

Samaki

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EDITORIAL

SAMAKI, The Aquatic Resource Magazine is published quarterly. Its aim is to keep the worldwide research community informed about the activities of Small Scale Fish Systems Project and to highlight issues relating to Environmental Research as well as Aquatic Resource Development and Utilization that have become topical in our country and time.

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Editor

Editor

Gilbert E.M. Ogutu

Small Scale Fish Systems Project

The Objective of the Small-Scale Fish System Project is to improve the earnings of rural women fish traders, through their reintroduction into the mainstream of the emergent Nile perch producing, handling, marketing and processing system, and through Omena processing methods. It is also aimed at helping the fisherfolk adopt new technologies or improve on traditional practices to boost their income, improve their standard of living and sustain the resource.

The initiator and director of the project, Dr. Gilbert E.M. Ogutu was educated at Makerere, Nairobi and Oxford Universities. He has done extensive research in the Socioeconomic aspect of fish production and marketing. He has provided a lot of consultancy services to researchers in the fisheries sector in Kenya and other countries. Currently he teaches at the University of Nairobi, Nairobi, Kenya and is a member of Programme and Strategy Review Committee (PSRC) of IDRC Fisheries Programme for Africa and the Middle East.

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Distribution

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Cover

1. Drs Asirye-Alemu and Muroki conducting organoleptic tests when they visited Artisanal Fisheries project.
2. Drs Gilbert Ogutu (Project Leader) and Anne White of IDRC Head Office Ottawa, Canada at Wichlum beach during Anne's visit to the project.
3. Beach seining at Kendu Bay.
4. Loading of buses with dry fish at Uhanya beach.
5. Fish retailing at Akala Market.

The views expressed in the articles are those of the authors and do not necessarily reflect those of the partners in Small Scale Fish Systems Project.

THE FRESHER, THE BETTER

Life in the Lake Victoria Fishery

by Andrea Prazmowski

The people on the beach waited expectantly, eyes fixed on the small fishing boat with its single blue sail. As it approached the shore, they moved closer to the water, followed by barefoot children.

As the boat landed, the buyers jostled for front positions to have the first - and the first chance - at the catch. No time wasted. Within minutes the six large Nile perch were claimed and taken up the beach to be weighed and priced.

The scene is repeated hundreds of times a day on the many landing beaches on Lake Victoria, which straddles the borders of three East African countries: Kenya, Uganda and Tanzania. It is marked with a sense of urgency and competition, as each catch is moved quickly from the boats to the buyers, to the processing stage, or straight to market by foot, bicycle, or truck.

While the fishing industry accounted for only 0.2 percent of Kenya's Gross Domestic Product between 1971 and 1981, it is big business for the Luo and Luyia people of western Kenya's Lake Victoria basin. Fish harvesting, processing and marketing employ almost half the working age population.

Other economic prospects are very limited. Rainfall is low, the soil is poor, agriculture is mainly at the subsistence level, and paying jobs are scarce. The area's major export has been people - to Nairobi, the capital, and to other cities.

Efforts to increase employment in the area and to improve the standard of living must focus on the fish-

ing industry, says Dr. Gilbert Ogutu, a Kenyan Sociologist and University of Nairobi Lecturer. He is hoping the IDRC-sponsored research he is conducting into the Lake Victoria fishery will point to ways of making the industry more productive, while ensuring that the benefits remain in the region.

Lake Victoria is one of Kenya's largest producer of fish. From the mid-1970s to 1981, its annual harvest increased from 17000 to over 39000 tonnes. The Kenyan government has set a 1988 production target of 50000 tonnes, a substantial share of the national target of 120000 tonnes.

Dr. Ogutu grew up only a few kilometres from the lake. He has witnessed the increasing commercialization and modernization of fishing and the decline in certain fish species as new types were introduced to the lake. He has also observed the social effects of rapid population growth in the area and high unemployment among early school leavers, many of whom turned to the fishing industry. The research focuses on the socioeconomic status of fishermen and fish traders, why they succeed or fail, their linkages to other parts of the economy, and marketing channels.

Since April 1985, Dr. Ogutu and his assistants have studied four of the Kenyan fishing districts, concentrating on 212 main landing beaches. They have used government records from 1984 and 1985, as well as their own observations and extensive survey of 64 landing beaches and 52 markets.

Profits not shared fairly:

The research has underscored one of Dr. Ogutu's prime concerns - that the people who carry out the bulk of the work in fish harvesting and processing do not receive an adequate share of the profits.



Transferring fish from the boat to the banda



A typical fisherman is a young married man between ages of 21 and 35, most likely with only a primary school education. More than half work as hired labourers and only 12 percent own their own boats.

While their average monthly income is quite high by local standard - as much as 1500 Kenyan shillings or US \$92 - the bulk of profits go to the people who own the boats and fishing gear,

Of the total day's catch from each boat, only 10 percent is paid to the labourers, usually divided up among four men per boat. The ministry of Fisheries and the local fishing cooperative take 10 percent between them, and another 10 percent covers the overhead. The remaining 70 percent is profit for what Dr. Ogutu calls the "absentee owners" of the boats, many of whom, live outside the region and have never set foot in a boat. "They (the owners) are exploiting these young men", says Dr. Ogutu. He would like to see their relationship altered so that the income is distributed more equitably and local fishermen can purchase their own equipment.

Entering the industry as anything but a hired labourer is extremely difficult for local men. A boat costs from 6,500 to 8,500 shilling (US\$406 to \$531), and seines, gill nets, and other equipment may total to 15000 shillings (US\$938).

