SOCIO-ECONOMIC IMPLICATIONS OF FISH TRADE AND EXPORTS IN UGANDA

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Abstract

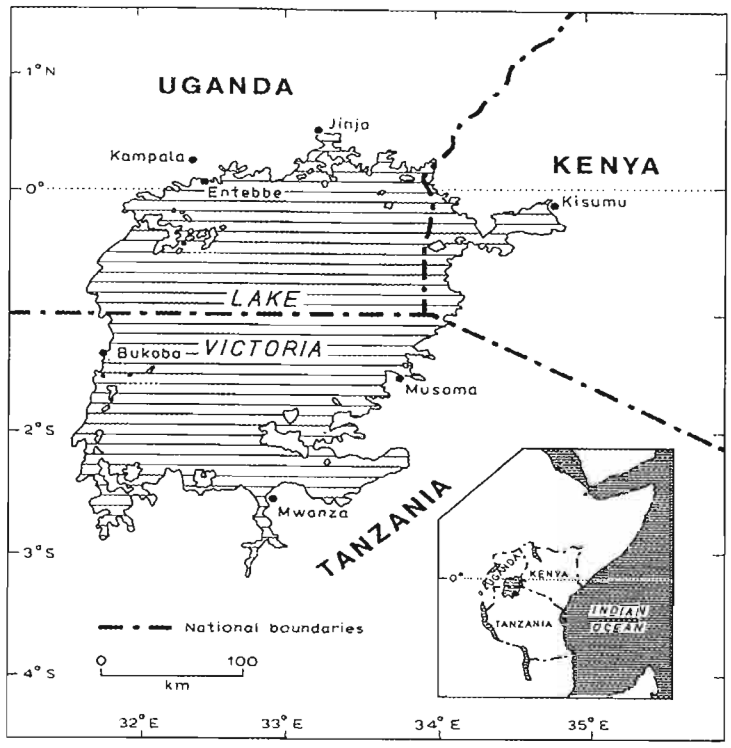
Implications of the fish export trade on the people and the fisheries resource of Lake Victoria, Uganda were examined. Eight fish processing factories and ninety fishers were analyzed in terms of socio-economic characteristics of fishers and the economic characteristics of fish factories. Results indicated that industrial fish processors in Uganda are presently the main link between the artisanal fisher-folk and the overseas export markets. Their entry into the market has stabilized and expanded the fisher-folk market and average earnings. Fishers attributed improvement in incomes and living standards (76%) to positive changes in the fish market (78%) in the last 5 years (1994-1999). Ugandan fisher-folk communities are not seriously affected by the Nile perch exports (73%) because they normally have easy access to cheap fish at prices much less than urban prices and; depend mainly on alternative fish species of less export value. The price of Nile perch influences positively the price of Tilapia. This makes poor domestic consumers and some fisher-folk communities more vulnerable to the high prices, which they cannot afford. Traditional fish processors and boat crew (real fishers) have lost out to boat owners, middlemen, local traders and factory owners who have benefited more from the export trade. The change to alternative low priced fish consisting mainly of juveniles has encouraged poor fishers to use illegal gear, which is more affordable. Attitudes of fishers towards the fish factory developments are positive but there is need for organization at the fish production and marketing level in view of the growing global fish trade if fishers can benefit.

Introduction

Lake Victoria, the second largest fresh water lake in the world, is shared by Kenya (6%), Uganda (45%) and Tanzania (49%) (Figure 1.0) (Welcomme, 1972). The lake constitutes the most important fishery for all the three riparian countries. For the Ugandan side of the lake, total fish production estimates in 1997 was 106,800 tonnes (MFPED1, 1998/99) accounting for ca. 50% of all fish production in Uganda of which 60% was *Lates niloticus* (Nile perch, *Mputa*) (UFD, 998). The boom in Nile perch fishery has sparked off large-scale investments in industrial fish processing for exports since early 1990s. The global trade driven by market forces is intensifying and shifting to small-scale fisheries (*Ngege and mukene*).

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Figure 1.0: Map of Lake Victoria Source: LVFRP



Productive and easily accessible fishing grounds located near major population centers already are at or near maximum levels of exploitation due to strong demand. This problem is particularly acute in the central region, which supports Uganda's largest population and demand for fish because of strong urban settlement and availability of fish export processing factories. The high demand for fish almost exceeds locally available supply from Lake Victoria. The study gives a theoretical overview of marketing and presents the prevailing marketing system along the Uganda shores of lake Victoria, giving a detailed account of trends in fish distribution and marketing with special emphasis on fish exports. Fish distribution levels are identified as well as problems faced by the Small Scale traders as they try to compete with the large firms. The implications of the growth in fish trade and market systems are presented in a discussion form and recommendations for market research and organization at production and distribution levels with respect to equity for all stakeholders given.

Socio-Economic Importance of the Fisheries Industry

Fishing, fish processing and fish trading have provided the basis for food security, employment income and cultural traditions in coastal and inland communities for centuries (FAO, 1995a). Fish are an important element of the human food supply, and fishing is an important factor in global employment. In most Sub-Saharan African countries it provides about 20 percent of total protein

intake (FAO, 1996). It is highly nutritious as well as a valuable supplement in diets lacking essential vitamins and minerals for poor communities in Africa. Fish is marketed fresh, smoked, dried, salted or frozen, and is distributed primarily through informal channels. With the exception of limited quantities of Nile perch exported from Lake Victoria, the overall inland production is consumed in the Region, providing nearly half of local supply (some 3.3 million tonnes) (ibid). Because African consumers prefer fresh fish it attracts a better price. It is generally marketed only near production centres although traders will distribute fresh fish to most urban centres accessible by road. The most important traditional fish preservation technique in Africa is smoke drying. Depending on the market, the fish is dried to different moisture levels. A hard-dried product takes up to three days of hot smoking but may keep for several months, allowing for long distance trading. There is active intra-regional trade in traditional smoked/dried fish (ibid).

