Impacts of Globalisation on Fish Utilisation and Marketing Systems in Uganda

DFID Project R8112

Final Report

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1. Executive Summary

1. The Ugandan fish marketing system is characterised by two distinct marketing chains, one ending in fresh and frozen exports of Nile perch, with some tilapia, the other serving internal markets with tilapia and other fish, including some Nile perch.

2. The project aimed to describe and analyse the marketing systems and model the financial flows through the sector with a view to indentifying losers and gainers.

3. The data collection activities included the extraction of official records and the collection of both quantitative and qualitative primary data, i.e. data of prices, costs and revenues, and data on community, especially women's, attitudes.

4. The sector is relatively recent in historical terms, and perhaps for this reason one feature of sub-Saharan fisheries is relatively rare, that is fish catchers indebtedness to traders. In fact most enterprises in the fishery get their capital from fishing itself or from farming.

5. Prices in the Nile perch marketing chain are determined by international conditions. The industry supplies an undifferentiated good to the world market and has to accept the international price.

6. Although the markets at most of the landing sites are too small to be really competitive, buyers and sellers seem to be well informed about price levels in general. However, there are some reports of traders exploiting their greater economic power to unilaterally alter the conditions of a sale in the light of the selling price they are able to achieve.

7. The sector is responsive to changes in the economic environment. Entrepreneurial drive can be seen in, for example, a lively industry processing factory by-products, skeletons, skins, etc, which has emerged in the last 15 or so years. In fact, the whole of the sector needs to be responsive and innovative because prices are on a declining trend. In December 2003 Nile perch prices fell to an unprecedentedly low level which could not be sustained in the long run by enterprises in the sector with their present cost profiles.

8. The artisanal fishery (catching, processing and trading) at a large landing site like Kasenyi near Entebbe has a complex structure with an advanced division of labour. At least some of these complexities are included in a MS Excel spreadsheet based model which traces factor income by sub-sector and lake.

9. The project facilitated the formation of a sector wide policy group with wide representation. One of its major initial concerns related to appropriate responses to changes in the international terms of trade.

10. The views and attitudes of fisherfolk communities, especially women, and other stakeholders are varied. The women in the landing sites raised a large number of issues reflecting their concerns over their own livelihoods and the welfare of the community as a whole.

11. In response to some of the suggestions made and issues that became apparent during the project two interventions are examined. One is technical in nature, the improvement of fish quality through improved handling, investigated using the Ice-IT tool modeling the interventions at a micro-economic level, the other organisational, the improvement of data collection procedures at the beaches.

2. Background

The project has focused on researching the impact of globalisation to the Ugandan Fish sector and recommending strategies for managing the risk associated to these issues. It is worth considering the current understanding of globalisation and the proposed impacts to trade and society in developing countries. The World Bank group have put in a place a specific homepage on globalisation which includes a full set of briefing papers and related articles on the issues. The briefing papers place globalisation in context and then review the potential impact of globalisation on poverty, inequality and the environment (IBRD, various dates).

Characteristics of Globalisation
The growth in cross-border economic activity between people in different countries as opposed to in-country trade is identified by the World Bank as the major component of globalisation. Globalisation is then discussed under three main headings: international trade, foreign direct investment and capital market flows. We will follow that structure here.

(i) International Trade
The international trade issues are critical to Uganda which has consistently developed and adhered to stringent economic and fiscal policy drives focused on increasing non-traditional exports. These initiatives have been successful mainly as they have been led from the top through specific presidential initiatives. *The Plan for Modernisation of Agriculture* (MAAIF and MFPED, 2000) and the fishery specific loan sought through the African development Bank are in place at least partly to support these export drives. Uganda is facing a growing spend on imported goods and services balanced by an increasing range of exports which generate large amounts of foreign currency. The increasing importance of Fisheries is reflected in Fisheries becoming the leading foreign currency earner having overtaken coffee at least twice in the last eight quarters.

The World Bank reported that this balance i.e. spend on imports versus share of country of international trade (exports plus imports of goods relative to GDP) rose from 32.3% to 37.9%. However the developing country ratio rose from 33.8% to 48.9% (IBRD 2003). This massive rise in GDP ratio signifies the increasing impact of globalisation on the economies of the developing countries. The singular importance of fisheries to the Ugandan economy provides a unique opportunity to use this research project to study this food commodity as a “co-efficient of globalisation” using international trade as major area.

