

## **Analysis of Competition in the Wholesale and Retail Markets for fish in Kisumu, Kenya**

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### **ABSTRACT**

This study analyses competition in the wholesale and retail fish marketing system in Kisumu, which is Kenya's largest fish market. It is based on cross sectional and time series primary data collected in a survey involving 88 retailers and 47 wholesale traders of fish in the town. Stratified random sampling method was used in selecting the respondents.

Concentration ratios, Lorenz curves and Gini coefficients are derived and evaluated for both markets. They demonstrate that market shares are unequally distributed among the wholesalers and retailers. The Gini coefficients are 0.37 and 0.45 for the whole and retail markets respectively.

Based on a Gini coefficient cut-off level of 0.4, it is concluded that the wholesale fish market exhibits effective competition while the retail outlet has oligopolistic tendencies. The implication of this level of competition to price efficiency is discussed. Intervention measures to enhance competition in the market are recommended.

### **INTRODUCTION**

The perfectly competitive market model is often used in economics to evaluate the structure and performance of a given marketing system. This model is characterized by a large number of buyers and sellers, ease of entry and exit, product homogeneity and adequate information flow in the market. Each trading firm in the competitive market maximises profits by equating the price to its marginal cost. The competitive market prices thus reflect both consumer demand and the cost of resources employed (SCHEID and SUTENAN, 1979). The prices are related in time, space and form dimensions by storage, transport and processing costs respectively (SHEPHERD and FUTREL, 1969). This illustrates efficient pricing.

Where there are only a few sellers, each with a big market share, decisions on prices and profits are in the hands of only a few participants. Such markets are associated with non-competitive pricing arrangements (STAATZ, 1980). The resulting price margins

are in excess of the costs of resources employed, indicating price inefficiency (SHEPHERD and FUTREL, 1969).

Competition and efficiency are hence closely related. (MILLER, 1984) affirms that competition in a marketing system is a pre-requisite for allocative and economic efficiency. (CLODIUS and MUELLER, 1969) define four variables commonly used to analyze competition in a marketing industry. They are the market concentration, product differentiation, market integration and barriers to entry and exit. Among these, market concentration has the most important influence on the market structure, conduct and performance (ROSENBLUTH, 1955; TOMEK and ROBINSON, 1972).

Market concentration refers to the percentage of total transactions accounted for by a given number of sellers or buyers, ranked in order of market shares from the largest to smallest (SCHEID and SUTENAN, 1979). The percentage share of the largest 4 or 8 firms are commonly used to compare market

concentrations and evaluate competition in the marketing industry (UNITED STATES, 1966; BAIN, 1951; BAIN, 1968; MANN, 1966; RHOADES, 1973; KEYSEN and TURNER, 1965; SCHEID and SUTENAN, 1979 STAATZ, 1986 and KARUGIA, 1991).

Lorenz curves also show the degree of inequality in the market. The Lorenz Curve is a graphical display of the distribution of actual market shares in comparison to the hypothetical case of equal sharing.

The Gini coefficient, on the other hand, is a statistical measure of range 0 to 1 based on the Lorenz Curve. It is a summary of the concentration for all firms in the market, and oligopolistic behaviour increases as the coefficient tends to 1 (SCHEID and SUTENAN, 1979). The Gini coefficient is a better measure where results for the top 4 or 8 firms is inconclusive in grading the competitiveness of the market.

ANDIC and PEACOCK 1961 show that the Gini coefficient,  $R$ , can be expressed as:

$$R = \sum_{k=1}^j (P_{k-1} Q_k - P_k Q_{k-1}) \times 1/10000$$

Where,  $P$  = Cumulative frequency of trader classes.

$Q$  = Cumulative frequencies of values of commodity sold by each group of traders.

$k$  = Serial order for cumulative frequencies of the class sizes.

