideal prey for carnivorous animals.

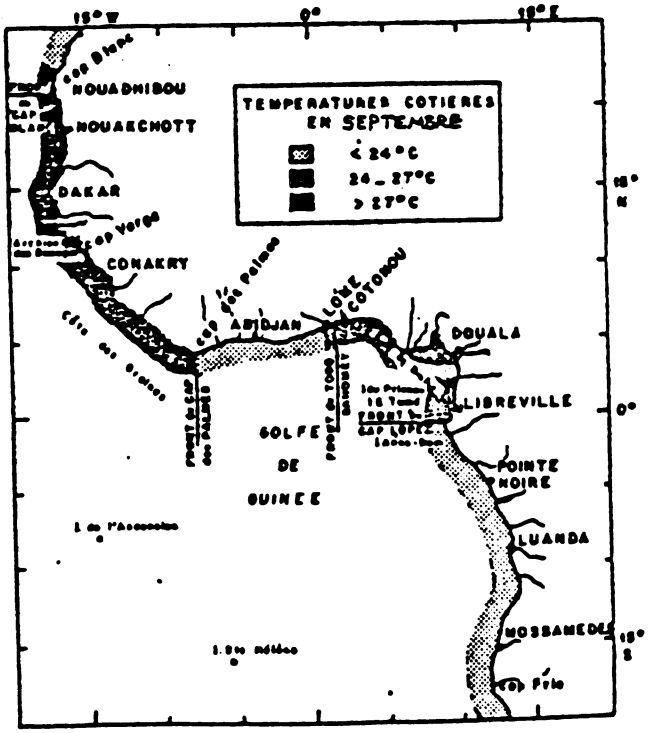
Productivity of the richest ocean areas compares favorably with intensely cultivated agricultural land; gross productivity in those areas can be as high as 20 grams of carbon per square meter per day (Gross, 1982). There is however, a peculiarity in the production of organic matter in the ocean. Land plants can grow for years before soils are depleted of nutrients whereas phytoplankton can only sustain maximum production for a few days before nutrients in the water are depleted. This is particularly true of tropical seas in which, under the effect of intense solar radiation, photosynthetic activity is always as its maximum. One important hydrological "trait" of the Eastern Central Atlantic is precisely its warm (24-27^{o}C) superficial

Figure 3 : Coastal Temperatures and Upwelling Areas in February



Source : Troadec and Garcia, 1979

Figure 4 : Coastal Temperatures and Upwelling Areas in September



Source : Troadec and Garcia, 1979

layer of water[10] which favors a faster rate of vegete growth than in colder regions and which, if not renewed, becomes rapidly a biological desert.

Underneath, below the thermocline, unreached by solar radiation, important mineral resources remain untouched and unexploited by the animals inhabiting these depths. During upwellings, these deeper, nutrient-rich, cold waters are brought to surface. Phosphate and nitrate ions depleted in sunlit surface waters by phytopankton growth, move vertically and resupply food for active plant growth. These in turn feed small animals and eventually fishes.

3. CLIMATOLOGICAL CONDITIONS AND THEIR IMPACT ON RESOURCES AND POPULATION DISTRIBUTION

Upwellings have been associated with climatological patterns, in particular wind action. In general, world weather is basically function of the temperature differences in the atmosphere which reflect varying amounts of solar heat reaching different parts of the world. These temperature differences and other factors as well set into motion various air masses which at the point of contact with the hydrosphere, cause water particles to move, giving birth to a surface current. In West Africa, the most important upwellings are associated with two major current systems; the cool Canary and Benguela current systems off Northwest and Southwest Africa, respectively (Troadec & Garcia, 1979; Gulland, 1971).

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10 Its thickness goes up to 30-40 meters along most of the West African coast, except for the Senegal-Liberia area where it is just 12-14 meters think. It is separated from colder waters by a theoretical transitional zone, the thermocline.

Patterns of upwelling in West Africa are seasonal causing various fish migratory movements and associated migration patterns among fishermen themselves. As a fact, the whole hydroclimatology of the region is determined by the seasonal migration and pulsation of two air masses:

> 1) The dry and dusty "Harmattan" or Easterly winds,[11] which blow seaward during the northern winter (or dry season), pushing offshore the superficial layers coming from the Canary current and producing an upwelling area all along the northern coast down to Cape Roxo.
> 2) The warm and humid Monsoon or Westerly winds, originating over the Atlantic ocean and blowing onshore during the summer of the Northern hemisphere (or rainy season). The two air masses meet at the Intertropical Convergence Front (ITC) - or ITD, Discontinuity zone - (Ojo, 1977; Franke and Chasin, 1980).

At least indirectly, the movements of the ITC are related to the pulsation along the coast of maritime fronts and the appearance of upwellings sweeping these regions or alternance zones.

In a CECAF region characterized in the North by an alternance zone extending from Cape Blanc (Mauritania) to Cape Verga (Guinea) and a southern homologous covering the area between Cape Lopez (Gabon) and Cape Frio (Angola), we witness the fundamental bipolarization of the fishery resources in the sub-tropical zones (20-10 N and 0-17 S) leaving in between a much poorer Gulf of Guinea. The situation is accurately described by Troadec & Garcia (1979):

> "The same climatic factors (localization of the Monsoon in tropical zones with heavy rainfalls) are at the origin of the diametrically opposed distribution of the resources vis a vis human populations and thus markets. The more dense human populations live along the Gulf of Guinea while the richest depths in fishery resources are

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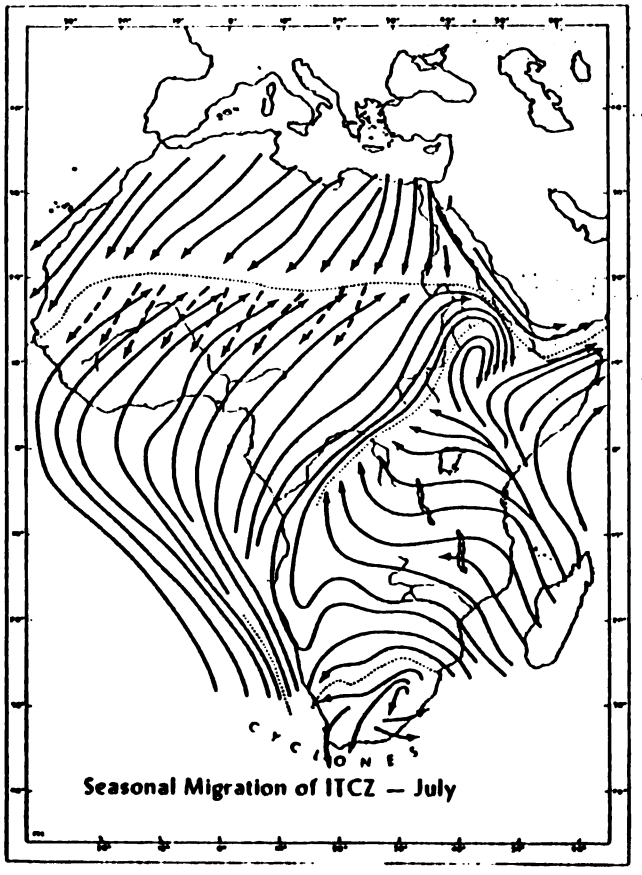
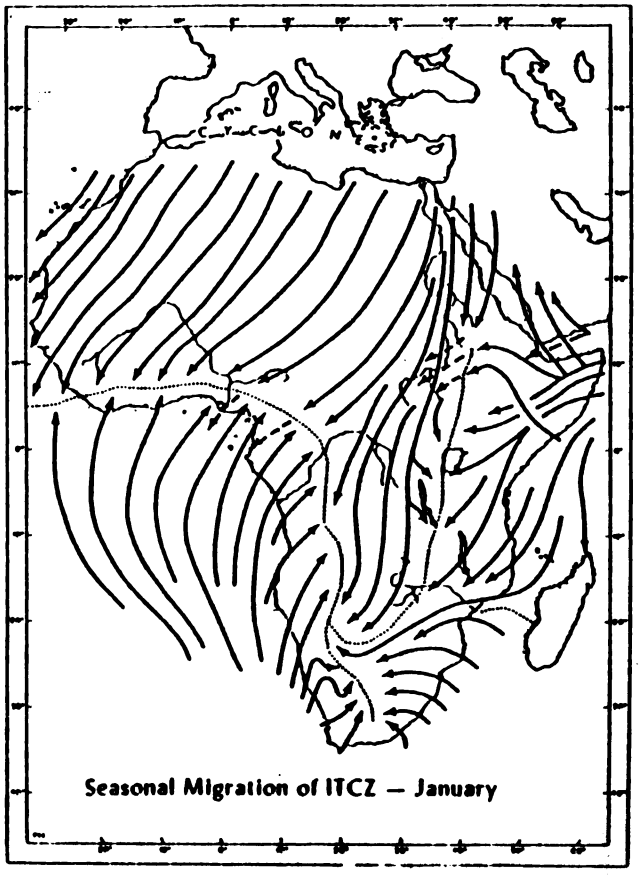
11 Easterlies are associated to the Tropical Continental (CT) air mass originating over the Sahara desert and Westerlies, to the Tropical Maritime (MT) air mass, originating over the Atlantic Ocean (Ojo, 1977).

Figure 5 : Seasonal Migration of ITCZ In July



Source : Martin and O'Meara, 1977

Figure 6 : Seasonal Migration of ITCZ In January



Source : Martin and O'Meara, 1977

...ound along the desertic coasts of the African continent (Mauritania, South Angola/Nambia). This gap between high production sectors and those with high consumption has conditioned the evolution of the whole exploitation and utilization scheme of the resources of the region." (personal translation from French).

4. THE FISHERY RESOURCES

"The Eastern Central Atlantic fishery is one of the world's most productive, ranking sixth out of 17 major fishing areas in 1978 and comparable to the Northwestern Atlantic in terms of weight landed." (Sutinen, et al., 1981)

In 1971, the annual biological potential of the region was estimated at 3.5-5.0 million tons. More recently, in 1980, Everett advanced a possible maximum catch of about 4.2 million tons. Recent reports of catches have been in the range of 3-3.8 million tons (Sutinen et al., 1981). These reported chatches are not far from the maximum sustainable yield. This situation however, may vary widely according to major fishery stocks - each having its own country - specific constraints and laws of development.[12]

Five stocks can be distinguished according to major species:

1) The coastal pelagic species are by far the most important stock of the region in terms of weight landed, making up 60% of the total reported catches in the mid to late 1970's (Sutinen, et al., 1981). In value terms, however, they are the least valuable accounting for only 7% of the region total earnings. Migratory species, for the most part, they include the sardine, the round and flat sardinella, the mackerel, the spanish mackerel, the horse mackerel and the ethmalosa (bonga).

2) Demersal fish species which make up a total potential catch of

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12 In Senegal, for instance, catches in 1981 were at 281,000 t., i.e. 56% of a maximum yield of 500,000 t (Fontana et Weber, 1982).

our 400,000 tons in the Mauritania to Guinea area and of 150,000 tons from Sierra Leone to Zaire, account for only one fourth or less of coastal catches (Sutinen et al., 1981). The most important species include, hakes, sea breams, croakers, mixed and the bigeye grunter of the Senegambian area. They have a higher commerical value than small pelagics and play a greater role in the local economies. Recently however, the explosion of a low-value species, the baliste or trigger-fish, of which very little is known (Domain, 1979) have apparently causes a dramatic perturbation of the marine eco-systems based on the same bathymetric distribution.[13]

3) In value terms, the cephalopod fisheries, concentrated in the CECAF Northern zone, represent the leading fisheries in region and one of the most important in the world. They concern 3 species: octopus (60-70% of the catch), cuttlefish (20-25%) and squid (10-20%) (Sutinen et al., 1981). With a commerical value of $199 million for 200,000 tons landed, they represented in 1975, as much as the total value of demersal and coastal pelagic fish species (Bakayohko, 1981). In 1977, cephalopods were accounting for up to 23% of the total value of the CECAF region, but only 4% of the total catches (Sutinen et al., 1981).

4) According to Sutinen et al., (1981), the next most valuable fisheries are the tuna fisheries, with skipjack, yellowfin and bigeye tuna being the principal ocean pelagic species caught in the CECAF region. They make up 17% of the value share in the region for a catch of 276,000 tons of the 1977 total.

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13 The explosion of the baliste might have caused the drop of the bigeye grunter, shad (Sutinen, et al., 1981) and Round Sardinella as well as inversely. The development of certain shrimp fisheries (Domain, 1979).

5) With an estimated 37,000 tons landed, the crustacean fisheries make up only 1% of the total CECAF Production. In value, however, they represented $184.5 million (16% of the value share) in 1977. Important stocks of pink shrimps are found near river mouths and lagoon entrances of Senegal, Gambia, Guinea Bissau, Sierra, Nigeria, Ivory Coast, Congo, etc... Prawns and other river estuarial and deep water shrimps are found in the area.

III. WEST AFRICANS AND THEIR AQUATIC ENVIRONMENT IN HISTORICAL PERSPECTIVE

> "Man hoisted sail before he saddled a horse. He poled and paddled along rivers and navigated the open seas before he traveled on wheels along road. Watercraft was the first of all vehicles." (Thor Heyerdahl, Early man and the ocean, 1980)

Historical studies have so far paid little attention to the relationship between the peoples of West Africa and their aquatic environment. The bias toward land-based civilizations has generally been the rule as in other areas of the social sciences. To make things worse, historic West Africans have not left[14] written documents made by themselves, for themselves and giving their own interpretation of their history. All information on prehistoric and historic West Africa, is to be taken from archeological evidence, accounts from Arab writers who first traded with medieval West Africa, oral traditions, descriptions by early Portuguese, Dutch and other European explorers, and reports of diverse colonial administrators.

At a time when the history of the West African sub-continent is still being unfolded, most contemporary historical studies are based on a combination of these sources and their interpretation. Few studies[15] have so far focused on organizing the historical data related to fishing communities and fishers in a single, explanatory framework with present-day relevance.

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14 Remarkable exceptions are Mohmoud Kati (1468-1554) and his grandson who left us with the "Tarikh El Fettach" - Chronicle of the Researcher - (1519-1665) and Es Sa'di who wrote the Tarikh Es Sudan" between 1627 and 1655.

15 Among those: Smith, 1970; Chauveau, 1981, 1982, 1983; Hendrix, 1983, Tymowski, 1970, 1967; Roberts, 1981.

A thorough understanding of the present is impossible without an equally thorough understanding of the past - the place of coastal and riverine socieities in the global economy and politics of West Africa as well as the subsequent modification of this place with successive regional transformations, the movements from river to marine fishing, technological transformations and the whole dynamic of the production systems cannot be appreciated without reference to the past.

On the basis of available historical data, a rough periodization of fishing and related activities will be sketched as a part of the global political and economic history of West Africa. Particular emphasis will be given to the medieval and precolonial history of fishers societies for the period extending approximately from the 5th to the 19th century B.C.

1. Early Fishing in Prehistoric Africa

The history of fishing is tightly bound to the history of mankind for, from the very beginning, fishing has been one of the primary food-getting techniques, much like hunting. Hopkins (1973) recalls that "Fishing communities between 7000 and 2000 B.C. may have been major laboratories where social patterns for sedentary living could be tested and elaborated." (in Hendrix, 1983).

Fishing activities in Africa can be traced back as early as the 7th millenium B.C. and perhaps earlier. Fossils associated with a lakeside camp at Ishango on Lake Mobutu, date probably from the 7th millenium (Clark, 1970) and it is known that as early as 7000 B.C., Black Africans had organized themselves in fishing-hunting communities

near Khartoum in Nubia which were also making pottery (Van Sertima, 1976). Around 6000 B.C. and earlier, fish is identified as a major source of protein intake, along with other animal and vegetable food present in lakes and rivers. Around the former lakes in central and southern Sahara and in the Nile Valley, there is ample evidence for waterside communities of fishers who used harpoons and fish-hooks of bone and in addition hunted and ate hippopotamus and crocodiles (Clark, 1970). Similar communities are known to have existed South of the Sahara at Ishango and around the shores of Lake Rudolph and Lake Nukuru.

The Sahara, in particular, which is believed to have been the experimental center of the neolithic revolution and the locus of invention of African agriculture during the climatic optimum of the 8th-3rd millenia (Suret-canal, 1966), provided a highly favorable environment for fishers. Several large freshwater lakes existed at the time when further south, Lake Chad covered eight times its present surface. This pattern continued until about the middle of the third millenium when the drying-out process of the areas peaked, forcing the populations of this once fertile environment in migratory waves either southward or North-East toward the rich Nile floodplains.

Fishing in predynastic Egypt is known to have undergone enormous development around 2000 B.C. Thanks to the paintings and archeological remains in Egyptian tombs, it is possible today to reconstruct major aspects of Egyptian fisheries. Harpoons, hand-lines, long lines, traps and nets were the main gear, used according to the species hunted. Harpoons (first made of bone and later of metal) were either trident-shaped or barbed as those used a couple of decenies ago in whale fishing.

Fish hooks similar in shape to contemporary ones and to neolithic bone hooks from Sudan and West Africa were made of copper until the 12th dynasty and later of bronze (Anson, 1975). Line fishing with multiple or single hooks was done from shore or in boat. Nets of various and mesh size have been found mostly in tombs and according to Hendrix (1983), they include dip-nets, seine-nets and beam trawls. The organic relationship between Ancient Egypt and Black Africa has been widely demonstrated by scholars such as Ch. A. DIOP (1954) and C. Williams (1974) who believe along with others that this relationship is a clue for understanding the basic cultural unity of African societies at large.

Among the boats used by Africans during prehistoric times, reed boats stand as an outstanding accomplishment. Present in all sizes in predynastic Egypt, they are, according to Heyerdahl (1980), the first in the history of mankind to have developed the sea-going characteristics which became a model for the wooden ship.[16] Reed boats were also common among Buduma papyrus boat-builders from Lake Chad, while rock-paintings discovered in the 1960's in the Sahara Desert showed hippopotamus being hunted from reed boats similar to those in use in predynastic Egypt. Carbon dating showed that this Saharan art dates from a period between the sixth and 2nd millenium B.C. Little is known about the wooden canoe in prehistoric times; the lack of archeological evidence in itself does not tell much in either way given the fact that the average life-time of a canoe is generally very short

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16 The fact that the Reed boat, "gaalu Kheref," preceded the wooden canoe on the Senegal River (Chauveau, 1981) seems to back this point of view.

(2-4 years) and the areas where it is the most abundant (such as West and Central Africa) do not preserve archeological remains such as wood.

2. The Atlantic Ocean

Historically, the Atlantic Ocean - the most formidable watermass of West Africa - is believed to have been no more than "a dead end, a cul de sac where cultural waves from the East, the epicenter of Sudanese civilization come to expire on the beaches of an ocean that leads now here" (Barry, 1981).

Neither the Sahara Desert, nor the Cameroon highlands and mountains at the edges of respectively North and Central Africa, ever prevented flourishing trade, migrations and even warfare to be established between West Africa and other parts of the world. In contrast, the Atlantic Ocean appears to have stood until the advent of the Atlantic trade as the most powerful barrier to interregional and intercontinental communication and trade while long-distance sailing and fishing are believed not to have been particularly developed by coastal fishermen. According to Mauny, the coastal boats of the area were "among the most primitive of the globe" and "absolutely improper to high sea sailing" (1961).

This belief, however, is highly arguable in view of the recent work of Van Sertima (1976). On the basis of navigational facts, scores of cultural analogies found nowhere, except Africa and America, carbon-14 dated archeological evidence, American Indians oral tradition, the presence of African cloth, plants and animals in America, Van Sertima demonstrated that Africans had done the Atlantic

voyage to America long before Columbus. The African presence in America probably dates back to the 15th Egyptian dynasty - 800-600 B.C.

In West Africa, during the Middle Ages, the Mali emperor, Abubakri II, 'the mariner', direct predecessor of Kanakan Musa, undertook two collossal expeditions across the Atlantic Ocean. According to Al Omari[17], these expeditions involved 200 master boats and 200 supply boats for the first one and 200 vessels during the second and final one.

To build such a fleet, Abubakri II, called on the best boat-makers of the empire from the Upper Niger to the Senegal and Gambia Rivers. The expeditions embarked in 1310 and 1311, respectively, from the only Atlantic window of the Mali empire, the Senegambian littoral. They soon were to enter "a violent current, like a river in the middle of the sea"[18]. These current - the Canary current - leaves the African continent along the Senegambian coasts and one of its branches flows into the North Equatorial current which has its terminal points along the America coast where it strikes a broad band ranging from the Guinanas through the Antilles. "Around this same time, evidence of contacts between West Africans and Mexicans appears in strata in America in an overwhelming combination of artifacts and cultural

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17 In "Masalik El Absar fimamilik el Amsar" by Al-Omari (1336-1338)- quoted by Cissokho, 1966; Mauny, 1961; Van Sertima, 1976.

18 From the testimony of one member of the first expedition whose boat sailed back instead of entering the current-in Al Omari.

p e s" (Van Sertima, 1976) Abubakri II made it[19], but unlike Columbus and early European maritime explorers, he was not able to make the trip back. His people ignored his accomplishment and are just starting to uncover his legacy more than 650 years later. The Atlantic Ocean was to remain an enigma for West Africans until the European invasions.

Maritime fishing was a regular activity of coastal communities through the Middle Ages and was practiced before the 15th century up to 2-3 miles from the coast. In the main, it was integrated along with other coastal activities in the continental economy of the region. The same is true of riverine, lagoon and delta communities of fishers which, as a whole, played a fundamental role in the development of states and the political economy of the Middle Ages.

3. Fishers in the Political Economy of West African States During the Middle Ages

To understand the situation of communities of fishers through the Middle Ages, it is necessary to keep in mind their distribution along major life zones of West Africa and their subsequent position in relation to the dense and intricate political and economic developments characteristic of that era. The concept of life zones developed by human geographers, refers here to distinct ecological region within

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19 Additional proof of the feasibility of such a voyage has been given by more than 120 modern expeditions on boats as rudimentary as "two rafts, two dugout canoes, two dories propelled only by oars, several dories fitted only with sails..." (in Van Sertima, 1976).

which people obtain their livelihoods in similar ways and have developed similar similar social and political forms (ref.: Stride & Ifeka, 1971). A life time would not suffice to give a full account of those developments let alone the exact place of very diverse communities of fishers in those processes.

It is possible however to distinguish 3 major human areas according to life zones and integration into major political and economic processes:

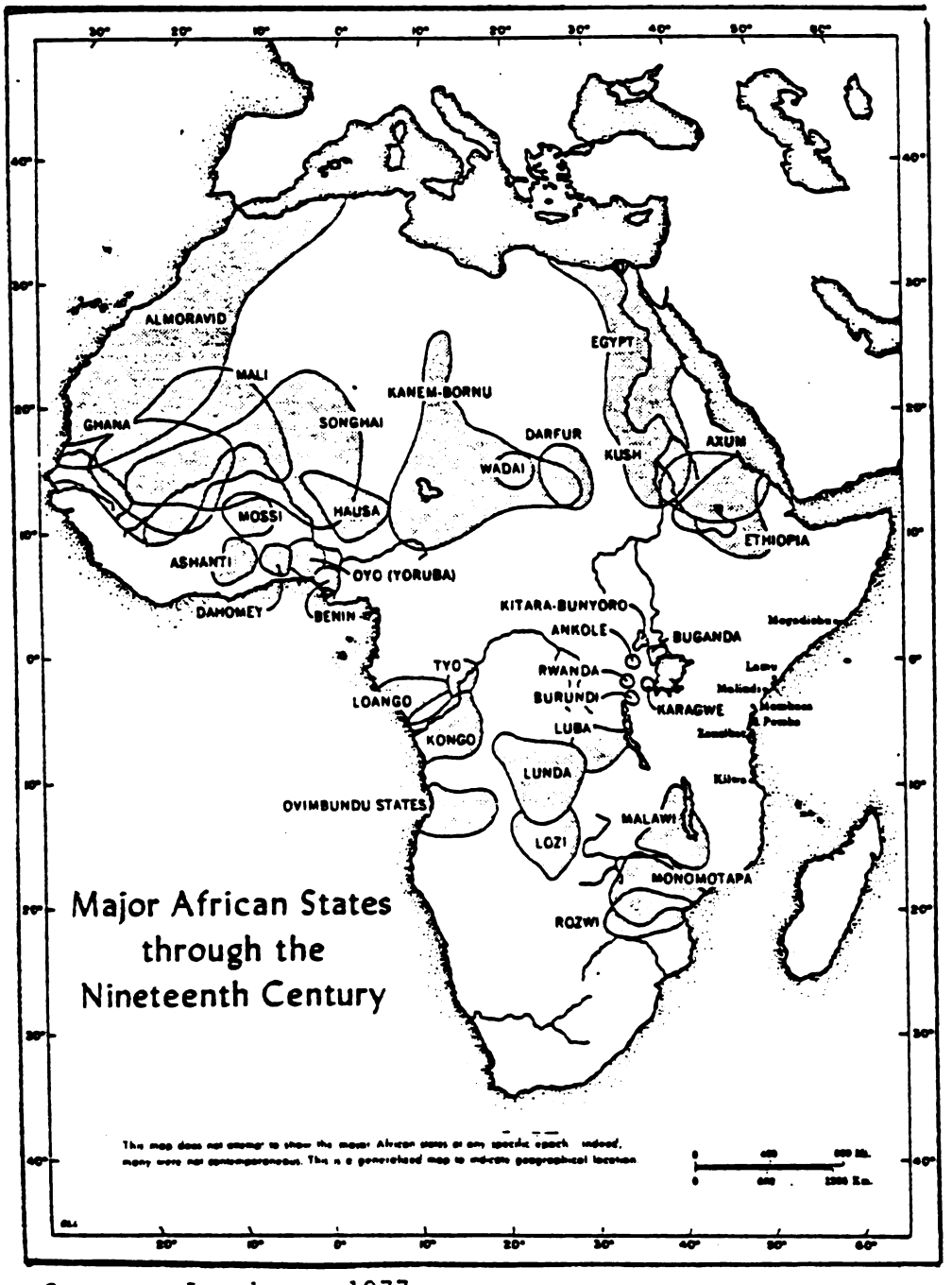
- The Sudanic Savanna grasslands, drained by a wide network of rivers (Senegal, Niger, Gambia, Volta. . .) around which the largest and most sophisticated medieval state developed.
- The Upper Guinea coast, including part of the Senegambian littoral, characterized by dense mangrove swamps and which developed mainly as a dependency of the Savanna states.
- The Guinea coast stretching, from Ivory Coast to Nigeria, through lagoons and creeks up to the innumerable waterways and mangrove swamps of the Niger Delta. Strong centralized states came to life later in the region which underwent political and economic developments independent from the older savanna states.

3.1. The Savanna states and the Riverine complexes

The role played by riverine communities of fishers in the development of the Savanna states of the western Sudan was great, though rarely mentioned by historians. The Senegal River and above all the Niger River at its upstreams, its bend and its confluence with the Benue River provided a fundamental axis around which, empire-building was made possible.

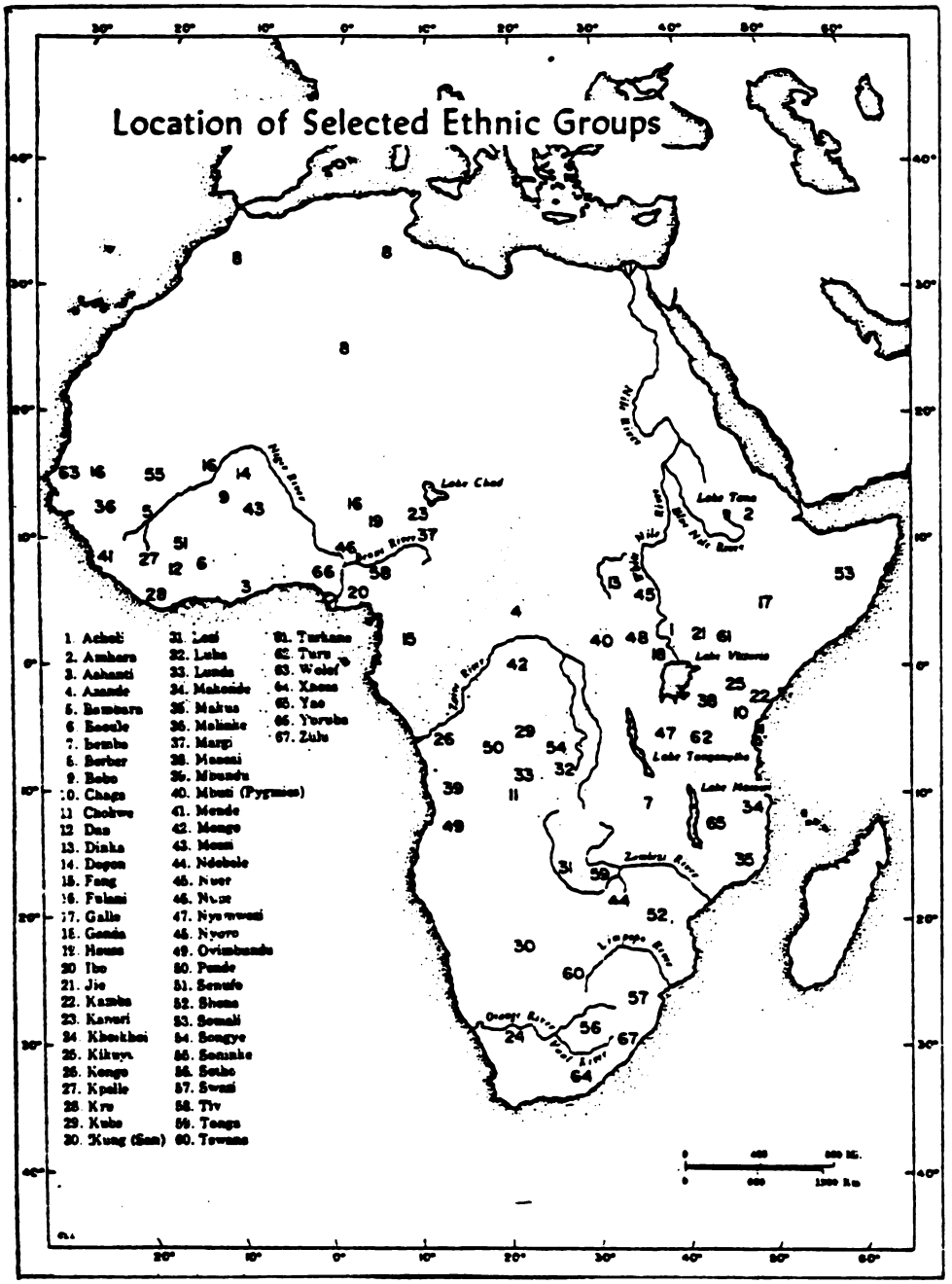
By 500 A.D., Tekur in the Senegal River Valley and Ghana, had started to emerge as the first Sudanic empires. Ghana, by far the greatest of the two, controlled the large supplies of gold in the Upper

Figure 7 : Major African States Through Nineteenth Century



Source : Lamphear, 1977

Figure 8 : Location of Selected Ethnic Groups



Source : Martin and O'Meara, 1977

Senegal and Niger valleys as well as the trans-saharan trade routes. This contact was maintained until the beginning of the 12th century after which Ghana was succeeded by Mali and then Songhai, each larger and more powerful than its predecessor. Contemporary of Mali and Songhai, or emerging from their respective breakdown at the end of the 14th and 16th centuries, a host of smaller states were also created. Most notable among those are the Mossi States of the Upper Volta Valley which safeguarded their independence throughout the entire Middle Ages, the Haussa city-states of the Niger-Benue confluence (13th-16th centuries and later), the Wolof, Tukulor and Serer states of the Senegambia (14th-19th AD.) and the Segu Bambara state of the middle Niger Valley (17th-19th AD.).

The common characteristic of all these states, whatever their scale, is their emergence from tribute-paying and trading social formations[20] of which they were the concentrated political expression. The whole scheme of state formation, conflicts and war in this part of the world and the place of fishers groups within this scheme, would not be grasped without an understanding of what was at stake: the control of the trans-saharan routes and of local populations, their resources and the tribute extracted from them. On all aspects, the role of fisher groups organized mainly along ethnic and occupation lines, was

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20 By 'Tribute-paying and trading social formations' (Amin, 1976), it is meantthe particular combination of a tributary mode of surplus appropriation with the transport (and not the generation) of part of the surplus from one society to another through long-distance trade. The tribute, i.e., 'the unity rent-tax, and a lever of formidable power' (Fossaert, 1977), is at the core of the mode of production in formations where the surplus produced by society is not appropriated by individual landlords, but by the state.

to prove essential. These groups, as in Songhai, were instrumental in the very founding of the state. They directly participated in the reproduction of tributary relations by paying dues and taxes to the state and they were important in the development of imperial communication, in transport, in the carrying out of trade and in military strategies.

3.1.1. Fishermen, Their Social/Organization and the State

Three groups of fishers - Bozo, Sorko and Somono - dominate the history of fishing in the western Sudan. Of course, other fisher groups played an important role in the political economy of some of the Sudanese states. In the Haussa state of Nupe, famous for the skill of its boats-builders, it is recorded that the Kyedye, centered near the Niger-Kaduna confluence, had established a number of subordinate trading and fishing villages along the river valley and were one of the two main groups of Nupe. The well-watered Haussa state of Kebi had also long been settled by populous groups of skilled fishermen (Strike & Ifeka, 1971). The role of the Tyubalo endogamous caste in the Futanke (Tukulor) almamya of the Senegambia is also known. Situated at the lower stratum of the Toroodo superior caste, they were "masters of the water" and were believed to have a supreme mastery of the aquatic elements. As all the other social groups, they had their chiefs - 'teignes', 'farba', 'diatalbe' - who were masters of defined fishing zones in the same way that the 'Jom leydi' was master of the land. They perceived fishing rights - 'kamngal' - on fresh as well as dried

fish and were major mediators in the relations between Tyubalbe[21] fishermen and the state (Diagne, 1967; Wane, 1959).

In the same way that Mali and Songhai dominated the history of medieval Sudan, the story of Bozo, Sorko and Somono fishing communities, whose fate cannot be dissociated from these two entities, best illustrate the general traits characterizing Sudanic fishermen and their relation to the state.

The Bozo are believed to have been the most ancient inhabitants of the interior delta on the western side of the Niger bend (cf map). Fishing, correlatively, was probably the most ancient occupation in this part - the most fertile - of the Niger. Between the 9th and 12th century, the area underwent a two pronged in-migration of Soninke (from the East) and Bambara (from the South-East) agriculturalists.[22] The subsequent agricultural colonization of the river banks did not destroy the fishing industry; rather the two activities became complementary. The Bozo, specialized fishermen, started to exchange their excess production against agricultural products (Tymowski, 1970). Soon was to emerge the Mandinka entity within which Bozo fishermen were organized as an endogamous caste.

Little is known about the Somono fishermen before the 18th century. According to Roberts (1981), "The term Somono means fisherman or more exactly boatman. As such it is an expression of an occupation

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21 Tyubalbe is the plural word for Tyubalo in Pulaar (or Fulani) language.

22 Bambara agriculturalist may have been in the area long before the 9th century according to oral sources quoted by Cissokho (1966). The Soninke, ancient rulers of Ghana may have moved in the area after the destruction of their emire in the 11th century by the Almoravides.

whereas Bozo refers to an ethnic group." This interpretation is also that of Tymowski (1970) who thinks that the Somono emerged relatively late in the history of Mali, following the incapacity of the Bozo to supply adequately the growing demand of fishery products from the increasing agricultural population. Recruiting from all ethnic groups - Bambara, Sononke, Songhai, Bobo, Mossi, Pheuls - a new social group specialized in fishing emerged, slowly transforming itself in a closed caste today. Though present in Mali, it is only later in the 18th-century Bambara State of Segu, that the Somono will develop their most sophisticated relation to the state.

At about the same time that the mandinka entity was being formed, another story was unfolding itself in the eastern side of the Niger bend. Between the 5th and 11th century AD., the Sorko, a skilled group of nomadic fishermen followed a long North-West migration along the Niger through which they formed several colonies such as Gao and Koukia which were to become capitals of the Songhai empire. Benefitting from their large number and their great mobility, they established their rule over the Da (or Do), who were fishing the area before, and also over the Koromba, Gurmanche and Gabibi agriculturalists. The Sorko advanced as far as Lake Debo, in the Western side of the bend, where they clashed with the Bozo. They gradually assimilated those groups until the emergence of a new entity - the Songhai people - of which they were the nucleus and the dynamic element (Cissokho, 1966, 1975; Stride ' Ifeka, 1971; Tymowski, 1970) later, with changes in the area's demography, the development of the economic basis of agriculture, the struggle waged by peasant groups and the incoming of warrior bands from the Northeast, important economic and political transformations took

place. As a consequence, the Sorko lost their hegemony and were transformed between the 13th and 14th century into a servile group of the Songhai empire in the same way that the Bozo and Somono in the west were subdued (Tymowski, 1970; Stride & Ifeka, 1971).

As in the Senegambia, fishermen of the Niger Valley were considered as "masters of the water" gifted with supernatural powers related to aquatic elements. They were to execute sacrifices to the genii of the river and to domesticate crocodiles and dangerous animals. They were organized on strictly endogamous basis and were part of the caste system characteristic of the western Sudan, while ethnic lines overlapped these occupational classifications. Integrated into the tributary economy, fishermen had to pay the taxes, dues and customs necessary to sustain the warrior aristocracies and the state machinery.

After their status regression, the Sorko was supplying the state with fish, canoes and crew members. Tymowski (1970) mentions that fish dues were fixed at 1-10 packs of dried fish per year, depending upon the ability of each Sorko-fisherman. The Bozo also were providing a tax in fish and transport services to local governors of Mali (Roberts, 1981). They were also supplying grass for horses and, later under the Askias of Songhai, canoes and even young children to serve as grooms (Tymowski, 1970). These fisher/state relationships were probably not unilateral. Roberts (1981) notes that a "social contract" existed between the state of Segu and the Somono fishermen. Says he:

> "the Somono were actually inserted in the actual process of reproducing the form and economic expression of the state, the state in turn recognized the Somono's important and fostered them through special recruitment and priviledge"

Somono fishermen were supplied with slaves by the state, given exclusive rights to navigate and fish the river, and had the special

protection of the king. In return, they paid a special tax in cowries and fish, provided ferry service and canoe service for the movement of information, material and troops; they also repaired and built the walls of the king's palace and other fortifications in the state.

> "Thus, the state sponsored the expansion of a group of fishermen who in turn provided goods and services crucial to the continued ability of the state to make war...The state inserted itself in the Somono mode of production...(1) through renewal of the social relations of production and (2) through the extraction of a portion of the social product" (Roberts, 1981).

It is likely that, if not in the form at least in the content, this tight interplay between the state and fish production was also present in Mali and Songhai.

A wide variety of fish production techniques were used in the Middle Ages. During the periods of swelling and fall on the river, at the time of lateral migrations of the fish, fishermen, particularly Bozo, used braided dykes and a system of trapping. In small ponds, they would even fish bare-handed. Nets, wicker-traps, cast-nets and hand-lines were used for bottom species. Harpoons were used for big fish and particularly for hippopotamus-hunting by the Sorko. Some of these techniques could be used by individual fishermen; however, most of them required collective fishing. Collective fishing had a great influence on the social relations of production and contributed certainly in solidifying the role of the extended family in the production process. Among the Bozo, the lineage was placed under the leadership of the family head. All the fish captured - individually or collectively - were to be given to him. After allocation of a share of the catch to the subsistence needs of the community (food was prepared in common), the surplus was either sold, exchanged, used to pay taxes

or offered as customary presents (Tymowski, 1970). Only a part of the catches was consumed as fresh fish. Most of the fish geared for trade or taxes was transformed.

Fish and fishery products were already precious items of trade in this historical period. Idrisi in the 12th century mentions that fish was dried and salted (Mauny, 1961).[23] According to Cissokho (1975), Sorko and Bozo fishermen were using methods of salting, smoking and sun-drying and were supplying the whole Niger up to the Saharan oasis, as well as most of the western Sudan down to the forest region.

3.1.2. The Canoe, Trade and Warfare

The prototypical vessel in the western Sudan was the dug-out canoe made all in one piece from a single tree trunk. Pirogues made of two joint hollowed-out trunks were also built, as well as plank-made vessels, both tied together with ropes. Sails were not used on the Upper Niger and the basic means of propulsion were paddling, punting and sometimes hauling, by pulling boats along the river with the help of a rope tied up to a tree (Tymowski, 1970; Smith, 1970). The larger boats - called Kanta in Songhai - were mainly used for the transport of trading goods. They could carry up to 30 tons of load, that is the load capacity of 1000 men, or 200 camels, 300 cattle or a flotilla of 20 regular canoes (Mauny, 1961). Tymowski (1967) suggests a load capacity of 50 to 80 tons.

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23 Tymowski argument that salt was to scarce to be used for extensive salting is interesting, but does not suffice to discard Idrisi's testimony (in Tymowski, 1970).