While it may be feasible to increase the Lake Victoria catch, under the present structure this would simply increase profits for the boat owners, says Dr. Ogutu. He is therefore looking for ways fishermen can increase their incomes by moving into the marketing of fish.

At present, the fishermen's job ends once the catch is handed over to the buyer. The buyer may then send the fresh fish directly to market by public transport or, in the case of large retailers, in refrigerated trucks which take fish as far as Nairobi, 340 kilometres away. However, most of the fish is sold and consumed within western Kenya. Because of the short shelf life of fresh fish, almost 60 percent of the catch is processed before marketing.

Since first introduced into the lake in the 1960s, Nile perch have increased rapidly and by 1984 represented more than half the catch at the 10 landing beaches in Ogutu's study. Meanwhile tilapia, previously the dominant species, have dwindled alarmingly.

Although there is a great deal of controversy over who is responsible for the shift in the fish population, Dr. Ogutu chooses not to dwell upon the issue. "The lake is not depleted of fish", he reasons. The important questions for him is:

• "How can the dominant species (perch) be exploited for the benefit of the local fishermen.

Consumers prefer tilapia:

Answering the question required consideration of a wide range of issues, from nutrition to cooking habits and processing, techniques. Local tastes still favour tilapia, despite the abundance of perch. Many people find the latter too oily. The price difference reflects this preference: the price of tilapia at the beach is three times that of perch. One of Dr. Ogutu's goals is to find better processing and cooking methods for perch, to increase its appeal and value.

It is the fish traders who do the processing and Dr. Ogutu and his research assistants have studied this segment of the industry in detail. In a sample group of 250 traders, they found 74 percent were women, most of them married, with between 3 and 10 children. Some women travel more than 65 kilometres from their homes to the landing beaches. More than half of the traders sampled spend two to five days per week living at the landing beach, processing the fish they buy, returning to their homes and families for the rest of the week. This pattern has led to the formation of loosely knit communities of women and children on the beaches.

One such community is at Uhanya Bay on the northeast end of the Kenyan shore. It is a ramshackle collection of one-room homes with mud walls, others with thatched roofing. Scattered between the homes are smoking kilns constructed of mud and sticks. Throughout the small community, fish are continuously being deep-fried, roasted, spread out to dry in the sun, or filleted.

At its peak, the population at Uhanya Bay reaches 2000, including about 100 children, many of them of nursery school age. Yet the nearest school is four kilometres away.

Some of Dr. Ogutu's recommendations will address the inadequacy of facilities in such communities. He is also concerned about the social damage by the separation of family members as well as the economic difficulties associated with a risky business such as fish trading.

Since most women rely on local transportation to get the fish to market, a bus breakdown or a flat tire on a bicycle could cause her to lose her entire load of fish. "Is there any way to improve the processing and make the transportation cheaper but more reliable, so that the spoilage is kept to a minimum?" asks Dr. Ogutu.

Improved processing techniques will increase both the shelf life and the value of the various fish products. Longer shelf life in turn allows market expansion. With fresh fish, each hour gained through improved preservation expands the immediate market radius by 50 kilometres or a minimum of 200 000 potential consumers, according to research findings.



Unhygienic Conditions:

The type and quality of processing vary widely from beach to beach. Although some traders make an effort to keep their fish clean, "the unhygienic conditions drastically reduce the shelf life of most species of fish".

Through education and by sharing his research findings with the local people, Dr. Ogutu hopes to see an improvement in the handling of fish from the moment they are caught until they are consumed. This will expand the markets, increase economic value and nutritional levels, and bolster the fish traders incomes.

Dr. Ogutu would also like to build a model landing beach for demonstration purposes. It would have improved facilities such as raised platforms for drying and smoking fish.

Boosting local incomes by improving fishing and related operations can only have an overall positive effect on the region because of the industry's importance to so many people, says Dr. Ogutu. For, in his words, "all the circulating currency notes in the region smell of fish".

Andrea Prazmowski is a freelance writer from Ottawa, Canada

SOCIO-ECONOMIC CONDITION OF ARTISANAL FISHERMEN AND FISH TRADERS OF LAKE VICTORIA

by Gilbert E.M. Ogutu

Introduction:

The fishing of the Sea of Galilee at the time of Christ was extensive and of commercial importance. It was chiefly done by means of drag-nets or seins. Casting of nets was also in practice and so was hook and line fishing. From the Bible we read:

Jesus said to Simon, "Put down in the deep and let down your nets for a catch." And when they had done this, they enclosed a great shoal of fish; and as their nets were breaking, they beckoned their partners in the other boat to come and help them. (Luke 5:5-7)

It would be interesting to find out, from a sociological point of view, the socioeconomic condition of the fishermen of the Sea of Galilee like Simon Peter and his partners - James and John the sons of Zebedee.



*Fishermen mending their nets at
Wichlum beach.*



However, such a study would be beyond our reach now. Suffice it to recall that the Sea of Galilee fishery was artisanal (Small-scale-commercial) just like Lake Victoria fisheries. And so, an appraisal of the socioeconomic condition of the Lake Victoria fishermen would give us hints as to what might have been happening at the Sea of Galilee and at the same time educate us on our own fisheries and fishermen. Such an appraisal would equally aid us in formulating policies and strategies for the improvement and expansion of the fishing industry in our own country and time.