Various authors have suggested standards for evaluating competition in the marketing industry based on the level of concentration. UNITED STATES 1966 define high concentration as a situation in which the 4 largest firms handle 50% or more of the sales. BAIN (1951) and MANN (1966) conclude that high concentration occurs when the largest 8 firms control 70% or more of the market, while RHOADES (1973) puts it where the largest 4 firms control more than 30% of the sales. KEYSEN and TURNER (1965) propose that moderate concentration occurs when the top 8 firms handle 50% of the trade. BAIN (1968) though puts it where the first 4 and 8 firms in the industry control at least 35% and 45% respectively of the market.

STAATZ (1986) classified the cattle and beef markets in Abidjan and Bouake, where the largest 4 traders controlled 36% and 50% of the sales respectively, as low concentration. KARUGIA (1991) also determined that the top 4 and 8 beef retailers in Nairobi handled 20% and 35% of the respective market sales and concluded that the market exhibited low grade oligopoly. Similarly, SCHEID and SUTENAN (1979) detected oligopolistic behaviour in the market for finfish in Costa Rica, where the largest 4 and 8 sellers controlled 38% and 62% of the trade respectively.

PARKER and CONNOR (1979) recommended a Gini coefficient of 0.4 and below to indicate effective competition, and otherwise as non-competitive or oligopolistic tendencies. This is a more definite measure since shares of all firms in the market are considered.

High market concentration suggests oligopoly while low concentration would imply competitiveness, provided there are no major barriers to entry into the market (BAIN, 1968). Market concentration also affects the levels and distribution of prices, income and profits. A highly concentrated industry may thus promote inequality in income distribution (SCITOVSKY, 1955).

### Kenya's fish industry

Kenya's fish industry is a source of income, employment and food for over 11.2 million Kenyans (OGUTU, 1992). It also earns foreign exchange for the country through export of fish products. In 1993 about 162,910 tonnes of fish was landed from Kenya's portion of Lake Victoria. This represented about 90% of Kenya's total fish output (KENYA, 1994). Three species of fish in the lake are extensively targeted due to their market value. They are *Lates Niloticus* (Nile Perch), *Oreochromis* species (Tilapia) and *Rastrineobola argentea* ("Dagaa").

The fish is sold in local beaches around the lake, in nearby and distant urban markets and in the export market. Kisumu is Kenya's largest urban market for Lake Victoria's fish. The typical marketing channel has both wholesale and retail traders who transfer fish from the fishermen on landing beaches to consumers buying fish at the designated retail outlets. (ABILA, 1995; MOEN, 1983; NYANJA, 1986).

## Limitations on Fish Marketing Policy

The Government policy on the fish industry aims at increasing fish production by ensuring high remunerations to fishermen. It also intends to promote fish consumption by making fish more available to consumers at affordable prices (KENYA, 1989). Where as fish prices have risen at all levels of the market in the last two decades, there have been disproportionate changes in earnings for retailers, wholesalers share of the consumer price declined from 40% to 20% between 1971 and 1985 and this trend is expected to have continued in the next decade (REYNOLDS and GREBOVAL, 1988).

Increasing consumer prices coupled with declining shares of fishermen's earnings are in contrast to the Government's objectives and it suggests imperfect competition among the fish marketing middlemen. Uncompetitive market prices may be inefficient and contain high margins above the actual costs of providing the marketing services, thus raising consumer prices unnecessarily. This raises the need to evaluate the competitiveness of the fish trade.

## Objective of the Study

To evaluate competition in Kisumu wholesale and retail fish marketing systems using concentration ratios, Lorenz curves and Gini coefficients and make appropriate recommendations.

## Methods of Data Collection and Analysis

The study mainly used cross-sectional and time series primary data obtained from a survey of fish traders carried out in Kisumu from 1992 to 1993. A stratified random sampling techniques was used to select 88 retailers in 10 fish retail markets and 47 wholesalers in 3 wholesale markets in the town.

