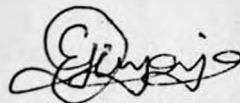
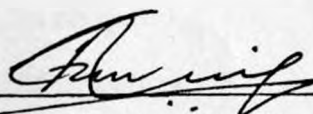


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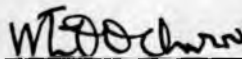


E. O. NYANJA

This Research paper has been submitted for examination with our approval as University supervisors.



Dr. G. M. RUIGU



MR. W.E.O. OCHORO

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Dedicated in memory of my father, the late Joel Nyanja Omondi who a part from himself being an educator, passionately loved academics. If not for the cruel hands of death, he should have lived a little longer to witness such a study from his own son.

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A B S T R A C T

The understanding of the marketing problems of such an important fishery as Lake Victoria provides a framework within which the management, production and institutional roles can be handled. The efficient production of fish as a source of proteins and a source of income as well as a means of earning foreign exchange is largely dependent on efficient distribution.

Fishery research needs to ensure that information on economic, social, political and natural factors are well understood. This study aims at satisfying an economic information which is necessary for the development of a fishery. The formulation and interpretation of the functions used, the examination of other aspects of the fishery, and the derivation of policy implications are thus aimed at filling an important information gap.

The understanding of the nature of the fishery resource and how the fishing industry as a whole functions is incomplete without determining the best means of influencing the system to attain the desired objectives. These objectives centre around man whose welfare need be improved through proper utilisation and development of such natural resources.

The results of this study indicate that fishermen's receipts from the sales of their catches are constrained by lack of preservation and transportation facilities for their highly perishable commodities. Seasonal and/or bad roads inhibit the smooth flow of fish trade. Impassable roads, especially during the wet days militate against the fresh-fish trade. This increases the risk of fish spoilage leading

to increased processing of fish. Processed fish is less remunerative than fresh fish. The fishing effort is therefore not well rewarded. Lack of preservation and transportation facilities furthermore, weaken the bargaining powers of fishermen vis-a-vis the fish-mongers.

The fishery, being multi-species, has experienced a major change in the composition of the landed catches over the years. These changes have important implications on the performance of the marketing system, and hence on incomes accruing to fishermen. The traditionally more preferred species have increasingly become scarce whereas an exotic fish, Lates niloticus has become dominant. This fish is less preferred by consumers within the Lake Basin who form the major market for the Lake fish. Furthermore the fish is highly perishable and bulky. It is therefore expensive both to process and to transport.

Co-operative societies in most developing nations are seen as important development tools with regard to the marketing of such commodities as fish. Fisheries co-operatives in Kenya are relatively more successful in Turkana, Naivasha and Coast regions. There are many such societies along Lake Victoria and their involvement in marketing the fish is still small. Their weaknesses stem from small financial bases, and lack of proper management. These societies, however, seem to hold the key for the improvements necessary in the marketing system. Being accessible to loans and assistances in one form or another from various organizations, the societies need to provide some of the essential facilities and then engage in aggressive marketing of fish. Incentives, through better prices, need be given to the fishermen to induce their

maximum participation as members of the societies.

The pooling of fishermen's resources through such co-operation is necessary for improved marketing and development of the fishery as a whole.

C H A P T E R O N E

INTRODUCTION

1.1. GENERAL

Fishing in Kenya is an important economic activity. It provides direct and indirect employment opportunities, and is a source of a valuable food item.

Fishing and Fish-marketing are largely rural based activities and their development can be considered in line with the Government's Rural Development Policy. Since independence, there has been a marked increase in the quantity and value of fish landed in Kenya. The total fish landed in 1963 was estimated to be 19,700 metric tonnes which was valued at K£.1.1 million (Development Plan 1984/88). This explicitly implies increased availability of a food item and increased earnings to the fishing population.

The efficiency of the marketing process of a product (especially of such a perishable one as fish) determines the successful development of its production. The structure, conduct and performance of a marketing system should be understood well in order to determine how it can be developed.

A reliable marketing system enables producers to move away from subsistence to commercial production thus benefitting both producers and consumers.

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Marketing can be regarded as part of production and is concerned with the creation of utilities of form, time, place and possession¹ (Oloya, 1968). Time and Place utilities are created during the process of physical distribution. Possession utility is involved when transfers in ownership take place.

The marketing system needs to keep pace with the development of the fishing industry as a whole. It can be a positive asset, acting as a strong encouragement to fisheries development, or it can be areal hindrance if its development lags behind. Throughout the Third world, familiar problems include inadequate market outlets, unreliable food distribution systems and difficulties with input distribution (Heyer, 1976). —

In the fishing industry, an efficient marketing system which performs its functions at low cost, and which develops, taking on readily new services and new products as required is of great importance. The industry is characterised by changes in the landed species overtime which calls for a marketing system ready to admit such changes so as to maintain producer incomes at reasonable levels and provide consumers with the food item at reasonable prices.

1. By Form, Time and Place utilities is meant the satisfaction derived when commodities reach consumers in the right form, right time and right place. Possession utility is derived during transfers in ownership.

1.2. THE LAKE VICTORIA FISHERY

Lake Victoria is the second largest Lake in the world and remains the single most important fishing area in Kenya today. The Kenyan part of the Lake which has a surface area of 755 Km² (about 10 per cent of the total Lake surface area of approximately 8,000 Km²) has for many years accounted for over half of the total fish production in the country. In 1981 and 1982 the Lake accounted 66.7 per cent and 68.0 per cent of the total national catch respectively (Econ. survey, 1983). Since 1983, the Lake accounts for about 80 per cent of the national catch. The contribution of the Lake as compared to other fishing grounds in Kenya can be seen from Table 1.1. below.

The above information shows that Lake Victoria's catch has a substantial influence on the overall national fish market, and hence, on the fishing industry. This study therefore considers Lake Victoria's fish catch important in the national fishing industry.

To understand the marketing of fish, one needs to understand the fish-species of the Lake. The Lake Victoria fishery is composed of well over 170 species all of which are valuable in one way or another to fishermen

TABLE 1.1. THE RELATIVE DISTRIBUTION OF YEARLY
TOTAL CATCH ON AN AREA BASIS FOR THE YEAR 1983

| FISHING GROUND | % CONTRIBUTION TO TOTAL CATCH |
|---------------------|----------------------------------|
| Lake Victoria | 79.4 |
| Lake Turkana | 10.4 |
| Coast Province | 8.3 |
| Lake Naivasha | 0.7 |
| Lake Baringo | 0.4 |
| Others ¹ | 0.8 |

SOURCE: 1984 Fisheries Statistical
Bulletin.

¹ Others include Dams and Rivers

and consumers. Scientists, however, group the Lake fish into 15 broad species. The composition of annual output varies from year to year and some species have tended to dominate overtime. Eight major fish species which currently represent over 95 per cent of the total catch from the Kenya waters of Lake Victoria include; Tilapia spp., Haplochromis spp., Bagrus dogmac, clarias moassambicus, Engraulicypris argenteus, Protopterus aethripicus, Lates niloticus, and Labeo victorianus. Some of the more valuable species like Protopterus aethripicus have been observed to decline in quantity over the years. Kongere observed a change in the dominant fish species between 1968 and 1977 (Kongere, 1979).

There are approximately 300 landing beaches along the shores of Lake Victoria (Kenya), but the major ones are 12. On nearly all these beaches fishmongers and a few wholesalers operate side by side with the former dominating the trade.

The Lake Victoria fishery has many positive effects to the local population around the Lake. Jansen estimated that in 1976 about 60,000 people were economically dependent on the fishermen in Lake Victoria (Jansen, 1976). Presently, there are about 20,000 fishermen in the Lake and about 5,000 fishmongers. Taking an average of five dependants per fisherman or fishmonger, it can be estimated that about 150,000 people are economically dependent on the fishery. In addition, many businesses such as food Kiosks, gear repairs and other supporting trades have sprung up. These businesses have generated employment to many people. The economic importance of the Lake in Kenya, therefore, needs no emphasis.

1.3. THE FISHERMEN

The features of a fishing population could provide a useful guide for the isolation of those socio-economic factors that may influence development policies in a fishing industry. The understanding of fishermen is necessary in order to be able to rationally define policies which may be required for achieving efficiency in fish-marketing at the landing beaches. Their economic role as primary producers and sellers is vital. Their

main interest lies in landing the largest catches possible of economically and nutritionally important fish. They will, therefore, go hunting and exploiting such fish species. Provision of storage, handling, processing and transportation facilities at the landing beaches is important to enable the sales of good quality fish in periods of excess supply. Fishery management also limits the fishing of immature fish. As in the case of Lake Victoria, the period April - July is closed for the use of gill-nets of mesh¹ measurements between 2" and 4".

Kongere describes fishermen as generally a conservative group with similar interests who tend to stick together. He attributes this to the existence of fishing villages which were once quite common along the shores of the Lake but have disappeared of late partly due to individual ownership of land. However, fishing villages are still common in other places like Lake Turkana, the coastal region and dams on the upper reaches of river Tana. This has probably been used to develop successful Fishermen's co-operative societies in the coast and Lake Turkana.

¹ Net sizes in common use in Lake Victoria vary between 1½" to 9" mesh sizes. The larger the mesh size the larger is the intended fish size. Smaller mesh sizes (below 2") are illegal nowadays.

Fishermen usually hold some taboos dear to themselves and strongly believe in luck. Okidi (1978) observed that the coastal fishermen believe that God predetermines their fish catches each day. This is also true with the Lake Victoria fishermen, but with increasing expertise this attitude is slowly fading.

Many people (including fishermen) regard the occupation as low paying and of low status. This has led to a situation where the relatively rich fishermen prefer to employ a labour force to operate their gear¹ while they find time to engage in other profitable businesses. A negative attitude towards the occupation could adversely affect investment in the industry. The attitude against the occupation need be dispelled if the Lake Victoria fishery has to be managed and developed for increased production and benefit for all.

The cultural background of fishermen could probably also influence the adaptations necessary in the development of a fishery. In the Lake Victoria region, especially in the Luo community who form about 90 per cent of the fishermen in the Kenya waters of Lake Victoria, adults are traditionally considered as distinct and separate economic units in the sense

¹ Fishing gear refers to traps, baskets, spears, gill-nets and seines that are used in catching the fish.

that property will be owned by individual heads of households. Profits that may accrue from enterprises will return to individuals even if the business is jointly owned. The implication here is that decisions are individualized and modern co-operative efforts become fairly difficult to forge among this group of people. This probably accounts for the relatively unprogressive nature of Fishermen's co-operatives in this region. Co-operation among fishermen would be necessary for the development of the fishery.

The fishing occupation is not currently difficult to enter but licences issued by the Kenya Fisheries Department are necessary. Many people start off as employees of other fishermen and in the process gradually acquire the necessary equipment which eventually enable them to launch themselves fully into the fishing occupation. Some people are afforded a few shillings equipment that would enable them to launch into the occupation. Such people are allowed to repay the advances received either with their catches, or with the cash proceeds realized through the sale of their landings.

Fishermen may be classified into two groups, depending on whether they are full-time or part time fishermen. The full time fishermen are usually fully involved in and almost completely dependent upon the occupation for their

livelihood, sparing very little of their time for work on their farms. This category migrate from one region of the Lake to another chasing the migratory fish species.

The seasonal or part-time fishermen are usually people with major interests in farming. They go fishing for food and some little income for extra family needs. This category only engage in fishing when there is little to do on the farms.

There is also another group of people who are basically non-fishermen but who may own fishing equipment. This group is usually composed of people like ^tTeachers, Government employees and other wage earners. They usually hire labour to work their equipments.

The full -time fishermen who depend almost entirely on fishing for their livelihood should be assisted so as to derive maximum sustainable returns from this occupation. One is therefore tempted to suggest that recruitment into the occupation should be regularized and based on clearly set out criteria. Those who are dedicated to the occupation, and hence, are out for its development need be given the desired support and protection.

1.4. THE FISH TRADERS

The fishermen of the Lake do not usually market their fish directly to consumers except in some of the smallest and isolated beaches. There is usually a middleman between the fisherman and consumers.

The majority of the dealers in Lake Victoria fish are women (Kongere, 1979). There are also a few young men who normally ferry their fish loads from the landing beaches to the inland markets on bicycles. The number of these fish dealers tends to respond positively to the quantities of fish landed. This means that many try to cash in on the temporary situation of increased abundance to earn some little money and abandon the business immediately there are signs of decline in catches. However, the response of these traders to increased catches might be inhibited by impassable roads at certain times of the year. This greatly interferes with the smooth flow of the trade. The major mode of transporting fish from the beaches is by buses which find it difficult to reach the beaches in time during rainy seasons (except for those beaches served by all-weather roads).

The fishmongers are generally small business people who possess very little capital for their business. It is probably due to this that the business of trading in fish landed from the Kenya waters of Lake Victoria has been able to sustain

so many fishmongers. They usually purchase enough quantity of fish that they would be able to transport partly on their heads or on bicycles or by public means to the inland markets.

There are some companies and people that currently undertake large scale business in the Lake Victoria fish. Such companies and individuals collect fresh or processed fish from the various landing beaches mainly for marketing in the big towns around the country. However, the local fishmongers still dominate in the marketing of the Lake Victoria fish.

the most X
Jansen (1973) observed that the fishmongers are normally adept at marketing their fish. They usually manage to dispose of nearly all their fish at a particular market in one day. However, any fresh fish left unsold on a particular day, is usually processed by sun-drying, smoking or salting and brought back to the market on another day. Jansen's finding revealed that no fish goes to waste at the hands of the fishmongers. This is also the view of this study.

The processing methods at the beaches are similar to the ones mentioned, but inspite of the added processing costs, the value is usually lower than for fresh fish. Storage facilities should therefore be adequate to some degree so as to maintain the quality of fish and thereby prevent wastage and the sales at low prices.

1.5. STATEMENT OF THE PROBLEM.

Fish is an important food commodity. Fishing is also an important economic activity providing an income earning opportunity to many people who would otherwise be unemployed. Fishermen need to be efficient in their operations so as to better their lot. Efficiency in the production of such a perishable food item as fish is easily realized when the marketing services are responsive to the changing aspects of the trade.

Given the absence of cold-storage facilities on the landing beaches of Lake Victoria, fish spoilage could be avoided with an efficient marketing system. Improved marketing services guards against adverse effects on fishermen's receipts during periods of increased catches.

The average annual per capita income of the Lake Victoria fishermen for the period 1981-1984 has been estimated to be K£.305 compared to K£.771 and K£.949 for the Nation's private and public sectors respectively. Furthermore, the Kenyan Fishing Industry faced a declining trend in the value of fresh-water fish between 1982 and 1984. It fell from K£.8.4 million to K£.8.3 million to K£.6.9 million whereas the landed quantities increased from 74,017 tonnes to 91,068 tonnes and declined to 74,424 tonnes in the same period. The fall in quantity of fish landed in Kenya

between 1983 and 1984, a drop of 19 per cent, has been attributed to the drought condition experienced during the year (Economic Survey, 1985).

Given the dominance of Lake Victoria in the Kenyan Fishing Industry, the decline in value of the fresh-water fish could be attributed to the decline in the average prices of the Lake fish. A fall in the average price of fish has a direct bearing on the fishermen's receipts and hence their welfare.

The average price of the Lake fish is determined by various factors. These include type of fish landed, the form in which the fish is sold, accessibility and location of the beach. Government policies towards the fishing industry are also likely to have an effect on the price that the fisherman finally gets for his product.

There are many fish species in Lake Victoria. Changes in the composition of the landed fish species are likely to influence demand especially if consumers have rigid tastes. Furthermore, the quantity of fish landed varies from one season to the other. In this respect, both changes in quantity landed during different seasons and changes in fish species will have implications on price and therefore, on fishermen's final income.

There are various beaches along the Lake. The distance of the beaches from the market centres is likely to determine the price the fisherman gets vis-a-vis demand for his fish. The more accessible beaches are likely to have a bigger market than those in remote regions.

On the Lake beaches, fish is sold in either fresh or processed form. Given its perishable nature, fish would fetch a higher price if it is sold immediately after landing than if it were processed to be sold at a later stage. Therefore, the income from fish trade, to a large extent, depends on the form in which the fish is sold.

Increased supply of a perishable commodity such as fish, especially of certain fish species, would require improved marketing services, and an expansion of the market. These entail increased costs to the fisherman and likely to lower their receipts. The organisation of fishermen into co-operatives enables the pooling of resources together. This is essential for the improvement mechanisms necessary in such a marketing system.

In Kenya, fisheries co-operatives are relatively more successful in other regions such as Lakes Turkana and in the coast, than in the area around Lake Victoria. Studies on Fisheries co-operatives reveal that the

pricing policies of these societies are relatively better than that of unorganised fishermen. The impact of co-operatives involvement in fish marketing on the prices of fish along the Lake is not yet clear.

1.6. OBJECTIVES OF THE STUDY

This study aims at describing the Lake Victoria fish marketing system, identifying the major problems in the system and to prescribe possible solutions for improved performance. The following are the major areas of concern.

(1) To identify the major factor or combination of factors that determine fish pricing on the Lake beaches.

(2) To examine the role of the Fishermen's co-operative societies in the marketing of the Lake fish.

1.7. RATIONALE AND JUSTIFICATION FOR THE STUDY

The goal for self-sufficiency in food is given in the National Food Policy Paper of 1981 (Sessional Paper No.4, 1981). On the basis of this policy paper, the need for efficient production, distribution and marketing of fish cannot be underestimated. The need to expand and diversify food production is accomplished with proper pricing and marketing of the products. The development of fisheries is an integral part of the strategy of increasing the national food production.

Fish marketing in Kenya is important in the sense that apart from determining the efficiency with which the development of the primary production phase is based, it adds the desired nutrients for the ever growing population. Biologically fish is a superior food item Sysoev (1970) has argued that the fat content in fish meat ranges from 0.3 to 30 per cent or more depending on the species, and that fish fat is absorbed faster and more completely by the human organism than the fats of warm-blooded animals. He notes further that 4 to 5 Kgs of fish meat provides 2.7 Kg. of proteins whereas about 11 Kg of beans would be required to obtain the same amount.

The above information indicates that given the increasing pressure on arable land, and the ever present threat of draught and famine, the efficient exploitation of the water resources through price incentives, and the subsequent distribution of fish could alleviate the possible shortage of beef and beans as sources of proteins. It would also aid in depressing the prices of such foodstuffs and hence improve the welfare of many within the economy.

Apart from its food value vis-a-vis other food stuffs, the price of fish is usually (at least for some types of fish) so low that the poorer section of the population can afford to buy it. Its distribution is thus important and hence factors that might

affect its price need to be known. The existing marketing margin could be justified but marketing costs could be greater at the beaches. The handling, processing, storage and transportation of fish should be efficient so as to minimize spoilage and maintain quality of the product so as to fetch higher prices for the producers.

Fishing and Fish-marketing are important economic activities in the region on which this study is based. Fish marketing does not require much capital and is labour intensive. The creation of employment and incomes is a major policy goal of the Kenya Government, and in fishing and fish-marketing, the goal is partly realized.

The contribution of the informal sector in the provision of employment in Kenya is important. Fish marketing has many similarities with the characteristics the ILO mission of 1972 to Kenya lists up under the informal sector (ILO, 1972). These characteristics are given as:

- (a) ease of entry
- (b) reliance on indigenous resources
- (c) family scale of operation
- (d) small scale of operation
- (e) labour intensive and adapted technology
- (f) skills acquired outside the formal school system and
- (g) unregulated and competitive markets.

The Lake Victoria fish-marketing has many of these characteristics, and hence contributes significantly in the economy. The earnings in fish-trade need to be maintained high enough to make fishing and fish-marketing lucrative occupations. The stagnation of fish prices affects the incomes of fishermen and thus puts them in a worse state vis-a-vis other sectors of the economy. The earnings obtained in fish and fish marketing are largely invested in other sectors of the economy (Jansen, 1971).