(ii) Foreign Direct Investment
The investment by individual companies in one country into business operations in another country is an economic reality in East Africa. The Alpha group are major investors in the Food Sector throughout East Africa owning fish factory operations in Uganda, Tanzania and Kenya. The flow of capital through Foreign Direct Investment is therefore driven by individual country economic policies, which may be supportive or detrimental to the business.

The current example whereby Uganda unilaterally led on increase in mesh size of fishing gear and enforcement of the policy related to undersize fish may have reduced financial inflow into commercial development in Uganda. The businesses have the capability to move money to Tanzania or Kenya to optimise return on capital if the Government policy is not seen as beneficial. The Ugandan private sector response has been to close some factories as availability of fish was reduced as product moved to Kenya or Tanzania. This reduction in capital inflow may be further accelerated if the market access issues (whether sanitary and phyotosanitary issues act as a technical barrier to trade) have resulted in question marks around economic returns of product from that country[1].

(iii) Capital Market Flows

Capital Market Flows – i.e. foreign bonds, equities and loans – are reported to have risen sharply. Savers' portfolios have increasingly diversified especially through ethical investment and borrowers – including Governments – increasingly turn to foreign sources of funding. The African Development Bank loan is currently being utilised by the Government to drive the development of their leading export sector. However, although these flows increased rapidly in the 1990s, they are much more volatile and restricted to a smaller range of emerging market countries. Fortunately Uganda is regarded as the major emerging market country in East Africa. However this must be balanced by the change in Government in Kenya, which has been previously regarded highly. This country claims the natural competitive advantage of size, seaboard access, cheaper airfreight, established trade routes and hosts the Headquarters of range of regional businesses.

Negative aspects of globalisation

In an increasingly global economy the impact of international legislation, technology, foreign direct investment (multi-national led) and capital movement have potential impact on food sector development. There is a divergence of opinion as to the benefits of the emerging export trade in fisheries with some claiming negative impact on internal food security being offset by gains through fisheries export[2]. The UK Food Group represents a wide range of non-government organisations from a broad range of development, farming consumer and environmental organisations, interested in assessing the impact of the Common Agricultural Policy. This work has concentrated largely on

[1] For example the capital inflows in Latin /America dropped from US$126 Billion in 1998 to $72 Billion in 2001- further the fall from grace of Argentina resulted in a decrease from $24 Billion to $3Billion between 1999 and 2001. FDI represents 25% of world FDI in 2001 and represents the largest form of capital inflow into developing countries

[2] The work reported by the UK food group has largely criticised the global food trade policy. The background briefing 1, Feb 2002, provides an overview of Common Agricultural Policy (CAP) – how it operates, key commodities, competitors and markets for the EU. Although the report focuses on agriculture the resulting legislation and impact on developing country markets (page 30) provides a well researched insight into the EU approach .The key facts include: CAP consumes 43% of budget but agriculture is only responsible for les that 2% of GDP (consuming some 43 Billion per year); EU is largest single market for food in the world- however 25% of CAP is paid to processors and exporters and other organisations other than producers; the overall effect on developing countries is to depress world process – the Borrel and Hubbard economic model (Economic affairs – June 2000- Global Trade Analysis Project-GTAP) verifies this. Further this work estimated the cost of CAP to the world trade of $75 Billion – with major impact to other industries- i.e. consumption would rise; production fall, imports and exports would be affected. However a major conclusion of the impact of CAP is made by the OECD economists who believe that magnified fluctuations of world prices are of particular concern to the non-protected exporting processors or producers. This may be of particular concern to countries with low food security and no or little social/economic safety nets for producers. A further source of negative impact is the restricted access to the EU market of "temperate" products – similar to fresh / high risk issues faced by the fisheries sector

emerging legislative issues but these are intertwined with the new technology, rapid communication and foreign direct investment issues.

The Fishery

The Ugandan Nile perch fishery is founded on the introduction of Nile perch and Nile tilapia into Lake Victoria in the 1960s, introductions which had transformed the biomass of the Lake by the late 1970s. The development of the export industry resulted from the demand for white fish in wealthier countries although it was facilitated by the liberal economic policies adopted by the Government of Uganda, both internally, where there has been a move away from public ownership and regulation, and externally, where trade barriers have been reduced.