Lake Victoria, the second largest fresh water lake in the world, is a trilateral lake shared by three East African countries of Kenya, Uganda and Tanzania. It covers an area of 68,000Km² of which Kenya portion is 3,755 Km² (approximately 5.9%). It is a shallow lake with depths ranging from 4-15m. at the fringes and 30-60m. in the open lake. The deepest part is estimated to be 70 metres. On the Kenya side it has a zigzag shoreline of 760 km with several embayments.

Fishermen and Fish Production:

The fishermen are all males whose ages, range from 15-60 years, with a mean of 31 years. Their level of education average 7 years of schooling for Siaya district and 4 years for South Nyanza.

About 38% of the fishing crew are hired workers, while the rest own some form of fishing vessel and/or gear. The vessels are sail boats manufactured locally, while the gear is industrially manufactured at the Kenya Fishnet in Kisumu town.

The main fish species landed are Nile perch, *Rastrineobola* and *Tilapia*, in that order of magnitude. There are 7,200 fishing units supporting some 24,000 fishermen. Between 1984 and 1986, 40% of the landings was used fresh, while 60% was processed. During the same period, 35% of the landings was consumed by the local fishing communities while 65% was marketed. The price of Nile perch rose from Kshs. 2 per Kg. in 1984 to about Kshs. 17.50 at the end of 1991.

The earnings from the fishing industry are spent locally on working the farms, investing in small-scale enterprises such as retail trade, operating tea rooms, educating the children and towards household expenses.

Emergent Issues:

A number of observations of immediate interest were made which need to be highlighted here:

- The fishing crews were found to be young male school leavers with no capital to buy fishing equipment; with no alternative gainful employment. Their average income was found to be Kshs. 750 per month, yet their employers earned in the tune of Kshs. 81,000 (net) per month from the business. This kind of production arrangement is definitely exploitative and blocks the young men's avenues for upward mobility.
- The entrepreneurs include seasoned fishermen, often with three, four or even five fishing units, wealthy fish traders; retired public servants; and people on regular wage employment operating as absentee owners. Their sharp urge for quick profits leads to overfishing and the attendant ecological problems.
- Equipping a fishing unit to harvest the dominant and the more remunerative Nile perch required approximately Kshs 45,000 (3,000 Canadian dollars). For the ordinary man, raising such a capital is almost unthinkable. It is one factor that makes the poor fishermen and fishing crews become easy prey to exploitation by the well-to-do entrepreneurs (and commercial firms) with whom they are compelled, by such difficult economic circumstances, to enter into a patron-client relationship. A situation is therefore emerging where the rich industrial exporters are virtually becoming owners of equipment or mortgaging the fishermen. As could be rightly argued, industrial fisheries are typically export-oriented which indeed earns the country badly needed foreign exchange but at a cost. The situation threatens to worsen due to the reluctance of commercial banks to extend credit facilities to the ordinary fishermen. The fishermen's only escape route appears to be co-operative societies, but unfortunately these remain weak.
- The time between fish harvesting and landing is normally 4-6 hours. This is more so because the fishermen, most of whom operate non-motorized crafts, have to rely on winds for locomotion. Consequently, a lot of fish caught go bad before landings because there are no chilling facilities on the boats. Spoilage increases further due to the handling methods at the beach particularly at the banda (landing shed). The loss of revenue as a result of these problems could be massive. But they might be minimized through better planning and more capital investment into the industry. This could go a long way in improving yields, quality of the products, prolong their shelf-life and improve earnings for the ordinary fisherman.
- There are no reliable statistics on the number of fishermen and fish traders operating at the lake. From our field study, it seems reasonable to put the ratio of fishermen to fish traders at 1:3. This would mean that there are some 24,000 fishermen and 72,000 fish traders on business along the lake. Our crude estimates put those who rely on the fisheries



industry and related activities at 11.2 million. This, is however, subject to verification.

- The most successful fishermen are not necessarily the better educated. On the contrary the educated look on fishing as an occupation of the under-privileged and are reluctant to take it up as a life career. Thus it is shunned by the more educated and otherwise more enterprising high school leavers. There also appears to be an under-utilization of family labour in the industry since wives and sons are often not involved in what their husbands/fathers are doing.
- Finally, the population involved in the fishery is not homogeneous. This implies that efforts to improve the quality of life among the fishing communities (including traders) must take cognisance of this fact, and design programmes according to the needs of each target group.

Traders and Fish Marketing:

The majority (75%) of the artisanal fish traders are women. Their age range from 18-46 years, with a mean of 37 years and a mode of 40 years. The traders are married with family sizes ranging from 3-5 children. Their level of education is generally low - they are either illiterate or primary school leavers. The women traders are mostly housewives from poor families. They, however, find entry into the fish trade easy because it required minimal initial capital investment of about Kshs. 500 or less, in addition to a licence of Kshs. 200, plus a health certificate.

The business is labour-intensive and because most of the women trade in processed fish, they have to move out of their homes into the beaches, some as far away as 120 km, and stay there for a number of days processing and assembling the fish they need. More often than not, they bring along with them their pre-school children. Evidently, this split of families generates its own problems.

Most of the landing beaches have thus turned into overcrowded settlements (rural ghettos) with no facilities such as schools or health centres. The makeshift one-roomed dwellings are clearly inadequate as they are undesirable. There are complaints, which are probably genuine that this kind of lifestyle degenerates into low moral standards leading, as it does, to broken marriages. For instance, during the study we met at least 43 cases of women who had thus been reduced to single parents.

