Thesis:

# Structure, Conduct, and Performance of Kisumu Fish Marketing System

# STRUCTURE, CONDUCT AND PERFORMANCE OF KISUMU FISH MARKETING SYSTEM

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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This thesis has been submitted for Examination with our approval as University Supervisors.

Prof. Odhiambo M.O.

Prof. Mbatia O.L.E.

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## ABSTRACT

The study analyzed the structure, conduct and performance of Kisumu fish marketing system, with the aim of understanding the organization of the market, the role of marketing middlemen, their capital outlay, costs and returns and how these relate to consumer price of fish. The study also assessed sources of supply of fish and the respective distribution channels.

Three areas of the fish marketing system were focused on. First, the structure of the market was analyzed in four aspects, namely: market concentration, product differentiation, market integration and conditions of entry into the fish business. Market conduct was analysed by measuring the degree of collusion among traders in making market decisions. Finally, market performance was evaluated by looking at the cost structures of the various fish types sold in Kisumu and relating the traders' gross margins to the consumer prices, the marketing margins and the opportunity cost of the traders' entrepreneurship.

The study used primary data obtained by interviewing 53 wholesalers and 98 retailers of different types of fish in Kisumu metropolitan urban area in March to May 1991. A stratified random sampling technique was used in selecting the sample while data was analyzed using SPSS and Harvard Graphics computer packages.

It was found that Lake Victoria and Lake Turkana supplied the fish sold in Kisumu. The largest 9% and 17% wholesalers (representing the largest 4 and 8 wholesale traders) handled 30% and 43% of the wholesale market sales. The same percentages of retailers controlled 32% and 48% respectively of the retail

market sales. The wholesale market had a Gini coefficient of 0.37 while that of the retail market was 0.45. Based on this, the wholesale market has been categorized as competitive and the retail market as oligopolistic.

There was product differentiation in the market and very little formal vertical market integration. Instead the traders commonly established trade contracts to ensure reliable fish supplies. The only notable barrier to entry into the fish trade was lack of suitable market space for new traders. While traders did not collude among themselves to decide fish prices or control sales volumes, one aspect of collusion noted was among wholesalers whereby they were barred from serving consumers directly, even where this was convenient.

The traders' gross margins constituted between 17% and 42% of the consumer price of the different fish types. The net incomes to traders were higher than the traders' opportunity cost for entrepreneurship, indicating that the incomes, hence gross margins, were excessive. In conclusion, the fish market had factors which favour imperfect competition, especially at the retail level. The resulting market prices were inefficient since they contained excessive trader remunerations and therefore did not reflect the costs of providing the marketing services.

# CHAPTER 1: INTRODUCTION

## 1.1 Importance of Kenya's Fishing Industry and it's Prospects:

Kenya's fishing industry has multiple roles in the economy of the country. Reynolds and Greboval (1988) estimate that Kenya's Lake Victoria alone provides income to over 300 000 individuals engaged in different areas of the fisheries sector. These include fishermen and their households, owners and operators of boats and gear, boat builders, gear suppliers and repairers, traders and transporters. Secondly, fish is a highly nutritious human food. Estimates by Sysoev (1970) are that 4 to 5 kg of fish meat provides 2.7 kg of proteins compared to 11 kg of beans which provides the same amount of proteins. In addition, the fat content in fish meat ranges from 0.3% to 30% depending on species and it is absorbed more completely by the human body than the fats of warm-blooded animals.

Towards the year 2 000, the demand for meat proteins is expected to rise sharply owing largely to the increasing human population, expansion of urban centres and rise in per capita income in Kenya (Kenya, 1986). Kenya's beef industry, which has been the dominant supplier of meat proteins, has experienced a slow rate of growth in recent years. In 1980 the national demand for beef was 135 000 tonnes against an estimated supply level of 140 000 tonnes. Where as the demand was projected to increase to 200 000 tonnes by 1990, the supply was expected to remain constant as a consequence of stagnated technology and poor

policies (Kenya, 1980). With positive growth in fish production, much of the shortfall in protein supply may be offset through improved fish production and marketing.

Local fish consumption is currently estimated at 6.00 kg per capita per annum. This is 100 per cent increase from 3.00 kg for 1975 estimated by Jansen (1976), but is still below the average for Sub-Saharan Africa at 8.10 Kg per year (United Nations, 1992). Besides fish for human consumption, the industry also provides fish meal, a protein-rich product used in the manufacture of animal feeds. The demand for this product will rise with intensification of animal husbandry in Kenya, hence the need for increased fish output.

Statistics show that there has been a gradual rise in fish output from the various fish production areas in Kenya in the last two decades. The greatest rates of increase in fish landings have been in Lake Victoria fisheries and in fish farming projects. Besides these, there have also been significant contribution from the other lakes like Turkana, Naivasha and Baringo. However there has been a downward trend in fish production from these lakes arising from climatic variations, uncontrolled human activity around the lakes and over-exploitation of certain fish species (Kenya, 1989). The development of marine fisheries has been slow and its impact on the overall fish output in Kenya has been small. Tables 1.1 and 1.2 show the total quantity and values of fish landed in Kenya between the years 1971 and 1992.

The export of fish and fish products have also risen over the last few years, making the fish industry one of Kenya's

important foreign exchange earners. Table 1.3 shows the quantity and values of exports from the fish industry in the years 1980 to 1989. This includes fish exported in the fresh, salted, smoked, dried, filleted and frozen forms.

## 1.2 Lake Victoria Fisheries

Lake Victoria is the world's second largest fresh water lake, covering an area of 68 000 square Km in Kenya, Uganda and Tanzania (Ogutu, 1992). Only 6% of this area lies in Kenya but this sustains the highest concentration of fishing activity. In 1979, Kenya landed 29% of the catch with Tanzania and Uganda sharing 55% and 16% respectively (Reynolds and Greboval,1988).

The lake is the dominant source of Kenya's fish for domestic consumption and for export. In 1989 Kenya received an estimated 133 000 metric tonnes of fish from Lake Victoria, representing 89% of all fish produced in Kenya (Kenya(i), 1990) and 3.5% of all fish from Africa's inland water resources (FAO, 1992).

There are at least 170 species of fish in Lake Victoria (Kongere, 1979). Out of these, the major fish species in terms of their economic value to fishermen are *Lates niloticus* ("Mbuta"), *Rastrineobola argentea* ("Omena"), and *Oreochromis species* ("Ngege"). Other species, though of less economic importance, are *Bagrus docmac* ("Otik sew"), *Haplochromis species* ("Fulu"), *Synodontis species* ("Okoko"), *Protopterus aethiopicus* ("Kamongo"), *Clarias mossambicus* ("Mumi"), *Barbus species* ("Fuani"), *Labeo victorianus* ("Ningu"), *Schilbe mystus* ("Sire") and *Mormyrus kanumme* ("Suma").

TABLE 1.1 QUANTITY OF FISH LANDED IN KENYA FROM VARIOUS SOURCES IN '000 METRIC TONNES (1974 - 1992)

| Year | Lake Victoria | Other Inland Lakes & Rivers | Marine Fisheries | Fish Farming | Total |
|---|---|---|---|---|---|
| 1974 | 17.18 | 7.99 | 3.12 | - | 28.29 |
| 1975 | 16.58 | 6.23 | 4.22 | - | 27.03 |
| 1976 | 18.68 | 5.67 | 3.89 | - | 28.24 |
| 1977 | 19.33 | 16.74 | 4.05 | .55 | 40.67 |
| 1978 | 23.86 | 17.61 | 4.18 | .56 | 46.21 |
| 1979 | 30.59 | 15.01 | 2.86 | .57 | 49.03 |
| 1980 | 26.91 | 15.37 | 4.91 | .60 | 47.79 |
| 1981 | 38.18 | 12.79 | 5.55 | .42 | 56.96 |
| 1982 | 60.96 | 12.62 | 2.05 | .44 | 76.07 |
| 1983 | 77.33 | 13.16 | 2.06 | .56 | 93.11 |
| 1984 | 71.85 | 11.64 | 2.21 | .71 | 86.41 |
| 1985 | 88.60 | 10.09 | 2.50 | 1.09 | 102.28 |
| 1986 | 103.16 | 9.05 | 5.98 | .98 | 119.17 |
| 1987 | 113.55 | 8.79 | 9.83 | 1.09 | 133.26 |
| 1988 | 125.07 | 4.81 | 6.03 | 1.12 | 137.11 |
| 1989 | 133.85 | 8.81 | 8.62 | 1.13 | 152.41 |
| 1990 | 185.10 | 5.73 | 9.03 | .97 | 200.83 |
| 1991 | 186.37 | 3.72 | 6.43 | 1.01 | 197.53 |
| 1992 | 183.78 | 3.82 | 8.87 | 1.02 | 197.49 |
| 1993 | 185.82 | 4.91 | 9.12 | 1.23 | 201.08 |

Source: Kenya Statistical Abstracts (1970-1990).

TABLE 1.2 VALUE TO FISHERMEN OF FISH LANDED IN KENYA FROM VARIOUS SOURCES (MILLION K£) (1971 - 90)

| Year | Lake Victoria | Other Inland Lakes & Rivers | Marine Fisheries | Fish Farming | Total |
|---|---|---|---|---|---|
| 1971 | .77 | .18 | .51 | - | 1.46 |
| 1972 | .84 | .16 | .46 | - | 1.46 |
| 1973 | .91 | .26 | .37 | - | 1.54 |
| 1974 | 1.05 | .28 | .34 | - | 1.67 |
| 1975 | 1.07 | .28 | .54 | - | 1.89 |
| 1976 | 1.20 | .18 | .54 | - | 1.92 |
| 1977 | 1.28 | .67 | .68 | .06 | 2.69 |
| 1978 | 1.85 | .77 | .80 | .07 | 3.49 |
| 1979 | 2.85 | .77 | .62 | .07 | 4.31 |
| 1980 | 2.94 | .95 | 1.16 | .07 | 5.12 |
| 1981 | 4.27 | .91 | 1.49 | 1.19 | 7.86 |
| 1982 | 6.17 | 1.09 | 2.05 | 1.19 | 10.50 |
| 1983 | 6.02 | 1.52 | 2.07 | .79 | 10.40 |
| 1984 | 6.67 | 1.43 | 2.21 | 1.24 | 11.55 |
| 1985 | 9.53 | 1.37 | 2.50 | 1.70 | 15.10 |
| 1986 | 12.36 | 1.22 | 2.83 | 1.59 | 18.00 |
| 1987 | 17.41 | 1.31 | 3.22 | 1.87 | 23.81 |
| 1988 | 26.06 | .68 | 2.64 | 1.89 | 31.27 |
| 1989 | 34.17 | .61 | 3.76 | .23 | 38.77 |
| 1990 | 77.37 | 2.40 | 5.82 | .41 | 86.00 |
| 1991 | 82.50 | 2.81 | 6.04 | .82 | 92.17 |
| 1992 | 90.2 | 3.02 | 7.15 | 1.41 | 98.78 |

Source: Kenya Statistical Abstracts (1970 - 1990)

TABLE 1.3: QUANTITY AND VALUE OF FISH AND FISH PRODUCTS EXPORTED FROM KENYA (1980 - 1989).

| Year | Quantity of Fish Exported (Metric tonnes) | Value of Exports (Million Ksh) |
|---|---|---|
| 1980 | 523 | 4.69 |
| 1981 | 1 160 | 14.71 |
| 1982 | 738 | 15.02 |
| 1983 | 734 | 15.02 |
| 1984 | 358 | 8.54 |
| 1985 | 338 | 1.42 |
| 1986 | 264 | 1.21 |
| 1987 | 2 877 | 85.52 |
| 1988 | 2 010 | 63.31 |
| 1989 | 2 905 | 94.40 |
| 1990 | 3 125 | 98.23 |
| 1991 | 3 359 | 101.10 |
| 1992 | 3 612 | 112.52 |
| 1993 | 3 981 | 123.04 |

Source: Kenya Annual Trade Report. 1980 - 1989.

A survey carried out by Hoekstra *et al* (1990) showed that there are 208 fish landing beaches and an estimated 6 229 boats operating within the Kenyan portion of Lake Victoria. Each fishing boat has an average crew of 3 fishermen. Therefore the total number of fishermen on the Kenyan part of Lake Victoria is about 18 687 persons. The landing centres are distributed in four administrative districts shown on Table 1.4. Figure A.1 in appendix shows the location of some of the major fish landing beaches and market centres around Lake Victoria.

Fish production is a medium cost capital investment. Jansen (1976 ) estimated that it cost between Ksh 600 and Ksh 3 000 to purchase and equip a fishing boat on Lake Victoria in 1975. Taking into account the inflationary trends, this would convert to between Ksh 4 000 and Ksh 20 000 in 1990. Mwaura (1987) also estimated the capital costs for Lake Naivasha fishery in 1986 at between Ksh 5 000 and Ksh 20 000. However many fishermen begin as employee fishermen before they acquire capital of their own. This has made entry into this sector relatively easy.

Nyanja (1986) points out though that many people, including fishermen themselves, still regard fishing as a low income activity with low social status. This may have had a negative impact on free entry to the trade. The shift of the fish business from subsistence production to largely commercial activity has given the fishermen the drive towards achieving greater profits. They aim to maximize their profits subject to minimizing risks (Odongkara, 1981).

TABLE 1.4 THE DISTRIBUTION BY DISTRICT, OF LANDING BEACHES AND BOATS ON THE KENYAN SIDE OF LAKE VICTORIA.

| District | No. of fish landing beaches | No. of boats | Estimated No. of Fishermen |
|---|---|---|---|
| Busia | 21 | 837 | 2 511 |
| Siaya | 45 | 1 537 | 4 611 |
| Kisumu | 35 | 603 | 1 809 |
| S. Nyanza | 107 | 3 252 | 9 756 |
| Total | 208 | 6 229 | 18 687 |

Source: Hoekstra *et al* (1990)

To achieve their goals, the fishermen attempt to land the largest amount of fish species possible that will provide the greatest returns. Their income will however depend on prices they can receive at the respective landing beaches. Given its large fish output, Lake Victoria has a big impact on the national fish market. Although some of the fish is consumed in small settlements and in local market centres around the lake region, much of the fish finds its way into the large urban centres such as Kisumu, Nakuru, Nairobi and Mombasa.

## 1.3 The Nature of Fish Marketing

There is very little direct dealing between fishermen and fish consumers. Apart from the local consumers in villages along the lake, the majority of consumers are found in local trading centres and in urban areas far away from the lake shores. In order to bring out larger quantities of fish, fishermen have tended to specialize on fish production, leaving the marketing roles to be performed by fish traders. In summary, the marketing functions performed along the marketing channel include semi-processing[1], transporting, storage, risk bearing, financing wholesaling and retailing.

The groups of traders involved in the fish marketing process operate at two distinct levels of the marketing channel. The wholesale level of the marketing channel consists of groups of traders who buy fish from fishermen at the fish landing beaches and transport it to the local or distant rural and urban markets where they sell it to retailers, or less often, to consumers in those markets. Besides buying, transporting and selling, these groups of traders may semi-process the fish or store it under refrigerated conditions in case the amount they buy cannot be immediately sold in the market (Nyanja, 1986).

The proportion of fish sold in the semi-processed form has increased over the years from 20% in 1975 (Jansen, 1976) to about 70% in 1985 (Nyanja, 1986). Fresh fish is more remunerative to

[1] Semi-processing of fish is used here and elsewhere in the text to refer to treatment methods for preserving fish. Common methods used around Lake Victoria are fish-smoking, sun-drying and deep-frying.

fishermen and traders than semi-processed fish. In 1984 the average price for fresh fish on Lake Victoria beaches was 2.47 Ksh/Kg as compared to 1.44 Ksh/Kg for the semi-processed fish.

The wholesale level of the fish market has in the past been dominated by traders with little capital, who purchased little quantity of fish on the landing beaches and transported it to inland fish markets (Nyanja, 1986). There were 4 000 such middlemen in 1975 and some entered the marketing of fresh fish with as little as Ksh 30 (Jansen, 1976). However in recent years, individual traders, fishermen cooperatives and fish processing firms have undertaken large scale wholesaling of Lake Victoria's fish.

In 1985 there were 34 fishermen cooperatives operating on Kenya's Lake Victoria but these handled only 6% of the catch (Nyanja, 1986). In the same year, fish processing firms controlled less than 20% of the fresh fish trade. Therefore fish marketing on the lake was still dominated by individual middlemen.

The second level of the fish marketing channel consists of small scale traders who perform retail functions at the consumer markets. This group of traders link the wholesalers and the fish consumers by buying fish from the former group and selling to the latter. In some small consumer markets located close to fish landing beaches a small group of traders may sufficiently combine both wholesale and retail functions.

However in cases where the consumer market is a large urban centre located away from the production areas, there may be more traders performing the various marketing roles, thus making the

marketing channel more complex. Therefore the number and organization of traders, their capital layout and their performance in the market place will depend on the size of markets they serve and how far they are from the supply areas.

## 1.4 Production and Marketing Problems in Kenya's Fish Industry

The goal of the Kenya government in fish production is to obtain maximal yields from inland and marine water resources but this has been hampered by several problems. These include ecological changes in some inland Kenyan lakes, leading to declining trends in fish output and low adoption of new fishing techniques by fishermen, causing under exploitation of existing potentials (Kenya, 1989).

To improve the performance and sustainability of the fish production sector, the same policy document recommends that fishing methods which over exploit or destruct breeding grounds for fish should be restricted, water pollution be continuously monitored and fish breeding farms initiated to restock depleted areas. It also urges increased research on new fish species and the regulation of the compositions and levels of current fish landings.

In fish marketing the Kenya government aims at providing the conditions that ensure high income to fishermen while making fish more available to consumers at affordable prices so as to promote its consumption (Kenya, 1989). These objectives have not been realized due to problems in two areas. First, the sector has

infrastructural problems such as inadequate transport network and insufficient processing, storage and transport facilities (Kenya, 1991).

These cause high marketing costs, thereby raising fish prices. The government has addressed these problems in a number of ways, with varying degree of success, by improving the roads to some fish landing beaches, encouraging private and corporate investment in fish processing and trade and educating fishermen and traders on economical methods for fish preservation (Reynolds and Greboval, 1988).

Secondly there are problems attributable to the organization and activities of the middlemen in the fish marketing sector. Reynolds and Greboval (1988) indicate that fish prices have risen at all levels of the market in the last two decades but there have been disproportionate changes in earnings for retailers, wholesalers and fishermen.

In 1971 the average prices of the species of fish sold in Kenya were 1.09 Ksh/Kg and 2.75 Ksh/Kg at the beach and retail levels respectively. The beach price thus constituted 40% of the retail price. However there has been a gradual decline in the fishermen's share of the consumer price. In 1985 the beach price was 2.94 Ksh/Kg and comprised only 28% of the consumer price at 10.59 Ksh/Kg.

A declining producer's share of the consumer price may not necessarily indicate imperfections in the marketing system but should raise the need for evaluating the performance of marketing institutions involved (Tomek and Robinson, 1972). Measures of costs, prices and income earned by the firms involved in

marketing may then be examined to determine whether or not margins are excessive.

Margins largely exceeding the costs of providing marketing services in place, time and form dimensions mean misallocation of resources and would imply the existence of imperfections in the market. High margins in the fish marketing sector would interpret as low producer prices and high consumer prices, both which are in conflict with the government's stated policy.

However the evaluation of margins in Kenya's fish marketing industry has not been done due to lack of adequate information especially on the costs of marketing fish, prices of fish and remunerations to the traders. These are related to the level of competition in the trade and the efficiency of the marketing system. Hence the need to study the structure, conduct and performance of the marketing system with reference to competition and efficiency.

## 1.5 Justification of The Study

The central role played by the fish marketing sector in linking fishermen and fish consumers is so crucial that it must be given priority in any attempts to improve the fish trade. In recent years, suggestions have been put forward for restructuring the industry, the most prominent being the creation and direct involvement of fishermen cooperatives in fish marketing (Reynolds and Greboval, 1988). However such decisions have often lacked supporting economic data and information to justify implementing the necessary changes. The need for marketing studies is

therefore imperative for planning and instituting reforms in the fish business.

Studies done so far in Kenya's fish marketing industry by Reynolds and Greboval (1988), Nyanja (1978), Jansen (1972) and Jansen (1976) dealt with issues such as factors affecting fish pricing on the landing beaches and local markets and the performance of fishermen cooperatives in marketing fish. However the present study differs from them since it focuses on the urban fish market where there are a large number of fish consumers. It also analyses the costs of marketing and the marketing margins, which none of the previous studies has done.