In Uganda, fish is the preferred source of animal protein with 70% of the production consumed domestically. Fish represents about 60% of the animal protein intake. The per capita consumption of fish on average is 12.5 kg per year, although an average figure of 38 kg is characteristic of fisher-folk communities within the radius of 35 km from the lake (SEDAWOG, 1999). Compared to the current per caput consumption for sub-Saharan Region of 6.8 kg/person/year this is relatively higher, and almost equal to the world's figure of 13.6 kg (FAO, 1996). Fish is now Uganda's most important non-traditional export with annual volume of about 55,000 tonnes and estimated earnings of US $ 60-80 million. More than 700,000 people depend directly or indirectly on the fish industry in Uganda. These include: fishermen, fishmongers, fish processors, fish exporters, wholesalers and retailers, and the local administration in the districts, which collects taxes on landing sites and markets (East African Newspaper, 1999).

In Uganda, fish processing for exports has increased in importance, being attracted by the growing international market of Europe, the Middle East, the Far East, USA and other developed economies. Their activities include buying fish and fish production either directly or through sub-contracting with fishing enterprises; fish handling, storage and transport of fish; fish clearing and filleting and for freezing or curing in the factory; fish marketing, including market procurement in the countries of destination.

Finally, it is Uganda Government policy to modernize agriculture, raise the quality and consequently increase the quantity of agricultural produce. Research on production and distribution from various sectors is part of the strategy to reduce poverty among the population and; the country has potential to do this from the fisheries sector. This research was undertaken to generate socioeconomic information on fish market systems and performance of the industrial processing industry, which will guide the processes leading to modernization of the fisheries sector and, sustainability of Lake Victoria fisheries. The main objective of this study was to evaluate the socio-economic implications of the fish marketing systems with particular emphasis on fish export market in Uganda by:

1. Analyzing the socio-economic characteristics of fishers in the Lake Victoria fishery.
2. Examining fish marketing systems and the impacts on the fishing activities, food security, employment opportunities and incomes of fisher-folk communities.

Methodology

A survey of 90 fishers (boat owners) and 8 fish factories was conducted from Sept. to Nov. 1999 on Lake Victoria, Uganda. Sampling units were the landing sites and the fish factories, with a fisher and factory manager as main respondent respectively.

Purposive sampling was used to select 8 out of 11 fish factories: Masese, Gomba, Fish and Agro Products, Hwan Sung, Uganda Fish Packers, Ngege, Greenfields and Marine Fish foods, representing all fish factories in Uganda. Some factories were un-operational and had closed down totally due to EU-fish ban in 1997 and 1999, while others were closed for renovation.

Selection for landing sites was based on a stratified approach that ensures full geographical representation of the Lakeshore and Islands. Two regions (Entebbe and Jinja) out of five fisheries regions of Lake Victoria (Entebbe, Jinja, Tororo, Masaka and Kalangala) were selected as a representative sample because most fisheries activity and industrial processing are constituted here. In Entebbe region, 6 landing sites (Kigungu, Kasenyi, Katosi, Ggaba, Kiyindi and Nsazi) and in Jinja region, 4 landing sites (Masese port, Lwanika, Lolwe and Jdagusi) were randomly selected. The market flow information involving fishers, middlemen, whole-seller and trader was collected and; each market was described and a flowchart for each Commercial species (three in total) was prepared.

Results

Market Systems and Fish distribution.

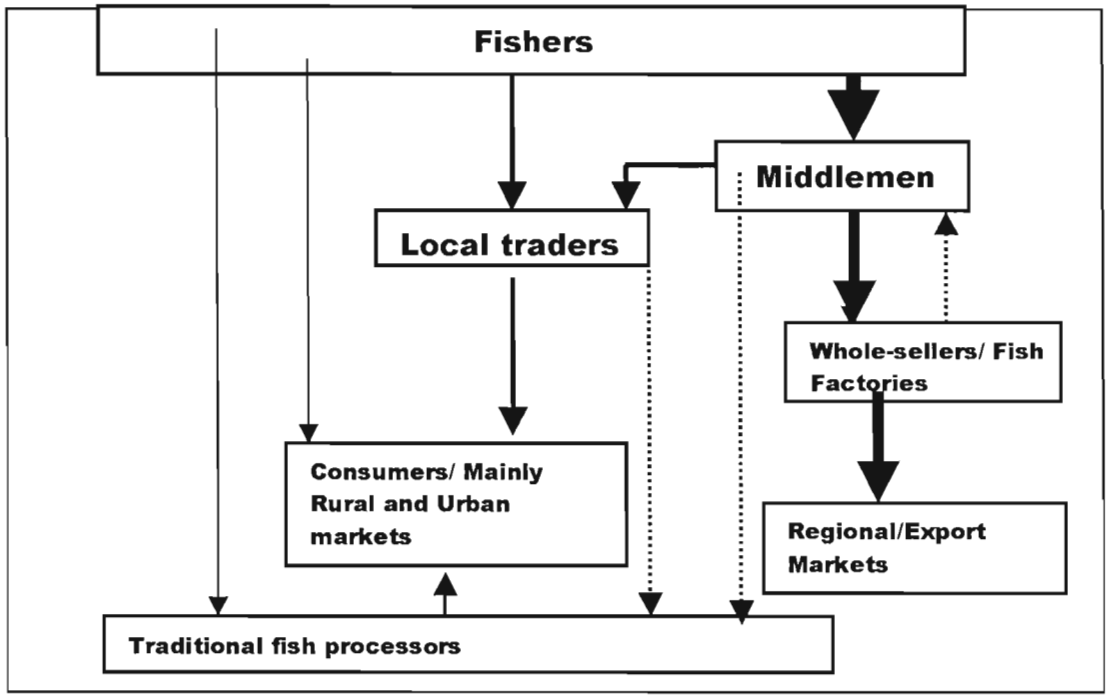
All the fishers interviewed sell their catch for cash and there was a well-developed network for wet fish, with fish being traded in large quantities to most urban markets in Uganda. The most prominent beach markets for fish include Katosi, Kiyindi, Gabba, Kasenyi, Dimo was found to be in Ggaba land beaches; Bugoto, Wakawaka and several beaches in Kalangala as Island beaches. Fishers sell their fish to independent supply agents, local market traders, local fish processors and directly to fish processing factories, and to consumers.