The importance of food marketing systems as a link between the producer and consumer is undoubtedly a major factor in stimulating rural development. Food marketing in Less Developed Countries (LDCs) is basically an income earning opportunity to many who would otherwise join the unemployment pool, and its inherent importance is unquestionable.

The rationale for the study of this marketing subsystem is, therefore, based on the following factors:

- (i) The system provides a livelihood, although meagre, to the the poorer members of the population which has few alternative income earning opportunities;
- (ii) Both the production and marketing activities of the industry have some linkage effects in the local economy;
- (iii) The final product of the industry (fish for consumption) is a need which is generated within the economy.

1.8. ORGANIZATION OF THE STUDY

This study consists of six chapters. The introductory chapter is followed by chapter two which is devoted to theoretical background and Review of Literature. The general theory of demand and supply of a good is discussed with special reference to the fish marketing on the landing beaches of Lake Victoria. Marketing efficiency which looks at the constituents of an efficient marketing system is also examined. The relevant literature on the marketing of foodstuffs in general and of fish in particular is reviewed. Chapter three is devoted to methodology and data exposition. Chapter four analyses the data relating to the fish pricing system and the factors which affect the prices which the fishermen receive. Chapter five is devoted to the institutional role of fishermen's co-operatives in the fish marketing.

Lastly, chapter six is devoted to the summary of findings, conclusions and policy implications, limitations of the study, and areas for further research.

C H A P T E R T W O

THEORY AND REVIEW OF LITERATURE

2.1. THE THEORY OF DEMAND FOR FISH

The demand for fish on the landing beaches by the fish traders reflects the demand by the consumers in the inland markets. Fish traders purchase those quantities of fish that they are able to dispose of at a profit. Given the perishable nature of the item, the traders purchase only those quantities which they expect to sell. The forces of supply and demand thus determine the price of fish on the landing beaches.

However, given the different kinds of fish on the landing beaches of Lake Victoria, the preference of consumers for certain fish species influences the prices. The composition of the landed catch varies from time to time and consumer preference, therefore, affects the average fish price. When one or two particular species of fish tend to dominate over the originally preferred type, the change in consumer preference determines the price to be offered for the new one.

The different fish species in Lake Victoria can be said to be nutritionally substitutable but might not be the case in the eyes of the consumers. The response of demand to seasonal changes of the landed catch is

therefore expected to influence the prices offered. Fish consumers are thus expected to substitute the increasingly more dominant species for the ones that are now scarce in the market. When one fish species becomes scarce its price will rise. The consumption of the more abundant fish species is therefore expected to increase if the fish species are substitutable. This might not be the case especially when consumers have rigid tastes for some species.

The demand for fish can also be expected to capture certain elements of the dynamic version of demand (Koutsoyiannis, 1980). This is a demand function which includes lagged values of the past levels of demand and income. Current purchasing decision can be influenced by past behaviour. The assumption here is that current behaviour depends on past levels of demand and past level of income. For a non-durable commodity such as fish, past purchases reflect habits acquired by buying and consuming the commodity in the past, so that the levels of purchases in the previous periods influences the current (and even future) patterns of demand. Such a pattern of demand also assumes that the more recent of past levels of income or demand have a greater influence on present consumption patterns than the more remote ones. In fish consumption, some species have been preferred and consumers tend to offer higher prices for those species which they have been accustomed to. The implication is that for new species, there must be a time lag before

prices adjust after consumers have developed the preferences for them.

The foregoing theoretical background reflects to some extent the nature of the fish market. Some of the factors discussed will be applicable in analysing the nature of this marketing sub-system.

2.2. THE THEORY OF MARKETING EFFICIENCY

It is relatively easy to enter wholesaling and retailing of fish because of the low capital to labour ratio required to carry out many marketing functions. Moreover often relatively low levels of technical and administrative skills are needed to perform certain jobs. Given such entry conditions, any suggestions of high profits in marketing brings additional middlemen into the picture. In Lake Vitoria fish marketing, the response of traders to increased catches can be said to be indicative of the profit accruing from the trade. This ensures that the landings on the beaches are bought in time to clear the beaches for new wares. This also ensures the absence of fish wastage or spoilage on the beaches. Efficiency in the fish market can therefore be said to exist with the beaches clearing at reasonable prices which provide incentives to the fishermen and fish traders on one hand and to consumers on the other.

An important aspect of fish marketing efficiency is to ensure that fishermen fetch better prices for the sale of their products. This calls for

and x. a market intelligence which would ensure that fishermen are in a better position to exercise their bargaining power. Once informed about supply and demand conditions, and existing price trends, fishermen, particularly those in isolated, inaccessible grounds would be in a much better position to bargain for higher prices. The lack of such information may often throw fishermen in what can be termed as a "buyers market" - a situation into which they would be forced by lack of information about the market conditions, aggravated by the perishable nature of their products, poor storage facilities and inadequate market outlet, to accept the price offered by the buyers whether it is satisfactory or not. In such a situation, the efficiency of the marketing system and of production are impaired.

The importance of marketing efficiency should be understood to be concerned with operational efficiency and pricing or economic efficiency. The conceptual differences may be brought out by considering two broad purposes of the marketing system of food products which are:

(i) to add for the benefits of consumers, the conventional time, form and place utilities to products through assembly, processing, storing, transporting, distributing and similar operations:

(ii) through the various mechanism of exchange to allocate commodities amongst buyers and returns

amongst sellers so as to give expression to consumer preferences that will serve as effective guides to the use of resources in both production and marketing.

The effectiveness with which the first of these purposes is served involves 'operational efficiency' while the second involves pricing or 'economic efficiency'.

These purposes need to be fulfilled in the marketing of fish so as to rationalise the use of resources in production and marketing for the benefit of a fishing population and external consumers. It is in light of such requirements that the analysis of the marketing of such a perishable item as fish need be done for the betterment of the fishing industry.

2.3. REVIEW OF GENERAL LITERATURE

This section describes briefly the Literature relevant to this study but does not claim complete exhaustion of the subject.

The importance of a reliable, well-developed and low-cost food distribution system in a country like Kenya is recognized by among others Judith Heyer (Heyer, 1976). She argues that food distribution is important and crucial to the specialization of production in rural areas, and that its reliability

is essential for the rapid growth in urbanization. She further observes that in terms of marketing services, the less Developed countries are characterised by inadequate market outlets and unreliable food distribution systems. On the basis of such a generalised observation, the present study attempts to explore into the marketing of fish along the lake Victoria region and any bottlenecks associated with it.

The efficiency of a marketing system is not easy to determine, The general approach has been to examine issues like marketing margins and costs. In this respect, a high marketing margin has usually been associated with inefficiency. However, Whetham argues that efficiency in a marketing system is a complex matter. To her, low marketing costs may be indicative of inefficiency if a community would be willing to pay for more expensive services. She further contends that a marketing system need not be judged inefficient because it offers small quantities of simply prepared foods, if this form of trade provides the greatest value to the consumers (Whetham, 1972).

Ruigu (1982) has also studied marketing margins. To him an important area of food marketing research is the analysis of those factors that influence the size of the marketing margins, and those that explain any inefficiencies, for example, monopoly power or the inefficiency that emanates from the underdeveloped nature of the distribution system.

The distribution of a perishable item such as fish may have important economic implications. In Nigeria, Moro (1985) observed the presence of transport difficulties as constituting a major bottleneck to the distribution of fish (especially fresh fish). He contends that in spite of the existence of a big potential market, the efforts of the large fishing community are restricted to some extent by the difficulties in reaching the markets. He also acknowledges the influence of climatic factors on fish. He argues, for example that humidity prevents sun-drying even when it is not raining. Such conditions encourage the decomposition of fish.

From the above, an analysis of food marketing is an intricate exercise which calls for the examination of several factors. In this analysis of fish marketing, emphasis will not be laid on marketing margins as such but on storage, processing and transportation facilities all of which are significant cost factors. The transportation aspect is a major area of concern. Its effect in discouraging fresh fish trade is emphasized as this determines fishermen receipts. The influence of climatic factors is also examined. In this paper, the effect of rainfall on the sales of fresh vis-a-vis processed fish is analysed.

In the analysis of fish marketing, more emphasis will be laid on the operations of traders and marketing organisations such as co-operative societies. In the

marketing of fish, there is virtually no direct contact between the producer and consumer. Therefore, the role played by middlemen is quite crucial. The impact of middlemen in marketing of fish is acclaimed worldwide. It is therefore important to review some of the existing literature on middlemen's activities.

u.c. x In discussing the economic role of middlemen and co-operatives in Indo-pacific Fisheries, Szczepanik (1960) argues that aid through these agents in development of fisheries is necessary due to the poverty of fishermen. Numerous middlemen have taken to fish marketing as a x result of the small and in-efficient scales of operation, geographical dispersion of beaches, inadequacy of credit, storage, transport and marketing facilities.

Middlemen are financially powerful. They provide fishing capital as well as consumer goods while insisting on the mortgage of fish catches. To Szczepanik, the advances provided by middlemen to fishermen are not of great use because they are of a short-term nature. If the fishermen were given medium or long-term loans, s.p.p. x they could be able to machanise, purchase^a new boats, etc. In conclusion, he feels that the price policy of middlemen is such that the fishermen have no incentive to increase their output (Szczepanik, 1960).

In India, middlemen are viewed as parasites who exert a stronghold over fishermen. The elimination of such middlemen would therefore maximize the benefits accruing to fishermen (Saha, 1970, Bhattacharya 1965).

Generalizing from Thai data, western experts appreciate the role of middlemen in the development of fisheries. To them, the strength of middlemen should not be underestimated since they have enormous influence emanating from several angles (FAO, 1949).

A somewhat balanced argument about the role of middlemen is advanced by Stirrat (1973) in his study in Sri Lanka. He argues that inspite of their exploitative nature in appropriating surplus value, the advice given to fishermen by middlemen may occur to an outsider as ~~an~~ ^{an} abiding factor for exploitation. However, from the point of view of the fishermen, this might not be the case. Middlemen enable fishermen to have a guaranteed long term outlet for their product. The relationship between fishermen and middlemen is both social and economic. For many of the poor fishermen, security might be a higher priority goal than capital.

From the above arguments it is evident that middlemen occupy a very strategic position as far as the marketing of fish is concerned. There are no unanimous consensus on their contribution both to the fishermen and the national economy at large. Opinions range from viewing these middlemen as parasites to appreciating their role as credit sources. However, it should be borne in mind that this group is important to the fish trade, otherwise as has been observed:-

"their existence is often systematic of considerable under or concealed under-employment and the social consequences of any drastic removal of such people from the trading scene, apart from the political effect, could be profound as they are often from the rural areas themselves and contribute to what little prosperity that exists. Since they are generally unorganized, with small capital resources, it cannot be expected that they are able to make large investments" (OECD/FAO, 1977, p.19).

Most of the observations from the foregoing analysis might be applicable to the Lake Victoria fishery. Most of the fish traders possess little capital and purchase small quantities of fish because their weak financial position militates against the purchase of storage facilities or cold rooms.

Given the important position middlemen occupy in fish marketing, the efficiency with which such a system functions would benefit both the producers and the consumers. Furthermore, the marketing system should be flexible enough to accommodate changes in fish supply in various seasons and for different species. It is, therefore, the task of this paper to explore into fish marketing system in the Lake Victoria region. Emphasis will be laid on middlemen and possibilities for co-operation among fishermen should they feel that they are getting a raw deal from the fishing activity. Moro (1985) attributes the presence of fishermen's co-operatives to the acute logistic problems concerned with long distances between the remote fishing areas and their markets. In such situations, he argues, there

are obvious scale benefits and the advantages to be gained from the pooling of members catches for marketing. Along the same lines, it will therefore be necessary to examine fishermen's co-operatives in Lake Victoria region.

It has already been stated that as individuals, fishermen are financially weak. In this respect, they have virtually no influence on the price they finally get for their product. However, one would expect that by pooling resources, both financial and material, these fishermen would be in a position to improve their welfare. This would be achieved, for example, through better marketing, processing and storage facilities, extension of credit to members and the promotion of fish - farming practices.

Okidi has argued that fishermen's co-operative societies have been established to promote the development of the traditional fisheries sector through two major strategies. First, they are to provide for systematic marketing and price stabilization by receiving the fish and choosing the market. Secondly, the co-operatives would be a vehicle for centralized co-operation for fisheries development (Okidi, 1978). It is documented that the average annual income from sales of fish by the fishermen's co-operatives is much higher than what is received by non-organized fishermen (Mikkola, 1977).

In Kenya, fishermen's co-operative societies have been in existence for almost two decades. There are 51 fishermen's co-operatives societies at present. Out of these 34 are found in Nyanza province. Despite the large number of fishermen's co-operatives in Kenya, and more specifically around Lake Victoria, it has been established that they have been only modestly successful in providing their members with essential services necessary for uplifting the standard of living of the fishermen. In areas around Lake Victoria, co-operatives have been playing a minor role in actual fish marketing (Mikkola, 1977).

Lake Victoria co-operatives are unpopular among fishermen. The proper picture is painted when we consider membership and actual fish marketing. For example, in 1978, there were 21 Fishermen's co-operatives with 18,000 fishermen. Out of these, only 3,800 or 21 per cent, were registered as members. Only 4 per cent of the total fish catch was marketed through the co-operative societies. (Ministry of co-operative Development, Planning Division, 1978). In 1984 there were 34 co-operatives societies with 20,000 fishermen. Only 6,447 were registered as members (Nyanza province co-operative office).

Most of the studies on fish marketing co-operatives have tended to focus interest on issues like membership and turnover. The general picture a majority of these studies paint is that of apathy among fishermen, while the societies are dormant, with their involvement in

marketing usually ^{Don-9} restricted to the collection of
a 10 per cent commission.

The present study will abstract a bit from the earlier studies on co-operative societies in Kenyan fishing industry. Instead of analysing statistics, emphasis will be laid on the salient factors responsible for the observed apathy among fishermen towards co-operatives in the Victoria region. From abroad perspective, the study is concerned with evaluating the role played by co-operatives in the fish marketing.

2.4. LITERATURE ON LAKE VICTORIA FISH MARKETING

Two studies on Uganda side of the Lake have exposed problems that are likely to be applicable to the Kenyan side of Lake Victoria. Karuhanga recognizes bottlenecks in the distribution system of fish. To him even though this might not restrict the expansion of output from the Lake, improved landing, processing, storage and transportation facilities are all essential for the future development of the industry (Karuhanga, 1979)

Odongkara (1981) observes a close association between fishermen and fish-mongers in what he describes as "collusion" in Uganda fisheries. His contention is that fishmongers collude amongst themselves in price determination without explicitly entering into agreements on how to control the prices and quantities

supplied. They consult each other on matters relating to the prices, bearing in mind unsold stocks, and being conscience of the activities of each other. To him, free competition in fish marketing does not exist and, as a consequence, consumers are charged higher than free competition prices. For consumers to benefit, Odongkara advocates the elimination of collusion among dealers and producers.

The above study covered the whole of Uganda's fishing industry. Several variables are believed to affect fish marketing. Moreover, he does not provide a basis for believing in the observed "collusion" neither does he offer prescriptions for the elimination of such "collusion". The present study is specific to Lake Victoria and investigates the major economic factors affecting fish prices on the beaches.

Nyholm and Whiting, (1971) undertook a survey of the operations of fish stall-holders in several markets in the suburbs of Nairobi. They provide us with information on stall-holders' fixed and working capital, opening and closing stocks at the end of the day, expenses, sales revenue and break-even points. Though their study looked at the urban retail market system, it is of paramount importance as it can enable the determination of price margin when the source of fish is known, the efficiency at the retail trade level and the price charged thereon is determined by the

efficiency of fish marketing at the landing beaches. Their study is thus a good supplement of the present one .

Jansen (1973) studied some features of fish marketing in Lake Victoria (Kenya). He observed that in fish marketing, there is an important distinction between fresh fish on the one hand and dried, smoked and salted fish, on the other. He observes that the production units are too small and scattered to allow for the trade in fresh fish to be concentrated in a few hands.

At the present time, the distinction between fresh and processed fish still holds true. However, the present study differs from Jansen's since it examines in detail the percentage contribution of the two forms of fish in the total annual sales. With improvements in transportation networks, one would expect that more landing beaches have been exposed to the market and therefore the scattered nature of production units is minimized. The present study will maintain the distinction between fresh and processed fish but will incorporate other aspects like the marketing of various fish species and how these species relate to sales of either fresh or processed fish.

Jansen observed that the wholesale trade in fresh fish is concentrated in the hands of a few big companies like Tilapia fisheries, operating in the Nyanza Gulf - Furthermore, he observes that wholesalers prefer certain species which over time might be over-fished. The present study examines the role of wholesalers or fish companies

vis-a-vis changes in the landed fish and changes in fish species during various seasons.

Overfishing has been an issue of general concern to the authorities. However, the supply of certain fish species cannot be wholly attributed to the rate at which such species are fished. Some other factors which have implications on supply are river and Lake pollution, predatory fishes and drought. The effect of changes in the supply of different fish species on consumer demand and average prices is an area of concern in the present paper.

On the question of fish wastage, Jansen argues that there is so much flexibility in the marketing organization that hardly is there any fish wastage. This is because the quantity of fish landed varies directly with the number of fishmongers. Through their expertise, fishmongers are able to process fish thereby avoiding wastage. Jansen does not study the marketing problems associated with various fish species especially the bulky type that might not call for simple processing methods.

Jansen's work, though general, contributes much to a better understanding of fish distribution system along Lake Victoria. This study extends his work by laying emphasis on the economic variables that go into fish marketing. This study also looks at the performance of the fishermen's co-operatives in the marketing of the Lake fish.

Oduor Otieno etal (1979) concentrate attention on the production of Lake Victoria fisheries.

Describing the fish market at the beaches, they see fishermen as price takers. However, there is a threshold price below which such fishermen would quit the occupation. The study does not discuss why fishermen are price takers neither does it explain what the threshold price would be. For lack of data, the study is largely unsubstantiated.

Whereas the above study lays emphasis on production, the present study will digress into an analysis of fish marketing.

CHAPTER THREE

METHODOLOGY AND DATA EXPOSITION

The analysis uses time series data covering a period of seven years (1978-1984). In certain cases, where possible, data for the last ten years have been used.

The data used in this analysis is largely secondary. It has been drawn from the statistical records in the Ministry of Tourism and Wildlife - Fisheries Department in both Kisumu and Nairobi. Apart from such data information given by fisheries officials, fishermen and fishmongers is incorporated in the analysis. This information was obtained through personal interviews.

In the analysis of co-operatives' role in the marketing of fish, the data used was obtained from the Fisheries Department in Kisumu, and from the Kisumu District and Nyanza province co-operative offices. More data was gathered through personal interviews of the co-operative officials at the District and provincial levels. In addition, two of the oldest fishermen's co-operative societies, Kaloka and Dunga Fishermen's co-operative societies, were visited and society officials interviewed. A discussion on each of them is done.

Data on the number of co-operatives, membership, turnover, location, amount of fish sold, prices paid to fishermen, and the selling prices are used in the analysis. In addition, the financial status of the

Kisumu District co-operative societies are given to illustrate the financial bases for the lake societies. The mentioned data are used to show whether these societies have made any improvements in the marketing services, and in influencing increased sales of the landed catches at better prices than would otherwise be realized. The data is then used to predict their future powers in improving the marketing of the fish.

Being a perishable commodity, fresh fish marketing could be affected by climatic factors. Sunshine, for example, is necessary for the processing of certain fish types. Rainfall, on the other hand, makes some beaches inaccessible in the absence of all-weather road networks connecting the beaches to the inland markets. The relevant climatic data used in the analysis was obtained from the meteorological department. Monthly rainfall figures as gathered from the various Meteorological stations around the Lake have been used. Each station is chosen in relation to the Fish landing beaches adjacent to it. A total number of eight stations are observed thus covering all the various points around the Lake.

A sample of twelve major landing beaches have been used in conformity with the Fisheries Department sampling. These beaches are representative of the Lake fish catches in two aspects. First, they are most important for the supply of the Lake fish. Second, their locations are such that five of them are drawn from the Southern portion of the Lake while seven are in the northern side.