There is no doubt that fish exports have had a strongly beneficial effect on the Ugandan economy as a whole, but the precise distribution of the benefits (and disbenefits) has not been clear. One objectives of the project was to estimate positive and negative impacts by economic sub-sector, gender and spatial location. The project also aimed to assess the attitudes of the fisherfolk to the changes in the sector.

3. Project Purpose

The declared purpose of the project was to develop and promote strategies and management systems to improve post-harvest utilisation of fish and its impact on the lives of poor processors, traders and consumers.

To achieve this the project required the development of a fuller understanding of the relationship between the export and local fish marketing systems, the improvement of the information flow to policy makers in government and non-government sectors and the identification of interventions which will assist poor fisherfolk promote their livelihoods. Specific objectives, intended to increase knowledge of the Ugandan fishery, included:

- the preparation of an income flow model of the sector.
- the use of the model to trace the indirect impact of changes in the export sector and consequential changes in the small-scale sector.
- the identification of past and contemporary adverse impacts and determination of ameliorating policies.
- the collection of views from stakeholders and the development of mechanisms for stakeholders to contribute to the policy debate.

4. Research Activities

The project was built on three types of information: quantitative data, qualitative and anecdotal data, and policy reviews. The research strategy was to test data quality by 'triangulation', i.e. gathering similar data from different sources.

The professional staff at the Fisheries Resources Research Institute (FIRRI) conducted a series of fisheries beach surveys concentrating largely, but not entirely, on quantitative financial information. Former students of the Fisheries Training Institute (FTI) gathered community based qualitative data, supplemented by financial information, for a number of landing places. The Department of Fisheries Resources (DFR) facilitated the extraction of official statistics from their archive. The DFR played the leading role in the policy debate.

FIRRI conducted a number of surveys for the project (see the annexes). In three of them (Vols 1, 2, and 5) beaches were visited to establish the economic structure of the sector. The sampling strategy for the first survey (FIRRI, 2002a), conducted on Lakes Kyoga and Albert in May-June 2002, was to select three landing sites on each lake so that one would come from each of the following categories: (1) where chilled transport facilities already operate, (2) where chilled transport facilities may become available during the project's life and (3) where chilled transport facilities are not likely to be available during the project's life. The intention was to examine the impact of accessibility to the industrial sector on the price of Nile perch. Within each landing site an attempt was made to sample a representative group of practitioners in each sub-sector of the industry. (In practice this proved difficult because the initial numbers were small even before absences and refusals caused further reductions.)

A similar strategy was followed in the second survey (FIRRI, 2002b), of six beaches on Lake Victoria, the fieldwork for which was undertaken in August-September 2002. The sampling strategy was a multistage process. To ensure a spatial spread the eleven districts bordering the lake were divided into three Zones as follows:
Zone 1 – Rakai, Masaka, Kalangala, Mpigi
Zone 2 - Wakiso, Kampala, Mukono, Jinja
Zone 3 - Mayuge, Bugiri, Busia
In each zone, two landing sites were selected including one landing site accessed by factory trucks and one which is not accessed by fish factory trucks although it may be accessed by factory/boat agents. The two landing sites were selected from different districts in each zone.

The fifth survey (FIRRI, 2003c) was undertaken in September 2003 and was designed to re-examine the local economies of beaches on Lakes Kyoga and Albert over a year on from the initial survey. In practice the data were not resilient enough to generate any conclusive information. The process of inter-temporal comparison was not helped by two of the selected beaches being unavailable for the return visit, one because the landing site had been closed because of the excessive use of illegal gears and the fishery transferred to a nearby site, and the other because "prevailing insecurity conditions sparked off by

misunderstandings between the fishermen and revenue collectors that left two people dead" (FIRRI, 2003c, pp 45 and 14).

The third survey undertaken by FIRRI (2003a) was of the by-products sub-sector. Data collection was carried out at 3 selected fish processing factories, at 11 markets and at roadside points where by-products are sold in the Kampala, Mubende, Luwero, Iganga and Palisa Districts. Key informant interviews were held with District Fisheries Officers and relevant personnel at the fish factories and at the markets. Information from owners of by-product marketing and processing units and from consumers was obtained through interviews using structured questionnaires.