From this survey, it was noted that three main commercial fishery have emerged with characteristic distribution channels (Figures 2 a, b and c). The main outlets being Fish factories, Urban markets, semi-urban and rural communities, fish-meal factories, Hotels and restaurants within the country and, regional and international export markets.

Overall, however, most fishers sell their fish to local market traders (63%) and to middlemen (46%). Only 19 % of the fishers interviewed supply their fish directly to fish factories; local

Fish market Structure for Nile perch, Nile Tilapia and *mukene*

Figure 2 a: Marketing structure for Nile Perch



Signify the flow of reject fish or Nile perch scrap from factories

Signify the flow of mainly immature Nile perch from very poor fishers

NB: The thickness of the line denotes the intensity of fish flow.

Figure 2 b: Marketing structure for *Mukene*

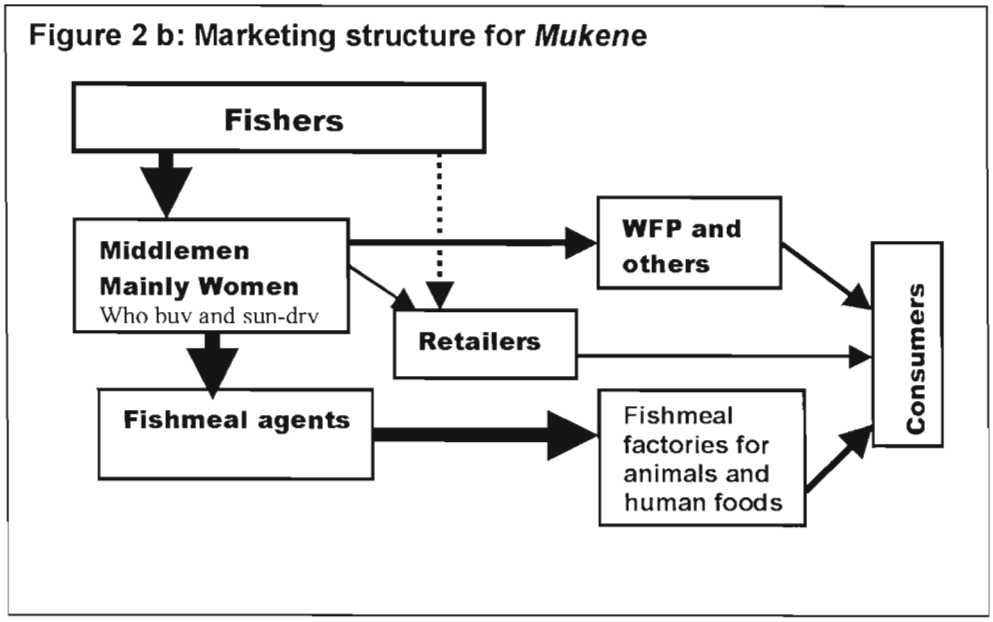
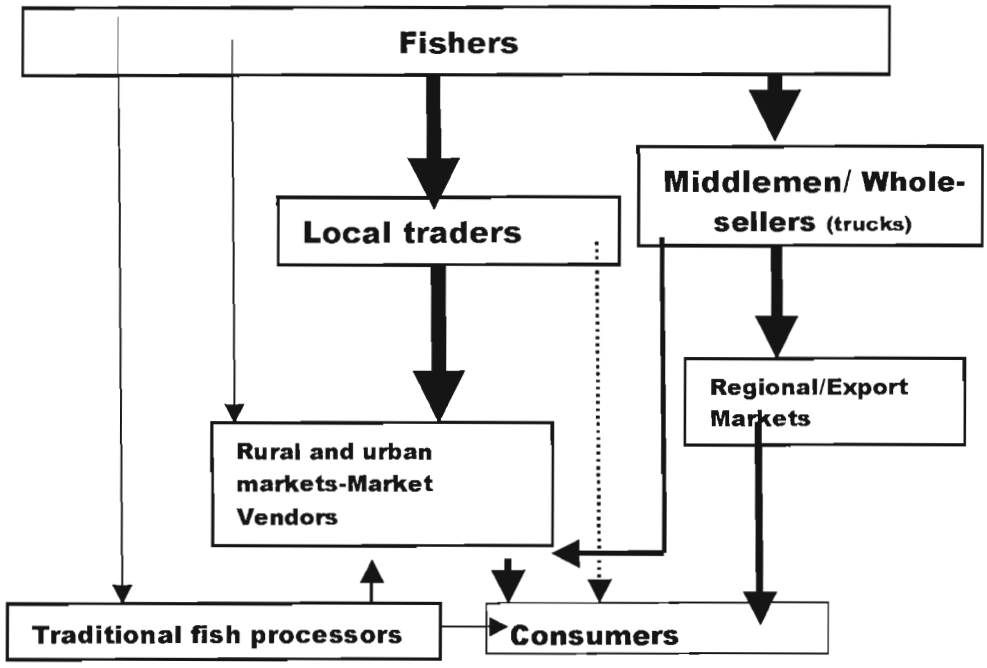


Figure 2 c: Marketing structure for Nile Tilapia



Signify the flow of reject fish

Signify the flow of mainly immature Nile Tilapia from very poor fishers

NB: The thickness of the line denotes the intensity of fish flow.

fish processors (15%) have the least chance of receiving fish from the fishers. These results indicate the importance of the local market, although the processing factories in the end claim more if we add 46 % and 19 %, giving 65 % (Table 1).

Table1: Fish Distribution from the fisher to end user.