They thus give a fair representation of the Lake fish supply. However, in most cases the whole quantity of the Lake fish supply has been used in the investigation of various issues.

Data on the number of co-operative societies, membership, turnover, location, amount of fish sold, prices paid to fishermen, and the selling prices are used in the analysis. These are used to show whether these societies have made any improvements in the marketing services, and in influencing increased sales of the landed catches at better prices than would otherwise be realized.

In identifying the major factor or combination of factors that determine fish prices and therefore fishermen's receipts on the Lake beaches, four sub-sections are devoted for the analysis. The first section discusses the basic factors that affect fish prices. These factors which include storage, processing and transportation are discussed showing the implicit and explicit costs emanating from each of them. The various processing methods are discussed. As regards transportation, the modes of fish transportation are discussed and the percentage of the Lake fish that finds its way in the major towns in Kenya from the sampled beaches is given. The second section discusses the form in which the seasonal catches are sold. It looks at the percentage sales in fresh and processed fish. The

third section examines the accessibility of the various beaches. The section therefore addresses itself to the transportation aspect of the trade. The fourth section examines the changes that have taken place overtime in terms of fish species handled.

In examining the seasonal variations in the form of sales of the catches, the two forms of the commodity, the fresh and processed are observed. Monthly data on fish catches and the sales of fish in the two forms in addition to consumption at the landing beaches was obtained for the period of the analysis.

The catches for each year are reported quarterly, and the sales in processed and fresh fish by quarter given in magnitudes and percentages for the seven year period. This quarterly reporting is taken to conform to a three - month closed period (April - June) in which the fishing of one fish species (Engraulicypris argenteus) is prohibited by the fishery management lest juvenile fishes are caught. This type of fish, as mentioned earlier, is all sold in a processed state.

In illustrating the effect of sales in a particular form on fishermen's receipts, the annual average of the sales in fresh fish is obtained. The average prices received each year is also given. The trends in the total catch, sales in fresh and processed fish are graphically illustrated so as to show the relationship between the differences in the sales of the two forms of fish and the prices so received.

X The trend in the sales of the two forms of fish would be explained by the accessibility aspect and/or the type of fish dealt in over a period of time. The two subsequent sections thus aid in answering the reasons behind the established trend in the sales and the receipts.

Given that fresh fish is more remunerative than processed, fishermen would be expected to strive for an immediate disposal of their catches. However, when fish landing beaches become inaccessible, processing of fish becomes inevitable given the absence of cold-rooms on the Lake beaches. Transport costs also increase during such periods forcing fishermen's receipts to fall.

In analysing the seasonal accessibility of the beaches, it has been hypothesised that much of the fish landings will be sold processed during periods of heavy rain. The assumption here is that most roads connecting the inland markets to the landing beaches around the Lake are seasonal in nature. Given that the means of fish transportation in this region comprise of buses and bicycles, these forms of transport could be adversely affected by impassable roads during the wet seasons.

The percentage sales in the two forms of fish per month is used in the analysis as mentioned earlier. This in essence takes care of the response of the fishing effort to the amount of rainfall received.

The relationship between the supply of fish and the rainfall magnitudes in any period is therefore ignored after the use of the percentage reporting in the sales of the forms of fish.

With the assumption that increased fish catches is normally accompanied by a positive response in the turnover of the numerous fishmongers, the accessibility of the landing beaches is measured by the use of the following generalized linear relationship.

$$Q_p = b_0 + b_i R_i + E_i \text{ -----3.1.1.}$$

Where : Q_p measures the percentage of the monthly fish landings for the whole Lake which is sold in a processed form ;

R_i measures the monthly rainfall in Millimetres as recorded in meteorological station, i ;

E_i is the error term which is the catch-all term incorporating all the other explanatory variables not included in the equation-

b_0 and b_i are the parameter estimates of the relationship between the variables.

From the above generalised model, eight equations or relationships have been generated. This corresponds to the eight meteorological stations around the Lake region as observed by the Meteorological Department. For these stations, mean monthly rainfall has been observed for several years ranging from two years

for Kadenge and Nyangoma stations to thirty two years for Kisumu station.

The rainfall figures are averaged on a monthly basis. This means that only one year (12 months) could be used in the analysis as far as the fish landings are concerned. The percentage sales in processed fish (Q_p) which is for the total Lake output was therefore observed for only a particular year. In the analysis, the monthly data for the year 1982 has been used in the eight equations. This year is chosen since it has the highest recorded percentage increase in the Lake fish landings. The increase was approximately 60 per cent compared to 42 per cent and 27 per cent in 1981 and 1983 respectively. 1980 and 1984 experienced decreases in percentage landings. The selected year is not unique in terms of rainfall received as compared to the other years. The monthly rainfall recorded at Kisumu station for 1982 stood at 102.9 compared to 92.2, 86.6 and 93.1 for 1980, 1981 and 1983 respectively.

For each of the eight models, a test of significance for the parameter estimates is done using the standard error test. The null hypothesis

$$H_0 : b_i = 0$$

is tested against the alternative hypothesis

$$H_1 : b_i \neq 0$$

A one tailed test has been used using the t-statistic given that the number of observations are less than thirty.

The null hypothesis is rejected if the value of the computed t is greater than the theoretical t-value from the Tables. The reverse is true when the computed t value is less than the theoretical value

Apart from the above test, the co-efficient of determination (r^2) is also obtained for each equation to show the degree of relationship between the percentage of fish sold processed and the amount of rainfall received at the different points around the Lake.

In addition to the above regression results, the general communication pattern around the landing beaches is discussed to explain the short-comings that arise in the process of fish distribution and the costs involved.

The Lake Victoria fish catch is not homogenous from time to time. Changes in the composition of the seasonal landings require accompanying changes in the marketing services. The fourth sub-section thus shows the yearly changes that have taken place in terms of the species caught. The supply and percentage contribution by quantity and value of the major different fish types over the period are given in tabular as well as graphical forms. These are compared to the trend

in the price by species and to the average prices received over the period. The data used in this sub-section covers a period of the last ten years.

A discussion on each of the major species mentioned earlier is also given to show how their relative abundance or scarcity affects the marketing services in terms of preservation, processing and transportation hence affecting fishermen's receipts.

The foregoing discussion on the analysis looks at the fish marketing activities along the Lake and attempts to expose all the explicit and implicit costs that affect the fishermen's final income. However, the analysis does not specify any institutional elements in the marketing system. Fishermen's co-operative societies handle some percentage of the Lake fish. An analysis of their role as instruments through which producer prices could be improved is, therefore, the subject of the fifth chapter. The sources of data for this particular analysis is stated at the beginning of this chapter.

The analysis of fishermen's co-operatives on the Lake beaches addresses itself to the question of whether the societies could provide better alternative pricing system than the current system of direct transactions between the fishermen and fish traders. It therefore

starts by looking at the activities of fisheries co-operatives in Kenya. The performance of the societies in fish marketing and their financial position for possible improvements in the marketing services is examined. Their pricing system in the recent past is given emphasis by examining the response of the co-operatives to the pricing system administered by a Price Review Committee. This committee was formed by the Government to review Lake Victoria fish prices and to strengthen the co-operative movement in this region. Finally, the general problems facing the societies, especially with regard to the marketing of fish are discussed.

C H A P T E R F O U R

ANALYSIS OF FISH PRICING

4.1. BASIC FACTORS WHICH INFLUENCE FISH PRICES

Like any other commodity, the price of fish on the Lake Victoria landing beaches is determined by the forces of supply and demand. The higher the demand for fish, therefore, the higher is the price of fish. Given the ever increasing population and the rapid rate of urbanization in Kenya, the demand for the Lake fish is undoubtedly large. However, given the perishable nature of the item, the price which the fishermen receive for their produce is influenced by the performance of the market services. Inefficient operations of the services curtail the potential demand for fish in terms of fish spoilage and higher marketing costs leading to lower receipts by the fishermen.

The principal factors in the marketing system which influence fish prices on the Lake beaches would be expected to include (a) storage, (b) processing, and (c) transportation. The last two factors are the most important in determining the final price of fish due to the costs incurred by either the fisherman or fishmonger in performing these marketing services. A discussion of each of these factors is therefore important for the understanding of the Lake fish pricing.

(a) FISH STORAGE

At the outset, it is important to mention that there are no cold storage facilities on the beaches to enable the preservation of fresh-fish while awaiting the arrival of traders. To fetch higher prices for good quality fresh-fish, therefore, the landed catch must be sold immediately. Trade in fresh fish in this respect flourishes when fishing canoes arrive in the morning hours and when traders are ready to make purchases. The fish traders usually arrive at the beaches early in the morning to await the arrival of canoes. The desired or effective demand, however, does not in most cases satisfy the actual fish supply. In most cases excess supply of fresh-fish occurs which could be stored for sale at a later time. The absence of cold-stores thus leaves the processing of excess fish as the only alternative for preservation.

There are fish-stores commonly known as "Fish Bandas", in which the processed fish is kept. In some cases, both processing and storage take place in such bandas. Traders in processed fish buy their wares from such stores from time to time.

There are, therefore, no operational costs incurred in fish storage on the Lake beaches. The fixed costs emanating from the construction costs of the stores do not explicitly enter into the final fish prices, and could be regarded as sunk costs.

Storage costs are thus borne by the individual traders after the fish has left the landing beaches. Lack of ice, furthermore, makes the preservation of fresh fish at the hands of the traders difficult save for those with refrigerated lorries. This forces them to offer low prices to the fishermen due to the expected costs to be incurred by them.

(b) FISH PROCESSING

Fish processing methods on the beaches of the Lake include salting, sun-drying, hot-smoking, cold-smoking and deep-frying. Filleting or canning is not included in this grouping. Sun-drying involves the spreading of the catch on mats or bare rocks to dry from the sun's heat. Apart from the opportunity cost of labour, sun-drying is an inexpensive processing method. Hot-smoking involves keeping the fish close to the fire, while cold-smoking involves placing the fish some distance from the fire place to dry. Deep-drying involves the heating of fish in oil—mostly fish oil.

The explicit processing costs include the cost of fuel-wood or charcoal for smoking and frying. In some cases fuelwood or dried reeds are obtained free of charge in the adjacent bushes. However, the high demand for these in certain regions has led to their scarcity thus rendering processing a more expensive exercise. The oil used in deep-drying is usually obtained from the fatty-

fish such as Lates. Alternatively, cooking-fat is applicable. These costs though may at first appear insignificant, are additional to the total cost of the product. They do account for a substantial loss in income to the fishermen as will be seen shortly.

Processing is usually done by the fishermen or their employees. Individual traders in some cases also process the fish at their hands. In all these cases, the costs are reflected in the fishermen's receipts.

All the fish sold on the beaches can be processed by any one of the mentioned methods except Engraulicypris argenteus which is all sundried, and is never sold fresh. It is a small type of fish which dries easily under the sun and can be stored longer than any other fish. The more oily Lates niloticus is mostly smoked and and is not easily sun-dried.

(c) TRANSPORTATION OF FISH

As discussed in section 1.4 of the paper, the modes of fish transportation from the landing beaches include Head-loads, Buses, Bicycles and private vehicles (mostly wholesalers). Traditionally, fish transportation from the beaches to the inland markets within the Lake region has been dependent on women. They buy small quantities of fish in baskets and carry them to the adjacent inland markets. Using buses/"matatus" the same group of traders have managed to venture into relatively distant markets

outside the Lake region including the major urban centres in the country. The buses facilitate the fast movement of the commodity to reach consumers in high quality form for higher prices. The bicycle traders are mostly young men and operate mainly within the Lake region. They are capable of visiting different market centres on subsequent market days to clear their stock of fish and then returning to the beaches.

The costs incurred during the trade include the cost of the baskets, labour costs and the costs of bicycle repair. Additional costs during transportation involve processing of the fresh fish that the traders are not able to dispose of at any particular market day. The left-overs must be processed for sale the next day.

The transport costs for the above traders can be easily affected by climatic factors. Heavy rainfall, for example, makes the seasonal roads impassable. This affects the movement of fresh fish between the markets and the landing beaches and also between the markets themselves. In this case, processing costs are incurred by the traders. These costs though being incurred during transportation of fish, are strongly used by the traders to bid fish prices down at the landing beaches.

THE WHOLESALERS: The last group of traders, the wholesalers, use private vehicles. They visit certain beaches only, and transport fish to the major towns

in Kenya. The notable companies in the Lake fish trade include Kenya Cold Storage, Samaki And Tilley Co. Ltd., and Hamisi Bilali. In addition, there are other such traders with different sizes of vehicles. It is reported by the Fisheries officers in Kisumu that most of these traders came to the Lake to trade in Tilapia whose production has declined and does not meet the demand. Samaki and Tilley started purchasing fish in Kendu Bay in 1980 and was by then the only company buying Lates niloticus from the shores of Lake Victoria. As more companies became aware of the existence of the high quality fish in the Lake region, they came and joined in the trade.

The wholesale business is important in the sense that it widens the Lake fish market, especially in the Towns where the market would be expected to be great. Lates niloticus, the commercial and dominant fish of the Lake in the 80's, is not highly preferred in the Lake region particularly in its fresh form, but is in great demand in towns especially in hotels and institutions. The private lorry traders thus open up the market for such kinds of fish, This is important for pricing policies.

The tonnage of the fish presently handled by these traders and the landing beaches from where they purchase the fish are shown in Table 4.1.

Table 4.1. PERCENTAGE OF FISH TRANSPORTED TO
DISTANT MARKETS FROM THE BEACHES
DURING 1981-1984

| LANDING BEACH | 1981 | 1982 | 1983 | 1984 |
|---------------|------|------|------|------|
| MARENGA | - | - | - | - |
| KUSA ✓ | - | - | - | - |
| SORI KARUNGU | - | - | - | - |
| KENDU BAY ✓ | N/A | 12.9 | 37.0 | 65.3 |
| DUNGA | - | - | - | 18.3 |
| UHANYA | - | - | 2.1 | 29.0 |
| NGENGU | - | - | - | 0.2 |
| MISORI | - | - | 0.2 | 2.0 |
| LUANDA GEMBE | - | - | - | - |
| LUANDA NAYA | 16.5 | 12.3 | 8.5 | 15.1 |
| USENGE | - | 2.2 | - | - |
| KALOKA | - | - | - | - |
| TOTAL | 4.4 | 3.4 | 7.03 | 17.0 |

SOURCE: Statistical Dept; Fisheries Dept. - Ministry of Tourism and Wild life.

1 Distant markets in this case refers to markets outside the Lake region e.g. Nairobi, Mombasa and Nakuru.

From Table 4.1. above, it can be deduced that except for 1984 less than 10 per cent of Lake Victoria fish catch get sold beyond the Lake basin, especially in the major Kenyan towns such as Nairobi, Mombasa and Nakuru. About 20 per cent of the production was marketed in these towns in 1984.

The Table also indicates that this mode of fish distribution is specific to certain landing beaches. Kendu-Bay and Luanda Naya are two beaches where these traders have operated from throughout the given period. The two beaches have been relatively more accessible. Kendu Bay beach is adjacent to an all-weather road with bound surface thus making it accessible throughout the year. Luanda Naya, on the northern side of the Lake is poorly served with good roads. However, it is strategically situated for the access of all kinds of traders. First, the area is among the dry ones in this region. The relatively dry weather allows the poor roads to be usable for most of the year. Secondly, being located on the Lake shoreline protruding into the water body, canoes can easily cross with fish catches to Mbita region to the south of the Lake or to Mfangano islands from where fish could be transported to outside markets. For Dunga beach, which is one of the most accessible, the demand for fish within Kisumu Town and the surrounding markets is high and does not allow the sales to distant markets. In 1984, however, about 20 per cent of its catch found its way to the distant markets. Uhanya beach is also accessible throughout the year and registered about 30 per cent of its catch being sold to the distant markets.

Table 4.1. therefore, shows that the transportation of the fish to distant markets is restricted

(SR) 2 30

to certain beaches only. Seven out of the Twelve sampled beaches do not sell their catches to the lorry traders. There are, in addition, several other landing beaches which are isolated and which are only served by fishmongers around the Lake.

All the above modes of transportation of fish have important implications for better fish pricing. Increasing transportation costs automatically reduces fishermen's receipts. The efficient operations of these outlets for the smooth flow of the trade is thus important for better pricing of the Lake fish.

The estimation of the costs incurred in the mentioned marketing functions is not undertaken in this analysis. The percentage of fish catch sold fresh or processed, however, indicates the efficiency of the marketing activities. Insufficient transportation facilities, for example, means increasing sales of processed fish and, therefore, lower prices to fishermen. A discussion on the form of sales the fish throws light on the inefficiency of the pricing system.

4.2. SALES OF FRESH AND PROCESSED FISH

The distinction in the marketing of fish between the trade in fresh and processed forms of fish need be investigated in this kind of analysis. Given that the production units are too small and scattered, fresh-fish trade cannot be concentrated in a few hands. The

fishmongers possess capital which is insufficient for wholesale operations. The wholesalers as mentioned, operate in specific beaches from where they transport fresh fish to the Kenyan Towns. The fresh fish trade among the local fishmongers is highly individualized and is mostly at the hands of the bicycle traders. This is because they normally reach the inland markets on the same day from the beaches thus arriving with high quality fish. However, other traders on the beaches which are well served with transportation networks also trade in fresh fish. How fast a given basket of fish arrives at the market place determines the percentage of the catch which can be sold fresh. The means of transport, therefore, is a major determinant of how much of the landed catch will be sold fresh at the landing beaches of the Lake.

The fish is thus sold in either of the two forms. The greater the sales in fresh fish, the greater is the turnover of the dealers at the time of the landings. It is the view of fisheries officers and the fishermen interviewed that fish wastage due to spoilage is non-existent at the landing beaches due to availability of the traders to buy any increased supply in either of the two forms. This study holds this view after observations made at some of the landing beaches, and examination of available data from the Fisheries Department.

Processed fish is less remunerative than fresh fish, as is the case with most perishable food items. Mikkola (1977) found out that the fishermen as well as their co-operatives in Kenya (mainly in Lake Turkana) do earn about twice as much per kilo of fresh fish as per kilo of salted, dried or smoked fish, comparing raw weights. Table 4.2. below shows the average prices received for the two types of fish sold on Lake Victoria beaches between 1976 and 1984.

Table 4.2.1. AVERAGE PRICES FOR FRESH AND PROCESSED FISH SOLD ON THE BEACHES OF LAKE VICTORIA, 1976-1984
In Shs/Kg.

0.04
15442

| | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|----------------|------|-------|-------|-------|-------|-------|------|-------|-------|
| FRESH FISH | 1.54 | 1.59 | 1.83 | 2.06 | 2.41 | 2.56 | 1.66 | 2.09 | 2.47 |
| PROCESSED FISH | 1.50 | 1.23 | 1.27 | 1.80 | 1.98 | 2.05 | 1.61 | 1.28 | 1.44 |
| % DIFFERENCE | 2.60 | 22.60 | 30.60 | 12.60 | 17.80 | 19.90 | 3.00 | 38.80 | 41.70 |

SOURCE: Statistical Section: Fisheries Dept - Ministry of Tourism and Wildlife.

1.56
2.06
1.52
2.04

From Table 4.2. it is clear that the price of fresh fish on the beaches is higher than for processed fish in absolute terms. The percentage difference between the two shows that the loss in income per kilo of fish due to sales in processed fish substantially affects the total net receipts to a fisherman. Even a loss

of less than 10 per cent per kilo cannot be underestimated in terms of income accruing to the fishermen vis-a-vis their fishing efforts. The outcome seems to indicate, given the price structure, that the fishermen would realize more if they sold their catch in fresh form. However, it is likely that the distance of fresh fish markets calls for processing of fish traditionally. The amount of sales in either of the two states thus determines the average price of fish at any one time on the beaches. It is, therefore, in the interest of fishermen to dispose of their catches in fresh forms. On the side of the traders, the amount of fish bought fresh is determined by the timing of the landings, and how fast the fish can be transported to the inland markets. Given the absence of storage facilities (cold rooms or ice) availability of transportation means remain a major determinant of the fresh fish sales. Accessibility of the beaches throughout the year is therefore critical for the prices received by fishermen.