It therefore intends to answer issues related to, among other items, the gross margins received by middlemen and whether they are higher than they should be. This information is essential in improving fish marketing so as to raise its consumption.

Moen (1983) suggests that fish consumption pattern in Kenya is dictated by cultural tradition, proximity to fishing areas and population density. Consumption of fresh water fish is highest along the shores of lake victoria. Based on the 1979 statistics, the same report suggests that Nyanza and Western Provinces which constitute 25% of the national population and are located near Lake Victoria lead the country in consuming fish. In this region Kisumu is the largest town, with a high population level dominated by the Luo ethnic group who culturally are prominent fish eaters. Kisumu is therefore favored to be the largest single market for Lake Victoria's fish. On this basis it was selected for this fish market study.

## 1.6 Objectives of The Study

The objectives of the study are:

1.6.1 To establish the sources of supply and the marketing channel for each fish type sold in Kisumu.

1.6.2 To assess the degree of competition in Kisumu fish market at the wholesale and retail level, using the following structure variables:

(i) market concentration ratios.

(ii) vertical and horizontal integration.

(iii) barriers to entry into the fish market.

(iv) the degree of product differentiation.

1.6.3 To examine collusive behaviour among fish traders.

1.6.4 To evaluate marketing margins and gross margins in Kisumu fish trade as follows:

(i) identify the marketing functions performed at various stages along the marketing channels for each fish type.

(ii) evaluate the costs of marketing along the channels.

(iii) derive marketing margins for wholesale market and retail market for each fish type.

(iv) evaluate wholesale and retail traders' gross margins.

1.6.5 To establish the factors determining fish prices.

## 1.7 Hypotheses to be Tested:

The following hypothesis will be tested in line with the above objectives.

i) That Kisumu wholesale fish market is competitive.

ii) That Kisumu retail fish market is competitive.

iii) That fish traders collude to decide on prices.

iv) That the fish traders' gross margins are excessive.

## 1.8 Scope of Thesis

The study has five chapters. Chapter 1 introduces the current status of Kenya's fish industry, in particular Lake Victoria fisheries, and its importance to Kenya's economy. It gives the problems in the industry and outlines the objectives of the study and the hypotheses to be tested. In chapter 2 is a review of literature on research on Lake Victoria and other fisheries resources in Kenya related to this work. Theories on the use of structure, conduct and performance model in market analysis are discussed and studies using this approach to analyze other commodity markets are reviewed.

Chapter 3 on methodology discusses the types of data used in the study, sources of the data and the techniques used in sampling respondents, collection and analysis of data. The sources of supply of fish to Kisumu and the marketing channels are described in chapter 4. This chapter also contains the discussion of results of market structure, conduct and performance analysis. The hypotheses are tested and either accepted or rejected. Finally chapter 5 gives a summary of the major findings of the study and presents the conclusions and recommendations for improving the fish trade.

## CHAPTER 2: REVIEW OF LITERATURE

Research work on Kenya's fish marketing sector has largely focused on marketing issues and problems affecting fishermen. The studies by Nyanja (1986), Mwaura (1987), Jansen (1972) and Oduor-Otieno (1978) all reveal that fishermen's receipts from the sales of fish have remained low and uncertain. They attribute the problem mainly to unfavourable production and marketing conditions and recommend possible solutions.

Nyanja (1986) explained that the marketing factors influencing fish prices, hence income to fishermen and traders on Lake Victoria, are the costs of storage, processing and transport. The inadequacy of cold-storage facilities causes the producers to sell fish immediately after landing, thereby reducing the length of the supply period and lowering their bargaining power. Alternatively the fish may be semi-processed to improve its storage before sale. However this means additional costs, hence a loss, to the fishermen and the traders.

Transport costs are largely determined by the state of the roads to fish landing beaches. In the wet season most of the roads are impassable, causing an imbalance in the supply of fish on the beaches and in the consumer markets. Transport costs are also high and fish spoilage substantial. These lead to large differences between the beach and consumer market prices.

To counter the problem, Nyanja (1986) recommended that the government should establish ice manufacturing and fish filleting plants in selected lake-side towns and improve the state of the

roads. It should also encourage fishermen to form viable cooperatives and assist them acquire cold-storage vehicles and motorized boats to enhance fish transportation.

Mwaura (1987) also found out that fishermen in Lake Naivasha do not get maximum returns from their catch for two reasons. First, there are difficulties in transporting fish due to inadequate transport facilities, leading to high transport costs. He suggested that fishermen should pool resources and acquire refrigerated vans which would enable them to transport good quality fish to distant markets at lower costs. The author also blamed monopolization of the fish trade by a few middlemen and recommended that the government should institute policies to encourage a more competitive trade.

Jansen (1972) and Jansen (1976) also undertook a study on fish marketing around Lake Victoria, focusing on the middlemen in the marketing system by analyzing their numbers, distribution and capital assets. He estimated that there were 18 000 fishermen and 4 000 fish traders on Kenya's Lake Victoria in 1975. These middlemen were mainly small-scale with a daily working capital valued at between Ksh 30 and Ksh 100.

Jansen (1976) argued that this had a negative and positive aspects. Its main advantage was that fish trade, especially that of fresh fish, was shared among many middlemen, thus leading to some degree of competition in fish distribution. Profits were therefore low and fairly shared out. However the small capital base limited the ability of the traders to venture into distant urban markets where higher prices may have been expected. Jansen concluded that fishermen's earnings could increase if marketing

agents raised their operating capital.

Oduor-Otieno *et al* (1978), observed that uncertainty in the fish business was a major limitation to the growth of the sector. Fishermen were uncertain about the level of market demand at a given time, hence they could not match demand with supply so as to stabilize the market price. To solve the problem, the authors suggested that information on the size of demand for fish, and the levels of supply and prices in different fish markets should be made available to fishermen.

The fish market, like other marketing systems, is influenced by a set of social, political, economic and physical conditions under which it operates. These will explain the strategies adopted by the participants and consequently the outcome of the market objectives. A structure - conduct - performance model may be used to assess the organization, behaviour and results in the marketing industry.

Using this model, parameters relevant to appraising the market are grouped as performance, conduct or structure variables. The direction of influence goes from structure through conduct to performance (Clodius and Mueller, 1961).

Clodius and Mueller (1961) define structural variables as those characteristics that influence the organization of a market and which strategically influence the nature of competition and pricing within the market. Tomek and Robinson (1972) highlight four market structure variables commonly used to assess competition in a marketing systems. They are the degree of seller concentration and inequality in market shares, the extent of product differentiation, the level of market integration in the

vertical and horizontal directions, and barriers to entry into the market.

Bain (1968), explains that high concentration and inequality in a marketing system indicate oligopoly while low concentration imply tendencies towards competitiveness, provided no major barriers to entry exist at the various market channel levels. Rosenbluth (1955) states that among the market structure variables, concentration is the most important in influencing the market conduct and performance. Miller (1984) associates competition in a marketing system with efficiency. He argues that competitive pressure is the best way to ensure that people in business organization perform efficiently.

Scitovsky (1955) further points out that market concentration may affect income distribution in an industry. This, he explains, comes in different ways, for example through the influence of concentration on profit margins, on prices charged in product and factor markets and by barring potential entrants into the industry. A highly concentrated industry, he concludes, is therefore likely to enhance inequality in income distribution and cause poor market performance.

Various authors have attempted to categorize competition in a marketing industry based on the level of concentration. Parker and Connor (1979) take a Gini Coefficient of 40% and below for an industry as indicative of effective competition, and otherwise as non-competitive or oligopolistic tendencies. United States (1966) define "high concentration" as a situation in which the 4 largest firms control 50% or more of the sales.

Bain (1951) and Mann (1966) together conclude that a

"critical level" of concentration occurs when the 8 largest firms control 70% or more of the market. Rhoades (1973) though puts the "critical level" where the first 4 firms control 30% of the trade while Keysen and Turner (1965) propose that substantial oligopoly exist where the top 8 firms handle 50% of the sales. Bain (1968) gives the most detailed classification, displayed in Table 2.1, of a marketing industry on the basis of shares of sales of the largest 4 and 8 firms.

The evaluation of market performance may be done by looking at the size of marketing margins with respect to the costs of marketing. Marketing margin is defined by Tomek and Robinson (1972) as the difference between the prices received by producers and that paid by consumers. Intuitively it is the price difference between successive market stages. Much attention has been given to the use of marketing margins. Bateman (1976) points out that the major reason for this is that margins, as opposed to prices, are usually stable in the short-term, thus making it a more attractive tool to use in market analysis.

Marketing margins may remain constant or vary over time. Increases in margins may arise from increased marketing costs, larger quantities marketed by individual participants and speculation on market price for product (Brosen *et al*, 1978). The latter shows the risk-averse nature of traders. Margins will also vary with respect to shifts in demand and supply levels, hence prices, at the producer level and retail market (Tomek and Robinson, 1972). Important issues related to marketing margins are therefore the size of the margins and their changes.

**TABLE 2.1 BAIN INDUSTRIAL CLASSIFICATION ON BASIS OF SALES SHARES OF THE LARGEST 4 AND 8 FIRMS**

| Type | % Share of the First 4 Firms | % Share of the First 8 Firms | No. of Firms | Description |
|---|---|---|---|---|
| i | >90 | >90 | very few | oligopoly |
| ii | 65 - 90 | 85 - 90 | few | highly concentrated |
| iii | 50 - 65 | 70 - 85 | few to large | high to moderate concentration |
| iv | 35 - 50 | 45 - 70 | large | low to moderate concentration |
| v | <35 | <45 | very large | moderate concentration with a large competitive fringe |

Source: Bain (1968)

In a perfectly competitive market, there is an economically efficient allocation of resources since each trading firm will maximize profits by equating price to its marginal cost (Scheid and Sutenan, 1979). The prices and margins will therefore reflect the true costs of providing the marketing services. In contrast, if imperfect competition exists among the traders in a market, the marketing margins may be higher than marketing costs in time, place and form dimensions. This leads to high consumer prices while remuneration to producers remain low (Shepherd and Futrel 1969).

Bateman (1976) however argues that neither increasing margins nor declining producer's share is an adequate measure of inefficiency in the market. He suggests that to determine whether marketing costs are higher than is necessary, the most straight forward approach is to use other variables such as the profits of middlemen, rather than marketing margins.

Ongiro (1979) though shows that margin analysis can be effectively used to evaluate the performance of a marketing system. He used a structure, conduct and performance approach to analyze the Mombasa poultry and eggs markets. He measured the concentration of shares of transaction among the traders and determined that in the poultry market, 8% of the retailers controlled 50% of the trade while the Gini coefficient was 0.55.

In the eggs market 5% of the retailers handled 50% of the sales and the Gini coefficient was 0.72. He concluded that the concentration ratios were high and indicated oligopolistic characteristics in the market.

To measure market performance Ongiro (1979) expressed

marketing margins as percentage of consumer price for the poultry and eggs markets. The middlemen's remunerations constituted 69% and 60% of the consumer price in the poultry and eggs markets respectively. He concluded that these margins were high and substantially raised the consumer price of the two commodities without any resulting benefits to the producers and consumers. He recommended the formation of a producer cooperative which could market poultry and eggs at the wholesale level and increase the producers' share of retail price.

A similar study on a different commodity was done by Agarwaal (1966) who estimated costs of marketing and the marketing margins for cabbage in Malaya. Using cross-sectional data obtained by interviewing farmers, wholesalers and retailers, he determined that cabbage producers received 60% of the consumer price. The traders' commission was 19% while 9% was spent by traders on transporting, handling and packaging cabbage. A further 12% of retail price was spent on processing cabbage at the market.

He recommended that the producers' share of the consumer price could increase up to 81% if cabbage was processed at farm level and transported to the market by producers. Detailed market research on costs of marketing and dealers' profits could then be conducted to eliminate unnecessary marketing functions and reduce costs.

Staatz (1986) also examined the structure, conduct and performance of the traditional cattle and beef marketing systems in both Abidjan and Bouake. Structure was evaluated by looking at the concentration of shares of sales among the traders. He

found that Abidjan market had a large number of sellers, each with small shares of transactions. The 4 and 8 largest traders controlled, at most, 36% and 56% of the sales.

In Bouake there were fewer sellers and market shares were larger, with the first 4 traders controlling 50% to 60% of the sales. He concluded that the concentrations in both markets were too low to allow collusion among the traders.

On market performance, Staatz (1986) examined the traders' and butchers' gross margins. The traders' margins took 4% to 9% of the retail price of cattle while the butchers' margins composed 8% to 12% of the consumer price of beef in the two markets. In comparison, the traders spent 28% of the retail price on transport and taxes. He concluded that the market was fairly efficient and lacked evidence of monopoly power or exorbitant trader profits.

Karugia (1990) evaluated competition in the Nairobi beef retailing system and established that the largest 4 and 8 beef retailers controlled 20% and 35% of the market respectively. He classified the retail market as exhibiting "low grade" oligopoly. He further compared the traders' remunerations to the opportunity cost of entrepreneurial inputs, defined as the minimum net income that a beef retailer would require to shift to an alternative business. He determined that the incomes were lower than the opportunity cost of entrepreneurship and concluded that the low margins depicted an efficient marketing system.

Similarly Scheid and Sutenan (1979) analysed the structure and performance of wholesale marketing of fin fish in Costa Rica and determined that the first 4 and 8 firms controlled 38% and

62% of the fish market. They concluded that the concentration levels suggested the existence of oligopoly power on the buyers side or imperfect competition.

Kabede (1990), in his report on the marketing of sheep in the Central Highlands of Ethiopia, argued that the evaluation of costs and margins can determine whether there are excess profits or whether wide margins are due to high real costs. Such costs may be the results of high service content or due to technical constraints in the marketing process.

The analysis of marketing costs is essential for the evaluation of margins. Various authors suggest ways of determining such costs. Wollen and Turner (1970) and Agarwaal (1966) offer good examples in this. Both take the approach of identifying and describing the marketing services offered and evaluating the costs of such services.

French (1977) goes even further and models the spatial components of marketing costs, namely the distribution costs, the delivery and assembly costs of marketing (French 1977). Whereas his models are designed for analyzing efficiency of distribution for a plant located centrally relative to supply areas and markets, his systematic break-down of distribution costs into small components (French 1977) may assist the present study in identifying and appraising the variable costs in fish distribution.

Abbot (1961), illustrates the steps used in deriving marketing costs and margins. First, it involves tracing the product as it moves through the marketing process and assessing the changes in value of the commodity and the accompanying

marketing services. The volumes of product handled and gross value of purchases and sales of the commodity by each marketing agent are then recorded. The average gross margin is obtained by dividing the difference between the value of sales and the marketing costs by the volumes handled. This method requires that products should be of comparable description and quality. Allowance must also be made for physical loss and time lag between successive market operations.

The above method has been partially employed in this study. The fish commodity has been traced from the landing beaches through the wholesale market to the retail point. Costs of marketing and price levels are noted at stages along the marketing channel and used to derive marketing margins and gross margins.

The gross margins are then evaluated by comparing wholesale and retail traders' net incomes with the opportunity cost of their entrepreneurship. This is calculated as the minimum net income that traders must get in an alternative business to quit their present trade (Karugia, 1990). If the current remunerations exceed the opportunity cost of management inputs then margins are too high.

# CHAPTER 3: METHODOLOGY

This chapter discusses the types of data required for the study, the sources of data and the methodology used in sampling respondents and the methods used in the collection and analysis of data.

## 3.1 Theoretical Framework

The perfectly competitive market model is often used in economics as a standard by which the structure and performance of the market can be compared and evaluated. The competitive market model is characterized by large numbers of buyers and sellers, low barriers to entry, product homogeneity and complete knowledge of alternative choices on the part of producers and consumers.

It also presupposes and entails an economically efficient allocation of resources. Since each trading firm maximizes its profits by equating the given price to its marginal cost, competitive prices correctly reflect both consumer demand and the cost of resources employed (Scheid and Sutenan, 1979).

In the case of the marketing sector of the fish industry, competition should ensure that prices and marketing margins fully reflect the costs of resources used. An efficient market will establish prices that relate transport, processing, and storage costs respectively to the provision of space, form and time utilities. In this study the structure, conduct and performance of Kisumu fish marketing system has been examined.

### 3.1.1 Market structure

Market structure refers to the organizational characteristics of the market which determine the relation of sellers to each other, of buyers to sellers, sellers to buyers and of sellers to the actual and potential suppliers (Tomeck and Robinson, 1972). The variables commonly used to explain the structure of a market are the degree of market concentration, the extent of vertical and horizontal integration, conditions of entry to the market and the magnitude of product differentiation.

Concentration refers to the percentage of total transactions accounted for by a given number of participants in the market. A market concentration ratio is a measure of the percentage share of the market controlled by a specified percentage of firms in the industry, usually the first 4 or 8 firms, ranked in order of market shares from the largest to smallest (United States, 1966: Acello-Ogutu, 1976: Bain, 1951: Mann, 1966: Keysen and Turner, 1965: Staatz, 1986: Karugia, 1990: Scheid and Sutenan, 1979).

Economic theory tells that the presence of a few sellers each having a big market share, leaves decisions on prices, hence profits, in the hands of only a few participants. Such markets are therefore associated with non-competitive pricing arrangement (Staatz, 1980). Consequently it may be assumed that high concentration and inequality indicate oligopolistic tendencies in the market while, in converse, low concentration suggests tendencies towards competition provided there are no serious barriers to entry into the market (Bain, 1951: Bain, 1968).

Other indicators of market power include the Herfindal index[2], Lorenz curve and Gini coefficient. The Herfindal index is a summary measure of concentration for any number of firms in the market (Samuelson and Nordhaus, 1989). Its advantage over the other conventional market concentration measures is that it reflects the impact of firm size differences on market power. Samuelson and Nordhaus (1989) however point out that it is less commonly used than the Gini coefficient.

Lorenz curves and Gini coefficients are used to demonstrate the levels of inequality in the market. The Lorenz Curve displays the distribution of shares of sales (or income) among the traders in the market. It therefore shows how the actual distribution of market shares differs from the hypothetical situation of equal distribution. The Gini Coefficient is a statistical measure based on the Lorenz Curve and measures the dispersion of concentrations in the total market (Ritson, 1988). It thus gives a summary of the deviations in percentage shares of sales among the traders.

Cuyler (1985) explains that Gini coefficient is a comparative measure of inequality in share distribution which is the mostly commonly used in income distribution studies. It has the range 0 to 1 and oligopolistic behaviour increase as the coefficient approaches 1 while the market becomes more

[2] The Herfindal (also referred to as the Herfindal-Hirschman) index, H, is expressed as:

$$H = \sum_{i=1}^{n} S_i^2 = S_1^2 + S_2^2 + S_3^2 + \ldots,$$

Where $S_i$ = Percentage market share of $i^{th}$ firm.
$0 \leq H \leq 1$ and monopoly power increases as H tends to 1 (Samuelson and Nordhaus, 1989). See Footnote 11 for H results.

competitive as the Gini Coefficient tends to 0 (Scheid and Sutenan, 1979).

Andic and Peacock (1961) show that the Gini coefficient, R, can be expressed as:

$$R = \sum_{k=2}^{j} (P_{k-1} q_k - P_k q_{k-1}) \times {}^{1}/_{10000} \quad \ldots\ldots \text{(equation 3.1)}$$

Where:

P = cumulative percentages of traders by classes
q = cumulative percentages of volumes or values of commodity sold by each group of traders
k represents the serial order of the cumulative percentages for each group of traders.

The values of fish traded by retailers and wholesalers in Kisumu per month will be taken as unit measures of transactions and used to construct Lorenz curves and calculate Gini coefficient.

Market structure is also assessed by analyzing the level of integration. This is the relation between sellers at the same market level, in case of horizontal integration, or at successive channel levels for vertical integration. Under a vertically integrated system, producers, wholesalers and retailers act as a unified system. Either one channel member owns the others or franchises them or have so much power that they all cooperate (Kotler, 1989). Such systems achieve economies through size, bargaining power and elimination of duplicated services.

Tomek and Robinson (1972) assert that integration occurs mainly because of the inefficiency or inadequacy of the market exchange mechanism to coordinate the flow of product in the correct time and with the desired attributes. Thus integration has an impact on the smooth transfer of commodity from producer

to consumer. In addition integration can reduce marketing costs, especially transfer costs between market stages, purchase price and procurement risks.