The sample comprised 37% and 51% respectively of the total population of fish retailers and wholesalers operating in the town. The traders were stratified on basis of the location of markets they operated in and the fish species they sold. Interviews were carried out using a detailed questionnaire.

In addition, samples of fish were weighed and unit prices, in Ksh/Kg, recorded daily. The quantity, in Kg, of fish sold by each sampled

trader was also recorded during the period. The monthly average quantity of fish sold by each trader multiplied by the mean monthly price gave the value of sales, in Ksh., by each retailer and wholesaler per month. This was taken as unit measure of the transactions and used to derive concentration ratios and Gini coefficient and construct Lorenz curve for the two markets.

## ANALYSIS AND RESULTS

### Wholesale markets

The wholesaler with the smallest transactions sold fish valued at Ksh. 12,768.25 per month while that with the highest monthly sales traded valued at Ksh. 341,693.55. The wholesalers have been classified into 7 classes of monthly transactions using class intervals of Ksh. 50,000 Table 1.

The largest 4 and 8 wholesalers, representing about 9% and 17% of the sample, accounted for 30% and 43% respectively of the wholesale market sales. The figures fall in the ranges indicated by KARUGIA (1991) and RHOADES (1973) but outside the ranges suggested by SCHEID and SUTENAN (1979), UNITED STATES (1966) and BAIN (1968) for oligopolistic markets. These results are hence inconclusive in telling the degree of completion in the market.

Lorenz curve, (Fig. 1), has been constructed for the wholesale market using data of sales values for all sampled wholesalers. The cumulative percentages of sales values arranged from highest to lowest in X-Axis is plotted against corresponding cumulative percentages of number of traders in Y-Axis. The degree of departure of the curve from the diagonal line shows the extent of the deviation of distribution from equality. There is hence inequality in the distribution of shares among the wholesalers.

Using cumulative frequency values (Table 1) the Gini coefficient for the wholesale market is calculated as follows:

$$\begin{aligned}
 R &= (42.5 \times 54.2) - (18.4 \times 80.8) = 816.78 \\
 &\quad (80.8 \times 70.8) - (54.2 \times 91.4) = 766.76 \\
 &\quad (91.4 \times 75.5) - (70.8 \times 93.5) = 280.90 \\
 &\quad (93.5 \times 82.2) - (75.5 \times 95.6) = 467.90 \\
 &\quad (95.6 \times 90.3) - (82.2 \times 97.7) = 601.74 \\
 &\quad (97.7 \times 100.0) - (90.3 \times 99.8) = \underline{758.06} \\
 &\qquad\qquad\qquad 3692.14 \\
 &= 3692.14 \times 1/10\ 000 \\
 &= \underline{.37}
 \end{aligned}$$

Table 1. Value (KSH) of Fish transacted by Sample Wholesale Traders in Kisumu per month

Serial No. of Class	Range of Values of Fish Sold by Class (Ksh.)	No. of Wholesalers in Class	Relative Frequency of Class Size	Cumulative Frequency of Class Size	Total Value of Fish sold by Class (Ksh)	Relative Frequency of Sales by Class	Cumulative Frequency of Sales by Class
1	Up to 50 000	20	42.5%	42.5	652 093.40	18.4%	18.4
2	50 001-100 000	18	38.3%	80.8	1 267 031.30	35.8%	54.2
3	100 001-150 000	5	10.6%	91.4	589 039.25	16.6%	70.8
4	150 001-200 000	1	2.1%	93.5	167 767.70	4.7%	75.5
5	200 001-250 000	1	2.1%	95.6	237 759.30	6.7%	82.2
6	250 001-300 000	1	2.1%	97.7	285 223.50	8.1%	90.3
7	300 001-350 000	1	2.1%	99.8	341 693.55	9.7%	100.0
<b>Total</b>		<b>47</b>	<b>100.0%</b>		<b>3 540 608.00</b>	<b>100.0%</b>	