The size of such boats - as much as the variety of vessels - indicates the importance of the river in the trade networks of the area.

Salt and cereals such as millet and rice, fish, kola nuts, honey, butter and even cattle and war slaves were carried in those huge boats. In addition to carrying goods, the canoe was a very convenient means of ferrying and transport for local populations; in comparison to other means of transport - horse, camel, men, cattel - it was undoubtedly cheap and efficient.

The importance of canoe transport is further highlightened by the heavy presence of the state in its organization. In Songhai, the State had organized an extensive network of "ports" in the major cities as well as in smaller ones. Each port was headed by a chief - the Goima-koi in Gao, the Kabara-farma in Kabara, etc. - whose duty it was to collect entrance and exit fees, to record the number of boats in the port and their load capacity and to keep track of the state's fleet. The overall system was headed by the "Hi-koi" supreme military commander - and the "hari farma" - supreme chief of the waters (Tymowski, 1967).

The state maintained its own fleet, obtained from the servile caste of boat-builders and also manned by these latter; other vessels were "privately" owned, that is probably, owned by a lineage. As witnessed later by Rene Caille in the 19th century, the crew of a transport canoe was made up of 16 to 18 men, headed by a captain "fanfa". The vessels were often organized in flotillas with their own organization based on mutual support (Tymowski, 1967).

War-making completed the economic role of the rivers in western Sudan. "It is not just by chance that the most important battles of

the Songhai empire took place on the banks of the Niger" says Tymowski (1967), Cissokho (1966) recalls that during its siege, Djenne was cut off from the rest of the world for 7 years by a flotilla of 400 vessels. The attempt by Sonni Ali-ber, founder of the empire, to build a canal from Ras el Ma to Oualata in order to facilitate the transport of troops, shows that - at least in Songhai - the use of naval means for warfare was a conscious strategy. The importance of the hi-koi, in the state gives further proof of this fact. In Segu the somono "faama" had a critical position in the state military organization while the carrying of troops and war material to the battle field was an explicit aspect of the "social contract" between the Somono fishermen and the state (Roberts, 1981).

In summary, the multi-faceted importance of fisher folk and of rivers in the political and economic developments of medieval Sudan was critical. As expressed by Smith (1970):

> "It has been said that "mountains divide and rivers unite" and the history of the Niger bears out the latter part of this statement. In the West Sudanese empires of Mali and Songhai, it was the Niger which enabled remote provinces to be brought under control and administered, which gave access to markets and whose banks provided sites for the main towns. Songhai notably, was able (as Mali had not been) to extend its power beyond the Sotuba rapids to the Southwest and as far as Boussa to the Southeast. "C'est au fleuve que ces territoires doivent leur cohesion politique et economique" writes Tymowski. This conclusion can also be applied to states further down the river such as Nupe..."

3.2. The West Atlantic Coast [24]

Information on the West African coast before the arrival of the Europeans is scarce if not nonexistent. Early descriptions of the Western Sudan by Arabic and indigenous writers paid little attention to coastal peoples despite the fact that early relations between the two areas is undubitable. It is only with the arrival of the first Portuguese explorers,[25] heavily preoccupied at that time with all the details likely to serve their commercial and navigational interests, that a significant mass of information became available.

To approach an understanding of the maritime economy of the West Atlantic coast during the Middle Ages, one should constantly bear in mind the basic ethnic, economic and political map of an area subject to complex processes among which the Sudanese hegemony and, from the 16th century onward, the progressive economic and political take-over by Europeans.

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24 The West Atlantic coast is the area stretching from Mauritania to modern Liberia. It includes the whole Senegambian coast and the Upper Guinea coast (in the terminology of W. Rodney) from the Casamance (overlapping both areas) to Liberia.

25 The most useful descriptions for the period have been the work of Valentin Fernandes (1506-1510), Duarte Pacheco Pereira (1506-1508) and of earlier explorers such as Zurara (1452-1453), Ca Da Mosta (1455-1456) and Diogo Gomes (1482).

3.2.1. The Peopling of the Coast and the Political Dominance of the Hinterland States

The first fundamental element concerning the West Atlantic littoral is that its very peopling was the result of continuous dislocation, over centuries, of populations from the interior to the coast. According to Rodney (1970), this process might have started as early as the 3rd century A.D. By the 11th century, the general pattern of migration in this area was already well established, as people moved in two directions : from North to South and from East to West. The actual sequence of arrival of those people on the coast is, however, more difficult to assess.

It is clear, in any case, that by the 12th century, the Sherbro were present in Sierra Leone while the Bullom are reported as being the single dominant group of that area (Rodney, 1970; Stride & Ifeka, 1971). By that time, North of Sierra Leone, the Baga, displaced from the Futa Jalon Mountains had moved toward their present habitat in Guinea and the Serer had reached the "Petite Cote" of Senegambia. The Futa Jalon was a crucial transitional zone in those times. It is through this mountain chain that the Susu moved in the 13th century after their defeat at the hands of the Mandinkas[26] before settling - like the Baga - on the coast of present-day Guinea. Between Guinea and the Gambia river, in an area encompassing the Casamance and present-day

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26 The Susu, of Mande Stock, were part of the Ghana Empire. After the breakdown of Ghana, they formed their own ambitions kingdom, Sosso, which was later defeated by the army of Sunjata founder of the Mali empire.

Guinea-Bissau, the first known settlers were the so-called "littoral refoules": Diola, Banhun, Balanta, Pepel, Bijago, Kasanga, Biafada, who despite their diversity present clear features of linguistic and cultural unity (Rodney, 1970). It is believed that very early, since, maybe, the 10th or 11th century (Brooks, 1981), Mandinka migrants had also peacefully infiltrated the area (Mane, 1979). Mandinka traders - the Dyula - were roaming the area and were successful middlemen in the trade networks of the time. Other Mande groups such as the Vai and Kono had also come from beyond the upper Niger in search of salt and settled in their present habitat in Liberia and Sierra Leone. By the 15th century, all these groups and certainly others were present on the West Atlantic coast. When the first Portuguese came they also found Azenegue[27] fishermen on the Mauritanian coast (Fernandes, 1938) and Wolof, who are first mentioned as an ethnic entity with the emergence of the Djolof empire which extended from the Senegal hinterland to the mouth of the Senegal river (Diogo Gomes, 1959). Other groups reached the coast around that time or later. The late Walter Rodney (1970) noted that up to the 16th century, the Temne - one of the most powerful groups of the Sierra Leone littoral - were still considered as an inland people. By the end of that century, however, they had reached the Sierra Leone estuary and had cut the Bulloms into two parts. In the Senegambia, the Lebu who were to become one the most famous groups of specialized fishermen on the littoral, moved to the Cape Vert and

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27 The Azenegues fishermen described by Fernandes are assimilated to the Imraguen of Mauritania by Robin (1955). Supporting this interpretation is the work of lieutenant Revol (1937) who describes the Imraguen fishing technique in all points similar to that of the Azenegues described by Fernandes (1938).

"Petite Cote" area only in the 17th century, with the creation of their theocratic confederation taking place even later, at the 18th century. It is also during this period that another group of skilled fishermen - the Kru - present today in Liberia and Ivory Coast, appear in the literature of Sierra Leone "because of their skills as sailors which earned them frequent mentions." (Rodney, 1970).

On the political front, almost the totality of the West Atlantic coast was either incorporated or under the control of the Mali empire at the 15th century. "The connection between the two areas, says Rodney, was intimate and fundamental." The Kingdom of Kaabu founded by a lieutenant of Sunjata in the 13th century had become a power in its own right and was controlling more than 32 provinces in the Guineo-Gambian space (Mane, 1979). Moreover, Manding aristocracies of warriors were co-opted into the ruling monarchy of the Gambian state of Nyomi which so impressed Diogo Gomes by the size of its canoe fleet. Even beyond the Gambia, in Serer country, the state of Siin at its establishment in the 15th century, was to be headed by a Manding dynasty, the Gelawar. By the beginning or the middle of the 14th century, Manding migrants from Kaabu had also reached the Gandun islands at the mouth of the Salum river where they intermixed with the autochtonous Serer inhabitants. From their encounter will emerge the Nyominka sub-group of fishermen - agriculturalists, considered today as a branch of the larger Serer ethnic entity (Martin & Beckert cited in Van Chi, 1977; Pelissier, 1966). Down south, in Sierra Leone, another Mande group - the Manes - were opening a major political crisis by invading the country in the 16th and 17th centuries. They subjugated the Temne, Bullom and Sherbro, captured the Sierra Leone watering place

and founded the Kingdoms of Bullom, Sherbro, Sierra Leone (Bure) and Lagos. In this process, the warrior elite of the Mane army became the new aristocracy of the coast (Rodney, 1970; Stride & Ifeka, 1971).

Thus, it can be seen, that even before the full fledge development of the Atlantic trade the West Atlantic littoral was a major stake in the power interplays of the Middle Age.

Mande political dominance, however, cannot sum up the totality of West Atlantic societies. All the people enumerated in this chapter have contributed to the actual socio-political configuration of the area. In fact, Mande people were, most often, rapidly absorbed by the groups they had conquered, as in the examples of Siin and Sierre Leone. Following the 16th century, several states emerged in the Senegambia, independent from Manding dominance (Futa Djalon, Kajor, Waalo, etc...). Parallely, original forms of communal organization were developed, in particular by the so-called "refoules," on the basis of village and family units (cf Diagne, 1967; Pelissier, 1966; Leary, 1971).

3.2.2. Fishing and the Littoral Economy

Fishing was a regular activity of coastal peoples in the 15th century and predates European arrival on the coast. Although adequate information is difficult to piece together, it can be said that most of the littoral peoples combined fishing and other ocean-based activities such as salt production, with farming. Progressively however, occupational specialization starts to develop among those peoples. Fernandes and Pereira refer to the peoples of the Senegalese littoral and of Rio de Cesto in present-day Liberia as 'great fishermen'

practicing canoe - fishing up to '2-3 leagues' from the coast. At that time, the Nyomi state of Gambia and the Bijagos in Guinea-Bissau already play a prominent role in fishing and in riverine as well as coastal ferrying, while the Bulloms of Sierra Leone produce fish and salt to exchange for agricultural products, mainly rice. Off the coast of Senegal, an oyster industry, created maybe since the 4th century A.D., is flourishing (Stride & Ifeka, 1971). Sophisticated methods of irrigated farming were developed on the Upper Guinea coast and peoples such as the Balantas, Banhun and Diola had mastered the mangrove swamp and were major suppliers of rice in the region. They were also livestock breeders. Salt production and its trade was particularly important to the littoral economy. Almost certainly the first mineral to be commercially exploited in West Africa (Brooks, 1981), salt was collected from mangrove leaves, produced by direct evaporation of seawater or extracted from salt impregnated soils, by percolation. Salt-making was virtually an all-year around activity. Rodney describes the importance of this trade as follows:

> "The ability of salt to generate trade and to attract people over amazing distances is well known. The Senegal was involved in the great trade net of the Sudanic empires by virtue of the salt obtainable at Aulil at the mouth of the Senegal river. Though this was not the case of the Upper Guinea coast, salt was nevertheless the most important item fostering contact between the littoral and the hinterland. The Baga on. . . the Pongo. . .were particularly important salt producers. . .it was noted in the latter half of the 17th century that every year, three caravans of Djalonke (the inhabitants of the Futa Jalon) set out for the coast principally in search of salt. One went North to the Senegal, one to the Gambia and a third to the Pongo."

In exchange for their salt, coastal peoples were seeking major products such as gold and cereals. Fernandes observed that the inhabitants of

the Rio Grande were taking their salt to the hinterland in Mandinka land in order to exchange it against gold. Pereira also notes that the salt of the Bulloes (sic) was exchanged against gold. Salt, dried fish, and mollusk were traded by coastal Serer communities with groups of the interior. In general, salt was linked to the coastwise exchange of kola, malagueta pepper and other forest products (Brooks, 1981).

The traditional West African canoe was fundamental to this trade and to the overall economic life of the region. It is said that in the Gambia, up to the 18th century,

> "This trade gave great power and authority to the Mandinka King of Barra at the Gambia estuary, since he had a fleet of canoes employed in ferrying salt up the river." (Rodney, 1970).

The traditional West African canoe was so important as a means of transport and communication that in the dense network of rivers of the Upper Guinea coast, people used to portage their canoe overland in order to make the connection between two rivers (Ibid).

In the 15th century, maritime vessels varied widely according to their use and to their users. In the Arguin region (Mauritania), the vessel of the Azenegue fishermen was no more than a lumber-raft tied together with the roots of a plant, which was also used to make nets (Mauny, 1961). South of the Senegal river, several types of canoes are described, from the small dug-out canoes carrying 3-4 persons to huge water crafts able to take up to 38 people in the Cape Vert and Petite Cote, 60 in Bijagos island, or 100 in the Gambia estuary (cf Chauveau, 1982b; Rodney, 1970). The first vessels described were without sail and board. While the smallest canoes were mainly fishing vessels, the larger boats were geared toward transport, trade and war in a fashion

similar to the boats of the Upper Niger circle. Canoes were used on the rivers of the coastal plain as well as along the coast.

Fishing gear techniques were also varied. The most prevalent in the 15th century were line fishing with bone-hooks, spearing, trapping, poisoning, bow and arrow fishing and netting. Hendrix (1938), notes that spearing and bow and arrow shooting could be practiced from a canoe as well as from the shore and that "the use of some type of netting for the capture of fish was universally employed throughout the Upper Guinea coast." Cast-nets similar in design to those used on the Niger bend, draw-nets, set-nets and drift nets are quoted among those. It is reminded that in the vicinity of the Senegal river mouth, Fernandes described the use of a trap-net in the shape of a handbag made of palm-oil leaves (see also Mauny, 1961). Also described by Fernandes is the trap net used by the Azenegue fishermen of Mauritania in combination with harpooning (Fernandes, 1938).[28]

Thus, by the 15th century, fishing is practiced by West Atlantic coastal populations, on the significant scale, all along the littoral. Maritime fishing is, however, much less developed than traditional continental fishing and on the coast, protected estuaries, lagoons and coastal lakes were the favorite fishing grounds. Chauveau mentions that in the Senegambia, the Cape Vert and the 'Petite Cote' offered particularly secure conditions and are the place of a more intense exploitation of marine resources. They are also "the place where

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[28] According to Chauveau (1982b), citing Ca Da Mosta who wrote in the 1450's, cotton nets were in use at that time. This information, however, is controversial (Hendrix, personal communication) and needs to be double-checked by a direct reference to the Protuguese originals of Ca Da Mosto.

(today) testimonies on fishing gears and craft are the most accurate" (Chauveau, 1982b). Chauveau's periodization of maritime fishing in the economic history of the Senegambian littoral (1982) is at present, the only one available for a part of the West Atlantic coast. It provides precious information on the Senegambia and reveals major trends of the West Atlantic littoral economy after the 16th century.

Through the 17th century, a technological revolution takes place in the Senegambia with the adoption of complex rigs on dug-out canoes used for fishing as much as for transportation. Fishing technologies also diversified with the appearance of the beach seine. Coastal exchanges are amplified, European trading and military forts multiplied and activities directly linked to the maritime economy such as techniques of bar passing, boosted. Fishing is regulated for Europeans by the states of the hinterland (such as Kajor and Waalo) who also have trading relations with European dealers. In this 'multiple partners exchange economy', coastal populations were playing a fundamental role as middlemen, supplying agricultural and other local produce to Europeans and salt, dried fish and shellfish to the hinterland. Saint Louis, where Tyubalbe fishermen come to settle, the "Petite Cote" and Gambia were at the forefront of this trade, while the peoples of the "Southern rivers" were refraining from getting involved in the European trade.

The 18th century marks the climax of the slave trade which dominated the Senegambian economy and the littoral. General insecurity is developed on sea as on land, and the regional economy is characterized by a general regression of the activities not tightly connected to the trans-Atlantic trade. Coastal production ceases to be

complementary to that of the hinterland and is developed primarily for the benefit of the inhabitants of European ports and adjacent inland areas. Only the salt trade seems to escape this trend. Most important, the sophisticated rigs of the previous century disappeared, together with coastal sailing. The Nyomi, increasingly autonomous from the rest of the Senegambia trading with the French, is an exception. Trade there, is prosperous and big transport vessels numerous. As a whole the economy is increasingly polarized around "traite" ports such as Saint Louis, which becomes the new pole of technological innovation and develops specific technologies necessary to the trade with European ships anchored off the coast. Bar passing techniques were further developed. Planks are sewn to the dug-out canoe which is also equipped with stems as well as simiplified, but functional, sails. Further in-migration of Tyubalbe fishermen and, above all, of Waalo-Waalo populations from the Senegal River Valley lead, to the creation of the maritime fishing village of Get-Ndar in Saint Louis. In spite of the production of salt and dried fish and shellfish, commercial activities dominated production per se. Continental fishing is still the major source of fish production in the 19th century.

3.3. THE GULF OF GUINEA

3.3.1. The Rise of States on the Guinea Coast

States came to life relatively late in the Gulf of Guinea where powerful political and military entities, even at their apex in the 18th century, did not match in scale the earlier empires of the Western

Sudan. However, the whole history of the Gulf of Guinea is dominated from the 15th century onward, by a few states - Benin, Oyo Dahomey, Asante and Fante - whose development intermingled tightly with the political economy of the coast and the history of inland as well as maritime fishing. Special mention should be made also of the city-state of the Niger delta which played a decisive role in the socio-political upheavals of the centuries preceeding colonial takeover.

The Bini state of Benin, which extended just west of the Niger delta and controlled the whole western coast of modern Nigeria up to Lagos, was the first of these states - along with Oyo - to emerge, in the 14th century. Reaching its greatest splendor early in the 15th-16th century, Benin will survive until the 19th century and was exchanging ambassadors with Portugal by the end of the 15th century. Around that time, the Yoruba Kingdom of Oyo had already grown as a formidable inland state. By the 18th century Oyo's power had reached its height. Barred from Northward expansion by the powerful Hausa state of Nupe, Oyo made its imperial growth southward, directly controlling the forest and the 200 miles long "Egbado corridor" leading to the coastal outlet of Badagri. Taking advantage of its quick-raiding cavalry, Oyo had developed the power to police wide areas and to extract enormous revenues in customs, taxes and tolls from tributary states such as Dahomey. By forcing its authority on this latter state in particular, Oyo was giving itself some say in the active transatlantic trade of the Dahomean and Ewe coast. By the 18th century, Oyo traders were actively participating in trade with Europeans through ports such as Porto Novo and Whydah. (Stride &

Ifeka, 1971), which were among the main coastal trading posts of the state of Dahomey ruled by the Fon, a branch of the larger Adja group. The Dahomey kingdom rose in the 17th and 18th century when the Fon of Abomey definitely established their hegemony over all the other Adja groups and their territories. Litterally kept under leash by Oyo, however, Dahomey is forced, from the 18th century onward, to pay an annual tribute to Oyo of "40 men, 40 women, 40 guns, 400 loads of cowries and corrals". It was not until a century later that it was able to shake the imperial strength of Oyo and to become, in the 19th century, one of the most famous military powers in all West Africa (Stride & Ifeka, 1971).

West of Dahomey, two entities, well-established by the 18th century, dominate the history of present day Ghana, Togo and Ivory Coast. Both states - Asante and Fante - emerged from the large groupings of Akan peoples, sharing similar laws, customs, religion and united by a system of 7-8 matrilinenal and 8-9 patrilineal clans. Political rivalry was intense among Akan groups. A map of 1629 shows that at that time, Akan states were making 28 out of 34 small states clustered in Southern Ghana (Adu Boahen, 1965; Stride & Ifeka, 1971). By 1750, however, after a succession of changes and political readjustments, the Asante state and the Fante Union had partitioned the Gold coast between themselves and were keeping the English and the Dutch in check. Asante, the more powerful of the two, will finally succeed in briefly incorporating Fante into an empire of unprecedented power in the entire Gold Coast.

3.3.2. Lagoon, Riverine and Coastal Communities of Fishers in the Political Economy of the Gulf of Guinea

The growth of state in the Gulf of Guinea took place at a turning point in African history. We have seen, as in the western Sudan, that the center of state supremacy progressively shifted eastward from the time of the Ghana empire to that of Songhai. The fall of Songhai in the 16th century, marks another shift eastward toward the Hausa city states and Kano, while states gain in importance in the immediate hinterland of the Senegambian and Upper Guinea coast. In the Gulf of Guinea, at a time when the Atlantic trade starts developing at an increasing pace, political and economic competition is progressively diverted toward the coast and European trading forts an ships.

By the 18th century, the economic map of all West Africa is definitively reshaped. The trans-saharan trade, though still important, is no longer the exclusive channel for long-distance trade, as the coast, from a periphery, becomes the active center of new trade networks leading to overseas markets.

As on the West Atlantic coast, these changes along with other historical conditions, have a definite impact on the position of the fisherfolk of the gulf, from the Gold Coast to the Niger Delta.

a) The Gold Coast

The origins of fishing on the Gold Coast seem to have been subject to a certain amount of confusion, probably due to the overwhelming role played by Fante fishermen of the coast since the 18th century. Rowena

Lawson (1974), among others, has credited the Fante for diffusing fishing culture to Ghana, she writes:

> "Many legends surround the origins of Ghana's fishing industry...It seems to be generally believed that the craft of fishing was introduced into Fante country first,...Sometime in the middle of the eighteenth century. Fantes seem to have been responsible for the spread of knowledge and skill of fishing to other parts of the coast and in many places, fishermen relate that the industry started when Fante canoes first landed on the beach."

This set of beliefs, apparently drawn from oral accounts, is shared by a Gold Coast historian such as Brown (in Christensen, 1977) and stems from the particularly dynamic role played by Fante fishermen in the development of ocean fishing in Ghana. However, the picture thus presented is not totally accurate because it ignores the role of pre-Akan peoples not only in the Gold Coast but in the Ivory Coast as well.

Long before the mid-18th century, which is the time when the Fante and Asante unions effectively divided the coast of present-day Ghana between them, fishing was practiced by indigenous people of the area. Fishing as an activity and fish products as items of trade on the Gold Coast even predate the first European contacts of the 15th century. As early as 1400, salt, fish and cloth from the coastal region, and kola-nuts, gold dust and slaves from the forest area, were items integrated into the trans-saharan trade network. At that time, three branches of the two most important routes connected the great markets of Mali and Hausaland to the coastal terminii of Elmina, Cape Coast and Accra (Adu Boahen, 1965; Stride & Ifeka, 1971).

In Ghana as well as Ivory Coast, fishing was a regular activity - particularly in the lagoon swamps - preceeding the arrival of the first

Akan groups in the area. Archeological evidence show that in Southern Ivory Coast, lagoon fisherfolk had been living in tiny hamlets bordering the lagoons "since at least the iron age and probably, since the stone age" (Stride & Ifeka, 1971). It is likely that well before the migratory waves of Akan and Kon (from the west) peoples at the 17th and of an original civilization based on the complementarity of fishing, agriculture and iron working (Verdeaux, 1981). With the settlement of these in-migrants from the forest, a process of fusion/assimilation at the end of which new cultural and ethnic entities emerged in the lagoons takes place. In the process, these groups of in migrants, generally considered as the dynamic element among "lagunaire" folks, had taken up fishing and adopted distinctive socio-cultural "traits such as systems of age classes found neither among Akan nor Kru socieites." (Verdeaux, 1981).

At about the same time and perhaps earlier, a similar process was taking place in Southern Ghana where groups of lagoon folks - the Guan - were undergoing the two-pronge pressure of Ga-adangbe and Ewe in-migrants from the East and Akan groups, among which the Fante - from the Northwest. From this time on, the Guan started undergoing a process of cultural and ethnic assimilation by these groups, a process still not achieved today. As in the Ivory Coast's lagoons, this process was not unilateral, since these settlers are likely to have taken up fishing upon contact with the lagoon folks and their environment, to the point where groups such as the Ga-adangbe incorporated the fishing gods of the Guan into their own religion (Stride & Ifeka, 1917). The fact that, according to Fyfe (1965), Akan peoples were looking for fish and salt when first established contacts

with Guan and Ga-adangbe groups, further demonstrates the anteriority of fishing among the lagoon folks of Southern Ghana.

According to Adu Boahen, Fante was still, during the first half of the 17th century, an inland state with its capital inland and only three main coastal outlets. At that time, the transatlantic trade was on the way to supplanting long-distance trade on the continent and the control of the coast was rapidly becoming a means for securing important sources of revenue. Gold, ivory and humans turned into slave commodities were increasingly exchanged against guns, gunpowder, textiles and luxury items while European ships and forts had to pay dues, customs and rents to their so-called coastal "landlords".

Though attracted by the lucrative position of middlemen that could be given by the control of the coast, the powerful Asante never succeeded in overrunning the Fante union until the 19th century. In the meantime, Fante city-states were tightening their hold on the most commercially active parts of the coast and were developing their coastal colonies. One of Fante's coastal outlets in the 17th century, Anomabu, illustrates Fante evolution with regard to the coast. Probably founded in the 16th century by Guan (or maybe Fante) people, Anomabu underwent intense in-migration mainly from Fante of the interior and had become by 1690, the most important trading center of the entire coast.

Around that time, accounts from European voyages reveal that skillful fishing was already developed on the coast. Barbot who made his last voyage in the Gold Coast in 1682, reported to have "often seen at Mina 700 or 800 canoes come out...at a time to fish with hooks and lines about a league of two off the sea". According to him, the

peoples of the coast had already developed techniques to pass the bars and carry goods and provisions all along the coast, as far as Angola.[29] According to Barbot, the fishers of Mina were "the fittest and most experienced to manage and paddle the canoes over the bars and breakings" while "the sailors of Winneba and Axim navigated their craft over the worst and more dreadful beating seas". Later in the 18th century, Adams, also notes that "a smooth sea caused every boat to be launched for fishing." (Smith, 1970), while Bosman records that the Fante had thousands of fishermen and traded by sea with Accra to the East and Axim to the West (Christensen, 1977).

According to Lawson (1974), the main method of fishing in the Gold Coast, through the 19th century, consisted of simple lines and small coast nets, used both from the shore and from canoes. These cast-nets were made of pineapple leaf fibers twisted into cord by rolling on the thigh, a slow and laborious task. Wall nets were also made from fiber and were anchored with stones while calabashes were used as floats (Christensen, 1977). No later than 1682, sails are described as being used by the natives of Winneba and Axim (Smith, 1970), two centuries earlier than it is sometimes believed (Christensen, 1977).

Further down the coast, beyond the frontiers of modern Ghana, people seem to have avoided the open sea. While De Surgy referred to the Pla fishermen of ancient Dahomey as "neither great fishermen, nor great sailors" (Pliya, 1981), Smith recalls that, between Whydah in ancient Dahomey and Lagos in historical Benin, European vessels, in order to carry out their trade with peoples of the area, had to hire Fante crews and take with them canoes from the Gold Coast.

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29 Angola, according to Smith (1970) might have meant Loango in the language of the time.

Adams, quoted by Smith (1970), writes that trade in this area of the Gulf of Guinea required:

> "one or two canoes and a set of canoe-men, both of these are to be obtained at Cape Coast...the canoemen, in number twenty-one receive mostly wages and subsistence during the time they are employed. The surf on this line of the coast being very heavy, and the natives never passing it, either for the purpose of fishing or trade, and boats being at all times unavailable for the purpose of communicating with the shore, renders a canoe and canoe-men of the above description indispensable."

Several points could be discussed as an explanation for this distinction between seafarers and other fishermen of the Gulf of Guinea.[30] A major element seems to be, however, that even more than in the West Atlantic coast, the network of lagoons, lakes and rivers paralleling 500 miles off the coast line from the Niger Delta to the Volta Estuary, were an ideal alternative to sea-faring.[31]

b) Ancient Dahomey

In Dahomey, the dense and extended system of lagoons and swamps provided secure conditions for water communication and fishing and served as a refuge against the deadly raids of the Fon army constantly in search of slaves. Two groups of lagoon fishermen dominate the

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30 In addition to the geographical conditions, Smith thinks that early history and traditional origins might be an explanation for the difference. We have seen, however, that the Fante were, in the 15th-16th century, as much an inland people as the Yoruba, cited by Smith's as a counter-example.

31 The particular dynamism of maritime fishing on the Gold Coast might have been favored by natural conditions. Smith notes in particular that in the area firm beaches afforded easy access to the sea, while the small promontaries jutting out from Axim gave shelter to the prevailing currents and winds.

history of ancient Dahomey - the Pedah and the Pla - both considered as a branch of the larger Adja group to whom also belong the Fon, the Aizo and the Gun-'people of the water' as called by Bourgoignie (1972).

The Pedah, called "Popo" fishermen by the Portuguese, are believed to have been the first settlers[32] of the country and, in the 15th century, they were already occupying the area surrounding Lake Aheme and had established the capital of their kingdom, Sahe. Later, they founded on the coast the outpost of Whydah, which became so important in the development of the Atlantic trade on the coasts of Dahomey (Pliya, 1981). According to sources quoted by Pliya, the Pla might have followed the same trajectory as the Pedah, splitting from these latter when they reached Lake Aheme. From there, they followed in canoes the course of the Mono River until they reached their main habitat in the lagoons bordering the littoral, as far as the Togo-Ghana border.

In the centuries following the 17th century, the life of those fishing folks was to be profoundly disturbed by the rise of the Abomey kingdom which in 1724 successfully conquered the rival state of Allada and in 1727 overran the Pedah state and burned its capital to the ground. Put directly in contact with European slave dealers by the capture of the towns on the coast, Abomey kings seem to have resisted involvement in the transatlantic slave trade and to have even destroyed several slaving ports of Dahomey. By the end of the 18th century, however, the economy of the kingdom was already deeply rooted in the

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32 As in the lagoons of Ivory Coast and Ghana, the Pedah probably found in the groups of hunter-fishermen - "Aghe" who proceeded them and are still taken as the "real owners of the land" (Pliya, 1981).

slave trade. The conjunction of these two factors - the conquest of all Adja states by Abomey and the development of the "traite des negres" on what will be named the "slave coast" - will have a tremendous impact of populations on fishers. Continuously raided and hunted down, these people were unceasingly dislocated and sought refuge inland, in the swamps of the littoral lagoons and of Lake Aheme. This situation grossly remained the same until the 19th century, when even the shift from slave dealing to palm-oil production did not prevent these populations, along with others, to be sought for enslavement in the plantations (Kilkenny, 1981).

The destruction of Sahe and the capture of coastal Whydah were first to provoke a massive exodus of Pedah populations. At that time, they moved "en masse" toward Lake Aheme in canoes heavily loaded with "Voduns" (gods) and signs of their wealth. At about the same time, the Aizo hunter-agriculturalists from Allada also settled on the banks of Lake Aheme and established villages of fisher-agriculturalists. During the whole period Pedah groups will be forced to move always farther in the swamp zones where they will meet other raided peoples of the region such as the Pla. In reality, no place escaped the control of Dahomey. Colonies of Fon families were systematically transplanted from Abomey into conquered territories and custom officers were sent all over the lagoons.

In the many islands and villages where these populations mixed, salt production, the exploitation of palm trees and fishing became the dominant activity of all groups including the Fon. Cast-net fishing was practiced, in particular by Pla fishermen, as well as fencing and trapping by Pedah and Fon fishermen. As a whole, the inland and

coastal complex of lagoons became "par excellence" the refuge zone where mixed populations specialized in fishing and salt production, and were unable to constitute any homogenous and structured political entity (Pliya, 1981).

However, the conquest and control of lagoon folks of Dahomey was not as easy as it appears. The forms of naval warfare which they developed in their resistance to Abomey's drive toward the sea, reveal both their mastery of aquatic conditions of the area and the military side of their social organization. Ambush and blockades were used and Smith recalls that in 1726-7 the Dahomeans were greatly hampered by their lack of canoes. In a later battle in 1753, they were drawn to a spit of land between the sea and the lagoons and had their retreat cut off by the Popo who then opened fire on them "at their leisure, from their canoes" (Smith, 1970). Elaborated forms of naval warfare in the lagoons existed not only in Dahomey but also in Lagos and the Niger Delta.

Strong tenure systems served to regulate life in the inland lagoons and the coastal complex where, in general rule, rights to the land were determined by the historical conditions of its occupation with the king or the chief of migration being commonly chief of the land but being distinct from the religious chief in charge of the voduns cult. In the aquatic world, collective ownership was the rule, modified only by the possibility for any individual or group of fishermen to own the gear (dykes, fences, traps) used in the water (Pliya, 1981).

Pla fishermen, who had a great mastery of lagoon fishing, had also settled on the littoral and were fishing the sea since the 18th

century. It seems, however, that lacking the appropriate boats, gear and techniques for efficient ocean fishing, they limited themselves to the use, from the beach, of the same gears they used for lagoon fishing (cast-nets, hand-lines). It is only with the full-fledged development of the colonial economy, that maritime fishing will experience new developments, correlative to the massive in-migration of Ewe fishermen from Ghana (Pliya, 1981).

c) The Niger Delta

In the Niger Delta, maritime fishing is not recorded as a widespread activity before modern times. The situation of the fisherfolk of the area, however, differed on fundamental grounds from that of Dahomey's fishermen; the most striking aspect being that Delta people, instead of raided populations, were instrumental, as active middlemen, in the slave trade.

Over 28,000 kms of mangrove swamps, creeks, and waterways and low-lying land, an original form of political organization based on the city-state came to life in the early 15th century among the different groups of people who settled in the area. According to legends, these group were preceeded in the Delta by previous inhabitants "Umuale," whom they had either chased out or completely absorbed (Stride & Ifeka, 1971).

By 1500 the Itsekiri of the Western Delta had founded the kingdom of Warri culturally linked to Benin. Sobo coastal dwellers were also on the western side of the Delta. The Central Delta was the land of the Ibo who founded the city-states of Nembe, Kalabari and Bonni. During

the 17th century the Efik, a branch of the Ibibio, moved from the forest to the creeks around the Calabar River in the Eastern Delta where they founded the city-state of Old Calabar. Coastal Ibibio are also found in the Eastern Delta.

While the Itsekiri of Warri have evolved particular institutions under the cultural and political influence of Benin, basic patterns of socio-economic organization characterized the peoples of the Delta. In response to their environmental conditions these peoples did not evolve strong centralized states; instead, they built a myriad of settlements and villages - each under the leadership of a headman - within what could be called 'trading empires.' Among the Ijo and Efik, villages were built around the "house system;" that is, the socio-political subdivision of a village into households and wards (quarters). Houses, equal in principle and homogenous in their composition, consisted of lineage group members under the authority of a council of elders. In the final analysis, the city-state itself was a confederation of houses, generally composed of a capital, satellite villages and a trading region in the interior forest belt (Stride & Ifeka, 1971). In a context where inland waterways were more extensively used than the sea and where canoes on the Rio Real could bring merchandise from 100 leagues or more up the river (Smith, 1970), peoples of the Niger Delta had two central economic activities, fishing and trading. Before their occupational involvement in slave dealing, Delta peoples were inserted into the long distance trade networks, and were exporting salt and fish to the hinterland in exchange for agricultural produce such as yams and farm animals such as cows, goats and sheep (Smith, 1970; Mauny, 1961).

Even after the full fledged development of the slave trade in the Delta, it is reported that the second most important occupations were

"making oil and trading to Ibo country" (Stride & Ifeka, 1971).

To carry out this trade, the dug-out canoe was the means of transport and communication "par excellence" and was included among the commodities to be bought from the forest for "in the word of a Nembe drum song:

> Tall as the Mangrove grows
> It makes no canoe
> The Nembe make no canoe" (Isichei, 1977)

Pereira in the 16th century was deeply impressed by the canoes he saw in the Eastern Delta. Says he: "the bigger canoes here, made from a single tree trunk, are the largest in the Ethiopias of Guinea, some of them are large enough to hold 80 men." These canoes had their own cooking hearths, and special arrangements for the storage of the crews sleeping mats. Much larger than the canoes of the Gold Coast, some were 70 ft. long and 7-8 ft. broad and had a sort of quarter deck made of strong reeds (Smith, 1970). Later in the late 18th century, "large canoes capable of carrying 120 persons" were seen, engaged in slaving expeditions up the river, capable of coming back with 1500 or 2000 victims (Ibid). According to Smith, genuine forms of naval warfare were developed in the Delta - as in the lagoon swamp of Benin and Dahomey - where in the 19th century war canoes were even equipped with cannons both fore and aft, muskets and other small and large guns, along with earlier weapons.

The canoe was therefore, fundamental to life in the Delta and, with the development of the slave trade, it became the very basis of the state. The trans-Atlantic slave trade, which dates back to the 16th century, underwent large scale expansion in the 17th and 18th centuries when the demand for slave labor increased with the

colonization of the Americas and the Carribean. The stakes were so high that wars were fought on both sides of the Atlantic for appropriation of its speculative profits. In this process, the Niger Delta was to become one of the most important export center of human commodities in west Africa. As reported by Stride & Ifeka, an English captain observed that in the late 18th century, the Ijo city-state of Bonny was:

> "The wholesale market for slaves, since no fewer than 20,000 are sold hereevery day."

Ibos from the Nigerian forest seem to have been the major victims of this trade as over a 20 year period, "not less than 320,000" of them were exported by Bonny and "50,000 more" by New and Old Calabar (Stride & Ifeka, 1971).

The grafting of slave dealing onto the traditional Delta trading system had a tremendous impact. the traditional 'house system' gave way to the 'canoe house', a well-organized fishing and trading corporation of kinsmen, strangers and slaves capable of maintaining the fleet of war canoes necessary for a successful participation in the trade. These trading and military corporations were vitally needed to keep open the strategic water-ways linking the slave producing hinterland to the coastal ports. A successful, dynamic canoe house would produce junior houses connected to the mother house. As the trading system became more complex, middlemen became more and more specialized. More and more market-brokers appeared in the slave-dealing chain. Credit was organized through the system of the "Trust trade", with European slave dealers advancing credit to powerful middlemen, house-heads and kings to buy slaves inland in return for a

specific share of the victims carried to the coast. In addition to direct sales, important revenues accrued to house, kings and settlements controlling strategic-waterways, in the form of trading dues (comey) paid by European ships, duties and fines. Secret societies were created among the Efik, partly in order to enforce the trust-trade and the structural unity of the city-state. Wealth, as a condition for political power was superimposed on the traditional lineage system and domestic slaves were able to become powerful canoe-house heads.

4. THE CLOSING OF A HISTORICAL EPOCH

This historical sketch of West African fishing developments through the Middle Ages reveals that this activity - practiced since prehistoric times - is an integral part of the socio-economic processes and political upheavals which shook and shaped West African social formations at large. For centuries, the West African hinterland stood as the gravitational center for the economic and political life of the region. Inland waterways, rivers, lagoons and protected estuaries were the laboratories where fishing crafts, gears, techniques and organization were first elaborated, tested and developed. Compared to inland fisheries, maritime fishing developed relatively late and the Atlantic ocean was rarely explored. Maritime groups such as the Fante, Kru, Lebu and Get-Ndar fishermen, whose role in modern fisheries is today preeminent, established themselves as maritime fishermen as late as the 17th century. However, maritime fishing was largely practiced all along the coast, no later than the 15th century.

The unfolding of the major social processes concerning fishing communities through the Middle Ages gives valuable insights about the dynamics of state and nation formation, ethnic aggregation and disaggregation, basic patterns of coastal peopling, in short, the very making of contemporary fishing societies in their relation to macro sociological processes. Integrated in the great trade networks of the western Sudan and, later, of the Atlantic, the economy of fishing communities was as a rule, multidimensional. Fishing was complemented by activities such as salt production, ferrying, farming, trading and even slave dealing. In the fulfillment of their economic role, original forms of social organization influenced by the specific societal context, were developed by fishing communities. The integration of these communities in the caste system of the western Sudan in opposition to the Senegambian and West Atlantic coast as well as the other inland and coastal life zones of the region, might indicate the conjunction of several factors in the genesis of caste organization in the area. For that matter, the different status of riverine and maritime fishermen, in societies organized along caste lines (Senegambia, in particular), might point at the historical conditions of maritime fishing development (later emergence in times of rapid social evolution) as well as the nature of ocean environment which nowhere on the coast seems to have been the object of communal or individual appropriation at the difference of inland waterways.

The basic model of production in precolonial societies is not made totally clear by historical accounts, but must have based upon the extended family household as a unit of production-consumption in the framework of communal principles. The mode of production in the Niger

Delta, the Senegal River, the Benin lagoons, the Niger Valley and the "sequelles" of such a system in modern maritime fishing points toward such an interpretation. Maritime and riverine production were above the subsistence level. A sizable surplus had to be created in order for fishery products, salt and other commodities to be exchanged through existing commercial networks. The dominant form of exchange was barter trade, despite the appearance of general equivalence measures such as cowries in the trade networks of the time. All across the region, the state was a constitutive part of the mode of production. In each social formation, it confiscated a part of the surplus produced by tributary fishing communities, in the form of taxes, duties or customs. Part of the surplus was also invested in the acquisition of fishing equipment. Technological reality was never static among medieval fishermen as indicated by the wide range of gear and boats used and the constant adoptions of new techniques before and after European intervention in the area. Finally, it should be said that women are the great "forgotten" of history text books for, despite all present-day evidences of their central role in the processing and marketing of fishery products as well as in other social and economic functions, (farming, domestic production, etc.), their actual "weight" in all these dimensions of fishing communities in the Middle Ages is rarely mentioned.