But in practice there is no assurance that these cost savings are passed on to consumers as lower retail prices or to producers as higher returns (Tomek and Robinson, 1972). The degree of integration also shows the power of the participants in making price decisions. Thus vertical integration may eliminate price as a coordinator between market levels, especially when the market is informal or weak.

Integration in the fish market is examined by determining whether there are contracts on quantity of fish delivered by fishermen to wholesalers or by wholesalers to retailers, on frequency of delivery of such fish, and on prices of delivered fish. The number of wholesale and retail traders having share in ownership or control of activities at other market levels, besides the wholesale and retail markets respectively, and other forms of integration such as extension of credit between traders are also assessed. Results are expressed in cross-tabular form and inferences made on basis of frequencies.

Barriers to entry into fish business is the third variable explored. Barriers limit the number of potential market participants and therefore directly influence competition in the trade. Aspects of the variable investigated in the study are the size of capital and financial requirement at start of business and whether credit facilities are accessible to traders. To determine these, the traders were asked how much funds they used to start their business, the sources of the funds and what their

current operational expenses were. They were also asked how much they thought a new trader would require to start the fish business as at the time of the study. The role of the government in the fish trade, particularly in licensing, checking hygiene standards and in allocating market space to prospective traders is also discussed as part of possible barriers to entry.

Differentiation of a product, real or imagined, leads to non-random purchases by buyers unlike under pure competition where the product is homogeneous (Tomeck and Robinson,1972). Markets with highly differentiated products thus show higher propensity towards oligopoly than to pure competition. Product differentiation may take various forms, for example it can be in form of packaging, quality differences, grading and after sales services. These make the consumer perceive one form of a product to be different from another form of the same product. To detect product differentiation in the market, the fish species offered for sale and their forms (fresh, sun-dried, smoked or fried) were listed. In addition, traders were interviewed to reveal different sales services they provided.

### 3.1.2 Market conduct

To assess market conduct, traders were asked whether they set prices of fish individually or by colluding with each other and also if they jointly restricted the amount of fish for sale so as to raise market price. The answers given were used to describe the level of collusion in the fish market.

### 3.1.3 Market Performance:

Market performance is analyzed by comparing marketing costs and marketing margins and by evaluating the traders' gross margins in relation to the consumer price of each fish type and the opportunity cost of entrepreneurial input. Prices at the different levels of the marketing channel shown in Table A.1 and costs incurred in marketing fish are used in the exercise.

The total variable costs, TVC, of marketing the main fish type [1] for each wholesale and retail trader is derived as:

$$TVC = \sum_{i=1}^{n} a_i \quad \text{.....(Equation 3.2)}$$

where,

$a_1$ is the transport cost in Ksh per kg of fish sold per month,

$a_2$ is the processing costs in Ksh per kg of fish sold per month,

$a_3$ is storage costs in Ksh per kg of fish sold per month,

$a_4$ is handling and packaging costs in Ksh per kg of fish sold per month,

$a_5$ is taxes in Ksh per kg of fish sold per month,

$a_6$ is expenses (on board and food) for trader in Ksh per kg of fish sold per month,

$a_7$ is cost of working capital in ksh per kg per month,

$a_8$ is cost (value) of fish loss in Ksh per Kg per month,

[1] where a trader sells more than one fish type, the cost components above have been proportionally adjusted in ratio of the market value of the main fish type to the value of all the fish types traded.

The Marketing Margin, $MM_T$, for the main fish type sold by each of the traders, is derived as:

$MM_T$ = Selling price (Ksh/kg) of Main fish - Buying price (ksh/kg) of Main fish ....(Eqn 3.3)

This is used in calculating a trader's gross margin [4], $GM_T$, as follows:

$$GM_T = MM_T - TVC_T \quad \text{..... (Equation 3.4)}$$

To determine the gross margin for wholesalers and retailers selling different fish types, the traders have been put in separate groups depending on the main fish type they sell in the market, viz: fresh tilapia, smoked tilapia, sun-dried tilapia, fresh nile perch and sun-dried "omena'. For each group, the gross margin is the average of the group members' gross margins. The gross margins for the different groups of traders are then separately expressed as percentage of the consumer price of the various fish types.

They are also compared to the opportunity cost of fish traders' entrepreneurship, defined as the minimum income that a trader would require in an alternative business in order to shift

[4] In General Economics and Farm Management , Gross Margin (GM) = Total Revenue (TR) - Total variable costs (TVC). If this definition is applied to the fish market,
GM = (Value of sales) - (costs of marketing + value of purchases)
= (Unit selling price x Quantity) - ( Unit buying price x Quantity) - ( Unit variable Marketing costs x Quantity)
For 1 kg of fish,therefore
GM = (Marketing Margin - Variable Marketing costs)

from the fish trade. It is calculated from the answers given by the traders in the questionnaire. Excessive margins are imputed where the remunerations are higher than the opportunity cost of management inputs. High gross margins imply that a big proportion of the consumer price pays for remunerating the traders rather than the costs of marketing services. An efficient system will have prices broadly reflecting such costs of marketing, with low gross margins to traders.

The last objective is to investigate the determinants of fish prices in Kisumu. In theory factors that determine price of a product are demand and supply levels, the market structure, price of substitutes and complements, costs of production and marketing and government interventions in the market. Fish prices in Kenya are not regulated and hence the government has no direct influence on prices. It is also expected that the demand for fish in Kisumu is relatively constant in the short-run. This leaves the possible causes of seasonal price changes as the levels of fish supply, costs of production and of providing marketing services and prices of close substitutes such as meat and poultry products.

With sufficient time series data on the above variables a multivariate regression model can be used to ascertain factors that determine fish prices and also the degree to which changes in these variables explain price fluctuations. The major limitation to regression analysis in this study was that time-series data, especially on prices and costs of marketing fish, was not available. Hence discussions and conclusions on this aspect will be based on answers provided by traders regarding how

they set their prices and how the prices change with fluctuating fish supplies as well as on results obtained in similar studies done previously.

## 3.2 Type of Data Required, Sources of Data and Methods of Data Collection

The study mainly relied on cross-sectional primary data obtained from the survey of the participants in the Kisumu urban fish marketing system from March to May 1991. The types of data required for empirical analyses were prices (Ksh/kg) of Nile Perch, Tilapia (fresh/sun-dried/smoked) and *Rastrineobola argentea* (sun-dried) at retail and wholesale market levels and at the source of supply of such fish for the period March 1991 to May 1991. Also needed were the weights (kg) of the various fish types handled by each trader for the same period and the corresponding costs incurred per month in marketing fish.

The costs of marketing are in different categories. There are operating expenses which include the purchasing costs of the fish, transport costs, processing costs, storage costs (including cost of ice), levies charged and other expenses incurred by traders while on business such as on food and board. The second category of costs are the working capital which consists of value (costs) of short-term assets like sacks, baskets, mats and polythene used in the trade. Finally there are mid-term expenses such as costs of trading license and health permit. The costs in terms of value of fish loss through spoilage is also estimated.

Because many traders do not keep records of transactions,

quantitative figures recorded were based on estimates using both the averages and ranges, which traders could recall. Data and information for qualitative and descriptive analysis was also obtained using the questionnaires in Appendix. These aimed at describing the marketing channel, assessing market structure variables and indicating constraints in the marketing system.

To collect the data, the participants in the Kisumu fish marketing system were sampled and personally interviewed with the aid of questionnaires. This included retail traders selling fish to consumers in various retail fish market outlets in Kisumu and wholesalers obtaining fish from various beaches or supply sources and who transfer and sell fish to retailers at wholesale fish market outlets in Kisumu. Some information was also obtained from three fish filleting companies based in Kisumu.

### 3.2.1 Sampling of Fish Retail Traders:

Retailers are individuals or organizations involved in selling goods or services directly to final consumers for the consumers' personal, non business use (Kotler, 1989). In this respect, the term "Fish Retail Traders" refers to that group of business people involved in the sale of fish principally to the final fish consumers. However in practice this definition may not be very precise as it is hard to establish clear-cut boundaries for defining retailers in the fish trade in Kisumu where some traders sell fish to both final consumers as well as to hotels and, in limited cases, even to other traders who later fry the fish and later re-sell it in informal markets mainly in low-

income residential areas.

In this study, "Fish Retailers" refers to that group of traders whose major customers are final fish consumers, mainly members of households or owners of restaurants and hotels or at times smaller traders in the informal markets. In the Kisumu urban fish marketing system, retail traders are located in designated fish retail market outlets in various parts of the town.

A stratified random sampling technique was used in selecting retail traders for interview. Stratification was based on the main fish type sold by each trader. To achieve this, retailers were grouped according to the type of fish they sold in largest quantity, referred to as "Main Fish", in the text. For the purpose of classifying retailers into the various strata for sampling, a pre-sampling survey was carried out in all designated retail fish markets in Kisumu urban area and a list of the names of all fish retailers found selling fish in these markets was produced and categorized according to the main fish types each sold.

A total of 236 traders were found operating outlets in the ten retail fish markets in Kisumu. Lying in the northern part of Kisumu Town are Otonglo and Kisian fish retail markets which are adjacent to the low-income residential areas of Otonglo, Kisian, Riat and Bandani estates. On the eastern end of the town are Manyatta, Kibuye, Kondele and Mamboleo fish markets located at the heavily populated residential areas of Kondele, Kibuye, Migosi, Manyatta, Nyawita, Tom-Mboya, Shaurimoyo, Pembe-Tatu and Makasembo estates among others. Other retail markets include

Kowino, Okonyowelo and Pand-Pieri markets found in the western part of the town adjacent to Nyalenda, Pand-pieri, Nyamasaria and Lower Milimani estates. Finally there is Jubilee (Mbero) retail market which is centrally located in the town and serves a wide section of the population, including transient traders and consumers travelling out to other parts of the country.

The fish retail traders were found selling one or combination of fish types like Tilapia (fresh, smoked, sun-dried), Nile Perch (fresh, fried) or *Rastrineobola argentea* ("Omena") in the sun-dried form. Other fish species listed in section 1.2 were not regularly sold in the study area because of either low and unreliable supply or lack of demand. Most traders regarded such fish as secondary to one of the Main fish types above. Thus, each of the five Main fish types listed above formed a stratum for classifying traders. The distribution of traders according to the Main fish types they sold in the retail markets are in Table 3.1.

The initial strategy was to select the number of traders from each stratum in proportion to the relative size of the particular group so as to give all traders equal chances of being selected. This however meant including only one trader dealing with Nile Perch. Since it is not feasible to make statistical inferences from one trader, it was considered appropriate to include all the six Nile Perch traders in the survey. This raised a sample of 98 retail traders, selected from the various markets as shown in Table 3.2.

### 3.2.2 Sampling of Wholesale Traders:

Kotler (1989) defines wholesalers as those business people involved in selling goods or services to those who buy for resale or business use. Therefore, wholesale middlemen have little or no trade interaction with the final consumers. In this study the term is used to describe individuals and organizations engaged primarily in bulk buying and transfer of fish from various supply sources to the three major Kisumu wholesale markets at Jubilee, Kibuye and Kichinjio, from where retailers purchase the fish.

A stratified random sampling method was used to select a sample of wholesalers for interview. As in the case of retail traders, wholesalers were stratified on the basis of the main fish type traded. Random selection of traders was then done within each stratum by using the table of random numbers.

As a prelude to stratification, a pre-sampling survey was conducted for one month in February 1991, where a list of all wholesale traders bringing fish into the three designated wholesale markets in Kisumu Urban area was made with respect to the fish types they sold. The study team identified 93 wholesalers who were then allocated into five strata in Table 3.3 in line with the five main fish types recorded.

A sample of 53 wholesale traders was picked from the population of 93 wholesalers. This should have been constituted proportionally with respect to the relative sizes of the five strata so that each trader could have an equal chance of selection.

TABLE 3.1 DISTRIBUTION OF RETAILERS POPULATION[5]

| Name of Retail Market | Number of Traders for Each Main Fish Type Traded | | | | | |
|---|---|---|---|---|---|---|
| | *Rastrineobola argentea* (dried) | Tilapia (smoked,dried,fresh) | | Nile perch (fresh) | | TOTAL |
| Jubilee | 23 | 10 | 11 | 24 | - | 68 |
| Kondele/Mamboleo | 18 | 4 | 14 | 13 | - | 49 |
| Kibuye | 10 | 5 | 4 | 8 | 2 | 29 |
| Otonglo/Kisian | 14 | 5 | 6 | 6 | - | 31 |
| Manvatta | 8 | 2 | 4 | 3 | 2 | 19 |
| Okonyowelo/Pand-pieri | 11 | - | 5 | 4 | 1 | 21 |
| Kowino (Nyalenda) | 6 | 4 | 4 | 44 | 1 | 19 |
| | 90 | 30 | 48 | 62 | 6 | 236 |

Source: Survey Results.

[5] Retailers selling a combination of fish types are listed under the types of fish contributing the largest share in their revenue ( referred to as "Main fish")

TABLE 3.2 DISTRIBUTION OF SAMPLE RETAIL TRADERS

| Name of Retail Market | Number of Traders for Each Main Fish Type Traded | | | | | |
|---|---|---|---|---|---|---|
| | *Rastrineobola argentea* (dried) | Tilapia (smoked.dried.fresh) | | | Nile perch (fresh) | TOTAL |
| Jubilee | 11 | 4 | 3 | 12 | - | 30 |
| Kondele/Mamboleo | 7 | 2 | 1 | 4 | - | 14 |
| Kibuye | 2 | 3 | 2 | 2 | - | 9 |
| Otonglo/Kisian | 4 | - | 4 | 1 | 2 | 11 |
| Manvatta | 4 | - | 3 | - | 2 | 9 |
| Okonvowelo/Pand-Pieri | 2 | 2 | 2 | 2 | 1 | 9 |
| Kowino (Nvalenda) | 5 | 2 | 4 | 4 | 1 | 16 |
| | 35 | 13 | 19 | 25 | 6 | 98 |

Source: Survev Results.

TABLE 3.3 DISTRIBUTION OF WHOLESALE FISH TRADER POPULATION IN KISUMU TOWN

| Name of Wholesale Market | Number of Traders for Each Main Fish Type Traded | | | | | |
|---|---|---|---|---|---|---|
| | *Rastrineobola argentea* (dried) | Tilapia (smoked,dried,fresh) | | Nile perch (fresh) | | TOTAL |
| Jubilee Wholesale | 24 | 10 | 6 | 18 | 2 | 60 |
| Kibuye Wholesale | 4 | - | - | 7 | 1 | 12 |
| Kichinjio Wholesale | - | - | 21 | - | 0 | 21 |
| | 28 | 10 | 27 | 25 | 3 | 93 |

Source: Survey Results.

TABLE 3.4 DISTRIBUTION OF SAMPLE WHOLESALE FISH TRADERS IN KISUMU TOWN

| Name of Wholesale Market | Number of Traders for Each Main Fish Type Traded | | | | | |
|---|---|---|---|---|---|---|
| | *Rastrineobola argentea* (dried) | Tilapia (smoked,dried,fresh) | | Nile perch (fresh) | | TOTAL |
| Jubilee Wholesale | 15 | 7 | 3 | 9 | 2 | 36 |
| Kibuye Wholesale | - | - | - | 5 | 1 | 6 |
| Kichinjio Wholesale | - | - | 11 | - | - | 11 |
| | 15 | 7 | 14 | 14 | 3 | 53 |

Source: Survey Results.

However this would mean having none or only one of the Nile Perch traders in the sample. To bring out more of the characteristics of the Nile Perch trade, it was decided to include all the three Nile Perch wholesalers in the sample as shown on Table 3.4 .

### 3.2.3 Economic Basis for Stratification of Traders:

Different fish types to a large extent require different marketing services. Hence traders will differ in marketing cost structures broadly on the basis of the fish types they deal on.

Stratification of traders based on fish types therefore enables us to select a sample that represents the population of fish traders and their different marketing characteristics. It also allows comparison of the performance of traders selling different fish types.

### 3.2.4 Trader Response Rates

Eighty-eight of the 98 sampled retailers responded while, in the case of wholesale traders, 47 of the 53 eligible respondents completed the interviews.The remaining traders either could not be traced or were unwilling to participate in the exercise.

The response rate[6] as defined by Churchill (1987) was therefore 89.8% among retail traders and 88.7% for wholesalers.

[6] Response rate = (Number of completed interviews/Number of eligible responding units) x 100%

### 3.2.5 Collection of Price Data

Fish traders charge prices based on subjective judgement of fish size and estimated weight. For empirical analysis therefore, it was necessary to generate prices based on actual weight in Kilograms of fish.

Various fish types were weighed and their prices recorded at the respective retail and wholesale markets. However for each fish unit weighed at the wholesale markets, the source price for that unit was also recorded. Two markets were attended each day thus ensuring that all the 13 wholesale and retail markets were covered every week in March to May 1991. At the end of the three months, twelve sets of weekly weight and price data had been collected for every market. These are presented in Tables 3.5 and 3.6.

TABLE 3.5 TOTAL NUMBER OF FISH UNITS WEIGHED BY FISH TYPE[7].

| Fish types | Retail Markets | Wholesale Markets |
|---|---|---|
| *Rastrineobola argentea* ("Omena") | 1 298[a] | 1 192[b] |
| Tilapia(smoked) | 3 300 | 3 156 |
| Tilapia (sun-dried) | 2 860 | 2 460 |
| Tilapia (fresh) | 4 276 | 3 224 |
| Nile Perch (fresh) | 320 | 200 |

Source: Survey Results

TABLE 3.6 WEEKLY AVERAGE NUMBER OF UNITS WEIGHED

| Fish types | Retail Markets | Wholesale Markets |
|---|---|---|
| *Rastrineobola argentea* ("Omena") | 108[a] | 99[b] |
| Tilapia(smoked) | 275 | 263 |
| Tilapia (sun-dried) | 238 | 205 |
| Tilapia (fresh) | 356 | 269 |
| Nile Perch (fresh) | 27 | 17 |

Source: Survey Results

[7] Units of measurement used by traders are:

- gorogoro or 2 litre tin (containing about 0.7 kg of "Omena")
- One sack (containing approximately 49 kg of "Omena").

The remaining units represent fish handled in single pieces.

## CHAPTER 4: ANALYSIS, RESULTS AND DISCUSSION

This chapter discusses the analysis of the survey data and the results. It describes the sources of supply of different types of fish sold in Kisumu and their marketing channels, and also presents the results of the analysis of the market structure based on four variables: market concentration, integration, product differentiation and barriers to entry into the market.

Collusion among traders in making price decisions is analysed as an indicator of market conduct while market performance is evaluated using marketing margins and traders' gross margins. The results of the two measures are presented and discussed.

### 4.1 Sources of Supply of Fish

The survey revealed that fish consumed in Kisumu comes from Lake Victoria and Lake Turkana. Fish from Lake Victoria is landed on beaches located in four administrative districts: Busia[8], Siaya, Kisumu and South Nyanza. Lake Turkana's fish comes from beaches located in Marsabit District.

Sources of supply tended to be specific to fish types. The

[8] It was established that not all fish originating from Busia district is actually landed on Kenyan beaches. Some fish, mainly sun-dried tilapia, is moved across the border from Uganda side into Busia either illegally or through formal channels. It was not possible during this study to differentiate the two kinds of trade. Another study may be required to establish the relative importance of these fish supply sources.

general pattern was that the more perishable fish, like the fresh Tilapia and Nile Perch, came from beaches close to Kisumu while the less perishable fish types were supplied from distant districts.

### 4.1.1 Tilapia (Fresh)

Kisumu receives most of its fresh Tilapia supply from the northern beaches of Lake Victoria shown in Appendix xiii. The sampled traders of fresh Tilapia all obtained the fish from beaches in Kisumu, Siaya or Busia districts. The beaches mentioned by traders were relatively close to Kisumu and were also accessible by road.

This is necessary since fresh tilapia must reach the consumer market within 10 hours of landing under non cold-storage conditions (Personal Communication). Table 4.1 shows the distribution of traders selling fresh tilapia according to the districts and beaches supplying the fish.

The results show that Busia district supplies 69% of fresh Tilapia, weighing about 102 071 Kg per month, consumed in Kisumu making it the main source. Beaches within Kisumu district are the least suppliers of the fish, contributing only 9% representing about 13 359 Kg monthly while those in Siaya District provide 23% or 33 781 Kg per month.