Source: Survey Results

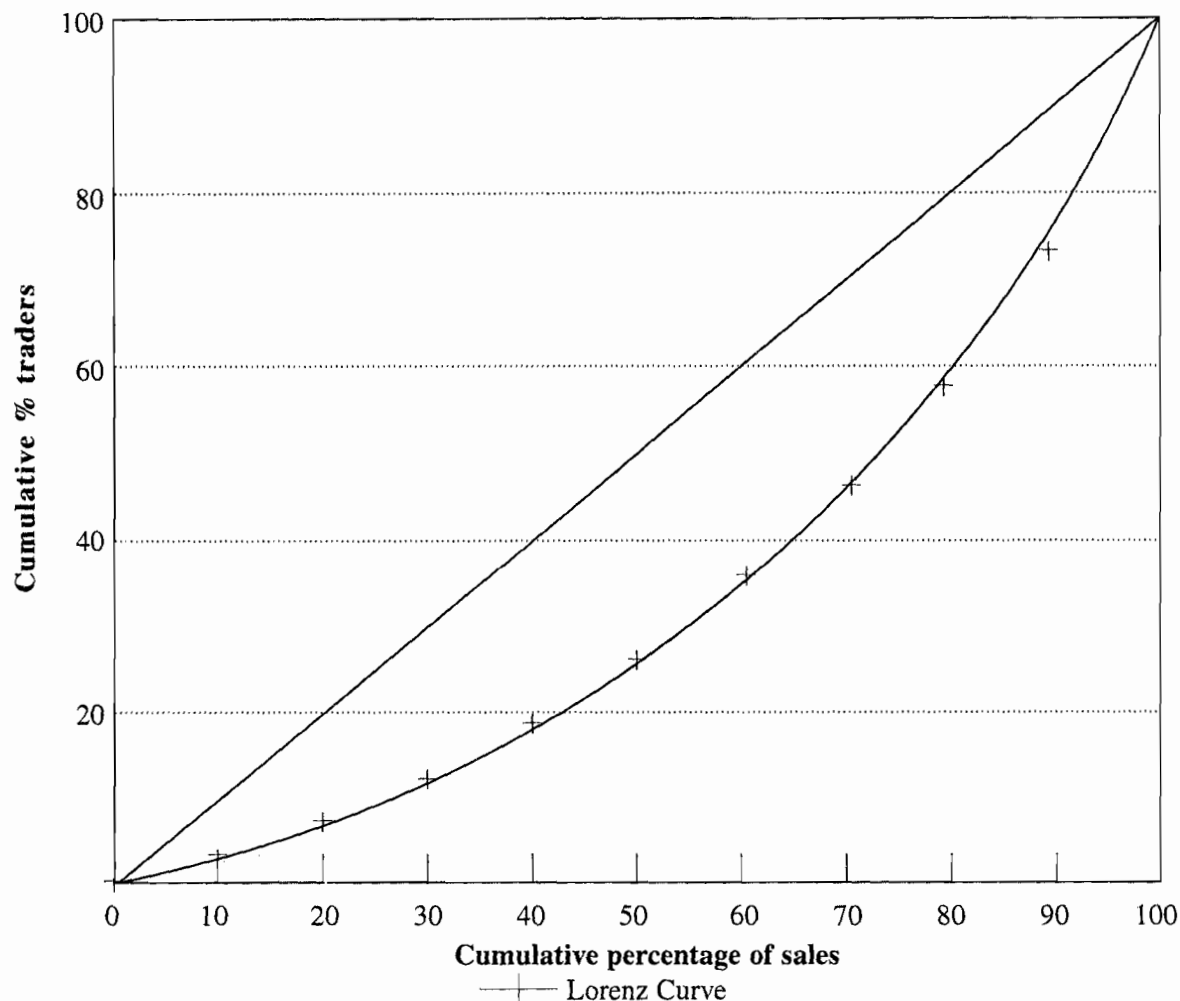


Fig. 1. Lorenz concentration curve for fish wholesale system in Kisumu

### Retail market

The retailer with the smallest monthly transactions handled fish valued at Ksh. 2 224.60 while that with the highest sales traded fish worth Ksh. 78 635.65 per month. The retailers have been put in 8 classes with intervals of Ksh. 10 000 (Table 2).