For the whole of the Lake fish supply, the determination of the demand for the two forms of fish over a period would explain changes in the fishermen's net income. The period 1978 to 1984 is taken for the analysis and Table 4.3 below shows the percentage sales in fresh fish on a seasonal basis. Each year is partitioned into four quarters showing the seasonal

Table 4.3 ANNUAL CATCHES AND SALES IN FRESH FISH,
1978-1984 (M. TONNES)!

| YEAR | QUARTER | TOTAL | FRESH SALES | SHARE % |
|------|--------------|-------|-------------|---------|
| 1978 | JAN - MARCH | 6195 | 2752 | 44.4 |
| | APRIL - JUNE | 3847 | 2781 | 72.3 |
| | JULY - SEPT. | 6796 | 3144 | 46.3 |
| | OCT. - DEC. | 7018 | 3254 | 46.4 |
| | TOTAL | 23856 | 11931 | 50.1 |
| 1979 | JAN - MARCH | 7188 | 3348 | 46.5 |
| | APRIL-JUNE | 6422 | 4517 | 70.3 |
| | JULY - SEPT. | 8899 | 4680 | 52.6 |
| | OCT. DEC. | 8073 | 2925 | 36.2 |
| | TOTAL | 30592 | 15470 | 51.4 |
| 1980 | JAN - MARCH | 7198 | 3407 | 47.3 |
| | APRIL - JUNE | 5447 | 4229 | 77.6 |
| | JULY - SEPT. | 7222 | 3280 | 45.4 |
| | OCT.- DEC. | 7047 | 2788 | 39.6 |
| | TOTAL | 26914 | 13704 | 50.8 |
| 1981 | JAN - MARCH | 10336 | 6037 | 58.4 |
| | APRIL - JUNE | 8463 | 5629 | 66.5 |
| | JULY - SEPT. | 10623 | 4810 | 45.3 |
| | OCT. - DEC. | 8757 | 3511 | 40.1 |
| | TOTAL | 38179 | 19987 | 52.4 |
| 1982 | JAN - MARCH | 11961 | 5165 | 43.2 |
| | APRIL - JUNE | 9935 | 4210 | 43.7 |
| | JULY - SEPT. | 16269 | 10361 | 63.7 |
| | OCT. - DEC. | 22793 | 9818 | 43.1 |
| | TOTAL | 60658 | 29554 | 48.5 |
| 1983 | JAN - MARCH | 20481 | 5251 | 25.6 |
| | APRIL - JUNE | 14929 | 8140 | 54.5 |
| | JULY - SEPT. | 21177 | 6915 | 32.7 |
| | OCT. - DEC. | 20740 | 6145 | 29.6 |
| | TOTAL | 77327 | 26451 | 34.2 |
| 1984 | JAN - MARCH | 20481 | 5931 | 31.2 |
| | APRIL . JUNE | 14929 | 6998 | 49.2 |
| | JULY - SEPT | 21177 | 6503 | 37.1 |
| | OCT. - DEC. | 20740 | 9495 | 43.6 |
| | TOTAL | 77327 | 28927 | 40.3 |

SOURCE: Statistical Section: Fisheries Dept. Ministry of
Tourism & Wildlife

fish supply and the respective percentage sales of fresh fish over the period of analysis.

From Table 4.3 it can be seen that, the difference in the percentage sales of fresh fish from season to season and from year to year is not large for the period of 1978 to 1981. The annual mean sales of fresh fish was slightly higher than for processed over the same period. It ranged from 50.1 per cent in 1978 to 52.4 per cent in 1981. However, over the same period, sales of fresh fish in the first, third and fourth quarters of each year tend to be lower than in processed save for the third quarter of 1979 and the first quarter of 1981. For the three quarters in this period, the sales of fresh fish ranged from 36.2 per cent to 46.5 per cent of the total catch. Bigger sales in fresh fish in the second quarter of each of the years is primarily explained by the fact that the period coincides with a ban on the fishing of Engraulicypris argenteus. The fish is usually all sun-dried before sales.

Over the period of 1982 to 1984, the mean percentage sales in fresh fish was lower than processed fish. The range was from 34.2 per cent to 48.5 per cent. In 1983 fresh fish sales in the first, third and fourth quarters declined tremendously in percentage terms and was as low as 25.6, 32.7 and 29.6 per cent respectively. This trend extended to the first quarter of 1984 in which it was also as low as 31.8 per cent. At the same time, fresh fish sales in the second quarter of each of these

years also declined, being lower than processed sales despite the absence of the fish that is sold all processed.

The latter period indicated a worsening trend in the sales of fresh fish as compared to the preceding period. Table 4.3 clearly indicates that fresh fish sales on the Lake beaches has always tended to be lower than for processed on a seasonal basis but the trend was worsened in the last three years of the analysis. Figure 4.1 below illustrates the above discussed trend of the sales in fresh fish as compared to the total fish supply by quarters.

It is clear from the figure that the gap between total fish catch and the sales in fresh fish by quarter was not very wide between 1978 and 1981. Especially between 1978 and 1980, the gap was narrowest in the second quarter of each year. The gap however, increased between 1982 and 1984, and being even wider in the second quarters of these years.

It is evident from figure 4.1 that the increased fish supply on the Lake Victoria beaches, especially in the period 1982 to 1984, was not accompanied by appropriate increase in the demand for fresh fish on a seasonal basis.

Figure 4.2. shows the relationship between the trends in annual mean percentage sales in processed and

TOTAL
FIGURE 4.1. SALES AND THE SALES OF FRESH FISH BY QUARTERS 1979-1984

SOURCE: Derived from Table 4.3.

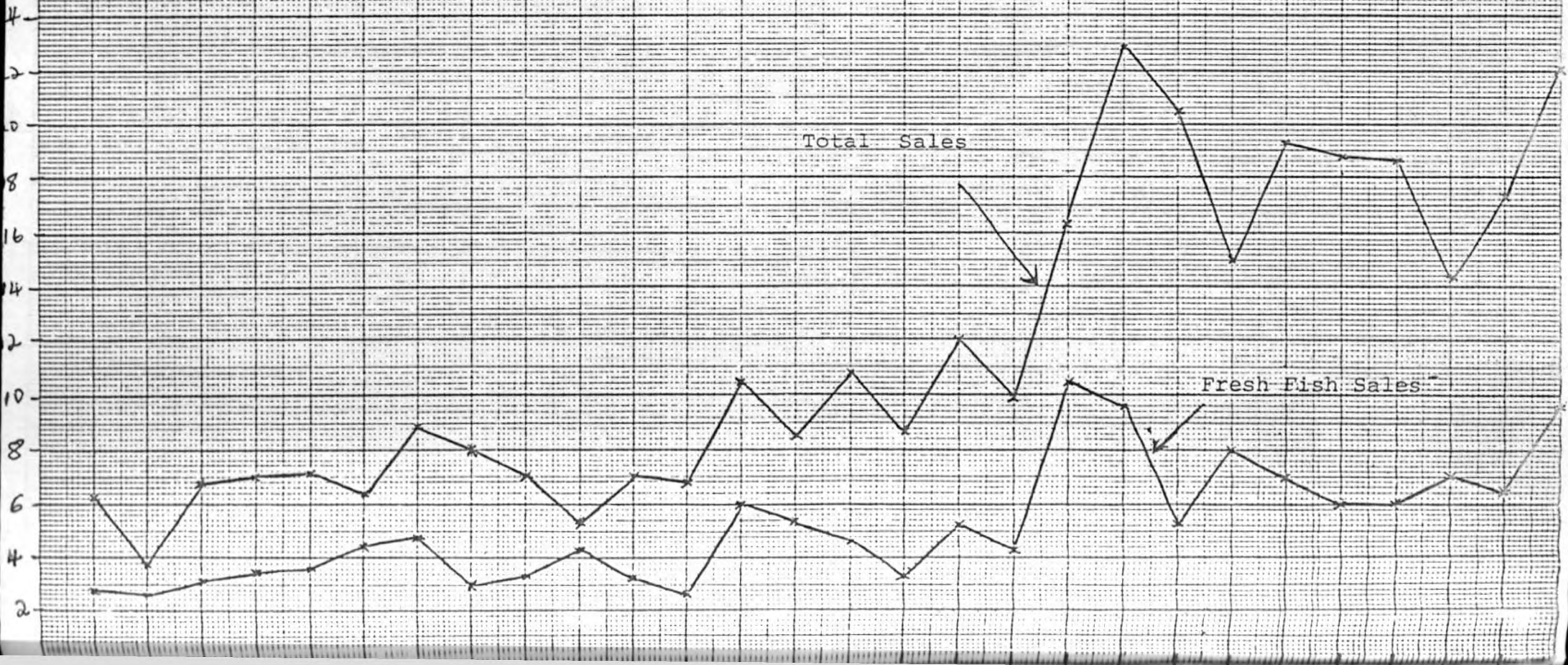
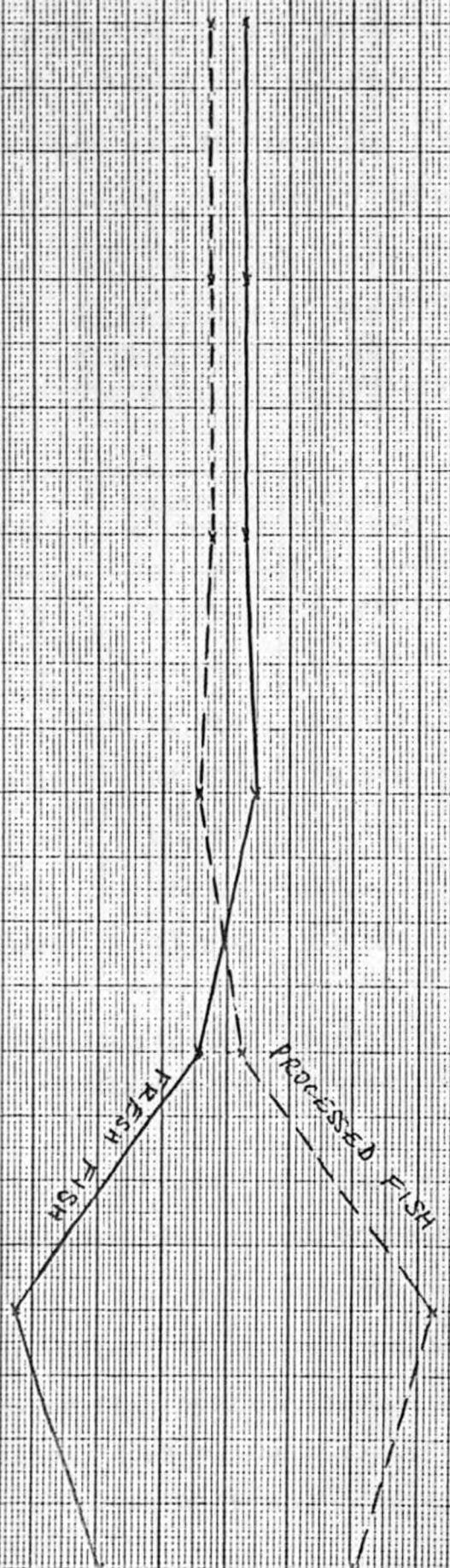


FIGURE 4.2 PERCENTAGE SALES IN FRESH AND PROCESSED FISH, 1978 - 1984

SOURCE: Derived From Table 4.3.



fresh fish. It illustrates clearly the fluctuations in the sales of the two forms. The decline in fresh fish sales in 1982 and 1983 has important implications on fishermen's receipts. The receipts from the sale of fish over the period is shown in Table 4.4.

Table 4.4 QUANTITY, VALUE AND AVERAGE PRICE OF FISH LANDINGS AT THE BEACHES OF LAKE VICTORIA DURING 1978-1984

| YEAR | QUANTITY M. TONNES | VALUE '000 SHS | AVERAGE PRICE SHS/KG |
|------|-----------------------|-------------------|-------------------------|
| 1978 | 23,856 | 36,980 | 1.56 |
| 1979 | 30,592 | 57,095 | 1.86 |
| 1980 | 26,914 | 58,805 | 2.18 |
| 1981 | 38,179 | 85,346 | 2.24 |
| 1982 | 60,958 | 123,400 | 2.02 |
| 1983 | 77,327 | 120,315 | 1.56 |
| 1984 | 71,854 | 133,309 | 1.86 |

SOURCE: Statistical section; Fisheries, Dept. Ministry of Tourism and Wildlife.

The fall in fresh fish sales notable in 1982 and 1983 is reflected in the concomitant declines in average fish prices over the same period as Table 4.4 illustrates. A look at the catch quantities and values of fish over the period shows that changes in fish supply does not necessarily imply changes in price in opposite direction as is evident over

the period. The total value of fish declined in 1983 which, apart from the 27 per-centage increase in supply, is explained by the lowest percentage decrease in the demand for fresh fish. In 1984, a decrease in fish supply of about 7 per cent together with an improved demand for fresh fish at 40 per cent explain the resulting increase in the price and value of the fish.

The analysis establishes that while the interaction of demand and supply forces in determining fish prices is admissible, a declining trend in the sales of fresh fish against increasing sales in processed fish adversely affects prices and hence fishermen's net income. The question is why increasingly more fish was sold in processed form overtime. The factors that do adversely affect the trade in fresh fish are thus responsible for lower prices in this region. These factors would include lack of storage facilities and better transport networks to enable the accessibility of the beaches throughout the year. The transport aspect in fish pricing can therefore be measured by the accessibility of the beaches. This is the subject of the next section.

4.3. THE ACCESSIBILITY OF THE LANDING BEACHES *

The accessibility of the fish landing beaches determines the percentage of the catch that is sold in fresh form. This is subject to one basic assumption that increased fish supply invites more traders to the beaches. This conforms to Jansen's (1973) finding that too little fish to trade in was characteristic of the Lake fish trade. In this paper, it is argued that certain beaches are inaccessible during certain periods of the year such that the timely arrival of fish traders for high quality fish is hampered hence resulting into lower receipts to the fishermen.

Given that the means of fish transportation in this region comprise of buses and bicycles, all of which could be adversely affected by impassable roads, the accessibility of the beaches remain an important determinant in the pricing system. During the wet season, therefore, much of the landed fish would be expected to be sold in processed form. Conversely, much of the landings would be sold fresh during dry seasons. The hypothesis is tested by the following generalized model whose components are explained in section 3.1 of the paper

$$Q_p = b_0 + b_1 + R_i + E_i$$

Where Q_p is the percentage of the monthly fish landings for the whole Lake which is sold in a processed form.

$i = R, N, M, K, G, H, W, B.$

R_R measures the monthly rainfall recorded at Rusing Is. Met.station

| | | | | | | | | |
|-------|---|---|---|---|---|---|-----------|---|
| R_N | " | " | " | " | " | " | Nyangana | " |
| R_M | " | " | " | " | " | " | Madiany | " |
| R_K | " | " | " | " | " | " | Kisumu | " |
| R_G | " | " | " | " | " | " | Kadenge | " |
| R_H | " | " | " | " | " | " | Homabay | " |
| R_W | " | " | " | " | " | " | Nyandiwa | " |
| R_B | " | " | " | " | " | " | Kendu Bay | " |

The regression results from the eight estimated relationships are given in Table 4.5 . below.

Table 4.5 : REGRESSION RESULTS FROM THE MODELS.

| EXOGENEOUS VARIABLE (R_i) | CONSTANT (b_0) | COEFFICIENT OF R_i (b_1) | COEFFICIENT OF DETERMINATION (r^2) |
|----------------------------------|-----------------------|--------------------------------------|-------------------------------------------|
| R_R | 44.0023 (7.67483) | 0.892808 (1.53459) ^c | 0.1906 |
| R_N | 45.3930 (8.20983) | 0.730471 (1.32875) ^d | 0.1501 |
| R_m | 41.0277 (7.67343) | 0.155763 (2.27252) ^a | 0.3406 |
| R_K | 40.7090 (5.04879) | 0.989982 (1.4436) ^c | 0.1725 |
| R_G | 41.5563 (8.25446) | 0.116834 (2.33558) ^a | 0.3530 |
| R_H | 43.9646 (5.37277) | 0.730923 0.998271) ^f | 0.0906 |
| R_W | 41.9646 (7.10312) | 0.158638 (1.94160) ^b | 0.2738 |
| R_B | 45.9212 (6.36333) | 0.635676 (0.862314) ^f | 0.0692 |

Note: a = Significant at 0.05
b = Significant at 0.10
c = Significant at 0.20
d = Significant at 0.30
f = Not significant
The t - statistic in parentheses

From Table 4.5 the positive relationship between the percentage sales in processed fish and the amount of rainfall received is a commendable result. This finding conforms to the a priori theoretical expectations from the hypothesis that much of the landed fish is sold in processed form during the rainy seasons.

The t-statistic tests of the parameter estimate (b₁) reveals that for two of the eight regressed models, the parameter is statistically significant at the 95 per cent level of confidence. For one other model, the parameter is significant at the 90 per cent level of confidence. For these three relationships the null hypothesis is rejected and we conclude that rainfall is significant in influencing the sales of processed fish.

For the three models, rainfall figures used are for madiany, Kadenge and Nyandiwa Meteorological stations. These stations cover nearly the whole of the northern side of the Lake. The landing beaches covered by the stations include Kaloka, Luanda Naya, Usenge, Marenga and Misori all of which are important in the fish supply.

Most of the road networks around these beaches consist of tracks and dry-weather roads. All weather loose surface roads occur in a few areas, for example, around Usenge beach.

The statistical significance of the parameter estimates for the three relationships is therefore justified on empirical grounds. However, the coefficient of determination (r^2) for the same models appear to be low. These r^2 are obtained as 0.34, 0.35 and 0.27 for Madiany, Kadenge and Nyandiwa stations respectively. It means, for example, that about 35 per cent of the increased sales of processed fish (for the whole Lake) is explained by increase in rainfall as recorded at Kadenge alone. The three r^2 in this respect can be said to be high given that they do not represent the sales in their respective regions only, but the whole of the Lake fish supply.

The t-statistic for two other models are statistically significant at the 80 per cent level of confidence. These are represented by Kisumu and Rusinga Island stations. In addition, one represented by Nyangoma is significant at 70 per cent level. The r^2 for these models are low, being close to 0.20. The low r^2 for some of these, as in the case of Kisumu is explained by better communication patterns.

It is of interest to note that the two models incorporating rainfall figures for Homa-bay and Kendu

Bay show no significance in b_1 and also very low r^2 of 0.09 and 0.06. These two stations are adjacent to Kendu-Bay and Homa-Bay landing beaches. These areas receive almost equal amounts of rainfall. These beaches are connected to the inland markets with all-weather roads, though some are loose surfaced. The beaches are traditionally served with good roads due to their locations and also sell fish to wholesalers who transport the fish to the major towns like Nairobi and Nakuru.

Given that out of eight, three models exhibit statistical significance in their rainfall parameter estimates at the 90 per cent level of confidence, the effect of rainfall on fish sales is thus established. This argument is reinforced by the fact that three other models show significance of the estimates at lower levels of confidence as explained above. The generally observed low r^2 obtained from the models is due to the fact that other unspecified explanatory variables are not incorporated in the equations. Some of them such as the seasonal changes in the species composition of the catches, are unquantifiable. Other factors are discussed generally in the analysis of the fishermen's co-operatives in the next chapter. Some of these such as the management of the societies have important implications in the sales of fish.

The above analysis shows that inaccessibility of certain beaches result into increased sales of processed fish which has an adverse effect on producer incomes. The general clearance of the Lake beaches, therefore, does not necessarily mean higher average prices for the landed catches.