TABLE 4.1 MAJOR SOURCES OF FRESH TILAPIA SOLD IN KISUMU TOWN BY DISTRICT AND BEACH

| Sources of Supply | Approximate Distance of Beach From Kisumu by road | Number and Proportions of Sampled Traders Obtaining Fish From Respective sources | | Amount of fish from respective source sold by sampled traders per month | |
|---|---|---|---|---|---|
| District | Distance | Number | % | Weight | % |
| Beaches | (Km) | | | (Kg) | |
| Busia | | | | | |
| Port Victoria | 131 | 8 | 38.1% | 67 951 | 45.5% |
| Sio port | 133 | 3 | 14.3% | 34 120 | 22.9% |
| Siava | | | | | |
| Asembo Bay | 71 | 1 | 4.8% | 22 247 | 14.9% |
| Misori | 108 | 1 | 4.8% | 11 534 | 7.8% |
| Kisumu | | | | | |
| Dunga | 5 | 4 | 19.0% | 5 960 | 4.0% |
| Usoma | 9 | 1 | 4.8% | 1 379 | 1.0% |
| Kaloka | 26 | 3 | 14.2% | 6 020 | 4.0% |
| | | 21 | 100% | 149 211 | 100% |

Source: Survey Results

### 4.1.2 Sun-dried Tilapia and Smoked Tilapia

The sources[9] for the two types of fish were mainly Alia Bay and Loiyangalani centres on Lake Turkana in Marsabit District and Busia district on Lake Victoria. The sampled traders of smoked tilapia in Kisumu all obtained the fish from Busia Town in Busia District. Of the 21 sellers of sun-dried tilapia interviewed 10 (48%) mentioned the district as their source of fish.

This group sold an average of 17 881 kg of the fish per month, representing 49% of the total market supply. The remaining 11 (52%) traders of Sun-dried tilapia obtained their supply from Marsabit District. This source on average accounted for 18 742 kg of sun-dried Tilapia per month, or 50% of the overall market supply.

It should be noted that some of the major supply centres, like those around Lake Turkana, are quite far from Kisumu. This is possible because Sun-dried Tilapia is relatively non-perishable and, according to the traders, can stay for more than three months, while smoked Tilapia may stay for up to two months. Moreover both forms do not require any specialized transport facilities. Despite the longer distance, hence more expenses incurred, between Kisumu and Lake Turkana, the latter continues to provide over half of Kisumu's sun-dried tilapia supply. This

[9] Approximate distance, in Km, by road between mentioned Town and Kisumu.

| | |
|---|---|
| Alia Bay | : 741 Km |
| Loiyangalani | : 585 Km |
| Busia Town | : 119 Km |

is probably because there is excess demand for this fish in Kisumu which the other nearby sources are unable to satisfy.

### 4.1.3 *Rastrineobola argentea* ("omena")

The supply of this fish was widely distributed among three districts: South Nyanza, Kisumu and Siaya. "Omena" may be delivered to the market in either fresh or sun-dried forms. According to the traders, the former type must be consumed within three hours after landing unless put under cold storage, which is rare. As expected therefore, most of this fish reaches Kisumu wholesale or retail markets in the sun-dried form.

The traders revealed that the sun-dried form of "omena" may be stored for more than three months before serious deterioration in quality. This factor enables the fish to be drawn from remote and far beaches in South Nyanza and Siaya districts in addition to those in Kisumu. As indicated in Table 4.2 South Nyanza leads in supplying "omena" to Kisumu followed by Siaya District and Kisumu District.

### 4.1.4 Nile Perch

Two of the three Nile Perch wholesale traders interviewed obtained the fish from beaches in Kisumu District, while one trader mentioned Siaya District as his source of supply. Nile Perch in the fresh form is a fast deteriorating product. According to fish traders, unless cold-storage facilities are provided, spoilage in quality starts within six hours of landing.

This explains why most small-scale wholesalers receive the fish from beaches neighbouring Kisumu market.

It is observed that, with only 6 retailers and 3 wholesalers, Nile perch is the least popular fish among traders. The traders gave two reasons to explain the small number of Nile Perch sellers. First there is low preference for Nile Perch among the local fish eating population of Kisumu.

Secondly there is stiff competition for the fish among the different large scale fish filleting firms who target the lucrative Nairobi and export markets. This makes the fish expensive and unprofitable for the small scale traders as the higher beach prices lower the gross margins for those in the Nile Perch trade, who again must compete in the consumer market with dealers of other cheaper types of fish. The gross margins for the fish traders are discussed in Section 4.6.2 .

## 4.2 Marketing Channels

There are two dominant channels in the fresh Tilapia and Nile Perch trade in Kenya. The first passes the fish from the fishermen to wholesale middlemen then to retail traders and finally to the consumer market. This mainly handles the fresh tilapia trade.

The second major channel involves the fishermen, through their cooperative societies, selling mainly fresh Nile Perch to the fish filleting firms which prepare and package fish fillets for export. These and other smaller channels in fresh fish marketing are displayed in Figure 4.1 .

TABLE 4.2 MAJOR SOURCES OF SUN-DRIED "OMENA" SOLD IN KISUMU TOWN.

| Sources of Supply | Approximate Distance of Beach From Kisumu by road | Number and Proportions of Sampled Traders Obtaining Fish From Respective sources | | Amount of fish from respective source sold by sampled traders per month | |
|---|---|---|---|---|---|
| District | Distance | | | Weight | |
| Beaches | (Km) | Number | % | (Kg) | % |
| South Nyanza | | | | | |
| Karungu | 214 | 2 | 13.3% | 8 332 | 17.7% |
| Mbita | 180 | 3 | 20.0% | 9 021 | 19.1% |
| Kendu Bay | 94 | 1 | 6.7% | 3 005 | 6.4% |
| Muhuru | 254 | 1 | 6.7% | 1 535 | 3.3% |
| Kisumu | | | | | |
| Kusa | 64 | 2 | 13.3% | 6 015 | 12.8% |
| Kaloka | 26 | 1 | 6.7% | 2 359 | 5.4% |
| Siava | | | | | |
| Osindo | 98 | 3 | 20.0% | 11 340 | 24.1% |
| Usenge | 96 | 1 | 6.7% | 2 105 | 4.5% |
| Wichlum | 95 | 1 | 6.7% | 3 401 | 7.2% |
| | | 15 | 100% | 47 113 | 100% |

Source: Survey Results.

For sun-dried and smoked fish, the dominant channel passes fish from fishermen to semi-processors who in turn sell fish to wholesale middlemen. The wholesalers sell fish to retail traders who re-sell it to fish consumers. Figure 4.2 shows the marketing channels for the semi-processed fish. For semi-processed fish, there is a processing stage in addition to the production, wholesale and retail stages. This causes the semi-processed fish to take longer time to reach the market. The classification of the fish marketing channels has been based on results of the interviews with fish traders and fisheries officers. However, further studies on the volumes of fish handled along the respective channels should be done and used to indicate the relative importance of the channels.

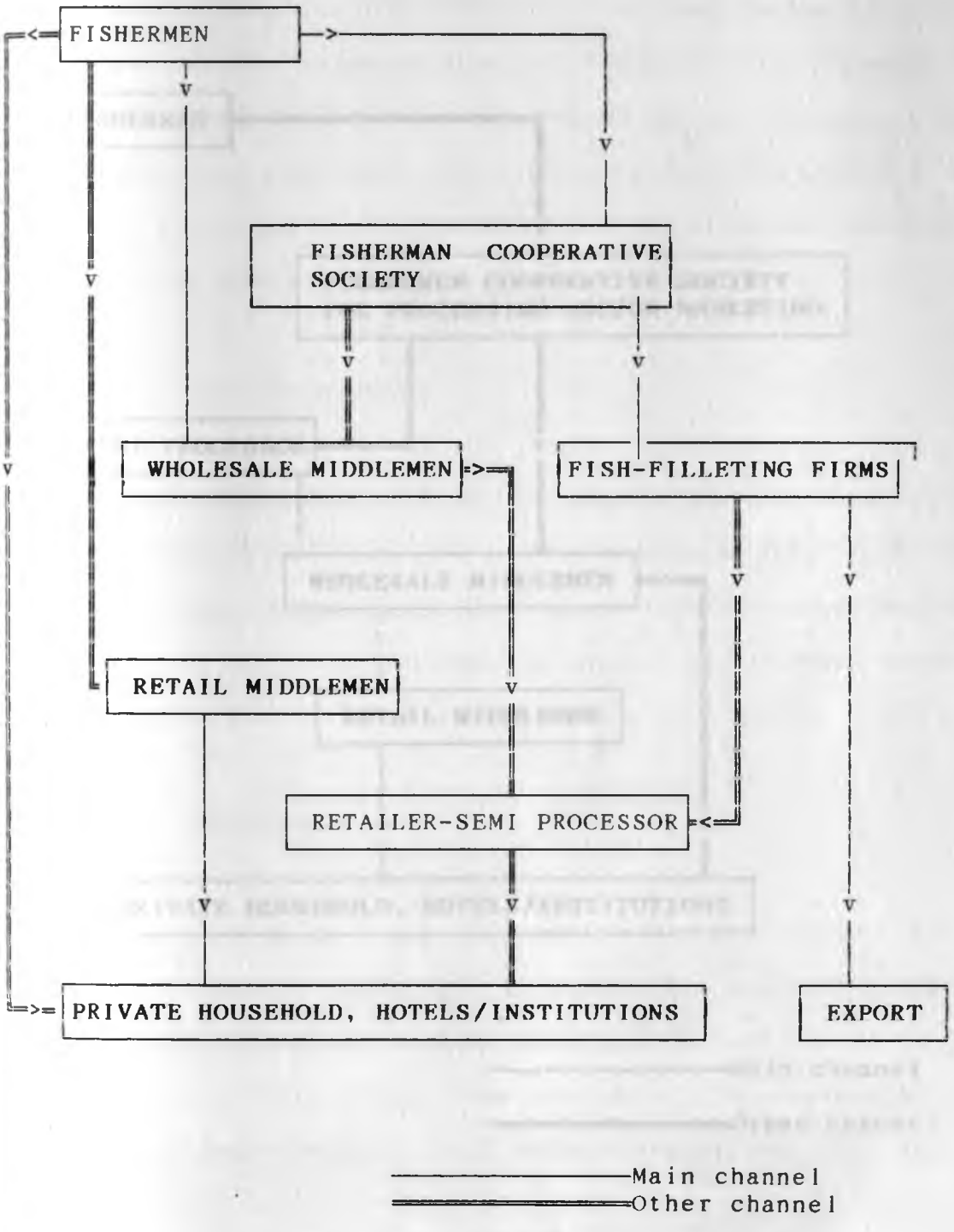
## 4.3 Marketing functions performed along channels:

The four major stages identified in the marketing system were production level, semi-processing stage, wholesale and retail levels. Various marketing functions are performed at each of the stages.

### 4.3.1 Production level

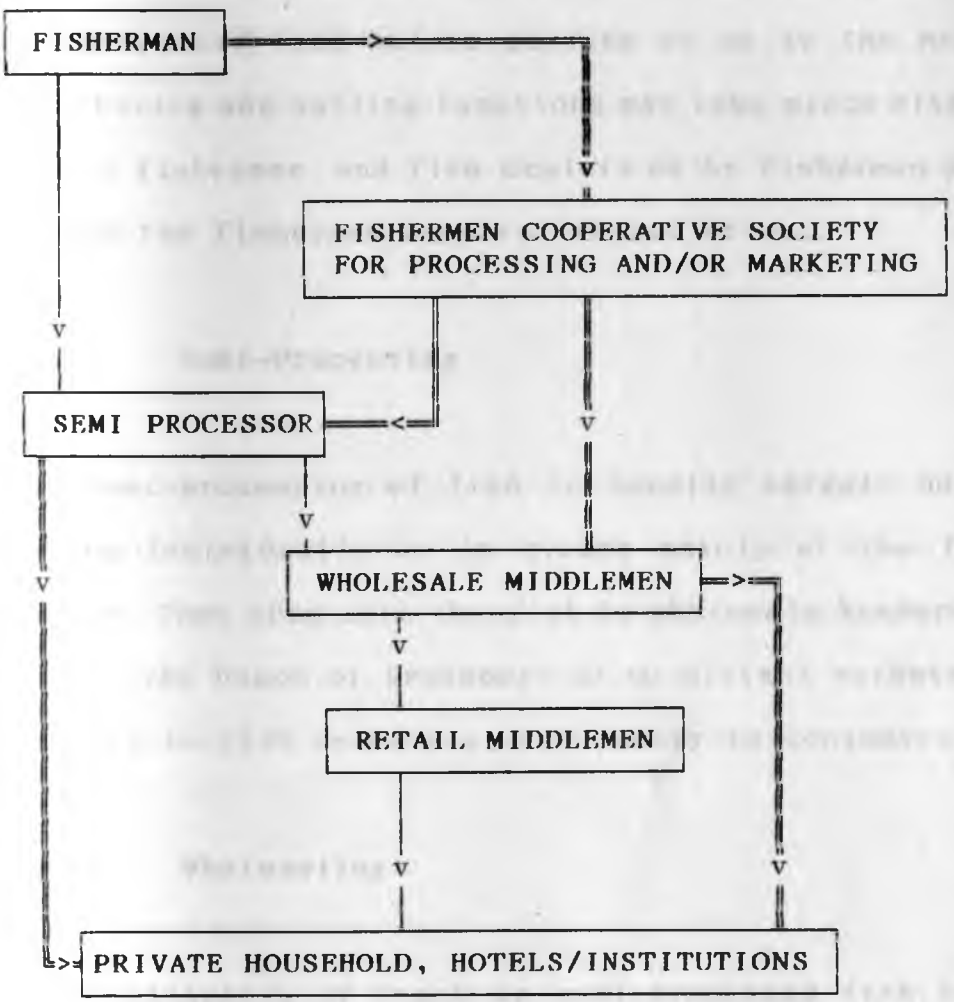
The main participants at this level are fishermen and fishermen cooperative societies whose major roles are fish production and in some cases semi processing of fish. Fresh fish is immediately sold to traders but semi-processed fish may be stored for two reasons.

FIGURE 4.1: MARKETING CHANNEL FOR FRESH FISH IN KENYA




Source: Personal communication with fish traders and fisheries officers

FIGURE 4.2: MARKETING CHANNEL FOR SUN-DRIED AND SMOKED FISH IN KENYA




Source: Personal communication with Fish Traders and Fisheries Officers

According to the traders, semi-processing is complete in two to four days for sun-dried fish and in one to two days for smoked fish and therefore storage cannot be avoided during this period. Secondly, such producers find it economical to accumulate the semi-processed fish before passing it on to the next stage in bulk. Buying and selling functions may take place either directly between fishermen and fish dealers or by fishermen selling fish through the fishermen cooperative societies.

### 4.3.2 Semi-Processing

Semi-processing of fish is usually largely done by women working individually or in groups mainly at the fish landing beaches. They then sell the fish to wholesale traders buying the fish at the beach or transport it to distant markets themselves and sell to fish retailers or directly to consumers of fish.

### 4.3.3 Wholesaling

Wholesalers of fresh or semi-processed fish buy the fish from fishermen, fishermen co-operative societies or fish processors around the beaches, transport it and sell it to retail traders or in some cases, fish consumers. The wholesale traders therefore help connect the production points with the fish markets.

Besides transport functions, wholesalers store fish when necessary, for instance when some of the fish made available in the market is not sold in time. The fish traders take advantage

of storage facilities provided at a fee by the Kisumu Municipal Commission and ice which may be purchased from Ice manufacturers in the town for preserving fresh fish.

In some cases fish wholesalers provide fishermen with cash loans to use in purchasing fishing facilities. Wholesale traders also play part in transmitting information between the market and the beaches. Grading of fish into small, medium and large sizes may also be done at this level.

### 4.3.4 Retailing

Retailers perform transfer functions between the wholesalers and retail market points. In addition they store fish and do limited semi-processing, especially deep-frying, of fish which is not sold within good time. Being the last holders of fish in the marketing system, they play an important exchange functional role.

### 4.3.5 Fish Filleting

Filleting of mainly Nile Perch fish is done by certain specialized industries who also operate a fleet of vehicles fitted with cold-storage facilities for transporting fish from the landing beaches to their factories in Kisumu and Nairobi. At the time of the survey there were three such factories located in Kisumu; Victoria Nile Perch Company, Fish processors Ltd and Afro Meat Company.

The fish filleting companies traded primarily on Nile Perch

which they filleted and sold in the export market. None of them had contracts to supply fish to any Institution within Kisumu. The main contribution of these industries to the local fish trade was that they provided Nile Perch frames[10] to a section of retail traders for resale. The scope of this study did not permit the analysis of the costs and profits in industrial fish filleting. This may be targeted in a future study as fish filleting is now an important component of Kenya's fish industry.

### 4.4 Market Structure Analysis

The structure of a market influences its performance and conduct. Knowledge about structure can therefore give some suggestions about competitiveness. As mentioned earlier, four variables of market structure are investigated in this study namely, concentration, product differentiation, integration and conditions of entry into the market.

#### 4.4.1 Market Concentration

The monthly Quantities (in kg) of fish sold by each wholesaler and retailer in Kisumu were recorded during the period of March to May 1991. This was multiplied by the prevailing average prices of each fish type in Table A.1, to provide the

[10] Fish frame is the remains of the fish once the fillet is removed. On average it constitutes about 40% of the live weight of a medium-sized Nile Perch fish (Ogunja *et al*). The processing industries either gave them out free or sold them at about 70 cents per piece, each weighing an average of 2.5 kg.

value of fish sold during the period by each trader.

The average value of fish traded per month by each wholesaler has been computed. The smallest transaction by a wholesale trader was for fish valued at Ksh 12 768.25 per month while the wholesaler with the largest transaction sold fish worth Ksh 341 693.55 per month. Because of this wide range, the wholesale traders have been grouped into seven classes of monthly transactions using intervals of ksh 50 000 in Table 4.3.

The wholesale traders have been further categorized into small, medium and large scales in Table 4.5, based on the range of values of fish sold. It was found that 42.5% of wholesalers were small scale traders and accounted for only 18.4% of monthly transactions. Another 48.9% of wholesalers fell under the medium scale category accounting for 52.4% of the transactions.The large scale group constituted 8.5% and controlled 29.9% of the sales.

The largest 4 and 8 wholesalers, representing about 9% and 17% of the wholesale traders, handled 30% and 43% respectively of the sales values for the wholesale market. These figures are within the range of concentration ratios indicated by Karugia (1990) and Rhoades (1973), reviewed in Chapter 2, for markets with oligopolistic tendencies. But they are below the levels recommended by Scheid and Sutenan (1979), United States (1966), Bain (1951) and Bain (1968). Hence it is difficult to conclude the status of competition in the wholesale market based on the market concentration ratios.

A Lorenz concentration curve has been constructed for wholesale traders using data from Table 4.7 and is presented in Figure 4.3. It can be seen that approximately 30% of total sales

was in the hands of 9% of wholesale traders while about 43% of the sales was controlled by about 17% of wholesalers.

The average value of fish sold by each retail trader has also been calculated. The retailer with the smallest monthly transaction handled fish valued at Ksh 2 224.60 while the retail trader with the largest transaction sold fish worth Ksh 78 735.65 per month. Because of the wide range, retailers have been grouped into eight classes with intervals of Ksh 10 000 in Table 4.4.

The retailers have also been arbitrarily categorized into small, medium and large scale in Table 4.6, based on values of fish traded. The small-scale retail traders constituted 52.3% and accounted for 19.2% of the sales per month. The medium scale retailers comprised of 38.6% and accounted for 48.9% of the transactions while 9.1% of the retailers were large scale who controlled 32.3% of the sales per month. In contrast to the wholesale market, the largest 4 and 8 retailers represented only 5% and 9% respectively of the number of retail traders. The sales of the first 4 and 8 retailers would thus not be a suitable measure to compare the two markets.

A comparative percentage of 9% and 17% of retailers would represent 8 and 15 retail traders respectively. These controlled 32% and 48% of the retail market sales. The above concentration ratios show that the retail market exhibits less competition than the wholesale market.But, as reviewed in Chapter 2, the ratios are below the levels recommended for markets showing oligopolistic behavior by Bain (1951), Bain (1968), Scheid and Sutenan(1966), United States (1966) and Staatz (1986). But they are within the levels accepted by Karugia (1990) and Rhoades

(1973). Thus, as on the wholesale market, the competitiveness of the retail market cannot be evaluated based on these results.

As was the case with wholesale traders, Lorenz curve in Figure 4.4 has been constructed for retail traders using data in Table 4.8. It can be seen that about 32% of total sales in the retail market was controlled by 9% of the retail traders while approximately 48% of the transaction was made by about 17% of the retailers.