The largest 4 and 8 retailers comprised only about 5% and 9% respectively of the sample. However a comparative percentage of 9% and 17% (as in the wholesale market) controlled 32% and 48% of the retail market sales. This would suggest that the retail market is less competitive than the wholesale market.

Where as these percentages fall within the ranges set by KARUGIA (1991) and RHOADES (1973), they fall outside the ranges suggested by BAIN, (1986), SCHEID and SUTENAN (1979) UNITED STATES (1966) and STAATZ (1986). Hence these results are also inconclusive.

Lorenz curve, (Fig. 2) has been constructed for the retail market using data of sales values for all sampled retailers and following the same procedure as for Figure 1. As in the case of the wholesale market, the retail market Lorenz curve shows market shares are distributed more unequally in the retail market than the wholesale market. The Gini coefficient for the retail market has been computed using cumulative frequency values (Table 2).

$$\begin{aligned}
 R &= (52.3 \times 37.9) - (19.1 \times 72.8) = 591.69 \\
 &\quad (72.8 \times 57.9) - (37.9 \times 86.4) = 940.56 \\
 &\quad (86.4 \times 67.8) - (57.9 \times 90.9) = 594.81 \\
 &\quad (90.9 \times 77.5) - (67.8 \times 94.3) = 651.21 \\
 &\quad (94.3 \times 84.9) - (77.5 \times 96.6) = 519.57 \\
 &\quad (96.6 \times 94.5) - (84.9 \times 98.9) = 732.09 \\
 &\quad (98.9 \times 100.0) - (94.5 \times 100.0) = \underline{439.45} \\
 &\qquad\qquad\qquad 4469.93 \\
 &= 4469.93 \times 1/10\ 000 \\
 &= \underline{.45}
 \end{aligned}$$

Table 2. Value (KSH) of Fish transacted by Sample Retail Traders in Kisumu per month

Serial No. of Class	Range of Values of Fish Sold by Class (Ksh.)	No. of Retailers in Class	Relative Frequency of Class Size	Cumulative Frequency of Class Size	Total Value of Fish sold by Class (Ksh)	Relative Frequency of Sales by Class	Cumulative Frequency of Sales by Class
1	Up to 10 000	20	52.3%	52.3	270 823.95	19.1%	19.1
2	10 001-20 000	18	20.5%	72.8	267 151.75	18.8%	37.9
3	20 001-30 000	12	13.6%	86.4	283 655.40	20.0%	57.9
4	30 001-40 000	4	4.5%	90.9	139 869.55	9.9%	67.8
5	40 001-50 000	3	3.4%	94.3	136 874.10	9.6%	77.4
6	50 001-60 000	2	2.3%	96.6	105 513.40	7.4%	84.8
7	60 001-70 000	2	2.3%	98.9	136 586.50	9.6%	94.4
8	70 001-80 000	1	1.1%	100.8	78 635.65	5.5%	99.9
<b>Total</b>		<b>88</b>	<b>100.0%</b>		<b>1 419 110.30</b>	<b>100.0%</b>	