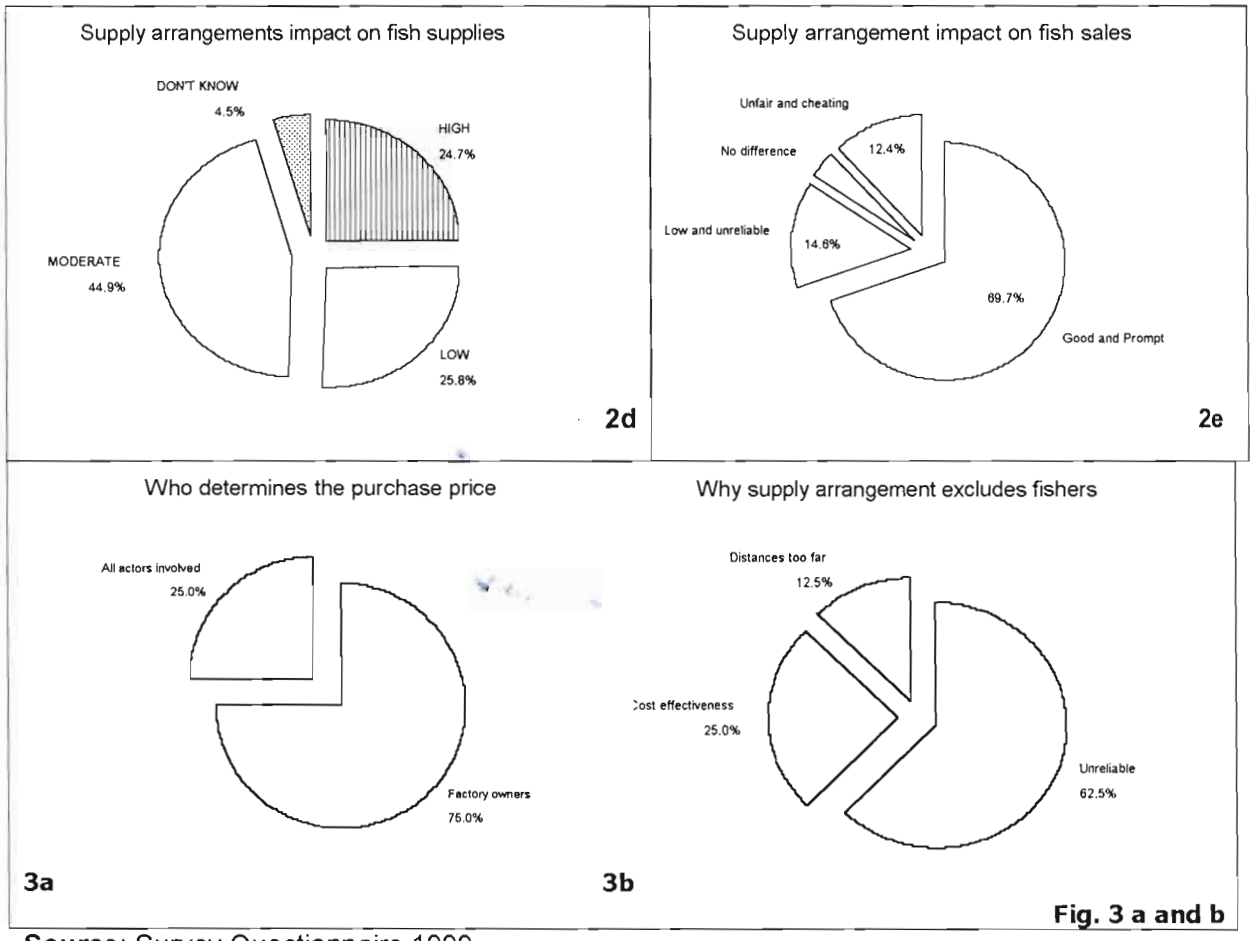
Market Systems Fish sold to:	Response of fishers %
Independent agent/Middleman	46.07
Local market trader	62.92
Local fish processor	14.61
Direct to factory	19.10
Directly to local consumers	2.25

Source: Survey Questionnaire 1999

Impact of Supply Arrangement on Fish supplied by Fishers, Price and the Sales

45 % of the fishers were of the view that the quantities of fish supplied are moderate and commensurate with the demand (Fig. 2d). 25 % said that the supply arrangement has ultimately resulted in less fish being supplied by fishers (probably due to increased effort/competition, over exploitation and decreasing catches). Another 25 percent thought that the quantities of fish supplied by fishers have increased as a result of the supply arrangement, whereas 5 % did not know what has resulted from the arrangement.

Figure 2 d and e :



Source: Survey Questionnaire 1999

Fishers were asked to comment on the impact of the supply arrangement on fish sales using the ratings: good and prompt, low sale and unreliable, unfair and cheating, and no difference. The price of Nile perch however, considerably influences the quantities supplied to factories affects price stability and induces competition from buyers. 70 % of the respondents indicated that the supply arrangements in place have resulted in good and prompt sales (Fig. 2e). That is, fishers are able to dispose of their fish on cash by cash basis and sell-off all the catch promptly. This again highlights the importance of demand for fish in this region. The remaining 30 percent, however, were not in favour of the supply arrangements by factories, reasoning that it is unfair and characterized by cheating (12%); additionally, that it is unreliable because it has resulted in less fish being sold to factories by fishers (15%). 75 % reported that factory owners normally set prices (Fig. 3a). Fishers noted that compared to other fish species (i.e. tilapia) in Lake Victoria, Nile perch price is relatively higher.

The findings indicated that 80% of the fish factories procure fish through agents/middlemen and 20% buy fish directly from fishers. Factories that use agents against fishers, reason that fishers are unreliable (63%), ineffective (25%) and uneconomically far away from the factories (12%) (Fig.3b).

Factory owners reason that they are not being unfair to fishers. They argue that faced with the realities of the market place, and the consumers' demand for quality at the lowest price and the competitive pressure of rival firms, they are forced to pursue cost-efficient business strategies. While such strategies entail many facets of production engineering and management organization, they also entail obtaining factors of production and other business and marketing-related services at the lowest cost possible.

Uganda's Fish Factories and Fish Processing

The fish factories are owned on partnership or sole basis by different nationalities, which include Ugandans, Kenyans, Koreans, Saudi Arabians, Indians and Dutch respectively. Most factory owners indicated that they have extensive professional experience in the fish processing business and; a few have only some relevant training in the business. Some of the factory owners, however, started the fish processing business without prior experience in the fishing industry. All the fish factories surveyed were dealing in Nile perch, which they say is on demand in the overseas export market (46%). The factory owners disclosed that Nile perch commands a good price; and that the product is available in good supply (46%), making it convenient for exploitation (Figure 4).