The 19th century marks a turning point in the development of West African fishing communities. It is the time when the most dramatic modifications of the political map of the continent occurs in the wake of the European drive toward colonial take-over. Four centuries of social and economic modifications had already paved the way for radical

changes in the social fabric of West African societies and the fishermen within them. The spectacular development of the slave trade had sharpened the contradictions internal to those societies and had established contextual conditions redefining the place of fishing communities - be they raided victims or slave dealers. With the triumph of industrial capitalism in Europe and the conquest of world markets at the beginning of the century, the impetus for a continuation of the slave trade dies off; the production of raw products designed to supply the apparatus of European industrialism is stimulated in a West African economy which had long lost control of its autonomous development. Palm-oil which was exported as early as the 18th century imposed itself as a substitute to the slave trade and was the major export of the Gulf of Guinea by 1850. In the Senegambia, the export of groundnuts taken precedence over other French commercial interests such as those related to the gum trade. Military steps are taken toward the annihiliation of the precolonial states of the region.

All these developments had a profound impact on fishing. Until then, continental fishing had been the major source of fish production, while on the coast the trade functions assumed by maritime communities dominated fish production. The growth of cities and ports as major transit zones of the new euro-centered export complex came about in correlation with the rapid increase of their population and the growing demand for fish and fishery products as a by-product of these changes. The simultaneous availability of markets and abundant ocean-resources created conditions for a leap in maritime fishing activities and for migratory movements toward the new "poles" of economic activity. In the Senegambia, the main trading ports (Saint Louis and Get-Ndar,

Dakar, Rufisque, Carabane, Albreda in Gambia) underwent a rapid swelling of their populations. Similar processes are noted on the 'Petite Cote' (Chauveau, 1982). In Benin, the construction of the wharf of Cotonou in 1891, is a primary reason for the first major migration of Pla fishermen toward the littoral. There they served mainly as a cheap labor force in the docks along with "Krumen" from Liberia, Ghana or Ivory Coast (Pliya, 1981). Somono fishermen came to fish and sell their catches to Saint Louis, Senegal and together with Bozo fishermen started going to the fisheries of Ivory Coast. An important Yoruba migration toward the Niger Delta is also noted (Sutinen et al., 1980).

The new dynamic generated at the level of entire societies is not without an impact on the mode of production, which, while retaining basic features of its long precolonial history, was drawn into the colonial cash economy in the same way as farming. Progressively, the production of use values and their distribution in kind among producers, the exchange of the surplus product through barter-trade and its appropriation by non-producers through tribute, gives way to the monetization of all these functions and to the appearance of surplus value as the monetary form of the surplus product.

IV. The Large- and Small-scale Fisheries in The Context of Modern Maritime Fishing Developments

4.1 Industrial fishing developments through the 1970's

West African countries came out of colonial rule in the early 1960's as structurally underdeveloped societies with relatively small industrial bases consisting mainly of import-substitution industries built in the Post-war era. In spite of significant differences in local conditions, agricultural production, consisting mainly of cash crops for export, has been the major source of production seconded by mineral exploitation, in particular, of oil and phosphate. Recurrent agricultural and food crises, further amplified by ecological catastrophes such as the waves of drought that hit the Western Sahel throughout the 1970's, pinpointed the necessity to rethink global development strategies and to more closely monitor the exploitation of available natural resources and, in particular, marine resources.

The interest in marine resource development, however, predates these crises. Various developmental schemes, characterized by a general bias in favor of European forms of industrial fishing, have been tried since the early days of colonial rule. In addition, foreign industrial fleets, which until the late 1970's were still dominating fish production off the West African coast, could be located in the area as early as the end of the 19th century. In 1880, two steamboats owned by the French company "La Maree des Deux Mondes" and equipped with extensive freezing equipment were already operating in West

Africa. In 1886, another French company, the 'Societe le Trident', based in Dakar-Senegal, was operating a freezer boat and a fish-freezing plant in the area. Both companies went bankrupt however, and despite other less-impressive attempts, the industry was for a long time, to remain dominated by indigenous canoe fishermen (Gruvel, 1908).

Well before WWII, European interest in the coastal resources of the region, was kept alive by the growing European demand for fisheries products at a time when North Atlantic fishery resources began to become seriously depleted. Gruvel's mission to West Africa (1906-1908), meant to assess the profitability for French businesses of West African maritime resource exploitation, must be perceived in that context. Until WWII, European vessels of diverse origins (Spanish, French, Portuguese, Italian, British, Norwegian, etc.) trawled actively in the region's waters, with a particular focus on the resource-rich Mauritanian coast. Already, long-distance trawlers equipped with freezing facilities onboard, came to fish in the area without making calls in local parts. Smaller trawlers operated nearer to the coast and prawn fishing was also practiced (Conference de la Peche Maritime, 1948). As a whole, the portion of the coast along the 'Southern colonial territories' (Gulf of Guinea), was weakly exploited.

In 1945, fifty years of overfishing had almost entirely depleted resources of the North Atlantic. In addition, during WWII, British and French colonies were cut off from their metropolitan centers, triggering, at the end of the war, a shift toward the establishment of import-substitution industries that could benefit from the availability in West Africa of a steady raw material supply and a cheap labor force. A number of fish processing plants were created by metropolitan

businesses and, with the gap that was thus created between the new treatment facilities and the level of fish production, conditions for the development of an aggressive, locally-based industrial fleet were created. As a whole, the French colonies of Senegal and Mauritania were the most advanced in that process and their industrial fleets were organically linked to French-owned local processing plants. In Senegal these plants processed mainly sardinellas and anchovies and were operating in the 'Petite Cote' before being relocated in larger industrial units in the Cape Vert. An important shark industry was also prospering from the manufacture and the sale on the world market of natural vitamin A, shark oil and dried shark fins. This particular fishery disappeared around 1952-1953 with the development in the Western world of synthetic vitamin A (Van Chi, 1967b).

The post-war era was also the time when various fishery departments and research institutes were created in the European colonies of West Africa. In 1948, a 'Maritime Fishing Conference', held in Dakar assessed the state of the sea resources of the region. Slowly, colonial and then 'national' industrial fleets started to develop in the various countries of the area. In the 'Gold Coast', the fisheries department had its first full-time officer in 1945 and, that year, two motor fishing vessels were ordered from Great Britain, marking 'the beginning of industrial fishing in Ghana'. It was not until 1953, however, that such a vessel was first owned and operated by a Ghanaian (Lawson, 1974). In Sierra Leone, the colonial government had, originally, to purchase and fit a 70 foot wooden ship in order to supply ice-chilled fresh fish to Freetown markets and also, to periodically use steam-powered naval ships for trawling the area. The

emphasis toward large-scale fishing schemes developed in that country throughout the colonial period (Liensenmeyer, 1976). Nigeria established its trawler fleet in 1956, with only one registered vessel (Ladipo, 1973) while, along the Benin littoral, an average of one trawler remained in operation between 1955, when trawling operations began, and 1962. After independence, national industrial fleet development gained some momentum. By the late 1970, the West African inshore industrial fleet (including Morocco) had grown to 1500 trawlers and purse seiners. Morocco excluded, Ghana, which had developed a fleet of eighteen distant-water trawlers and thirty-three tuna vessels, had the largest industrial fleet (Sutinen, et al., 1981). Senegal which now has thirty-five tuna vessels, had developed between 1962 and 1976, the most ambitious long-distance fleet of the region which, then, included three transoceanic tuna boats and several freezer boats. Because of disastrous financial, managerial and technical choices, the whole operation ended up in the bankrupcy of the state corporation in charge of the enterprise (Domingo, 1982). The industrial fleet is reported to be also important in the Ivory Coast and in Nigeria. In that latter country, seventy distant-water, factory-type trawlers were registered in 1968 (Ladipo, 1973).

However, in spite of the growing involvement of nationals in industry fishing, one should remain aware of the fact that foreign businesses under 'national' flags are still an important - and sometimes, dominant - component of 'national' fleets. Often 'national' vessels are, in reality, chartered vessels which have to be paid in foreign currency when landing their catch in a West African country; this gives these nationally-based companies the objective status of

import agents (Ladipo, 1973; Liensenmeyer, 1976; Lawson, 1974; Domingo, 1982). Another problem faced by nationally-owned vessels is, as in Senegal, their links to processing industries which rarely have their own export channels outside of the country. Therefore, national businesses are often forced into associating themselves with foreign dealers who, alone, control outside markets and the international terminii of the price chain (Fontana & Weber, 1983).

Finally, and whatever their development, local industrial fleets have not yet matched the scale of the long-distance foreign fleet. This fleet dominates West African fisheries since the early 1960's with its operations concentrated in the area stretching from Mauritania to Sierra Leone. In 1977, long-distance foreign vessels were making more than 70% of the value of all catches in the region. For the most part, they were "large vessels (over 200 GRT) often having freezing facilities on board and capable of operating for long periods at sea. Some of the ships are accompanied by large (over 1,000 GRT) motherships which process, store and transport the fish catch" (Sutinen et al., 1981).

By the mid- 1970's, the principle foreign nations operating in the region were the U.S.S.R., Japan, Spain, South Korea and other East and West European nations. Spain had the largest fleet in value terms (26% of the total catch value) while the U.S.S.R. dominated the region catch in weight with 37% of the total production. In 1978, however, the share of non-African production started to drop and went below 60 percent (Sutinen et al., 1981). This new trend has been attributed to the adoption of 200 miles EEZ's in the second half of the 1970's, coupled with the rising cost of distant-water operations.

Nevertheless, it is likely that long-distance foreign fleet operations will not disappear from the region for the times to come, several countries having established compensatory agreements with foreign companies in exchange for the right to fish in their EEZ's.

4.2 The competition between large- and small-scale fisheries

In the search for markets and manpower, as well as in two other fundamental areas - the allocation of scarce public financial resources and the exploitation of biologically-limited resources - artisanal fisheries are in competition with the large-scale industrial fleets which have just been described.

It would not be fair to say that artisanal fishermen have been ignored by policy-makers in West Africa, insofar as resource allocation is concerned. Starting with colonial administrators concern with guaranteeing a steady supply of fish to colonial and indigenous populations, various schemes have been developed in order to increase the output of artisanal fishing operations. These 'development' or 'modernization' schemes have essentially consisted in public loans and credit mechanisms for the purchase of outboard motors, mechanized vessels or fishing gear, often channeled to fishermen through freshly organized cooperative. In many cases, these initiatives failed because they profoundly misunderstood the internal structure of the canoe fishing industry. This was the case in particular of the 'Charter Party' scheme in Ghana (Lawson, 1974; Christensen, 1977), the cooperative experience in Benin (Pliya, 1981), the loan and credit project in Sierra Leone (Liensenmeyer, 1976) and the first generation

of Senegalese cooperatives. Some success was, however, obtained in Senegal and Ghana after an initial phase of 'try-and-miss' schemes (see Chapter VI).

Though not ignored by policy makers, artisanal fisheries in West African countries have suffered from a general 'grand design' bias in favor of large-scale fishing. In Sierra Leone, Liensenmeyer (1976) reports that only 6.7% of public investments in fisheries were to go the small-scale industry during the period 1974-1979. Moreover, import duties for nets, motors and other small-scale fishing equipment were set at 36.5% of the purchase value, the same rate as the one applied to semi-luxury items. In contradistinction, 67% of public investments were scheduled for building a fleet of ten large trawlers, twenty purse seiners, four deep-sea trawlers and the facilities needed for operating this fleet. In addition, imported large-scale equipment items were taxed only at 10% of their purchase price. Furthermore, Liensenmeyer points out that:

> "Large scale firms have received development certificates which grant such concessions as extended tax holidays, exemptions from import duty on packaging material and fishing gear as well as reduced duty on trawlers, diesel fuel and lubricants."

In Senegal, the position of artisanal fisheries with regard to public expenditures has been better than in Sierra Leone, given that outboard motors have been sold tax-free to fishermen since 1966 (Domingo, 1982; Weber, 1980). However, it is not until 1979 that artisanal fisheries share of the budget allocated to the whole fishery sector reached 32%. During the four four-years plans which followed independence in 1960, the bulk of public expenditures went to industrial fisheries which, in the 4th plan, were receiving 80% of the fishery budget (Domingo, 1982).

The governments of Benin and Togo are, reportedly, reluctant to

substantially invest in industrial vessels, giving most of their attention to their small-scale lagoon fisheries (Sutinen et al., 1981). However, both the Ivory Coast and Ghana, are reported to follow the trend observed in Sierra Leone, and to a lesser degree in Senegal. The Ivory Coast, in the period 1976-1980, was planning to devote most of its $70 million investment in marine fisheries to distant-water fishing, tuna boats, port and cannery facilities, etc. . .(Sutinen et al., 1981). As for Ghana, "Government planning has been directed more at the development of large trawlers which utilize the harbor and cold storage facilities at Tema near Accra. For the small operator, more attention has been given to those wishing to invest in inboard trawlers than in traditional canoes." (Christensen, 1977).[33]

Competition for fishing grounds is a second major area where the interests of artisanal fishermen sometimes clash with those of industrial fleets[34]. Garcia, Boelly and Freon (Troadec & Garcia, 1979) have mentioned the competition between the artisanal and industrial sectors in lagoon and maritime shrimp fishing and in the exploitation of small coastal pelagics. The tight interaction among fisheries creates the possibility of one affecting the other through parental or

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33 Lawson (Lawson - COPACE, 1980), suggests on the contrary, that in Ghana the canoe fleet has been given more attention than the industrial fleet. This appreciation however, seems not to take into account the considerable public support given to inboard trawlers - at the expense of the canoe fishery - through the State Fishing Corporation (SFC) and the 'Charter Party Scheme' described by Lawson herself (1967; Lawson & Kwei, 1974).

34 Such conflicts occur even in countries where artisanal and industrial fleets have delimited fishing zones. That is the case in Senegal and Nigeria where the inshore coastal area has been reserved to artisanal fisheries, respectively in 1976 and 1972 (See Fontana & Weber, 1983; Ladipo, 1973).

juvenile catches and through the simultaneous exploitation by two or more flotillas which catches have similar demographic structures.

The problem is further increased by the fact that long-distance foreign fleets do not land their captures in local ports. These fleets often take advantage of this opportunity and underestimate their catch reports in order to reduce their financial contribution to national economies. Maritime fishing being the exploitation of a common pool resource, this raises uncertainties about the actual level of stocks exploitation and makes it difficult, for instance, to assert which, of overfishing and purely biological phenomena, accounts for the reduction of artisanal fisheries catches in some areas.

Finally, because of the lack of adequate enforcement, a great number of trawlers come to operate in coastal zones reserved to artisanal fishermen, therefore, creating two negative effects;

1) A greater pressure on coastal stocks and available biomass. These trawlers use very small mesh size and discard 40% to 60% of their catches in the sea, as is increasingly the case in Senegal (Fontana & Weber, 1983).

2) The destruction of artisanal fishing equipment (nets in particular). In Senegal, such losses are estimated to average CFA 100 million per year[35] (Fontana & Weber, 1983).

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35 $1.00 U.S. is currently around CFA 400 and was CFA 250 in January, 1981.

V. Systems of production and human dimension in the Artisanal Maritime Fisheries of West Africa

"Every production is appropriation of nature by the individual in the framework and through the channel of a given form of society"___K. Marx

Social groupings and nature are related through the processes of adaptation, transformation and appropriation. Nature is socially appropriated by a given mode of production characterized by the type of relation linking the producer to the means of production and to other producers and non-producers involved in the process of production. In the real world, modes of production do not exist in isolation; they are not only articulated to other modes of production, but are enclosed in concrete social formations incorporating several other material and non-material dimensions of social life.

Therefore, the mode of fish production in West Africa must not be perceived as unidimensional and isolated from the general social organization of fishing communities articulating various productive and social strategies to the hunting of ocean animals. These strategies can be understood only, within an analytical frame that links sea-based activities to the land-based arrangements of fishing communities. The resulting Totality-referred to, here, as a 'system' of production - is therefore a multi-level organization characterized by specific, ranked and complementary goals. The general characteristics of fishing communities, their ethnic dimension, their patterns of economic specialization, division of labor and migration will be better understood within that framework and will lay the ground for the later study of the mode of production in artisanal fishing.

5.1 General characteristics of the West African fishing population

Statistics on the West African fishing population are hardly reliable and vary widely according to sources. Sutinen et al. (1981) evaluate the number of artisanal fisheries in the region at 600,000 men, operating 105,000 dug-out canoes, while Lawson's estimate for the region's canoe fleet is only 35,510 canoes (Lawson - CECAF, 1980). The discrepancies in available data on the artisanal fisheries are partly due to the different quality of national fishery departments and research institutes statistics and to the shortcomings of regional coordination at the CECAF level. Some countries include lagoon fishing in their statistics on the maritime economy (Ivory Coast) while others classify it with other forms of continental fishing (Benin). While 70,000 canoes are estimated for Nigeria by Sutinen et al. (op. cit.), estimates provided by Lawson and excluding transport vessels, are just 9000 (Lawson - CECAF, 1980). In both cases, it is not said whether fishing vessels operating inland, in the Niger Delta are included. As for Senegal, the first source overestimates the fishing population (put at 46,000) and the canoe fleet (6,442) while the latter underestimates the size of the canoe fleet (put at 3500). CRODT's statistics, obtained from the last census of the fishing population in 1982, give 27,000 as the number of fishermen in Senegal, operating 4,350 canoes (Fontana & Weber, 1982).

Whatever their deficiencies, available statistics per country provide some information on the relative importance of fishing in the region (See table 1). Artisanal fishing accounts for more than half of

TABLE 1. Artisanal Maritime Fishing

in West African Countries

Country	Size of maritime fishing population	Size of canoe fleet	Approximate percentage of landings contributed	Weight of in-migrant fishermen (o)
Mauritania	± 650*	± 145*	22	250 Senegalese* operating 60 canoes
Senegal	27,000+	4,350+	66.9	Negligible
Gambia	± 3,000*	--	66	Important - 50 - 80% of fleet - Senegalese, Some - Ghanaian*
Guinea-Bissau	--	--	71.4	Significant - Senegalese
Guinea	4,000*	--	28.6	--
Sierra Leone	12,000Δ	5,000Δ	92.5	Important in past - Fante
Liberia	2,889*	700*	83.3	Important About 80% of fleet - Fante*
Ivory Coast	17,000 - 22,000 (including lagoon fishermen)	--	33.5	Important - Ewe, Fante
Ghana	60,000 - 100,000*	8,200*	72	Negligible
Togo	4,000*	600*	82.5	Important - 30% fleet* - Ewe, Ga
Benin	2,000 - 4,000°	500*	42.9	Important - Ewe (Keta)
Nigeria	(Probably much less than) 415,000*	9,000v	86.3	Sensible - Ewe

Sources: *Sutinen et al, 1981.
°Everett, 1979 (in Sutinen et al., 1981)
vLawson, COPACE, 1980
+Crodt, 1981 (Bosse - Pechart)
ΔLiensenmeyer, 1976
θPliya, 1981

the fish landed in West Africa and makes up 70% of the landings in a country such as Senegal. There are also differences in the size of the canoe operations among West African coastal nations and these differences can be related to ecological determinants and the type of social choices developed by littoral societies. For example, the persistent weight of lagoon fishing in the Gulf of Guinea confirms the lessons drawn from its precolonial history. Today, as yesterday, historical conditions associated with the poor geographical and biological characteristics of the Gulf of Guinea, contribute into making the lagoon complex, a predilected eco-niche for various fishing folk.

Even in Nigeria, which has the largest fishing population of the region, most of the fishermen operate in the brackish waters of the Niger Delta rather than on sea. In 1973, more than 5000 villages were scattered among the swampy shores of the lagoons, creeks and estuarine networks while only 250 could be found on the beaches along the Atlantic Ocean (Ladipo, 1973). In the South West of Benin, a similar situation could be found in the early 70's when 4,000 marine fishermen were thought to be dwelling on the littoral, as opposed to 10,000 fishermen around Lake Aheme. According to a 1978 source, the number of marine fishermen could have even dropped to 1,887 people (Pliya, 1981).

Strikingly, artisanal maritime fishing is also relatively underdeveloped in Mauritania despite the existence, off the Mauritanian coast, of the richest maritime environment of the region studied. Mauritanian fishermen have remained only few and have undertaken only minor developments of their fishing techniques. The fishing techniques of Azenegue fishermen were much less developed than those of their

neighbors to the South during the precolonial period. It must also be pointed out that Mauritania, for the same ecological factors explaining the richness of its coasts (see Chapter II), is a largely desert area where nomadic patterns of social organization have generally dominated sedentary forms of living of the type developed by fishing communities.

In general, the most aggressive maritime fishermen in West Africa, have been those who, since precolonial times, have particularly strived to invest their human resources into ocean exploitation. Outstanding examples are the fishermen of Ghana and Senegal who have largely been engaged in long distance migrations and who played, and are still playing, a major role in the diffusion of fishing techniques and the development of artisanal fishing along the entire littoral.

5.2 The ethnic dimension in West African fishing

Ethnicity is an important dimension of artisanal fishing in West Africa and to some extent, national characteristics such as Ghanaian, Senegalese, Sierra-Leonian or Nigerian fishermen constitute an abstraction. In each of these countries, various ethnic groups such as the Ewe, Nyominka, Temne, or the Ibibio do not have the same history and the same level of involvement in fishing, nor do they exhibit the same patterns of adaptation to the challenge of their environment. Table 2 lists the main fishing groups in West Africa according to national and ethnic origin and summarizes their main occupational characteristics.

Ethnic groups involved in fishing are numerous and their degree of occupational involvement in the activity varies widely, as it will be

TABLE 2. MAJOR WEST AFRICAN FISHING GROUPS BY COUNTRY OF ORIGIN, ETHNICITY AND OCCUPATION

Country	Ethnic Origin	Main Occupational Characteristics
Mauritania	Imraguen	Fishing
Senegal	Lebu	Fishing-Farming
	Nyominka	Fishing-Farming-Cattle Raising
	Wolof (Getwadar)	Fishing
	Diola, Serer, Sose, & others	Farming-Fishing
Gambia	Wolof, Sose...	Fishing-Farming
Guinea Bissau	Bayote, Mandjack, Pepel, Dida	Farming-Fishing
Guinea	Susu	Fishing-Plantation (Coconut, Oil Palm)
	Baga	Fishing-Farming
Sierra Leone	Temne	Fishing-Some Farming
	Sherbro	Fishing-Some Farming
	Susu, Mende...	Farming-Fishing
Liberia	Kru	Fishing
	Bassa	Fishing-Hunting & Gathering of Forest Products
Ivory Coast	Kru	Fishing
	Alladian	Fishing-Plantation
Ghana	Fante	Fishing
	Ewe	Fishing
	Ga	Fishing-Farming
Togo	Ga, Gon	Fishing-Farming
	Ewe	Fishing
Benin	Pedah	Fishing (Lagoon Mainly)
	Pla	Fishing
	Fon, Mina...	Farming-Trading-Fishing
Nigeria	Ijaw	Fishing-Farming
	Yoruba	Fishing-Farming
	Ibibio (Andoni-Ibeno)	Fishing-Farming

seen later. In all countries, maritime fishing is dominated by one to three groups which make up most of the labor force in the sector. Sometimes, as in Gambia, Liberia or Ivory Coast, these groups are in-migrant groups coming from other West African countries (see table 1). It should be kept in mind however, that the ethnic map in West African fishing is highly, and increasingly, heterogeneous and that the traditional hegemony of a few groups over artisanal maritime fishing is eroding progressively. In a significant number of countries, people from a variety of ethnic background are increasingly moving to the coast to work as migrant laborers in fishing units. This is the case, in Senegal, of Serer and Wolof groups of the hinterland as well as Bambara, Tuklulor and Fulani migrants. In addition, fishing is increasingly taken-on in some Diola areas of the lower Casamance. In Benin, next to the major groups of Pla, Ewe and Pedah fishermen, there is a wide array of fishermen coming from groups traditionally less oriented toward the sea, such as Fon and Mina groups. Finally, ethnicity among West African fishermen is two-dimensional. On one hand, ethnicity transcends occupational specialization (not all Fante or Lebu communities are communities of fishermen), on the other, specialization translates the ethnic concept in its own terms and provides for new meanings and new realities. In the Lebu areas of the 'Grande' and 'Petite Cote' in Senegal for example, 'Lebu' is becoming the generic term for all fishermen permanently established in those areas, whatever their true ethnic origin (Van Chi, 1967a; Chauveau, 1983a). This is not without reminding the earlier processes of ethnic fusion during West African precolonial history. Groups such as the Somono were real ethnic 'melting pots', taking their substance only

from the commonality of their occupational specialization. Throughout the Gulf of Guinea, the first lagoon dwellers were literally 'phagocitized' by Akan, Ijo and other conquering people coming to settle on the lagoons. All evidence indicates that those processes of fusion, and also of fission, were not limited to fisherfolk, as it can be seen in the fact that different totemic names (which can be traced back to different clan origins) are found today both within and across the boundaries of ethnic groupings at large (Diop, 1954).

All of these examples show that ethnicity in fishing can neither be taken for granted, nor can it be written-off as an 'imaginaire' which, ex-nihilo, came out of colonialism (Verdeaux, 1981). The ethnic fabric of fishing societies is not only complex, it is also dynamic. On one hand, ethnicity, which is present in the 'vecu' of those societies, their self-imagerie and their identity concepts, mediates their socio-economic action upon their environment; on the other hand, it is constantly being transformed by the general motion of larger social and economic formations and does not suffice to explain the dynamics at work in fishing communities.

5.3 Specialization and Complementary in Maritime fishing communities

The degree of community involvement in fishing is wide ranging in coastal West Africa and a few typologies have been designed to describe the amount of group involvement in the activity. Among those, the distinction between 'part-time' and 'full-time' fishermen is by far the most common. These two concepts, however, fail to make the distinction

between the relative amount of time spent in fishing and the relative importance of fishing vis a vis other subsistence strategies.

By making the distinction between 'dominant' and 'co-dominant' fishing societies, Pollnac (1976), clearly, takes as a point of departure the importance of fishing relative to other activities. In a 'dominant' fishing community, fishing is the major subsistence strategy, whereas, in a 'co-dominant' community, fishing shares in importance with some other subsistence strategy. In this case, however, a few occupational situations in fishing are not described by the two alternatives offered. In contradistinction, the typology used by Pliya (1981) to describe Benin fishermen, goes into a great deal of refinement. Pliya's classificatory scheme identifies five types of fishermen:

1) Exclusive lagoon or river fishermen (continental fishing only);
2) Exclusive maritime fishermen (sea fishing only);
3) Mixed fishermen (combine continental with maritime fishing and, occasionally, farming);
4) Fishermen-agriculturalists (fishing is co-dominant with farming);
5) Agriculturalists-occasional fishermen (farming is occasionally complemented by fishing).

Both Pliya's and Pollnac's classifications have a number of strong points and, insofar as maritime fishing is concerned, the following distinction will be based upon a synthesis of the two typologies and will distinguish among three types of fishermen:

Type 1: 'Exclusive' or 'dominant' fishermen - Maritime fishing is the exclusive area of primary production. Other activities when they exist are dominated by and area function of fishing.

Type 2: 'Co-dominant' fishermen - Maritime fishing and another activity (such as farming for example) constitute two poles of the community's economic life.

Type 3: 'Occasional' fishermen - Fishing is a secondary activity dominated by some other productive activity.

Despite the scarcity of detailed information on most of the fishing groups of the region, available evidence suggest that the largest majority belongs to type 2. This indicates the importance of subsistence strategies, such as farming, palm-oil production, cattle raising in the economic life of artisanal fishermen. This fact is further reinforced by the existence of some groups of occasional fishermen (type 3) whose main occupations are land-based. Among those, groups such as the Diola of Southern Senegal and Guinea-Bissau are famous for their farming skills, particularly in rice production. On the Senegalese littoral, Serer groups of the hinterland also participate in fishing despite their well documented preference for agriculture and in Benin some villages of agriculturalists are occasionally involved in fish production (Pliya, 1981).

Co-dominant fishing communities (type 2) have been spotted in almost every single country in West Africa. In Guinea, Baga fishermen are also farmers while Susu fishermen depend on coconut and palm-oil for a significant portion of their income (Sutinen et al., 1981). Dependency on forest products as a complement to fishing is also found among the Bassa of Liberia (Sutinen et al., 1981) and in the Benin villages of fishermen-agriculturalist practicing also vegetable growing, salt making, poultry, small livestock breeding and trading (Pliya, 1981). Salt making, trading and farming are also found among Ijaw, Yoruba and Ibibio fishermen of Nigeria, whenever possible under the conditions of the mangrove swamps. In Sierra Leone, outside the major fishing areas, fishermen engage seasonally in farming and petty

trading. According to Liensenmeyer (1976), commercial production of vegetables and swamp rice in the Bullom Peninsula and subsistence agriculture in most other areas constitute major alternatives to fishing in that country. Among Nyominka fishermen in Senegal, fishing and agriculture have been for centuries, the two central means of subsistence supplemented eventually by cattle raising. The pursuits of these diverse goals have also been at the basis of complex migrations within the limits of the Nyominka Islands as well as beyond the island's boundaries. Along most of the Senegalese littoral, among the Lebu and Serer sedentary fishermen of the 'Petite Cote' as well as among Lebu villages of the 'Grande Cote', fishing is articulated to the cultivation of cash and food crops and to vegetable growing. The importance of this dual, and sometimes, multidimensional involvement of littoral communities into various productive activities must be kept in mind when dealing with these communities. On most of the West African coast, environmental conditions set a natural complementarity between fishing and agriculture given the seasonal character of both activities and their opposition, as a result of hydro-climatological phenomena (see Chapter II). Even in cases where farming and fishing seasons do overlap, as it will be seen later, the productive strategies developed by fisherfolk bear the imprint of their specific environmental conditions associated with social and economic constraints. Typically, one major response to this 'set of constraints', has been for fisherfolk to distribute their social and economic investments among different alternatives in order to maximize the benefits subtracted from the resources available to them.

The second major response to environmental and socio-economic conditions in coastal West Africa has been the exclusive specialization

of some communities in fishing. Type 1 fishermen are found in almost all the countries where fishing has taken some proportion. Among the most visible of those, are Fante and Ewe fishermen from Ghana. Although the Fante and the Ewe are large ethnic groupings including a very important proportion of non-fishermen, the actual demographic and sociological 'rapport' between fishermen and non-fishermen is rarely mentioned in the literature. It is known that however, in the low-lying coastal area extending from Southern Ghana to Lome (the capital of Togo), fishing is the most important single occupation for Anlo-Ewe men. Estimates for two Ghanaian areas surveyed by Hill (1970) put the proportion of fishermen at 31% to 37% of the total population. In Aome villages, farming is practiced by a very small number of families, while a village much as Muniano, described by Wyllie (1969), appear as "a one industry village whose entire existence rests upon the activities of its. . .beach seine fishing companies". Christensen (1977, 1982) mentions that Fante towns and villages "usually contain farmers as well as fishermen" and that their fishing segments "tend to cluster in the older and poorer housing near the beach" Quinn (1971), in a sample of 74 households from the Fante town of Biriwa, found that more than 88% of the men were 'full-time' fishermen while only 12% had other occupations such as farming, carpentry or lorry driving. In the mostly Fante town of Cape Coast, 20% of the population was made up of fishermen.

On the coast of Benin, Ewe (Keta) and Pla fishermen make up the core of villages involved exclusively in fish production. Sometimes, these villages are also populated by Fon and Mina elements. A similar

role is played by Fante fishermen in Liberia and in Sierra Leone.[36] In Ivory Coast, maritime fishing is dominated by large settlements of Fante and Ewe fishermen whose spread into several West African countries appears to be a logical consequence of their dominant specialization in fishing. Among Sierra Leonean fishermen today, 'full-time' fishing is reported to be the rule in all the major fishing areas of the country (Liensenmeyer, 1976). In Senegal, only one group, the Wolof fishermen from Get-Ndar in the Northern Senegalese city of Saint Louis, is involved in fishing at the exclusion of other areas of primary production. Representing 29% of the Senegalese fishing population, Get-Ndar fishermen are the most numerous and, perhaps, the most dynamic fishing group of the Senegambia. They are also largely involved in medium and long-range migrations.

Factors leading to the specialization of fishing communities in one or several productive activities have not been the object of much discussion among marine scientists. However, Breton's (1973) work in Eastern Venezuela gives some insight into the matter and points at several factors among which the most important are the natural resources available to those communities and men's utilization and alteration of those resources. In West Africa, patterns of economic specialization in fishing communities are also explained, to a large extent, by the characteristics of the land and sea resources available to those communities. However, while in Eastern Venezuela, communities which present a higher degree of specialization in fishing are those

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36 In 1977, Fante fishermen were expelled from Sierra Leone in retaliation for a similar move of Ghanaian authorities against Sierra Leone nationals in that country.

which possess better ecological conditions in addition to other favorable historical situations (Breton, 1973:309), the situation in West Africa appears as somewhat different. Strikingly, communities benefitting from the most favorable ecological and oceanographic conditions in the region have tended to diversify their field of activity, while the most active groups of exclusive fishermen have been characterized by poorer ecological conditions at home. This fact does not disqualify resource characteristics as a relevant explanatory variable for specialization; rather, it suggests that maritime and land resources articulate differently according to their specifities. Furthermore, it suggests that the exploitation of these resources is mediated by historical, economic and social constraints which assign a place to each activity (fishing vs. agriculture as well as different produces within each field) in the economic life of each fishing community. In short, it is not individual variables, but what is called in this thesis the 'set of constraints and determinants' that determines specialization. In the actual intermix of its constitutive variables, some have more weight than others and can be identified only through concrete investigation. A few examples drawn primarily from the Senegalese situation will serve to illustrate the point. Nyominka fishermen of the Saloum Islands, Lebu and Serer fishermen of the 'Petite Cote' and Lebu fishermen from the village of Kayar, in Senegal, are all co-dominant communities of fishermen. However, their geographic and ecological conditions, their conditions of insertion into the Senegalese market economic and their historical evolution differ in a number of ways. The village of Kayar on the 'Grande Cote', located next to a deep and rich marine depression, receives abundant

stocks of demersal and pelagic-species but only during the regular fishing season (January to May-June). In contradistinction, the Nyominka Islands, located at the mouth of the Saloum River considered in reality as an arm of the sea, benefit from their best estuarine conditions between May and November. That period, during which fishery resources are the most abundant, includes the whole farming season (June-September) (Van Chi, 1977). Oceanic conditions off of the 'Petite Cote' are even more peculiar than around the Saloum Islands. The 'Petite Cote' is the locus of the most fertile oceanic conditions of the Senegalese littoral and at the difference of most other areas, upwellings in that region take place throughout the year, under the influence of the equatorial counter-current. As a result of its high biological productivity, fishing in the 'Petite Cote' can be practiced all-year round, during all seasons.

In all the three areas mentioned, favorable conditions agriculture on land, add to the availability of marine resources. Originally both fishing and farming in those areas were predominantly geared toward household consumption and the whole economy was guided by principles of self-sufficiency. The 'Petite Cote', among all three, was the first to be drawn into the cash capitalist economy and despite the permanent fertility of its water, groundnut production for cash became the major alternative to fishing and a primary motive for stopping fishing activities during the farming season.

Groundnut production took also precedence over food crops such as millet, and, even as fish production was being fully inserted into the Senegalese market economy, retained a major place in the economic calculus of the fishermen-agriculturalists of the 'Petite Cote'.

In Kayar, where the land area around the village has always been favorable to vegetable growing, familial households used, in the past, to produce cassava, sweet potatoes, maize, millet, and some groundnut in addition to the daily fish requirements. Only excess production was traded and only at the local level (Van Chi, 1967a). Vegetable growing being practiced, at the difference of groundnut and millet, during the dry season, at the same time as fishing, the two activities were coordinated within the family division of labor by age and by sex. The building of a road opening the village to outside markets in the early 1950's, was the basis of fundamental changes in the local economy. The new marketing opportunities provoked a dramatic influx of seasonal migrant fishermen, traders and other workers while production for markets and profit started to take precedence over household priorities; "l'ancienne economie de subsistance est morte", says Van Chi (1967a). The village kept the two pillars of its economy, vegetable growing and fishing, but these latter no longer enjoyed the complementarity of the past; rather they had become increasingly competitive. The terms of trade in the cash economy being more favorable to vegetable production, the tendency among Kayar families, particularly those benefitting from the richest agricultural land, became to put most of their resources on vegetable growing at the expense of fishing (Van Chi, 1967a).

Among Nyominka fishermen, rice cultivation has stood as the central, natural complement of fish in the fulfillment of the subsistence needs of the community. In a number of villages, millet, vegetables, peanuts and cotton are cultivated and coconut and palm-oil regularly harvested. Cattle raising and ferrying also constitute

important aspects of the economy. Along with food crops, a small portion of groundnut is transformed and consumed within the community. However, the fundamental function of groundnut, as well as cotton and plantation products, has been to provide the cash necessary for obtaining products available only on the market (sugar, coffee, cloth, medication, peanut oil). Because fresh water is scarce in the Nyominka Islands which are also relatively isolated from the continental economy, Nyominka fishermen have, early on, developed long-distance migrations beyond their insulary boundaries in order to get needed water supplies and to exchange their products against other commodities. Originally, fish was used within the framework of these migrations as a means to get needed produce, such as millet for certain villages, mostly through barter-trade. Today, fish has essentially become a commodity serving a purpose similar to that of peanut and cotton.

In addition to long-distance migrations, Nyominka fishermen have also developed "complex agricultural, fishing and, eventually, cattle raising migrations within the limits of islands' region" (Van Chi, 1977), in order to take full advantage of the land area available to them. Each mother-village has, therefore, its satellites campenents where most of the farming is done during the Senegalese rainy season. At the difference of Kayar and the 'Petite Cote', fishing never really stops in the islands. First, men usually fish even during farming days in order to meet the daily fish requirements of the working group. Secondly, Nyominka migrants, who are required to come back to the islands in order to participate in the field work, do not, in reality, farm during the whole farming season. They participate only in the

planting (for about a week) and three to four months later in the harvesting (about two weeks). Between the two periods, no work is done on the rice fields. The subsequent loss in agricultural productivity is largely compensated by two facts: 1) the high yield obtained through rainy season fishing in the inlands; 2) the exceptional presence of fishmongers coming into the area despite various access problems, because of the general reduction of fishing activities, on other parts of the littoral during the farming season.

It can be thus seen, across different fishing communities, how the actual co-dominance of fishing and agriculture can take different forms and result in local differences in emphasis and priorities. It is found that general environmental and ecological conditions are largely responsible for the type of activities taken on by fishing communities. However, the degree of involvement in different activities, depends on the actual combination of various constraints and determinations. Despite the sharp difference in their oceanic conditions, the fishermen of Kayar and the 'Petite Cote' observe largely the seasonal alternance between fishing and farming and, in Kayar, the tendency has been toward the emphasis of agricultural production. In contrast, Nyominka fishermen have, in practice, given priority to fishing and have developed long and short range migrations within which fishing occupies a central place. One of the most significant factors explaining the preceeding differences is the substitution of a logic of self-sufficiency and complementarity among activities by a rationale of profitability and increased competition among those activities. The new social and economic calculus created by market penetration does not eradicate the complementarity of activities but changes the terms of

their articulation. A function of concrete local and contextual conditions, these terms are dictated by the degree of market penetration (Nyominka insularity vs. Kayar openness with the road) as well as the type of resource available, their seasonality and their profitability. With new constraints, new arrangements are made, within which farming and fishing are given new strategic functions.

The exclusive specialization of Get-Ndar fishermen in fishing appears as a product of the particular historical evolution of the same factors (environmental conditions and socio-economic constraints) which, elsewhere, have led to the co-dominance of fishing and agriculture among Nyominka, Lebu and Serer fishermen. As it appeared in the study of its precolonial history, the expansion of Get-Ndar as a major fishing center was related to the development of the city of Saint Louis as a major trading port in the 19th century and to the growth of an important market for fishery products, linked to the demographic swelling of the city. Nevertheless, Get-Ndar fishermen were still complementing fishing with rice, millet and watermelon cultivation after WWII (Chauveau, 1981). Fishing, therefore, was not, from the start, an exclusive choice of the community. To the contrary, available evidence suggest that the decline of agriculture as a complement to fishing was progressive and was the combined result of the depletion of arable land in the area associated with the high profitability of fish production and marketing. Despite its location at the mouth of the Senegal River, Get-Ndar benefits from less productive fishing grounds than off the Nyominka Islands, the Petite Cote and Kayar. In addition, fishing on the coast of Saint Louis has proved to be particularly dangerous because of the bar (Van Chi, 1967a)

and a highly seasonal fish stocks availability. As a response to this overall set of constraints, Get-Ndar fishermen have largely developed and sophisticated their patterns of migration and have, even more than the Nyominka, developed long-distance maritime fishing campaigns and less extensive, short range campaigns on the Senegal River between September and November (Sene, 1982). Because of the historical conditions of its occurence, exclusive specialization - as much as co-dominant specialization for that matter - must not be taken for granted forever. The existence, in the fishing villages south of Saint Louis, of vegetable growing and coconut exploitation and the presence of fishermen at the head of agricultural farms in that area (Chauveau, 1981) show, in that line of reasoning, that occupational specialization is not irreversible. The whole case of dominant fishing in Senegal come therefore as another illustration of the general lessons drawn from the comparison of co-dominant fishing communities.