The fourth survey was a general survey of the fish marketing and distribution system conducted in March-April 2003 (FIRRI, 2003b). This study was carried out in eight randomly selected districts that derive their main fish supplies from Lakes Victoria, Kyoga and Albert. Kampala, Masaka, Luwero and Tororo were selected as districts supplied from Lake Victoria; Masindi and Arua as districts supplied maninly from Lake Albert and Kayunga and Soroti districts that recieve their fish mainly from Lake Kyoga. A list of (fish) markets in each district and information on market days was obtained from the Fisheries Officers and in each district one or two markets, both rural and urban, were selected yielding a total of 15 markets.

The field research for the FTI report (2004) was carried out by a group of former students. They were asked to pay an extended visit to a varied group of landing places and report on the physical infrastructure and fisheries practices, and collect the views of women at the landing place by means of a semi-structured group discussion. The report contains details from 21 landing sites on the five largest lakes (and the Kazinga Channel). The fieldwork was undertaken in July-August 2002 and the report edited in 2004.

Further quantitative data, secondary rather than primary, were obtained from the records at the DFR, where records for the gazetted (approved for the export trade) beaches are stored. The DFR also facilitated much of the fieldwork of UK-based project staff.

The DFR made a significant contribution to the project through the position papers on poverty and the fishery (Nyeko and Keizire, 2003a) and on the views of local fisheries administrators in the districts and at the beaches (Nyeko and Keizire, 2003b). Further contributions to the project's activities to do with fisheries policy and administrative practice were made by DFR staff working on the revised data collection forms. The DFR team also set up the Policy working group which reviewed how this project could be used to support further Government projects, e.g. ADB and UNIDO, and could usefully advise on future policy making instruments. Further the role of the macro and micro tools in modeling cost impacts was agreed to be of major interest to Government..

Additional information was gleaned during fieldwork and in a collaborative exercise with the Integrated Lake Management project a joint report was produced on a survey of the impacts of by-products in markets in the Lake George area (Marriott, 2004).

The financial inputs of the project were achieved more or less in accordance with the initial project memorandum. Two changes were made, both with the agreement of the PHFRP manager. The first was the transfer of £8,470 + VAT from other budgets (£5000 + VAT for a visiting FAO expert, £1790 + VAT from the initial allocation to the Uganda Fish Packers and Processors Association, and £1680 from the Fisheries Training Institute) to Manufacturing Improvement International staff time. The second was an underspend of £5600 + VAT in the budget of the Department of Fisheries Resources. This was because there was no dissemination activity undertaken during the life of the project and the DFR budget was intended to finance that activity.

5. Outputs

5.1. Planned Outputs and Outcomes

The outputs planned at the commencement of the project, and the results of the project activities are:

1. Description & analysis of commodity systems (the product and value chains) affecting both small-scale producers, processors, traders and consumers and the industrial/export fishery.

The descriptions and discussions of the fishery-related activities at the landing places are more detailed than any previously available (see Section 5.2. and the annexes prepared by FIRRI and FTI). They provide a clearer statement of the position of post-harvest activities in the sector than earlier research. In particular, the project examined the structure of the by-product processing and marketing sub-sector for the first time (Section 5.4.2.). The interest of this activity is that it is an unplanned and innovative response to an unanticipated opportunity and shows the potential dynamism of the indigenous economy.

2. A model expressed verbally, diagrammatically and quantitatively of the system as a whole, i.e. including the small-scale chain, the industrial chain and interactions between the two.

Illustrative models of income flow through the economy are presented, in diagrammatic form in Section 5.2 and the annexes by FTI (2004) and Hannah (2004) and quantified in Section 5.6. and the accompanying MS Excel spreadsheets. Although aggregation inevitably results in the loss of much local detail the spreadsheet model permits the estimation of regional factor incomes for the harvesting and post-harvest sub-sectors and how incomes change with changes in price of fish, price of inputs and factor allocations.

3. Description and analysis of livelihoods coping strategies among poor producers and consumers and their vulnerability to systematic shocks, especially changes in the industrial/export sector.

The FTI and FIRRI reports place fisheries activities in their wider livelihood contexts. The sector has passed through a number of stages of expansion and contraction the rapidity of some of which have justified their description as ‘shocks’. These have been facilitated by the reduction of current expenditure (e.g. on labour through the formulae used for crew members and reducing casual employment, and on fuel), the cessation of the maintenance of capital equipment and the postponement of capital investment. The severe fall in the price of Nile perch for export in December 2003 was managed by a general reduction in fishing activities. The least securely established workers – often the least well paid – tend to be disproportionately affected.