Figure 4.3 and 4.4 suggest that there was inequality in the distribution of transactions among wholesale and retail traders. They also show that the wholesale market had a more even distribution of shares than the retail market. If there was absolute equality in the share of transactions, 9 per cent of traders, for example would control 9% of the market sales, while 48% of the trade would be in the hands of an equal proportion of traders. Departure from the diagonal line, represented by the Lorenz curve shows the deviations of distribution from equality.

Gini coefficients may be calculated to support observations from the Lorenz curves. Ongiro (1979) suggests that the best method for calculating Gini coefficient is by integration. This approach requires the knowledge of the equation of the Lorenz curve, which is lacking in our case.

A second applicable procedure would be to calculate the areas of small squares enclosed between the $45^0$ line and the curve.The sum of these areas would then be expressed as a ratio of the total area under $45^0$ line. Ongiro (1979) points out that this approach is easy but inaccurate since some squares would not be full squares.

TABLE 4.3: VALUE (KSH) OF FISH TRANSACTED BY SAMPLE WHOLESALE TRADERS IN KISUMU PER MONTH

| Serial No. of Class | Value of Fish Transacted (Ksh) | No. of Sample Wholesalers in Class | Relative Frequency of Wholesaler Class | Value (Ksh) of Fish Transacted | Class Percentage of Total Transactions |
|---|---|---|---|---|---|
| 1 | Up to 50 000 | 20 | 42.5% | 652 093.40 | 18.4% |
| 2 | 50 001-100 000 | 18 | 38.3% | 1 267 031.30 | 35.8% |
| 3 | 100 001-150 000 | 5 | 10.6% | 589 039.25 | 16.6% |
| 4 | 150 001-200 000 | 1 | 2.1% | 167 767.70 | 4.7% |
| 5 | 200 001-250 000 | 1 | 2.1% | 237 759.30 | 6.7% |
| 6 | 250 001-300 000 | 1 | 2.1% | 285 223.50 | 8.1% |
| 7 | 300 001-350 000 | 1 | 2.1% | 341 693.55 | 9.7% |
| Total | | 47 | 100 | 3 540 608.00 | 100 |

Source: Survey Results

TABLE 4.4: VALUE (KSH) OF FISH TRANSACTED BY SAMPLE RETAIL TRADERS IN KISUMU PER MONTH

| Serial No. of Class | Value of Fish Transacted (Ksh) | No. of Sample Retailers in Class | Relative Frequency of Retailer Class | Value (Ksh) of Fish Transacted | Class Percentage of Total Transactions |
|---|---|---|---|---|---|
| 1 | Upto 10 000 | 46 | 52.3% | 270 823.95 | 19.1% |
| 2 | 10 001-20 000 | 18 | 20.5% | 267 151.75 | 18.8% |
| 3 | 20 001-30 000 | 12 | 13.6% | 283 655.40 | 20.0% |
| 4 | 30 001-40 000 | 4 | 4.5% | 139 869.55 | 9.9% |
| 5 | 40 001-50 000 | 3 | 3.4% | 136 874.10 | 9.6% |
| 6 | 50 001-60 000 | 2 | 2.3% | 105 513.40 | 7.4% |
| 7 | 60 001-70 000 | 2 | 2.3% | 136 586.50 | 9.6% |
| 8 | 70 001-80 000 | 1 | 1.1% | 78 635.65 | 5.5% |
| Total | | 88 | 100 | 1 419 110.30 | 100 |

Source: Survey Results

TABLE 4.5: CATEGORIES OF FISH WHOLESALE TRADERS IN KISUMU

| Size category | Size Class (Value in Ksh of Fish Traded per month) | Number of Traders | Relative Frequency | Value in Ksh of Fish sold by Class per month | Percentage of Total Transactions |
|---|---|---|---|---|---|
| Small | ≤ 50 000 | 20 | 42.5% | 652 093.40 | 18.4% |
| Medium | 50 000-150 000 | 23 | 48.9% | 1 856 070.60 | 52.4% |
| Large | ≥ 150 000 | 4 | 8.5% | 1 032 444.00 | 29.2% |
| Total | | 47 | 100 | 3 540 608.00 | 100 |

Source: Survey Results.

TABLE 4.6: CATEGORIES OF FISH RETAIL TRADERS IN KISUMU

| Size category | Size Class (Value in Ksh of Fish Traded per month) | Number of Traders | Relative Frequency | Value in Ksh of Fish sold by Class per month | Percentage of Total Transactions |
|---|---|---|---|---|---|
| Small | ≤ 10 000 | 46 | 52.3% | 270 823.95 | 19.1% |
| Medium | 10 000-40 000 | 34 | 38.6% | 690 676.70 | 48.7% |
| Large | ≥ 40 000 | 8 | 9.1% | 457 609.65 | 32.2% |
| Total | | 88 | 100% | 1 419 110.30 | 100% |

Source: Survey Results.

TABLE 4.7 CUMULATIVE FREQUENCIES OF TRANSACTIONS BY CLASS PERCENTAGES OF WHOLESALE FISH TRADERS IN KISUMU

| Serial Order of Class | Cumulative Frequencies of Traders in Class | Cumulative Frequencies of Transactions by Traders in Class |
|---|---|---|
| (K) | (P) | (Q) |
| 1 | 42.5 | 18.4 |
| 2 | 80.8 | 54.2 |
| 3 | 91.4 | 70.8 |
| 4 | 93.5 | 75.5 |
| 5 | 95.6 | 82.2 |
| 6 | 97.7 | 90.3 |
| 7 | 99.8 | 100.0 |

Source: Survey Results

The third method, and which is employed in this study, uses the formula by Andic and Peacock (1961):

$$R = \sum (P_{k-1} Q_k) - (Q_{k-1} P_k) \; )^{1}/_{10\,000} \quad \text{... (equation 3.1 used in section 3.2)}$$

where, as before, P and Q represent the cumulative percentages of traders and value of transactions respectively and K is the serial order of cumulative percentage: $K \geq 2$.

Using the cumulative percentage values in Table 4.7 the Gini coefficient for the wholesalers is calculated as follows:

R = (42.5 X 54.2) - (18.4 X 80.8) = 816.78

(80.8 X 70.8) - (54.2 X 91.4) = 766.76

(91.4 X 75.5) - (70.8 X 93.5) = 280.90

(93.5 X 82.2) - (75.5 X 95.6) = 467.90

(95.6 X 90.3) - (82.2 X 97.7) = 440.00

(97.7 X 100.0) - (90.3 X 99.8) = 758.06

3692.14

= 3692.14 X 1/10 000

= .37

Similarly the Gini coefficient for the retail traders is calculated below using the of values in Table 4.8.

R = (52.3 X 37.9) - (19.1 X 72.8) = 591.69

(72.8 X 57.9) - (37.9 X 86.4) = 940.56

(86.4 X 67.8) - (57.9 X 90.9) = 594.81

(90.9 X 77.5) - (67.8 X 94.3) = 651.21

(94.3 X 84.9) - (77.5 X 96.6) = 519.57

(96.6 X 94.5) - (84.9 X 98.9) = 732.09

(98.9 X 100.0) - (94.5 X 100.0) = 439.45

4469.93

= 4469.93 X 1/10 000

= .45

In conclusion we observe that the degree of relative inequality in market shares was 0.37 for wholesale traders and 0.45 for retailers on a scale 0 to 1, where 0 depicts absolute equality and 1 displays complete inequality of distribution.

TABLE 4.8 CUMULATIVE FREQUENCIES OF TRANSACTION BY CLASS PERCENTAGES OF RETAIL FISH TRADERS IN KISUMU

| Serial Order of Class | Cumulative Frequencies of Traders in Class | Cumulative Frequencies of Transactions by Traders in Class |
|---|---|---|
| (K) | (P) | (Q) |
| 1 | 52.3 | 19.1 |
| 2 | 72.8 | 37.9 |
| 3 | 86.4 | 57.9 |
| 4 | 90.9 | 67.8 |
| 5 | 94.3 | 77.5 |
| 6 | 96.6 | 84.9 |
| 7 | 98.9 | 94.5 |
| 8 | 100.0 | 100.0 |

Source: Survey Results

A Gini coefficient[11] of 0.37 means that a randomly selected wholesale trader is expected to have a sales level which is 37% above or below the mean sales level. Similarly, a coefficient of 0.45 means that a retail trader selected at random is likely to have a sales level which deviates from the mean by 45%. An alternative definition is that any two randomly selected wholesalers or retailers are each expected to differ in value of sales by 74% and 90% respectively.

[11] In comparison, the Herfindal indices are H = 0.34 and 0.48 for the wholesale and retail markets respectively. The R and H values are hence close in both cases.

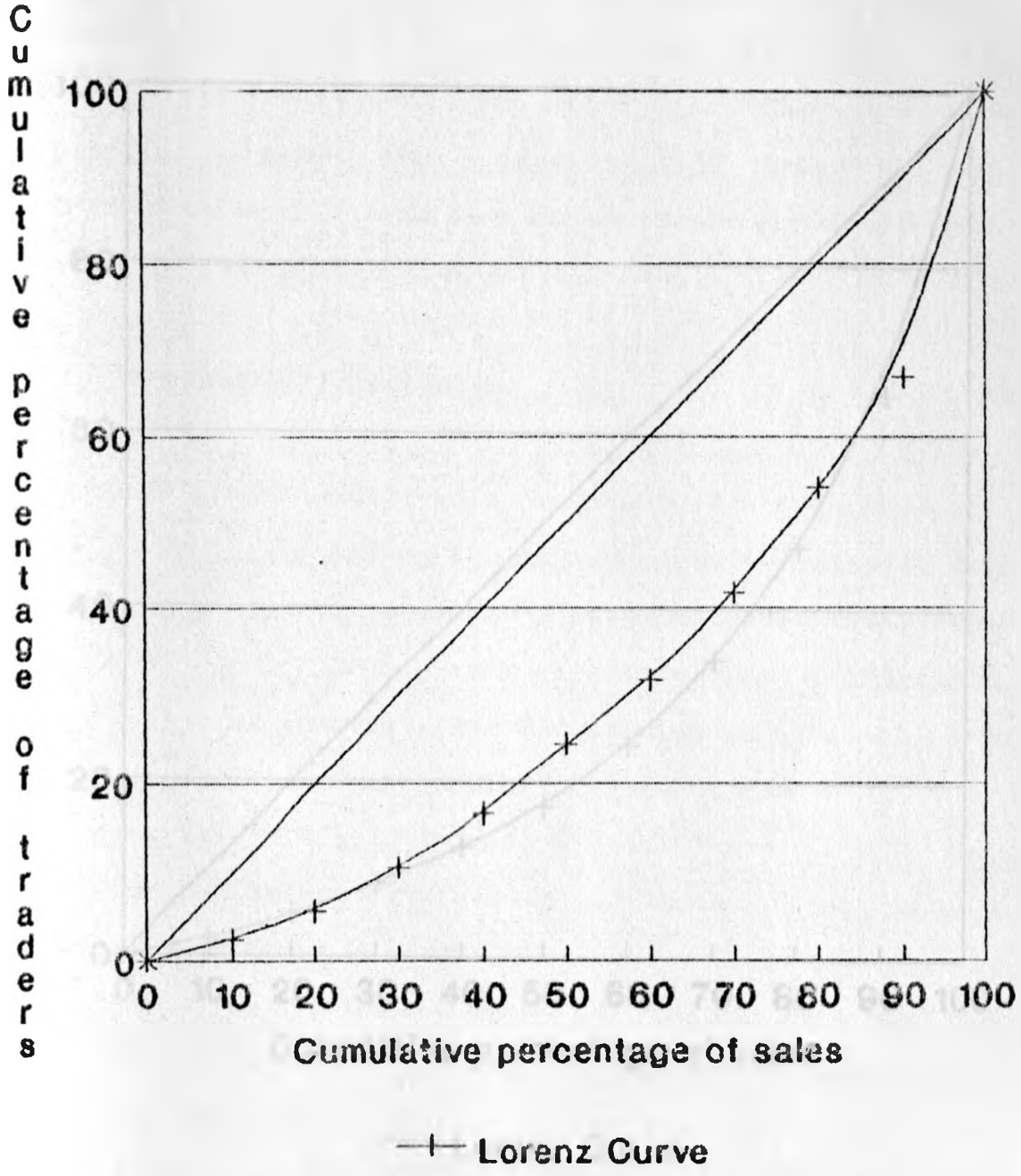



Fig. 4.3: Lorenz concentration curve for fish wholesale system in Kisumu

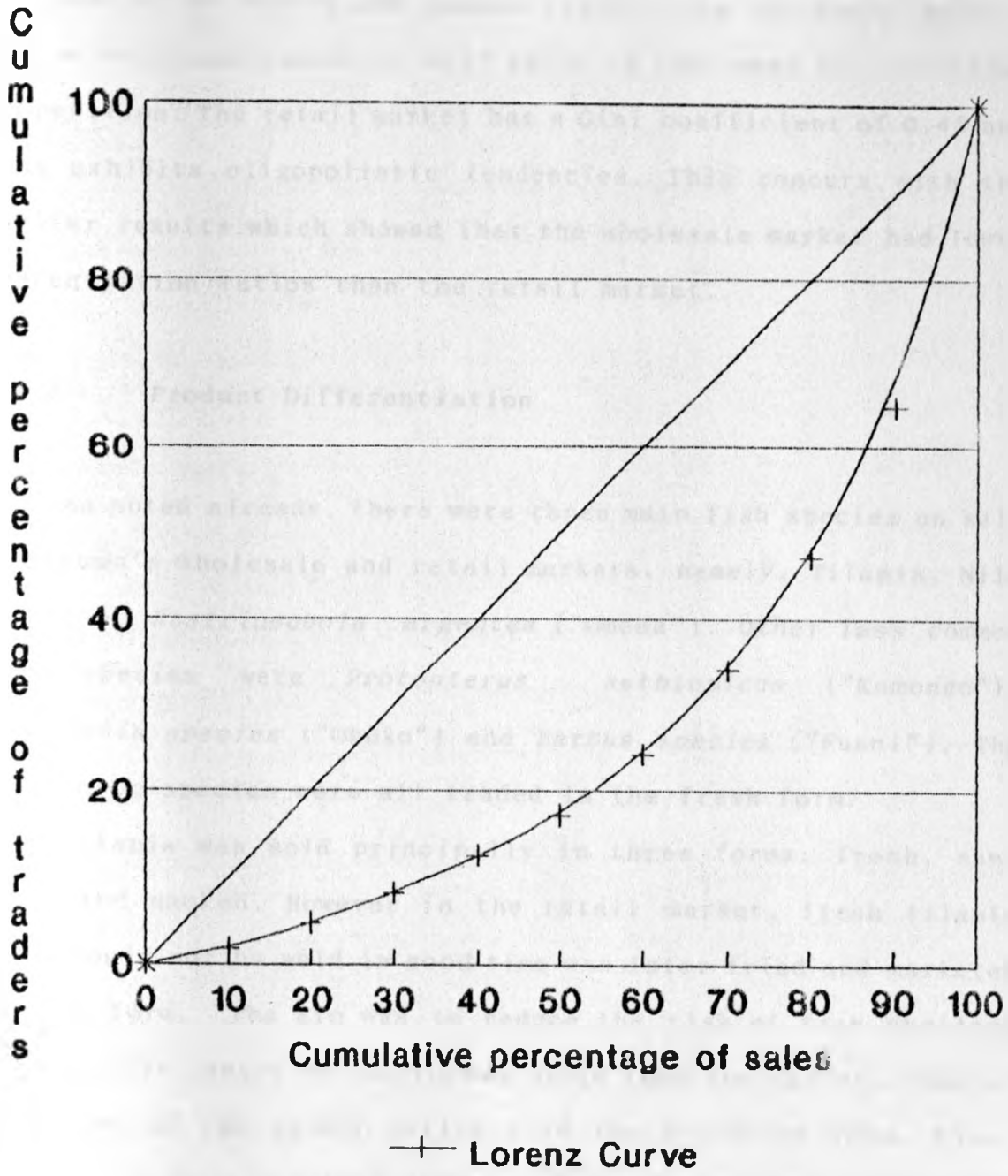



**Fig. 4.4: Lorenz concentration curve for fish retail system in Kisumu**

Based on the Gini coefficient cut-off point of 0.4 recommended by Parker and Connor (1979), the wholesale market, with a Gini coefficient of 0.37 falls in the range for effective competition. The retail market has a Gini coefficient of 0.45 and thus exhibits oligopolistic tendencies. This concurs with the earlier results which showed that the wholesale market had lower concentration ratios than the retail market.

### 4.4.2 Product Differentiation

As noted already, there were three main fish species on sale in Kisumu's wholesale and retail markets, namely, Tilapia, Nile Perch and *Rastrineobola argentea* ("Omena"). Other less common fish species were *Protopterus aethiopicus* ("Kamongo"), *Synodontis species* ("Okoko") and *Barbus species* ("Fuani"). The last three species were all traded in the fresh form.

Tilapia was sold principally in three forms: fresh, sun-dried and smoked. However in the retail market, fresh tilapia which could not be sold in good time was later fried and marketed in that form. The aim was to reduce the risk of fish spoilage which occurs faster in the former state than the latter. "Omena" was found in the market entirely in the sun-dried form. Three (20%) of traders revealed though, that in some other seasons of the year they do sell small quantities of "Omena" in the fresh form obtained from beaches nearby Kisumu.

In the wholesale market Nile Perch was traded in the fresh form while the retail market had both fresh and fried forms. The latter was attained by deep-frying of fresh fish by retailers.

TABLE 4.9 TYPES OF FISH SOLD BY SAMPLE WHOLESALE TRADERS IN KISUMU

| Type of Fish | Number of Wholesalers | |
|---|---|---|
| | Number | % |
| Sun-dried "omena" only | 12 | 25.5% |
| Sun-dried Tilapia only | 7 | 14.9% |
| Smoked Tilapia only | 3 | 6.4% |
| Fresh Tilapia only | 12 | 25.5% |
| Fresh Nile Perch only | 2 | 4.3% |
| Smoked Tilapia + Sun-dried Tilapia | 6 | 12.8% |
| Sun-dried 'omena' + smoked tilapia + sun-dried Tilapia | 5 | 10.6% |
| | 47 | 100% |

Source: Survey Results

According to the survey results, the retailers and wholesalers each sold either one fish type or a combination of fish types in Tables 4.9 and 4.10. With the exception of "Omena", traders graded the other fish types discussed above in three main size categories: small, medium and large. Consumers made choice on the various sizes of fish.

TABLE 4.10 TYPES OF FISH SOLD BY SAMPLE RETAIL TRADERS IN KISUMU

| Type of Fish | Number of Retailers | |
|---|---|---|
| | Number | % |
| Sun-dried "omena" only | 29 | 33.0% |
| Sun-dried Tilapia only | 12 | 13.6% |
| Smoked Tilapia only | 10 | 11.4% |
| Fresh Tilapia only | 13 | 14.8% |
| Fresh Nile Perch only | 3 | 3.4% |
| Fresh Tilapia + Fresh Nile Perch + Fried Tilapia | 12 | 12.5% |
| Sun-dried 'omena' + smoked tilapia + sun-dried Tilapia | 10 | 11.4% |
| | 88 | 100% |

Source: Survey Results

Quality was another attribute which influenced preference of fish buyers. Seventy-five percent of the sample traders mentioned quality maintenance as one way of attracting customers. To meet the quality requirements, the traders said that fresh fish should be stored in ice-cold conditions during transport from the beaches and at the market. It must also be washed to look clean and attractive to customers.

Sun-dried and smoked fish should be stored in cool and dry conditions while any breakages or insect infestations on them must be avoided. Fried fish should be stored in clean and dust free conditions. Whereas some traders met the above requirements, others did not, thus causing differences in quality of fish available for sale. According to the traders interviewed, fish consumers regarded quality very highly and would reject any fish which was not in good condition.

Packaging of fish sold to consumers was done simply using sheets of paper. This method was practiced by all retail traders interviewed, thus making packaging a less important factor in product differentiation. Wholesale traders however sold fish to retailers without packaging it and it was upto the latter to provide the containers for carrying the fish.

Whereas some consumers tend to be specific to particular fish species and would not consume a different species, others may substitute one fish species for another. Some fish consumers may therefore not perceive different fish species as different forms of one product. In this regard product differentiation cannot be discussed strictly on the basis of the number of fish species sold in Kisumu.