The demand for fresh fish differ from beach to beach and from season to season. However, the response of the demand to changes in supply determines the prices received by fishermen for their highly perishable fresh items. Tables 4.6 and 4.7 below show the sales in fresh and processed fins and the percentage sales in fresh fish by beach respectively.

Table 4.6 . SALES IN FRESH AND PROCESSED FISH BY BEACH, 1981-1984 (M.Tonnes) >

| BEACH | 1 9 8 1 | | 1 9 8 2 | | 1 9 8 3 | | 1 9 8 4 | |
|--------------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
| | FRESH | PROCESSED | FRESH | PROCESSED | FRESH | PROCESSED | FRESH | PROCESSED |
| MARENGA | 143714 | 1793 | 273336 | 5648 | 492925 | ∅ | 360907 | ∅ |
| KUSA | 110156 | 126703 | 165092 | 96337 | 27333 | 14236 | 60234 | 22894 |
| SORI KARUNGU | 111991 | 3955 | 54812 | 8173 | 85096 | 35353 | 92311 | 63983 |
| KENDU BAY | 355276 | 157899 | 187085 | 58158 | 440552 | 147022 | 559451 | 45156 |
| DUNGA | 189766 | 77476 | 194354 | 16311 | 222177 | ∅ | 256252 | ∅ |
| UHANYA | 28711 | 184022 | 54110 | 668867 | 8867 | 37503 | 117466 | 30881 |
| MISORI | 194274 | 198629 | 88901 | 277030 | 77169 | 589313 | 183169 | 228909 |
| LUANDA GEMBE | 54015 | 68003 | 28749 | 137609 | 17398 | 225037 | 71600 | 386354 |
| LUANDA NAYA | 267746 | 722619 | 160623 | 693960 | 177290 | 1929084 | 349541 | 3057672 |
| USENGE | N/A | N/A | 104879 | 122773 | 35101 | 150721 | 143476 | 1198 |
| KALOKA | 85979 | 90562 | 55738 | 34824 | 49873 | 29670 | 36426 | 81051 |
| TOTAL | 1541628 | 1631664 | 1581868 | 2147788 | 177517 | 3319487 | 2752774 | 4037257 |

SOURCE: Statistical Section: Fisheries Dept; Ministry of Tourism & Wildlife

NOTE: ∅ Means a very small amount (unqualified)

Table 4.7. PERCENTAGE SALES IN FRESH FISH BY BEACH,
1981/84

| BEACH | 1981 | 1982 | 1983 | 1984 |
|--------------|------|------|--------|--------|
| MARENGA | 98.8 | 98.0 | 100.0* | 100.0* |
| KUSA | 46.5 | 63.1 | 65.8 | 72.5 |
| SORI-KARUNGU | 96.6 | 87.0 | 70.6 | 59.1 |
| KENDU BAY | 69.2 | 76.3 | 96.8 | 92.5 |
| DUNGA | 71.0 | 92.3 | 100.0* | 100.0* |
| UHANYA | N/A | 90.6 | 54.2 | 81.4 |
| NGEGU | 13.5 | 44.7 | 7.0 | 79.2 |
| MISORI | 49.4 | 24.3 | 11.6 | 44.5 |
| LUANDA NAYA | 27.0 | 18.8 | 8.4 | 10.3 |
| USENGE | N/A | 46.1 | 18.9 | 99.2 |
| KALOKA | 48.7 | 61.5 | 62.7 | 31.0 |

SOURCE: Statistical Section: Fisheries Dept. Ministry
of Tourism and Wildlife.

Note: * Means nearly the figure indicated.

It should also be noted that most of the beaches which show low sales in fresh fish were earlier mentioned to be represented in those models in which the statistical significance of the parameter estimates was recognized.

Landing beaches such as Marenga, Dunga, Kusa, Sori Karungu, Kendu Bay and Uhanya show a consistently higher sales in fresh form. These beaches are well served with better roads. Most of them sell to

distant markets. In 1983 and 1984 Dunga and Marenga beaches registered fresh fish sales of nearly 100 per cent of their landed catches.

There are numerous other landing beaches which are inaccessible during the wet seasons all of which are badly affected in the pricing system. The absence of cold-stores puts fishermen at a poor bargaining position vis-a-vis fish traders especially during the periods of excess fish supply, or during the periods when the beaches become inaccessible to many traders. there is no reason to explain why traders in specific beaches would prefer processed to fresh fish, and the demand for the latter will definitely be affected by how fast a given quantity can be purchased soon after landing and then transported immediately to the inland markets for sale.

It would be expected, therefore, that fish prices would be higher at the beaches with higher sales in fresh form than in those with lower sales in the same type. The average fish price by beach for the period 1981 to 1984 is shown in Table 4.8. .

Table 4.8 . AVERAGE FISH PRICES BY BEACH, 1981-1984,

In Shs/Kg

| BEACH | 1981 | 1982 | 1983 | 1984 |
|--------------|------|------|------|------|
| MARENGA | 3.01 | 1.93 | 1.65 | 2.65 |
| KUSA | 2.60 | 2.63 | 2.50 | 2.48 |
| SORI KARUNGU | 3.90 | 3.46 | 1.52 | 1.77 |
| KENDU BAY | 1.94 | 1.79 | 1.67 | 1.77 |
| DUNGA | 2.56 | 2.13 | 1.99 | 2.17 |
| WHANYA | N/A | 2.54 | 2.11 | 3.0 |
| NGEGU | 1.83 | 1.51 | 1.26 | 1.58 |
| MISORI | 2.90 | 2.46 | 1.53 | 1.94 |
| LUANDA NAYA | 2.08 | 1.92 | 1.24 | 1.41 |
| USENGE | N/A | 2.31 | 2.23 | 2.83 |
| KALOKA | 1.74 | 1.63 | 1.70 | 1.89 |

SOURCE_ Statistical section: Fisheries Dept -
Ministry of Tourism & Wildlife.

A look at Table 4.8 shows that fish prices on average are slightly higher at the more accessible beaches such as Marenga, Sori Karungu, Dunga and Whanya in a given year except with some exceptions. However, it cannot be concluded from Table 4.8 that at the relatively more accessible beaches fishermen get significantly higher offers for their catches than their counterparts in the more inaccessible beaches.

The difference in fish prices between the beaches is not so great as was the difference in the percentage of fresh fish sold between the beaches.

This finding is not surprising since the two forms of fish compete for the same markets inlands, at least to a greater extent. Fish consumers, especially around the Lake region, might not be willing to pay dearly for the fresh fish when processed fish is available in the same market at a lower price. Fresh fish traders will therefore be forced to lower prices at the landing beaches to enable them sell their wares side by side with the processed fish traders.

Impassable roads to certain landing beaches militate against the better pricing of the fish as a whole. However, there are other factors that are not easily quantifiable which affect the pricing system. The omission of these other variables in the regression model also explain its weak predictive power as evidenced from the results. One such factor is the changes in the composition of the landed catches from season to season and also over a given period. The effect of the changes in species composition of yearly supply on the pricing of fish is discussed in the next subsection.

4.4. THE EFFECT OF CHANGES IN SPECIES COMPOSITION
OF ANNUAL SUPPLY

Yearly changes in the species composition of fish supply require concomitant changes in the marketing functions. The response of consumers and the available marketing services to such changes could affect the pricing system and thus need be captured in the final price analysis. It has been mentioned earlier that one of the fish species from the Lake need be sold all processed. Given the existence of the many species therefore, changes in their supplies from season to season is bound to affect producer prices. The preference of some consumers for certain fish species, for example, could be so rigid in the short run that substitution for the other species become acceptable only at lower prices.

Table 4.9 and 4.10 below give the percentage share of the major species to total supply and to the total value of the Lake catches over the last decade. The economic importance of each of the species is discussed in Appendix I.

4.9 PERCENTAGE SHARE OF THE MAJOR SPECIES TO THE TOTAL
SUPPLY OF FISH SOLD ON THE BEACHES OF LAKE VICTORIA
(KENYA), 1975-1984.

| SPECIES | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| BAGRUS | 8.38 | 5.49 | 5.90 | 5.85 | 5.78 | 2.39 | 1.13 | 4.15 | 1.61 | 0.12 |
| CLARIAS | 15.58 | 13.42 | 9.08 | 7.25 | 9.90 | 4.55 | 2.63 | 3.38 | 1.61 | 1.09 |
| ENGRAULICYPRIS | 27.43 | 30.26 | 34.68 | 36.51 | 30.47 | 35.09 | 20.00 | 17.09 | 21.27 | 27.05 |
| HAPLOCHROMIS | 27.86 | 34.09 | 27.82 | 27.75 | 21.57 | 13.51 | 2.40 | 4.18 | 0.79 | 0.06 |
| LABEO | 0.65 | 0.66 | 4.86 | 0.62 | 1.45 | 1.79 | 0.29 | 1.51 | 0.10 | 0.08 |
| LATES | 0.31 | 0.52 | 1.05 | 4.47 | 14.01 | 16.01 | 59.81 | 54.36 | 67.73 | 57.50 |
| PROTOPTERUS | 8.86 | 5.01 | 3.99 | 2.57 | 1.54 | 1.37 | 0.49 | 0.39 | 0.14 | 0.11 |
| TILAPIA ESCULENTA | 0.17 | 0.26 | 0.22 | 0.75 | 0.31 | 0.33 | 0.36 | 0.66 | 0.14 | 0.14 |
| TILAPIA NILOTICUS | 1.22 | 2.25 | 2.40 | 4.08 | 3.14 | 4.40 | 4.87 | 4.23 | 3.25 | 8.54 |
| TOTAL | 90.46 | 91.96 | 90.00 | 92.85 | 88.17 | 79.44 | 91.98 | 89.95 | 96.19 | 94.69 |

SOURCE: Own compilation from Fisheries Dept. Statistical Bulletins.

Table 4.10 . PERCENTAGE CONTRIBUTION OF THE MAJOR SPECIES TO THE TOTAL VALUE OF FISH SOLD ON THE BEACHES OF LAKE VICTORIA (KENYA), 1975 - 1984

| SPECIES | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| BAGRUS | 7.19 | 4.63 | 4.97 | 5.51 | 5.20 | 2.20 | 0.13 | 4.10 | 0.06 | 0.17 |
| CLARIAS | 17.01 | 16.61 | 12.47 | 9.88 | 11.76 | 5.12 | 3.20 | 4.54 | 1.65 | 1.32 |
| ENGRAULICYPRIS | 21.18 | 21.67 | 26.83 | 26.85 | 23.60 | 29.43 | 15.56 | 11.44 | 14.84 | 18.20 |
| HAPLOCHROMIS | 24.57 | 30.53 | 21.56 | 19.64 | 14.24 | 7.36 | 1.87 | 2.375 | 0.63 | 0.05 |
| LABEO | 2.02 | 0.73 | 3.99 | 0.71 | 1.64 | 2.43 | 0.40 | 1.53 | 0.13 | 0.09 |
| LATES | 0.37 | 0.62 | 1.49 | 5.06 | 15.37 | 12.64 | 53.68 | 48.93 | 60.67 | 49.44 |
| PROTOPTERUS | 13.43 | 7.53 | 6.34 | 3.77 | 2.21 | 1.80 | 0.57 | 0.74 | 0.28 | 0.26 |
| TILAPIA ESCULENTA | 0.28 | 0.65 | 0.40 | 1.72 | 0.64 | 0.58 | 0.64 | 1.71 | 0.42 | 0.41 |
| TALAPIA NILOTICUS | 2.56 | 5.16 | 5.44 | 9.84 | 7.00 | 8.38 | 9.99 | 11.67 | 11.60 | 22.40 |
| TOTAL | 87.61 | 88.13 | 83.49 | 82.98 | 81.66 | 69.94 | 86.04 | 87.41 | 90.28 | 92.34 |

SOURCE: Own compilation from Fisheries Dept. Statistical Bulletins.

It is clear from Table 4.9 that annual changes in the species composition of supply is evident on the Lake beaches. Fish species such as Bagrus, Clarias, Labeo, Haplochromis and Protopterus all of which are commercially valuable, have declined in supply over the years. Some of them appear to be disappearing completely from the beaches. Haplochromis species, for example, was accounting for about 30 per cent in the '70s but has declined to less than 1 per cent in the '80s.

The two Tilapia group has over the period shown little variation in their contribution to total supply. Tilapia esculenta has maintained a less than one per cent share in most cases. Tilapia niloticus share on the other hand, has ranged between 1 and 5 per cent except in 1984 when it rose to 8.5 per cent. However, the apparent stable supply of Tilapia spp falls short of its great demand. This has made it a very scarce species on the landing beaches.

Engraulicypris argenteus and Lates niloticus are two species that have dominated the catches in the '80s. For the former, its dominant role has prevailed throughout the period. The share of Lates niloticus has risen from 0.30 per cent in 1975 to 16.01 per cent in 1980 and to about 60 per cent in 1981. Such a notable rise in a particular species is bound to have important implications on the marketing system.

Table 4.10 shows the accompanying changes in the percentage contribution of the same species to the total value of fish sold on the beaches. It is evident that these changes have moved almost along the lines of the changes in the species composition of supply. However, it is important to note that for some of these species, their contribution to the total value does not reflect the true picture about their dominance in the supply. For example, Engraulicypris argenteus accounted for 27 per cent of the total supply in 1984 but contributed 18 per cent to the total value. Lates niloticus accounted for about 60 per cent of the supply but contributed about 50 per cent to the total value. On the other hand, Tilapia niloticus contributed about 9 per cent to the total supply but accounted for 22 per cent of the total value. Even though the demand and supply interactions for the individual species could explain this phenomenon, the net remuneration from individual species by fishermen should reflect the fishing effort so applied. Table 4.11 below gives the average prices received per species in the decade.

Table 4.11 AVERAGE FISH PRICE BY SPECIES ON THE LAKE VICTORIA BEACHES, 1975-1984, SHS/KG.

| SPECIES | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|----------------------|------|------|------|------|------|------|------|------|------|------|
| BAGRUS | 1.10 | 1.09 | 1.12 | 1.46 | 1.68 | 2.01 | 2.24 | 2.00 | 1.99 | 2.58 |
| CLARIAS | 1.32 | 1.59 | 1.82 | 2.11 | 2.22 | 2.46 | 2.72 | 2.72 | 2.34 | 2.29 |
| ENGRAULICYPRIS | 1.91 | 0.92 | 1.03 | 1.14 | 1.45 | 1.83 | 1.74 | 1.35 | 1.09 | 1.26 |
| HAPLOCHROMIS | 1.13 | 1.15 | 1.03 | 1.10 | 1.23 | 1.19 | 1.75 | 1.33 | 1.21 | 1.74 |
| LABEO | 3.99 | 1.41 | 1.09 | 1.77 | 2.11 | 2.97 | 3.03 | 2.06 | 1.89 | 2.14 |
| LATES | 1.53 | 1.55 | 1.88 | 1.76 | 2.05 | 1.72 | 2.01 | 1.82 | 1.39 | 1.39 |
| PROTOPTERUS | 1.95 | 1.95 | 2.10 | 2.28 | 2.67 | 2.86 | 2.56 | 3.82 | 3.15 | 4.43 |
| TILAPIA ESCULENTA | 2.14 | 3.20 | 2.45 | 3.53 | 3.90 | 4.31 | 3.94 | 5.28 | 4.73 | 5.57 |
| TILAPIA NILOTICUS | 2.70 | 2.95 | 3.01 | 3.75 | 4.15 | 4.16 | 4.59 | 5.58 | 5.55 | 4.85 |

SOURCE: Statistical Section: Fisheries Department, Ministry of Tourism and Wildlife.

From the table it is clear that the difference in the average fish prices between the species is not great except for a few exceptions. The more scarce species appear to fetch prices similar to those of the more abundant ones. The Tilapia spp show higher prices than all others. Looking at fish prices in the '80s it is evident from Table 4.11 that prices of the different species tend to move in the same direction

between years. The decline in the average fish prices, for example, affected all the species with the fall being greater for some species than others. The rise in fish prices in 1984 also affected all the species. The finding indicates some degree of substitutability between the species. This substitutability, though not measured, implies that fishermen's receipts would be higher when the dominant species in the annual catch are those whose nature allow fast distribution so as to fetch higher prices in the inland markets. The trend in the supply of four major species on the Lake beaches is shown in figure 4.3 below.

The supply of fish on the Lake beaches between 1981 and 1984 has been dominated by Lates niloticus and Engranlicypris argenteus which together have accounted for nearly 80 per cent of the total supply since 1982. Lates niloticus, in particular, has become a dominant and commercially valuable species in this period. Some of the originally dominant and commercially valuable species were observed to be declining. The pricing implications from the changes is easily understood by looking at the requirements of different species in order to be able to reach the consumers.

Figure 4.3. Quantities of some major species supplies to the Beaches of Lake Victoria 1978-1983

SOURCE: Derived from Fisheries Department Records.

- ||||| Lates niloticus
- xxxxx Haplochromis spp
- Tilapia spp
- - - Engrulicypris argenteus



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Tilapia spp is easily marketable. Most of this fish sell in fresh form thus making it more remunerative. The fish is cheap to transport given its medium size. Hardly is this fish processed on the beaches, and if processed, it is done by simple smoking which does not consume much time and resources.

Engraulicypris argenteus though one of the dominant species at the present time (as it was even before) is an inexpensive fish to process. It is all sun-dried and so requires no explicit processing costs. A substantial increase in the supply of this fish will lead to a greater fall in its price as evidenced between 1982 and 1983. This is because its tiny nature has made it the most unpopular fish, especially to consumers beyond the Lake region. Furthermore, it is not usually consumed in large amounts even within the region. It is, however, the cheapest to transport and can be stored longer than any other fish without going bad.

Lates niloticus is an oily fish which can go bad faster than the others. Given its dominant role, the marketing services would be required to have adapted to its requirements. The fish requires an immediate market soon after landing or need be well preserved. It has attracted the attention of most wholesalers because it is easily filleted for sale in urban centres. Given the established inaccessibility of some beaches, increased supply of this fish means increased processing costs. Furthermore, due to its fatty nature, the consumption

of this fish by households within the Lake region (and even beyond) is restricted to its processed form.

The processing of Lates is mainly by smoking (both cold and hot smoking). The method consumes a lot of time and also fuelwood and/or charcoal, all of which in some places have become scarce and hence expensive. This means that the net income to the fisherman is low.

Given the bulky nature of this fish, its transportation cost is also bound to be high. This has made the fish unpopular amongst the many women fishmongers who depend on headload and buses as means of transportation. This has further weakened the bargaining power of the fishermen.

The fish, however, has a wide market. Given the declining trend in the supply of Tilapia spp vis-a-vis its demand, Lates has attracted the attention of wholesalers who ferry it to the major urban centres in Kenya such as Nairobi and Mombasa. These traders fillet the fish and sell to urban hotels, institutions, households and also to other fishmongers in the urban suburbs. However, the wholesalers operate on specific landing beaches which are relatively accessible such as Kendu, Uhanya and Dunga all of which were earlier shown to be increasingly selling to the distant markets. Increased supply of Lates niloticus on the relatively inaccessible beaches such as Luanda Naya and Kotieno implies lower prices. Luanda Naya registered the lowest average price

per kilogramme in 1983 and 1984 because of this. The dominance of this fish species has led to increased sales of processed fish due to its nature augmented by the inaccessibility of beaches. The fall in the demand for fresh fish has therefore meant lower prices to the fishermen.

From the foregoing analysis, it can be argued that the marketing system has not been able to adjust to the changes that have occurred in the species composition of the landed catches. This has hampered better pricing policies for the Lake fish.

The foregoing analysis, however, does not specify any institutional elements in the pricing system. Fishermen's co-operatives societies exist in this fishery and are important marketing agents. Their economic role in the provision of the necessary marketing facilities is addressed in the next chapter.