Although the initial capital investment is generally low, a number of traders have invested rather too heavily in the business. They own fishing vessels and gear, and have hired crewmen to fish for them. Others buy processed fish in bulk (involving purchases of up

to Kshs. 10,000 or more). These they then transport to markets outside the fishing region. Thus, we are dealing with a stratified community of fish traders.

The transitional state of Lake Victoria has had a significant impact on the activities of the fish traders. During the study period (1985-7), Nile perch was dominant. They market it either fresh or processed. Processing it, however, places serious pressure on fuel-wood in and around the beaches, a condition which needs to be reversed through alternative methods of processing which could conserve the forestry. To process Nile perch, it is either smoked or deep-fried. The rapid expansion of the commercial sector encouraged by increased output of Nile perch from the lake has the potential of pushing artisanal traders out of business due to the scales operations of these two sectors. Those with large filleting export firms offers better prices at the beaches, which process would make artisanal trade unviable. There is, therefore, now a tendency for the artisanal traders to shift to tilapia and *rastrineobola* due to the relatively lower production costs and therefore a better profit margin for the small-scale trader.

It has also been noted that the persisting artisanal nature of Lake Victoria fisheries is reflected in fluctuations in fish supply. To encourage constant supplies, traders enter into a type of patron-client arrangements with the fishermen by providing them with financial incentives.

Transportation to markets is done of foot, bicycles, public transport (matatus, buses) and at the other extreme end, insulated and iced trucks of the big commercial firms. And the marketing channel levels for the various fish products depend on their shelf-life. Generally, we have three-stage channels, except in the case of *Rastrineobola* where a long shelf-life makes it possible to have five stages.

Emergent Issues:

Our analysis of the market looked at structure, conduct and performance. Assuming that a higher entry barrier leads to high concentration than the commercial one because the entry requirements are low. In contrast the more sophisticated export markets has high entry barrier and is usually beyond the reach of artisanal participants.

The conduct of the artisanal market was examined in terms of attitudes to quality, efficiency in operations, pricing behaviour and profit margins.

The fishing districts of western Kenya supply labour to urban centres and other parts of the country. Migrants are mostly men who leave their wives behind. Many of these women enter into the fish trade because of lack of alternative income generating opportunities.



Meanwhile, the emergent issues are that:-

The traders process the fish to increase their shelf-life. This processing activities have placed pressure on the forest cover leading to serious problems of deforestation and high processing costs.

- Poor hygienic conditions at the villages pose serious health problems and the lack of basic facilities like schools, health centres and recreational facilities have made life rather difficult for the settlers.
- Generally the traders keep no records of their purchases, sales and operation costs. Consequently, many of them are unaware of the losses they incur. Some get pushed out of business as a result of such undetected losses. This situation could be remedied through requisite simplebook-keeping lessons extended to them by the Fisheries Department and the Lake Basin Development Authority.
- The emergent patron-client relationships the traders enter into with the fishermen are exploitative and need to be discouraged. It becomes worse when the giant export firms get involved in these deals. They threaten the viability of the small-scale (artisanal) traders.
- The artisanal sector of the fishery is still fragmented, and perhaps a pooling of resources to expand their scale of operations would be a possible solution to their problems. This might help them acquire storage facilities that would remove the need for forced sales or eliminate the need to move fish to distant markets to cope with the present short shelf life of the products.

Policy Implications:

Production and Management:

- Youth unemployment remains a major problem in the lake region. In the past there has been a tendency to emigrate to the urban centres and to tea and sisal estates. This appears to be slowing down. Thus previous remittances to the area for development have decreased.
- In the face of these changes, attention should be directed toward improved utilization of the fishery resource in order to help absorb this excess labour, provide needed protein food intake and increase income and develop the area generally. To improve the area's labour absorption capacity new policies are needed to bolster up artisanal fisheries rather than the commercial sector.
- A policy geared toward improved utilization of the fishery should be part of an integrated development strategy for the entire lake region. The idea is to encourage backward linkages between fisheries and the rest of the local economy. These background linkages could encourage and stimulate as well as sustain industrialization in the region. This again will help create employment opportunities locally especially for the school leavers.
- There is a need to extend credit facilities to the artisanal fishermen to help them to expand their scale of operation. Strengthening fishermen's cooperative societies would be one solution,



Sun dried tilapia retailing at Ugunja Market



Market Improvement:

- Since our findings are that the traditional marketing system which is labour intensive now operates alongside a commercial capital intensive and export-oriented one, careful planning is needed that would benefit both sector. Unless this is done, there is a possible danger of the commercial sector pushing out the traditional small-scale (artisanal) traders.
- For the artisanal system, the technology is simple, financial requirement low and the products are many. In contrast, the technology in the industrial (commercial) sector is advanced and sophisticated and requires relatively heavy capital investment. But the products like silage, tanned Nile perch skins and distilled Nile perch oil for other users are being developed. One would want to see a clear policy as to which products are to be emphasized, and by whom; and what this would entail in terms of participants and benefits to the local community.
- The present fish product diversification already alluded to calls for immediate assessment of the lake's resource capacity to sustain such expanded and more vigorous exploitation for both local and export markets.

- Similarly, one needs to look at matters related to the management and rehabilitation of the resources. This is crucial because, for the export market to flourish, the supply of fish of specified size/age and quality must be steady and regular. The same applies to the artisanal marketing system which is expanding rapidly with more Kenyans eating smoked fish. Thus, to ensure a high and sustainable yield and supply to traders, closed season rules must be observed strictly. Closed spawning areas should be established and those out of use at the Fisheries Department station in Kisumu should be revived. There is need to restrict size of mesh and fishing effort should also be regulated. To protect the artisanal fisheries, there should be no trawling, of whatever kind in the Kenyan portion of Lake Victoria.