5.4 The Social Division of Labor in Fishing Communities

Many studies of fishing communities do not pay sufficient attention to their non-fishing elements - the women, the younger and the elder - despite the role played by these groups in the fulfillment of vital economic and social functions. In West Africa, basic patterns of division of labor by sex and by age appear everywhere, with only minor variances. The first commonality, shared by most coastal communities around the world, is that while males do the fishing, women are specialized in the land-based segments of the industry,

particularly in the processing and the marketing of fishing products. By assuming these two tasks, women play a pivotal role without which productive activities could not go above the subsistence level, that is, the limited catch of the daily fresh fish requirements of the household. However, women do not have an exclusive monopoly in those areas and are increasingly faced with the competition of male market-brokers, as it will be shown later. Women have also a significant weight in the agricultural activities of their community, helping to free the portion of the male labor force needed for fishing activities. In the Nyominka Islands, women not only participate in the collective work done in the satellite campements but are the only ones involved in rice cultivation in mother-villages. In addition, they extract and sell palm-oil and have, in some villages, their own cotton fields. This is true of most co-dominant groups and even of some dominant communities where conditions exist for some farming. In Benin for instance, the wives and children of exclusive maritime fishermen are periodically involved in the harvest of coconut fruits. The often-neglected area of domestic organization is also crucial and bears important economic and social implications, as female work liberates men from practically all domestic tasks including meal preparation and children's education. Finally, it should be said that, in some instance, women do anticipate in fishing itself. This last activity however is limited to ponds, shallow waters or to the beach. In Benin, women reportedly participate in the pulling ashore of beach seines (Pliya, 1981); among the Nyominka, they - along with children - practice trap-basket fishing, a passive technique used in the waters nearby mother-villages. In the Sierra Leone Peninsula, women in the

19th century had their own fishing gear, a scoop-net about 11 feet long and circular in shape which had to be worked in shallow waters by two women on either side of the opening. Women also used indigenous forms of fish traps and were also using toxic plants to stun and capture fish (Hendrix, 1982). It is not clear whether these methods altogether disappeared or whether some forms are still used by Temne, Sherbro or Mende women.

Several factors account for the sexual division of labor characterizing maritime communities and are mentioned in the literature. The particular polarization of sex roles with regard to the organization of fishing contrast with that of agricultural and industrial groups and leads naturally to an investigation of the nature of sea fishing for an explanation. The danger and 'high risk factor' (Smith, 1977; Pollnac, 1976) associated with the extent of removal from land-based society (Pollnac, 1976) inherent to the activity, play undoubtedly a fundamental role in such a polarization.

In a context where childcare requirements are borne by women, the domestic organization of the household has therefore provided the model around which land and sea-borne activities have been attributed on the basis of gender (Verdeaux, 1981). The processing of fishery products became assimilated to woman's work (cooking) while women were simultaneously taking charge of trading functions, that could not be efficiently undertaken by fishermen. Finally, given the limitations in the rise of household labor, women and non-fishing elements have been assigned to a number of farming and gathering tasks, as a way to reduce competition in the exploitation of available resources (Chauveau, 1981). Today, the extension of artisanal fishing as primarily, an

exchange economy, is affecting the traditional position of women in the communal division of labor. Increasingly, their monopoly over certain activities is being challenged by powerful middlemen and middlewomen who are often outsiders with regard to the community.

The nature of the marine environment and the constraints set by the characteristics of the labor force in fishing communities have also been instrumental in the social division of labor by age. In West Africa, the widespread system of age classes characterizing most societies, have been a major vehicle for regulating such a division of labor. Sometimes, this system has taken the form of organized work groups, as among Lebu and Nyominka fishermen. As a whole, it has stimulated the specialization of the different strata of producers in different activities. Though subject to some variation, the basic model has been the following:

> -The youngest (teen agers) start their productive activities by farming (sometimes with women) and/or by working occasionally as apprentice in a crew.
>
> -Men (aged 18 to 40) form the bulk of the labor force engaged in fishing. In co-dominant societies, they also engage seasonally in farming.
>
> -Past 40, fishermen start thinking of retiring. This happens generally after they turn 45. The general trend is to go back to agriculture after having handed over previous fishing equipment to a son or a younger brother. The link to fishing however is rarely broken; often, these retired fishermen remain the formal owners of the means of production and play some role in the management and spiritual organization of fishing units. This is particularly true of 'dominant' fishing communities, where elders often lack the alternative offered by farming. It appears, therefore, that fishermen are generally young in West Africa. In Senegal for instance, the age mean of the active fishing population is estimated to be under 30 (Lawson - CECAF, 1980). A monographic study of a beach seine of the 'Grande Cote' in 1980, revealed that about 80 percent of the 39-man crew was between 16 and 30 years old while only 10 percent of the crew was found to be older than

45 (Diaw, 1981). An earlier study, based on a sample of 132 fishermen of the 'Petite Cote' found the same age structure and the same percentage (10%) of aged (45-60) fishermen (Van Chi, 1967b). These general facts were also true for Kayar where, despite a mainly young out-migration, most fishermen were 20 and 40 years old (Van Chi, 1967a). In 1967 - Ghana, 'young' fishermen (15-34) constituted 63% of the fishing labor force of the town of Biriwa. If one includes younger apprentices, fishermen below 35 years of age represented 79.7% of Biriwa crews. By contrast, adults aged 35 to 54 represented only 18.5% of crews and fishermen over 54, only 1.8% (Quinn, 1971).

Today, the increased mobility of the labor force in artisanal fishing is modifying the age structure of the industry. The communities the most affected are those characterized by a high rate of youth out-migration causing the age mean in fish production to rise. Such a trend is reported in Senegal (Kayar), in Ivory Coast and in Ghana where the age mean is said to have risen above 45 and to be raising concerns about the very survival of the small-scale industry in the future (Lawson - CECAF, 1981; Verdeaux, 1981; Van Chi, 1967).

5.5 Migration Trends in the Artisanal Fisheries of West Africa

The study of migration movements in West Africa has neglected the specific nature of fishing migrations and bears the general land-based bias of social research in general. Such a study therefore is much needed. Two distinct types of migrations manifest themselves in the small-scale fisheries of the region; they can be respectively characterized as 'migrations of labor' (Amin, 1974) and as 'regulated fishing migrations'.

5.5.1. Regulated fishing migrations

Regulated fishing migrations are absent from existing typologies describing migration movements. In his summary of those typologies, Aurselle (1976) distinguishes among 'ancient' migrations or movement of peoples, agricultural migrations, colonialization movements, rural/urban/rural migrations, state-directed or planned migrations and labor migrations. It is difficult to see how the most common forms of migration in maritime fishing fit in those categories. In a few cases, migrations of fishermen have been acknowledged. Amin (1974) identifies the movements of Sorko fishermen along the Niger River and of Anlo-Ewe fishermen along the Atlantic coast as 'migrations of colonialization'. However, the progressive settlement of some fishing groups along their migration routes is yet to be distinguished from fishing migrations per se.

Regulated fishing migrations are the primary form of migration movements in artisanal maritime fisheries. Correlated to the development of fishing communities primarily oriented toward maritime fishing in the precolonial and early colonial period, fishing migrations are basically determined by the 'technical necessity' to pursue highly migratory fish stocks and by the need to fulfill a number of economic necessities (salt and fish trade, transport, etc. . .) They have been organized within the line and internal dynamic of 'sending' communities and constitute a form of 'nomadism as an occupational necessity' which cannot be ruled out of migration phenomena as Amin (1974) has suggested. Being not only regular moves through space, they also determine definite 'changes in social

conditions' (Amselle, 1976) as it can be seen in the whole reorganization of fishing units when in campaign and in a whole set of new arrangements (housing, food, legal and political regulations) made in receiving areas.

There are few maritime communities in West Africa that do not engage in some form of migration, be it short, medium or long range. Long distance - or international - migrations are the most spectacular form taken by these movements. However, important local and medium range migrations within the limits of national boundaries constitute significant component of the overall phenomenon. In the region, fishermen from Ghana, and Senegal have been the most involved in both forms of migrations and their movements are illustrated in figure n.

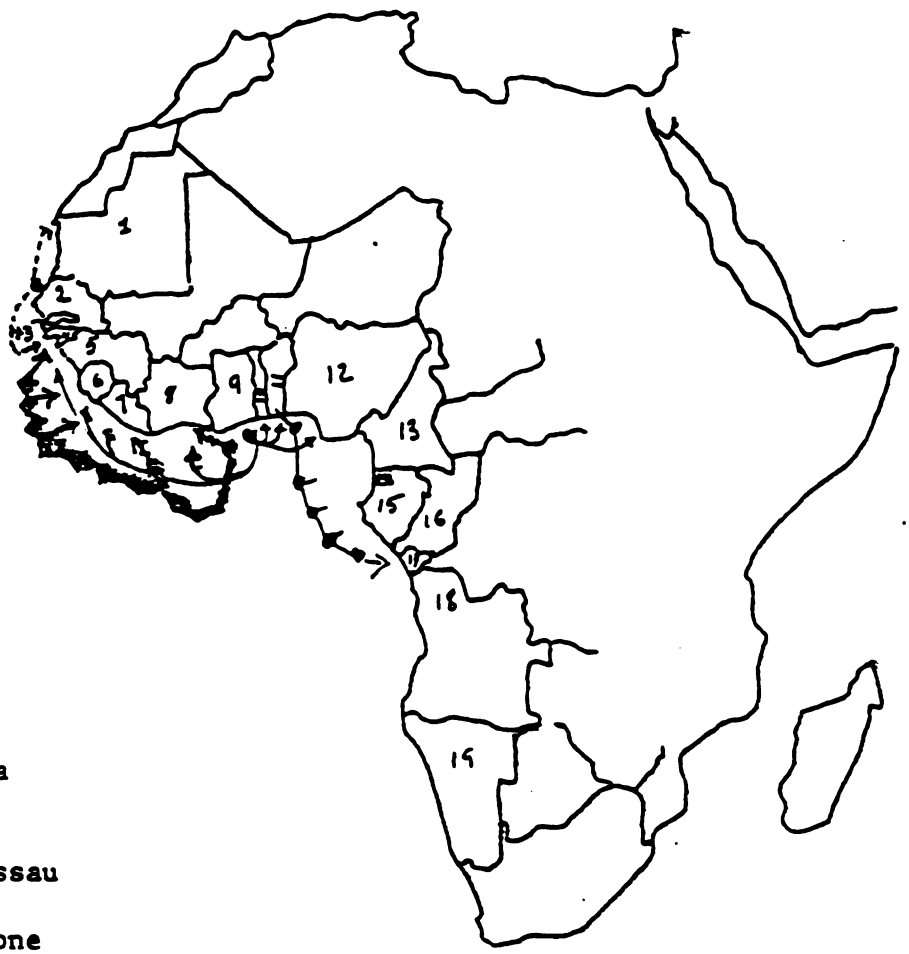
While Ga fishermen do only limited migrations along the Ghanaian coast (Lawson & Kwei, 1974), Ewe fishermen, particularly those from the district of Keta in Eastern Ghana, go, westward, as far perhaps as Southern Guinea, according to Hill (1970). They go to Sierra Leone and Liberia and in 1964, eight Ewe seine companies were established in Freetown and seven in Monrovia. Northwest of Ghana, the largest Ewe settlements are, however, found in the Ivory Coast where, in 1964, thirty-one Ewe fishing companies were recorded by De Surgy (Hill, 1970). South-eastward, Ewe fishermen to to Togo and Benin where they have established settlements in which they intermix with Pla and other local fishermen. Great concentrations of Ewe fishermen are found as far South as Nigeria (Hill, 1970; Lawson, 1968; Lawson & Kwei, 1974; Pliya, 1981; Guilcher, 1959). In Benin that they reached in the 1910's, Ewe beach seine fishermen have been instrumental in the development of maritime fishing among Pla fishermen. Today these Pla

fishermen ("popoh") migrate as far as Conigo and, possibly, Angola where they play a similar innovative role (Pliya, 1981; Chaboud, 1982).

Fante fishermen migrate from the Cape Coast area in Central Ghana up to Accra and Ada in the East. Their most important movements however are done in a Northwest direction, to the Sekondi area in Western Ghana up to the Ivory Coast, Liberia, Sierra Leone and even Southern Senegal and Gambia. Their role has been particularly important in the technical and socio-economic development of the fisheries of Sierra Leone, Liberia and the Ivory Coast. In the Tombo fisheries of Sierra Leone, the arrival of Fante fishermen in the 1950's is credited for "almost all the significant innovations that promoted Tombo into a viable commercial entity" and for having forced fishermen in that community to "change their socio-economic organization in revolutionary ways" (Hendrix, 1983). They introduced in particular the Ali (or Adee) ring net used to catch pelagics such as the ethmalosa Bonga and herring, larger dug-out and plank-made canoes equipped with outboard motors and new corresponding patterns of crew organization. Fante are also responsible for the introduction of a larger oven design - 'Banda' - used for fish processing (Hendrix, 1983). Today, Fante fishermen who have been, since, expelled from Sierra Leone, dominate the fisheries of Ivory Coast, where they share in importance with Ewe fishermen, and the fisheries of Liberia where, however, they have not succeeded in influencing autochthonous Kru fishermen still attached to hand line fishing in small, two-men dug-outs (Christensen, 1982).

In Senegal, many Lebu and Serere fishermen from the 'Grande' and 'Petite Cote' do engage in some local migrations along with the two main migrant groups of fishermen from Get-Ndar and the Saloum Islands.

Figure 9 : International Fishing Migrations In West Africa (A summary)



1= Mauritania
2= Senegal
3= Gambia
4= Guinea-Bissau
5= Guinea
6= Sierra Leone
7= Liberia
8= Ivory Coast
9= Ghana
10= Togo
11= Benin
12= Nigeria
13= Cameroon
14= Equatorial Guinea
15= Gabon
16= Congo
17= Angola
18= Namibia

Ewe Migrations
Fante Migrations
'Popoh' (Pla) Migrations
Get-Ndar Migrations

These migrations, within Senegalese waters, are significant. During the regular fishing season in April, 1981, 27% of the canoe fleet was in campaign along the Senegalese coast. In September of the same year during the farming season, the number of migrant units was cut by half but this, yet, represented 557 units still migrating on the littoral (Soceco - Pechart, 1982). In addition, these statistics do not take into account the significant number of Senegalese fishing units involved in international migrations to Mauritania (Get-Ndar fishermen), Gambia and Guinea-Bissau (Get-Ndar and Nyominka fishermen). Among Ghanaian fishermen, the extent of international migrations is much more limited among their Senegalese couterparts. These latter have nowhere made the kind of permanent settlements established in foreign countries by Ewe and Fante fishermen and their movements cover a smaller range of countries. In the 1950's, Nyominka fishermen were going to Guinea, Sierra Leone, the Ivory Coast and as far as Nigeria. However, these movements involved only a small number of individuals, were related principally to transport and trading activities, and have ceased today (Van Chi, 1977).

The factors explaining migration patterns among maritime fishermen, their extent and the differences found among the groups involved, are related to the same set of constraints and determinants that determines the differential specialization of fishing communities. In general, patterns of local and international migrations among West African fishermen have been largely function of their technical preference (type of gear, targeted fisheries), the characteristics and variations of the marine eco-system (continental shelf's size, upwellings, salinity, fish migratory movements), as well as a number of

socio-economic conditions related to market conditions and their profitability and the possibility of savings at home or away from family (lineal) obligations. Fishing migrations are 'multiform and integrated', however, one important factor accounting for the different patterns of migrations (extensive vs. intensive) between Ghanaian and Senegalese fishermen, is found in the profound difference in their ecological and oceanic conditions at home. Senegambian waters benefit not only from a higher biological productivity than the Gulf of Guinea (see Chapter I), but also from the seasonal complementarity of the two major fishing areas of that region.

These two areas correspond to division of Senegambian waters into two distinct hydrological zones. South of Cape Vert, in Casamance, Gambia and particularly on the 'Petite Cote', the abundance of organic matters carried by the Casamance, Gambia and Saloum Rivers associated with the permanent upwellings taking place during the year, explain the exceptional fertility of the shelf. Dense pelagic stocks of sardinella and ethmalosa are found in the area even during the rainy season and explain the higher frequency of nets (purse seine, gillnets, beach seine, etc. . .) among the gear used by migrant and local fishermen in the area. North of Cape Vert, the shelf is less productive than further South. The dry season, however, is the time when heavy upwellings take place along the littoral and when demersal and pelagic species migrate toward the Northern shelf. In contradistinction to the considerable opportunity made available to Senegalese fishermen by the bi-polarization of their fishery resources, the fishing season in Ghana is short and grossly the same for the whole coast. Ewe fishermen, famous for their specialization in the beach seine fishing of

horse-makerel-'alfalfa' - have therefore tended to follow the species through its migratory route from Ghana (August to September), to Togo (October - November) and Benin (November - March) for instance (Pliya, 1981; Lawson, 1968). The same is true of Fante fishermen who have done their long-distance migrations mainly in the search for pelagic species such as herring and bonga.[37] In Ghana, the herring season of 'sardinella aurita' coincides with the slight upwellings taking place on the narrow continental shelf between June and September; for the rest of the year, catches are low and irregular despite fair catches of 'sardinella cameronensis' in December and January (Lawson, 1974).

Fishing migrations have a great impact on receiving areas, one of the most visible being the tremendous swelling, in spatial and human terms, of fishing centers during the time of the migrations. In the Senegalese village of Kayar, the population is four times larger during the fishing season, increasing from 2,000 to 8,000 inhabitants. In the Ghanaian village of Otrokpe, such as seasonal growth reaches its most phenomenal proportions when, in April and May, the population of the village is multiplied by thirty to forty and is increased from 200 to 6,000-8,000 inhabitants (Lawson, 1974). This sudden influx of such a large number of people, cannot but have a number of socio-economic incidences on the receiving towns and villages. It necessitates a rapid mobilization of resources (food, housing, transport, etc. . .) and is necessarily correlated to the seasonal aggregation of various

37 Shark fishing which provides the raw product for the 'methora' (smoked shark) is also an activity of some Fante migrant units. In February, 1983, interaction was made with such a unit, based in Gambia but then, operating in in South Senegal.

social categories around fishing activities. In reality, in-migrants are not only fishermen; it is found among them a wide array of professionals - artisans, mechanics, carpenters, market-brokers, merchant traders, transporters - as well as an important unskilled labor force drawn into the area by the possibility to be employed in several subsidiary activities. The seasonal nature of such a population explosion, implies also that after the end of the season, a vacuum is created by the departure of the people who had transformed the area into a rushing economic center.

Adjustment of resident fishermen to the 'in' and 'out' phases of migrations have not been reported as an insurmountable problem. In spite of the potential conflicts over social as well as economic issues, few clashes have been recorded and interaction at sea is often a good one, better than interaction on land. A number of mechanisms rooted in the organization of receiving communities help to regulate social life and to diffuse tensions. In Kayar, the customary tribunal headed by the village chief is responsible for settling disputes (Van Chi, 1967a). In Ghana, in the 50's, every coastal town or village had an 'apopohen' - fishing chief - whose main function was to settle disputes between fishermen or crews. The 'apopohen' also collected the fee - 'amandze' - charged outsiders for the temporary right to fish or sell their catches in the village (Christensen, 1977). The potential problem at hand, however, should not be underestimated for, in many places, migrant fishermen are considered as 'foreigners' by local fishermen and administrative authorities, even after several years of campaign or even, settlement. In the 70's, a small quarrel in Kayar developed into a major conflict which left one dead. A recent trip to

Casamance in Southern Senegal revealed that other Senegalese fishermen are often perceived as 'foreigners' by their fellow countrymen. Earlier, in the inland Balante village of Birkama, Tukulor migrant fishermen found themselves caught in the very middle of the conflict which then opposed the shrimp company 'Amerger', to the fishermen of the region over the issue of catch renumeration (De Jonge, 1980). A more extreme case can be found in the 1971 deportation of thousands of Fante fishermen and their families from Sierra Leone, in spite of their generally positive role in the fisheries and the fact that a number of these families had been in Sierra Leone for so long that they had forgotten their specific ancestral locality (Christensen, 1977).

One of the most positive developments for which migrant fishermen have been credited is undoubtedly related to their role in the development of more efficient technologies in receiving areas and of maritime fishing in general. As much as Ewe and Fante fishermen in Benin, Ivory Coast, Togo, Liberia, and Sierra Leone, such a role has been played by Senegalese migrant fishermen as can be seen by the role of Get-Ndar in various technological developments in Senegal, including motorization (Chauveau, 1981; Van Chi, 1967a). The influence of migrant fishermen on local economics however, can sometimes present mixed results. In Ivory Coast for instance, the more efficient gear used by Fante and Ewe (as well as Bozo migrants in the lagoons) creates some risk of disturbing the ecological balance of the resource. In addition, their in-migration, favors the important out-migration of young fishermen from the sector by diverting financial resources away from less efficient local production units. Finally, international migrations have been presented as resulting in a number of foreign

exchange problems. The national currency of countries, such as Ghana, being overevaluated, fishermen are tempted to land their catches in countries benefitting from a stronger currency and to get involved in illegal exchange transfers as well as smuggling. This seems to be particularly the case of Ghanaian fishermen (Lawson - CECAF, 1980; Lawson, 1974); Nyominka fishermen are considered as skillful smugglers. It would be an error however to perceive migrant fishermen as the root-cause of this problem. West African precolonial history has shown the dimension of exchange networks at the scale of the continent as well as the long-time function of fisher communities as producers of a number of goods such as dried fish and salt and as ferrymen and traders. The development of nation-state, in the wake of the independences, on the basis of much smaller economic spaces primarily oriented toward Europe - the so-called 'balkanization' of Africa - created radically new reality to which migrant fishermen are trying to adapt. This means that no real solution to this problem can be found without a fundamental reexamination of macro-economic strategies at the level of West African state.

In light of the preceeding fishing migrations appear as a complex and multidimensional phenomenon in evolution. Migrations are an intrinsic part of the strategies developed by fisher communities in order to cope with the specific natures of their marine eco-system but are also a function of each community's social and economic calculus which considers factors such as fishing grounds, markets, resource-base seasonality, farming season, i.e., 'etic' factors as well as concrete 'emic' specificities. As a whole fishing migrations have been largely function of the objective needs of sending communities which provided

them with legitimacy and a regulatory framework. In their 'pure' form, they have produced little uprooting, acculturation or destabilization of the out-group, by contrast to modern migrations of labor. Fishing migrations, however, do not totally escape the general trends found in other aspects of the maritime economy. Increasingly, monetary considerations and individualization of migration decisions enter in the picture, while in receiving areas the development of commodity exchange creates conditions escaping the control of 'receiving' as well as 'sending' communities. In short, 'perverted' forms of original fishing migrations are already in the making and the poor state of the artisanal fishing industry in Ghana (Lawson - CECAF, 1980) indicates the necessity to understand not only the migrations, but also the other fundamental processes underlying changes in fisher societies.

5.5.2. Migrations of labor in and out the small-scale fisheries

Artisanal fisheries in West Africa are increasingly affected by individualized migration movements distinct from the traditional 'hunting' migrations organized by fishers communities. While a number of these movements are done toward the small-scale fisheries, most of the people concerned at the level of the region, tend to move out of the fisheries. In Ghana where motorized canoe fishing is described as a 'depressed industry' by Christensen (1981), the situation is so serious that, according to Lawson, the Ghanaian small-scale fisheries may disappear in ten to fifteen years (Lawson - CECAF, 1980). In the Ivory Coast, the substantial youth out-migration from the maritime and

lagoon fisheries is seriously disrupting the fish production system, while the bigger nets used by an increasing number of professional in-migrants is accelerating the overall decline of traditional fishing styles (Verdeaux, 1981; Weigel, personal communication, 1983). Few fisheries in West Africa are exempt from some amount of individual migration out of the sector. Even the relatively sheltered Nyominka society is subject to such movements. Individual migrations of both men and women toward the urban centers of the Sine-Saloum region and Dakar have particularly intensified since the end of the 50's and are the source of growing tensions in the islands, particularly at the family level. Some of these migrants have even settled in urban areas, despite living conditions which, for the majority are more difficult than in the islands (Van Chi, 1977). In Kayar, youth out-migration is also a distinct phenomenon and its menace on the perpetuation of fishing traditions can be perceived through the increased frequency of cases where boats and fishing gear are sold after the death of their owner and the product of the sale divided among his heirs (Van Chi, 1967a). Despite its strong maritime focus, Get-Ndar is also affected by this trend (Sene, 1982).

The motives underlying individual migrations out of the artisanal fisheries sub-sector show that they share the basic unicity of modern labor migrations in West Africa. The search for wage labor positions particularly in urban areas where industrial complexes are polarized in West Africa is a constant priority of migrants and reflect the profound unequal development of the region's economy characterized by the generalized crisis of rural areas. Attracted by the perspective to make 'good cash', young fishermen when they leave the activity, go to

the cities in order to become employed as factory workers, electricians, drivers, house-keepers, or, where possible, as crew members in an industrial unit. In the worse cases, they may end up simply as a part of the growing 'reserve army of the unemployed' aggregated around West African cities. The educational system also plays a very questionable role in that respect. Educational programs have, most often, no reference whatsoever to fishing and serve basically to diffuse urban models of behavior alien to the reality and needs of the fisher community. It is thus no surprise that most fishermen children who have undergone some schooling leave the profession for unguaranteed white collar jobs (Verdeaux, 1982; Van Chi, 1967a & b; Liesenmeyer, 1976). Not all of these same migrations out of the community have the same scale and the same impact on the out-group. Migrants often keep some link with their community to which they send money, gifts and come back periodically. Sometimes they even participate in village projects and activities as in the case of the Nyominka. In extreme cases however, a total rupture with both the community and the fishing activity is created. As suggested by Lawson (Lawson - CECAF, 1980), such cases need to be studied in order to help define policy measures that could prevent the development of the same tendency in other fisheries.

Labor migrations in the artisanal fisheries are not limited to the out-migrations described above. In spite of a common belief (Lawson - CECAF, 1980), movements of people leaving the occupational activities for an employment in small-scale fisheries do occur. This is the case of some Senegalese fisheries, particularly those requiring large labor inputs (seine nets, purse seines. . .). In their genesis and

underlying causes, these individual migrations in the artisanal fisheries are by no means, different from out-migrations. The study of a beach seine in the Senegalese village of Hann (Diaw, 1981) revealed that 62 percent of its crew consisted of seasonal laborers who left the countryside for Dakar, the Senegalese capital in order to "find a job" or "make money". These seasonal workers had, in their quasi-totality, no skill in fishing. It was also found that the fluctuations of this occasional labor force in and out of the beach seine was chronic, as shown by the fact that more than 200 people had been part of the 39-men crew during one single year. The basic functioning of the crew was made possible by a permanent nucleus of kin-related fishermen. Despite the relative scarcity of factual data, it is known that similar movements in Senegal's artisanal fisheries are found in all the areas where better employment opportunities are created by the relative prosperity of fishing vis a vis other alternatives (petty trade, farming, unemployment, etc. . .). In reality, labor in-migrations to the fisheries do not only concern crew jobs; they consist also in a host of other activities related to the 'portage', processing, marketing, transportation of fishery products. As much as out-migration trends indicate pauperization and crises in a fishery, the aggregation of non-professionals in and around the activity constitute an indication of relative prosperity. However, 'the tree should not mask the forest'; the fluctuations and seasonality of labor migrations as witnessed also in Kayar and the 'Petite Cote' (Van Chi, 1967a & b), reveal that if the movements 'in' constitute the general trend, movements 'out' are an integral part of the process. The basic instability of the labor force constituted by in- and out-migrants

alike, refers back to the present crises of West African rural economies and to the dominant capitalist and industrial environment, both conducive of a highly mobile and unskilled labor force. At the difference of 'organized'fishing migrations, the individual migration in the fisheries do not signify a 'commitment' to the activity, while the movement out constitute a net loss for maritime communities. From the point of view of the migrant, the abandonment of one's land for fishing or the abandonment of one's fishing unit and gear for some wage labor opportunity, constitute a concrete step toward the separation of the individual from his means of production. In that sense also, individual labor migrants are different from migrant fishermen who, in campaign even more than in normal times are closely united around their gear and boat.

VI The Mode of Production in Artisanal Maritime Fishing

> "Marx n'a pu degager de concepts abstraits comme [celui de] mode de production qu' a partir d' un materiel historique concret. Il a reconstruit les concepts pour mieux comprendre la realite. . ." (A. Dieng, 1973:78)

The concrete analysis of fishing social formations in West Africa, shows the multi-level complexity of their social organization and economic pursuits. The analysis also indicates that these societies are, in various ways, responding to a number of changes taking place at the scale of the entire region and that production and exchange is being increasingly monetized and penetrated by market principles. However, the analysis cannot be limited to general societal processes without going to the root of fish production, that is, its mode of production. Only such an analysis could reveal, in a nutshell, the fundamental processes unfolding at the very heart of the fish production system. As a concept, the mode of production is a theoretical construct aimed at unraveling the structural base of concrete societies. To define a mode of production is to construct a scientific instrument capable not only of describing and interpreting the underlying economic foundation of a given society, but also of revealing the structural unicity of otherwise different social phenomena. A set of invariant elements are found in all modes of production; they constitute the critical variables which status and evolution should be investigated and provide the backbone of the following analysis of production relationships in the artisanal maritime fisheries of West Africa (see Figure 10).

Figure 10:

The components of the mode of production

Invariant components	Operational variables in fishing
A. THE FORCES OF PRODUCTION	
1. The Producer	1. The Fisherman
2. The Means of Production	
2a. Subject of Labor	2a. Resource base and living resources
2b. Instruments of Labor	2b. Boats Propulsion equipment Gears
B. THE SOCIAL RELATIONS OF PRODUCTION	
R_1. Technical relations of production	R_1: Crew characteristics, work force composition and forms of access to labor Division of tasks within crews: roles, decision making, control of labor process.
R_2. Relations of appropriation	R_2:
a. Formal appropriation of the means of production	a. Forms of tenure, ownership and property rights
b. Product/surplus product appropriation or relations of real appropriation	b. Share system, forms of labor and capital remuneration

6.1. The theoretical status of the marine resource

The ocean environment has been largely characterized in the specialized literature as an 'open access' or 'common property' resource. Most often, this characterization has served to generate scientific debates and bio-economic models primarily concerned with fishery management issues. Compared to this management-oriented body of literature and to the discussions of resource ownership from the point of view of national and international jurisdiction,[38] studies relating the economic status of ocean resources to the specificity of marine communities' social organization and social relations of production are few. Back in 1954, Gorden was making the link between the communal status of the ocean and the fact that, in contradistinction to agricultural land, the former cannot be divided nor directly appropriated by the producer. For want of actualizing themselves in the resource, social relations of appropriation thus take shape at the level of the instruments of production (Breton, 1981). Faris (1977), who is endorsed in that respect by Hendrix (1982), emphasizes the absence of resource ownership in fishing and the subsequent impossibility to control the means of production through rent or title. According to him, only the adoption of a farming technology on the spawning ground of the fish could make possible the investment of capital and labor in the resource, its long term control

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[38] See for instance, Emmerson, 1980; Vanderpool, 1981, Eckert, 1979; Gamble & Pontecorvo, 1974; Retting & Ginter (ed.), 1981; for discussion of marine resource status as related to MSY (Maximum Sustainable Yield), MEY (Maximum Economic Yield), economic rent and 'limited entry', national and international jurisdiction.

and its transfer through inheritance. In the absence of such a technology, 'the mobility of the product of the resource (fish) inhibits ownership as a means of alienating it from producers. Finally and more important to the distinction between fishing and agriculture, is the fact that labor cannot be embodied in the resource.

> "the resource is, as Marx as suggested, the subject of labor and cannot become an instrument of labor. . . Though labor is expended in extracting fish from the sea, labor is not normally embodied in the resource per se, making it the receptacle for value. . .It is because it is not possible to capture and embody labor in the resource itself - only in its product - that makes its ownership economically problematic" (Faris, 1977)

Faris' interpretation of Marx and its adaptation to the specific problems of fish production is seductive, original and provides valuable insights into the difficult question of resource ownership in small-scale fisheries. However, a number of questions need to be further discussed.

First of all, the resource in maritime fishing, cannot be reduced - contrary to Faris' suggestion - to the liquid oceanic environment. Fish, instead of being a mere 'product' of the resource, is an integral part of that latter and, better, is its main component in maritime fisheries. As defined earlier (Chapter I), the marine resource should be considered as 'the ecological system that includes both ocean organisms and the non-living environment, each influencing the properties of the other and both necessary for the maintenance of life in the sea'. Because there can be no fish without water and no fishery without fish[39], and furthermore, because men in the fishing process

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39 Marx's apparent second thought concerning the status of uncaught fish as means of production in the fishing industry (Marx, 1967:181n; Faris, 1977:247n) necessitates a return to the basic principles of his materialist theory. Means of production exist as such only if they are

alter both the living and non-living environment, fish and their oceanic environment have to be considered comprehensively as the fundamental subject - or object -[40] of the fishing industry. They constitute the basic material, 'spontaneously provided by nature', being worked upon and transformed in the fish production system. It should be stressed at this point, that the two constitutive elements of the resource in maritime fisheries do not carry the same weight nor do they have the same position with regard to the production process. Analyzing the problem in terms of 'ecological constraints'[41], Charest (1981) distinguishes between 'principal' constraint - i.e., 'the constraint that most directly conditions the structure of production and reproduction in a given social grouping' - and 'secondary' or 'derived' constraints. These analytical tools can be used to locate the respective place of the biotic (living) and abiotic (non-Living) elements of fishery resources in the production process. It thus appears clearly that while animal species constitute the principal object of fish production, the larger oceanic environment constitute a subject of such a production only in a secondary, derived fashion. Even at a later stage when they enter the processing sub-sector of the industry, fish products remain the fundamental subject of labor - its

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actualized in a production process. By the same token, in waters containing no fish, there can be no fishery, no fish production, no means of fish production.

40 The concepts of 'subject' and 'object' of labor, which are found respectively in the English and French literature, will be used interchangeably in the discussion.

41 Ecological constraints are defined after Bahuchet's definition, as "the elements of the milieu (abiotic and biotic) which condition the ecological niche of a given animal species" (Charest, 1981).

'main substance' - for 'all raw material is also subject of labor' (Marx, 1967). In the same way than any production is human production, all products are products of labor. By working upon it, 'labor has incorporated itself with its subject. The former is materialized, the latter transformed'. To paraphrase Marx, the fisherman fishes and the captured fish is its product (Ibid).

From the point of view of resource ownership, Faris' argument according to which the impossibility of labor embodiment in the abiotic resource is what makes its ownership economically problematic is therefore, questionable. Pollnac (1976) has pointed at another factor, namely, "the flat, relatively featureless nature of the sea and its broad expanse [which] presents boundary-marking problems not associated with land". Of practical importance, boundary-marking problems have not however, constituted an outstanding obstacle to appropriation or control of parts of the ocean expanse. In his own comparative review of the literature, Pollnac (Ibid) refers to communal ownership as, 'perhaps, the most frequent form of sea tenure'. Pollnac also mentioned one case of individual ownership, "among the Strait Salish of Western Washington [where] some shellfish beds and fishing areas were formally owned by important men in the community". This situation presents similarities with the 'prebendal domains' of Eastern Venezuela where the entire marine zone adjacent to the Gulf of Cariaco was granted, between 1821 and 1928, to a few individuals with exclusive rights over some species and over the techniques of pelagic fishing (Breton, 1977).

These two latter cases, through extremely rare in maritime fishing, indicate the theoretical possibility of private rights

establishment over a portion of ocean space and over certain types of species. Formal rights, however, do not guarantee effective appropriation which is possible only through capture. In addition, at the difference of private land ownership, fishing rights in the examples provided had - de facto - to be shared among the 'big men' of the community and did not constitute an integral alienation of ocean space. Finally, communal ownership, which predominance over 'open access' fisheries has still to be documented by additional evidence, does not, in any fashion, constitute a medium of ocean space alienation by individuals or groups of individuals; rather, it acts as a regulating mechanism designed to manage and organize the access to the resource by community members and outsiders. As correctly suggested by Faris (1977), such an arrangement serves primarily as a means to distribute access, if not equitably, at least randomly, to those in possession of the necessary gear to fish given sites, or to the community at large.

In other words, the scarcity of cases of formal rights establishment over the marine resource, the actual limitation of such rights it terms of effective appropriation and, above all, the predominance and persistence of the 'common property' or 'open access' status of marine resources; points at the existence, in the resource, of inhibiting mechanisms making appropriation fruitless, from the perspective of capital accumulation. It is argued however, that the driving force behind such mechanisms must be found, not in the abiotic environment, but in the principal subject of fish production - maritime animals; in their fundamental mobility, the uncertainties and fluctuations in their availability and the still untested possibility

of permanently capturing them in a localized fraction of ocean territory. Only such a hypothetical step could open the way to an effective fish farming technology in the ocean domain, transform the resource form a subject to an instrument - i.e., a medium - of production and transfer the locus of capital penetration from investments in gear and boats to direct investments in the resource and in its reproductive capacity. This position effectively supports Faris initial proposition but contradicts his second and central thesis. The case can be further argued by a reference to international as well as non-fishery aspects of ocean exploitation; reference that could help disenclave the discussion and isolate the role of different components of the marine resource in making ownership problematic. The case of anadromous marine species wandering between the high seas and localized in-shore spawning grounds is instructive in that respect. The enclosure of ocean expanses and the establishment of legal, national rights over wide ocean territories, did not in itself insure national monopoly over such species[42] and the uncertainties related to their fate once they reached the high seas long inhibited adequate management efforts and investments in the resource by the state. The case of offshore hydrocarbons exploitation further demonstrates that as long as a natural resource is characterized by a certain amount - be it minimal - of mobility and uncertainty (in its location), effective economic appropriation remain problematic and can be realized only through

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42 For instance, until - and sometimes despite - the establishment of international treaty arrangements, Alaskan Salmon species and seals of the Berring Sea remained the subject of intense pelagic fishing by third nations.

capture[43]. The existence of private, corporate rights over known oil reserves also shows that once the problem (mobility, uncertainty) is by-passed, effective ownership of ocean itself, becomes the way to guarantee resource appropriation and ceases to be a problem.

6.2 Means and technical conditions of production in West African Artisanal Maritime Fisheries

Forms of sea tenure in West Africa have not been the object of sufficient research. Nevertheless, it is known that practically all marine fisheries in the region have the status of a common property, if not an open access resource. Nowhere has the maritime domain been the object of exclusive appropriation by individuals or groups of individuals. Lewis (1977) indicates for example that, in Fante society

> "Unlike the situation obtained among cultivators where land could be readily apportioned, Fante fishermen had no clear delineation of territorial rights with respect to the ocean and its resources. Admittedly, rulers of fishing villages could and did exact tolls from fishermen, but no effort was made by them, or by lineages, to specify either the places where, or quantities of, fishes which could be caught"

In general,

> "neither the lineage nor any other group could claim exclusive ownership of the means of production or control access to resources in maritime society. . ."

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43 This is in particular the situation of the largest European oil reserve 'Stajfjord', located at 90% on the Norwegian side of the North Sea and at only 10% on the British side. Norwegian effective appropriation of the resource has been jeopardized by Britain's choice for early and intensive exploitation (Eckert, 1979). Early land exploitation of hydrocarbons in the United States leads to the same conclusion and reinforces it since land was subject to private ownership.

The absence of corporate kinship rights to fishery resources is also documented by Horton (1969) in the case of Kalabari fishing society in Nigeria. Communal structures of authority, where they exist, assume fundamental a function of management, control and regulation of the modalities of access to the resource. It has been seen earlier their role in the settling of conflicts arising in the fishing community (Chapter V). As documented for the case of Ghana, these communal structures can have a number of specific tasks among which:

> a - The determination of fishing seasons and the enforcement of resulting interdictions during the off-season.
>
> b - The enforcement of mesh size regulations.
>
> c - The control of the seasonal migrants: levy of a tax and control of their professional activities, organizational of housing arrangements and eventual designation of a woman of the community for the processing of their catches.
>
> d - For seine-net fishing; designation of fishing days for each seine and allocation of sites on the beach for each of them.

In Ghana, these functions are exercised within the frame of a system of penalties known by all with the possibility of fines, fishing prohibition and in extreme cases, confiscation of fishing material (Lawson - COPACE, 1980). As a rule, communal management structures of maritime fisheries have not evolved toward any form of open or hidden appropriation of the collective domain and have, to the contrary, been weakened by the development of the colonial and post-colonial state which, in many places, has systemically by-passed their authority when promoting management schemes.