CHAPTER FIVE

THE FISHERMEN'S CO-OPERATIVE SOCIETIES IN THE FISH MARKET

5.1. FISHERIES CO-OPERATIVES IN KENYA

Fishermen's co-operative societies in Kenya have existed for almost two decades. However, their impact has been less pronounced than that of the agro-based marketing co-operatives. The main aims of the fisheries societies are to:-

- (1) arrange for marketing, processing and transportation of fish
- (2) provide credit facilities to members
- (3) encourage thrift and to accept deposits, i.e. provide Banking services to the members
- (4) promote good fish-farming practices.

Mikkola (1977) observed that Fisheries co-operatives in Kenya have been only modestly successful in providing their members with the essential services (like the ones mentioned above) necessary for uplifting the standard of life of the fishermen. The achievement of the societies in some of the stated goals need be clear. Their role in improving fish prices would be important as it provides the base for improving the welfare of fishermen.

In the fishing areas around Lake Victoria, co-operatives have been playing a minor role in actual fish marketing. As will be seen in the next section, only about 6 per cent of the total value of the catches were handled by the societies in 1984.

There are at present 51 Fishermen's co-operative societies in Kenya out of which 34 are found Nyanza province. One of these is a fish farming society (the Nyabondo Fishermen's co-operative society) and one a Multi-purpose Union (the Mbita Multi-purpose Union). The huge number of these societies around Lake Victoria would be indicative of their smallness to enable them function as viable economic entities.

5.2 LAKE VICTORIA FISHERMEN'S CO-OPERATIVE SOCIETIES

In Kenya's fishing industry, the Lake Victoria fishing ground has lagged far behind others in terms of the development of active fisheries co-operatives despite being the most important fishery in Kenya.

Compared to other fishing grounds where the societies are actively involved in fish marketing, the Lake Victoria landings have experienced declining prices in recent years. This is not the case with other areas such as Turkana and Naivasha Table 5.1. below shows the trend of fish prices over the years on an areal basis

Table 5.1. QUANTITY AND VALUE OF FISH IN KENYA 1981-1983

SOURCE: Statistical Section: Fisheries Dept. Ministry of
Tourism And Wildlife

| FRESH WATER | 1981 | | | 1982 | | | 1983 | | |
|--------------------|----------|----------|--------------|----------|----------|-------------|----------|----------|-------------|
| | M.TONNES | 'OOO SHS | AV.PRICE/ KG | M.TONNES | 'OOO SHs | AV.PRICE/KG | M.TONNES | 'OOO SH. | AV.PRICE/KG |
| LAKE VICTORIA | 38179 | 85346 | 2.24 | 60958 | 12,3400 | 2.02 | 77327 | 120315 | 1.56 |
| LAKE TURKANA | 10529 | 10849 | 1.03 | 11040 | 12033 | 1.09 | 10113 | 13552 | 1.34 |
| LAKE BARINGO | 467 | 617 | 1.32 | 401 | 768 | 1.92 | 352 | 684 | 1.94 |
| LAKE NAIVASHA | 269 | 2531 | 9.41 | 411 | 5786 | 13.95 | 692 | 9379 | 13.55 |
| LAKE JIPE | 340 | 981 | 2.88 | 409 | 1194 | 2.92 | 463 | 1262 | 2.73 |
| LAKE CHALA | 110 | 314 | 2.85 | 90 | 288 | 3.20 | 10 | 63 | 6.30 |
| FISH FARMING | 421 | 23747 | 56.41 | 440 | 23818 | 54.13 | 585 | 15880 | 27.14 |
| OTHER AREAS | 1070 | 2861 | 2.67 | 268 | 1700 | 6.34 | 1526 | 5442 | 3.57 |
| TOTAL | 51385 | 127246 | 2.48 | 74017 | 168936 | 2.28 | 91068 | 166577 | 1.80 |
| <u>MARINE FISH</u> | | | | | | | | | |
| LAMU | 1393 | 4764 | 3.42 | 1298 | 5371 | 4.14 | 1346 | 5416 | 4.02 |
| TANA RIVER | 69 | 244 | 3.54 | 36 | 109 | 3.02 | 22 | 97 | 4.41 |
| KILIFI | 801 | 4294 | 5.36 | 1287 | 7433 | 5.78 | 1070 | 8475 | 7.92 |
| MOMBASA | 1860 | 11205 | 6.02 | 2330 | 17218 | 7.39 | 1854 | 15268 | 8.24 |
| KWALE | 810 | 4534 | 5.80 | 743 | 4769 | 6.42 | 818 | 3766 | 4.60 |
| SPORT FISHING | 613 | 4690 | 7.65 | 94 | 418 | 4.44 | 148 | 666 | 4.50 |
| AREA NOT ACC. FOR | N/A | N/A | N/A | 844 | 5670 | 6.72 | 540 | 7561 | 14.00 |
| TOTAL | 5546 | 29731 | 5.36 | 6622 | 40988 | 6.19 | 5798 | 41249 | 7.11 |
| GRAND TOTAL | 56431 | 156977 | 2.76 | 80639 | 209924 | 2.60 | 96866 | 207826 | 2.15 |

A study by Mikkola (1977) revealed that average annual income from sales of fish by the fishermen's co-operatives is much higher than what is received by non-organized fishermen. His statistics collected from the coast show that members of co-operatives on the average receive a price which is about 100 per cent higher than that obtained by non-organized fishermen. This is similar to the earlier mentioned finding that fresh fish is nearly twice as expensive as processed fish. This indicates that most sales by co-operatives consist of fresh fish due to their ability to find a ready market for the landings. The costs of the marketing services per fisherman is also low when they pool their resources together via co-operation.

On the basis of the above, one could strongly argue for the development of strong co-operative societies in the Lake Victoria region for the possible improvement of the fishermen's welfare.

The planning Division of the Ministry of co-operative Development argues that the Lake Victoria co-operatives have for a long time been unpopular

amongst the fishermen. In 1978, for example, there were 21 Fisheries co-operatives in Lake Victoria. The total number of fishermen on the Kenya side was around 18,000, but only 3,800 (21 per cent) of these were co-operative societies' members (Planning Division, Ministry of Co-operative Development, 1978). The dismal role of the services extended by the maximum participation as members.

An interview with co-operative officers in Kisumu indicated that since 1979, it has been made conditional for licencing of fishermen to be restricted to co-operative members only. This would require all the fishermen on the Lake to be members of the societies. Table 5.2 below, however, shows the position of the Lake co-operatives membership and turn-over for the latest four years.

Table 5.2. MEMBERSHIP AND TURNOVER OF THE LAKE VICTORIA FISHERMEN'S CO-OPERATIVE SOCIETIES, 1981 - 1984

| YEAR | No. of Societies | Total No. of Fishermen | Co-op. Members | Members as % of Total | Total Value of catch '000 shs | Co-ope Turn-over '000 Shs |
|------|------------------|------------------------|----------------|-----------------------|-------------------------------|---------------------------|
| 1981 | 26 | 18,000 | 4,396 | 24.4 | 85.3 | N/A ¹ |
| 1982 | 30 | 19,000 | 5,119 | 26.3 | 123.0 | N/A |
| 1983 | 32 | 20,000 | 6,431 | 32.1 | 120.3 | 6.95 |
| 1984 | 34 | 20,000 | 6,447 | 32.2 | 133.2 | 6.87 |

SOURCE: Nyanza Province Co-operative Office Records.

1 N/A means not available.

From Table 5.2 it is evident that at present only about 30 per cent of the Lake Victoria's fishermen are members of co-operatives, and only about 6 per cent of the total value of the catches are presently attributed to the co-operatives. This means that even though fishing licencing is pegged on co-operative membership, many fishermen still ignore the requirement and operate on their own.

An interview with the co-operative officers in Kisumu also indicated that the landing of the bigger sized Lates niloticus in big amounts has also tended to induce fishermen's interests in co-operatives. The difficulties in preserving this kind of fish and in finding a ready market accounts for this. The societies act as disposal channels for such fish given that the bigger fish dealers who own vehicles and transport the fish to Nairobi and Mombasa normally buy fish from the societies.

The Lake co-operative societies could be expected to strengthen their positions if they are able to obtain higher prices for the fish. This would encourage the fishermen to sell their catches through the societies for the general improvement of the fishing population. The fact that there has been an improvement in co-operative membership from about 3000 in 1978 to about 6,000 in 1983, and also in the total value of fish handled by the societies indicates that there is still room for further improvement.

The major problem facing the Lake Victoria societies is lack of finance for the purchase of essential equipments for handling, preservation and transportation of the fish. Given the dispersed nature of fishing centres, the perishability of the product and poor transport and preservation facilities, the existence of numerous middlemen has been a major hindrance to co-operative development. The fishmongers who traditionally provide loans to fishermen dominate the marketing of fish. This is especially true in the case of the more valuable fish species such as Tilapia spp. The fishmongers have over the years acquired knowledge of the marketing and financial aspects of the trade, and, being supported by better financial resources and a powerful profit motive, are formidable competitors for the co-operatives.

Kongere (1979) observed a proliferation of Fishermen's co-operative societies around Lake Victoria and saw this as a very undesirable for the future development of the societies. At that time there were only 21 societies in the region as compared to the present number of 34. The constant splinter organizations emerging from the already established ones is a big source of weakness in the movement. The smallness of the societies could militate against their efforts to form powerful development units. Some of these societies are locationally based and their areas of operations are limited to small areas. In South Nyanza District, for

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example, there are nine (9) Divisions. The fifteen fishermen's co-operatives in the district are all found in five of the Divisions. Mbita Division has five, Kendu has four, Rangwe has two, Macalder has three while Ndhiwa has one.

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The above example^s shows that there exists many unviable societies in areas which could be served better by one society. This explains the general weakness of the societies. A merger of some of these would be a necessary condition for the development of improved marketing facilities in this region. Table 5.3 below shows that the financial status of the individual societies would not permit aggressive marketing research and the development of essential marketing facilities. However, it can be argued that through such mergers, the financing of some necessary facilities is feasible.

Table 5.3. TURNOVER, BANK BALANCE AND COMMISSION PER SOCIETY FOR KISUMU DISTRICT FOR THE YEAR ENDED 31.12.84

| NAME OF SOCIETY ¹ | TURNOVER | COMMISSION | BANK BALANCE |
|------------------------------|--------------|------------|--------------|
| Kaloka | 2,157,256.55 | 45,683.00 | 260,493.00 |
| Dunga | 132,934.00 | 13,293.40 | 58,410.00 |
| Nyamwere | 337,333.00 | 33,733.30 | 62,600.00 |
| Asat | 39,022.00 | 3,902.20 | 12,612.85 |
| Usoma | 91,167.50 | 9,116.75 | N/A |
| Nduru | 271,731.50 | 27,173.15 | 46,938.80 |
| Arongo | 114,430.00 | 11,443.00 | 8,431.20 |
| Paga | 130,756.50 | 13,075.65 | 7,004.00 |
| Ogal | 11,390.00 | 11,939.00 | 13,862.95 |

SOURCE: Kisumu District co-operative Office Records.

1 of the 12 societies in Kisumu District, 3 had not submitted their records for the year and hence omitted from the Table. These were Nyakach, Miruti and Nyabondo.

It is evident from Table 5.3 that most of the individual societies in Kisumu District are not capable of purchasing a vehicle for the transportation of catches to the markets. Even if a society owns a vehicle, its maintenance costs vis-a-vis the receipts would be prohibitive in the development of the society. It can be argued, however, that through a merger of these societies, the economies of scale that would be realized by the societies, given the big financial base

would act as a stabilizing factor. This is, however, subject to efficient management which could be monitored via the unions and the Ministry of co-operative Development.

In the absence of strong societies, it would be expected that the unions to which the societies are affiliated would also be weak. Of the 34 societies, 15 are in South Nyanza, 12 in Kisumu and 7 in Siaya Districts. These societies are affiliated to South Nyanza, Kisumu and Siaya District Co-operative Unions respectively. The Mbita-Multipurpose Union also operates independently in South Nyanza. The three Unions were formed in 1984 to render services to the societies and their impact is yet to be seen. Information available in the Nyanza province co-operative office shows that nine societies in South Nyanza and five in Kisumu District had paid their affiliation fees as at May 1985. Even for the affiliated societies, the records of some are not properly kept and as such their annual reports from which the turnovers could be obtained are not easily available for the assessment of their status. This specifically is a weakness of the management committees. The improvement of the management of these societies, would be an important factor in their development. It is therefore important to briefly examine the general management of these societies.

5.3. MANAGEMENT OF THE FISHERMEN'S CO-OPERATIVE SOCIETIES

The principal role of the management committee is to see that employees of each society are well supervised and the financial records of the society are properly kept and suitable for auditing. The management committee is supposed to see that each fisherman pays commission out of the receipts from the sale of his catch. The committee is expected, inspite of the limited finances, to guide fishermen in fishing methods and arrange for the supply of fishing gear at cheaper rates or on credit basis. However, the management committees of the *fallow* societies have fell far behind their expectations. This has weakened the marketing functions of the societies thus leaving individual fishermen to arrange the disposal of their catches for themselves.

An interview with co-operatives officers at the Kisumu District co-operative office revealed that in some cases the management committees of the societies have failed to keep proper records of the societies for auditing. This was the case with the three societies omitted in Table 5.3. The societies' officials are even reported to take along time before banking the commission collected. These allegations are reflected in their failure, in some cases, to submit their annual reports to the central office. This has made it very difficult to assess their financial status.

Gross mismanagement of most of these societies, therefore, militates against fishermen's co-operation and leads to internal squabbles and subsequently splinter groups - a factor which has given growth to the so many societies which could be considered too small to realize economies of scale.

X In order to exemplify the role of these societies in the fish marketing, and their possibilities of development, it is relevant to look at case studies of these studies. Kaloka and Dunga are the oldest and most stable fisheries societies in the region. These two societies now sell fish to fishmongers on behalf of the fishermen.

5.4. KALOKA FISHERMEN'S CO-OPERATIVE SOCIETY LTD.

This is a registered co-operative society under the co-operative society Act with its head office at Kaloka beach. It was founded in the year 1963 by 17 members, and registered in the year 1969. The total membership at present stands at 180.

In the beginning of 1984, direct selling of fish to fishmongers on behalf of the fishermen has been in operation. This has made the collection of the 10 per cent commission from fishermen's catches much easier. A part from the income from commission, the society also sells fishing materials (fishing gear and canoes) and also runs Hardware shops (started in April, 1984)

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at Kombewa, Bondo and Kisumu. Table 5.4 below shows that the society has been realizing an increasing annual commission since 1980.

Table 5.4. COMMISSION FROM DAILY PROCEEDS AT KALOKA BEACH, 1980 - 1984

| YEAR | K.SHs. | CTS |
|-------|---------|-----|
| 1980 | 20,977 | 60 |
| 1981 | 25,604 | 90 |
| 1982 | 26,656 | 10 |
| 1983 | 34,036 | 60 |
| 1984 | 45,683 | 00 |
| TOTAL | 152,958 | 20 |

SOURCE: Kaloka Fishermen's C-operative Society Annual Reports

From Table 5.4, it is clear that the society's share in the value of fish landed has been steadily increasing and was highest in 1984 when the society sold fish on behalf of fishermen. However, average fish prices as realized at the beach have not increased impressively as was earlier shown. It is not easy, therefore, to know how the society has improved the pricing system of the fish. The argument that can be advanced from the available figures is that the financial position

of the society indicates possible improvements. This could be used to develop the marketing services for the better pricing of the Lake fish.

Amongst the Lake co-operatives, Kaloka is one of those which have received assistance from various sources. Some of these have been specifically for improvement of fish marketing services. The Fisheries Department wholly financed the building of permanent Fish "Bandas" for the society. Like in the case of the Mbita Multi-purpose union, the Kenya Freedom From Hunger Council donated a fish van to the members of the society in 1983. This van has not been effectively utilised for the purpose of fish marketing. Instead, it has been diverted for use in the sale of fishing materials and hardware.

The society has benefited from the loan facilities offered by the co-operative Bank of Kenya as stated below.

- (a) The first loan was given in 1975 worth Ksh.500,000 and paid back in full by the end of 1976.
- (b) Second loan also Ksh.50,000 received in 1978, and repaid by the end of 1979.
- (c) The third loan of Ksh.250,000 received in 1980 and repaid in full by April, 1983.
- (d) Fourth loan of Sh. 300,000 was received by March 1984 and was supposed to be fully repaid by April, 1985.

The above infirmation indicates that apart from the commission from fishermen, other sources of finance are available which could be used to improve on the marketing facilities.

The management of the accounts remains an important factor for the development of these societies. To the extent that fishermen's share of the catches has not substantially improved, one can argue that the management of the society has siphoned off a bigger portion of the available funds from the development of the fish handling and distribution facilities. The sale of fishing materials plus the Hardware shops which are the other areas of investment realized a total of Ksh.7,461,038.05 in 1984. These investments look lucrative and could compete with any investment in improved marketing services for the available funds.

SP + It is clear from the preceding information that Kaloka is a financially stable society capable of improving the welfare of its members. The management of the accounts so that some of the available funds are directed towards the development of marketing services at the landing beach could be a step towards better pricing of the catches so landed by the society's members.

5.5. DUNGA FISHERMEN'S CO-OPERATIVE SOCIETY

This society is situated at the Dunga Fish landing beach which is adjacent to Kisumu Town. The society was formed in 1965 and registered in 1969. The total membership as at April 1985 was 165. According to the society's officials about 100 fishermen are currently active in fishing. This means that the majority of the fishermen in this beach are co-operative members.

The society comprises of seven committee members, as in many other societies, plus three employees who are paid a total of KShs.1030 per month. The education level of the committee members is very low and only one holds a certificate of primary Education.

The society does not have any cold store which is also true of virtually all other societies in the region. Being adjacent to Kisumu Town, the beach is generally accessible throughout the year.

Like Kaloka Fishermen's co-operative society, the Dunga society now sells fish on behalf of fishermen. Currently, the fish landings are dominated by Late niloticus whose price per kilo has been fixed at Ksh.2.00 by the society following the guidelines from the Price Review Committee of April, 1985. The role of this committee in fish pricing is discussed in the next section.

On landing the fish by the fishermen, the society officials and field officers from the Fisheries Department weigh the catch. The society then pays the fisherman at the rate of Ksh.2.00 per kilo, and sell it to the waiting fishmongers at Ksh.2.20 per kilo. The twenty cents is the 10 per cent commission to be kept by the society. The fishermen at Dunga are thus assured of Ksh.2.00 per kilo of the Lates niloticus on landing the catch. This explains why almost all the fish sold at Dunga Beach is recorded as sold in fresh form in the last two years.

The society officials indicated that there are occasions when fish supply exceeds demand, and that when this occurs it is a major problem for the society. However, the society has an outlet for this surplus. All the unsold stock at the end of the day, which could be recorded as processed, is sold at a lower price than the stipulated minimum to the Vice Chairman of the society. The Vice-Chairman together with an Asian fish dealer own a cold-store in Kisumu from where they transport the fish to the bigger towns for sale.

Therefore, there is no fish spoilage at Dunga Beach. At the time when the writer visited the beach, the supply of fish could not meet the demand as the waiting fishmongers were far too many and some could easily be forced to pay higher prices in order to fill their baskets.

With a cold-store owned by the society, fish prices at the beach could be higher. The aim of this society should be to own a cold-store and capture the market currently supplied by the Vice-Chairman of the society.

The society's earnings from commission currently averages Ksh.150 per day with a mean monthly figure of Ksh.4,500. It is evident that the society can be able to meet the administrative expenses and also save some funds. This could be usefully invested in purchasing any equipment for better handling and distribution of fish.

The society has relieved fishermen of the processing costs in case of excess supply. However, the sale of excess fish at a price lower than the stipulated minimum remains one area of concern. The society should strive to pay fishermen a minimum price but to let the independent market forces determine the price during periods of increased demand. Higher prices that might prevail during such periods should be given to fishermen as windfall gains.

The pricing system of most of the Lake societies has since 1984 followed guidelines from a Fish Price Review Committee for Lake Victoria. This committee was formed by the Government to strengthen the activities of the Lake co-operatives and to improve the fish prices in the Lake Victoria region. It is therefore important to briefly examine the activities of this committee and how the societies have worked with it in pricing the Lake fish.