4. A forecast of current trends into the medium term future and assessment of consequential shocks on the small-scale fishery.

On closer examination of the international market context within which the industry operates attempting to forecast sales in the medium term appeared unhelpful. A forecast of future income depends on two factors: selling price and quantity produced. With

regard to price, there is little doubt that there will be a continued demand for white fish on the international market (although possibly at lower prices – the declining trend price trend is commented on in Section 5.4.2.. But it is not easy to absolutely confirm Uganda's continued status in the international market. The Ugandan export fishery is essentially a price taker on the international stage and can do little to secure its position other than remain price and quality competitive. The other factor affecting the long term status of the industry is the supply of fish from the lakes. This is outside the scope of this project although we can note that the Department of Fisheries Resources is actively managing the resource.

5. Widespread consultation on the policy implications of the results and identification of appropriate interventions in response to the views of the poor and Ugandan government anti-poverty policies.

A large number of interventions were suggested in the consultations with poor fisherfolk but, inevitably, many were unrealistic. Representative members were invited on to a policy group chaired by the Commissioner of Fisheries. The project built on previous work on improved fish handling techniques. Efforts were also made to develop and improve fisheries statistical data collection systems to incorporate improved economic data especially of fish processing at the landing sites. This activity proved timely in that Beach Management Units are recently established in Uganda. They have both revenue raising powers and an interest in accurate local information. (See Sections 5.7. and 5.8.)

6. Critique of innovative research methodologies and tools developed e.g. system modelling and forecasting methods.

The process of converting data from fieldwork and official sources into a quantified interactive model required only a limited degree of approximation (Sections 3, 5.6., the MS Excel spreadsheet and Hannah (2004)). Continued refinement of the costs and revenues of enterprises in the sector should mean that the MS Excel spreadsheet model is of continuing worth. The micro model of intervention costs and revenues operates on Ice-IT, a package designed to manage data from the industry.

5.2. Fish marketing chains

Lake Victoria now supports a major fishing industry based on three species: Nile perch, tilapia and mukene. On Lake Kyoga there is a similar fishery while on the other lakes there is a rather wider variety of fish caught. The industry operates in two quite distinct sets of enterprise depending on the location and nature of their markets. On the one hand is the fishery serving the local market which is widespread throughout Uganda and extends into adjacent countries. On the other hand is the fishery serving the export market in higher income countries. The initial fish catching processes are similar - both sectors are clearly artisanal with non-motorised canoes being the dominant fishing boat. 20% of the canoes are motorised although most of these catch Nile perch for export.

5.2.1. The Export Market Chain

Nile perch is caught by small-scale fishers using both paddle-powered and motorised boats. Typically the non-motorised boats land at more remote beaches or transfer their catches to collector boats on the lake, while the motorised boats land at gazetted beaches, which are officially approved for landings intended for export. Both fish catching and fish collecting require access to capital for the purchase of the boat, engine and gear and access to working capital for fuel. But enterprises are small scale – there are several owner-fishers and owner-collectors. A variation of this pattern is the introduction of fresh brought overland from other lakes, sometimes to gazetted beaches, sometimes directly to factories. The traders involved at this stage are also small scale, the capital requirement is not unlike that of collectors on Lake Victoria.

The fresh fish, certified as fit for export by a Fisheries Inspector, is taken to the factories either by the factories themselves or, increasingly, by a trader-transporter. After processing the fish fillets are taken to Entebbe airport (fresh fish) or Mombassa container port (frozen fish).

Spatially the chain is strongly focused on a small number of gazetted landing sites on Lake Victoria, together with smaller outlying beaches on Lake Victoria and on Lakes Kyoga and Albert, at its start and on the processing factories at its end.

5.2.2. The Local Market Chain

In areas close to urban centres a high proportion of the fish consumed locally is traded fresh, but the rapid deterioration of the product necessitates some kind of preservation before distribution to distant markets. Hot smoking is by far the most common method of preservation although the technique is beset by problems of fuel supply of mango and other hard woods. In addition fish enters the local market sun dried (with or without salting), and fried. Distribution is by foot, bicycle, lorry, pickup or public transport.