Factory Capacity and Real Factory Output

Data was graphically presented and qualitatively compared (Figures 5 a & b). This was in order to appreciate the changes that have taken place in the industrial fish processing sector, the

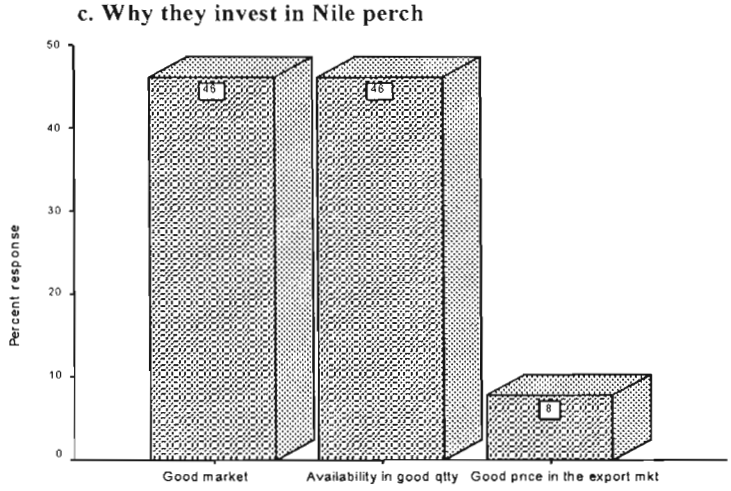
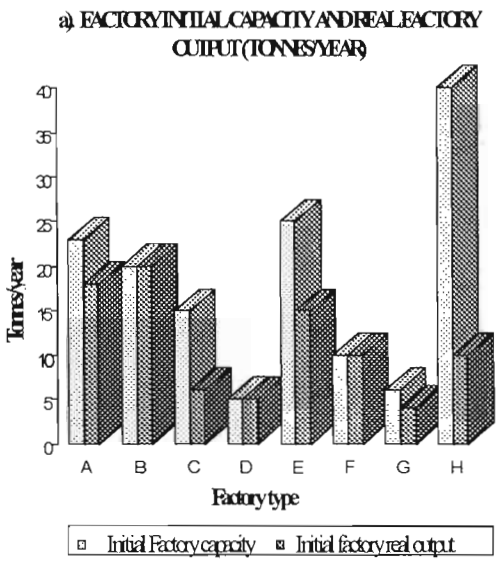


Figure 4.



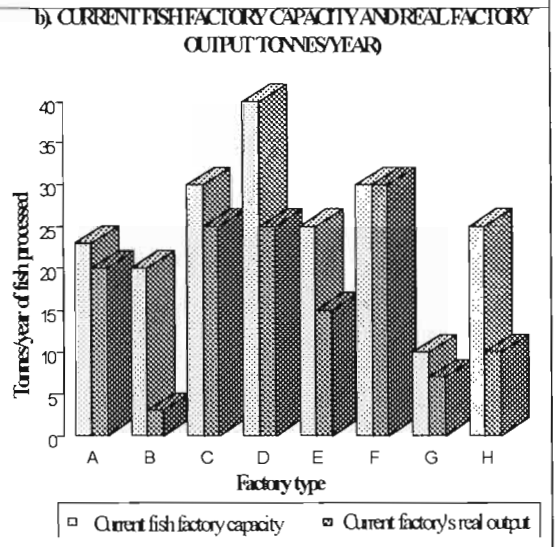
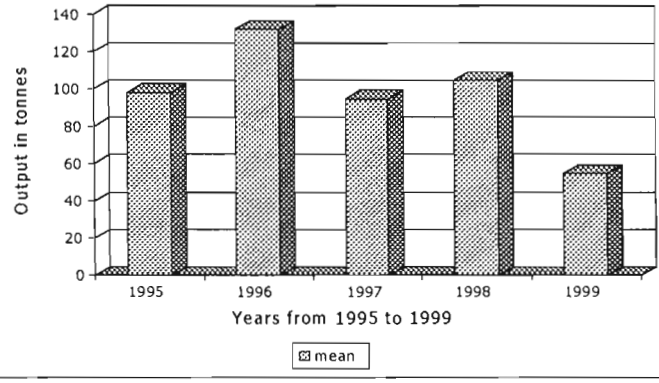


Figure 5 a & b initial and current capacity and real out put



capacities of factories and their real output per day from the year they started processing to 1999. Generally, there has been growth in capacity and in real output for the factories over the recent years as indicated from results in figure 5 a, and b. Factories A, E and G, however, maintained the same level both in capacities and daily output, while C, D and F registered a big growth both in capacities and daily output. Fish factory B showed a decline in real output at constant capacity while factory H had reduced its capacity at constant output. Generally, there was an observed decline in the volumes of fish processed since 1995 - 1999 (Fig. 6).

The factories in Uganda export about 2500 tons of Nile perch per month, which is only 50% of the existing capacity. The excess capacity is mainly due to the difficulty factories face in getting adequate fish supplies, although some of them also have constraints related to marketing, fish quality and under-financing. Besides fillet, the plants also produce frames (skeletons), fish maws (bladder), fish oil and skins for various markets. Fillet and maws are exported to several countries overseas. There is however already a potential local market for much of the exported Nile perch.

Most of the fish frames produced by factories now go for fishmeal. Similarly about three quarters of the catch of a small sardine-like fish, *mukene*, goes for fishmeal. The demand for both products in the local market for human consumption is high and unsatisfied. Therefore Nile perch frames and *mukene* going for fishmeal is directly in conflict with food security requirements for local people. Because of the strong demand for fishmeal, the price of fish frames and *mukene* has risen beyond what most consumers can afford. The industries also draw away fish and fish products from the traditional processing sectors, thus causing unemployment, which outweigh the new employment opportunities created in the modern sectors.