In that context, the instrument of production (gear, boats and propulsion equipment in particular) and the modalities of their

appropriation have been the principal object and medium of change in the mode of production.

6.2.1. Canoes and boats in West Africa

Apart from the Canarian 'lancha' borrowed since the 1950's by the Imraguen fishermen of Mauritania[43] and the small mechanized vessels imported in Ghana during the same period, the tropical West African canoe has remained the universal fishing vessel for the artisanal maritime fisheries of the region. Since precolonial times (see Chapter II), the basic dug-out, made all in one piece from a hollowed out trunk, has provided the prototypical model from which all sorts of modifications have been made; one of the most fundamental being the adjunct of a planking on the sides of the hull. Today, the most common form of canoe on the West African sea is the 'composed' one.

The 'pirogue' in several West African countries has been abundantly described and in great details (see Gruvel, 1908; Leca, 1934; Balandier & Mercier, 1948; Van Chi, 1967a; Smith, 1970; Christensen, 1977; Pliya, 1981). Despite local variations, craft-building technology can be summarized in some basic operations. First of all, the carved-out hull is obtained in the following manner:

> "After felling and shaping, the trunk is excavated by an adze-like iron tool. In the case of large and heavy boats built in the bush, the operation is sometimes carried-out by cutting sections which the builders then excavate simultaneously, leaving temporary bulkheads between each section in order to facilitate the draining of rainwater. Excavation is usually completed by

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43 Imraguen's typical fishing methods did not involve the use of vessels (see Chapter II). Recently, a few cutters have also been brought from Canarian fishermen.

Table 3: Boat Characteristics in 5 West African Countries

	Boat Type	Construction Style	Length (m)	Beam (Width) (m)	Depth (m)	Propulsion
1. Mauritania	'Lancha'/'balandro'	Plank-canarian	6-8			Sail
	cutter	"	8-10			Sail
2. Senegal	Small canoe	Dugout	4-6			Paddle
	Small canoe	Dugout & plank	6-7	.80	0.60	Sail-paddle/motor
	Large canoe	" "	9-15	1.70	0.85	Motor
	Very large canoe	" "	17-20			Motor
3. Sierra Leone	'Fante'	Plank	10-15	1.5-2.5		Motor
	'Salla'	Plank	7.5-12	1-1.8		" /paddle
	'Standard' canoe	Dugout & plank	7	.5-.8		Sail/paddle
	Kru	Dugout	5-7	.5		Paddle
4. Ghana	Small (before 1950)	Dugout	6-7	1	.6	Sail/paddle
	Small Fante canoe	Dugout	7-9	1-1.5	.7-.9	Sail/paddle
	Large Fante canoe	Dugout & plank	10-15	<1.8	>1	Motor
5. Benin	Small canoe	Dugout	5	1	.40	Paddle
	Small canoe	Dugout-plank	7	1.10	.60	Paddle/sail/motor
	Large Fante canoe	Dugout-plank	8-9.30	1.14-1.30	.58	Motor/sail

> burning out the interior using dry grass as fuel. This operation serves to disinfect and preserve the fabric of the boat. . .and to drive out insects and other parasites. During the burning, the wood tends to expand; in the case of sea-going canoes, this - and the resulting cracking - is prevented by squeezing the canoe between props. . .(Smith, 1970).

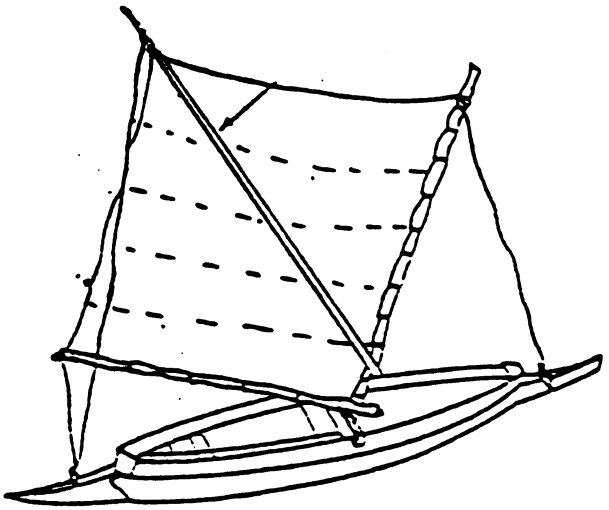
When done, the planking is realized by adding one or several strips of timber originally sewn to the hull (since precolonial times). In Senegal, the 'sewn pirogues' were progressively replaced during the 1950's by a model in which the additional stack is nailed to the hull (Chauveau, 1981). Today, 'sewn canoes' are mentioned nowhere in modern artisanal fisheries. The size of the planking can vary from three inches to twelve inches or more. Caulking is done by using straw and nailing a tarpauling to the inside of the boat and by putting mastic and tarring the outside. Plank-thwarts, which number depends on the size and the function of the canoe, are nailed to the hull. In canoes using sails, a piece of wood is arranged at the bottom of the vessel in order to fit up the mast.

Despite these common operations (which still can vary in the detail) that "justify the identification of the West African canoe as a 'type' of vessel, the specific style of the canoe, its size, make material, overall configuration vary significantly from one area to another and been have subject to important modifications over the years. In terms of size, "the canoe is not as such an instrument of analysis sufficiently precise. It can be found as many common points between the 7 m Lebu pirogue and the huge purse seine canoe of Djifere (20 m, 20 t of load capacity) than between a small car and a truck" (Weber, 1980). Several factors account for canoe style and size differences: the oceanic characteristics of the milieu (rough or calm

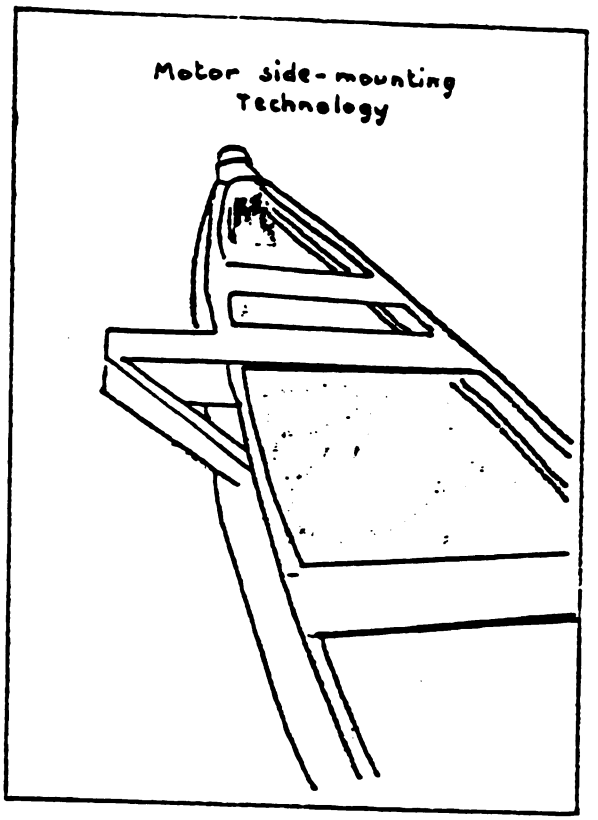
sea, bar passing, estuarine conditions), target species and gear used, technological choices (motorization), historical, cultural and ethnic specificities of the community. With respect to these elements, it results that all canoes do not have the same performing qualities. The Fante canoe is probably the most widespread in West Africa and is found in the areas corresponding to the geographical dispersion of Fante fishermen. Having itself been the object of important modifications with regard to its size and the adoption of the outboard motor, it has spread to several countries because of its performing qualities. In the 1950's, the Fante canoe varied in length from 7 to 9 m with a beam of 1 to 1.5 m and a depth of 70 to 90 cm (see Table 3). Smaller canoes were used for inshore fishing with small nets or handlines, while the larger ones would go farther to sea with larger nets ('Ali' in particular). The increase in the size of the Fante boat in the 1960's was directly linked to the adoption of the outboard motor and probably also the increase in the size of the nets some being 270 to 365 m long (Christensen, 1982).

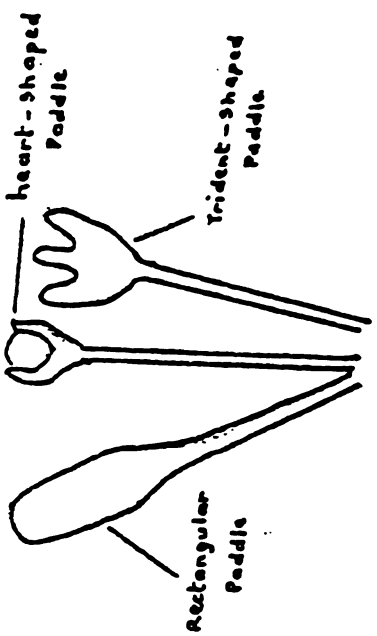
All over West Africa, the adoption of the outboard motor to the canoe appears as a technological prowess for this was done without destroying the natural profile and efficacy of the vessel. On the Fante canoe, this was done by mounting the motor "on a triangular bracket of wood reinforced with steel and bolted a few feet forward on the stern of the starboard" (Christensen, 1932). This side-mounting of the motor is the same on the 'pirogues' of Benin (see Figure 9) and on Fante boats elsewhere in the region. The rapid adoption of the Fante canoe in several countries of the region is the result of its better performance by comparison with indigenous vessels. In Benin, the Fante

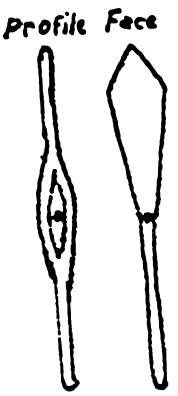
Figure 11 : Propulsion Technology



Sail Technology







Triangular paddle

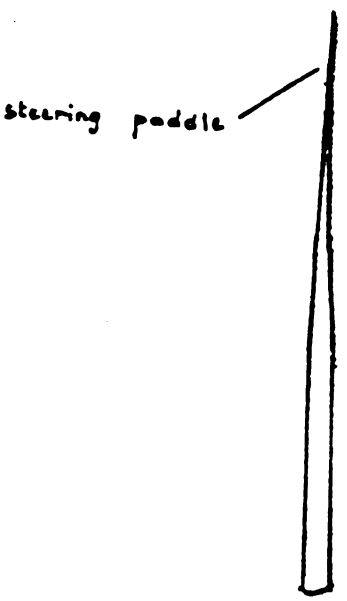
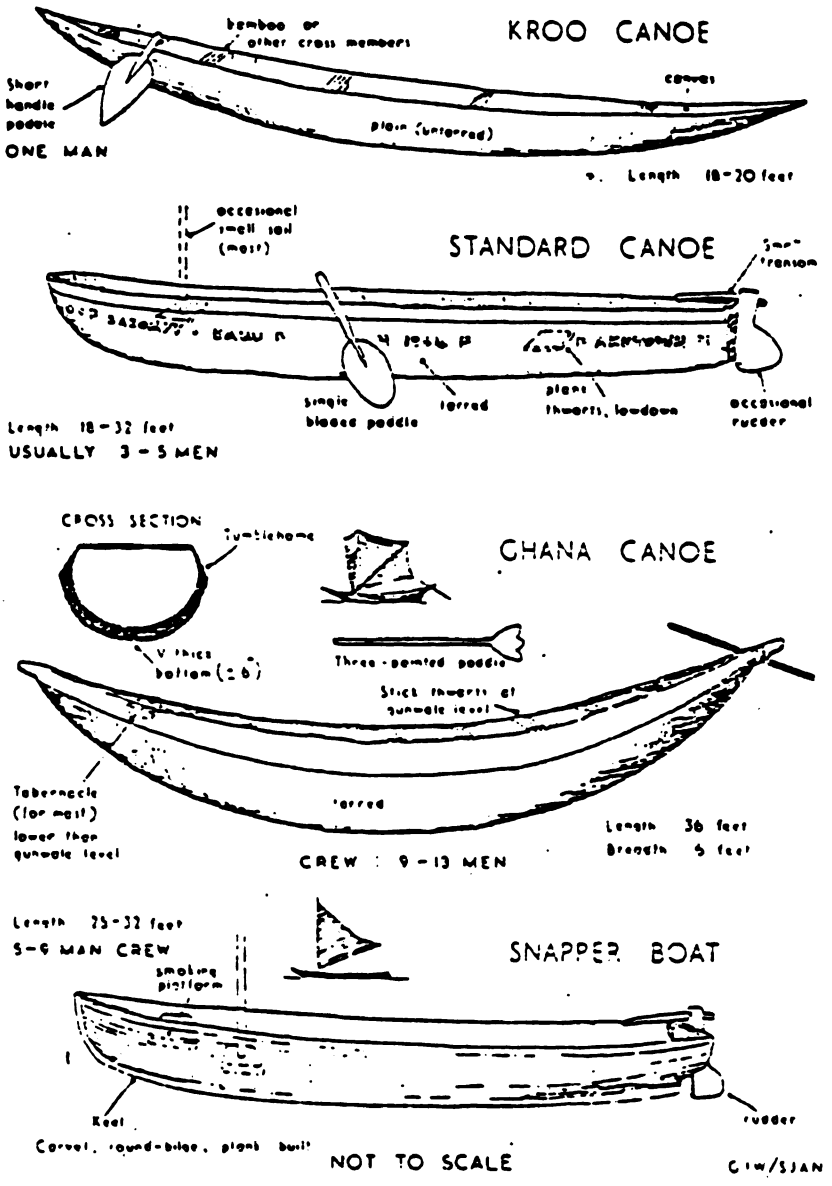


Figure 12 : Sample of West African Canoes



Source : Hendrix, 1983

boat was ideal for 'manhoundo' fishing (the equivalent of Ali net fishing in Ghana) which required a larger crew (about 10 persons) than previously (Pliya, 1981). in Sierra Leone, considerations for Fante boat adoption were similar -larger net ('Ali'), larger crew (6-14 men) - (Hendrix, 1982). In addition:

> "The Fante boat due to its size and type of construction is capable of traveling considerable distances at sea. The open boxed well which houses the engine, protects the engine from the direct impact of the waves and permits better operations in adverse weather conditions than does the Salla boat. The smaller boats such as the Salla and especially the standard canoe are more restricted as to the distance at sea and the weather conditions under which they operate." (Liensenmeyer, 1976).

By contrast to the Fante canoe, the Senegalese pirogue has not considerably spread outside of Senegal's border[44]. Senegalese canoes are extremely diversified and vary with regard to size, load capacity form, stacks dimensions, number of planks used, motor location, etc. . .Also, differences can be seen in ethnic and regional subtypes. The Lebu canoe for instance is a little bit bigger, lower, more rackish and with a smaller prow than the Get-Ndar canoe (Van Chi, 1967a; Weber, 1980). Whatever the differences however, a distinct 'Senegalese style' can be identify, for all boats boil down to a unique base-model, product of a long accumulation of technological knowledge. Neither its motorization, nor its development into a huge purse seine boat (cf Table 3) resulted in an alteration of its basic mode of construction. Even compared with the innovative Fante boat, the Senegalese canoe seem to present a number of advantages. As pointed out by Pliya (1981):

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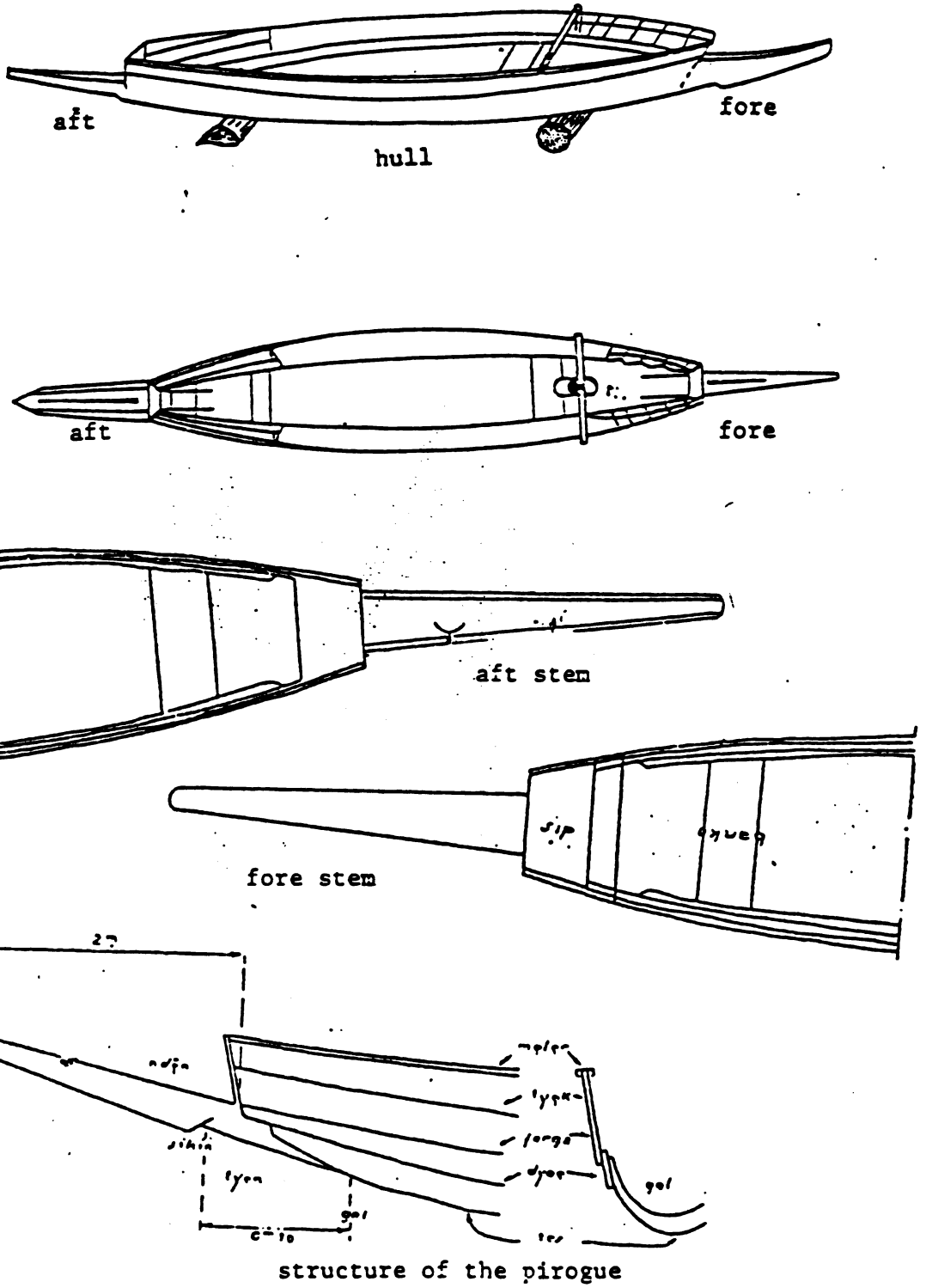
44 See figures for a 'cliche' of some major canoe styles in West Africa.

Figure 13 : The Senegalese Pirogue



structure of the pirogue

Adapted from Van Chi (1967a) and Balandier & Mercier (1948)

> "The Ghanaian boat type presently used on the Benin littoral possesses undeniable qualities: lightness, stability, great mobility, price relatively compatible with the financial capacities of the fishermen. However, Collart (1965), comparing it to the 'Senegalese pirogues' with their crescent profile, their pointed extremities, their body carved in the form of a truncated V in its median part, well defended from the waves by a relatively high planking", finds that these latter have unconstestable advantages on the Ghanaian canoes with their round extremities, much lower and flatter."

The existence of particularly long stems at both the bow and stern of the boat, constitutes one distinctive 'trait' of the Senegalese canoe. Constituting with the dug-out hull and the planking, one of the three major constitutive parts of the canoe, the stems are about-2m-long triangles that prolong the axis of the hull (see Figure 13). Aft, the stem is planked by a 3 cm thick strip of timber which serves as a support to the steering-paddle. In addition to the advantages mentioned by Pliya, the adjunction of stems to the main body of the canoe gives three other significant advantages:

> -First, the stems make much easier the hauling of the canoe onto the beach with the help generally of round logs of wood.
>
> -Secondly, the bow stem facilities both bar passing and navigation, particularly in rough seas.
>
> -Thirdly, the aft-stem proved to be particularly valuable in the adaption and the mounting of the outboard motor on the canoe.

In smaller boats, the motor is fit into an elliptical cavity dug in the stem aft of the boat. This positioning of the outboard motor permits to avoid propelling the canoe through the water at a slight angle, which is a significant shortcoming of the side-mounting of the motor on Fante boats (see Christensen, 1982). In addition by reducing the immersion of the engine during navigation, the stem-mounting of the

motor diminishes the risks of grating shallow or rocky bottoms (Chauveau, 1981). In some canoes, the motor is directly mounted off the hull; never on the side.

6.2.2. The motorization of the small-scale fleet in West Africa

For several reasons, the development of a mechanized, semi-industrial fleet of trawlers and 'cordiers' could be considered as part of the problematic of motorization in artisanal fisheries. For lack of time and space, this question will not be treated here and only the motorization of the canoe fleet - by far the dominant component of the artisanal fisheries - will be considered.

The motorization of the artisanal canoe fleet in West Africa started first in Senegal with the adaptation, between 1950 and 1952, of the French outboard motor GOIDT to Get-Ndar pirogues. The use of the motor started to spread after four fishermen experienced it and after modification of the 'machine box' - designed to be iron-made by the French initiator Arnoux, but changed into a wooden box by the fishermen. Parallely, fishermen increasingly use 'nailed canoes' at the expense of the 'sewn canoe' which - though more flexible - might have been too sensitive to the vibrations of the motor (Chauveau, 1981). As seen earlier, the adaptation of the outboard engine to the Senegalese canoe never represented a serious technical equation. In Ghana, to the contrary, significant technical difficulties had to be overcome in fitting the motor to the canoe. Because existing canoe design did not lend itself conveniently to this purpose, several

alternatives were sought including various side-mountings in 1954 (which caused the canoe to spin around), fittings to a transome at the stern or in a central well in the hull. These two latter attempts, made in 1959, did not prove to be practical, for the 'wawa' wood had a tendency to rot while the positioning of the engine was obstructing maneuverability when coming through the surf. It is only in late 1959-early 1960 that a solution was found with the construction of a very strong mounting unit reinforced by wrought iron and of an additional board placed on the side of the canoe opposite to the engine as a counteraction to the spin around tenderly (Lawson, 1974). The spread of canoe motorization in West African countries appears primarily as a fact of the 1960's. In that process, Senegal, and later, Ghana, seem to have played a pioneering role. As pointed out by Pliya (1981):

> "The interest given to canoe motorization for fishing stems from the results observed in Senegal where canoe fishing was remaining highly competitive with regard to industrial fishing while practicing production prices clearly lower than those of the Dakar fishing port. The experience was imported to Abidjan by some Senegalese in 1954, then to Ghana (1960-61)[45] 'the considerable effort of Ghana in that respect lead to the diffusion of motorized fishing on the shores of the Gulf of Guinea' (Surgy, 1969)" (personal translation)

By 1979, the motorization of the artisanal fleet was largely developed, despite some important differences among countries. The rate of motorization seem to have been particularly rapid in Ghana where in 1972, 87% of canoe fleet was already motorized (Lawson & Kwei, 1974:69n). In Senegal, it is only in 1977 that the rate of

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45 This fact is not reported in the available literature on Ghana.

motorization reached 80% (Domingo, 1982). Today, the motorization of Senegalese fleet is considered as total (90%). The 10% remaining concern very small canoes or canoes used for beach seining and their remaining close to shore. These vessels cannot be motorized profitably (Fontana & Weber, 1983). In Togo, the motorized fraction of the artisanal fleet is reported to have rose spectacularly from 16% in 1967 to 79% - i.e., 474 boats - 10 years later in 1977 (Sutinen et al., 1981). In other countries, the pace of motorization seems to have been much slower. In Sierra Leone for instance, two unrelated reports (Liensenmeyer, 1976; Everette, 1979; in Sutinen et al., 1981) put the rate of motorization at about 13.5% in 1976 and 22.7% in 1979.

The role of the state, the nature of its intervention, the credit mechanisms and the nature of the institution mediating those mechanisms, the way input supplies maintenance and repair problems have been tackled seem to account for most of the discrepancies existing in the pace and scope of motorization schemes in West Africa. In the initial failure of most motorization projects in the region, the blame has often been hastily put on the 'mentality' of fishermen. A more investigative approach has shown to the contrary the acute sense of program exhibited by artisanal fishermen once their interests and the nature of their social organizations was taken into account.

In Senegal, the two first experiences of motorization through individual loans and later through the first generation of cooperatives ended up in a failure. Despite a 20% subsidiary accorded by the state, the first operation started in 1952, found itself limited by the incapacity of most fishermen to reimburse according to existing payment plans or by their refusal to pay in case of motor breakdown. Ten years

later, the whole operation was reframed and placed within the context of cooperative organizations grafted on the current model of agricultural cooperation. Motors were sold tax-free (which corresponded to a 35% subsidy over the market price) and were to be paid according to a 18-month installment plan including the payment of a low interest rate. Cooperatives were held collectively responsible for outstanding debts and an additional interest was placed on overdue payments. By 1970, after 8 years of experience, the failure of this financing scheme was made obvious by overdue payments which, then, were over CFA 33 million (Domingo, 1982).

The prime element according for the failure of these experiences is to be found in the inadequation of the credit and loan schemes to the structure and seasonality of fish production. The spread of installment repayment over the period in equal amount, did not fit the highly seasonal character of the activity and consequently of fishermen's income. In addition, problems of maintenance and the continuous availability of main parts was not given sufficient attention. Last but not least, the structure of the cooperatives, framed on the agricultural model, made possible the domination of those institutions by market-brokers which often took advantage of available credits and reinstated within the cooperatives, their traditional role of money-lender.

Collective responsibility and additional overdue interest had for only effect to act as an ill-defined mechanism of sanction which lump together 'good' and 'bad' debtors and to lock most fishermen into an endless cycle of indebtedness. Experiences similar to the Senegalese have been made elsewhere in the region. In Benin, the motorization

program was first, successfully experimented, thanks to credit facilities, the supply of motor-fuel at a reduced price, free technical repair and engine maintenance ensured by a repair shop. In general, the first cooperatives in the early 1960's were characterized by a clear success. Soon however, typical difficulties started to arise marked by the breakdown in inputs supply, delays in installment payments which timing did not take into account fishing seasons, the principle of 'collective' responsibility which penalized indiscriminately all fishermen of a given cooperative. By 1976, all the cooperatives and 'precooperatives teams' had disappeared. New schemes had to be designed for an appropriate support to the fishing community (Pliya, 1981). In Sierra Leone, things look even more gloomy when it is considered that the fisheries loan and credit program designed in 1961, to facilitate increased small-scale production through the purchase of outboard motors and fishing gear, required the fishermen to pay 36% of import duties in addition to the 4% interest on the loan (see also Chapter II). In addition, due to the limited capacity of the extension division, difficulties in obtaining spare parts were 'extreme' and some activities were slowed down due to the lack of material and supplies. It is thus no surprise that the actual rate of loan reimbursement by fishermen was just disastrous. . . (Liensenmeyer, 1976). In Ghana, about which available reports are sharply conflicting,[46] errancies in the definition of an appropriate model of fishing material financing seem to have been limited. This

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46 Christensen (1977) in particular, contradicts Lawson's report by qualifying the motor loan program as 'an economic disaster' without however, giving further detail.

evaluation is apparently backed by the early high rate of motorization in that country. According to Lawson and Kwei (1974), once the technical impediments to the adoption of the outboard motor were overcome, other problems were easily solved. The loan scheme introduced by the fisheries department was on the basis of hire-purchase, legal ownership not passing to the fishermen until completion of installment payments. Loans were not apparently made through cooperatives but on an individual basis and after adjustments had been made with regard to the terms of loans repayment (adapted to the short fishing season) and the repayment schedule extended from one to two years, the purchase of motors sharply rose (after 1961) and the operation was considered a success. This success was also made possible by the availability of spares, the widespread provision of repair facilties and the training and extension work undertaken by the fisheries department (Lawson & Kwei, 1974). In Senegal, a similar successful drive was realized through the second generation of cooperatives which distinguished between Input Supply Cooperatives (Cooperatives Primaires d' Avitaillement - CPA) and Marketing Cooperatives (Union des CPA). The new CPA taken in charge by the Fishereries Department (Direction de l' oceanographic et des Peches Maritimes - DOPM), were open only to professional fishermen, while, to the principle of 'collective' responsibility, were substituted individualized loans. With Canadian help, a center for the support of canoe motorization was created (Centre d' Assistance a la Motorisation des Pirogues - CAMP) in 1972 and was put in charge of the distribution of motors and spares, the maintenance of distribution material and the training of extension personnel. The material was bought tax-free

while payments were scheduled to fit the seasonability of the fishing activity and were to be paid in 24 months without interest. A compulsory insurance was included into the overall cost of the engine. The new scheme guaranteed the success of the Senegalese motorization experience (Domingo, 1982).

The adoption and generalization of the outboard motor in West African artisinal maritime fisheries has had a number of consequences with regard to fish production:

> -First of all, the motor has had the effect of widening the scope of the activity by making available new fishing grounds and by making possible an efficient pursuit of the fish.
>
> -By reducing the time period effectively needed to reach a given point, the motor has also increased the time of actual fishing, when it did not shorten the time spent at sea; it reduced the travel time for canoe fishing and thus improved the quality of the fish delivered:
>
> -Relative independence from natural elements enhanced fishermen's freedom to decide on the timing of their expeditions and to choose landing sites on the basis of economic criteria.
>
> -Finally, the motor made possible a dramatic increase in the size of the canoe, and therefore, the use of bigger nets for a greater catch. It did not imply a reduction of crew size and an increase in individual income as often expected, since the reduction in the number of paddlers needed has been largely off-set by the need for larger crews to handle larger nets (see Weber, 1982; Domingo, 1982; Pliya, 1981; Christensen, 1977). The overall impact of motorization on social relations of production will be analyzed later. As a whole, the West African canoe has proved to be a highly efficient tool, very adaptable to technical changes and also very cost efficient.

2.3. Fishing gear technology in the Artisanal Fisheries

From a technical standpoint, fishing gear is probably the most important item of equipment. While boats and propulsion equipment specify the conditions under which fish hunting is to be pursued, the net (in net-fishing), its intrinsic characteristics (gill/seine; active/passive; closing mechanism, etc. . .), its length, width, mesh size, ultimately determine the type of species that can be sought, the technical operations accomplished to capture the fish, the crew size needed to conduct those operations, the number of boats needed and their type. If it is true the gear type is only one of the constitutive elements of a fishery and that all the other elements act in return on the development of fishing gear technology (motorization, bigger plank canoes, preferred species, available manpower. . .), nets and lines appear nonetheless as the most important determining factor in the technical accomplishment of fish production. From a social and economic standpoint, their importance is just as significant for, in a majority of cases, nets are the most expensive item of equipment.

Several varieties of nets are used in West Africa along with the land or long line manned by crews of 1 to 5 men. In Ghana, 17 different nets were recorded in 1950 (Christensen, 1982). Net types vary from the large and heavy beach seine that can be more than 1.5 km long to the tiny scoop-net ('Dokpoe') used on the beach by small Benin children (Pliya, 1981). Furthermore, one single net type such as the Gillnet, can be the subject to so much refinement (see Table 5), in function of the specific species targeted, that its subtypes may - in

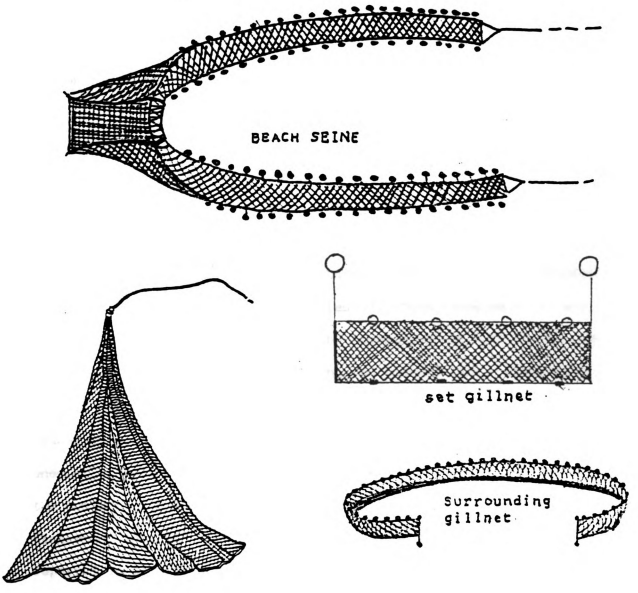
Table 4: Artisanal Fishing Gear Technology in West Africa
(A Summary)

Gear Type	Target-species (quantity/ccl value*)	Length (meters)	Width (meters)	Catching Device (mesh size [cm])	Capture Technique	Crew Size & Boat(s)
Line (hand-/long)	large demersal & pelagics-smc/hiv	-	-	up to 15-2.5 cms 10 cm hooks	From canoe. Hooked with bait	1-5 small, all motorized
Beach or shore seines--small/ large	Pelagics (many juveniles) [VLc/Lov]	100-300(small) 300-1.6km (large)	7-15 m	4.5-5 cm in wings/ 2.5-3 in central bag	Drawn from shore. Encirclement in semi circle. Fish guided toward central conical bag.	•36 to 60 men •1 non-motorized boat
Gillnets Large/small	Demersals Bedinan & large pelagics [Lc/Lov/hiv]	Vary from 20 m to 2 Kms	1.3Hm to 7m	.36-.45 cm to 3.81 to 12.7	Various. Meshes allow head of fish to pass but entangle as it seeks to withdraw.	•from 1-5 men to 5-8 (large •1 non-motorized to large motorized canoe.
Surrounding gillnets	Pelagics (herring, bonga, etc.) [Lc/Lov]	250 to 1000	4-12 to 22m	.6 to 3.8 cm	Entanglement. Net is active; shot in a wide circle, then encirclement of fish school.	•6 to 14 men •1 big motor canoe
Cast nets	-	Conical 7-9 m diameter		2.5 cm	Thrown from above. From shore or canoe. Fish entangled.	•1-2 men •1 small canoe or none.
Purse seines	Pelagics (herring, bonga, etc.) [VLc/Lov]	250-300 m	14-40 m		Net is active. School encircled, trapped in pocket closed with slot. Quick operation.	•9-14 •15-30 •2-3 very large canoes

Table 5: An Example of Technological Refinement: Gillnets in Senegal
[Adapted from Gerlotto et al., 1979 (in Weber, 1980)]

Net Type & Target Species		Net Characteristics length (m)	width (m)	mesh size (mm)	Fishing Ground	Regions
Bottom Nets	Fish	60	4.2	120	•Shallow bottoms: muddy/sandy	•Petite Cote, Salum
		18	4.8	160	•30m: sandy, near rocks	•Grande Cote
	Shark	18	4.0	160	•Variable: sandy, near rocks	•Grande Cote
		35	4.5	180	•Variable: sandy	•Whole coastline
	Meagre	20	5.2	200	•20-30m: sandy	•Petite Cote
	Thread fish	90	1.5	140	•8-10m: sandy, near rocks	•Petite Cote
	Lobster	38	0.6	220	•15m: sandy, near rocks	•Petite Cote, Gambia, Southern Senegal
	Cymbium	18	1.2	240	•Shallow: sandy/muddy	•Whole coast
	Pompano	50	3.4	140	•Estuarine: sandy/muddy	•Casamauce mainly
Pelagic Nets	Etmalosa	40	9.0	80	10-15m: sandy, near rocks	•Petite Cote, Saint Louis
	Sardinella	200	8.0	60	12-20m: sandy	•Petite Cote

Figure 14 : Artisanal Fishing Gear Technology



their diversity - appear as totally different gear. This 'expose' will thus limit itself to describing the major gear used in West Africa fisheries (see Table 4 and Figure 14), the fishing techniques associated with each of them and their requirements in terms of labor and production equipment (boat, propulsion).

a. Line fishing: hand and long-lines are generally 100 to 300 meters long according to the depth of the rocky grounds in which they are being used. A centuries-old gear, the line used to be made of natural baobab or palm tree fibers before being made of cotton material reinforced with tar. Since about 30 years ago, lines have been made of blue or green nylon which has the advantages of being lighter, more resistant, invisible in the water and rot-proof. Hooks of all sizes, adapted to the capture of different fish species are fixed on the lines; they can number as many as 15 hooks grouped by clusters of 2 or 3. Small fish are commonly used as bait. Line-fishing is generally targeted at large, valuable species - often demersals - and is generally done miles from the shore by 'companies' of 1 to 5 men each possessing his own lines including a reserve-line. Considered in Senegal as the time-long 'specialty' of Get-Ndar fishermen, line-fishing is practiced all along the West African coast but is unequally developed. In Benin, line-fishing on rocky grounds had to be the subject of a special 6-month course, instructed by 20 Senegalese fishermen in 1962 (Pliya, 1981). A decline of line-fishing has been reported in several areas of benin and Ghana (Pliya, 1981; Lawson, 1974) and even in Get-Ndar, where it is characterized by Isene (1982) as 'an out-fashion technique'. This fishery - to which a great impetus was given by the adoption of the outboard motor - remains however, a

significant aspect of West African fisheries. In Senegal, motorized line-fishing units still account for 46% of the fishing population and occupy 72% of all canoe units (CRODT, 1982).

b. Cast-netting: Of all of the major nets used in pelagic fishing, the cast-net is the smallest. Generally used from the shore, the cast-net is an individual gear mainly operative in shallow waters and is thrown from above over shoals of small fish. With a diameter of about 7 to 9 meters, its use is generally limited to the requirements of domestic consumption.

c. Beach Seining: The beach seine - "Mbaal laaw' in Wolof, 'Afafa' or 'yevudor' in Ewe, 'Twunuwii' in Fante, 'Aguene' in Pla - is a huge pelagic net which has been used on the Senegambian coast since the 17th century (See Chapter II) and perhaps later on the Gulf of Guinea. The beach or shore seine, generally made of several bundles of netting attached to each other, comes with largely different sizes. Small shore nets may be 100 to 300 meters long while medium size to large nets varying from 300 meters to 1.5 kilometers, as observed among Ghanaian beach seiners. Made of long wings - with a mesh size of approximately 4,5 - 5 centimeters - terminated by a central comical pocket (mesh size 2.5 - 3 centimeters), the beach seine can make very large catches of small and medium size pelagics which relatively low commercial value is compensated by the size of the catch. The handling of the beach seine necessitates, according to the size of the net, the mobilization of a crew which most common size is 40-45 men but which can be as large as 80 to 100 men (Hill, 1970; Lawson, 1974) and as small as 15 to 13 men (Hill, 1970; Wyllier, 1969). Detailed descriptions of beach seining have been made by Diaw (1981), Pliya

(1981), and Hill (1970) and the number of technical operations perfonned from net-casting to the mending of the net can be as high as eleven or more (Diaw, 1981). The overall operation is well summarized by Hill (1970):

> "Beach seine (or drag seine) nets are operated, unlike purse seines, from the shore. When the net is to be cast, it is stowed, together with its attached hauling ropes, in a dugout canoe which is paddled, according to its size, by a crew of up to about 12 men, neither sail nor outboard motor being required for this offshore fishing. The end of the rope attached to one wing of the net is held ashore, while the canoe is paddled out to sea to the full extent of the rope, which may be a mile or more. . .The canoe is then turned parallel to the coast. . .When the end of the wing is reached, the bag - which is separate - is either attached by members of the crew who dive into the sea, or it may be attached later on when the net has been partly hauled toward the shore. The other wing of the net is then shut, continuing the line of the first. The canoe then makes for the shore about a half-mile or more up-current from the point of departure paying out the second rope as she goes. When the second rope is launched, groups of men tail out on each rope, the number depending mainly on the size of the net but also on the proportion of. . casual helpers. The net is pulled slowly ashore by a disciplined and singing band which moves rhythmically backward with short stilled steps. . .The end of the rope is carefully coiled on the ground and as each rope-puller reaches the coil, he returns to the head of the line the hauling may last 4 or 5 hours and even longer, with some intervals for rest. The work of the two teams requires close coordination, by whistling, shouting and waving, for as the net comes in, the two wings must be brought closer and closer together, to enclose the fish and drive them into the bag, until, when the bag is finally landed, they are only a few feet apart."

d. Gillnets in West Africa: The functioning principle of gill-netting is based upon the entanglement of the fish in the net meshes. These latter allow the head of the fish to pass through, but entangle as the fish seek to withdraw. Gillnets were the most popular net in many coastal areas before the introduction of the purse seine

and are still a widely used gear, particularly in Fante fishing areas, in Benin, Sierra Leone and Ivory Coast. Among all nets, Gillnets are probably the one which exhibits the largest number of specialized subtypes. These can be divided in two broad categories: the passive drift or set nets and the active surrounding gillnet.

e. Passive gillnets: Passive gillnets appear under the form of surface or bottom, set or drift nets and exhibit an impressing degree of technical refinement. A 1979 study classifying gillnets in Senegal according to their essential characteristics (in Weber, 1980), identified 11 different gillnet types (9 bottom nets and 2 surface nets), each being targeted at very specific species (shark, lobster, cymbium, ethmalosa, sardinella, etc. . .) In Benin, the set net 'Tonga', also used in lagoon fishing, serves both as a bottom gillnets for the capture of drums, catfish, sole, rays, threadfish, and as a surface net for flying fish. The 'Tonga' net has its equivalent in Ghana ('Tengo' net) where it has been borrowed from. the length of a 'Tengo' net varies from 20 to 200 meters, with a width of about 1.50 meters and a mesh size of 36 to 45 mm (40-60mm in Ghana). Several other varieties of the gillnet exist on the West African coast. They include the Ghanaian 'telegraf' net which, contrary to Surgy's characterization (in Pliya, 1981), is to be distinguished from the 'tenga' net (Lawson, 1974; Gladwin, 1970). The telegraf net is longer than the 'tenga' net, has a larger mesh and catches mainly demersal species. A similar net, with larger meshes, is used to catch sharks and large fish (Lawson, 1974). In Benin, a larger variant of the 'tenga' is called 'Gana' net, while another net, the 'Sovi' is in fact a very small tenga. According to Pliya, 'at least 2 or 3 'sovi' are owned by every fisherman.