The dominant fish traded locally is tilapia. The Nile perch which enters the local market is lower grade fish rejected by the factories and fish landed at landing sites where factory agents do not operate. Like tilapia it is sold locally fresh and smoked and there is a

significant regional export market from Uganda to the Congo. An industry processing the by-products - skeletons, heads, skins, and offcuts – and rejected fillets from the factories has emerged in the last two decades. These by-products are usually smoked and distributed largely to markets serving poorer consumers. The third of the major species in the fishery, mukene, is invariably sun-dried. The best of the product is sold for human consumption while lower quality fish is used as animal feed. A wide range of other species, catfish, lungfish, and happlochromines, for example, are sold to better off consumers.

Figure 5.2.1. The Marketing Chain for Smoked and Sundried fish

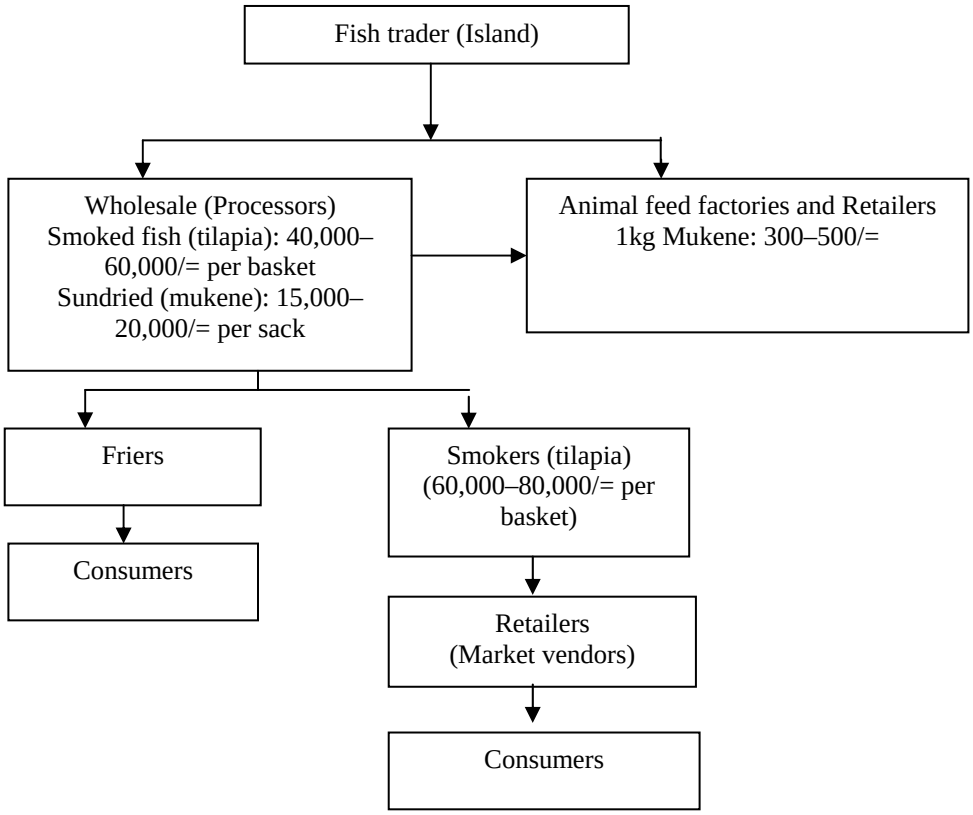
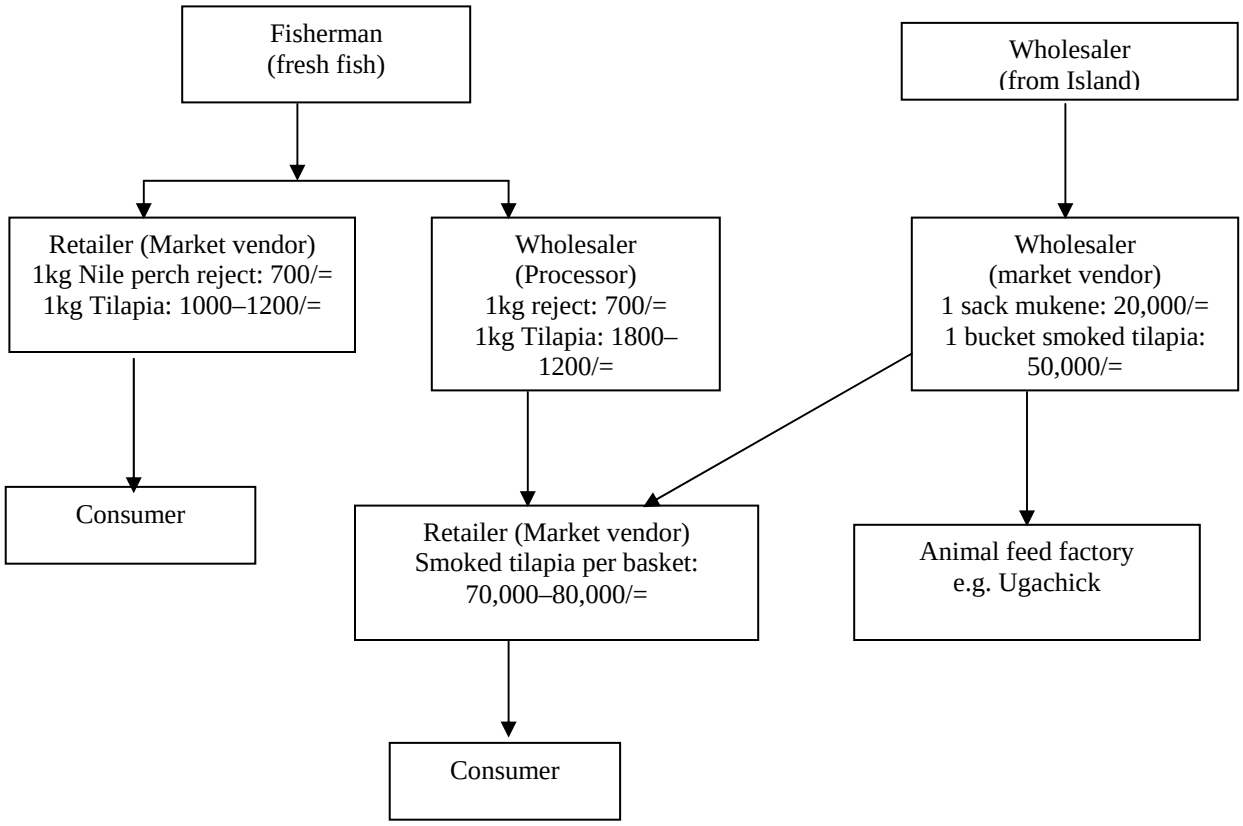