Gilbert Ogutu is the Project Leader, Small Scale Fish project, University of Nairobi, Kenya.

Towards the Development and Management of Lake Victoria (Kenya Sector) Fisheries with Special Reference to Improving the Marketing Infrastructure

by W.J.O Adhiambo

Background:

The land immediately surrounding the Kenya sector of lake Victoria is a semi-arid and has negligible agricultural production. The main cash crop in this area is fish. Comparatively due to climate and edaphic factors, the whole area surrounding the Uganda Sector of Lake Victoria is agriculturally productive. The same situation prevails in North western Tanzania around Bukoba, Mara and Mwanza areas touching on the lake have well developed cotton and rice growing. Here the communities have alternatives and substitutes. Furthermore, Kenya has a very small portion of the Lake compared to the other riparian states of Uganda and Tanzania, hence limited fishing areas. In colonial Kenya, development was emphasized in the agricul-

turally high potential areas along the Kenya - Uganda railway and railway branches to mount Kenya area, Northern Kinangop Dairy area, Kitale wheat area and Kisumu for Lake connection to Uganda and Tanganyika. Even the missionaries preferred cool, high altitude areas. The missions which usually had schooling and medical facilities were situated very far from the lake shores.

The few temporary tracks within this area run from interior direct to a few strategic area on the lake shore like Muhuru, Sori, Karungu, Kendu Bay, Asembo Bay, Port Southby and Usenge to mention some. This left a lot of areas completely inaccessible. On attainment of independence, the area within 40 km of the lake did not have any project. There was no infrastructure to speak of. However, there were a few schools and dispensaries here and there. In the sixties and seventies, the above area was shielded from development for some reasons. In the eighties, Lake Basin Development



Authority was established to spearhead the development of the area. But most of the Lake Basin Development Authority projects and programmes are far removed from the semi-arid areas around the basin. The area has been faced with serious threat of tropical diseases like malaria, sleeping sickness and bilharzia.

The Core Area of Lake Basin:

South Nyanza, Kisumu, Siaya and Busia Districts form the core of Lake Basin. Within this core area, there is the inner core area which is the most disadvantaged of them all. The inner core area comprises Muhuru, Kadem, Karungu, Gwasii, Kaksingri, Mfangano, Rusin-ga, Gembe, Lambwe, Kanyada, Kochia, Kagan, Karachuonyo, Nyakach, Kano, Kisumu (excluding Municipality) Seme, Asembo, Uyoma, Sakwa, Yimbo, Bunyala, Samia, Kabuoch, Kanyamwa, Gem (Asumbi), Kasipul, Kabondo, Gem (Siaya) and Alego. The above are the semi-arid areas which should be given a priority in any development planning. There is the danger of concentration on developing the high potential areas within the Lake Basin and ignoring the most deserving parts. It should be firmly recognised that the shore strip (about 40 km from the shore) is semi-arid and should be included in the ASAL national programme. A.S.A.L. - means Arid and Semi-Arid Lands of Kenya. At present, the core Lake Basin area is assumed to be arable and that it does not need any special attention. The first step in developing the above is to recognize that it is semi-arid and unless extra effort is applied, the area will not develop economically. With irrigation facilities and application of dry land farming techniques the development of this area will be enhanced. It is essential to work out an integrated plan in which all sectors play a part.

The Status of Fishing Industry in Lake Victoria (Kenya Sector):

Artisanal fisheries has been and continues to be the mainstay of fisheries development in the Kenya Sector of the Lake. Artisanal fishing system has been popular due to its labour intensive nature, providing valuable protein to local population and generating income. After landing, fish was bought by local fish traders who distributed it in both near and far markets within the country. For a long time, the multi-species fishery of this sector of the lake was considered fully developed and serving the local population adequately. During the period described above, the main thrust of fisheries management was the restriction of mesh sizes and closed seasons. In the late seventies, the introduced Nile perch had established itself in the lake. Due to its large size, high fat content and the fact that it was new, the local people took some time to be used to it. Thus in early eighties, there was an apparent lack of market for the Nile perch, thus the price was very low about 20

cents per kilo or being distributed free. Moreover, the numbers landed were so large that local fish traders and Co-operative Societies were unable to cope with the Nile perch. Thus there was lack of market and handling facilities for the Nile perch and for sometime Nile perch fishing was unpopular. It was the vacuum so created that triggered the involvement of experienced fish processors like Samaki Industries and Kenya Cold Storage into Nileperch trade. Later, proliferation of fish processors, traders and exporters became the order of the day and prices started to improve. The Nile perch fishery gained popularity. One outcome of this development was the voluntary increase of the gill net meshes by the fishermen to catch the Nile perch. This mesh size increase no doubt improved both the Nile perch and tilapia fisheries. The prices increased without the fishermen co-operative societies or any other authority playing any particular role or improving anything. Here is a situation where prices increased due to free market conditions. The free market situation has established the pricing system at the level of willing seller, willing buyer. Thus the prices fluctuate according to supply and demand

Nowadays, the prices in the major beaches have increased beyond the capacity of local communities, so total catches are sold to the enterprising middlemen leaving the local communities with no fish to eat.