Set and drift nets are in West Africa, often used in subsistence fishing by crews rarely exceeding 5 men and operating one small motorized canoe owned by one of the crew members. Each member of the crew generally owns one (sometimes several) bundles of netting, these small nets being tied together in order to form one large net (Gladwin, 1971; Weber, 1980; Vercruijsse, 1980; Pliya, 1981). Gillnet fishing is either practiced during the day or at night, the net being left several hours in the water before being retrieved. A certain amount of fish thus die and not in the meshes and has to be discarded. As a whole, passive gillnet fishing is in general limited in scale and is far from requiring the amount of capital and labor power mobilized in beach and purse seining and in the use of the active surrounding gillnet.

The Surrounding Gillnet

The Ghanaian (Fante) ring gillnet - Adee or Ali - is without contest, a very 'popular' net among researchers and has been the focus of numerous studies[47]. This attention given to the Adee net which is found in Sierra Leone, Liberia, Ivory Coast, Ghana and Benin where its local name is 'manhundo' (Pliya, 1981), is justified by its social and economic significance in fisheries where it often represents the dominant form of fish production. The Adee net is a pelagic net used mostly for the capture of sardinellas and bongas and might have been in use as a drift net in Ghana since the second half of the 19th century. Its use on the Ghanaian coast however, did not become widespread before

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47 Among others: Quinn, 1971; Gladwin, 1971; Lawson, 1974; Christensen, 1977, 1982)

the second decade of the 20th century (Lawson, 1974; Christensen, 1977).

The Adee ring net has a length that commonly ranges from 250 m to 1000 m but may be as long as 1.5 km in Sierra Leone (Liensemeyer, 1975). Its width varies from 5.5 m to 22 m while its mesh size may be 3.8 cm. As a rule, Adee fishing requires a relatively large crew - 7 to 14 men using one large Fante canoe - because of the size of the net and the nature of the operations involved. These operations described in detail by Quinn (1971) and Gladwin (1971) consist, briefly, in the casting of the net around a previously-sighted-and-chased fish school, that is trapped by encirclement. Once the encirclement is done, the two ends of the rope are together tied to the boat and the whole crew then jump into the water and, positioning themselves all around the net, start beating the sea in order to frighten the fish into the meshes. After having hauled back the net and its catch into the boat, the laborious- and time-consuming task of extracting the fish from the net is undertaken. That latter operation which may take anywhere from one to four or five hours is generally considered along with the whole task of frightening the fish into the meshes, as a major negative side of the surrounding net. In Senegal, surrounding gillnets made their appearance later than in Ghana and the Gulf of Guinea[48]. Situated at an intermediate technological stage between the set or drift net and the

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48 While Weber (1982) situates the beginning of the diffusion of the surrounding gillnet in Senegal at 1965, Chauveau (in formal communication, 1983) reports its use by Tyubabe and then Nyominka fishermen in the Saloum Islands during the 1940's. Available reports on Fante fishing, on the other hand, do not clearly indicate how and when the 'Adee' started being used in Ghana as a ring rather than a drift net.

beach seine, the surrounding gillnet was first used on the 'Petite Cote' and in the Saloum Islands by fishermen experienced in the use of both techniques. Generally subject to individual appropriation, it is on the average, manned by a 7-man crew using a 14 m-long motorized canoe. It success in Senegal, will be instrumental in the undertaking of a new technological jump with the adoption of the purse seine (Weber, 1982).

e. The Purse Seine: The purse seine is usually considered as the newborne gear of artisanal fishing in West Africa but has been in used in the region for nearly 20 years. Operated in Ghana since the middle of the 1960's, generally in combination with 'Adee' fishing (Gladwin, 1971; Quinn, 1971; Christensen, 1977), purse seines were not introduced to Senegalese fishermen before a few years later, by the FAO in 1972. The expansion of the purse seine stands as one of the major changes in artisanal fishing techology in this second half of the century. In a way, it combines the advantages of both the beach seine and the gillnet and has tremendously boosted the productivity of canoe fishing in the marine area. Its specific operational characteristic lies in the attachment of iron rings on the bottom rope of the net while another rope passes through these rings; the fishermen, by hauling on it, are able to close the bottom of the net, thereby trapping the fish inside (Breton, 1973). The purse seine has small meshes (3/4"), 250 m to 300 m long, a width that can vary from 15 m (Quinn, 1971) to 40 m (Weber, 1980) and is specifically targeted at pelagic species. More productive than the beach seine, it shares with this latter the disadvantage of catching species of low commercial value (bonga, sardinella. . .).

The superiority of the purse seine over both the beach seine and the gillnet is responsible to a large extent for the rapid pace of its

adoption by Senegalese and Ghanaian fishermen. The advantages of the purse seine ('atonwonam' in Fante) over the 'Adee' net are well summarized by Quinn (1971):

> "Because the mesh of the net is uniformly smaller, small fish which escape the gillnet are captured in the purse seine. Moreover, the cold task of slapping the water to frighten the fish into the mesh is eliminated; as is the length and tedious task of separating the fish from the mesh. Most important, fish which are taken out of Adee are often mutilated and quickly go soft, while fish caught in 'atowonam' remain fresh longer."

At the difference of gillnetting which exhibits roughly, in Senegal and Ghana, the same requirements in terms of capital equipment and labor, purse seining in the two countries, is practiced with significant differences. In Ghana, purse seining is practiced (at least through the 70's) by 'Adee' units, no more than 14-men-strong and using one single large Fante boat (through these boats are the largest available). It is thus not surprising that in Cape Coast as in Biriwa, the carrying capacity of the boat appeared as 'the factor limiting the size of a day's catch' (Gladwin, 1971) this load capacity being 30,000-40,000 fish maximum (Quinn, 1971). In Senegal, two canoes and three motors are operated by a fishing crew that commonly numbers 20 men. Some crews are smaller (15 men) while others number 30 men or more, 10 to 20 men remaining ashore to serve as substitutes or in the land-based handling of the catch (Weber, 1980).

The first canoe in Senegalese purse seines is used to carry the net and the crew and is generally 14 m long while the second is to carry the catch and is 14 to 20 m long with a load capacity that ranges from 16 to 25 metric tons. The casting of the seine and the encirclement of the fish school have to be done with considerable speed

for are a fishing operation to succeed. Once the slot pulled, the fish trapped in the pouch is hauled in the loading-canoe. A number of fishermen transfer to that latter which is tilted in the side while the fish is taken inside the boat with the help of small nets. The overall operation necessitates, a considerable amount of labor power but yields high productivity, several tons of fish being frequently caught in a single trip (Weber, 1980). The importance of purse seining in the artisanal maritime fisheries is related not only to its technological performance but also to its impact on production relationships as well, as it will be seen later.

Several other gear are used in the fisheries of West Africa and some need to be briefly mentioned; they include trawling lines, metalic boxes - 'casiers' - which are 2 m long/20-30 cm wide and are used in Senegal for the capture of cephalopods, lobsters and shrimp, and the Benin 'Watcha' described by Pliya (1981) as a gillnet operated with a slot but which might just be the Benin version of the purse seine.

2.3.4. Technological intermix and production relationships

When analyzed from the standpoint of their influence on the technical and social relations of production, the means of production in fishing must be regarded as specific combinations of gear, boats, propulsions and other equipment, i.e., as technological complexes specific to the objectives of diverse production units and the nature of their targeted fisheries. The fundamental diversity of marine organisms and the peculiar features of the ocean environment stand - as argued by Pollnac (1976) - as the very phenomena that accounts for the

2.4 The Relations of Production in West African Artisanal Maritime Fisheries

The preceeding technological analysis has been dealing with the nature of the resource base - the subject of production - and with the elementary means of action upon this latter - the instruments of production. In the mode of production in fishing, the action of the instruments of production on the marine resource are mediated by given production relationships, first among producers and, eventually, between producers and non-producers. Production relationships have two intrinsic components - the technical relations of production and the relations of appropriation: they are simultaneously technical and social. In turn both technical relations and relations of appropriation can be broken down into several interviewing variables. In their basic structure, production relationships in fishing thus appear as follows:

1. The Technical Relations of Production:
   a - Work force composition and crew characteristics (age, sex, kinship, skills, etc. . .
   b - Division of tasks within crews: 'Roles', decision-making, control of labor processes.

2. The Relations of Appropriation:
   a - Appropriation of the means of production: forms of tenure, ownership and property rights.
   b - Product/surplus appropriations or relations of real appropriation: share system, forms of labor and capital renumeration.

Finally, the analysis of the production relationships in fishing will need to be complemented by the study of the exchange sphere (fish marketing) and the other 'moments' of the fish production system. This

analysis will be carried out later, from the standpoint of the impact of land-based arrangements on the fish mode of production.

2.4.1. The technical relations of production

a/ The composition of fishing crews

The study of fishing communities at large (Chapter V) has shown how the general composition of the work force in the fish production sphere is a function of the larger societal division of labor by sex, age and activity. The characteristics of the ocean environment (danger, removal from land-based society, etc.), the type of labor requirements - the 'travail de force' - necessitated by sea fishing and the social specialization of women into the functions of biological reproduction and domestic organization, produce a sea-fishing work force which is primarily male and young. It has been seen also that fishermen in West Africa might be of different types, i.e., exclusive fishermen, fishermen-agriculturalists, professional migrants, rural migrant laborers. . .and that ethnic origin, associated with other socio-economic determinations, plays some role in defining the character of fishing populations. In addition to the above characteristics, two factors are essential in the definition of production units in artisanal fishing and their size and the type of labor employed.

Foster (in Pollnac, 1976) has noted that in contrast to farming groups, the size of fishing groups is rigidly determined by technology. This assertion is, to a considerable extent, confirmed by the low

degree of variation among the fishing units of West Africa using similar transportation, propulsion and gear technologies[49]. If it is true that differences in the size of crews manning the same gear is, to a very large extent, explained by the - sometimes tremendous - differences in the sizes of one single net type, social and economic factors are also accountable for some of these variations. This can be easily seen in the overtime fluctuations affecting scores of fishing crews in West Africa and has been documented by the case of some over-sized beach seine and purse seine unites in Senegal (Diaw, 1981; Weber, 1980). There is a high mobility in the fishing labor force which apparently favors the integration within some crews of a 'semi-reserve' force. This force is designed to avoid possible shortages of the technically-necessary labor force.

The type of social labor employed by fishing is perhaps the variable that most intimately connects the work force composition of fishing units to the mode of production and appropriation specific to any given fishing unit. The special character of labor in fishing relates closely to the position of the laborer to the means of production and includes the questions of kin and non-kin labor, owner and non-owner operations, fixed labor and corporate labor. As pointed out by Christensen (1977,1982), technology does intervene in that aspect of crew composition for, the increase in the size of the technology put at work in a number of fisheries in the West African

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49 Crew size for various forms of fishing: line fishing: 1-5; cast netting: 1-2; 1-5, 5-8, etc. men for gillnet units; 6-14 men for surrounding gillnets; 9-14 men for 'Adee' and purse seining (Ghana); 15-30 men purse seine (Senegal); 13-20, 35-80 men beach seine.

region decisively shattered the exclusive constitution of crews on the basis of lineage affiliation.

Technology, however, does not explain everything. In a technology such as beach seining in Senegal and in Ghana for instance, the structural discrepancies existing in the composition of the work force as well as in the forms taken by work-group cooperation are explained only - ceteris paribus - by the coresponding modes of production and appropriation differentiating Ewe and Senegalese beach seine units. Further, it will be seen that more similarities can be found between Senegalese beach seining and Adee'Purse seine fishing in Ghana or between purse seining in Senegal and beach seining among the Ghanaian Ewe than between beach seining in the two countries mentioned. The nature of the mode of production in those fishing units and its impact on the dimensions of the production sphere, including the composition of the work force and the technical relations of production as a whole, will be scrutinized later in this section.

In all fisheries, crew members either associate voluntarily, are recruited or benefit from some form of rights system granting them automatic access to a given fishing unit on the basis most often of ownership or lineal affiliation. Three cases can be derived from these alternatives:

- The corporate or "free" association of independent fishermen;
- Kinship-based crews;
- Hired/contractual crews.

Crews are not necessarily of one type or another and can be a combination of several of the above.

The free association of independent fishermen putting their means of production together in order to cut down fishing costs or to

increase their production is frequent in fishing activities which involve only simple cooperation and relatively little capital investment such as line units, drift or set gillnetting or cast-netting. It is often the result of informal arrangements among friends who might or night not be kin-related. Such simple cooperative associations, are found all along the West African coast and are still very much alive.

The corporate association of fishermen is similar to the preceeding case of crew formation in the sense that here also, a 'company' is formed out of the voluntary 'getting together' of free individuals who often have also participated in some way in the pooling of initial capital for the purchase of fishing equipment. This case is well illustrated by the Fante migrant companies described by Christensen (1982). These 'companies' operating in Liberia are composed not only of about 20 adult males, but also of 4 to 6 male apprentices in their late teens and 8 to 10 wives of adult males. Each member of the company is responsible for his/her share of the equipment which consists usually of 2 canoes, at least 3 varieties of large nets (Adee, purse seine, gillnets with large mesh), and outboard motors (commonly 45 HP). Financing of the equipment is done through loans from kinsmen and/or money-lenders. These companies remain generally together for 5 to 5 years, the product of their first years being used to pay-off the initial debt contracted for equipment and also transportation. Corporate associations of fishermen exist also among Senegalese beach seiners. This reflects the mixed history of beach seining which in Senegal as elsewhere in West Africa was typically the property not of individuals but of social groupings such as wards,

lineages or independent associations[50]. This latter form of beach seine crew organization is still created today on the model of the 1934 'fishing society' of Petit-Mbao in Senegal, described by Baladier and Mercier (1948). This is the case of several beach seine companies in the Nyominka Islands, among which the 'susete' of Dionwar depicted by Van Chi (1977). Created by 20 men who participated equally in providing the initial capital outlay, the 'susek' is the common property of its crew which share all costs and benefits. It also functions as a cooperative of consumption and mutual help.

Kinship-based crews constitute a very common form of work force composition in fishing around the world and have been the forces of considerable attention particularly in North America (Anderson & Wadel, 1972; Pollnac, 1976; Breton, 1981). In West Africa, Quinn's (1971) study of Fante fishing crew composition in Biriwa, Ghana, provides valuable insight on the place of kinship in the constitution of fishing crews. Her study is complemented by the work of Gladwin (1971) in Cape Coast, Christensen (1977) in Cape Coast and Elmina and by the study of Diaw (1981) in Hann, Senegal (see Table 6).

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50 This is confirmed by Hill (1970) in the case of Ghana where certain beach seine companies are still operated on a family basis in the lagoons.

Table 6: Kinship Structure in Biriwa, Cape Coast and Hann crews

	Cognatic Kin	Agnatic Kin	Non-Kin	Total
Biriwa - 1967	.29	.20	.51	1.00
Cape Coast 1972	.34	.37	.28	1.00
Hann-beach Seine 1980	.08	.20	.72	1.00

Adapted from Quinn (1971:137), Christensen (1977:82) and Diaw (1981:13).

Fante society being primarily matrilineal, in its system of inheritance, the higher proportion of cognatic kin in relation to patrilineal kin, in Quinn's sample of 487 fishermen, reflects the propensity of matrilineal claimants to work in production units which 'belong' to the lineage and which they can hope to inherit someday. However, both the considerable presence of patrikins and 'strangers' (51%) in Quinn's sample indicate the two-fold pressure borne by the system in a society where all kinds of subterfuges are found to circumvent the matrilineal system of descent in favor of direct sons. Also hired labor has become a necessity, technically and socially justified by the size of the technology and the presence of a labor force deprived of its own means of production - the people who 'da mu gyan' as the Fante call them, i.e., 'those who sleep in nothing' (Quinn, 1971). Insofar as sponsorship of new crew members is concerned, in only 10.7% of the cases was this done by strangers, while

owners and 'claimants' were responsible for 89.3% of new recruits sponsorship. Owners and claimants exercised the exclusive privilege of selecting or admitting other claimants (124 out of 125 cases), but were also preponderant in the selection of non-claimants, which they did in 86% of the cases (Quinn, 1971:141). The findings of Quinn's on Fante crews composition have been checked by the work of Gladwin and Christensen[51] which, though not meant to be replications of Quinn's study, proved to be useful, for they both deal with Fante units in Cape Coast, an urban area just 11 miles from Biriwa the site of Quinn's work. Gladwin (1971:15-16) states that 'westernization' in Cape Coast has 'deemphasized the maternal inheritance ideology' and that matrilineality does not seem to predict much about behavior in boats as far as its survey data is concerned. Unfortunately, Gladwin does not back his claim by statistical data that could counterweight the findings of Quinn. Rather, he limits himself to mentioning that a man may be recruited into a boat through a matrilineal relationship with the 'bosun' or some other member of the crew, through a patrilineal relationship, or as a friend or non-kinsman of the bosun or whoever recruits him into the boat. Christensen's findings however, seem to provide some support for the contention concerning the deemphasis of the matrilineal system. Christensen's 1972 sample of 184 fishermen, shows a ratio of cognative kin to agnatic kin of .92 against a ratio of 1.45 in Quinn's sample. However, the proportion of both matrikin and patrikin in the sample is greater in Christensen's sample, and reflect the strong familiar character exhibited 1972-Cape Coast- units at the

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51 Kronenfeld's study of Fante kinship behavior (1969) has not been available.

expense of 'hired' labor. This is easily understood because all three studies on Ghanaian Adee/purse seine units show that family cores tend to be more stable than non-family cores; the 'bosun' being generally at the center of family cores.

The greater stability of family cores in units combining family labor with 'hired' labor is further supported by Diaw's study of a Senegalese beach seine unit in 1980. Although interesting because of the detailed analysis of one single production unit, the findings of this study, however, are not generalizable to the 120 beach seines operating in Senegal with similar types of crew circulation. Nonetheless, the study shows that in a crew composed only at 28% of kinsmen (see Table 6) dramatic and chronic fluctuations were constantly taking place and were essentially the fact of non-kinsmen. Compared to Quinn's data starting in 1940, that is the very year during which the Hann beach seine was acquired, it is striking to observe that a comparable percentage (15% in Hann, 20% in Biriwa) of the crews at the time of the study had been in their units for more than 8 years. In both cases, the majority of those were related to ownership by virtue of kinship. On the other hand, Quinn's data (1971:147) show that 54.6% of her sample had been working in their units for 2 years or less while the situation is worse on the Hann beach seine (Diaw, 1981:15) where 62% of the membership did not stay one year without interruption in the crew. Moreover, in only 2 months, 46% of this crew had left it and had only been partially replaced at the time of the study. It is thus clear that in production units functioning under the mode of lineal appropriation, the considerable instability of the 'hired' portion of the crews further reinforces the necessity of stable family cores and

the resistance to forces that could altogether eliminate kinship as the basis of crew composition.

Devising mechanisms to insure the operational viability of fishing crews is vital to large units requiring extended labor cooperation. It has been seen how corporate associations of 'equals' and reinforced crew kinship structures are in part designed to accomplish this goal. The situation is no different in the fishing units exhibiting a number of features characteristic of capitalist organization (as it will be seen later) and recruiting, almost exclusively, non-kin related, hired fishermen. Such units, including the Senegalese purse seines, the Ewe beach seines and perhaps the large surrounding gillnet units briefly mentioned by Liensenmeyer (1976) in Sierra Leone, short of offering a system of reward based on corporate or familial share in unit ownership must therefore, resort to totally different means. It must be said however, that Senegalese purse seine units, which unfortunately have not been the object so far of a detailed study, are still at a crossroad in terms of social organization, some of them being owner and family-operated and operated almost exclusively by hired labor. The same transitional character of Sierra Leone's ring net units could be derived from Liensenmeyer's data which show that in a sample of 93 units (including female and other land-based labor), family participation represented 25% of total labor input, mostly in managerial positions.

In contradistinction, the Ewe beach seine units analyzed by Wyllie (1969) and Hill (1970) present clear-cut, well-documented cases of how production units relying almost exclusively on hired labor put together

their crew membership[52]. Following the model of a capitalist enterprise, Ewe beach crews are constituted on the basis of a contractual obligation that formally links the hired fisherman to the net-owner who acts as his employer for the time specified in writing by the 'fishing labor contract'. Hill notes that the system is so standardized that some net-owners use printed receipt forms recording the names of the parties involved, the sum advanced to the fisherman, the beach site and the time of employment. Here, the bulk of the recruiting is done by one individual - the net owner - helped sometimes by his 'officers' ('bosun', 'second bosun', etc. . .) Many of the people recruited in the beach seines are reported to be rural migrants. As 'advance' in cash is given to the new recruit to be used for the transportation of his family to the fishing site to pay old debts, and other familial expenses. In practice, the 'advance' binds the hired fishermen to a particular unit and its owner. The system of inheritance in the beach seine units described being patrilineal, a net owner's son, younger brother or nephew may work in his company. The power of Ewe net-owners on their crews is so great that in the fishing migratory center of Muniano in Ghana, the net-owners exercise their authority over members as well as non-members (fish sellers, fish curers) of their companies. Moreover, each net-owner is given the exclusive right to distribute the land for rent in the section of the village occupied by his company, net-owners therefore, end up having collectively, the power to select the very population of Muniano itself

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52 The considerable work of de Surgy on Ewe Beach Seining all over coastal West Africa (see Hill, 1970) has not been available.

(Wyllie, 1969). This extreme case gives an instance of the whole range of possibilities with regard to the forms of access to labor and the composition of the work force in fishing units. It gives insights into the forms of labor control taking place in a sector where the fisherman can be either totally independent and master of his means of production, inserted in lineage structures mediating his relations to the means of production or totally separated from those latter and bound to his unit through contractual obligation.

b. The Technical Division of Labor

The composition of a crew, the way various people are brought into a unit of production, the relation of those people to the means of production, all this is not unrelated to the technical division of tasks and the way in which the labor process is organized and controlled within those production units. Line, cast-net and small gillnet units are characterized by a low division of labor. For those units, the labor process is controlled by each fisherman who is on an equal footing with all other members of his crew. In larger units, the necessity of extended cooperation and an extensive division of tasks arises out of the technically complex acts to be performed in production. In order to overcome these difficulties, the energies of the various agents of the production operation are either juxtaposed (steering-net-casting-bailing) or merged (net hauling). But this overall process has other far-reaching effects, for at the time when labor is being brought together and combined, it is also simultaneously specialized and differentiated; skilled labor becomes distinguished

from unskilled labor by virtue of the discrepancy in the nature of tasks such as fish sighting and bailing. But the 'necessities' are not only technical. Gladwin (1971) distinguishes among 'roles' in fishing units by ownership, authority of command and function or occupation in the crew. Ownership roles may be assimilated to what is characterized elsewhere as managerial position but they appear in some instances as separate functions. Technical descriptions in a crew can be further differentiated according to the degree of specialization required by each specific task. In her study of Fante 'adee' units, Quinn (1971) describes various tasks accomplished in Adee crews and scale them according to their degree of specialization. These tasks concern 'Adee' as much as purse seine fishing and, to a large extent are generalizable to those fisheries in the region. During net-casting, the activity which involves a maximum number of operations taking place at the same time, the following activities and the number of men in the crew engaged in each operation were identified:

1/ steering (7.4%);
2/ net casting (17.9%);
3/ cork holding (20.7%);
4/ motor driving (6.8%);
5/ bailing (2.9%);
6/ odd tasks such as throwing out lantern float, balancing the boat to keep it from rocking, holding the net in the water while it is tied, watching the net's rope to make sure it is untangled. . .(4.3%);
7/ unspecialized or unskilled functions (40%).

Other sea-based operations are also performed before and after the casting of the net and include sighting or spotting the fish often performed by the steerman (or 'captain' in other fisheries), hauling the net (which in Adee as in beach and purse seining requires the mobilization of the entire crew), retrieveing the fish from the net

(specific to gillnet fishing, involve the participation of the entire crew). At sea, the function of a steerman and to a slightly lesser degree that of net caster represent in Adee and purse seine units the highest degree of technical expertise followed by motor driving and cork holding. Bailing is, as a rule, the task of apprentices. In boats, such as Senegalese canoes, the function of steerman might be the same as that of motor driving. In beach seining the determination of the area being covered and the casting of the net operated onboard a non-motorized canoe, represent the most crucial technical operation, followed by the inspection of the net in order to avoid its being torn by odd objects, and then by the direction of the hauling operation (Diaw, 1981). On land and for all fishing types, net-mending constitutes the natural extension of sea operations. In Sierra Leone, net mending occupies 42% of the male labor allocated to fish production (Liensenmeyer, 1976). In Ghana, it constitutes the first step in the training of apprentices; while in the Hann beach seine, it is only performed by a small group of experienced fishermen. As pointed out previously, the division of labor in fishing units is simultaneously technical and social. The technical division of tasks in crews characterized by a complex system of cooperation also expresses the social dimension of labor. First of all, the distribution of decision-making and specialized function in sea operations is, despite superficial appearances, a function of the social position of the various actors with regard to the mode of production and not merely of their technical skill. The best illustration of this reality can be seen in Quinn's data (1971), 62 percent of the 29 fishermen (6% of total sample) permanently occupying the sensitive function of steerman

in Biriwa 'Adee' units were owners - or claimants to the ownership - of fishing equipment. Taking into account that in the overall sample 269 people (55%) mastered all technical skills, the over-representation of claimants in the body of steermen might indicate a lack of pure randomness or pure technical consideration in the distribution of command roles in the crew. In the Hann shore seine, all the critical functions mentioned earlier were, in the same fashion, exercised by members of the family owning the net; some of these occupations being occasionally relinquished to experienced fishermen if needed. In Ewe seine nets functioning under a different mode, authority of command in technical tasks is systematically assumed by the owner or his 'hommes de confiance' - the bosun (if different from owners) or 'second bosun'.

Most importantly, it is in the land-based 'fusion' of managerial command and ownership functions that the role of social criteria defined by the mode of appropriation characterizing a given production unit appears as decisive in the division of labor. In all large fishing units, several major decisions are currently taken on land. Crucial to the life of the unit, these areas of decision-making are directly related to the authority borne by management or ownership functions. They are the following:

1. Sea going decisions (when and where to go);
2. Disciplinary functions;
3. Accounting;
4. Selling operations;
5. Crew selection
6. Means of production:
    a. Expenses
    b. Purchases
    c. Loans.

In fishing units operating with a family or semi-family (individual ownership but use of family labor) structure of ownership

under the conditions of petty commodity production, the quasi-totality of these decisions are taken by family members. Thus the family acts as a 'collective owner'. In Adee units for instance, ordinary crew members hardly participate at all in land-based decision-making areas while steersmen unrelated to equipment ownership had a significant participation only in the sea-going, fish selling and to a lesser degree, account-making decision. On all accounts, management and ownership decisions, including the three areas above-mentioned, were taken in priority by the owners or claimants to the ownership of the equipment; those combining ownership with steermanship scoring the highest of all. Selecting the crew along with equipment and loan decisions appears as the quasi-exclusive domain of owners and claimants, while a disciplinary function such as settling cases was entirely exercised by the direct owners. In family-operated beach seine units, the situation is not much different in the sense that in all the areas mentioned, decision-making responsibilities are primarily assumed by family members according to modalities internally defined among them. (Balandier et Mercier, 1948; Van Chi, 1977; Diaw, 1981).

Family-operated units are at an intermediate point between corporate companies and capitalistic units with regard to the technical division of labor. In the former, the company is largely run by consensus and the division of labor is generally limited to the technically-necessary minimum. Brought together on the basis of a common agreement, company members usually decide together of sea-going operations while they are individually involved from the start in equipment and loan-making decisions (Christensen, 1977; Van Chi, 1977). Profits are generally kept by an elected treasurer (as among Nyominka

'associations') or turned over to various members of the group for more safety (Liberia). Disciplinary, fish selling and other land-based management tasks are often assigned to one member of the company (the 'second bosun' in Liberian companies) without prejudice to the collective nature of crew organization.

At the far end of the spectrum in terms of division of labor are the individually-appropriated beach seine companies. In those units, the bulk of crew selection, equipment and loan decisions, constitute the prerogative of the net owner. It has already been seen that ordinary crew members are, for all practical purposes, excluded from the decision-making sphere. In order for the owner - who may or may not participate in the day-to-day work of his company - to keep control over a crew whose only obligation to the unit is a contractual one, authority of command is delegated in his absence to a group of 'officers' at the head of which is the 'bosun'. The 'bosun' is generally assisted by a 'second bosun' and a clerk plus a fundamental innovation, the function of management and discipline assumed by these 'special' laborers is renumerated by an extra share in the system specific to the fishing unit.

The role of the 'officers' in Ewe beach seine units is well described by Wyllie:

> "The bosun's position commands a degree of authority which is second only to that of the net-owner. It is the bosun who is left in charge of the company when the net-owner is absent. He directs the net-casting operation from start to finish. . .he is also responsible for deciding when the net should be hauled in to the beach and he supervises this operation personally. Throughout, his major task is to coordinate the various activities going on during the fishing season. Normally it is the bosun who controls the selling of the fish on the beach.

> The second, sometimes referred to as the 'coxswain' or the 'disciplinarian' assist the bosun, for whom he may deputize in his absence. Working under the bosun's direct command, the second's principal responsibility is that of maintaining discipline within the company. He notes infringements such as late arrival for work, slacking and carelessness and reports these directly to the net-owner. . .He is also prominent during the selling of the fish.
>
> The company clerk, who is often the only member of the company with some formal education, records various items of company expenditure, the cash value of each catch, the amount of credit given to the women fishmongers, and the fines levied on members for various infringements and offenses. He also calculates, at the season's close, the sums of money due to the members as their shares of the companies takings."

With this last form of division of labor in fishing units, we are certainly not at the stage of the industrial chain of production. However we see clearly unfolding the genesis of social differentiation within the technical process of production itself and more than ever, Marx's description of the division of labor in capitalism comes to mind:

> "Just as at first the capitalist is relieved from actual labor. . .he hands over the work of direct and constant supervision of the individual workman and group of workmen to a certain kind of wage laborer. An industrial army of workmen under the command of a capitalist requires, like a real army, officers (managers) and sergeants (foremen, over-lookers) who while the work is being done, command in the name of the capitalist."

2.4.2. Appropriation and Ownership in Fishing Units

2.4.2.1. Share system and surplus appropriation: an economic analysis of fishing units

Relations of 'real' appropriation are at the very heart of any mode production for, the most fundamental question with regard to the production process is in the last analysis: how is surplus product extracted and appropriated? Product and surplus product appropriation in fishing integrated several interconnected dimensions at the core of which is the 'share system' of distribution, the basis upon which are economic analysis of production units ought to be based. The share system appears as the most striking, universal features of fishing units in their artisanal- and semi- industrial forms and displays a surprising permanency despite the discrepancies in the technological level of artisanal fisheries across time as well as space. Found in geographical areas as dispersed as Venezuela (Breton, 1973, 1977), Brazil (Giasson, 1981), Canada (Faris, 1972), New England (3PS, 1982), Malaysia (Firth, 1946), Indonesia (Emmerson, 1980) and Jamaica (Pollnac, 1976), the share system constitutes the general form of capital and labor renumeration in West Africa.

Because of its complexity and the variables of its practical applications according to the type of gear, propulsion and transportation equipment, according to geographical and cultural areas and even among units in all other aspects similar, a way has to be devised to capture the fundamental 'logic' of the share system and the

driving force behind the unity/diversity of its 'emic' forms. To accomplish this task, a general formula of the share system based on the artisanal fisheries of West Africa is developed.[53]

A. The General Formula of the Share System

Catch sharing modalities in West Africa range from the very simple to the very complex. Consequently, a mathematical formulation, in order to bear some universal value, cannot avoid a minimal level of complexity. The constitutive elements of the system will be first examined and explained (see Table 5); they will lay the ground for the fundamental equations of the system (see Table 6). Finally, the overall formula will be illustrated by a study of cases before being analyzed in terms of its substantive and methodological implications.

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53 The elaboration of a formula to express the underlying mechanisms of the share system in West Africa has been partly inspired by Faris' account of the elements included in the 'division of the voyage' in Cat Harbour, Newfoundland (Faris, 1972; Leap, 1977). Unfortunately, Faris' illustration does not go beyond a description of Cat Harbour. I am also indebted to Raymond Faye, CRODT's computer scientist for his suggestions on the ways to improve the original equations formulated.

TABLE 7

The Symbols of the share formula

1) P = unit's surplus product (or total revenue)

P_1 = Total part of capital (or pure economic profit)

P_2 = Total part of labor

P_{11} = gear part

P_{12} = canoe part

P_{13} = motor's part

P_{20} = Total part accruing to ordinary labor

P_{21}

P_{22}

P_{23} } = Extra parts corresponding to various forms of labor special renumeration

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P_{2n}

2) S = basic individual share of all fishermen in unit

$S_1 - S_{11}, S_{12}, S_{13}$

$S_2 - S_{21}, S_{22}, S_{23}$

$S_3 - S_{31}, S_{32}, S_{33}$ } = individual and differential shares of 'special' or 'specialized' fishermen

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3) n = total number of 'ordinary' shares in crew (include all crew members)

n_1 = total number of shares in P_{21}

n_2 = total number of shares in P_{22}

n_3 = total number of shares in P_{23}

nn = total number of shares in P_{2n}

n^1 = total number of individualized shares, specified in sharing modalities

4) E = Total expenses borne by unit

E_1 = Cost of capital reproduction (maintenance, repairs, gas, spare parts, etc. . .)

E_2 = Cost of labor force reproduction (food, housing, transportation, medical expenses, etc. . .)

5) C_v = Gross catch value

C_w = Gross catch weight

of E_1 and P_1. Thus, by its very nature, the share system, as soon as in its constitutive elements are outlined, renders transparent the actual modalities of product and surplus distribution between production and reproduction and among the various forces of the production process represented by the fishermen and the equipment-owner. At this point, the constitutive equations of the share formula ought to be spelled out (see Table 8).

a. Analysis of the components of the formula

S (the fisherman's share), P_1 (the 'pure' economic profit realized by the owners of the fixed capital) and P_2 (the portion of the surplus product or surplus value that returns to labor as whole) are the central components of the share formula. The distinction between S and P_2 is justified on the ground that S and P_2 are not only analytically distinct also because according to the unit of production analyzed, labor may be either renumerated individually along with the other pieces of equipment or renumeration by a gross share, P_2, meant to be divided later among the different categories of laborers.

This latter form of catch division involves the greatest number of variations and requires the breakdown of P_2 into sub-components. $P_{2\emptyset}$ represents the global renumeration of 'ordinary' labor and is equal to P in cases where no economic differentiation is made between ordinary and specialized labor. P_{21}, P_{22}, P_{23} correspond to the extra parts allocated to different categories of 'special' laborers ('officers'/net-menders/most 'hard-working' crew members) in units where labor is not only technically and socially but, also, economically differentiated. The maximum number of parts allocated to 'special' labor has been, here, limited to three on the basis of known cases. Theoretically, however, ample room is left for integrating new experiences and conceptualizing as many 'special' part as reality would actually suggest (P_{24}, P_{25}. . .). P_2 remains the summation of all parts accruing to labor, be it 'ordinary' or special: $P_2 = Pi.$[54] P_2

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54 A part is defined as any global renumeration of a factor or a category of agents of production. A share is

is also, ultimately the summation of all the 'shares' accruing to labor.

Therefore, to the breakdown of P_2 into several possible components corresponds the differentiation of S from $S_1, S_2, S_3 \ldots S_n$ and of n from $n_1, n_2, n_3 \ldots n_n$ (see Table 7). S is the ordinary fisherman's share and can be defined, exactly - as the basic share of the catch to which all fishermen, including 'officers' and other 'special', laborers, are entitled. The summation of all individual's gives $P_{2\emptyset}$, which is the fraction of P_2 accruing to ordinary labor. $S_1, S_2, S_3 \ldots s_n$ constitute the individual renumeration of the 'special' labor of officers, foremen, net-menders, 'hard working' fishermen. They are correlated to, respectively, $P_{21}, P_{22}, P_{23} \ldots P_{2n}$, which are the funds from which the extra shares are taken.

S_1, for example, can be considered as $S + X_{1\emptyset}$, $X_{1\emptyset}$ being the average renumeration of - let us say - the 'officers' in the unit considered. As such, $X_{1\emptyset}$ will be equal to the total extra part allocated to the 'officers' divided by the number of 'officers' concerned (n_1); $X_{1\emptyset}=P_{21}$. In n_1 practice however, the extra renumeration of 'special' and specialized labor is rarely equal and is as a rule, based on principles of hierarchy and differentiation. $X_{1\emptyset}$ (and in the same fashion $X_{2\emptyset}, X_{3\emptyset} \ldots$) will be considered as an average any time that the data available will not provide details on the internal distribution of extra parts among their beneficiaries. Whenever possible however, the differential renumeration of the 'officers' for instance, will be taken into consideration.

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defined as the individualized renumeration of the agents of production.

Conceptually, this will be done by changing the average $X_{1\emptyset}$, into X_{11}, X_{12}, X_{13}. . .which will be actual proportions of P_{21}. The same principles hold for S_2, S_3. . .and their corresponding $X_{2\emptyset}$, $X_{3\emptyset}$ and X_{21}, X_{31}, etc. . .

Finally, there is a last form of labor renumeration in fishing crews - defined as S' - which needs to be mentioned. S', as much as S_{11}, S_{21}, S_{31}, . . .,S_n, is the expression of a particular modality of renumeration which recognizes the special labor performed by apprentices and women. At the difference of S_1, S_2, S_3. . .S_n, however, S' does not represent an extra renumeration but is a fraction of S. As such, it belongs, practically, to $P_{2\emptyset}$ without being a full fisherman's share. S' has no practical effect on the determination of the sharing formula because, as a set fraction of S, it is always correlated to this latter[55].

The sharing modality in any production unit is <u>preset</u> in function, primarily of the type, size, number and, ultimately, cost of the means of production utilized. As such P_1 is a decisive variable in the system. P_1, which can theoretically be broken down to its components (P_{11}, P_{12}, P_{13} representing the gear, the boat(s) and the motor(s)), does not, however, constitute a particular methodological problem. The part received by each of its components being always clearly demarcated. As a whole, P - the unit's total 'revenue' or surplus product/value which is also the summation of P_1 and P_2 ($P=P_1 + P_2$),

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55 In the case of women specialized in cooking, or other work, for a fishing company, s' does not belong analytically to P_2 but to E_2 (the cost of reproducing labor). The labor of those women, though 'useful', is not a 'productive labor' in terms of direct fish production.

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will be equal to C_v - E; whereas C_v represents the gross value of the catch and E the total expenses or the total cost entailed by the reproduction of labor and capital.

C_v is equal to c_w (the gross catch weight or quantity) weighted by general market conditions including prices and post-harvest/pre-marketing losses. C_w is a function, for any given fishery, of the particular characteristics of each element of the productive force: 1/the resource (oceanic productivity/seasonality, weather conditions, fish stock size and mobility, size and weight of individuals and other bio-ecological characteristics); 2/ the instruments of production; boat type and size (e.g., Fante vs. Senegalese purse seine boats); propulsion equipment (e.g., sail/motor, breakdown of motor, possibly of pursuit or to reach offshore fishing grounds, etc.), gear type and size (pelagic/demersal, length/width/mesh size, net/line, etc.); 3/ labor: crew size, individual and collective skills, knowledge of environment, etc.).