Source: Survey Results

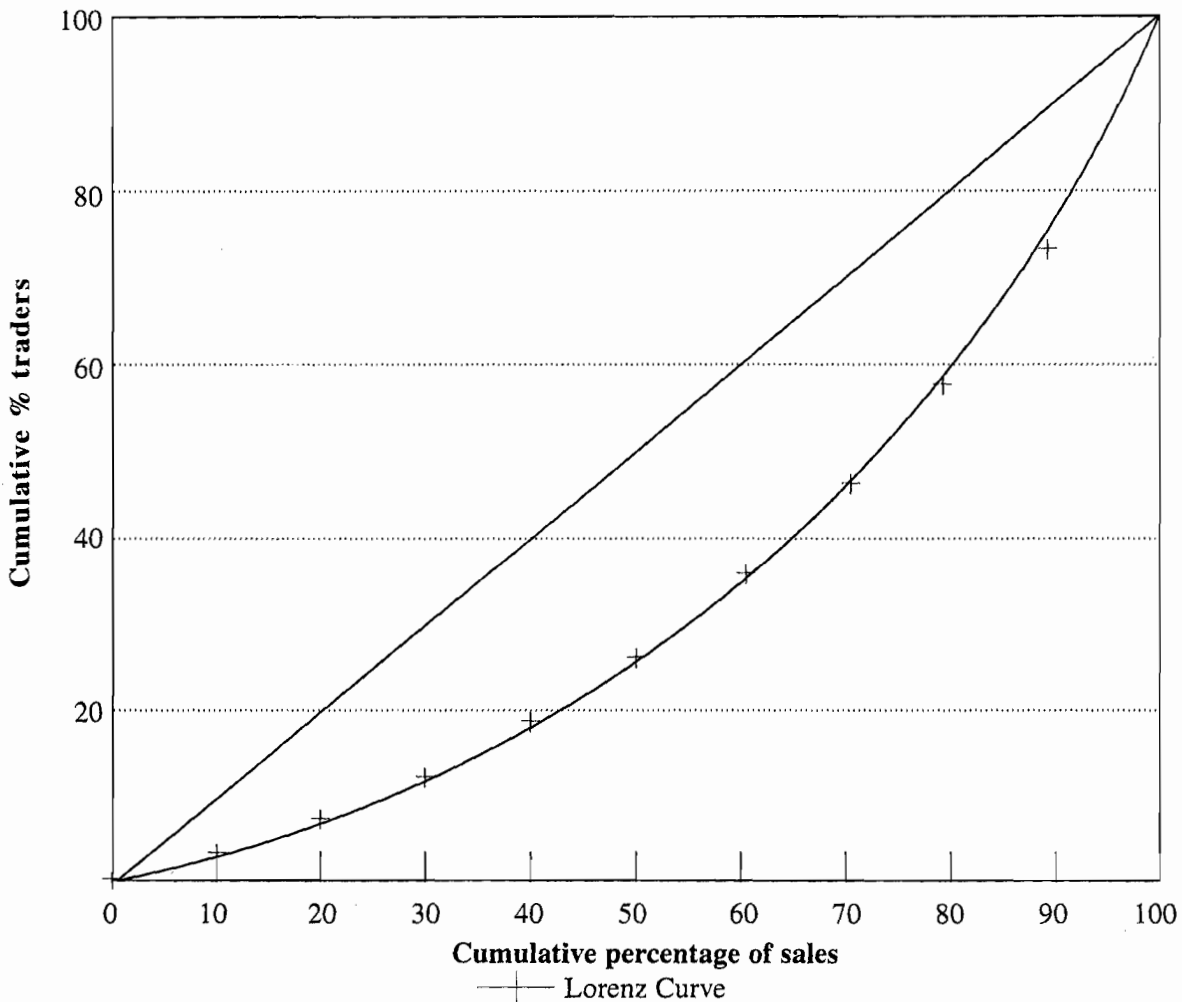


Fig. 2. Lorenz concentration curve for fish retail system in Kisumu

## CONCLUSION

The Gini coefficient for the wholesale market is 0.37 while that for the retail market is 0.45. A randomly selected wholesaler or retailer is therefore expected to have a sales level in the respective market by 37% or 45%. Based on a Gini coefficient cut-off point of 0.4 recommended by Parker and Connor (1979), the wholesale market exhibits effective competition while retail market has oligopolistic tendencies.

## RECOMMENDATIONS

There is need to enhance competition in the Kisumu 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 existing small-scale fish traders. One way is to initiate a credit

system for the traders through which they can easily acquire loans and expand their business. Increased access to market information may also assist in increasing the level of competition and achieve more efficient prices.