The present trend of transporting the whole catch to the urban areas has denied the small scale fish traders mainly women participation in the industry. These women used to buy the whole fish, chop it in pieces, fry it in its own oil and sell it locally and also transport to inland markets using matatus and buses. Alternatively, they used to hot-smoke the Nile perch and sell as above. Thus the fish processing companies have effectively displaced the local business-women from the beached where they used to process fish. The carcase - that is the part of the body remaining after filleting and removal of swim bladder, skin and fat. The processing factories sell it to urban fish traders mostly women who fry the pieces of carcase in own oil. The factories extract the fat from fish abdomen, they melt it and sell it to the urban fish traders who use it for frying pieces of carcase which are sold within the area or transported elsewhere.

The Co-operative Societies have found themselves sandwiched between the fishermen and fish dealers without any real role in the marketing of fish. They have remained as mere collectors of the commission with no economic contribution to the fishermen or the local community. They could participate in the general development of the fish landing beaches where they operate by engaging in priority development projects and programmes. The rich societies could build their own cold storage and processing facilities while others could buy shares in such projects whenever they are started. Only Wiclum Fishermen Co-operative



Society has one three ton vehicle transporting Nile perch whole to Nairobi for sale, thus not fully assisting in the development of their beach. They should be restructured into Savings and Credit Societies. It is clear that the setting up of factories at the landing beaches will reinstate the displaced business women to some extent and the factories will provide employment for the local community. One sad aspect is that even the indigenous Africans have merely joined the bandwagon of transporting total catches without the slightest thought of assisting the local communities who are now left behind all aspects of development. It has been observed in most beaches that only the few which have reached a high level of decomposition remains behind for some form of processing. The chances of engaging in fish trade due to high prices tend to encourage the landing of alot of small fish by beach seines, so that the local people have something to buy. The under-aged Nile perch is difficult to deal with because there is no oil to fry it in since all the larger fish with fat are transported to Urban areas. They try to fry in vegetable oil but this is not feasible because this makes the price to shoot up beyond the average buyer.

There are three main commercial fishes in the lake namely:- Nile perch, Omena and the tilapine *Oreochromis*. All of them are largely unavailable to the local community. Omena is dried and transported to Nakuru, ground and used as animal feed while the community in which it is produced lack protein food. Another aspect of the state of fisheries in Lake is over-fishing. This is apparent from large numbers of juvenile fish landed. Presently, landings are maintained by enormous increase in fishing effort. This is due to the fact that Lake Victoria is an open access fishery where anybody is free to be licensed. This is mainly due to lack of other alternative sources of income and occupation. There is need for stricter management enforcement to save the valuable Nile perch, omena and *Oreochromis* fisheries in the Kenya sector of the lake. However, the success of management will to a large extent depend on the co-operation of the fishing community. Furthermore, the co-operation of the fishing community will also depend on their ability to find alternative substitutes to subsist on.

Managing the Fishery Industries "Sector":

The fisheries management regime adopted will have a good chance of success if it forms part of an integrated development of the lake and the surrounding area. The integrated approach to the development of semi arid area surrounding the Kenya Sector of Lake Victoria is the only feasible alternative which will make the local community realize their aspirations. The development of agriculture through irrigation and making available agricultural inputs like tractors, fer-

tilizers and seeds need no emphasis in this area. The infrastructure development i.e all weather roads, electricity, piped water and social amenities will greatly facilitate general development of this marginal zone. The integrated plan should include processing the fish at major landing beaches to create employment for the local people thus enhancing alternatives in employment. Presently, the fishing community benefit only by direct whole fish sales while benefits from processing is enjoyed by other communities who have innumerable alternatives. The fishing community have no access to benefits accruing from Nile perch skin, swim bladder, oil carcase remaining after filleting and even fish bones for their dogs and cats. It is also worth pointing out that it is doubtful whether the benefits of foreign exchange from fish product sales abroad trickle back to the beaches in the absence of infrastructures necessary for proper industrial development. Proper management of the fishing industry in Kenya sector of Lake Victoria has to take into account the social economic situation of the communities living in the semi-arid access to the fishery, one has a fair chance of obtaining a reasonable alternative occupation within the same area without having to resort to crimes for livelihood or migrating to urban areas in search of rare greener pastures either way complicating the overall national management. The management endeavours are incomplete without identifying training needs and training staff on a continuous basis. The training for the area which produces more than 90% of Kenya fish needs setting up a Freshwater fisheries Training Institute at a central landing beach like Luanda Kotieno.

Major Objectives of Fishing Industry:

The major objectives tend to be defined as maximisation of production on a sustained yield basis but this maximization is merely a strategy to some other goals and objective.

Employment: The fishing industry provides employment to fishermen and fish traders. Artisanal fisheries which is the mainstay of the Kenya Sector is labour intensive and serves the people well. Fish processing facilitates employment of more people in the industry.

Food: Fish serves as human food. It provides protein of high quality. The swim bladder of Nile perch can also be used directly as food. The fish oil can be used for preparing other foods. It is also medicinal.

Provision of linkages with other Industries: Fishery Industry cannot be developed in isolation from other industries. The fishing industry can facilitate development of the other industries on which it depends i.e water, electricity and access roads.



Development Strategies:

Establishment of cold storage and fish processing facilities at all major landing beaches: At present, all Nile perch fish landed is transported to Kisumu, Nairobi, Mombasa and a few other places in the country. The fish is processed in the towns named above and the products such as fillets and swim bladders are exported to other countries earning Kenya much needed foreign exchange. The fish processors also remove the Nile perch skin for sale to tanneries. They also extract the fat which is melted and sold to the people who fry the carcase which remain after filleting. The carcase is cut into pieces and then fried in own oil. The idea of transporting the whole Nile perch to towns denies the local people a share in the benefits of swim bladders, skin oil, carcase. The other weakness in transporting Nile perch whole to the towns is the expense of transporting the whole fresh fish resulting in using more oil/fuel and large vehicles resulting in unnecessary loss of foreign exchange.