E is a crucial variable to understand in the share system. Representing the amount of expenditures necessary to maintain both capital and labor active during the production period, it represents the portion of the total product which belongs to the domain of production, destined from the very beginning to 'productive consumption' and reproduction. E is not, however, an homogenous entity and must be broken down into the expense going to the reproduction of capital equipment (E_1) and those going to the reproduction of labor (E_2). E_1 represents essentially the service cost of capital and is the sum total of the expenses made for gas and engine maintenance, engine

repairs, boat maintenance, gear maintenance and repair[56]. The actual value of E_1 is generally difficult to estimate prior to the periodic accounting done by fishing units because of its dependency on several uncontrollable factors. E_1 can depend in particular on: the type of technology (e.g., non-motorized boats vs. 25 HP units), the nature of the fishing ground (e.g., rocky vs. sandy bottoms), the location of the fishing ground (gas consumption), the retail price of spare parts, gas and other items (subsidies, rural or urban location of landing site, etc.). E_2 represents the cost of crew maintenance and includes items such as food, drink, housing, transportation, medical expenses, tea, coffee, etc. It does not include the widespread practice of distributing 'eating fish' ('ndawal' in Wolof, 'dzidzi nam' in Fante) taken from the product of each day's catch. Considered as a given, 'eating fish' is not computed at all but is an integral part of E_2. This is also true of special fishing trips done by some units for the benefit of the entire crew or for crew members with family expenditures or other social needs. From the point of view of labor reproduction, the analytical distinction made between E_2 and P_2 presents a considerable theoretical advantage in the sense that at once, E_2 can be grasped as the real cost of reproducing labor. E_2, therefore, does not need to be calculated on the basis of social averages as it would be if the laborers were paid fixed salaries or wages. The same is true

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[56] One problem which is difficult to circumvent is that most sharing modalities in fishing units do not include the absorption of the depreciation of capital as part of unit expenses. This latter has most often to be borne by P_1. On the other hand, necessary repairs such as net-mending are sometimes done free by crew members and, though belonging to E_1, and capital, are thus borne by labor without being included in P_2.

Table 8: Equation of the Share Formula

1/ A unit's total revenue is equal to the catch volume minus the expenses E is also equal to the labor part ($P_{2)}$ plus the part of capital ($P_{1)}$. Therefore:

$P=P_1+P_2$ $P=C_v-E.$

2/ The total labor part (P_2) is the summation of the parts attributed to each category of labor in unit. Therefore:

$P_2=P_{2\emptyset}+P_{21}+P_{22}+P_{23}+\ldots P_{2j}$

3/ The total part of capital is the summation of the parts attributed to the gear, the boat(s) and the motor. Therefore:

$P_1=P_{11}+P_{12}+P_{13}$

4/ The basic individual share of a fishermen is equal to the part of ordinary labor ($P_{2\emptyset}$) divided by the total number of ordinary shares in the crew. Therefore:

$$S=\frac{P_{2\emptyset}}{n}$$

5/ The individual share of each specialized fisherman is equal to a basic share (S) plus an extra individual share. Therefore:

$\underline{S}_1 = S+X_{1i}$, or whereas $X_{1i}=X_{1\emptyset}=\frac{P_{21}}{n_1}$ and is an average

$X_{1i}=X_{11}, X_{12}, X_{13}, X_{1h}$, i.e., the actual values taken by the extra renumeration of each element in n_1.

$\underline{S}_2 = S+X_{21}$, whereas X_{21} can take the average value of $X_{2\emptyset}=\frac{P_{22}}{n_2}$.

or X_{21}, X_{22}, X_{23} - i.e., the actual values taken by the extra renumeration of each element in n_2

$\underline{S}_3 = S+X_{3i}$ whereas, X_{3i} can take the average value of $X_{3\emptyset}=\frac{P_{23}}{n_3}$

or X_{31}, X_{32}, X_{33}. . .i.e., the actual values taken by the extra renumeration of each elements in n_3

With these equations in mind, it is now possible to consider the practical sharing modalities in use in a selected number of fisheries and to express the relations of real appropriation in the production

sphere. It might be necessary to remind that these relations can be laid out only in terms of proportion since C_v and E are not determined. It has been said that roughly:

$C_v=(C_w-1) \times p$, 1=post-harvest/market losses, p=unit price

It must be understood that all the elements, in the preceeding equation are a function of uncontrolled variables. It could depend on the technology used (refrigeration facilities or not), unit type (25 tons of load capacity purse seines vs. small line units catching few individual species), beach facilities, etc. P is function of general market conditions including the demand/supply dimension, the 'rapport de force' or relative position of strength between fishermen and fishmongers etc. C_w as well as E are both functions of the particular combination of the variables mentioned earlier in the analysis of the components of the share formula. General environmental, technical and social conditions (and the factor 'chance as well), will thus determines the specific values of C_v and E.

b. The modalities of catch sharing

Catch sharing modalities will be analyzed according to unit types. Concrete cases will be drawn from different countries and different areas in the same country. In each case, P_1, P_2, S, S_1, S_2. . .S_n will be determined as percentiles of P which is considered as equal to 1. In each case different crew sizes will be considered because it is expected that crew size will have a significant impact on the results. P_{20}, P_{21},. . .,P_{2j} will be computed.

Small fishing units (line, gillnet, 'tenga'. . .)

Two cases will be used to illustrate the modalities of catch sharing. In Ghanaian 'tenga' units, the share of each fisherman corresponds to his actual catch, minus say fish he must contribute to the boat owner (Lewis, 1977). This boat-owner share, is according to Verjcruisse (1970), equal to 1/5 or 1/4 of the catch proceed. We have therefore an s which is variable, while P_1=20-25% of P and P_2=80-75% of P.

In Senegal, all units - except surrounding gillnet and beach and purse seine units - share the proceed of their catch according to the following set formula: 1 S - canoe

1 S - motor

1 S - per fisherman

If we take the example of line units with 4-6 men strong crews, we have the following results. For P=1, $P_{20}=P_2=\frac{n}{n_1}$

$S=\frac{P_{20}}{n}$, $P_1=P-P_2$

crew size	n	n'	S	P_1	P_2
4	4	6	16.7%	33.3%	66.7%
5	6	8	12.5%	25.0%	75.0%

Surrounding gillnets

In Senegal, surrounding gillnets manned by crews of 7-14 men, are characterized by the following sharing modality (see Weber, 1982):

1 share - net

1 share - motor 1 share - per fisherman

1 share - canoe

crew size	n	n'	S	P_1	P_2
7	7	10	10.0%	30.0%	70.0%
10	10	13	7.7%	23.1%	76.9%
14	14	17	5.9%	18.0%	82.0%

In Ghana, gillnet fishing offers a greater variety of sharing formula by comparison with Senegal. This is partly due to the fact that gillnet (Adee) fishing is more intensively practiced in Ghana and the 'Adee' fishing has recently undergone a number of modifications, the least of which not being it combination with purse seining in 'Ahwea' fishing (see Verjcruisse, 1980).

According the Christensen (1982), the most common sharing pattern in 1973 was the following:

2 shares -canoe 1 share - owner (for 'management' role)

3 shares - net 1 share - each fisherman

4 shares - motor 1/2 share - each apprentice

Crew size varies commonly from 9 to 14 - sometimes 16 men, including 1 or 2 apprentices. Two apprentices will be included in the following cases:

$P_{20}=P_2=\frac{n}{n'}$

crew size	n	n'	S	P_1	P_2
9	8	18	5.6%	55.6%	44.4%
12	11	21	4.8%	47.6%	52.4%
15	14	24	4.2%	41.7%	58.3%

A few years earlier the common pattern in Biriwa was the following according to Quinn (1971):

1 share - boat

3 shares - net — 1 share - per fisherman

3 shares - motor

crew size	n	n'	S	P_1	P_2
9	8	15	6.7%	46.7%	53.3%
12	11	18	5.6%	38.9%	61.1%
14	13	20	5.0%	35.0%	65.0%

At the same time, in 1967, further complexity in the share system was reported in Cape Coast, just 11 miles from Biriwa (Gladwin, 1971).

The system was the following:

3 shares - motor

2 shares - net — 1 share - each fisherman

1 share - boat

In addition, 1 share was put aside as 'in between', extra incentive or 'bonus' to 'hard-working' crew members, while 2-3 shares were, during the catch sharing instead of before, reserved to net and motor repair and maintenance (E_1). As such, the full catch proceed being shared is not equal to P, but to $P + E_1$. To have P_1 it will be necessary to subtract E_1 from the total value being shared and then only, compute the proportions of S, P, and P_2 in P.

Therefore, the two or three shares going to E_1 will be omitted in the following computations. $P_{20}=\frac{n}{n'}$; $P_{21}=\frac{1}{n'}$; $P_2=P_{20}+P_{21}$;

$n_1=n$ and it is remembered that $S=P_{20}$; $S_1=S+X_{10}$; as an average,

$X_{10}=\frac{P_{21}}{n_1}$.

crew size	n	n'	P_{11}	P_{12}	P_{20}	P_{21}	$S+X_{10}$	S_1
9	8	15	40.0%	60.0%	53.3%	6.7%	6.7%	.8%
12	11	18	33.4%		66.6%	5.6%	5.6%	.5%
14	13	20	30.0%	70.0%	65.0%	5.0%	5.0%	.38%

In reality, as rewarding only 'special' labor, S_i is likely to be above the values in the table, which are a minimum. At the difference of other cases that will be examined later, individual fishermen can be rewarded for their 'productivity' but cannot be penalized for 'bad attendance record' or other reasons. Consequently S is the minimal proportion of P returning to the individual fisherman, while theoretically, one individual fisherman could have a maximum of 25, i.e., his share plus the whole extra share.

As a comparison, in 1950, 'Adee' gillnet units shared their catch proceed by allocating 1 share to the boat, 2 shares to the net, 1 share to each fisherman and 1/2 shares to apprentices. Crew size varied between 5 and 8.

If we take an average of 6 full shares in a boat's crew, we have n=6 and therefore:

S= 11.1%, P_2 = 66.7%, P_1 = 33.3%.

Purse Seine Units

While in Ghana, purse seine units cannot be distinguished from 'Adee' units with which they care combined, in Senegal and in Benin purse seine units are the object of a specific type of production and are characterized by specific catch sharing modalities. In Benin, according to Lawson (Lawson - COPACE, 1980), a profit of - let us assume - CFA 1000, is divided according to following principles:

First, the owner receives CFA 200 the rest is divided in 21 shares:

15 crew members receive each	1 share
The owner receives	1 share
The net receives	2 shares
The boat receives	1 share
The motor receives	2 shares

Let us, for matter of convenience, break down P_1 into P_{11} and P_{12}. Therefore, P_{11}=20% of P, P-P_{11}=80%, $P_{20}=\frac{n}{} \times .8 = P_2$

crew size	n	n'	P_{11}	P_{12}	P_1	P_2	S
15	15	21	20%	22.8%	42.8%	57.1%	3.8%
20	20	26	20%	18.4%	38.4%	61.5%	3.0%

In Senegal, the most common pattern among purse seine units is to divide the catch by allotting 1/3 to the net and 2/3 to the crew, the boats and the motors each receiving 1 share (Weber, 1982). For example, if we consider an average crew of 20, using 1 net, 2 canoes and 3 motors, we end up with 25 shares and [n=20]. The results, for the same crew sizes as in Benin are the following:

crew size	n	n'	P_{11}	P_{12}	P_1	P_2	S
15	15	20	33.3%	16.6%	50%	50%	3.3%
20	20	25	33.3%	13.3%	46.6%	53.3%	2.6%

If the crew size was the same than in the Benin example, we would have had:

n = 15, P_{11} = 33.33%, P_{12} = 16.67%, P_1 = 50%, P_2 = 50%, and

S = 3.33%.

Another modality of catch sharing mentioned by Weber (1980) is to give:

1/3 to the net

1/3 to canoes and motors

1/3 to the crews

Thus,

crew size	n	P_1	P_2	S
15	15	66.6%	33.3%	2.2%
20	20	66.6%	33.3%	1.7%

Beach Seine Units

In Senegal, the catch proceed is shared by allotting half of the catch proceed to the net and the other half to the crew and the sole boat used, each receiving one share. P_{11} is thus set and P_{12}=S

crew size	n	n'	P_{11}	P_{12}	P_1	P_2	S
30	30	31	50%	1.6%	51.6%	48.4%	1.6%
40	40	41	50%	1.2%	51.2%	48.8%	1.2%
40	49	50	50%	1.0%	51.0%	49.0%	1.0%

By contrast to the Senegalese case, Ewe beach seine units are characterized by a high degree of variation in arithmetic practice and other accountancy details essentially due to the overriding concern of net-owners for ensuing and enforcing the discipline and the productivity of hired labor without jeopardizing profit. Divisions into 2, 4, 5, 7, 8, 9 parts are reported by different companies (Hill, 1970). Invariably, however, a fixed number of these parts is allocated to the net owner and the rest to the company members, including those entitled to a specific share.

In a case of 9 parts division presentful by Hill (1970), the modalities were the following:

3 parts to net owners

1 part to all ordinary crew members (P_{20})

3 parts to all company members according to 'productivity' (P_{21})

1 part to regular net-members (P_{23})

1 part to officers (bosun, etc. . .) (P_{22})

We have, therefore, 4 different modalities of labor renumeration while capital and each category of labor receive fixed, invariant parts:

P_{20}	P_{21}	P_{22}	P_{23}	P_2	P_1
11.1%	33.33%	11.1%	11.1%	66.67%	33.33%

However, S, S_1, S_2 and S_3 vary in function of n, n_1, n_2 and n_3. Since all crew members can, in principle, have a share in n_1, n_1 will

be considered as equal to n and X_{10} will be computed as an average (X_{10} = P_{21}). As an average, the final renumeration of the individual fishermen will be, therefore, equal to ($S+S_1$). If all the 'executive' members of the crews (the 'bosun'; the 'second bosun'; the 'head-man' - whose duty is to check the damages to the net and the canoe; the clerk; the controller; the foreman) are included in n_2, this latter will be equal to 7 and as average, $X_{20}=P_{22}$. The number -n_3-of-net-menders not being provided, it is not possible to compute S_3, even as an average. By using the equations in Table (b), we have:

crew size	n	n'	n^2	S	S_1	$S+S_1$	S_2
40	40	40	7	.28%	.83%	1.11%	2.7%
50	50	50	7	.22%	.67%	.89%	2.8%

In the preceeding modality of labor renumeration, the dramatic discrepancy between shares is a striking fact with an average crew of 40, S_2 double the average earning of an ordinary fisherman and is 10 times as much as what gets a 'penalized' crew member whose share would be limited to S. Then crew size goes up, the officer's share decreases absolutely, but increases relatively to almost three times ($S+S_1$) and more than 11 times S.

The forms of specialized labor renumeration constitute one of the crucial issues in Ewe seines catch share-out, which needs a much more detailed field investigation than what has been so far available. Hill (1970) notes briefly that other possibilities are usually practiced in Ewe shore seining, including the case where no S_2 is attributed but where officers get a greater share of S_1 and the case where they get a fixed sum before the formal catch division; as for instance, 10 to the

bosun, 5 to the 'second', 5 to the clerk, 2 to the man directing net hauling. In the town of Muniano described by Wyllie (1969), the discrepancy between officers and ordinary fishermen is somewhat less dramatic, with the 'bosun' receiving about 50% more than the ordinary fisherman, the second receiving 25% more and the clerk, 10 % more. The ratio K/L is the same as in Hill's example: P_1 = 33.33%, p_2 = 66.67% For a crew of 40, with only this 3 officers receiving an extra share, we would an average S of: S = 66.67 = 1.63% P, whereas the 'bosun' would receive 1.83 + .816 = 2.45%P, the 'second' would receive 1.83 + .816 = 2.04%, the clerk would receive 1.83 + .816 = 1.79%.

In reality, the difference between the bosun's renumeration and the lowest paid fisherman, was likely to be much wider than the ratio 2.45/1.63 since, as recorded by Wyllie, differentials among ordinary members arose from factors such as work attendance, penalties for non-attendance, eagerness and diligence displayed. Throughout the season, exceptionally good workers being given such a bonus.

With regard to the ratio P_1P_2, Hill notes that the net owner profit can be higher than 1/3 of P and was, in 7 out of 9 cases studied, lying between 33.3% and 42.8% of P.

A last situation found in Ewe beach seining is the 'mavee' system of hired-net where the net owner is an absentee-capitalist who is not even present to oversee the daily operations of the beach seine. In the rare case of 'mavee' net-hiring, the catch proceed is shared 50/50 between the net-owner and the company operating the seine set ($P_{1=}P_{2=}50\%$). One peculiarity of this system is that all E_1 are borne by the owner out of the net's share. The 'mavee' is, therefore, a high profit/high risk system in which the net-owner may be ruined if his/her net is severely damaged during operations.

Large cooperative ventures

A final form of catch sharing is found in the cooperative, or corporate, association of fishermen operating large net units. Two cases illustrate the principles of catch sharing in such units: the case of Nyominka association - the 'susete' - operating a large shore seine and that of Fante migrant companies in Liberia, using two canoes, three variety of nets and outboard motors. In both cases the material is collectively owned and the catch proceed equally shared among company members after deduction of expenses and after the repayment of the company's debt, if any (Van Chi, 1977; Christensen, 1982).

In the Nyominka association, functioning also as a food and mutual help cooperative, special fishing trips are organized to pay taxes, support older members or meet other needs of the company. Regular sharing modalities are simple since $P=P_2=P_{20}$. For a company of 40 men, S=2.5% of P, for a 30-man company, S=3.33%.

Among the Fante migrant companies, the situation is more complex, given that the material is generally financed by high-interest loans from money-lenders. According to Christensen (1982:270), a company stays together approximately five to six years, the profit from the two first years being used to repay the company's debt. The average company consists of twenty adult males, four to six apprentices in their late teens and eight to ten wives of fishermen. Adult fishermen receive 1 share each; apprentices and women have a one-third share in the company. If we consider that P_2 start taking substance only after the debts are paid, we have the following results:

number of operating years	number of women and apprentices in company	n	P_1	P_2	S	S^1
5	12	24	40.0%	60.0%	2.5%	.8%
5	15	25	40.0%	60.0%	2.4%	.8%
6	12	24	33.3%	66.7%	2.8%	.9%
6	15	25	33.3%	66.7%	2.7%	.8%

B. Issues in catch sharing

General findings are generated by the comparative study of sharing modalities: 1) As the instrument of production and the technological tools in artisanal fishing moves from simpler to more complex forms, the amount of the surplus product appropriated by the owners of the means of production increases proportionately (see Summary, Table 7). In the smaller production units, including the Senegalese surrounding gillnet, the proportions of the surplus returning to labor is approximately 70% to 80% while in the most advanced forms of purse and beach seining, along with 'Adee-Ahwea' fishing, it ranges from a high of 70% to a low of 33%, with a most frequent ratio evolving around 50%. The evolution of Ghana Adee fishing, observed over time, shows that the same trend applies to a single unit type undergoing significant transformations in the size and the cost of the instruments of production put at work. The increase of capital's share of the surplus from 30 to 40% in 1967 - Cape Coast to 42 - 56% in the same area in 1973, directly parallels such transformations, observed by Christensen (1977;1982). Within these overall trends, beach seining is characterized by an apparent reversal. In the most 'advanced' forms of

Table 9: Summary of Surplus Product Appropriation by Capital and Labor and Their Constitutive Element in Selected West African Cases [P=1]

	Small Units		Surrounding Gillnets				Purse Seines		
	Ghana (Tenga)	Senegal (All)	Senegal	Ghanaian Adee-Case 1 Cape Coast, 1973	Adee 2 Biriwa, 1962	Adee 3 Cape Coast, 1967	Benin	Senegal Most Common	Senegal 2nd Case
(P_1)	20-25%	25-33%	18-30%	42-56%	35-47%	30-40%	30-40%	47-50%	67%
(P_2)	75-80%	66-75%	70-82%	44-58%	53-65%	70-60%	57-62%	50-53%	33%
S or($S+S_1$)	variable	12-17%	6-10%	4-6%	5-7%	5-7%	3-4%	3%	2%
S_2	-	-	-	-	-	5.5-7.5%	-	-	-
S_3	-	-	-	-	-	-	-	-	-

	BEACH SEINES				COOPERATIVE VENTURES	
	Senegal	Ewe Seines Case 1	Ewe Seines Case 2	Ewe Seines Case 3	Case 1 (Nyoninka)	Case 2 Fante Migrants in Liberia
P_1	51-52%	33%	33%	33-43%	0	33-40%
P_2	48-49%	67%	67%	57-67%	100%	60-67%
S or($S+S_1$)	1-2%	.90-1%	1.7%	.9-1.7%	3.3-2.5%	2.8-2.4%
S_2	-	2.5-2.7%	1.8-2.5%	1.8-2.5%	-	-
S_3	-	?	?	?	-	-

beach seining (among Ewe fishermen), the general return to capital runs from a high of 43% to a low of 33% while the ratio capital/labor was 50/50 in the 1950's (Lawson, 1958) and is approximately 51/49 in the family-based seines of Senegal. To understand the apparent discrepancy between the general freud and the case of shore seines, a recourse to other factors such as ownership, labor situation and the mode of production, appears as necessary and will be done later.

2) As technology moves from the simpler to the more complex, the individual fisherman's share of the surplus product declines steadily and in all circumstances. From a high of 17% - 12% in small units this share reaches a low of 3% to less than 1% in the larger and most labor-intensive units. This means that the economic distance between the owners of the means of production and the individual fish producer increases steadily and dramatically as does the relative pauperization of the individual fisherman. The ratio of owners to fishermen's share moves from a low of 2/1 in small line and gillnet units in Senegal for instance to a high of 10/1 in Adee units, 30/1 or 50/1 in beach and purse seining and the trend might be even more dramatic as cases of split ownership of equipment decreases with the increase in the size and cost of technology.

3) The basic structure of sharing modalities and its evolution correlated to technological transformations, appears primarily as a way to safeguard a maximum return to capital investment while maintaining a minimal degree (and sometimes an illusion) of 'fairness' in the renumeration of the fisherman. The development of productive technologies in artisanal fishing has necessitated increasingly labor-intensive forms of production. Parallel to the increase in crew

size, the share system has become increasingly complex. Initially, both capital and labor have been renumerated out of a single fund in which fishermen and the various instruments of production used were renumerated by individualized shares (line, gillnets, surrounding gillnets). Within a system in which the fisherman and the various instruments of production are renumerated out of a single fund and according to a set formula, any increase in crew size has a direct impact on the share accruing to capital and the individual fisherman. The rule given by the formula is that the increase in crew size leads to an increase of the return to labor as a whole and a corresponding decline of the return to capital and of the share allotted to the individual fisherman. The typical response of equipment owners has been in this first sharing modality to alter the system of shares by augmenting the number of parts allotted to the equipment. Notwithstanding the actual process of shares-setting in the fishing community and the input of fishermen in the determination of 'what is fair' the results of the new sharing modalities clearly reveal who benefit from the change. It is not a new equilibrium that is reached, but a greater disequilibrium in which the proportional share of capital is greater than previously. The individual fisherman bears most of the cost of the change undergone and sees his relative share decline even further. The evolution of Adee units appears as the best example of this case.

The second system of catch sharing, found only in the most labor-intensive units, beach and purse seines, in particular, shows the limitations of the system described earlier at the same time that it confirms, from the standpoint of equipment owners, the logic underlying

the evolution of the share system as a whole. The characteristic of this second form of catch sharing lies in the fact that from the outset, labor and capital are renumerated out of two different funds, two different parts; the result being that the fluctuation in the number of crew members have no effect on the profit made by equipment owners. In some instances (Benin purse seiners, Senegalese beach seines), only one portion of the share renumerating ownership is set aside, while another is integrated into the 'common' fund of the unit. As in the first case, this formula let the cost of crew size increase to be borne by the fisherman. In addition, it increases the degree of certainty for equipment owners with regard to their share of the profit and reflects a better 'position de force' of equipment owners in relation to crews. It has been seen, in the case of Ewe seines in particular, how this principle of separate parts for capital and labor has been even extended to the differential renumeration of labor out of a labor fund split into two or more different parts, having no effect on each other. In the last instance, the complexity of the situations encountered in catch sharing only reflects the simultaneous presence in the artisanal fisheries of production forms which in reality have a different 'age' and which in one snapshot lay before us the whole process of transformation of AM fishing in modern times.

2.4.2.2. Ownership, Capital and Market Forces

This preceeding analysis, done within the limited boundaries of production, has left out crucial exogeneous outside elements in isolation from which the mechanisms operating within the production

sphere would not be completely understood. The question of how is the surplus appropriated in artisanal fishing would not be completely answered without considering by whom it is being appropriated. An answer to that question requires an investigation of ownership patterns in the artisanal sector and of the very peculiar role of market forces in the circulation of capital.

a. Ownership

The question of ownership is important in understanding not only the question of surplus appropriation, but also to assess the real potential for capital accumulation in the artisanal fisheries. In other words, what is the impact of formal rights over the means of production upon economic appropriation and what are their effects on the possibilities for equipment owners to accumulate capital and expand their activities? How does the position of the fishermen evolve in relation to different patterns of ownership?

In the analysis of the technical relations of production in artisanal maritime fishing, four major patterns of ownership were distinguished in maritime fishing units:

1) The ownership of their own instruments of production by the producers themselves taken individually (cast nets, 'tenga' nets, small line units, etc.)

2) The ownership of their means of production by producers themselves taken collectively in cooperative ventures or corporate associations.

3) Family or lineal appropriation of the means of production. Part of the labor force has formal rights on the unit; another part is

'hired' and separated from the appropriation of their means of work.

4) Individual appropriation of the means of production. The bulk of the work force is totally separated from the legal appropriation of the means of work and sometimes from the control of the technical conditions of production.

The economic distance between 'owners' and producers is kept to a minimum in the first two forms of production and the possibilities of capital accumulation limited either by the size of fishing operations (despite the higher value of species caught by line units for instance, yield is much lower) or by the sharing modalities which put producers, if not on an equal footing, at least on a common ground whereas each producer is renumerated according to his input with regard to the equipment utilized. It has been seen that such units could sometimes be financially autononomous given the low cost of their technology or the nature of their cooperative arrangements but that others depends on loans from outside forces, essentially money-lenders for the constitution of their capital equipment. While the beach seines described by Van Chi (1977) and Balandier & Mercier (1948) succeeded in putting together their initial capital outlay by way of equal subscriptions by all members of the companies, the financing of the Fante companies operating in Liberia (Christensen, 1982), was done almost entirely by way of loans from kinsmen and particularly money-lenders. In this latter context, the total initial debt of a company could vary from $8,000 to $15,000. One money-lender alone was reported to have contributed $8,000 to start a company, while 38 companies operating in 1975 were reportedly financed by only two prominent money-lenders. Despite the greater possibilities of savings

in cooperative ventures, the possibilities of enlarged primitive accumulation are not totally obvious. In the cases already mentioned, the equipment is from the start a property of the company as a whole or becomes so as soon as the initial debt has been paid. The fact that no share is reportedly allotted to the equipment as the renumeration of 'collective ownership' means that while the revenue of the individual fisherman is considerably higher than in other similar units characterized by a different form of equipment tenure, the total surplus product of the company is fragmented and dilutes in the individual shares renumerating the fishermen. Production and reproduction are ensured; income is higher but expansion and primitive accumulation are limited.

Family and lineal appropriation of fishing equipment constitute a third, widespread pattern of ownership in fishing units. This third form of equipment tenure is a complex one, with regard at least to the two possible - matrilineal and patrilineal - systems of descent, not to mention cases of double descent. In addition, it is often difficult to assess the status of heirs, 'claimants' and owners vis a vis the means of product and first impressions gathered by researchers may often be misleading[57]. Family units are partly operated by members of the extended family and is the core of the work force in such units. As shown by the study of crew composition and work organization, the

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57 Quinn, (1970) for instance, was 'surprised' to learn that one boat, always spoken of as if it belonged to the man who actually managed, it was in fact the inherited property of his elder brother. This common situation is also found in units such as the Hann beach seine (Diaw, 1981) whose 'owner' has in fact no legal rights over the seine, other than being the 'Kalifa', the eldest chief and manager of the family and the seine.

principles supporting production activities are intimately dependent upon lineal organization in general.

Two important factors affect the actual disposal equipment profits and the possibilities of capital accumulation in general: the lineal character of the 'ownership fund' and the system of inheritance.

Generally, the funds accruing to the net, the boat and eventually the motors, are reserved, as in all fishing units, reproduction, renewal, and expansion of those equipment items. Despite the lineal character of equipment funds, owners are aware of the necessity to keep, as much as possible, the source of their production activitiy untouched. Given the rights of family members over the equipment, various family expenditures are thus financed out of the equipment fund and include family ceremonies, house building and repairing, education fees for family members and the financing of all types of special occasions. It is not rare, however, to see part of the profit go to a family fund used to finance activities other than fishing. Family members may also borrow, interest-free, from the fund (Lewis, 1977' Diaw, 1981; Quinn, 1971). Despite the willingness not to jeopardize the productive activity of family units, the social function of mutual help assumed by those units makes unavoidable for part of the surplus accumulated to evade the sphere of direct fish production.

Matrilineal and patrilineal systems of descent also affect the question of primitive accumulation in family units. Among Fante fishermen matrilinearity is still an important (and in some instances, dominant) component of the system of inheritance. The basic characteristic of the matrilineal system of descent which once was the dominant form of descent in the continent as a whole is that property

is inherited through the maternal line in function of a complex system of seniority. Matrilineal descent means that maternal brothers are first to inherit by order of seniority until the last of them has died. The generation of sister's sons then takes over following the same principle. In the third and successive generations, the system is becoming more complex with eligibility extending to all matrilineal descendants of the original owner according to two different principles of seniority: seniority of the line and seniority within the generation. As Quinn (1971) states, "the process of lineage segmentation beginning at the deepest geneological level is painfully familiar to students of African descent since the Nuer". What is most important however, from the standpoint of social analysis is the fundamental implication of such a system on the structure of ownership and primitive accumulation; the matrilineal system standing as a structural barrier to the individualization of ownership and preventing the control by one man and his sons, over the common property. This corresponds entirely to the historic function of the matrilineage as a 'gorde fou' against individual expropriation and capital accumulation as well shown by Diagne (1967) in his study of the traditional forms of political power in West Africa. The fact that among Fante fishermen today, the original owner of the equipment is free - not withstanding lineage pressures - to dispose of his property out of the lineage reflects a compromise very often present in communities maintaining a matrilineal system of descent within a global society demanding an increased individualization of ownership and inheritance rules in order for capital accumulation to become possible[58]. The shift toward

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58 For Diagne (Ibidem) the conflict between matrilinearity and patrilineal descent may date back to the Atlantic

patrilineality in the inheritance system of fishing units appears as a powerful, irreversible trend dictated by the increasingly capitalist environment in fishing communities. While Quinn and Gladwin were already mentioning the trend toward the emphasis on Fante crews ego-centered organization and the deemphasis of their basis on descent, Christensen found in 1973 that in a sample of 118 men, the 'preferred heir' came out to be a son in 75% of the cases against only 19% for a maternal nephew.

Such attitudes should not be taken lightly, for, they more fundamentally reflect the progressive individualization of ownership (which is different from cases of 'individual owners who turn out to be just the 'manager' of a lineage unit) at the expense of lineal ownership in general.

The increased individualization of ownership in artisanal fishing has been correlated in particular to the rising cost of fishing equipment, the increased separation of the individual fisherman from the means of work, and new a fact, the penetration of the sub-sector by non-fishermen including fishmongers, money-lenders as well as retired fishermen.

The situation found in one of the most advanced forms of individualization appropriation of the means of production in artisanal maritime fishing - Ewe beach seining - well summarized the entire situation. As shown by Hill (1970):

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trade in the Senegambia, at a time when social relations were being greatly shaken, domestic slaves turn into a commodity and the matrilineal system undergoing the pressures of part of the aristocracy eager to maintain the benefits from this volatile era within their own direct line.

> "Perhaps there was a times when most Anlo men who lived near the sea or the lagoon owned nets of one foot or another and certainly ownership of lagoon net is still widespread. But nowadays, the ownership of the main fishing net, the costly 'yevuder' is concentrated in a few hands and there are many active seine fishermen, including bosuns, who are not aspirant-owners. In an economic sense, a propertied class of net-owners had slowly emerged during the last half-century."

During the last decade, the hard-core of these net-owners consisted of the owners of large contractor built houses in Ewe areas, whose fathers owned nets before them. In a system based on direct patrilineal inheritance, individualization appears as directly related to concentration of ownership. Hill's mention of present 'yeonder' owners as offspring for the most part of former beach seine owners is confirmed by Wyllie (1969) who shows that out of the 11 company owners of the town of Muniano, 10 had either inherited their net or had a father net-owner. According to Hill, while many net-owners owned only one net and many others owned 2 to 4 nets, a few have concentrated in their hands a large number of nets, generally ten to mote nets. From the profit accumulated in fishmongerring, some women often act as net-financiers, if not net-owners while a few professional men and traders, attracted by this risky way of making money, also invest in production.

Central to the process of capital accumulation in Ewe beach seining is the 'Agbadoho' (or 'load of wealth'), a separate fund of working capital to sustain business, and which is comparable, according to Hill, to the funds of women traders. Net and 'agbadoho' are integrally related concepts, for the net is both a gain and concept. Hill (1971) says:

> "It is where sons begin to assume full charge of some, or all of their father's nets, or when a net-owner dies that the notion of 'agbadoho' necessarily crystallizes,

> so that there after, the son will say: 'this money is a central fund of my father's net'... Companies are temporary organizations, never reproducing themselves. Ideally, the net and the 'agbadoho' should live for ever."

Coming into existence through the net, and becoming progressively a separated capital fund with a life of its own right, 'not to be dissipated on food and other living expenses', the agbadoho represents the whole process of capital formation liberated from the bonds of the old society. It is thus no surprise that, given the intrinsic possibilities of capital accumulation in Ewe Beach seining, that the role of market forces in the financing and ultimately penetration of the production sphere appears as less significant then in other forms of fishing.

B. Fishmongers, Money-Lenders and Fishermen

The role of fishmongers and money-lenders has been the focus of considerable attention from social researchers in the marine area.[59] Because of lack of time and space, this study will limit the analysis of market foces from the exclusive standpoint of their impact on production and producers.

Middlemen, market-brokers in the maritime fishing area have often been the object of critical attacks from scholars as well as

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59 Studies done include: 1) On Senegal: CRODT, 1981; Cormier, 1981; Weber, 1980; De Fruge, 1980; Van Chi, 1967a; 2) On other African countries: Christensen, 1977, 1982; Schwimmer, 1979; Quinn, 1978; Lewis, 1977; Liesenmeyer, 1976; Kwei & Lawson, 1974; Gladwin & Gladwin, 1971; Gladwin, H., 1971; Couty, 1971; Couty & Durand, 1968; 3) General: Pollnac, 1976, 1982; McCay, 1981; Vanderpool, 1980; Lawson, 1977; Firth, 1946.

governmental circles. To some extent, it must be recognized that these attacks have often been unilateral and have led to bureaucratic schemes of marketing arrived at by-passing market-brokers without fully understanding the nature and the extent of their role and relations to fishermen in the artisanal fisheries. The result has been that, as pointed out by Lawson (1977):

> "In many countries, attempts to introduce wholesale markets on an auction market for fish trade have been met with boycotts... In all countries, the trader is seen as adding nothing to the real value of the product; he is considered to be a parasite and the real value of his trading functions as a risk-taker, a collector, assembler, organizer and redistributor is frequently unrecognized."

This aspect of Lawson's point of view is shared by others who also emphasize the multidimensionality of the role of market-brokers in artisanal fishing (Emmerson, 1980; Weber, 1980, 1982; Pollnac, 1982). This position is justified to some extent, by the very nature of sea fishing and the necessary division of labor between sea-goers and the people-originally, the wives and female relatives of fishermen - in charge of the marketing, processing and redistribution of the product on land.

> '...A fisherman's many hours at sea are physically exhausting and when he arrives at shore, he usually does not have the...energy to process or distribute his highly perishable product." (Pollnac, 1982)

The basic functions performed by a host of intermediaries linking the product landed on the beach to the consumer are therefore vital to the survival of the small-scale industry. These functions include the servicing of large areas and the development of transportation means which are recognized to be costly in conditions where roads and communication networks are often sufficient, the product highly

perishable in a tropical and sub-tropical environment, and credits from banks controlled by other business interests, very scarce (Crodt, 1982; Weber, 1980; Lawson, 1977). Not only are the fixed costs, related to the purchase and absorption of the depreciation of the vehicle as well as the payment of various taxes and dues, high, but variable costs - particularly in the marketing of fresh fish - are even higher given the constant need for ice, gasoline, salaries, commissions, maintenance and repair of equipment (Crodt, 1982). In addition, despite often misleading appearances, fish dealers have generally been very efficient in developing a large web of information circuits in order to cope with the chronic fluctuations of supply conditions is sea fishing. Finally, fishmongers and money-owners, in general, have long been a much needed source of credits and loans to fishermen, particularly in times of off-season or bad harvest, in situations when whole units could find themselves completely broke after an accident, or in case of a unit's incapacity to make necessary investments in fishing equipment. But relations between fishers and traders have never been unilateral; rather, the terms of trade between fishermen as a group and fishmongers, in general, have largely been favorable to the latter. Because originally most fishmongers did not have the capital necessary to buy - cash on the beach, catch were and still are given to them on credit. This means that generally, fish traders do not have 'to buy in order to sell' and merely revising a number of areas, in return for any portion of the surplus value above the amount set as a result of her/his bargaining with fishermen. Fishmongers are, in reality, entitled not only to any profit made above the beach price but also to a commission (10% both in Senegal and Ghana) on the amount returned to

fishermen. Moreover, if the broker has suffered a loss in marketing the catch, he/she has in addition, the possibility to have the original beach price reassessed and reduced (Crodt, 1982; Gladwin, 1971; Christensen, 1977). In some instances, 'advances' from fishermen are even granted to fish dealers in order to help them start a business (Crodt, 1982).

Today, with a process of concentration of marketing functions developing in many artisanal fisheries, some large-scale dealers have acquired the possibility to purchase whole catches with the up-front money. Some have also become 'big' money-lenders, loaning to fishermen a portion of the capital accumulated from profits made by selling fishermen's catch. Despite all appearances, qualifying fishermen/fishmongers relations as 'symbiotic' and 'mutually beneficial' is to evade a number of issues and take appearances for substance.

The overemphasis of the 'services' provided by market-brokers to fishermen, can easily lead to dangerous interpretations of the social relationships within the sector as a whole and to a number of assumptions characterized by clear ideological overtones. Lawson in particular, goes very far in that direction:

> "Motivations for lending by fish traders are not, on the whole, for the extorsion of a high rate of interest, but mainly for the specific purpose of securing regular supplies of fish and for ensuring a continued business relationship." (1977:49)

and

> "Before imposing the capital risk-taking function of vessel ownership on small-scale fishermen, it should be realized that it is not easy to make entrepreneurs out of people who, for decades, have been dependent on the work created by the risk-taking of others. . . .As in the case of low-income rural producers, it is likely that the small-scale fisherman's greatest need is primarily for a subsistence level of income. This is a

> fundamental and very common motivation in both small-scale fisheries and traditional small-scale farming throughout the world. It might be said that the price paid by the fisherman for a secure level of subsistence is his willingness to enter into a perpetual-debt relationship with the financier-trader." (Lawson, 1977:49)

In short, artisanal fishermen are content with their low level of income and the mere reproduction of their labor at the subsistence level; they are 'willing' to enter into a perpetual-debt cycle with the financier trader; they are grateful for the work created by the risk-taking of these latter who are motivated by no more than the mere desire to secure a regular supply of fish for a self-sustaining business.

On all counts these assumptions are wrong and systematically inverse the true nature and history of the fishermen/trader-financiers relationships in artisanal fisheries. To a certain extent, they contradict Lawson's own assessment of the situation in Ghana where she notes that until the late 1950's:

> "Fishermen are usually able to raise money from fish traders for the purchase of equipment, but in return the trader expects the fisherman to pass all his catch to her. This arrangement is usually of great benefit to the fish trader who not only secures a regular supply of fish but is able to charge a high rate of interest, which is not always specified at the time loans are made. . .At times, it seems almost impossible for the canoe fisherman to escape from the hold which fish traders have over them." (Lawson, 1974:131-132; emphasis added.)

Moreover, in 1952,

> "Many fish traders were able to get high rates of profit; business carried few overheads and with very little capital involved and high rates of turnover, their trade involved little risk." (Ibidem:140; emphasis added.)

These last elements are much closer to reality. Although the amount of risk may vary significantly between fresh- fish and

processed- fish (largely the case in Ghana) marketing, risk in fish trade as a whole is not to be overestimated. In addition, whatever might be the 'services' provided by professional traders and money-lenders, the chronic indebtedness of some fishermen toward these latter is never voluntary. 'Perpetual' debtor-client relationships turn out to be forced upon the fishermen and are largely the result of high, usury interest rates (often 50%). In Sierra Leone where the rate charged by traders is 40%, 57% of the fishing units surveyed in 1974-1975 borrowed regularly from their 'customer'; 70% of the borrowers had remained currently indebted to their money-lenders (Liensenmeyer, 1976). Payments are generally made in kind (raw/smoked fish) and usually valued at 8% to 11% less than the market price at the time of the repayment. While loans are outstanding, fishermen are obligated to sell only to their creditors. As Liensenmeyer (1976) points out: "This provided the wholesaler with an assured source of suppply and a monopsonistic bargaining position". Such a practice is widespread in West Africa. In Ghana, Christensen (1977) gives the example of a market women lending 800 cedis to a unit in order for that latter to buy a motor. Consequently, she is to be repaid 1200 cedis (interest is not compounded), is entitled to the motor's share and also to the right of purchasing the crew's share as well. According to Christensen, it is not unusual for repayment periods to equal the life of a motor and the process often repeats itself. In this second form of tied-loan, the very status of ownership is open to question for not only does the loaner market the whole unit catch and gets the usual extra profit, but in addition, she/he receives the part of the surplus normally attributed to the equipment. Market-brokers involvement into

production and their action on production relationships is therefore multi-faceted.