## BIBLIOGRAPHY

- Abila, R.O., 1995. Structure, Conduct and Performance of Kisumu Fish Marketing System. Msc. Thesis, University of Nairobi, Nairobi.
- Andic, S. and A.J. Peacock, 1961. "The International Distribution of Income, 1947-1957", *Journal of Royal Statistical Society* Part II, 1961.
- Bain, J.S., 1951. Relation of Profit Rate to Industry Concentration of American Manufacturing, 1936 - 1940. *Quarterly Journal of Economics* No. 65, John Wiley and Sons, New York.

- Bain, J.S., 1968. *Industrial Organization*, John Wiley and Sons, New York.
- Clodius, R.L. and W.F. Mueller, 1961. Market Structure Analysis as an Orientation for Research in Agricultural Economics, *Journal of Farm Economics* XLIII (3) 1961.
- Karugia, G., 1991. Competition and Efficiency in the Nairobi Beef Retailing System, Msc. Thesis, University of Nairobi, Nairobi.
- Kenya Government, 1989. Development Plan 1989-1993, Ministry of Planning and National Development, Nairobi.
- Kenya Government, 1993. Statistical Abstracts, 1993 II, Ministry of Planning and National Development, Government Printer, Nairobi.
- Keynes, C. and D.F. Turner 1959. *Antitrust Policy*, Harvard University Press, Harvard.
- Mann, H.M., 1966 Seller Concentration, Barriers to Entry and Rates of Return in Thirty Industries, 1950 - 1960, *The Review of Economics and Statistics* Journal No. 48, New York.
- Miller, L., 1984. Economic Organization of Australian Agriculture. National Agricultural Outlook Conference Report, Canberra.
- Moen, E., 1983. FISH: Market Patterns and Prospects, FAO Fisheries Technical Paper No. 233, FAO, Rome.
- Nyanja, E.O., 1986, An Economic Analysis of Fresh-Water Fish Marketing on the Landing Beaches of Lake Victoria, Msc. Thesis, University of Nairobi.
- Ogotu, G.M., 1992. Socioeconomic Condition of Lake Victoria Fishermen, The Aquatic Resource Magazine Vol. 1 No. 1, National Printing Press, Kisumu.
- Parker R.C. and J.M. Connor, 1979. Estimates for Consumer Loss Due to Monopoly in the U.S. Food Manufacturing Industries. *American Journal of Farm Economics*, 1979.
- Reynolds, J.E. and D.F. Greboval, 1988. Socioeconomic Effects of Evaluation of Nile Perch Fisheries in Lake Victoria: Review CIFA Technical Papers, FAO, Rome.
- Rosenbluth, G., 1955. *Measure of Concentration*, National Bureau of Economic Research Conference Report, Princeton University Press, New Jersey.
- Scheid, A. C. and J.C. Sutenan, 1979. The Structure and Performance of Wholesale Market for Fin Fish in Costa Rica ICMRD Working Paper No. 4, USAID, Costa Rica.
- Scitovsky, T., 1955. Economic Theory and the Measure of Concentration, National Bureau of Economic Research Report, Princeton University Press, New Jersey.
- Shepherd, G.S. and G.A. Futrell, 1969. *Marketing Farm Products*, IOWA State University Press, Iowa.
- Staatz, J., 1980. Economics of Cattle and Meat Marketing in Ivory Coast, Discussion Papers No. 86, Centre for Research on Economic Development, University of Michigan, Michigan.
- Tomek, W.R. and K.L. Robinson, 1972. *Agricultural Product Prices*, Cornell University Press, London.
- United Nations 1992. Survey of Economic and Social Conditions in Africa, 1989 - 1990, United Nations, New York.
- United States National Commission on Food Marketing 1966, Food from Farmer to Consumer. *Commission Report*, Government Printing Press. Washington.