Packaging of large fresh whole fish also result in significant post harvest losses which would otherwise be considerably reduced if only frozen fillets, dried swim bladders and skins were to be transported leaving offals etc. behind. Quality would also improve as the processing time is shortened. It is only the fishermen and the trader who benefit. The rest lack even food and have to resort to vegetables which are rare in the semi-arid area around the lake. They are thus forced to buy vegetables from high potential areas. In the free market economy, where the willing buyer willing seller principle operates, the way out to assist the communities living around the lake is to set up fish processing facilities right at the landing beaches. The example followed in coffee, tea, fruit and sugar industries in this country should be followed in coffee, tea, fruit and sugar industries in this country should be followed in fishing industry. That is the factories should be situated where the fish is landed just as sugar factories are built in the middle of sugar farms and Tea factories right in the centre of tea farms, yet a Nile perch factory is set up in Mombasa. Fish processing factories should be set up at the following beaches. Nyamwa, Liunda, Usenge, Luanda Kotieno, Asembo Bay, Asat, Paga, Dunga, Nduru, Kusa, Kendu, Nyandiwa, Sori, Aneko, Muhuru and Port Victoria. Mbita one is already being set up by the Government. The capacities of the factories have to be related to daily fish landings at the beaches.

- Small scale Processing facilities at other Landing Beaches:

The smaller beaches could do the filleting and fillets are taken to the main factory. Products which do not require advanced technology in the initial stages like skin of Mbuta and swim bladder can be handled in the other beaches and only partly processed products

are transported.

- Fish Bandas at all Landing Beaches:

These would facilitate initial processing like filleting and temporarily storing fillets in ice in insulated rooms or deep freezers before transporting to main factories.

Dry fish stores and mills in all the beaches where Omena fishery is important. At present, the bulk of omena fishery is dried and transported to Nakuru and other destinations in lorries and trailers. The omena is ground and sold as animal feed. The community from where the omena is fished remain with nothing to eat. They are further denied the employment opportunity arising out of further processing of omena. Here is proposed that the omena mills should be set up at the landing beaches to provide employment for the local communities as the present situation is a double tragedy for them.

- Development of Piped water:

Piped, treated water is a pre-requisite for a fish processing facility. Raw water contains fish spoiling bacteria and is not safe for washing fillets or for use in making ice. The availability of treated piped water will improve the life of the people.

- Development of electricity supply to all major landing beaches:

Electricity is essential for running cold storage and ice making machines. The supply of electricity to the beaches should be possible under rural electrification programme. A part from direct facilitation of fisheries development, the programme will cater for a host of other needs.

- Development of fish access roads:

As there are tea roads, coffee and sugar roads, so there should be fish roads to facilitate the growth of fishing industry. The situation of access to fish landing beaches is pathetic especially during the rainy season. Infact a major road should run along the shores of lake Victoria (Kenya Sector) with appropriate branches to the beaches.

- Fish Farming Development:

Fish Farming supplements the natural capture fisheries. It is essential to examine the potential in this field so as to have a balanced fisheries development. Good potential does exist along the many streambeds and rivers. Channels could also be dug to utilize places like Siregi at Wichlun etc.



FINANCING THE FISHERIES PROJECTS AND PROGRAMMES.

The enabling infrastructure i.e fish roads, rural electrification, supply of treated piped water and major irrigation infrastructures should be done by the Government. The fish processing plants could be built by the Government or the private sector. The processing plants even if built by the Government should be rented out to enterprising companies or individuals to run them for the sake of efficiency and profitability. The infrastructure development could also be done by willing donors to supplement Government contribution. The fishermen cooperative savings from comision could be used to put up cold storage and processing facilities. The savings could be used as collateral to attract large loans from financial institutions for development of the essential infrastructure as referred to above.

Summary of Recommendations:

Fish processing facilities should all be situated at the major landing beaches. Treated, piped water should be made available at all major landing beaches to facilitate fish processing. Rural electrification programme should be extended to all important landing beaches. Fish roads should be extended to all gazetted fish landings beaches to improve movement of fish and fish products to markets. Establishment of social amenities at all major fish landing beaches. These should include schools, hospitals, and recreational centres. These could be done by the local communities themselves from fish sales. It is highly recommended to set up irrigational facilities to improve agricultural output. Fisheries development is incomplete when done in isolation from other sectors. Irrigation improves fish farming capabilities due to availability of plenty of water which is the medium in which fish lives. Fishing inputs should be made available for hire or purchase. More export markets should be found. The fish products for export should be transported direct from factories at the landing beaches to national airports or port of Mombasa as the case may be. It is recommended that an international airport should be built at Kisumu to facilitate quick export of fish products to foreign markets. This will improve quality as the latter deteriorates with time. The indigenous people from Lake Basin Core Areas should be encouraged and assisted to participate meaningfully in the fish industry. At present, the industry especially the processing and export is dominated by people from outside the area.