However within one species, the semi-processed and the processed types may be rightly regarded as differentiated product lines. This is also true for the different size groups of any fish type in the market. Quality aspects is another attribute of product differentiation. Traders revealed that their customers were aware of the various fish types in the market, the size ranges and proper quality standards and that consumers often based their choices on these factors.

In conclusion, we observe that, in addition to "omena" there were four forms of Tilapia and two of Nile Perch sold in the retail market as shown in Table 4.11. These were in three size grades and in some cases they varied in quality. In the wholesale market there were three forms of Tilapia and one type of Nile Perch in addition to "omena' displayed in Table 4.11. Apart from "omena" the other fish were put in three sizes categories. Because of the factors above, it is inferred that the level of product differentiation in the market is significant enough to affect competition.

The wholesale market has fewer product lines than the retail market and hence, as in the earlier results, the former is likely to be more competitive than the latter, subject to the other aspects of market structure.

### 4.4.3 Integration and Contractual Agreements:

To analyze the existence of integration in the marketing system, wholesale and retail traders were first asked whether they had shares in ownership of business activities at other

levels of the market besides the wholesale or retail markets respectively. Four percent of the sampled wholesale traders confirmed participating also in fish production either by employing fishermen or in joint ventures with the fishermen.

Such traders provided part of the fishing facilities or gave loans to the fishermen. The remaining 96% of wholesalers interviewed were fully occupied in wholesale business and played no part at other market levels. As for fish retailers, the entire sample performed only retail functions and had no control over other operations within the marketing system.

Out of the 47 wholesalers, 44 reported that they each purchased fish from the same supplier(s) always while only 3 dealt with different suppliers. In case of retailers, 57% reported obtaining fish from the same supplier always while 29% changed suppliers frequently.

The traders were then interviewed to reveal existing contracts with their suppliers and customers in the areas related to terms of purchase and sale of fish or on other advance agreements, arrangements for supply of fish and regarding fish prices.

The answers provided by traders are summarized in Table 4.12. It was further established that all contractual agreements mentioned were oral and informal although they seemed to be strictly adhered to. The table shows that the most common arrangement is that where traders specified the quantity of fish to be supplied to them and the frequency of delivery of the fish.

This agreement, as gathered during the survey, is prevalent probably because fish production is prone to fluctuations.

TABLE 4.11 VALUES (IN KSH) OF DIFFERENT FISH TYPES SOLD BY SAMPLE TRADERS IN KISUMU

| Fish Type | Wholesale Market | | Retail Market | |
|---|---|---|---|---|
| | Value (Ksh) of Fish Sold | % | Value (Ksh) of Fish Sold | % |
| Tilapia (fresh) | 1 475 752.10 | 41.7% | 731 582.24 | 51.6% |
| Tilapia (Sun-dried) | 524 080.45 | 14.8% | 143 298.22 | 10.1% |
| Tilapia (Smoked) | 322 985.62 | 9.1% | 63 320.92 | 4.5% |
| Tilapia (fried) | - | - | 4 958.66 | 0.35% |
| Nile Perch (fresh) | 42 684.77 | 1.2% | 101 651.37 | 7.2% |
| Nile Perch (fried) | - | - | 1 117.44 | 0.1% |
| "Omena" (sun-dried) | 1 175 105.10 | 33.2% | 373 181.44 | 26.3% |
| Total | 3 540 608.00 | 100% | 1 419 110.30 | 100.% |

Source: Survey Results

TABLE 4.12 CONTRACTUAL AGREEMENTS BETWEEN FISH TRADERS IN KISUMU AND THEIR SUPPLIERS

| Type of Contractual Agreement | Number of Wholesale Traders Mentioning Contract | | Number of Retail Traders Mentioning Contract | |
|---|---|---|---|---|
| | Number | % | Number | % |
| 1. Purchase fish on Credit | 10 | 21.2 | 12 | 13.6 |
| 2. Agreement on Quantity of fish supplied and on frequency of delivery | 15 | 31.9 | 17 | 19.3 |
| 3. Advance agreement on price only | 2 | 4.3 | 4 | 4.5 |
| 4. Both 1 and 2 above | 15 | 31.9 | 10 | 11.4 |
| 5. Both 1 and 3 above | 1 | 2.1 | 4 | 4.5 |
| 6. No contract | 4 | 8.5 | 41 | 46.6 |
| Trader sample size | 47 | 100 | 88 | 100 |

Source: Survey results

A trader must therefore ask for the maximum amount of fish that he can sell, given the size of the market. It also assures the trader of receiving supplies during the low production periods. Both wholesale and retail traders also frequently purchased fish on credit.

Under this practice the recipient paid for the fish only after it was sold. This was one way in which fish dealers assisted each other to overcome the problem of low financial base, and in this way ensured continuous commodity flow.

In case some fish purchased on credit could not be sold for any reason, the buyer would still pay for it, sometimes arranging to pay over a relatively longer period of time. The small proportion of traders having advance agreement on prices with the suppliers in Table 4.12 is a reflection of the uncertainty that exists in the fish market. It is hard to be certain of levels of future fish landings and hence, according to the traders, it is difficult to set a price that will clear the market at varying supply levels.

Another observation is that 91.5% wholesalers had at least one contract with suppliers as compared to 53.4% for retailers. A possible reason is that wholesalers, as opposed to retailers, obtained fish from widely dispersed landing points. Contracts were therefore essential to avoid much movement from one beach to another in search of fish. Retailers largely bought fish from central wholesale markets and generally did not require pre-arrangements to get fish in the desired quantity and frequency.

Wholesalers sold fish primarily to fish retailers while retailers mainly served private households, hotels and other

institutions. Only 11% of retail traders had one or more contracts with their customers. Out of this 9% sold fish to consumers on credit while 11% had pre-arrangements with customers on quantity of fish they (the retailers) would supply and on frequency of delivering fish. None of the traders pre-arranged with customers on the price of fish in advance of delivering it while 89% of retail traders had no contracts with customers at all.

In conclusion it was observed that horizontal integration, which by conventional definitions, involves the ownership or control of operations on the vertical and, or horizontal directions of the marketing channel is not widespread in Kisumu fish marketing system. Instead a loose type of integration commonly existed in form of contractual agreements especially between fishermen, wholesale and retail traders. The contracts were oral and informal and acted mainly to facilitate commodity flow from production points to the market. The contracts though did not allow them to change trading partners freely with changing market conditions and thus limited the degree of competition in both markets.

### 4.4.4 Barriers to Entry

Most fish traders raised finances for entering the business from previous own savings. Ninety percent of retailers and wholesalers realized their initial funds in this way. From the study it was estimated that at the time of interview at least Ksh 2 000 would be required to join the business at the wholesale

market while about Ksh 800 would suffice to finance the initial operations of a retail trader. Only 4% of wholesalers and 1% of retailers had received formal loans to finance their trade, even though 86% of wholesalers and 72% of retailers stated that they needed loans to expand their business. This indicated that loans are not readily accessible to the traders.

The Government's role in the fish market is mainly to license prospective entrants and set hygiene standards. Licenses are renewed subject to the trader undergoing and passing a compulsory health examination. The combined fee for license and medical certificate was Ksh 320 per year during the survey. The license cost the same for all traders irrespective of the fish type sold or the market level. This allowed sellers free movement from one fish type to another or from one market level to the other. The fish business was also characterized by low capital investment, for example kiosks constructed with cheap building materials, containers and mats, thus making it easy for a trader to enter or exit the business altogether.

Suitable market space, especially in the areas most frequented by fish consumers, was inadequate. New traders would therefore not easily find good places for displaying fish for sale. The Local Authority in Kisumu set rules to facilitate market activities. Such rules included allocation of market space for displaying and selling fish. As a practice, fish is supposed to be sold within designated market areas so as to ensure that proper hygienic conditions are met. In conclusion the factors discussed above do not amount to serious barriers to entry into the fish trade.

## 4.5 Analysis of Market Conduct

Market conduct explains behaviour characteristics in the market place. In our case it was explored by examining the level of collusion among traders on aspects of quantity of fish sold, prices at which fish is sold and in the selection of customers.

The results show that it was not a common practice for traders to collude among themselves in setting fish prices. Only 7% of wholesale traders and 9% of retail traders set prices based on price levels charged by other traders in the relevant markets. The rest of the dealers set prices individually on basis of the purchase price. Their price setting was therefore devoid of collusion. There was also no incidence of collusion among traders on quantity of fish to sell.

Interview of retail traders showed that every fishmonger decided alone on the amount of commodity to purchase and sell. Since traders derived income from price differential of each unit of fish sold, there would be more returns from higher sales, subject to such factors as the level of risks and the trader's financial position. Restricted sales arising from collusive deals would therefore not be in the interest of traders individually or even collectively.

One aspect of collusion prevalent in the fish market was that traders collectively decided on who to sell fish to. By consensus, wholesalers sold fish only to retail traders. This prohibited wholesalers from dealing directly with fish consumers even where the wholesale and retail markets were located closely. Retailers on the other hand had the monopoly of serving the

various fish consuming groups.

## 4.6 Market Performance Analysis

Market performance is measured by evaluating the gross margins in relation to the opportunity cost of entrepreneurship for wholesale and retail traders and by comparing marketing margins and marketing costs of each fish type. The average quantities of various fish types sold by wholesale and retail traders are listed in Table 4.13. The variable costs of marketing the fish are discussed in the tables in section 4.6.1. They are purchasing cost of fish, transport, storage and processing costs, handling and packaging costs, taxes, trader expenses on food and board while on business, working capital and cost of fish loss in the marketing process. The aggregate of costs of performing each of these services by traders has been computed using equation 3.2. This is divided by the quantity of fish sold by traders in each group to get the cost per kilogram.

Gross margins have been calculated for wholesale and retail traders and expressed per kilogram of fish handled. This is the Marketing margin less the variable costs of marketing a kilogram of fish represented by equation 3.4. The wholesalers' gross margin is therefore the wholesale marketing margin for a given fish type minus the variable costs of marketing the fish between the source and the wholesale market. Likewise the retailers' gross margin is the retail marketing margin less the variable costs of marketing fish between the wholesale market and retail outlet.

TABLE 4.13: QUANTITIES OF VARIOUS FISH TYPES SOLD IN KISUMU

| Type of Fish | Average Quantity Sold by Each Trader per month (Kg) | |
|---|---|---|
| | Wholesalers | Retailers |
| Fresh Tilapia | 11 321.0 | 2 103.7 |
| Smoked Tilapia | 1 744.0 | 132.2 |
| Sun-dried Tilapia | 1 650.2 | 147.2 |
| Sun-dried "Omena" | 3 833.0 | 531.3 |
| Fresh Nile Perch | 1 390.4 | 666.3 |

Source: Survey Results

The marketing costs and margins are expressed in Shillings per kilogram. They could as well be expressed as percentage of consumer price, in which case it would be possible to ascertain the part of consumer price contributed by various cost components.

### 4.6.1 Derivation of Variable Costs in Fish Marketing:

The following are the variable costs of marketing fish :

#### 4.6.1.a Producer, Wholesale and Retail Prices of Fish

The prices, in Appendix Table A.1, are average prices of each fish type at the landing beach, the wholesale market and the

retail market respectively as recorded during March to May 1991.

#### 4.6.1.b Transport Costs

This is expressed as the aggregate of costs incurred by traders in transporting fish from the landing beach to the wholesale market for wholesalers or between the wholesale market and the retail market for retailers. To get the costs at the two stages, wholesale and retail traders were respectively asked to estimate their monthly expenditure on transporting various fish types. This was divided by the quantity of fish traded by each group in Table 4.13 to get the unit transport costs for the various fish types expressed in Table 4.14.

#### 4.6.1.c Processing Costs

These are the costs of firewood, frying oil and other ingredients used in changing the physical form of fish from fresh state to smoked, dried or fried form. Since our analyses involved fish sold in the same physical form at all market stages, no processing costs were incurred.

#### 4.6.1.d Handling and Packaging Costs

Handling costs are incurred in loading, unloading and displaying fish for sale. The packaging costs are the expenses on packaging materials. The estimates of these for each trader was used to get the average unit costs in Table 4.15.

TABLE 4.14 COSTS OF TRANSPORTING VARIOUS FISH TYPES IN KISUMU

| Type of Fish | Monthly Average Expenditure, in Ksh, on Transport per Trader | | Average Transport Cost (Ksh/Kg) | |
|---|---|---|---|---|
| | Wholesalers | Retailers | Wholesalers | Retailers |
| Fresh Tilapia | 13 585.2 | 778.4 | 1.20 | 0.37 |
| Sun-dried Tilapia | 3 745.5 | 125.3 | 2.27 | 0.85 |
| Smoked Tilapia | 4 185.6 | 119.0 | 2.40 | 0.90 |
| Sun-dried "Omena" | 2 683.1 | 26.6 | 0.70 | 0.05 |
| Fresh Nile Perch | 2 794.7 | 386.5 | 2.01 | 0.58 |

Source: Survey Results

TABLE 4.15 COSTS OF HANDLING AND PACKAGING FISH IN KISUMU

| Type of Fish | Monthly Average Handling and Packaging Expenses per Trader (Ksh) | | Average Handling and Packaging Costs (Ksh/Kg) | |
|---|---|---|---|---|
| | Wholesalers | Retailers | Wholesalers | Retailers |
| Fresh Tilapia | 452.8 | 399.7 | 0.04 | 0.19 |
| Sun-dried Tilapia | 49.5 | 87.0 | 0.03 | 0.59 |
| Smoked Tilapia | 52.3 | 75.4 | 0.03 | 0.57 |
| Sun-dried "Omena" | 115.0 | 69.1 | 0.03 | 0.13 |
| Fresh Nile Perch | 1 765.8 | 459.7 | 1.27 | 0.69 |

Source: Survey Results

#### 4.6.1.e Expenses by Traders (e.g Food, Board) While on Business

These are the expenses by wholesale and retail traders specifically on food and boarding while performing the marketing duties. The average unit costs in Table 4.16 are obtained by dividing the expenses incurred by traders with the quantity of fish sold by each group in Table 4.13.

#### 4.6.1.f Cost of Working Capital

The costs incurred by each trader per month in purchasing and replacing working capital was estimated. Using results in Table 4.13, the average costs of working capital for marketing various fish types have been calculated in Table 4.17 by dividing the expenses by traders with the quantity of fish sold.

#### 4.6.1.g Cost (value) of Spoilt Fish

This is the estimate of the value of fish loss due to spoilage in the marketing process. The aggregate values of spoilt fish are derived in Table 4.18 by dividing the losses for wholesalers and retailers with the quantity of fish sold in Table 4.13.

#### 4.6.1.h Storage Costs for Fish

These are the expenses incurred in renting space for storing

fish and the cost of ice used for keeping fish in good condition. The average storage costs per month are derived in Table 4.19 by dividing the expenses with the quantity of fish sold in Table 4.13.

#### 4.6.1.i Expenses on Taxes

These are the regular levies paid by fish traders in the market place. The aggregate in Table 4.20 is obtained by dividing the taxes for all traders selling the same fish type with the quantity of sold fish listed in Table 4.13.

The above expenses and prices in Appendix Table A.1 have been used to derive the cost structures and margins in marketing the five fish types in tables 4.21 to 4.25. Gross Margins, and not profits, have been used to analyze market performance. In calculating profits all fixed costs, including interests on loans and depreciation on capital should be included, but data on these were not readily available.

For each fish type the total marketing margin has been derived. This is the difference between the consumer price and the producer price. It includes the costs of marketing services and traders' gross margins. Marketing margin expressed as percentage of retail price tells the costs of marketing relative to production at a particular time. The results reveal that 68% and 67% of the consumer prices of sun-dried Tilapia and smoked Tilapia respectively are incurred in marketing as opposed to 58%, 56% and 43% for fresh Nile Perch, fresh Tilapia and sun-dried "Omena".

TABLE 4.16 KISUMU FISH TRADERS' EXPENSES ON BOARD AND LUNCH

| Type of Fish | Monthly Average Expenses on Board and Lunch per Trader (Ksh) | | Average Lunch and Board Costs (Ksh/Kg) | |
|---|---|---|---|---|
| | Wholesalers | Retailers | Wholesalers | Retailers |
| Fresh Tilapia | 1 018.9 | 1072.9 | 0.09 | 0.8 |
| Sun-dried Tilapia | 2 970.4 | 518.9 | 0.94 | 3.52 |
| Smoked Tilapia | 3 139.2 | 420.1 | 1.80 | 2.85 |
| Sun-dried "Omena" | 958.3 | 669.4 | 0.25 | 1.26 |
| Fresh Nile Perch | 1 390.4 | 626.3 | 1.00 | 0.4 |

Source: Survey Results

TABLE 4.17 COSTS OF WORKING CAPITAL FOR MARKETING FISH IN KISUMU

| Type of Fish | Monthly Average Expenses on working Capital per Trader (Ksh) | | Average Working Capital Costs (Ksh/Kg) | |
|---|---|---|---|---|
| | Wholesalers | Retailers | Wholesalers | Retailers |
| Fresh Tilapia | 792.5 | 336.6 | 0.07 | 0.16 |
| Sun-dried Tilapia | 1 864.7 | 154.8 | 1.13 | 1.05 |
| Smoked Tilapia | 226.7 | 76.7 | 0.13 | 1.05 |
| Sun-dried "Omena" | 76.7 | 244.4 | 0.02 | 0.46 |
| Fresh Nile Perch | 750.8 | 139.9 | 0.54 | 0.21 |

Source: Survey Results

TABLE 4.18 COSTS OF FISH SPOILAGE IN KISUMU

| Type of Fish | Monthly Average Value, in Ksh, of Spoilt Fish per Trader | | Average Costs of Fish Spoilage (Ksh/Kg) | |
|---|---|---|---|---|
| | Wholesalers | Retailers | Wholesalers | Retailers |
| Fresh Tilapia | 1 018.9 | 147.3 | 0.09 | 0.07 |
| Sun-dried Tilapia | 16.5 | 33.9 | 0.01 | 0.23 |
| Smoked Tilapia | 34.9 | 26.4 | 0.02 | 0.20 |
| Sun-dried "Omena" | 38.3 | 31.9 | 0.01 | 0.06 |
| Fresh Nile Perch | 278.1 | 639.6 | 0.20 | 0.96 |

Source: Survey Results

TABLE 4.19 COSTS FOR FISH STORAGE IN KISUMU

| Type of Fish | Monthly Average Expenses on Fish Storage per Trader (Ksh) | | Average Storage Costs (Ksh/Kg) | |
|---|---|---|---|---|
| | Wholesalers | Retailers | Wholesalers | Retailers |
| Fresh Tilapia | 1 811.4 | 231.4 | 0.16 | 0.11 |
| Sun-dried Tilapia | 132.0 | 0.0 | 0.08 | 0.00 |
| Smoked Tilapia | 174.4 | 0.0 | 0.10 | 0.00 |
| Sun-dried "Omena" | 38.3 | 53.1 | 0.01 | 0.10 |
| Fresh Nile Perch | 834.2 | 339.8 | 0.60 | 0.51 |

Source: Survey Results

TABLE 4.20 KISUMU FISH TRADERS' EXPENSES ON MARKET LEVIES

| Type of Fish | Monthly Average Expenses on Taxes per Trader (Ksh) | | Average Cost of Taxes (Ksh/Kg) | |
|---|---|---|---|---|
| | Wholesalers | Retailers | Wholesalers | Retailers |
| Fresh Tilapia | 3 622.7 | 441.8 | 0.32 | 0.21 |
| Sun-dried Tilapia | 561.1 | 117.1 | 0.34 | 0.80 |
| Smoked Tilapia | 436.0 | 290.8 | 0.25 | 2.20 |
| Sun-dried "Omena" | 268.3 | 196.6 | 0.07 | 0.37 |
| Fresh Nile Perch | 472.7 | 253.2 | 0.34 | 0.38 |

Source: Survey Results

The producer prices of various fish types account for the largest part of the consumer price, taking between 32% in sun-dried tilapia and 57% for "omena". Food and board expenses by traders constitute between 3% for fresh Tilapia and 10% for smoked Tilapia. This is almost the same as the percentage expenditures on transporting fish from the sources through wholesale market to the retail outlet. The latter is in the range of 4% and 10% of consumer prices for sun-dried "Omena" and Fresh Nile Perch respectively.

It is observed that expenditures on transporting fresh Tilapia and Nile Perch each constitute a higher percentage of consumer price than for any of the three semi-processed fish types. While transport costs of fresh tilapia and fresh Nile Perch take 9% and 10% respectively of consumer price, that of the semi-processed fish takes between 4% and 7% of the final prices.