5.6. THE FISH PRICES REVIEW COMMITTEE

The committee was formed on 3rd December, 1984 in order to streamline the fish prices so as to serve the interests of fishermen and fish traders. The committee proposed to reduce the complaints from fishermen which did not permit a favourable climate for the business. It proposed to monitor and review fish prices from time to time in order to assist the parties concerned through the co-operative effort.

The committee started its work in South Nyanza District under the Chairmanship of the District Commissioner. Other members include the District Co-operative Officer, the District Officer, the Chairman of Mbita Multi-purpose Union, the clerk to the County Council of South Nyanza, a senior Fisheries Officer, and the representatives of co-operative societies and of fish dealers.

In order to set fish prices it was found necessary to embark on market research. This task was allocated to three members - the senior fisheries officer, the co-operative Officer and the South Nyanza Fishermen's co-operative Union Chairman. The market research took the team to several beaches along the Lake and places outside the province such as Nairobi, Mombasa, Naivasha and

and Lake Turkana. Table 5.5. below shows the observed prices of Tilapia spp. and Lates niloticus from some of the landing beaches visited by the team.

Table 5.5. PRICES AT SELECTED BEACHES IN KSH/KG
FOR FEB. 1985

| LANDING BEACH | TILAPIA | LATES NILOTICUS |
|----------------|---------|-----------------|
| Kendu Bay | 7.00 | 2.00 |
| Mainunga | 7.50 | 1.50 |
| Sovi Bay | 5.80 | 1.50 |
| North Kadem | 6.00 | 1.50 |
| Homa Bay | 6.75 | 2.00 |
| Kaloka | 5.00 | 1.70 |
| Kopiata | - | 1.80 |
| Luanda Kotieno | - | 1.50 |
| Misori | 5.70 | 1.80 |
| Uhanya | 6.00 | 2.00 |
| Mbita | 5.00 | 1.70 |
| Luanda Gembe | 6.00 | 1.80 |

SOURCE: Report of the Market Research Team
To The Price Review Committee
(February, 1985)

One aspect in the fish pricing that the committee recognized was the remoteness of particular beaches and inaccessibility in certain periods of the year.

These are periods of heavy rain as discussed earlier in the paper. The transportation of fish from such beaches to buying centres was viewed as desirable for a better pricing of the fish.

The committee has divided South Nyanza into zones according to their remoteness from good roads and/or the distance from the possible markets. Certain centres such as Kendu Bay, have been selected where centralized marketing could be done. This move by the committee establishes the fact that inaccessibility of many beaches adversely affects fish sales thereby accounting for large declines in prices during periods of excess supply and heavy rain. The committee proposed central buying centres to increase demand by directing fish traders to the more accessible beaches. This also lays the basis for possible mergers of some of the societies. The task facing the committee is how to transport fish from the remote beaches to the buying centres. The fishermen's co-operatives are expected to finance this.

Following the market survey results, the price Review Committee made major decisions some of which are listed below.

- (a) Fish prices were to be fixed in such a way that it took care of the distances to particular beaches.

- (b) All fish prices would be reviewed only by the Committee
- (c) Prices for Lates niloticus and Tilapia spp. were recommended to be as in Table 5.6 below.

Table 5.6 PROPOSED PRICES FOR TILAPIA SPP. AND LATES NILOTICUS, APRIL, 1985

| LANDING BEACH | TILAPIA SPP. | LATES NILOTICUS | |
|---------------|-----------------------|----------------------|----------------------|
| | OLD PRICE KSh./Kg. | OLD PRICE KSh./KG | NEW PRICE KSh./KG |
| Kendu Bay | 7.00 | 2.00 | 2.50 |
| Mbita | 5.00 | 1.80 | 2.30 |
| Kopiata | 5.00 | 1.70 | 2.20 |
| Kadem | 6.00 | 2.00 | 2.50 |

SOURCE: Report By The Fish Price Review Committee
To The Nyanza Province Co-operative Office,
April, 1985.

The above prices were arrived at taking into account the market forces and the dominance of Lates niloticus in the output. For Tilapia spp., it was observed that the demand was great and thus the forces of the market were to determine its price. However, it was recommended that its minimum price should be what had prevailed at the different beaches as given in Table 5.6. For Lates niloticus, the committee increased prices by fifty cents per kilo per centre.

It is evident from Table 5.6 that the committee could improve fish prices especially for Lates niloticus. The committee, however, noted that the above prices would prevail only in the event of all the fish landings being brought to a centralized point by the societies. When the fish dealer goes to each beach collecting fish, it was recommended that the old prices should prevail.

From the committee's pricing system, it is clear that transportation of the catches to the markets in time remains an important factor in improving the Lake fish prices. Given the numerous landing beaches and the financially weak societies, transportation of fish to the buying centres remains a major problem. For the transport of fish only Kaloka society and Mbita union have suitable transport vans. These vehicles were donated to them by the Kenya Freedom From Hunger Council. The vans are currently not being used for this purpose due to lack of ice for keeping the fish fresh.

The proposed centralized marketing would be important in reducing the cost of fish collection by the traders. This cost would be shouldered by the societies. By pooling their resources together, each society would be expected to lower its transportation costs as a result of the shared costs.

Centralized marketing to a great extent strengthens the powers of the co-operatives. However, it should not ignore the role of the local fishmongers who, as mentioned earlier, form the backbone of this trade in this particular region. The central markets should encourage competition between the local fishmongers and other fish traders for the Lake fish as has prevailed in many of the beaches.

Fish prices, especially for Lates niloticus, were set by the committee based on the prices mainly offered by big fish dealers who own refrigerated trucks and are capable of transporting the fish to the major towns in Kenya. One such company, Samaki and Tilley (K) Ltd. has improved its fish sales from 20 - 30 tonnes per month in 1983 to 150 tonnes per month in 1984. Such companies usually trade in specific fish species such as Tilapia spp and Lates niloticus which can be easily filleted. Given the dominance of the latter species on the beaches, these companies ferry many tonnes of the fish to the distant markets. Competition between these companies and the local fishmongers need be encouraged for better prices.

The committee's involvement in fish pricing through the co-operative would be important in the development of the fishery. It should be used to induce fishermen's co-operation. As mentioned earlier, increased supplies

of larger sized Lates niloticus has itself forced many fishermen to sell their catches through the societies.

Following the committee's guidelines, fish prices, especially the price of Lates niloticus improved in 1985 as proposed. However, there are many points along the Lake that are important for the catches. These areas need be exposed to all types of traders so that the resulting competition for the fish would improve the prices. The management of the societies need to improve, especially in marketing facilities, so as to induce fishermen to co-operate in order to obtain higher prices for their produce.

5.7. GENERAL PROBLEMS.

The foregoing analysis shows that the Price Review Committee's involvement in the Lake fish pricing has activated certain beaches to co-operate in the sale of fish, specifically, the sale of Lates niloticus, mostly to bigger traders with refrigerated lorries.

The turnover figures per society as earlier shown indicates that some of the co-operatives receive a substantial share of the total value of the catches. Most of the remote landing beaches which are poorly catered for in terms of cooperatives service, however, do account for bigger sales of the fish. In such

beaches most sales take place between the fisherman and fishmonger. The earlier finding that about 6 per cent of the total value of the fish is attributed to the co-operatives thus still shows the insignificant role of the societies in the Lake fish trade. Good management and aggressive marketing seem to be the necessary ingredients for the improvement of the societies' roles.

The analysis shows that the involvement of fishermen's co-operatives in the Lake fish market is important. Through the societies, all the landed catch get sold at stipulated prices thus stabilising producer prices. Fish prices, especially for the Lates species, also tend to have improved on the landing beaches manned by the societies through the help given by the Price Review Committee. In terms of the forms of sales, it can be argued that most sales by the societies are in fresh form given that the excess supply gets sold to wholesalers as is the case in Dunga. However, fish prices are still low compared to prices received for the same species in other grounds such as Naivasha, Baringo and Turkana. As argued earlier, preservation and transportation facilities remain the key factors for the improvement of the marketing system. However, there are handicaps in co-operatives involvement in the Lake fish marketing which need highlighting. Some of these are given below.

(a) Financial Weakness

As mentioned in the analysis, this is a major draw back in the co-operative movement. It stems from the proliferation of the many societies in a given region.

(b) Management

There seems always to be dishonest recorders who do not surrender the commission they have collected and so on. The management committees do not meet regularly, and the management of the societies is, therefore, quite often left to the Chairman, secretary and a few other committee members.

(c) Lack of Education.

Co-operative education and training does not appear to have received adequate attention as far as the fisheries co-operatives are concerned. This is partly because the majority of the fisheries societies are not affiliated to any union and on their own cannot employ trainers. This leaves the burden of education to the Department of co-operative Development which seems to have so far overlooked the needs of fishermen's co-operatives, especially with regard to the marketing of their produce. Furthermore, the majority of the societies' officials are lowly educated and are difficult to train. In the case of Dunga, it was found that only one official holds a certificate of primary education. This means that

basic education need be provided to the majority of the officials.

(d) Competition From Fishmongers/Dealers

In some cases fishmongers offer credit and hence get paid either in kind or in cash. Some fish dealers offer better prices and hence induce fishermen to evade paying society's commission. These dealers are formidable competitors to the societies. This competition is, however, desirable for efficiency and better prices.

In addition to these problems, as has been mentioned, every society seems to have its own individual problems, originating from internal disagreements and petty politics. This implies that the relative success of societies in Turkana, coast and Njivasha cannot be indicative of automatic success of the Lake Victoria societies.

The development of the Lake Victoria societies and their active involvement in the fish trade should take into account the mentioned constraints. The social, economic and political set up of this region also need be considered in proposing policies for the improvement of the societies as effective agents in the fish trade so as to improve fish prices in this important fishery.

The conclusion derived from co-operatives' involvement in marketing fish is that the share of the societies is still small and the status quo needs improvement.

Given their smallness, they have not been able to provide the much needed marketing facilities while some have never seriously taken this into consideration. Some societies have managed to organize the fishermen to sell at common points in some areas.

Some of the very smaller societies should be encouraged to merge so as to be economically viable. This would be done by the enforcement of the co-operative Act through the Commissioner of Co-operatives.

In view of the observations, it is felt that there is a strong case for complete reorganization of the Lake Victoria Fishermen's co-operative societies to achieve operational and economic efficiency. There is a need to induce the fishermen to co-operate through rendering appropriate services. Membership by coercion is itself self-defeating. The societies should seek to fulfil their goals as much as possible. In fish marketing, these societies should provide facilities for storage and transportation of fish, and then let the market forces determine the price.

Given the earnings from commission and the aids the societies receive from outside agencies such as Fisheries Department and the Kenya Freedom From Hunger Council, most of the very essential facilities need be provided to the major beaches. The unions to which the societies are affiliated should be strengthened to monitor their activities and perform the relevant functions effectively.

CHAPTER SIX

SUMMARY, POLICY IMPLICATIONS, AND AREAS FOR FURTHER RESEARCH.

6.1 SUMMARY

The development of Lake Victoria fishery, and the general improvement of fishermen's welfare through better receipts for their catches formed the central target for this study. The study aimed at identifying the major factors that determine fish prices on the landing beaches and examining the role of the fishermen's cooperatives in marketing the fish.

It was found that there are no storage facilities on any of the beaches along the lake. However, there is little fish-spoilage on the beaches, and when it occurs, the percentage is low. Nearly all the landed fish is either consumed on the beaches or marketed in either fresh or processed forms. The fishmongers are reported to be capable of selling all the fish that they purchase from the beaches without running the risk of fish spoilage.

The basic factors that influence fish prices are mainly processing and transportation. Processing methods include salting, sun-drying, smoking (both hot and cold) and deep frying. The processing costs so incurred by either the fishermen or fishmongers is reflected in the fishermen's net receipts. In terms of income to fishermen and fishmongers alike, processed fish is less

renumerative than fresh.

The transportation of fish from the beaches is mostly done by women who use head loads and buses in ferrying the fish to the inland markets. There are also some bicycle traders who are young men. They are capable of riding to and from the beaches, and also between markets to clear their stocks. These modes of fish transportation are usually adversely affected by impassable roads during the wet seasons. These traders have no preservation facilities and consequently have to sell the fish in processed form during such times. The low demand for fresh fish at the beaches during such periods implies lower receipts to fishermen emanating from increased processing costs.

uc There are few lorry traders (the wholesalers) who transport the fish to markets beyond the lake region. These consist of companies and individuals such as Kenya Cold storage, samaki and Tilley (K) Ltd., Hamisi Bilali etc. who transport fish to Nairobi, Mombasa and other urban cities. They sell the fish to institutions, hotels and to other fishmongers in the urban areas. This group of traders operate on specific landing beaches only. Currently, they account for about 20 per cent of the total catch.

The trend in the sales of fish was analysed for the period 1978 to 1984. Fresh fish sales declined since 1982. It reached as low as 34.2 per cent of

total sales in 1983 and 25.6 per cent in the first quarter of the same year. This explains the lower average prices observed in the period. However, in 1984, a decrease of about 7 per cent in fish supply accompanied with a 40 per cent increase in the demand for fresh fish led to an increase in the price and value of fish. The analysis thus established that even though the consumer price of fish is determined by the demand and supply forces, the percentage shares between fresh and processed fish in demand is an important determinant of the final receipts.

Accessibility to the beaches was shown to be important in determining the sales of the catches in either of the two forms. Some beaches tend to sell most of their catches in processed form than others. The regression results, showing a positive relationship between the percentage of the catch sold processed and the rainfall received by region conforms to the a priori theoretical expectations. The significance of some of the parameter estimates at the higher levels of confidence also established the fact that increased rainfall encourages sales of fish in processed form. The low coefficients of determination (r^2) is explained by the omission of other unspecified and/or unquantifiable explanatory variables in the models.

The difference in actual fish prices among the beaches, however, is not as great as the difference in

the percentages of fresh fish sold among the beaches. This finding indicates that fish consumers tend to be unwilling to pay dearly for fresh fish when processed fish is available at lower prices. Fresh fish traders thus offer lower prices at the beaches so as to be able to compete with the sellers of processed fish in the inland markets.

It was also shown that over the years, the species composition of the landed catch has been changing. This can be said to be a production problem, but it brings new products into the markets as well as removing some.

Commercially valuable fish species such as Bagrus Clarias, Labeo, Haplochromis and protopterus have declined in supply over the last decade. Some of these were among the dominant species in the 1960's but currently account for less than one percent of the total supply. The Tilapia group has maintained a somewhat stable position in the share of total supply. However, because of the increasingly greater demand for this fish, it is usually scarce on the landing beaches.

Engraulicypris argenteus has maintained a dominant role in the total catch and presently accounts for about 30 per cent. Being sold all-sun dried, it is generally a less expensive fish to process. However, it is not a popular fish, especially with consumers beyond the lake region. This makes it less remunerative to the producers.

* Lates niloticus' share of the total has risen from less than 1 per cent in 1975 to less 20 per cent in 1980 and to about 60 percent in 1981. The rise of this fish from insignificant levels to dominance has adversely affected the marketing system. The fish is oily and spoils faster than other fishes. It therefore requires improved preservation and/or processing methods. It is processed by either hot or cold smoking. This requires more labour and fuel wood or charcoal. It is therefore a more expensive fish to process and to preserve. Given its bulky nature, its transportation costs are also higher. This has made it less popular with the women fishmongers who depend on headloads and buses for transport. The bargaining power of fishermen has thus been curtailed.

* The lorry traders transport lates niloticus to the urban centres where it is sold, mainly in its filleted form, to hotels, and institutions. Some is sold to other fishmongers in towns. The fish, therefore, has a wider market unlike Engraulicypris argenteus. However, these traders still offer lower prices at the landing beaches. The fish is less popular in the lake region amongst the consumers than the others due to a belief in its predatory nature. This has further weakened the bargaining power of fishermen, particularly in the isolated beaches.

The existing 34 Fishermen's cooperative societies around the lake currently handle about 6 per cent of the

total value of the catch. This means that even though fish licencing is pegged on cooperative membership, many fishermen still ignore the requirement and sell on their own. Some societies sell fish on behalf of their members. Fish is bought direct from the fishermen and then sold at a 10 per cent margin to traders by the cooperatives. Dunga and Kaloka are some of those involved in the direct marketing of fish.

uc. x
In 1984, the Government established a Fish Price Review Committee for lake Victoria. Its purpose was to look into the issue of falling prices and to foster the cooperative spirit for the improvement of the fishermen's welfare. The Committee started its work in South Nyanza District and has established minimum prices for Lates niloticus and Tilapia spp. Some of the existing societies have been encouraged and do sell fish at prices stipulated by the committee. The price of Lates niloticus has, therefore increased by fifty cents per kilo at the central markets such as Kendu Bay. Central marketing has not yet succeeded fully due to the difficulties on the part of the societies to transport the fish to such centres. There are many isolated beaches where the prices are still lower.

The study found out that there are too many societies in this region even in areas which could do with one. Some of these function on a locational basis such as those in South Nyanza District. Consequently,

Many of them are weak due to small financial bases. However, there are a few progressive societies in this region. Kaloka and Dunga are two such societies whose financial bases are strong enough to cater for the essential services for improved marketing and pricing of fish. The Kenya Freedom From Hunger Council (KFFHC) and the Fisheries Department also assist the societies. KFFHC has donated vans for fish transportation to Mbita Union and to Kaloka Fishermen's cooperative society. However, probably due to lack of ice, these vehicles have not yet been put into the effective use. Instead, the vehicle donated to Kaloka, is used to transport hardware in which the cooperative has considerable investment.

In addition, the Lake Victoria societies are faced with a number of problems which greatly affect their performance in the marketing of fish. These include financial weakness, Management, lack of education (basic education and cooperative training) and competition from the fish traders.

6.2 POLICY IMPLICATIONS

A combination of factors have been found to be affecting pricing policies for the Lake Victoria fish. Lack of cold-stores and ice-making plants lead to increased processing costs. Given the scarcity of fuel-wood in most areas, processing is becoming an increas-

ingly costly exercise.

Transportation of fish from the landing beaches remains an important determinant of the pricing system. Impassable roads during the wet days cripple the business in fresh fish. This leads to increased processing costs hence lower income to fishermen and fishmongers alike.

Access and all-weather roads, therefore, should be provided to the isolated beaches. This would enable a smooth flow of the trade throughout the year for a healthy economic atmosphere in terms of better pricing. It would not be economically practical however, to provide such roads to each landing beach. The identification of buying centres is thus supported. These centres need be geographically and strategically set to mobilize all kinds of traders from the shores of the Lake. Healthy competition in the trade should be encouraged. The measure also calls for availability of vehicles and/or big motorised boats to transport any excess catches from other beaches to the centres.

Preservation facilities at or near the specified points along the lake need be provided. This would strengthen the bargaining power of fishermen. Even though fish cannot be stored indefinitely or for many days, it would act as a signal to the fishermen about the demand conditions. Fishery management could also act along the same lines to advice fishermen on when

to set which types of gear. Storage facilities would also assure fish traders of fresh fish at any time in the day. At present, the demand for fresh fish is greatest in the morning hours and declines as the day progresses. The buying and selling of fish need be evenly spread throughout the day.

However, storage costs cannot be assumed as they can greatly affect fishermen's receipts. Fishermen should be encouraged to pool their resources together through the cooperative effort. With additional funds from grants and loans by outside agencies, the purchase of generators and cold-stores is not a remote possibility. Once the fixed costs are catered for, the operational costs can be shared amongst fishermen thus being insignificant in the final price of fish.

The cooperation of fishermen is therefore seen as a necessary ingredient in the marketing system. The cooperative societies need be encouraged to own refrigerated vehicles and then engage themselves in aggressive marketing. They need to establish selling centres in the major urban centres where some companies and individuals are presently enjoying some degree of monopoly. In this way the societies would expand the market for many of the fish species. The fact that some of the societies have recognised the importance of central markets along the lake shows that establishment of selling centres inland is economically and socially plausible.