Proposed Fish Access Roads to Major Fish Landing Beaches in the Lake Basin Area:

Siaya District:

From	To	Approx. Distance (Km)
Bondo	Liunda	25
Bondo	Nyamnwa	25
Kipasi	Wichum	16
Amoyo	Ludhi	4
Nango	Uyawi	5
Nango	Sirongo	5
Nyamonye	Oele	4
Usenge	Uhanya	6
Kipasi	Misori	35
Nyabera	Ndigwa	10
Ndori	Luanda	
	Kotieno	45
Kalandin	Asembo Bay	5
Asembo Bay	Aram	10
Mituri	Kopiata	5
Ndigwa	Gudwa	6
Ranyala	Madundu	3

Kisumu:

Yatch Club	Dunga	5
Akado	Ralayo	5
Akado	Nyamarwaka	5
Konam	Arongo	5
Kombewa	Asat	15
Kapiyo	Kaloka	8
Obambo	Ogal	10
Chuthber	Paga	8
Airport	Usoma	5
Rabuor	Nyamware	10
Korowe	Nduru	15
Ahero	Ogenya	20
Kusa	Sango Rota	3

**South Nyanza:**

From	To	Approx. Distance (Km)
Kendu	Miti Mbili	20
	Homa Lime	10
	Alum	10
	Mijeri	5
	Ndegu	5
Lare	Homa	12
Rodi	Karungu (Sori)	48
Homa Bay	Mbita	41
Ogongo	Mirunda	10
Ogongo	Nyandiwa	30
Mbita	Around Rusinga	20
Mbita	Nyandiwa thro' Sindo	20

From	To	Approx. Distance (Km)
Migori	Muhuru	50
Othoch Rakuom	Got Kachola	8
Busia District:		
Ukwala	Port Victoria Via Rambwa	50
Rwambwa	Sio Port Via Budalangi	25
Total No. of Kilometres 695.		

Winston W. Adhiambo is a Senior Fisheries Officer incharge of District Fisheries Office, Kisumu, Kenya.

SOME REFLECTIONS ON THE FISHERIES IN THE LAKE VICTORIA, KENYA

by Jackton B.L. Akumu

The developmental role of social and economic aspects of fish production and marketing in Lake Victoria was recently studied by Dr. Gilbert Ogutu of the University of Nairobi.

A summary of the findings of the study was presented in November 1988 Workshop held in Kisumu where other related papers were also presented by various experts.

A number of important social and economic issues raised during the Workshop had important policy implications. The exercise was concerned with among others, identifying local fishermen, fish traders and why they remained poor.

Methodological and implementation trap.

To be successful, remedial recommendations must be dynamic and comprehensive enough to ensure a successful implementation of the recommendations for the exercise. It must be dynamic to take account of interim changes which come into play. More important-

ly the recommendations for a given study must unambiguously seek to improve the situation. Failure to take account of these methodological and implementation traps has always caused very important research reports to be shelved in the libraries and archives without being implemented. Our hope is that Artisanal Fisheries project will escape this trap by publicizing their findings.

Unequal trading competition:

Local fishermen and fish traders have remained poor because they suffer from low level equilibrium trap and vicious circle of under development.

Local small fishermen and fish traders operate under unequal competitive circumstances. They operate non motorised crafts which "rely on wind for locomotion"

They lack refrigerated facilities both in the crafts which are small and in the landing beaches. Thus, their small fish harvests go bad before landing as they remain in the lake for long periods of up to six hours where they rely on the luck of wind going the direction of their landing beaches. The few fish harvests that reach the landing while fresh must be sold immediately or risk



being spoilt.

At the other extreme, their wealthy competitors own big fishing boats, equipped with refrigerated facilities in the Lake and refrigerated transport lorries in the landing beaches.

Whereas the level of spoilage of the small fishermen is disturbingly high; the wealthy fishermen and transporters control both the sources and market outlets (forward and backward integration) and do not suffer any spoilage.

Local fishermen and fish traders also suffer from inability to satisfy collateral requirements for obtaining loans from the financial institutions.

A fishing unit capable of harvesting the more remunerative Nile perch costs approximately Kshs. 60,000. The average of Local fishermen are young male school leavers who are capable of being trained to become competent businessmen.

Technological Intervention needed:

More recently, the wealthy fishermen have changed their techniques for fishing and trading in fish. Most fishing and fish trading is now transacted in the Lake for specific market destinations. This latest development has come into play about a year after the aforementioned Workshop.

Todate, neither the Government nor Local fishermen and fish traders have developed any programme for enabling these local fishermen and fish traders to overcome their problem of low level equilibrium trap.

It is now recognized that free market mechanism always favours the wealthy and pioneering business organisations. The small and new business organisation always suffer from the late comers syndrome. They secure wrong inaccessible business locations, consumption pattern do not always change soon enough in favour their products or services. Finally they en-

counter market barriers.

The industrialized nations for example the United States of America these days officially recognize the need to facilitate small disadvantaged business organizations owned by women or minority marginalised groups.

Such disadvantaged business organisations or groups are advised to reveal their disadvantaged positions when bidding for national tenders.

May be there is a need to think along these times with respect to local fishermen and fish traders in Kenya.

The advent of NGOs in short circuiting the delays:

It takes a long time to incorporate new private recommendations within the National Development Plan and Budget. For example it may be sometime before Kenya's programme for Rural Electrification Programme reaches the shores of Lake Victoria.

Meanwhile the advent of Non Governmental Organizations (NGO's) and their direct developmental role can short circuit programmes which would otherwise suffer from bureaucratic delays.

Need to for alternative Options:

There is a need to examine alternative options such as a privately sponsored and funded programme for introducing a Revolving Funds Loans Scheme (RFLS) Programme with guaranteed credit system to enable local fishermen and fish traders to increase their competitive positions.

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