Fish Processing

Artisanal fisheries catches are marketed fresh or processed in line with consumer taste, storage conditions and; supply and demand. The lack of a highly developed cold storage and marketing network makes fresh and frozen fish distribution to the inland population in the country difficult. In Uganda, cold-storage systems are lacking/inadequate and fish not sold the same day is either dried or smoked. However, more than 80% of the fish is sold fresh, about 10% is salted/dried and 8% smoked. In general, there is an increasing tendency to sell the fish captured by artisanal fisheries in fresh form due to an increased availability of ice, together with increased demand from fish factories. There is also a growing trade among neighbouring countries due to the same reasons together with improved co-operation between countries. The main trade flows are: DRC, Rwanda, Kenya.

The processing methods used are mainly traditional ones dominated by women, though improved technologies are being introduced and gradually adopted. Different techniques of smoking fish exist and are based on tradition, preferred tastes and market preferences. The quality of smoked fish is different according to the smoking methods, species used to the wood (*aradirachita,*

mangifera, schirrophora, etc.) used in the smoking process, which can give a different taste to the final smoked product. In general there are two main different smoking techniques: hot-smoked and dried-smoked. The first is considered of superior quality than the second and has a better market acceptance but, as it contains some water, it has a reduced conservation time compared to the dried-smoked fish. The main products processed and traded include dried *mukene*, smoked catfish and smoked tilapia. Other traditional forms of processing are sun-dried, dried-salted and fried.

As mentioned earlier, fresh and frozen fish is generally exported to Europe, though some is also traded within the region. The most important quality criteria are fish size and their fat content.

Fish trading varies, the sale of a consignment of catch to a commissioned agent, fish auctioning, purchasing fish in bulk for sale in the fresh state or for curing. Elsewhere, direct bargaining between producer and trader remains the most popular trade process.

Contrary to what is generally expressed about the small size of Nile perch processed by fish factories, results from this survey (Figures 7 a, b & c) showed that the size of Nile perch processed has been increasing on average.

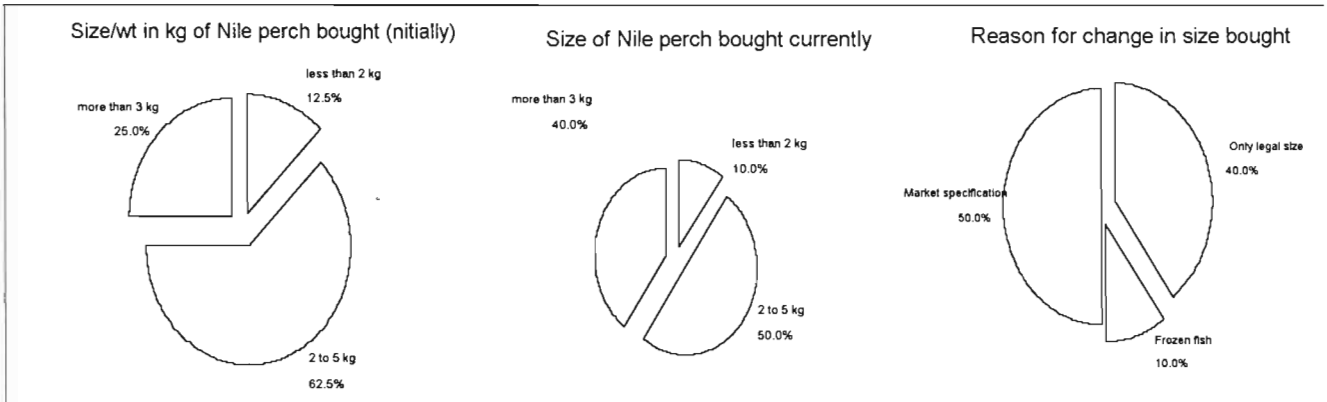


Fig. 7 a, b & c

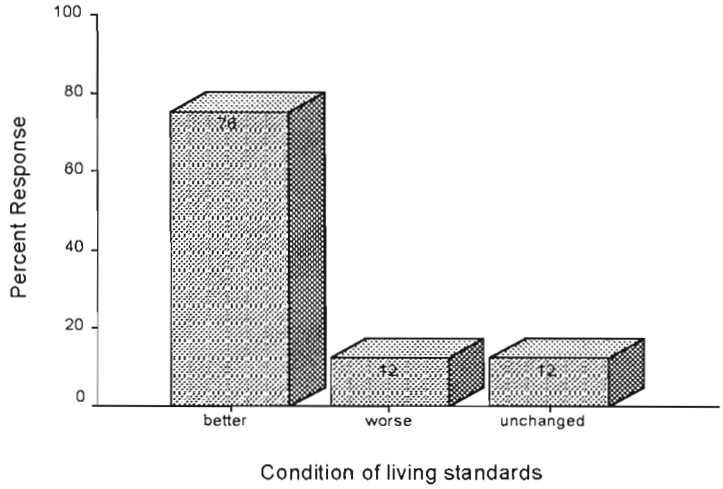
Initially, factories used to process Nile perch of sizes ranging from 2-5 kg (62 %), >3 kg (25 %) and <2 kg (13 %). During this survey, the number of factories processing fish of >3 kg had gone up to 40% and those processing fish of 2-5 kg had gone down to 50%. Only 10% were still processing fish of <2 kg. Factory owners indicated that the sizes of fish processed were mainly determined by specifications of the export market (50%) and the legal obligations (40%), which emphasize non-exploitation of small size fish. In addition, the nature/type of product (i.e. frozen fish) (10%) also determines the fish size processed.

It is indeed difficult for factory owners to agree that they are buying immature Nile perch though recent personal observations (October 2001) from various landing sites on Lake Victoria show that all factories are now buying fish of less than 2 kg. This has come about due to the increasing demand for Nile perch for export now that the ban on fish has been lifted.