Fish trade along the lake is traditionally competitive. The societies, through the price Review committee should encourage this. The central markets should be geographically and strategically located to enable and encourage dealers to buy fish. The handling and distribution of fish should continue to be based on the traditionally decentralized labour-intensive system of marketing.

The dominance of two fish species, Lates niloticus and Engraulicypris argenteus in the increased supply further complicates the performance of the marketing system. The demand for the latter is elastic given that its market is largely limited to areas within the lake region. The former, being fatty, requires smoking before sales to the local consumers. Furthermore, the fish has been unpopular in the lake region where the biggest market for the lake fish exists. It therefore follows that Fishermen's net income from the two dominant fish is low.

Currently, Lates niloticus has a wide market in urban centres where it is sold in filleted form. Given the difficulties in preserving and transporting the fish, many traders are not capable of supplying the urban market with the item. The few lorry traders who have ventured into this market do not, therefore, get enough competition. Through the purchase of refrigerated vehicles by the cooperatives, and identification of selling centres, particularly in the major urban centres,

the competition in the fish trade could be realized for better pricing incentives.

On the demand side, there is a need to encourage fish consumers within and outside the lake region to eat varieties of fish species. Fish-eating campaigns, such as those done by the Lake Turkana Fishermen's society need be done, especially for certain fish species from Lake Victoria.

Within the lake region, consumers should be encouraged to eat Lates niloticus in bigger quantities. This fish being exotic to the lake is yet to interest the consumers. Many local consumers do not at present know the cooking requirements of this fish. Poor cooking methods has made it less popular in this region. Such campaigns would enable consumers to understand the cooking requirements of the fish. This market is very important for the lake fish.

8/7 Outside the Lake region, many people in Kenya are still culturally bound and hence dislike fish. Such rigidities need be broken through the campaigns to enable the fish to reach all corners of the republic. The popularity of many nutritionally important fish species could be extended in this way especially in the urban centres.

The decline in quantity of some fish species in the lake cannot be underestimated nor ignored. These species are important both economically and ecologically. It is therefore recommended that fish-farming practices be encouraged. Fish farming has traditionally been biased for Tilapia spp only. While this is commendable in view of the importance of this fish, it would be a more complete exercise if fish-farming is extended to the other declining fishes also. Some of the originally commercially valuable species are presently under the threat of total demise. Most of these have existed side by side with Tilapia spp. It therefore follows that the same Tilapia ponds can accommodate some of them.

Improvements in the pricing of the Lake catches involves a combination of measures. The development of certain infrastructural facilities such as better roads around the lake seems to be the answer to most of the discussed handicaps. Income generated from fishing need be ploughed back for the improvement of the various phases of fish business. Incentives need be given for such resources to be invested within the fishery, especially in facilities for handling storing, processing and transporting fish.

The development of stronger fishermen's cooperative societies should be an overriding concern for the improvements necessary in this fishery. Such societies

are capable of providing the necessary facilities for fish marketing. The merger of some smaller societies, for example, those within a location should be encouraged. The ministry of cooperative Development should look into this.

The problem of management of the societies can be minimised through education and training. Fishermen and society officials should be educated on various aspects at regular intervals. Many of the present officials have very little or no formal education. Training such people becomes very difficult if not impossible. Recruitment of the officials need be based on formal education acquired. Proper auditing of the accounts of these societies should be a major priority goal. This encourages financial or any other kind of assistance from various agencies and also loans from financial institutions. The development of stronger unions is therefore necessary for better performance of the societies. The societies' role for improved marketing of fish is therefore seen as crucial. Their involvement in direct marketing of fish at the beaches and in the distant markets is necessary for better returns to the fishermen and the future development of the fishery at large.

6.3 AREAS FOR FURTHER RESEARCH

The subject of Fisheries Resource utilisation has been largely ignored by Economists, particularly in Kenya. There is need for Economists to be interested in this field where Biologists are almost venturing into the sphere of Economics but lack the tools for economic analysis.

There is a generally hypothesised view in public circles over the exploitation of fishermen by fish dealers, especially those venturing into the urban markets. Research on this is necessary. The determination of the existing marketing costs of the fish dealers, and the determination of price margins for the major fish species are economically important. Such a research would help in identifying other major cost factors in fish distribution. It would enlighten fishermen and their cooperatives on possibilities of directly marketing fish to consumers in the distant markets.

It is clear that the lorry traders are able to preserve fish and sell in the distant markets. Research need be done on possibilities, of encouraging the local fishmongers to sell fresh fish through the provision of ice. The costs involved in carrying ice by the women and the bicycle traders vis-a-vis the returns should be known.

Proposals have been made by agencies such as NORAD for the introduction of Trawlers in Lake Victoria for inshore fishing. Such a change in technology have important implications on employment and incomes. Research need be done with emphasis on how it can affect production and the marketing of fish.

Good!

An economic research on the production of the Lake fish incorporating the explicit and implicit costs of producing a given batch of fish is also considered necessary for policy measures.

The observed decline in quantity of certain fish species from the lake is ecologically and economically an area of concern. While scientists need to expose the right causes of such declines, economists need to show its effect on the welfare of the fishing population. The proposal of fish farming as a conservatory measure for Tilapia spp need be extended to the other species which are greatly threatened with extinction. The need to understand the economics of fish-farming practices thus calls for research in this area.

Lastly, it is the view of this paper that the socio-economic set up of the lake Victoria Fishmen's cooperative societies should be clearly understood for the development of this fishery. It is therefore important that further research be done if the societies are to be well understood as better development tools for this important fishery.

APPENDIX 1

FISH GROUPS OF ECONOMIC IMPORTANCE IN THE LAKE VICTORIA FISHERY

As mentioned in the paper there are well over 170 species in the Lake. The understanding of the impact the changes in species composition on average fish prices requires the understanding of the important fish species of the lake. The percentage contribution of the fish groups to the total annual value and supply of the catches during the various period can be seen in Tables 4.9 and 4.10:

Tilapia Species (Ngege)

This group of fish is considered to be the most important of all the fresh water fishes in Kenya. This has led to its high demand subjecting it to extremely intensive fishing pressure. The exploitation of the Tilapia fishery has particularly been most severe in the Kenya waters of Lake Victoria.

In recent times the apparent decline in Tilapia fishery in the Kenya waters of Lake Victoria has mostly been attributed to the predatory behaviour of Lates niloticus (mbuta). This may not be true as there is not yet no convincing evidence in support of the claim.

In absolute terms, it is quite true that the production of Tilapia species from the Kenya waters of lake Victoria has gone through a gradual reduction over the recent years. However, from Table 4.9 it can be seen that the percentage share in total value of this species has been rather stable compared to the rest, and presently Tilapia niloticus is amongst the first three species in terms of earnings to fishermen. Economically, this is theoretically given that its price is very high being that it is in short supply. Tilapia

niloticus is exotic to lake Victoria and like lates niloticus (mbuta) was introduced into the lake in the 1950's. It took time to establish itself but is now becoming the predominant Tilapia species and has attracted a lot of consumers.

Fisheries scientists have offered various explanations for the decline in the Tilapia spp. in the Kenya waters of lake Victoria. Apart from overfishing, it has also been observed that the use of beach seines along the open beaches of the lake which are inhabited by the juveniles and immature stages of Tilapia species do affect its supply. This has led to the ban on the use of this type of gear during April-July. The considerable rise in Lake Victoria water levels in the period 1961 through 1964 was also explained to have accounted for the decline in submerged and distrayed the nursery grounds of most of the Tilapia species (Welcome.1969) welcome argued that the rise in water levels made many of the places too deep and other sites to become cheked with thick emergent vegetation. He felt that Tilapia esculenta must have been hit hardest by the rise in the lake levels.

Engraulicypris argenteus (Omena)

This was an insignificant fishery until the late 1960's when it began to appear prominently in the catches from the Kenya waters of the lake. From tables 4.7 it is evident that this species occupies a big position in the total value of fish at the beaches. The fish is never sold in a fresh state and is always processed by sun-drying.

The fish is small in size and is mainly captured through the use of registered mosquito seines and employing light attraction techniques. The consumption of this species was originally restricted to the areas around the lake of but of late its demand has extended, although in a smaller scale to the outside markets and in towns. This fish

is never found on the beaches during April-July for it is a closed period for the use of the type of gear that captures it.

Haplochromis Species (Fulu)

This has been an important fishery in the Kenya waters of Lake Victoria for many years. The species has been a leading one in terms of total value until 1980 when its percentage share in the total value dropped and continued to drop between 1982 and 1984. This fish species is considered to be more abundant in the off-shore waters (more than 30 metres from the lake shore). The exploitation of this species has drawn much attention with respect to the appropriate technology for its exploitation. EAFPRO/FAO¹ project team in 1969 recommended that a boat of the size of about 40ft would be most suitable in exploiting the unused fish stock in the lake.

It has been observed by fishermen and various fisheries officers that larger sized species of Haplochromis have considerably declined in the last few years. It is normally exploited by gill nets of the sizes 1½" to 1¾" and 2½". The decline in the larger sizes of Haplochromis may also be attributed to the predation of Lates niloticus. Nile Perch prefers Haplochromis for food (Gee, 1969).

It should be pointed out that there seems to be a great potential for this fish species in this ground but the form of its exploitation still remains unknown. The species also has no major market share in distant areas from the lake Victoria region.

EAFPRO - East African Freshwater Research Organization
FAO - Food and Agricultural Organization.

Bagrus dogmac (Otik Scw)

This species is caught by all sizes of gill nets used in Lake Victoria. The percentage contribution of the species to the total annual value appears to have been steady up to 1979. It is in 1983 when it fetched the lowest percentage income to the fishermen.

Clarias Mossombicus (Cat fish- "Mumi")

This species is primarily caught with hooks and lines as well as gill nets down to 2½". Total catches appear to have considerably varied and it also was a high income earner to fishermen until 1979. However, Clarias is an off-shore fish and is expected to be more abundant in the deeper than in the shallower zones of the lake.

Proroptenus aethiopicus (lung-fish-Kamongo)

This species is caught in the gill nets from 2½" to 6" as well as by hook and line and spear hunting. Total catch of this species has declined over the years. It is a traditionally valuable fish amongst the consumers around the lake.

Its gradual decline from the lake beaches has not been well explained.

Lates niloticus (Nile perch - "Mbuta")

Lates niloticus are endemic to only two East African lakes, Lake Albert and Lake Turkana. In order to try and assess the effect of an introduction of lates into a cichlid dominated fauna, a pilot introduction was made in lake Kyoga and a number of smaller lakes and dams in Uganda in 1955. Lates, managed to establish itself and form an important element of the commercial catches of lake Kyoga. In 1960 Lates first accidentally gained access to and were

deliberately introduced into Lake Victoria and are now increasingly becoming an important fishery in the lake. From the near zero catch in 1968 the Nile perch fishery has steadily increased in the Kenya waters of lake Victoria. The percentage contribution of Nile perch to the total catch of all species has similarly, gradually increased from nearly zero in 1968 to 0.52 in 1974, 1.05% in 1977 and 67.73% in 1983. This trend seems to imply that lates fishery is the most important fishery in Kenya today. The marketable size of lates is $\frac{1}{2}$ to 11 kg - beyond this size the fish is so oily and not easily marketable, at this state the perishability rate is also very high.

Lates is caught in gill nets of 5" mesh sizes and above. For sporting purposes hook and line may also be used. It is an inshore fish and may also be taken in beach seines.

Much controversy has developed in the recent years over the possible role of Lates niloticus in the changing trends in the fisheries of lake Victoria. Some people have attributed the apparent decline in some of the lake fisheries, especially that of Tilapia spp, to the predatory activity of Lates niloticus in the lake. (Oyugi Aseto, 1979). In most cases the people have ignored the successful lates fishery in lakes such as Turkana and Albert where the supposed monster has co-existed with Tilapia for hundred of years without affecting the Tilapia fishery. Lates admittedly is a predator and will certainly feed on most of the fish species found in Lake Victoria including their own young ones. Like most other animals, though, lates will have its preferred food. What is not certain is that the preferred food is Tilapia. Moreover, there is no convincing evidence to support the claim that the presence of lates may be affecting the Tilapia stocks in Lake Victoria.

A study by Gee (1969) which involved examination of the stomach contents of Lates from Lake Vitoria, Kyoga and Albert revealed that while the fish do not feed specifically on any one species or group of fish, Haplochromis form the main component of their diet. This finding could explain the observed declining trend in Haplochromis supply to the Lake beaches. Gee goes on to explain that this trend in food composition appears to remain the same irrespective of the size of Lates.

Lates, though an invaluable fish offers a larger amount of fish per unit of weight than even the preferred Tilapia spp. It is presently filleted and sold to the major towns in Kenya by the big companies such as Samaki and Tilley (K) Ltd., and Kenya Cold-storage. Moreover, Lates is most popular with sport fishermen, offering possibilities of extending tourism to Western Kenya. The Lates fishery in the Lake Victoria is, therefore, likely to be of multi-socio-economic value in the long run than may presently be apparent.

Labeo Victorianus (Ningu)

This species has decreased in importance over the years despite the great preference by the consumers, especially those around the lake, They are usually caught in 1½" nets and traps laid across river courses. The population has largely been overfished with the catch reducing from 59 tonnes in 1974 to as low as 0.10 tonnes in 1983. In a way people have given up fishing specifically for Labeo because they had virtually disappeared.

Other Fish Groups

The other fish groups that together account for about 4% of the fish landings from the Kenya waters of Lake Victoria include Barbus (Fauni-Odhadho) Mormyrids, (Suma) Schilbe, (Sire) Synodontis, (Okoko) Alestes, (Osoga) etc. Among these the riverine Barbus remains the most luxurious fish from Lake Victoria although it has mostly been over-fished and become very rare. Like Labeo, Barbus fishery may only be able to pick up in the long run if trapping along the river courses is prohibited.

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QUESTIONNAIRE 1

(FISHERIES OFFICERS)

1. The Kenyan Fishing industry faces some problems, some of which are minor and others major. Which ones do you consider as major?
 - a)
 - b)
 - c)
 - d)

2. Do you think there are also some problems in fish marketing systems? Yes/No If yes specify.

3. Of the problems you have stated in Questions two (2) which ones do you think can be specifically attributed to lake Victoria fish catch? Explain.
 - a)
 - b)
 - c)
 - d)

4. How can you describe the fish marketing system as it presently exist around the lake?

5. Give percentage share of wholesalers in this particular fish market
6. What are the main factors in determining fish prices along the beaches of Lake Victoria?
 - a)
 - b)
 - c)
 - d)
7. How do you explain the recently reported general decline in the average prices especially for the Lake Victoria landings?
8. What do you think could be a solution to the price decline?
9. For fish not to go bad there are some facilities used for storage. What storage (preservation) facilities are used for this purpose on the landing beaches of Lake Victoria?
 - a)
 - b)
 - c)
 - d)

10. During certain times of the month or in the year there may be some waste perhaps due to poor storage handling facilities, what percentage of the monthly or annual catches go to waste approximately
- a)
 - b)
 - c)
 - d)
11. At certain times prices of fish differ a great deal because some people may like to buy fresh fish or processed fish. Averagely how would you compare the prices of both kinds of fish

Fresh fish

Processed fish

12. What factors determine the demand for fish along the Lake Victoria.
- a)
 - b)
 - c)
 - d)

13. Are all the landing beaches accessible^{ble} throughout the year or some of them are closed at a certain time of the year?
- a) open throughout
 - b) Some of them get closed
14. If open or closed, how does this affect the fish trade
- a) If open
 - b) If closed
15. In your opinion, what steps do you think are very necessary for the general improvement of the Lake fish trade.

QUESTIONNAIRE 2

(FISHERMEN)

NAME:

AGE:

SEX:

EDUCATION:

1. What factors determine the price you charge for your landed catch?

2. What are your major marketing problems?

3. How do you solve some of these?

4. When you land more fish than can be bought, what do you do with the excess
 - a) Process
 - b) Sell at very low prices
 - c) Throw away as a waste
 - d) consume
 - e) others

5. If you process them what extra costs do you meet and does this affect your receipts?

6. Who are your major customers
 - a) Wholesalers who own lorries
 - b) Headload women
 - c) Bicycle traders
 - d) Cooperatives
 - e) Others (specify)
7. Of the above dealers, whom would you prefer in your sales? (Give reasons)
8. Do your present customers arrive always in time for fresh fish:- Yes/No. If No, what affects their arrival in time?
9. Overtime, there has been changes in the landed composition of the catch. Why do you think it occurs?
10. How has this affected your receipts?
11. How can this be improved?
12. Have consumers adjusted their tastes to the presently dominating fishes such as Lates niloticus

13. If No what do you think will be the effect of this in future?

14. How do you think the fish trade in this region can be improved for the betterment of both fishermen and fish traders.

QUESTIONNAIRE 3

(FISHMONGERS)

NAME:

AGE:

SEX:

EDUCATION:

1. From whom do you buy your fish
 - a) Fishermen
 - b) Cooperative
 - c) Another dealer

2. What are the major problems you encounter in your trade?
 - a) Lack of fish
 - b) Transportation
 - c) Fish sportage
 - d) low demand
 - e) others (specify)

3. What is your means of fish transportation
 - a) Head-load
 - b) Bicycle
 - c) Buses matatus
 - d) Others (specify)

4. Where do you sell your fish?
5. On the demand side, what are the factors that determine the demand for fish?
6. How willing are consumers to substitute the fishes, given that some are presently not available?
7. How do you sell the relatively new and dominant species like Lates niloticus?
8. What can be done to improve fish trade in your area of operation?
9. Do you get stiff competition from other dealers in buying and selling the fish?

10. How do you compare these functions to those of the societies in other parts of the country?

11. Are these societies affiliated to Unions? Yes/No. If Yes, which are these Unions?
 - a)
 - b)
 - c)
 - d)

12. What are the functions of these unions?
 - a)
 - b)
 - c)
 - d)

13. In what ways have the functions promoted/inhibited the activities of the Lake Societies.

14. What is the general organisation of these Societies?

15. In your opinion, what percentage of the total annual catch do cooperatives markets? (For particular years)
 - a)
 - b)
 - c)
 - d)

16. Give the volume and value of fish sold through the cooperatives

Year Volume Value

17. For a given cooperative, give the price paid by the Society and price paid to the society for different fish species last year. Compare with the prices from other lakes.

LAKE VICTORIA

| | |
|---------------------|---------------------|
| price paid to Coop. | Price paid by Coop. |
| Other Lakes | |
| | |

18. What are the major problems facing the Lake Victoria fishermen's cooperatives societies?
 - a)
 - b)
 - c)
 - d)
19. What is your opinion about the future position of the Lake Societies, specifically in fish marketing?
20. What is the total number of registered fishermen in this beach? _____
21. How many of these are the Society's members?
22. How does the Society handle the landed fish by members?
23. Who are your main consumers and how do you think they have improved the slaes?

24. If the society directly markets the fish, what problems are often encountered
 - a)
 - b)
 - c)
 - d)
 - e)
25. What happens to unsold stock of fish?
26. In the process of selling fish what costs do the society meet?
27. If there are costs, what is their effect on the final price of the fish?
28. How can the marketing system be improved for the benefits of the society, fishermen and fish-traders?

QUESTIONNAIRE 4

COOPERATIVE OFFICERS

1. When were the fisheries cooperatives started in Kenya?
Give name of Society and year of formation
 - a)
 - b)
 - c)
 - d)

2. If the Lake Victoria Societies are not amongst the above, then give the first ones in this region and their years of formation.
 - a)
 - b)
 - c)
 - d)

3. Do you know any successful fishermen's cooperatives in Kenya? Yes/No. If Yes, which ones are they?
 - a)
 - b)
 - c)
 - d)

4. What is the basis for their success?
 - a)
 - b)
 - c)
 - d)

10. If No, how do you negotiate the price you pay at source?

11. Do you consider this to the best pricing system
No/Yes

12. If No, how do you think it can be improved.