TABLE 4.21 VARIABLE COSTS OF MARKETING FRESH TILAPIA IN KISUMU

| | Values in Ksh/Kg |
|---|---|
| **Costs for Wholesale Traders** | |
| Producer Price of Fresh Tilapia | 8.20 |
| Transport Costs | 1.20 |
| Processing Costs | 0.00 |
| Storage Costs (including Cost of ice) | 0.16 |
| Handling and Packaging Costs | 0.04 |
| Taxes | 0.32 |
| Expenses by Traders while on Business (e.g. on food & Board) | 0.09 |
| Cost of working capital (Sacks, Baskets, Mats, Polythene) | 0.07 |
| Cost (Value) of Spoilt Fish | 0.09 |
| Total Variable Costs for wholesalers | 10.17 |
| Wholesalers' Gross Margin | 3.18 |
| **Costs for Retail Traders** | |
| Wholesale Price of fresh Tilapia | 13.35 |
| Transport Costs | 0.37 |
| Processing Costs | 0.00 |
| Storage Costs (including Cost of Ice) | 0.11 |
| Handling and Packaging Costs | 0.19 |
| Taxes | 0.21 |
| Expenses by Traders while on Business (e.g. on food & Board) | 0.51 |
| Cost of working capital (Sacks, Baskets, Mats, Polythene) | 0.16 |
| Cost (Value) of Spoilt Fish | 0.07 |
| Total Variable Costs for Retailers | 14.97 |
| Retailers' Gross Margin | 3.50 |
| Retail Price of Fresh Tilapia in Kisumu | 18.45 |
| Overall marketing Margin | 10.25 |
| Marketing Margin % of Consumer price | 55.6% |

Source: Survey Results

TABLE 4.22 VARIABLE COSTS OF MARKETING SUN-DRIED TILAPIA IN KISUMU

| | Values in Ksh/Kg |
|---|---|
| **Costs for Wholesale Traders** | |
| Producer Price of Sun-dried Tilapia | 14.40 |
| Transport Costs | 2.27 |
| Processing Costs | 0.00 |
| Storage costs (Including cost of Ice) | 0.08 |
| Handling and Packaging Costs | 0.03 |
| Taxes | 0.34 |
| Expenses by Traders while on Business (e.g. on Food & Board) | 0.94 |
| Cost of working capital (Sacks, Baskets, Mats, Polythene) | 1.13 |
| Cost (Value) of Spoilt Fish | 0.01 |
| Total Variable Costs for Wholesalers | 19.20 |
| Wholesalers' Gross Margin | 8.95 |
| **Costs for Retail Traders** | |
| Wholesale Price of Sun-dried Tilapia | 28.15 |
| Transport Costs | 0.85 |
| Processing Costs | 0.00 |
| Storage Costs (including cost of Ice) | 0.00 |
| Handling and Packaging Costs | 0.59 |
| Taxes | 0.80 |
| Expenses by Traders while on Business (e.g. on Food & Board) | 3.52 |
| Cost of Working Capital (Sacks, Baskets, Mats, Polythene) | 1.05 |
| Cost (Value) of Spoilt Fish | 0.23 |
| Total Variable Costs for Retailers | 35.19 |
| Retailers' Gross Margin | 9.76 |
| Retail Price of Sun-dried Tilapia in Kisumu | 44.95 |
| Overall marketing Margin | 30.55 |
| Marketing Margin % of Consumer Price | 68.0% |

Source :Survey Results.

A possible reason for this difference lies on the transport arrangements for the different fish types. As explained earlier in section 4.1.1 fresh fish must reach the market in the shortest time possible to avoid spoilage. Traders therefore spend minimum time on the beaches and are unable to assemble fish from different sites. Most traders hire transport vehicles without prior knowledge of the amount of fish available at the beaches and hence it is apparent that there is under-utilization of existing transport facilities when little fish is landed, leading to high unit transport costs.

As stated in section 4.1.2 semi-processed fish may be stored for a longer duration and so there is less urgency to reach the market. Because of this, traders are able to assemble fish from several beaches into one transport facility, hence reducing per unit transport costs.

The combined retail and wholesale traders' gross margins also take a substantial proportion of the consumer price. The lowest is that of Nile Perch where trader gross margins are 17% of retail price. Sun-dried tilapia leads by having 42% of consumer price apportioned to traders' gross margins, while in the case of smoked tilapia, the retailer and wholesaler gross margins constitute 40% of retail price.

Fresh tilapia traders and those of "omena" have combined gross margins comprising 36% and 27% of final fish prices respectively. Therefore, apart from Nile Perch, dealers in the remaining fish types have gross margins comprising of more than a quarter of retail price.

TABLE 4.23 VARIABLE COSTS OF MARKETING SMOKED TILAPIA IN KISUMU

| | Values in Ksh/Kg |
|---|---|
| **Costs for Wholesale Traders** | |
| Producer Price of Smoked Tilapia | 14.90 |
| Transport Costs | 2.40 |
| Processing Costs | 0.00 |
| Storage Costs (Including Cost of Ice) | 0.10 |
| Handling and Packaging Costs | 0.03 |
| Taxes | 0.25 |
| Expenses by Traders while on Business (e.g. on food & Board) | 1.80 |
| Cost of Working Capital (Sacks, Baskets, Mats, Polythene) | 0.13 |
| Cost (Value) of Spoilt Fish | 0.02 |
| Total Variable Costs for Wholesalers | 19.63 |
| Wholesalers' Gross Margin | 8.42 |
| **Costs for Retail Traders** | |
| Wholesale Price of Fresh Tilapia | 28.05 |
| Transport Costs | 0.90 |
| Processing Costs | 0.00 |
| Storage Costs (Including Cost of Ice) | 0.00 |
| Handling and Packaging costs | 0.57 |
| Taxes | 2.20 |
| Expenses by Traders while on Business (e.g. on Food & Board) | 2.85 |
| Cost of Working Capital (Sacks, Baskets, Mats, Polythene) | 0.58 |
| Cost (Value) of Spoilt Fish | 0.20 |
| Total Variable Costs for Retailers | 35.35 |
| Retailers' Gross Margin | 9.71 |
| Retail Price of Sun-dried Tilapia in Kisumu | 45.05 |
| Overall marketing Margin | 30.15 |
| Marketing Margin % of Consumer Price | 66.9% |

Source: Survey Results

TABLE 4.24 VARIABLE COSTS OF MARKETING SUN-DRIED "OMENA" IN KISUMU

| | Values in Ksh/Kg |
|---|---|
| **Costs for Wholesale Traders** | |
| Producer Price of Sun-dried "Omena" | 12.25 |
| Transport Costs | 0.70 |
| Processing Costs | 0.00 |
| Storage Costs (Including Cost of Ice) | 0.01 |
| Handling and Packaging Costs | 0.03 |
| Taxes | 0.07 |
| Expenses by Traders while on Business (e.g. on Food & Board) | 0.25 |
| Cost of Working Capital (Sacks, Baskets, Mats, Polythene) | 0.02 |
| Cost (Value) of Spoilt Fish | 0.01 |
| Total Variable Costs for Wholesalers | 13.34 |
| Wholesalers' Gross Margin | 0.91 |
| **Costs for Retail Traders** | |
| Wholesale Price of Sun-dried "Omena" | 14.25 |
| Transport Costs | 0.05 |
| Processing Costs | 0.00 |
| Storage Costs (Including Cost of Ice) | 0.10 |
| Handling and Packaging Costs | 0.13 |
| Taxes | 0.37 |
| Expenses by Traders while on Business (e.g. on Food & Board) | 1.26 |
| Cost of Working Capital (Sacks, Baskets, Mats, Polythene) | 0.46 |
| Cost (Value) of Spoilt Fish | 0.06 |
| Total Variable Costs for Retailers | 16.68 |
| Retailers' Gross Margin | 4.92 |
| Retail Price of Sun-dried "Omena" in Kisumu | 21.60 |
| Overall Marketing Margin | 9.35 |
| Marketing Margin % of Consumer Price | 43.3% |

Source :Survey Results.

Such trader gross margins are arguably large and constitute a significant portion of the total marketing margin. The effect of the high middlemen's gross margins is that consumer price of fish is kept higher than it would be under a more competitive system. In case of Nile Perch two reasons were advanced by the traders which could explain the relatively low gross margins. First there is high competition for this fish at the beaches between the local traders and the big firms processing it for export. This inevitably has led to high beach price for the fish.

According to the traders, Nile Perch is also less preferred to Tilapia by the fish eating population of Kisumu. The demand for the fish is therefore small in Kisumu, causing low consumer price for the fish. The low margins realized by the Nile Perch traders have resulted in few numbers of traders found dealing in Nile Perch as compared to other types of fish.

For the other fish types, it is observed that retailers' gross margins expressed as a percentage of consumer price exceed that for wholesale traders, albeit only slightly. In "omena" however, the difference is exceptionally large with the retail trader gross margin being 23% of consumer price while the wholesalers' margin is only 4% of the same.

This observation concurs with the earlier findings on concentration ratios and product differentiation, which suggested that the retail market has more factors inclined towards oligopoly than does the wholesale market. A less competitive (more oligopolistic) market is expected to have higher trader margins.

TABLE 4.25 VARIABLE COSTS OF MARKETING FRESH NILE PERCH IN KISUMU

| | Values in Ksh/Kg |
|---|---|
| **Costs for Wholesale Traders** | |
| Producer Price of Fresh Nile Perch | 10.45 |
| Transport Costs | 2.01 |
| Processing Costs | 0.00 |
| Storage Costs (Including Cost of Ice) | 0.60 |
| Handling and Packaging Costs | 1.27 |
| Taxes | 0.34 |
| Expenses by Traders while on Business (e.g. on Food & Board) | 1.00 |
| Cost of Working Capital (Sacks, Baskets, Mats, Polythene) | 0.54 |
| Cost (Value) of Spoilt Fish | 0.20 |
| Total Variable Costs for Wholesalers | 16.41 |
| Wholesalers' Gross Margin | 1.79 |
| **Costs for Retail Traders** | |
| Wholesale Price of Fresh Nile Perch | 18.20 |
| Transport Costs | 0.58 |
| Processing Costs | 0.00 |
| Storage Costs (Including Cost of Ice) | 0.51 |
| Handling and Packaging Costs | 0.69 |
| Taxes | 0.38 |
| Expenses by Traders while on Business (e.g. on Food & Board) | 0.94 |
| Cost of Working Capital (Sacks, Baskets, Mats, Polythene) | 0.21 |
| Cost (Value) of Spoilt Fish | 0.96 |
| Total Variable Costs for Retailers | 22.46 |
| Retailers' Gross Margin | 2.34 |
| Retail Price of Fresh Nile Perch | 24.80 |
| Overall Marketing Margin | 14.35 |
| Marketing Margin % of Consumer Price | 57.9% |

Source: Survey Results

Combined wholesale and retail trader gross margins expressed as percentage of the overall marketing margins ranged between 29% for Nile Perch and 65% for fresh tilapia. Sun-dried and smoked tilapia traders' gross margins constituted 61% and 62% respectively of the marketing margins, while for "omena" they took 62%. The trader gross margins in all cases were large with respect to the proportion of the marketing margin they constituted.

### 4.6.2 Fish Traders' Opportunity Cost

The traders were asked to estimate the opportunity cost for their entrepreneurship, defined as the minimum net income they must receive in an alternative business to be persuaded to quit the fish business. This gave monthly averages of Ksh 9 500 for wholesale traders and Ksh 1 250 for retailers which are presented in Table 4.26. These have been compared to the net incomes for wholesale and retail traders displayed in Tables 4.27 and 4.28.

The results show that the stated opportunity cost of entrepreneurship for wholesalers of fresh, smoked and sun-dried tilapia, who comprise more than 70% of wholesale traders, is less than their present net income. It is though higher than the incomes of wholesalers of sun-dried "omena" and fresh Nile perch. Because the present net incomes are higher than opportunity cost for the majority of wholesalers, we conclude that the incomes, hence gross margins, to wholesale traders are excessive.

TABLE 4.26 OPPORTUNITY COST IN KSH. FOR KISUMU FISH TRADERS

| Type of Traders | Number of Traders | Range (Ksh.) | Mean (Ksh.) | Standard Deviation |
|---|---|---|---|---|
| Wholesalers | 47 | 2 000 - 35 000 | 9 500 | 770.44 |
| Retailers | 88 | 500 - 7 000 | 1 250 | 216.83 |

Source :Survey Results

For retail traders, the net incomes are higher than the stated opportunity cost for entrepreneurship for all fish types. This indicates that the retail traders' incomes, hence gross margins, are higher than they would earn if they engaged in other business in the area. Large trader gross margins in the fish market imply that the costs of real marketing services are small in relation to the overall marketing margins. These are reasons to suggest that the market is not competitive since the marketing margins do not reflect the costs incurred in the creation of the place, form and time utilities.

TABLE 4.27 KISUMU WHOLESALE FISH TRADERS' NET INCOMES[12]

| Fish Type | Trader Gross Margin (Ksh/Kg) | Quantity per Trader per Month (Kg) | Monthly Net Income per Trader (Ksh) |
|---|---|---|---|
| Fresh Tilapia | 3.18 | 11 321.0 | 36 000.8 |
| Smoked Tilapia | 8.42 | 1 744.0 | 14 684.4 |
| Sun-dried Tilapia | 8.95 | 1 650.2 | 14 769.3 |
| Sun-dried "omena" | 0.92 | 3 833.0 | 3 526.4 |
| Fresh Nile perch | 1.79 | 1 390.4 | 2 488.8 |

Source: Survey Results

TABLE 4.28 KISUMU RETAIL FISH TRADERS' NET INCOMES

| Fish Type | Trader Gross Margin (Ksh/Kg) | Quantity per Trader per Month (Kg) | Monthly Net Income per Trader (Ksh) |
|---|---|---|---|
| Fresh Tilapia | 3.50 | 2 103.7 | 7 363.0 |
| Smoked Tilapia | 9.71 | 132.2 | 1 283.7 |
| Sun-dried Tilapia | 9.76 | 147.2 | 1 436.7 |
| Sun-dried "omena" | 4.92 | 531.3 | 2 614.0 |
| Fresh Nile perch | 2.34 | 666.3 | 1 559.0 |

Source: Survey Results

[12] Net income is the total income less the variable costs of marketing. It is derived by multiplying the trader's gross margins with the quantity of fish traded.

## 4.7 Factors Determining fish Prices

The data collected in the survey could not be used to show the determinants of fish prices. The major shortcoming was that there were no records of past fish prices, quantities of fish landed, prices of substitutes, production and marketing costs. Hence it was not possible to establish statistical relationships between fish prices and these variables to explain the factors causing changes in the prices.

However traders were asked how they set their prices and how the prices varied with fluctuating supply. Ninety-three percent of wholesalers and 91% of retail traders interviewed stated that they based their selling price on the purchase price, leaving a margin to cater for marketing costs, risk allowance and their own payment for labour, management and time. The remaining traders set prices according to existing price levels in the market.

The implication of this is that the consumer price is largely pre-determined at the producer level. Factors causing variations on the beach price will therefore have an impact on prices at the succeeding stages of the marketing channel. Fish prices at the beach move up and down with seasonal variations in amount of fish landed. Interview of wholesale traders showed that fish prices are relatively constant within one season but change at the transition to the next supply season. Each fish species has specific seasonal supply pattern. It was gathered that much more fish of all species is landed in the rainy seasons than during the dry spell. For Lake Victoria this falls in the months of April, May, October and November.

For "omena", seasonal changes in landings are determined by the phases of the moon. Traders revealed that the quantity of "omena" available at the beaches greatly decrease during bright-moon nights while much more is landed in the period of dark nights. The reason for this phenomenon is that "omena" fishermen use artificial light while fishing to attract the fish at night. More fish is therefore attracted to light from the lamps when the night is darker. Therefore there are usually two sets of seasonal prices for this fish each month corresponding to the two phases of the moon.

Eighty-nine percent of the wholesale traders interviewed stated that the period of peak supply of Tilapia and Nile Perch is from July to September while December and January are the low production months. March to May fall within the medium supply season. According to the traders, fish prices rise during the low production seasons and decrease when supply rises.

Even though prices at the fish markets are not formally regulated, beach prices of some fish types were set by cooperatives acting on behalf of fishermen. Nile Perch, smoked tilapia and sun-dried tilapia from some beaches on Lake Victoria and those on Lake Turkana fell in this category. Such prices set by cooperatives remained fixed in the short-term, irrespective of supply fluctuations. The effect of fixed beach prices was that prices at the wholesale level and at the retail market tended to be uniformly adjusted, with very small range for bargaining.

Available literature indicate that there are other factors which influence fish prices. Nyanja (1986) illustrates that fish prices depend on the fish species and the state in which it is

sold, with fresh fish fetching higher prices than the semi-processed ones. However caution must be taken when comparing the fish on weight terms since semi-processed fish weighs much less than fresh fish of the same size.

The price of Nile perch has mainly been influenced by the involvement of fish filleting firms targeting the export market, causing increased demand. Hence the levels of supply and demand are important factors in price determination (Nyanja, 1986). He also states that storage, processing and transport costs are factors that influence prices at market level.

Reynolds and Greboval (1988) point out that market prices of fish are also decided by the quantity and prices of other fish types in the market, the distance and accessibility of the market from the landing beaches and the number of intermediaries involved in fish transport and trade.

## 4.8 Testing of Hypotheses

The results of the analysis of the fish market structure show that the Gini coefficient is 0.37 for the wholesale market and 0.45 for the retail outlet. There is inequality in distribution of shares of sales in either market, with the shares in the retail market being more unfairly distributed.

Both markets have incidence of product differentiation arising from the variety of fish types on sale. Product differentiation is though less pronounced in the wholesale market than at the retail level. Horizontal market integration is absent in Kisumu fish marketing system. However vertical integration is

expressed in form of contracts between buyers and sellers operating at various stages of the marketing channel.

These factors inhibit the attainment of maximum competition in the wholesale and retail markets. However, based on the empirical values of Gini coefficients above, the wholesale market has been classified as competitive while the retail market is oligopolistic. On this conclusion, hypothesis (i) that the Kisumu wholesale market is competitive is accepted. Hypothesis (ii) that Kisumu fish market is competitive is therefore rejected.

Results on market conduct indicate that fish traders broadly define who each group of traders may sell fish to. Traders however do not collude to restrict sales volumes or make price decisions. This rejects the third hypothesis that fish traders collude in making price decisions.

Results from analysis of market performance indicate that wholesale and retail traders' opportunity cost of entrepreneurship exceed their net incomes. The net incomes, hence gross margins, are therefore excessive. Based on this, hypothesis (iv) that Kisumu fish traders' gross margins are excessive is accepted. However it is shown that gross margins above the opportunity costs are higher for retail traders than for wholesalers, demonstrating that the wholesale market is more competitive than the retail market.

## CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of the major findings in this study and gives recommendations on how to improve the fish marketing system.

### 5.1 Summary

The study on Kisumu's fish marketing system undertaken in the medium fish supply season of March to May 1991 revealed that fish consumed in Kisumu was drawn from beaches on Lake Victoria and Lake Turkana. Various fish types had different sources of supply. Generally the more perishable types of fish came from beaches close to Kisumu town while the processed fish was mainly supplied from distant districts. The marketing channels for fresh fish differed from that of semi-processed fish in terms of numbers of intermediate stages. The former had fewer stages since, compared to semi-processed fish, fresh fish must reach the consumer in a much shorter time in order to avoid spoilage.

The wholesale and retail market levels were had Gini coefficients concentration ratios of 0.37 and 0.45 respectively, illustrating unequal distribution in shares of transactions.

There were five main fish types identified as being sold in the wholesale market, namely: Fresh Tilapia, Smoked Tilapia, Sun-dried Tilapia, Fresh Nile Perch and Sun-dried "Omena". In addition to these, retail traders sometimes fried Tilapia and Nile Perch and sold them in that form in the retail outlet. Apart from "Omena" the other fish types were graded in three different

size groups. There were also variations in quality of fish offered for sale by different traders. These factors suggest that there was product differentiation in the fish markets, with the retail market having more product lines than the wholesale market. However there was very little integration in the conventional sense of ownership and control of operation at more than one channel level by individual traders. Instead, fishermen, wholesalers and retail traders commonly established informal contracts with the aim of facilitating marketing activities.