Fish agents / Middlemen

Fish agents act on behalf of the fish processing factories by buying the fish from fishers and then supplying the same to the factories. Most of these fish agents are influential and powerful. Many own outboard engine boats and vehicles for fish transportation, while some own canoes and nets and employ fishermen. Many times the fish is bought in the lake and brought directly to the factory. However, fishers have also become disillusioned with the fish agents. As a go-between for the fishers and fish processing factories, the fish agent is in a position to exploit the fisher. Instead of buying fish at the agreed price (agreed between the agent and the fish processors), upon reaching the beach, the agent will set his own buying prices, which in most cases are lower than the agreed prices; he then retains the balance. The situation becomes worse when there is only one agent buying fish at the beach. According to some fishers interviewed, 'on seeing the catch, the agents behave as if he is not interested at all'. By displaying this attitude the fisher becomes helpless and the middleman sets his own price. The fishers are forced to sell at that price to avoid the unnecessary loss, since fish is highly perishable. Some narrated the kind of frustration they had undergone through the agents. 'These people are so connected with the factory management to the extent that if you take your fish directly to the factory, by-passing them either you will not enter the factory, but if you enter, then much of your fish will be declared "reject" and hence sold at a throw away price'. Arrangements are sometimes made between individual agents/factories and fishers, in which the agents either employ the fishers or provide them with fishing equipment on credit and in return, the fishers supply fish to him and, in the process pay back his loan. This strong patron-client relationship is geared towards serving the interests of the factories and middlemen. By establishing tight control of the fishers who, in many cases are forced to supply them with fish, many fish agents have undermined the role of the fishers' co-operatives. They have become constraints for community participation in the marketing of the fisheries.

Figure 8: Living standards of fishers



TABLES

Table 2: Major changes in the last five years

Changes In The Fishery	Frequency	Percent
Incomes of fisher communities have improved	60	39.5
The fish market has greatly improved	58	38.2
Fishing effort has shot up	13	8.6
Local processors have reduced	4	2.6
Increased use of illegal gear and destructive fishing	11	7.2
Reduction in use of destructive fishing and illegal gear	6	3.9
Total response	152	100.0

Table. 3: Descriptive statistics depicting fishers' attitudes towards fish factories.

STATEMENTS	CATEGORIES		
	Agree	Disagree	Not sure
Fish factories have created employment for fishers	71	9	5
Fish factories provide credit to fishers	20	44	21
Fish factories provide good market for fishers	82	1	2
Fish factories have helped improve fishers' incomes	73	9	3
Factories provide fishers with education on fish handling	25	52	8
Factories by controlling fish supply arrangement deprive fishers of livelihood	35	34	16
Fish factories responsible for illegal and deteriorating fishing practices	21	58	6
Fish factories deprive locals of their domestic fish needs	19	62	4
Fish factories likely to deplete fish	28	49	8

4.0 Discussion of Results

The fisheries sector in Uganda plays an important role in food security through the provision of supplies of fish to the fisher-folk communities, rural poor, and the urban populations. Adding to this is the provision of employment opportunities, especially in rural areas and in its contribution to economic growth.

The findings show Nile perch as the dominant fish targeted for commercial purposes, while other important species are Tilapia and *mukene*. Nile perch is mainly targeted for the fish processing factories for export, but the local market also claims a large volume of it. The drive for profit means that more and more Nile perch has to be fished and this puts stress on the fishery. The fishery is mainly artisanal and the commercial gear used is predominantly gill nets. Seines of various types, hooks, long line and cast nets are also mostly used by artisanal fishers, mainly for subsistence as well as cash.

4.1 Socio-Economic Implications

The new system of fish marketing resulting from the Nile perch export trade benefits mostly the factory owners and their agents, although most boat owners and fish traders believe they have also benefited from the market. The Nile perch was found to be the main target commercial fishery attesting to the views of most researchers who say that it is the one driving the fish industry with prices rising and stabilizing in phases. For example, many powerful people in the fishery business consider the Nile perch a savior, not an ecological disaster, since the lake is still producing record numbers of perch that are bringing in badly needed foreign exchange. The strategies they use to procure fish combine making credit available to fishers in return for regular supplies, boat engines and collection boats, and resident agents on larger beaches. Even though there was no recorded competition between processing plants and local traders for fish during the time of this survey, accounts of cases where competition is augmented by demand during times of scarcity were noted. This to a great extent concurs with what Gibbon (1997) describes about the developments in Nile perch markets on the Tanzanian side of Lake Victoria. Gibbon describes how industrial fish processors managed to win control of the fish market by using fish agents/middlemen, offering higher prices for fish and supplying vessel owners with gear, an arrangement that was associated with increases in fish supply.

This research has shown that industrial fish processors in Uganda are presently the main link between the artisanal fisher-folk and the overseas export markets. Their entry into the market has tended to stabilize and expand the market for artisanal fisher-folk while increasing their average earnings. There have been changes in the distribution of wealth resulting from the Nile perch fishery, different from that of the original artisanal fishery. Most local fishers actually consented

that they were doing well as a result of the Nile perch boom though large-scale operations that exploit the Nile perch for foreign currency were doing much better.

It was found that more quantitative and qualitative transformations in capital flows in the fisheries sector emerged and accelerated faster in mid 1990s. Significant investments by many "artisanal" vessel-owners, independently of the gear and engines supplied to them by the factories were made.

These sharply rising investment levels were accompanied by a steep increase in full time equivalent fishers and auxiliaries (except "artisanal" processors) and, a more than corresponding increase in total real income to the artisanal sector as a whole (much of which has been ploughed back into the industry).

As a matter of fact, most fishers were attributing improvement in incomes and living standards to good changes in the market (see Table 2) as noted from their responses when asked about major changes since 5 years ago. Increase in incomes and assets and improved fish market featured prominently. Improvement in standards of living according to fishers (75 %) is evidenced from increased incomes and local investments in form of houses, assets, and increased capital for fishing (Figure 8). These fishers indicated that they have been able to acquire land, build houses, marry and raise children plus the basic requirements while others have acquired vehicles and other income generating activities like shops, etc. Indeed for most fishers it seemed that the need to rectify the fish market, some credit facility and good governance on the part of government fisheries officials was there major concern. The author however, observed that the crew (real fishers) and traditional fish processors were marginalized and poor in reality unlike the boat owners , which this study targeted.