Figure 5.2.2. Market Chain for fresh and dried fish from the islands.



Fish catching is almost entirely conducted by canoes most of which are not motorised. Gill nets are the most commonly used gear, although there are many other fishing methods used including mosquito nets (very small mesh nets used to catch mukene), hooks and lines, long lines, beach seines and cast nets. Typically gill nets are set in the evening (6-8 p.m.), hauled in morning (5-7 a.m.) and the fish are taken to landing beach or to a collector boat. The collector boats carry Nile perch stored on ice to officially approved landing sites. The fish for local sale are stored less carefully and deteriorate more quickly. In particular ice rarely used; it is not readily available, is not seen as cost effective and in any case the canoes are too small.

Figures 5.2.1. and 5.2.2. show marketing chains which are entirely confined to the local/small-scale/artisanal sub-sector (except for the supply of mukene to a animal food factory). The data are taken from the FTI report. Figures 5.2.1. and 5.2.2. relate to Kasenyi, a large landing site near Entebbe, which is referred to later in the report.

The increase in commercially attractive species leads to a marked increase in both fish catches and fishing effort. The increase in catches was particularly sharp during the early and mid 1980s. Inputs into the industry have also increased. For example, the number of

fishing boats was about 3,000 in the early 1970s, it rose to 8,700 in 1990 and to 15,500 in 2000 (Uganda, Government of, 2000, pp 4-11).

The size of the domestic market in Kampala makes it a nodal point in fish distribution. Domestic fresh fish sales are dominated by markets close to the lakes. Kampala is the major market. Although some of the fish taken up country is fresh, much more is smoked. Smoked fish from Lake Victoria is taken to markets spread widely across southern Uganda. Other lakes also serve regional markets. Lake Kyoga in the north, Lake Albert in the area close to the lake and further north, Lakes George and Edward the south west. Nevertheless, there is a substantial overlap between the market areas. Masindi, for example, mid-way beween Lakes Albert and Kyoga receive fish products from both.