There were no major barriers to entry into fish trade apart from inadequate market space, even though new traders could not easily acquire loans to finance their business. Traders also did not collude with each other to set prices or restrict sales volumes.

It was also established that the major components of marketing costs were purchasing costs, transport costs, traders' gross margins and their expenses on food and board. The combined retail and wholesale traders' gross margins accounted for between 17% and 42% of retail price of the various fish types. In all cases the proportions of retailers' gross margin were bigger than that for the wholesalers. The wholesale and retail traders' net incomes and gross margins exceeded their opportunity cost of entrepreneurship. Finally, market price of various types of fish were derived from the beach price. The latter was affected by seasonal landing patterns which were specific to each species of fish. Other factors which influenced fish prices were the type of fish, the state of the fish, the forces of supply and demand, and the costs of storage, processing and transport. Fish prices

also depended on quantity and prices of other types of fish in the market, the distance and accessibility of the market, and the numbers of middlemen involved.

## 5.2 Conclusion

The analysis of market structure reveals that there are factors that favour imperfect competition in Kisumu fish marketing system at both wholesale and retail level. They are unequally distributed shares of transactions among traders, the existence of product differentiation in the market, and the supplying of fish on contract, which denies the participants the free movement and choice of trading partners with changing market conditions. These factors are more prevalent in the retail outlet than at the wholesale level, indicating that the former is less competitive. However, based on Gini coefficient values of 0.37 and 0.45 for the wholesale and retail markets respectively, the former was categorized as competitive and the latter as oligopolistic.

Analysis of market performance revealed that, with the exception of Nile Perch, between 27% and 42% of consumer prices of various fish types are due to combined wholesale and retail trader gross margins. Nile Perch traders' gross margin takes 17% of retail price. The wholesale and retail traders' net incomes exceeded their opportunity cost of entrepreneurship, indicating that the incomes and the traders' gross margins were excessive. The implication is that a big part of the overall marketing margins are due to trader remunerations rather than to costs of

real marketing services such as storage, processing, transport and facilitative operations. Therefore the Kisumu fish marketing system is not price efficient.

## 5.3 Recommendations

In line with the above discussions, the following may be done to improve the system of marketing fish:

1) There is need to enhance competition in the fish market. This may be achieved by taking measures that favour entry into the market by more individuals and by raising the scale of operation of the small-scale fish traders. The government should start a credit system for the traders, through which they can easily acquire loans and expand their business. By increasing competition in the market, the traders' gross margins and consequently, fish prices may be lowered for the benefit of fish consumers.

2) Transport costs, especially of fresh Nile Perch and fresh Tilapia, have been demonstrated as one of the main causes of high fish prices. These may be lowered if traders obtaining fish from the same beaches shared transport facilities. This would lower the unit costs of transporting the two types of fish. Reduced marketing costs will make the fish more affordable to consumers.

3) Introduction of weighing scales should be encouraged at all levels of the marketing channel so that selling of fish is not based on subjective judgement. This would allow the use of standardized weight system which consequently would

broaden market transparency. In addition this would ease the keeping of proper records by traders for future research.

## 5.4 Suggested Areas for Future Research

1. There has been marked growth in export earnings from the fish industry. However this area has not been given much attention in research. Such studies should focus on the expansion of industrial fish processing in Kenya in terms of the participation, output and profits as well as on the foreign demand for Kenya's fish.
2. Transport costs have been indicated as one of the main deciders of fish prices. The economics of alternative ways of transporting fish may be further looked into to determine cost effective means of fish transport.
3. The economics of fish processing has been very briefly handled in this work. There is need to carry out a comprehensive economic analysis of fish processing in the country.

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## APPENDIX

TABLE A.1 FISH PRICES AT BEACH (SOURCE) LEVEL, WHOLESALE MARKET AND RETAIL MARKET IN KISUMU FISH MARKETING SYSTEM (AVERAGES FOR MARCH - MAY 1991)

| | Price (Ksh/Kg) by fish types | | | | |
|---|---|---|---|---|---|
| | Tilapia (Fresh) | Tilapia (Sun-dried) | Tilapia (Smoked) | "Omena" (Sun-dried) | Nile perch (Fresh) |
| **Retail market** | | | | | |
| Kibuye | 17.45 | 43.30 | 43.30 | 21.90 | 23.60 |
| Manyatta | 19.45 | 49.40 | 49.80 | 22.10 | 24.80 |
| Otonglo | 16.85 | 49.70 | 48.60 | 22.70 | - |
| Jubilee | 17.70 | 41.00 | 41.10 | 20.65 | 25.20 |
| Kowino/Nyalenda | 19.15 | 41.20 | 41.65 | 20.75 | - |
| Okonyowelo/ Pand pieri | 18.55 | 41.55 | 42.05 | - | - |
| Kondele/Mamboleo | 19.85 | 48.60 | 48.75 | 21.80 | 25.60 |
| Aggregate | 18.45 | 44.95 | 45.05 | 21.60 | 24.80 |
| **Wholesale market** | | | | | |
| Jubilee | 13.15 | 28.80 | 29.20 | 14.25 | 18.00 |
| Kibuye | 13.50 | - | - | - | 18.40 |
| Kichinjio | - | 27.50 | 26.90 | - | - |
| Aggregate | 13.35 | 28.15 | 28.05 | 14.25 | 18.20 |
| **Source /Beach** | | | | | |
| South Nyanza (Karungu, Muhuru, Mbita, Kendu Bay) | - | - | - | 12.15 | 10.00 |
| Kisumu District (Osiri, Usoma, Dunga, Tako, Kusa, Kaloka) | 8.70 | - | - | 12.35 | 10.90 |
| Siaya District (Misori, Asembo, Uhanya, Wichlum, Usenge) | 8.20 | - | - | 12.30 | 10.45 |
| Busia District (Busia, Port Victoria, Sio port) | 7.75 | 14.50 | 14.90 | - | - |
| Marsabit District (Alia Bay, Loivangalani) | - | 14.35 | - | - | - |
| Aggregate | 8.20 | 14.40 | 14.90 | 12.25 | 10.45 |

## QUESTIONNAIRE FOR RETAIL FISH TRADERS

1. Location of market .....

Nature of Premises: Market Stall/Kiosk/Other .....

Information on Respondent:

2.1 Name of respondent ..... Sex: Male/Female

2.2 Position of respondent in business: Owner/Wife of Owner/ Partner/Employee.

2.3 Besides this business are you in any other occupation?Y/N

2.4 If yes, specify the other occupation (s) .....

2.5 How much time do you spend on this business daily? Full day/Half day/Less than half day.

2.6 How many days of the week do you operate this business?

.....

Background of Business

3.0 When was this business started .....

3.1 How much was required to start business .....Ksh

3.2 Where did you get funds for starting business? Own savings/Revenue from other business/Loan from Bank or Cooperative/Borrowed from other traders/ Others.....

3.3 How much would one require to start such a business now? ..... Ksh

3.4 Is the premises where you sell fish owned/rented .....

3.5 a) if owned how much did it cost you to build or purchase? ..... Ksh

b) When was it build? ..... What is its expected life span .....

3.6 If rented how much do you pay? ..... Ksh per month.

3.7 List the other facilities you have for marketing?

| Facility | Number | Cost of Purchasing | Year and Month acquired | Expected life span |
|---|---|---|---|---|
| | | | | |

3.8 How much do you pay for license? ..... Ksh per year

3.9 Other levies charged .....Ksh per day

.....Ksh per month

3.10 How much is the health permit .....Ksh per year

Buying Activities

4.0 a) Which is the main fish type you trade in? .....

b) Which other fish do you trade in? .....

4.1 From whom do you buy the fish? Fishermen/Wholesale middlemen/Cooperatives at the beaches/Other retail traders/other.....

4.2 Do you go to get fish from your supplier or they deliver fish to your premises? Get from them/deliver to me.

4.3 Do you buy from same supplier(s) always? Yes/No

4.4 Do you make any arrangement with your supplier in advance? Yes/No

4.5 If yes what are the specifications of agreement?

On price/On quantity of fish to deliver/On frequency of delivery/Credit arrangement/ Others .....

4.6 In which months of the year do you experience shortage in

supplies of fish?.....

4.7 How does that affect price demanded by your supplier(s)?

Increase/same

4.8 In which months of the year do you have excess supplies of fish? .....

4.9 How does that affect prices demanded by your supplier(s)?

Decrease/Same

Selling activities

5.0 Do you make any arrangement with your customers in advance?

Yes/No

5.1 If Yes, what are the specifications of agreements?

On price/On quantity of fish to deliver/On frequency of delivery/Sell on credit/ Other .....

5.2 Which group of customers do you arrange with?.....

5.3 What different services do you provide to attract more customers? .....

5.4 Are all your customers aware of such services? Yes/No

5.5 When selling do you know the quantities and types of fish sold by other retailers in the same market? Yes/No

5.6 When selling fish do you know the prices of other retailers? Yes/No

5.7 How do you find out this information?

Own observation/From other traders/Other.....

5.8 Do you make any agreements (on price/Quantity of fish to sell) with your rivals? Yes/No

5.9 If Yes, what are the specifications of agreements?

On prices to sell fish at/On quantity of fish to sell.

5.10 What do you base your selling price on?

On buying price/On quantity available in the market for sale/On prices charged by rival traders/ Others .....

Part II COSTS OF MARKETING[1]

11.1 Name of Main fish traded.....

11.2 Number of units of main fish handled per month .....

11.3 Average weight per unit of fish .....Kg

11.4 Total weight of main fish sold by trader per month.....Kg

11.5 Monthly purchasing cost of main fish traded.....Ksh

11.6 Monthly value of main fish traded .....Ksh

11.7 Give details of other fish types traded

| Type of fish | Source of fish | Average Number of units/month | Unit weight | Total Weight sold by trader |
|---|---|---|---|---|
| | | | | |

[1] for estimates of quantities and costs, give average for months of March, April and May 1991

11.8 Total monthly purchasing cost of other fish types traded .....Ksh

11.9 Total monthly value of other fish types traded .....Ksh

12.0 In which form do you buy the main fish?

Fresh/Semi-processed

12.1 Do you semi-process the fish before selling? Yes/No

12.3 How much do you spend on semi-processing?....Ksh per month

13.0 Do you incur any cost for storage of fish? Yes/No

13.1 What are the storage charges per unit/per day?.....Ksh

13.2 What is the approximate storage cost? ..... Ksh per month

13.3 Do you use ice to preserve fish? Yes/No

13.4 What is the cost of ice? .....Ksh per day

.....Ksh per month

14.0 What means do you use to transport fish from your supplier to market? Pickup or lorry/Train/Matatu/Bicycle/On foot.

14.1 How many trips do you make? .....per day .....per month

14.2 What is the transport cost per trip (includes fare).....Ksh

14.3 How many units of fish do you carry per trip.....

14.4 What is the approximate transport costs per month .....Ksh

14.5 How much do you spend on the following?

| | Amount per week (Ksh) | Amount per month (Ksh) |
|---|---|---|
| Handling costs | ..... | ..... |
| Packaging cost | ..... | ..... |

14.6 What are your personal expenses (e.g for food and board) while on business? Ksh .... per day Ksh..... per month

14.7 a) approximately how much fish do you lose due to lack of customers?..... Kg per day ..... Kg per month

b) What is the estimated cost of fish loss?

.....Ksh per day Ksh per month .....

15.0 Do you employ any labour? Yes/No

15.1 If Yes, state number employed and average wage.

Number employed .....

Average wage ..... Ksh

16.0 How much net income would you earn if you were in a different trade? Ksh.....per month

Which trade? .....

16.1 What minimum net income should you earn to keep you in this business? Ksh.....per month

## QUESTIONNAIRE FOR WHOLESALE FISH TRADERS

1.1 Name of respondent .....

Location of Business .....

1.2 Position of respondent in business:

Owner/Wife of owner/ Partner/Emplovee/ Other .....

1.3 When was the business started? .....

1.4 How much was required to start this business? .....

1.5 Where was the source of funds for starting business?

Own saving/revenue from other business/loan from bank or cooperative/ Loan from other fish dealers/ Other .....

1.6 How much would one require to start a similar business now?

.....Ksh

2.0 a) Which is the main fish you trade in? .....

b) Where is the source of this fish? .....

2.1 List other fish types you trade on and their sources?

| | Fish Type | Source |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |

2.2 Are you also fisherman/Wife of fisherman/Partner with fisherman/None of these .....

2.3 If none, from whom do you get fish ?

fishermen/other fish traders/cooperative/ other .....

2.4 Do you buy from the same supplier(s) always?

Yes/No

2.5 Do you make any contractual agreement with your suppliers in advance?

Yes/No

2.6 If Yes, what is the nature of agreement made?

On price delivered/ On quantity delivered/On frequency of delivery/ Purchase fish on credit/Other .....

3.0 To whom do you normally sell fish (Number in order of importance): Private households/Hotels and Institutions/ Retail Traders/ Others.....

3.1 Do you have contractual arrangement with any of your customers? Yes/No

3.2 If Yes, Which group of customers? .....

3.3 What is the nature of agreements made? On quantity of fish to deliver/On frequency of delivery/On prices/sell on credit/other.....

3.4 Do you make any agreement (on price and/or quantity of fish to sell) with your rivals? Yes/No.

3.5 If Yes, what is the nature of agreement?

Price to sell at/quantity of fish to sell

3.6 What do you base your selling price on?

On buying price/ On quantity available for sale in market/ On price charged by other traders.

3.7 Indicate the general supply and price levels (High-H, Medium-M, Low-L) during the months of the year for main fish traded

| | J | F | M | A | M | J | J | A | S | O | N | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Supply Level | | | | | | | | | | | | |
| Price Level | | | | | | | | | | | | |

3.8 In your opinion, what factors determine the supply patterns for this fish at the beaches?.....

3.9 a) approximately how much fish do you lose due to lack of customers?..... Kg per day ..... Kg per month

b) What is the estimated cost of fish loss?

.....Ksh per day Ksh per month .....

4.0 Do you employ any labour? Yes/No

If Yes, Numbers ..... Average Wage ..... Ksh

4.1 How much time do you spend in this business ?

Hours per day..... Days per week .....

4.2 List marketing facilities owned

| Name of facility | Number | Cost of purchasing | Year acquired | Estimated life span |
|---|---|---|---|---|
| | | | | |

4.3 How much do you pay for license? Ksh.....per year

4.4 Other levies charged: Ksh.....per day

Ksh.....per month

4.5 How much is health permit? Ksh.....per year

Part II: Cost of Marketing

11.1 Name of Main fish traded.....

11.2 Number of units of main fish handled per month .....

11.3 Average weight per unit of fish ..... Kg

11.4 Total weight of main fish sold by trader per month.....Kg

11.5 Monthly purchasing cost of main fish traded .....Ksh

11.6 Monthly value of main fish traded ..... Ksh

11.7 Give details of other fish types traded

| Name of fish | Source of fish | Average Number of units per month | Unit weight | Total Weight sold by trader |
|---|---|---|---|---|
| | | | | |

11.8 Total monthly purchasing cost of the other fish types traded ..... Ksh

11.9 Total monthly value of the other fish types traded..... Ksh

12.0 In which form do you buy the fish?

Fresh/Semi-processed

12.1 Do you semi-process the fish before selling? Yes/No

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for estimates of quantities and costs, give average for months of March, April and May 1991

12.2 How many units do you semi-process?

per day ..... per month .....

12.3 How much do you spend on semi-processing?

per week ..... Ksh. per month ..... Ksh.

13.0 Do you incur any cost for storage of fish? Yes/No

13.1 What are the storage charges per unit/per day?..... Ksh

13.2 On average, how many days/ how many units do you store?

per week ..... per month .....

13.3 What is the approximate storage cost?..... Ksh per month

13.4 What is the cost of ice?

.....Ksh per day ..... Ksh per month

14.0 What means do you use to transport fish from your supplier to market? Pickup or lorry/Train/Matatu/Bicycle/On foot.

14.1 How many trips do you make? per day ..... per month .....

14.2 What is the transport cost per trip (include fare?.... Ksh

14.3 How many units of fish do you carry per trip? .....

14.4 What is the approximate transport costs per month ..... Ksh

14.5 How much do you spend on the following?

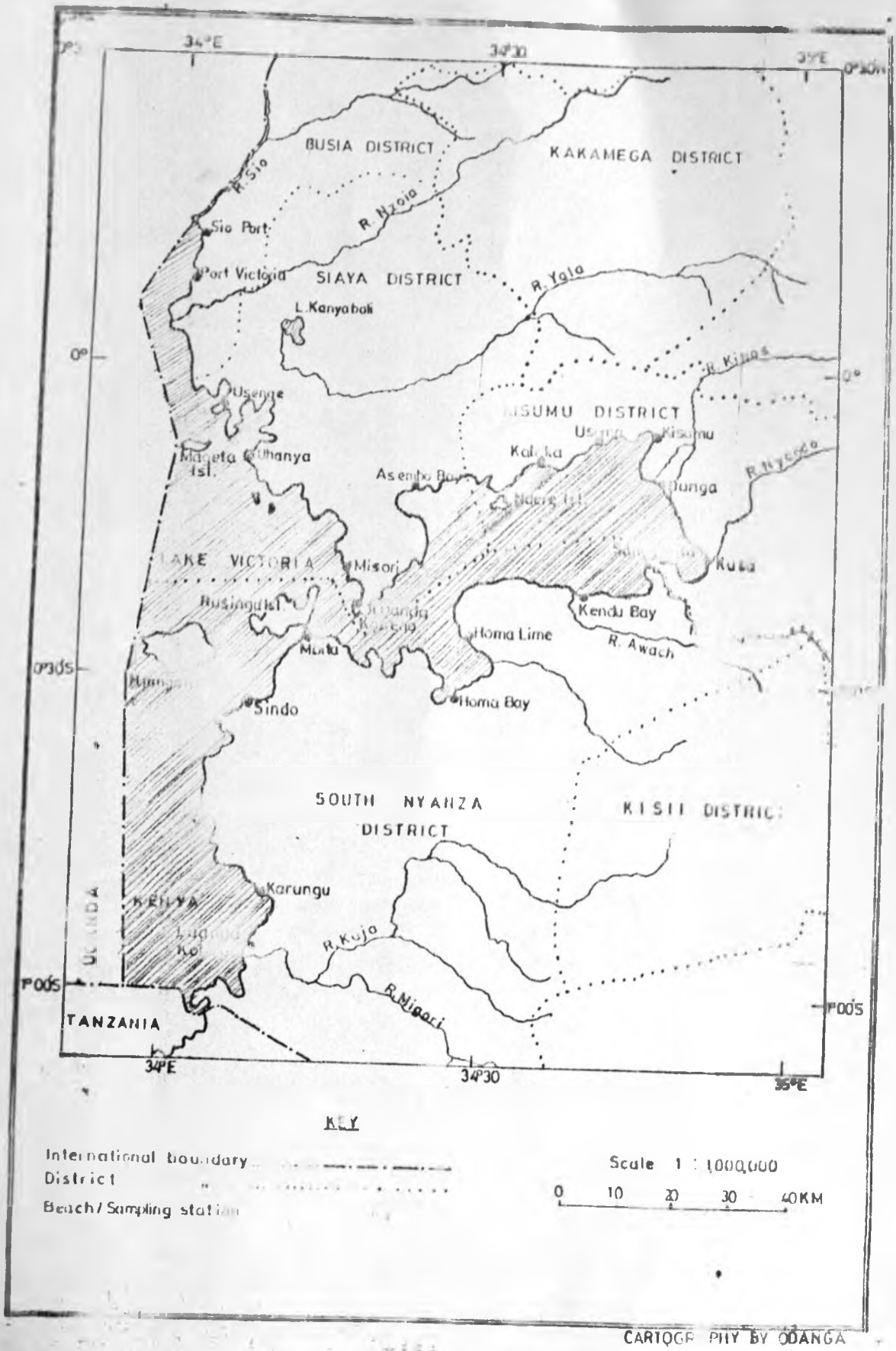
| | Amount per week (Ksh) | Amount per month (Ksh) |
|---|---|---|
| Handling costs | ..... | ..... |
| Packaging cost | ..... | ..... |

14.6 What are your personal expenses (e.g for food and board) while on business? per day ....Ksh per month ..... Ksh

17.0 How much net income would you earn if you were in a different trade? .....Ksh per month Which trade? .....

17.1 What minimum net income should you earn to keep you in this business? ..... Ksh per month

FIGURE A.1: FISH LANDING BEACHES ON LAKE VICTORIA (KENYAN WATERS)

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