4.2 Implications for Food Security

Findings from this survey indicated that fish protein requirements for fisher-folk communities in Uganda are not seriously affected by the Nile perch export trade (see Table 3), in spite of protein malnutrition fears in the lake basin as expressed by socio-economists especially on the Kenyan side (Mugabe *et al*, 1999). The explanation to this is that fishers in Uganda normally have easy access to cheap fish at prices much less than urban prices (about 50 % less), and due to dependency on alternative fish species of less international value (Tilapia, lungfish, *mukene*, cat fish, etc.) by fishers. Moreover, the prices at landing sites, urban markets and export markets are generally in the range 1:2:7. However, given the greater exportability of fish and increasing demand from fish factories, it is practically possible that the rural consumers are receiving less fish than before the fish export drive. The dramatic increase in fish exports promoted by higher export prices and favourable exchange rates and the attractive markets in the urban centers are the underlying factors to the diversion of fish demand and supply.

4.3 Local Fish Demand

The demand for Uganda fish, according to government sources (Fish Master Plan 1996), is divided into five market segments as for 1995-1996. The rural fish markets take up to 55 percent followed by urban fish market at 16 percent, then export market at 14 percent. Subsistence consumption by fishing communities and fish farmers was estimated at 11 percent and regional markets at 3 percent. This again concurs with the findings that most fish is sold to local market traders by fishers. In Uganda, fish prices fluctuate following the law of supply and demand. Two distinct markets prevail: the Tilapia and *mukene*, that is of low market value, and the Nile perch that target customers with a relatively higher purchasing power and for exports (Figures 9, 10 and 11). The price of *mukene* and Tilapia captured by artisanal fishers varies seasonally in relation to their abundance. It is cheaper than meat, while higher valued species show a price near to that of meat. Moreover, the fish species preference for most people is Tilapia (70 % for the whole lake region) against Nile perch (SEDAWOG, 1999). In general, as far as the product form is concerned, prices of fresh fish fluctuate more than fish in other forms. There is the risk of a future increase in fish prices due to the joint effect of the supply deficit and the increased demand resulting from a steady population pressure on one side and the rise in production and import costs on the other.

The potential to increase the catches (or destroy through destructive fishing) of less global value (Tilapia and *mukene*) have more direct implications for the food security particularly of urban poor and rural communities. These species are most economically caught, handled and distributed in large quantities and are thus suitable for urban markets and rural communities.

4.4 Implications for the Fisher-Folk Communities and the Lake's Sustainability

In 1996 the total commercial catch of fish from Lake Victoria was 106,400 tons of which 13,650 tons were exported (Table 5 In: Namisi, 2000). In 1997, the total commercial catch almost stagnated at 106,800 tons of which only 11,580 tons were exported. By 1998 the total catch was 105,200 tons and the exports went down to 10,530 tons. These figures show a small but steady decline in the fish harvest from the lake, which until that point had been increasing. The poor subsistence fisher-folk communities of Lake Victoria who rely on fish for their daily food requirements lose out as demand and prices increase. Usually the price of Nile perch greatly influences the price of other fish species like Tilapia. Whenever, the price of Nile perch goes up that for other fish automatically goes up too. This means that as prices are hiked by the export market the domestic consumers and some fisher-folk communities become vulnerable to the high prices, which they cannot afford. In fact, Odong-kara and Okaronon (1997) expressed such fears that expansion of export-oriented fishing industry for Nile perch was likely to drive the cost of the fish beyond the reach of many fisher-folk communities. Interestingly, the findings of this study confirm the steady rise in fish prices (Fig. 3 In: Namisi, 2000) ever since the international fish

market was established in early 1990s. Already some domestic consumers have resorted to alternative low priced fish consisting mainly of juveniles. This in turn is encouraging fishers who use illegal gear to fish (actually fishers say that they use this type of gear because it is affordable compared to the legal gear). Definitely this is a more ill fated activity for the sustainability of the fishery resource. When hard pressed by the need to survive and sustain the family the fishers will have no alternative but to fish regardless of the stress put on the resource. Widespread poverty within the population plays a significant role in environmental degradation (Pinstrup-Andersen & Pandya-Loch, 1996). It is particularly difficult for poor and hungry people to make the critical trade-offs necessary for long-term sustainability of natural resources because of their pressing immediate needs.

5.0 Conclusions and Recommendations

a. The fisheries sector plays an important role in food security through provision of supplies of fish, the provision of employment opportunities especially for the rural poor fisher-folk communities and in its contribution to economic growth.

b. The significant increase in fish exports in the last decade was influenced by the boom in Nile perch fishery and international fish demand, which resulted in increases in real prices and stimulation of investments in industrial fish processing for export and boosted domestic fish market trade. Conversely, the rapid growth in fish exports has remarkably enhanced fishing effort (fishers and gears) and competition.

c. Many fishers have benefited from the boom in terms of employment, income, and living standards but some group of fishers (crews, *baria*), traditional fish processors and poor fisher-folks have lost out. Deprived of work and unable to afford this higher priced (and less palatable) catch, some local people face a serious economic threat.

d. Although most fishers felt contented with the fish market arrangement, the fact that fishers lack any serious organization leaves them vulnerable to fish agents and fish traders who 'exploit' them by giving low prices because they are somewhat more organized.

e. No significant competition for fish purchases by domestic consumers with the fish factories was observed suggesting that local demand for fish is stable among the fisher-folk communities. The export processing industry, however, will continue to grow and, to be the driving force in the Nile perch fishery for some time to come.

f. Equity concern should be seriously addressed by government, NGOs and other service providers to ensure that women, traditional fish processors, hardcore fishers/crews and poor fisherfolk communities are helped financially and intellectually and, probably by promoting diversification into other economic activities.

g. Sustainability concern need to be taken seriously and addressed through, amongst other approaches, co-management arrangements including fishers, Government (as well as wider co-operation between the three countries sharing the lake) and, due to its significance in this context, the private sector in the form of the processors.

h. In spite of some partial economic optimism by fishers as expressed from the results of this study, the worries of many fishers about their catches becoming sporadic and fish smaller should be taken seriously. The day-to-day operational reality of the artisanal fishing community should form the basis for a precautionary approach where science-based construction of reality is scanty.

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