Besides the financing of equipment and the second form mentioned, which at best can be considered as a modality of extracting absolute rent, outright rent of equipment and direct ownership of part or a totality of a fishing unit's equipment are frequent today and reflect a process of vertical integration of some production units into the overall activities of capital-owners in the artisanal sector. In Ghana, ownership by non-fishermen was rare in 1950, but by 1974, the catching gear was owned or financed in a majority of cases by non-fishermen, most of whom are market-brokers (Christensen, 1977). In a sample of 80 units drawn from five fishing communities, Christensen found that fishing equipment were owned in 79% of cases by non-fishermen, including men and womne. In Senegal, a similar but less dramatic trend has been noted, since particularly, the introduction of large purse seine units which radically altered the organic composition of capital and made returns on capital investments highly profitable - and therefore attractive - to capital-owners previously entrenched in the marketing sector, known as 'mareyage'.

It thus appears clearly that there are two distinct phases in the development of merchant capital in West African artisanal maritime fisheries. Risk is an inherent dimension of sea fishing and it makes little sense to portray fishermen as non-risk-takers. Investment on gear, boats, motors and other equipment items represent a considerable amount of capital and bears serious risks given the material conditions of production in fishing (Breton, 1977). Risk and uncertainty manifest themselves not only in the financial and social hazards of fishing but

in a physical aspect as well; fishing is one of the most physically hazardous occupations (Vanderpool, 1981). Therefore, in their incipient phase of capital accumulation, capital-owners prefer to invest in the marketing, processing and transportation sectors of a fishery, leaving the responsibilities of production to the small producer. This latter, until then, retains as illusion of independence (Breton, 1977; Faris, 1977; McCay, 1981). In fishing, within the initial conditions of petty commodity production, trade and usury thus constitute the essential field of action and source of profit for capital. Lingering at the periphery of production, merchant and usurer capital are, during that period, the very forces expropriating part of the value created by 'the risk-taking of others', as it appeared so clearly in Ghana in 1952.

At a certain point in the development of capital, a number of conditions appeared in the production and exchange spheres of artisanal fisheries, that make direct involvement in production attractive. On the one hand, productive investment is a way for large-scale fishmongers to strengthen their position vis a vis other competitors and not only maintain (Breton, 1977), but also expand their value of exchange; on the other hand and largely as a result of the introduction of new performing technologies, favorable terms of return on investment in production, become a powerful magnet attracting rish fish-dealers and also capital-owners coming from other fields of activity (agriculture, administration, usury, etc.). As a whole, this new process is characterized by a two-fold phenomenon of concentration, horizontal and vertical, and an increased differentiation of the agents involved in exchange and in production.

On the exchange side, it must be clarified that the terms of 'fishmongers', 'market-women', 'money-lenders', etc. can be misleading on several counts. First of all, not all fishmongers are money-lenders, and not all money-lenders are fish dealers. Some people in the artisanal fisheries are exclusively money-lenders, i.e., usurers. A few, powerful fish-dealers are also involved in production (financing, renting, owning equipment). A large number of them have their activities limited to the marketing or retailing of fishery products.

Secondly, the definition of fishmongers as 'women' is often misleading, for at least two reasons. First, in almost all West African countries, the sector of fish marketing is being penetrated by male entrepreneurs who in Senegalese fisheries, for instance, make up the bulk of the wholesaler fish-brokers - the 'mareyeurs'.

Secondly, gender does not suffice to define socially the position of women in the market chain for, alongside powerful female wholesalers and money-lenders, it is found a host of other situations where women are involved in the mere carrying up the beach (Quinn, 1971; Gladwin, 1971). Women traders may also be organized in 'companies' of 4 to 8 pooling their 'shares' of the catch and selling in bulk (Lewis, 1977; Crodt, 1982). They may also be small retailers on the beach or at the market-place or play the role of 'commissioneers' for the fishermen (Crodt, 1982). As a whole, including male and female traders, the whole marketing link might involve as much as 4, 6, 8 or more intermediaries, all occupying a different position in the process. The links existing between market-brokers and fishermen also differ widely. Together they may form the traditional economic unit in fishing and

fish marketing as husband and wife, fishermen and fish traders may also be linked by complex relations of kinship, religious affiliation or 'clientele' (Cormier, 1981), traders may merely play the role of commissioners for fishermen as well as they may be their 'landlord of the sea', to use McCay's (1981) expression. Profits made by these latter are in no way comparable to that of small intermediaries or retailers. In general, the larger the scale and concentration of the business, the larger the profit made. In Ghana, according to Christensen (1977), a market-broker controlling through loans, the totality of a unit's equipment could easily make - by conservative estimates - a profit of 25% over beach prices. In addition, it was not uncommon in 1974, for entrepreneurs of that scale to also have ovens for smoking and retailers to work for them. In Senegal, the net margin (the difference between selling and buying prices) made by large-scale 'mareyeurs' operating 10 tons vehicles is approximately 165 times greater than the net margin of fish dealers equipped with a 1 ton vehicle. In the first case, 94% of the value added constituted in pure economic profits against 20% in the second case (Crodt, 1982). Thus it appears that despite the persistance of a large number of small-scale fish traders in the marketing sector of the artisanal fisheries, this sector is being increasingly differentiated and characterized by a few poles of concentration. This horizontal concentration of merchant capital activities is intimately correlated to its increased penetration of the production sphere and to the vertical concentration of its activities, made possible by the relative weakness of small prodcuers. It has already been seen that the evolution of the sphere system and of the relations of surplus appropriation at the restricted

level of production has taken place in terms generally unfavorable to the ordinary fisherman. It should be added that until a certain point, even in the Ghanaian's 'adee' units, the effective potential for capital accumulation by equipment owners have been limited not only by patterns of ownership but also by the high cost of unit maintenance and the fluctuations and insecurity in fish catches (C_w). In 1967 - Biriwa, it is reported that the cost of repairs and new equipment outstripped the amount set aside for that purpose (Quinn, 1971). The same phenomenon also existed in Cape Coast at that time, where in a sample of 11 boats, all but one needed repair or new equipment 'to a cost greater than the total profitability of the fish caught'. (Gladwin, 1971). In such conditions, frequent in small-scale fishing, equipment money has to be supplemented by extensive credit and loan practices in which fish-dealers and money-lenders play a role of overwhelming importance. This role has been facilitated by the progressive monetization of economic relations in fishing and the full scale development of petty commodity production. Today the cash payment of crew members has become the rule in maritime fisheries and has replaced the old practice of sharing the catch in kind in which each crew member was responsible for the marketing arrangements (generally with wives and relative) concerning his share. Now, in a large majority of cases, the catch is sold in bulk to one or several wholesalers and the sharing done only after payment has been made on a daily, weekly, monthly, or seasonal basis.

The rising cost of fishing equipment coupled with the introduction of new expensive techniques has also been of significance in the increasing importance of money-owners in the artisanal fisheries.

Between 1970 and 1974 the cost of equipping a fishing unit to Ghana had increased by approximately 1000% (Christensen, 1977). In Benin, between 1972 and 1978, the price of an average surrounding gillnet had doubled and that of a gillnet ('tonga') tripled, while the cost of a medium-size beach seine had also more than doubled between 1970 and 1971 (Pliya, 1981). In Ewe beach seine fishing, the transition from cotton nets to nylon nets also implied three times more investment in the net (Hill, 1970). In Senegal, the cost of an average purse seine canoe in 1980, was approximately 10 times that of a small dug-out and could be as much as 20 times as high (Weber, 1980). All of these conditions have reduced the ability of petty commodity producers to self-finance their business and also the ability of the extended family or lineage to support the fisherman by providing him interest-free loans. As already mentioned, the new expensive fishing techniques ('Ahwea', purse seining) are also more productive and yield a return of capital investment that might be even higher than in beach seining, which, we said, had an advantage over other 'old' techniques. In Sierra Leone, for instance, the net profit made by units operating large ring nets and Fante boats using 25 HP engines, was 2 to 9 times that of smaller 'Salla' ring-net units in 1975 and about 16 times the profit made by a non-motorized unit (Liensenmeyer, 1976). In Senegal, a survey of 8 fishing centers in the Cape Vert region showed that purse seines generate a profit per units six times larger, on the average, than other motorized units (Crodt, 1982).

The sum total of all of these conditions, summarized by the weakening of the economic position of the small producer and the small fish-traders, on the one hand, and by the increased profitability of

both production and marketing resulting from the increase in the scale of both activities, on the other hand, are favoring the on-going concentration of the economic activity of capital-owners at the level of marketing as well as production. This process of concentration/differentiation constitute today one of the most significant trends characterizing social relationships in the artisanal fisheries.

Conclusion

This comparative analysis of the social relations of production in the artisanal fisheries of West Africa portrayed the interrelationships of components of the modes of fish production under varying historical, biological, and societal conditions.

Several forms of production were identified as well as the most significant variables affecting - and being affected by - change in the sector. Heterogeneity, rather than homogeneity, is the rule in fish production. Several authors have already tried to identify the mode of production in fishing, usually by relating it to the mode of production characterizing the landed - peasantry (Faris, 1977; Vercruijsse, 1980; De Fruge, 1980; Hendrix, 1983; McCay, 1981). Such an approach was originally suggested but not systematized by Firth in his masterpiece on Malay fishermen. According to Hendrix (1983:9),

> "the peasant mode of production has been distinguished in the following manner: that the producers have direct access to the means of production; that the family is the basic labor unit, and that both production and commerce is oriented and organized within this context; that the work unit operates according to the law of subsistence rather than the law of value; and that the family is integrated into a larger social economy in which their surplus production is regularly appropriated in one form or another."

Epistemologically, this approach is legitimized by the necessity to overcome the 'taxonomic problem' in the study of fishing communities (Faris, 1977; McCay, 1981) through the focus on social relations of production - i.e., 'the similarities of organization, planning and social relations of production' - in fishing and farming (Faris, 1977; Hendrix, 1983).

However, as acknowledged by Hendrix (1983:9-10), the

classification of fishermen as peasants has proved problematic with regard, in particular, to resource ownership in fishing and farming. In addition, the concept of 'peasantry' is probably one of the most nebulous in the social sciences today (Breton, 1981:18). In West Africa, this analysis of artisanal fish production revealed, that little is left of the old peasant economy described by Hendrix. Despite the persistance of a certain amount of kinship determination, the identity of the production unit with the domestic group is, in the context of intense labor mobility, at an advanced stage of dissolution. At the same time, the law of value, the principal regulator of exchange, has paved the way for an increased differentiation of production units as well as the penetration of merchant and usury capital in the production sphere. A mode of petty commodity production[60], whose emergence dates back to the colonial period, is today the principal form of production in artisanal maritime fishing has provided the basis

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60 In petty commodity production, the means of production and the product of labor are appropriated by producers without the intercession of a class of non-producers within the production process. However, both the division of labor and money exchange have already separated the producer from the direct control of his product. Apart from a small portion of his production, this latter is, essentially, sold on the market. The exchange sphere is therefore the locus where non-producers can capture part of the surplus value while the monetary character of exchange creates a potential (absent in barter trade) for capital accumulation through trade, credit and usury (Marx, 1967; Mandel, 1968; Amin, 1976). Capitalist production is distinguished from petty commodity production by three conditions: 1) The means of production and the surplus value, in capitalist production, are appropriated by a class of non-producers; 2) The direct producer is totally separated from the control of his means of production; 3) Labor power is transformed into a commodity paid mostly through wages - according to its price on the labor market (Ibid).

for a primitive accumulation of capital both inside and outside fish production. However, petty commodity production in artisanal fishing is, itself, undergoing rapid modifications as can be seen in the different forms it is taking ('free' or corporate associations, family-owned units, etc.) and the recent emergence of production units characterized by a capitalistic mode of organization and appropriation. This trend toward capitalist units of production in marine fisheries is characterized by radical changes in the organization of production, by the development of absentee ownership, by a process of heterogeneization, fragmentation and hierarchization of the labor force and by important modifications in the share system which appear finally as a disguised form of wage renumeration.

The analysis of West Africa fishing communities shows, therefore, that the trends noticed by Firth and other scholars more than thirty years ago, and in various points of the world, are also present - in specific forms - in the West African region. In addition, the use of a comparative approach in the study has made possible the identification of the similarities and differences in the general social organization of fishermen in the region and in the organization of their productive activities. The 'reading' of such similarities and differences has been greatly facilitated by the breakdown of the concept of mode of production into its various components and their detailed analysis.

One major, unforeseen breakthrough has been the unraveling of the underlying principles of the share system in artisanal fisheries. The elaboration of a mathematical formula describing those principles may add to the substantive findings of the study, a valuable methodological input. In particular, it can help estimate income and profit in

fishing units with only a minimal amount of information on the production unit, its size, its sharing system. For example, information gathered from a few fishermen could, hopefully, provide a solid basis for estimating an equipment-owner's profit. This type of data are, presently, very difficult to obtain in field research.

While it is hoped that this work may bring something of value to the study of maritime fishing communities and, more generally, to the sociological investigation of the labor process in an area of primary production, one must remain fully aware of its limitations. The painful investigation of the literature, in particular, has confirmed that the most reliable, relevant and complete data for a specific research project are best found through direct field investigation. This study lays down a number of theoretical leads that will be, hopefully, completed and corrected by further field research and further collaboration among researchers in the marine area. Its main findings are illustrated by the following figures and tables which are meant to be, in the perspective described earlier, a 'working model' for the analysis of fish production. Potential areas of research beyond the production sphere in artisanal fishing, are also illustrated by figures breaking down some of the variables to be investigated in fish processing, marketing and consumption.

Figure (15) portrays the basic relationships among the components of the fish production systems. It shows that not only are the components of the mode of production are tightly interconnected, but also that they are closely related to market forces and the organization of production in fishing communities and to larger historical, social and political-economic conditions. Figure (15) summarizes the whole line of the thesis.

Figure (16) visualizes the most significant trends affecting social relations of production in contemporary coastal fishing in West Africa. It emphasizes the place of ecology and the role of technological transformations in setting in motion such trends without neglecting state intervention and the action of market, finance and credit in the overall process. The social conditions of production in West African artisanal maritime fishing, however, are not totally described by Figure (16) which portrays only the tendencies which, analytically, are the most significant in terms of social dynamic - the 'heavy trends' - in coastal fishing.

Table (10) and Table (11) describe, precisely, the wider range of 'static' situations found in the sector. They show the relations of correspondence between the four forms of production analyzed in the thesis and several dimensions of the relations of appropriation (Table 10) and of the technical conditions and relations of production (Table 11).

Figures (17) and (18) isolate the two central agents competing for surplus appropriation in coastal fishing: the capital owner and the fisherman. Figure (17) shows the state of capital accumulation as a variable of economic appropriation (R_{21}) on one hand and formal ownership on the other. Figure (18) describes the variables intervening in the determination of a fisherman's total revenue, including the cost of reproducing his labor power (living expenses) and other, eventual sources of income.

Finally, because the fish 'circuit' is a complex totality which includes not only fish production but also, other 'moments' of the system, potential avenues for future research are opened through the

Figure 15 : Basic Relationships in Fish Production

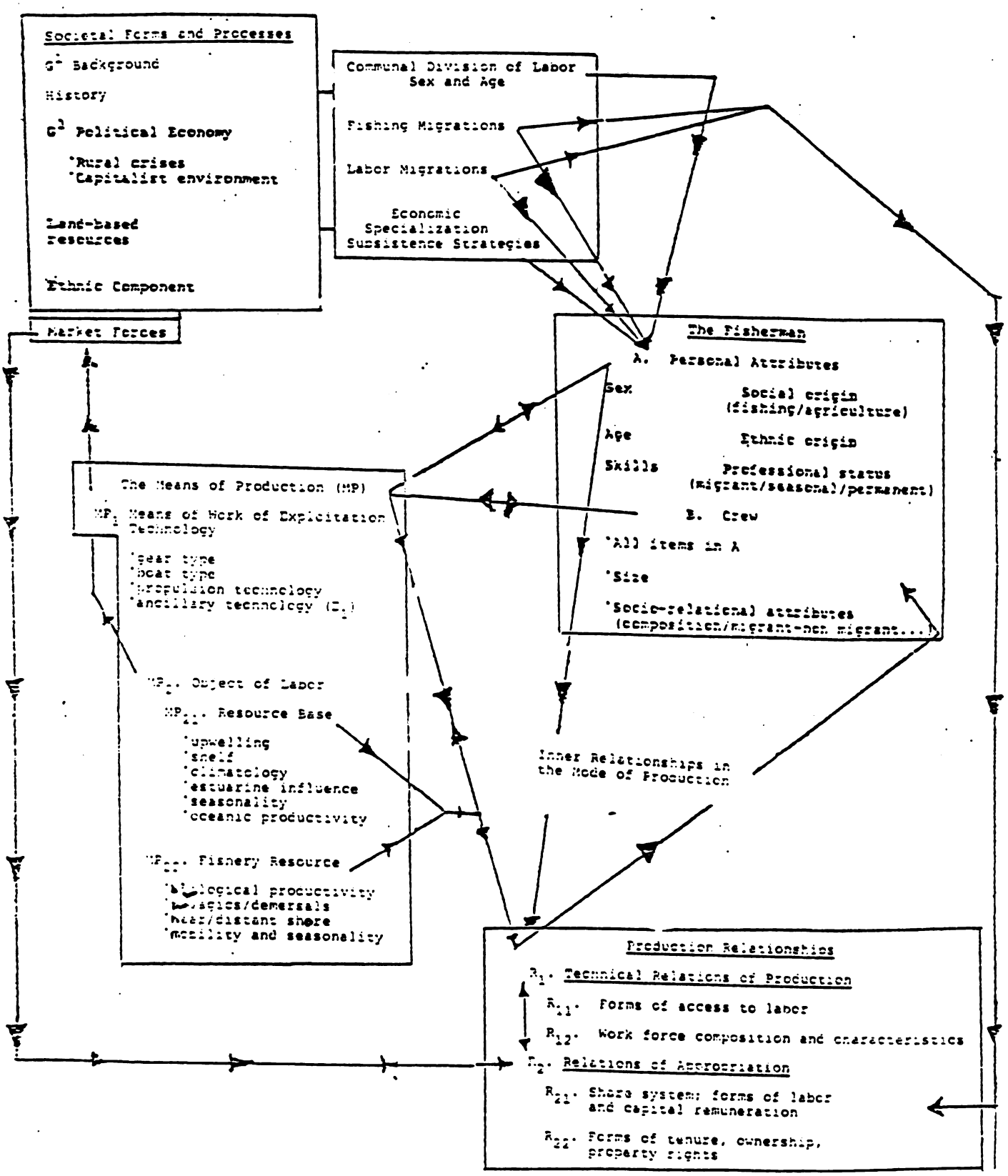


Figure 16: Techno-ecological Impact and "Heavy" Trends in the System and Mode of Production

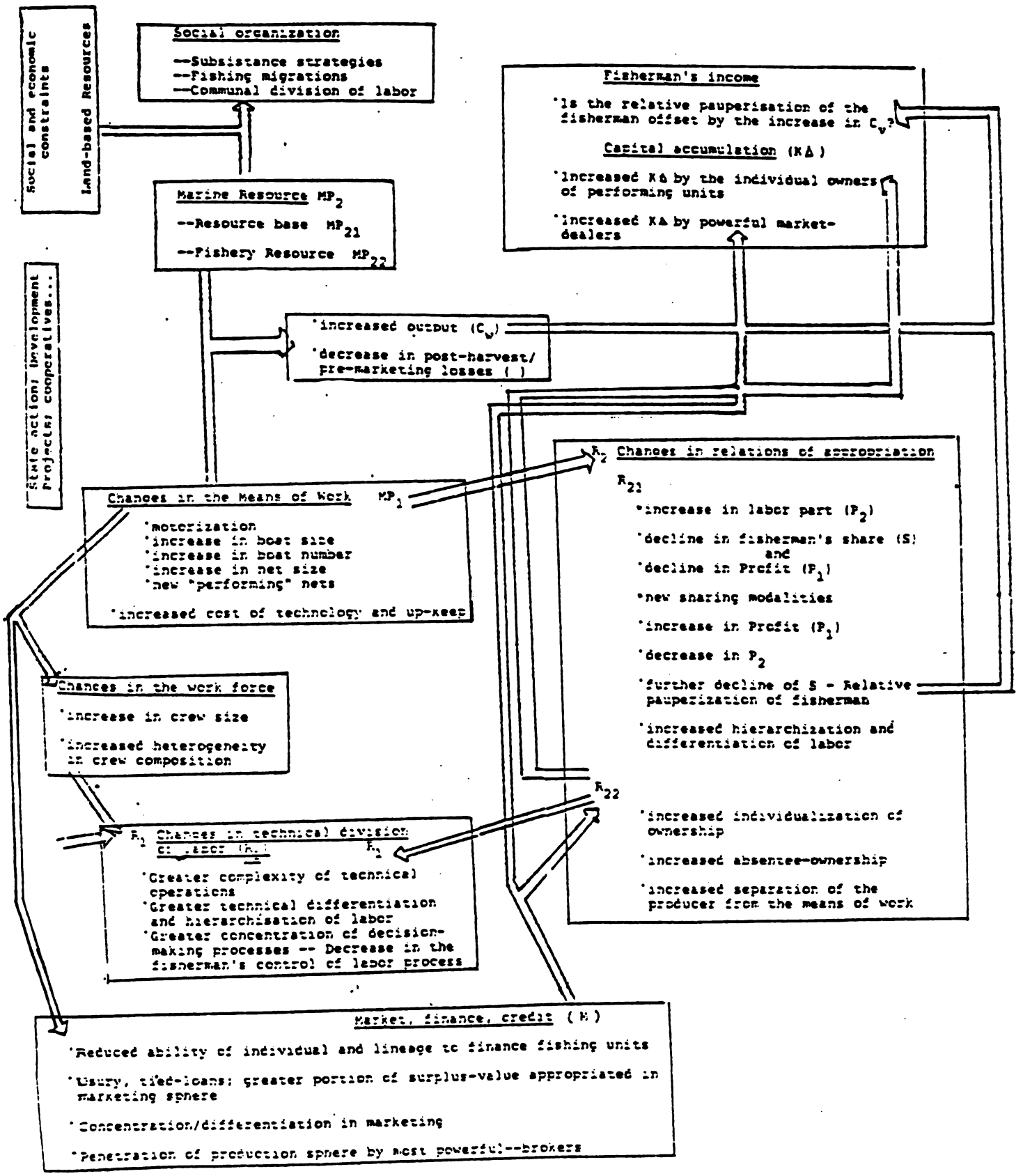


Table 10: Relations of Correspondence Between the Modes or Forms of Production and the Relations of Appropriation

	Ownership	Relation of Fishermen to MP	Fisherman's Income	Economic Differentiation of Labor	Profit(P_1)	Potential for KA
Free association of individual producers in petty commodity production (PCP)	Individual	Entirely owner-operated	High	Low	Low	Low
Corporate association of producers under conditions of PCP	Collective	Entirely owner-operated	High to intermediate	Low	Low	Low
Kinship-based units under conditions of PCP	Family or individual with family input	Mixed: some = related to MP_1 through kinship/others = separated from MP_1	Intermediate to low	Low	High	Intermediate
Privately-owned units under conditions of capitalist production	Individual	Totally separated from MP_1	Low	Low to very high	Intermediate to high	High

Table 11: Relations of Correspondence Between Modes or Forms of Production and Technical Conditions and Relations of Production

	Unit Size	Nature of Labor Process	Technical & Social Differentiation of Labor	Fisherman's Participation in Management & Command	Recruitment & Access to Crew	Crew Stability
Free association under PCP	Small	Simple cooperation	Very low	Extensive	Crew: mutual agreement	Optimal
Corporate association under PCP	Large	Extended cooperation	High technical/low social	Extensive	Crew: mutual agreement	High
Kinship-based units under PCP	Medium to large	Extended cooperation	High	Fair to little	Recruitment: sponsorship by owners & family	Low
Privately-owned units under capitalist produc-	Large	Extended cooperation	High to very high	Excluded	Recruitment: individual owner or foreman	Intermediate (contractual) to low

Figure 17: Capital accumulation as a variable of relations of appropriation

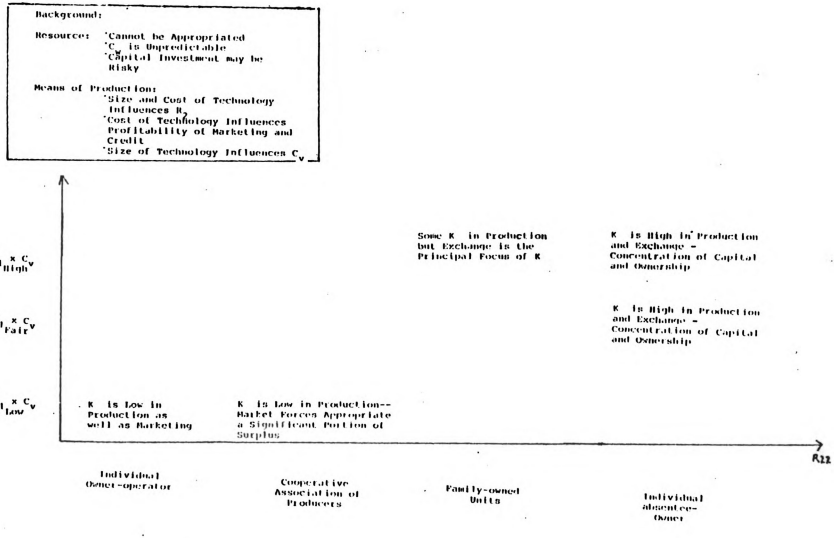


Figure 18: Variables in Labor Remuneration and in the Determination of Fishermen's Income

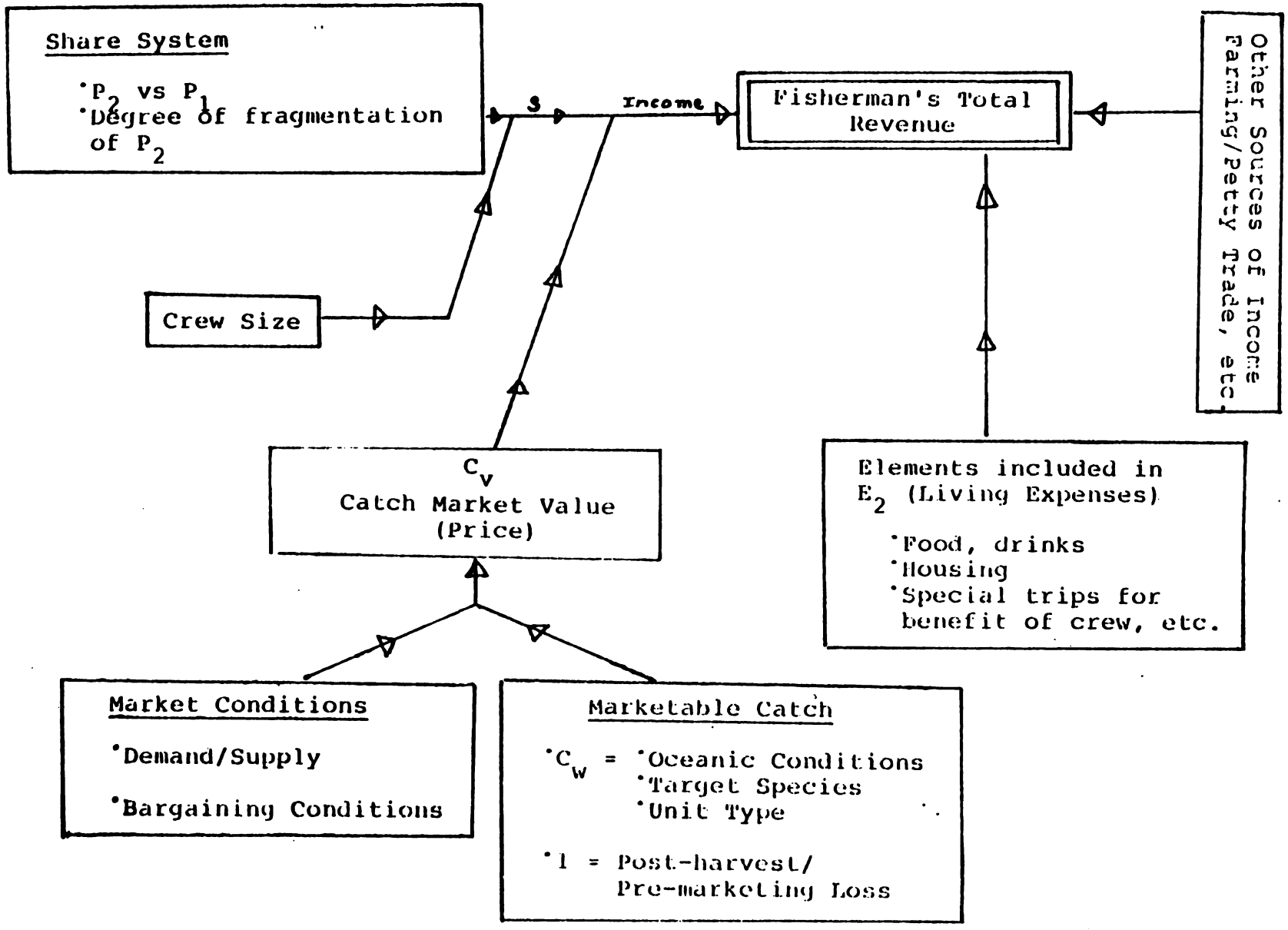


Figure 19 : Processing Sector : Variable Breakdown

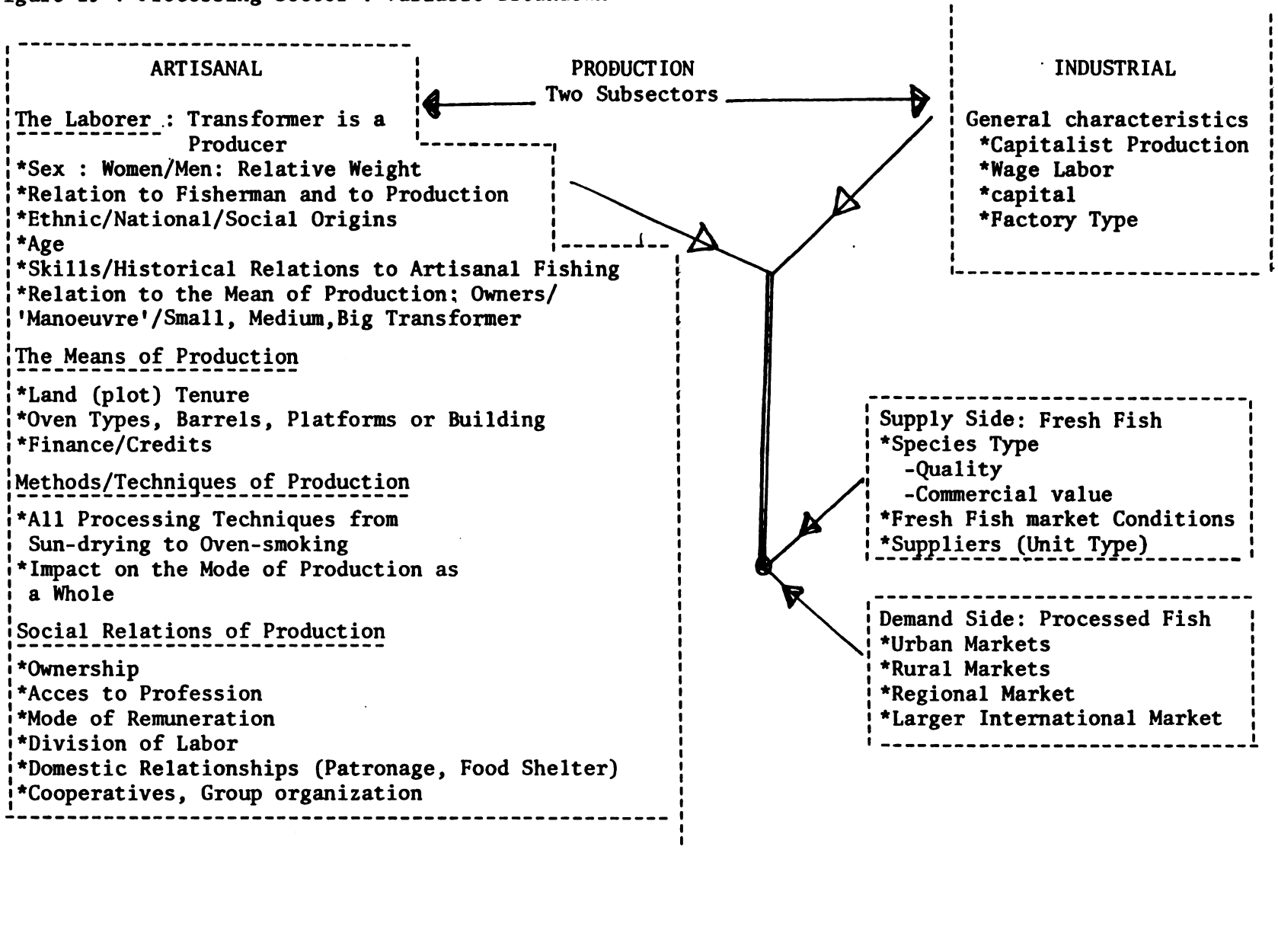


Figure 20 : Marketing and Distribution Sector (Variable Breakdown)

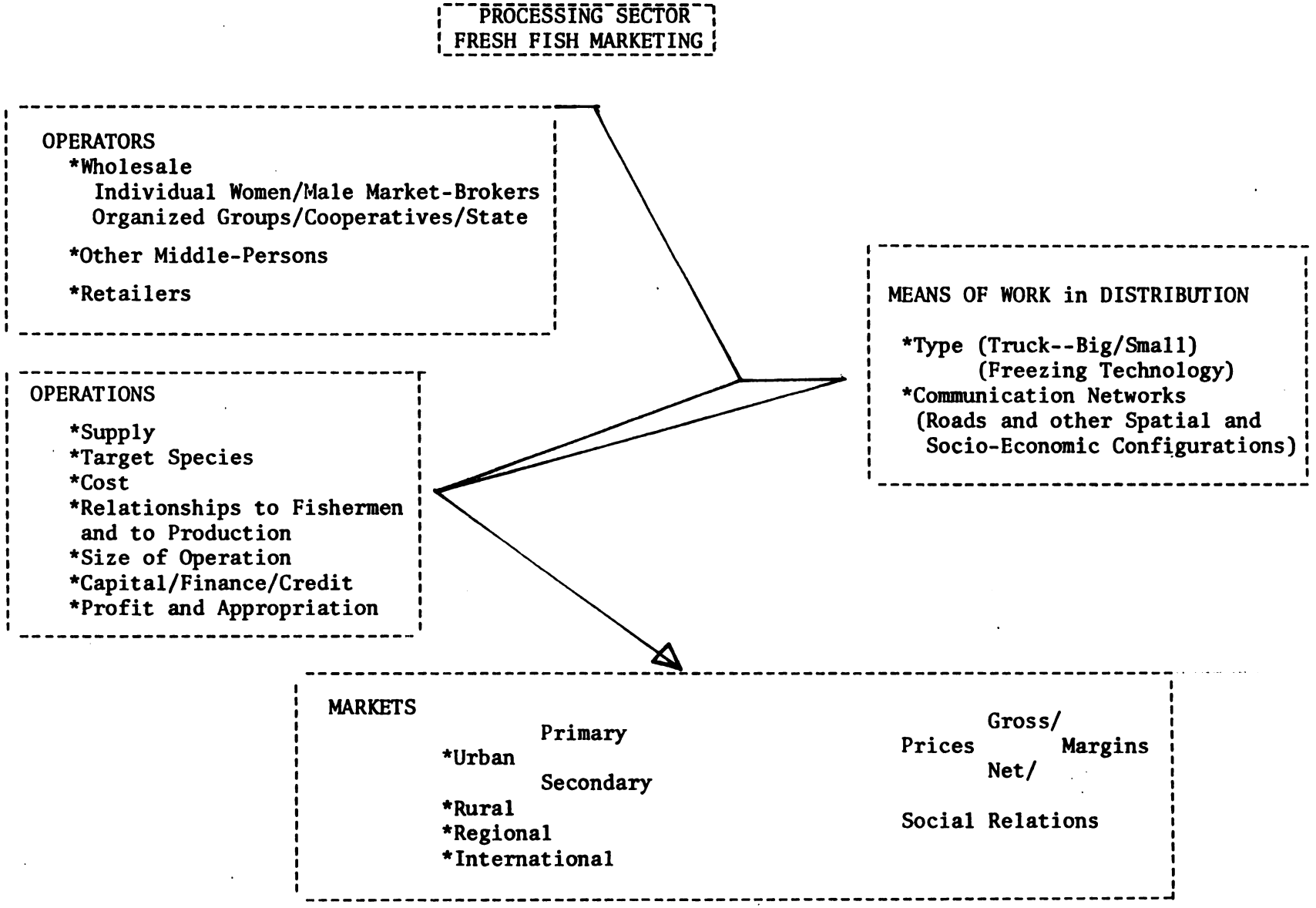
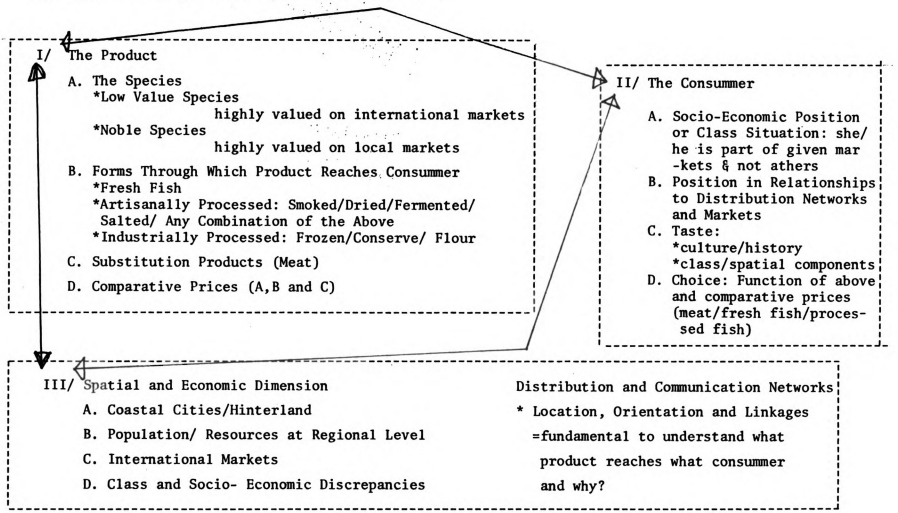


Figure 21 : Consumption (Variable Breakdown)



portrayal of the processing, marketing and consumption spheres in artisanal maritime fishing (Figures 19, 20, 21). Artisanal processing is often neglected as being also a production process involving women, men and paid workers. In artisanal processing, fish enter both as a raw material and as a transformed product to be commercialized. Figure (19) breaks down some of the significant variable in fish processing and includes also the industrial processing of artisanal fish production.

The impact of market forces on the mode of fish production has been analyzed in the thesis. However, fresh and processed fish marketing in artisanal fisheries has a dynamic of its own right which needs to be the object of sociological inquiry. Figure (20) presents in a simplified fashion some of the variables to be considered.

Consumption is the end-stage of all fishery products. As such, its importance to fish production and to the other moments of the system does not need to be demonstrated. Figure (21) hints at the variables in consumption, which are likely to be of a significant impact on the system.

In short, figures 19, 20 and 21 lay before us the whole research agenda for a complete sociological understanding of the fish circuit in the artisanal maritime fisheries of West Africa.

These graphic portrayals of the fish production system form a basis from which a social impact assessment model can be developed. Such a model can be used to isolate not only the structure of the fish production system, but also the changes that are occuring in it as a result of changing technology, development programs, policies of fish conservation and management etc. For research centers such as Crodt, it can help:

- Understand the non-biological factors conditioning the canoe-fishing industry in order to help in the definition of fisheries management policies,

- Translate the results of marine research in terms of planification choices,

- Develop an understanding of artisanal fisheries as a social system of production in rapid evolution from the standpoint of technics as well as social structures,

- Understand the fish circuit as a whole. (Weber, 1982)

In the final analysis, further elaboration of the fish production system through subsequent research will greatly assist the development of sociological knowledge of the structure and role of marine fisheries in West African coastal societies, in developing countries and the world at large.

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