5.2.3. Links Between the two Market Chains

The two chains (i.e. (1) industrial/export/Nile perch and (2) artisanal/domestic/tilapia and mukene) are largely, but not entirely, separate from fish catching to retail selling stages.

Of the three main species landed, Nile perch, tilapia and mukene, the technological and commercially arrangements of fish catching and handling are similar for two species, Nile perch and tilapia.

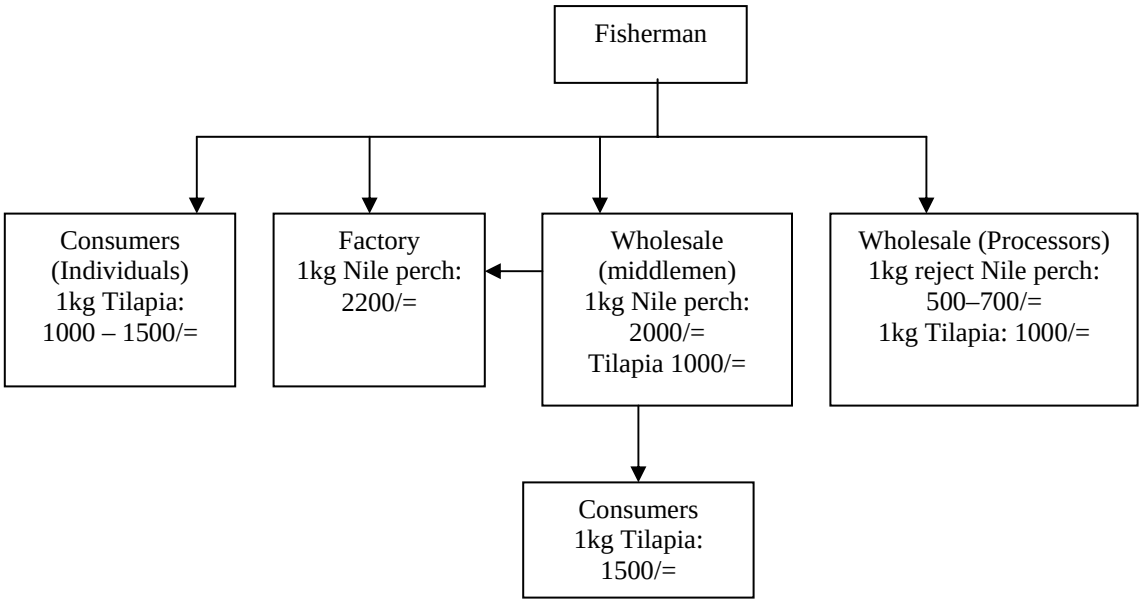
The technology, commercial processes and physical assets used are most similar, and most easily transferred at the first stage in the chains, the catching stage. The physical factors are practically identical. The boats are the same design and although those landing Nile perch at the major landing beaches are larger than those catching tilapia even this difference appears not to exist at smaller landing places. The main gear used, gill nets, is similar although a larger mesh size is used for Nile perch. Many more Nile perch boats use outboard motors but the physical factor is identical. Fish catching skills required are similar, but not identical since the two fish have slightly different habitats. Nevertheless there is a significant commitment to one target species or another with, it appears, little transfer from one to the other. This may be related to skills, marketing links (established outlets), licensing arrangements. Mukene catching and handling is more different.

At later stages there is less contact between the two chains. Although not all of the Nile perch or tilapia continues in the chain where it starts.
(1) By-catch, of tilapia in the Nile perch fishery and Nile perch in the tilapia fishery, often crosses over at first landing;
(2) the factories purchase some tilapia for export; and
(3) the factories supply by-products and sub-standard fillets to local processors.

This latter is a demonstration of the dynamism in the fishing industry and economic implications will be examined in the following section.

Some links at an early stage are illustrated in Figure 1.3. which also relates to Kasenyi.

Figure 5.2.3. Initial Stages in the Marketing Chain for Fresh Fish at Kasenyi



5.3. Sectoral Exclusivity of Fisheries Livelihoods and Links with Other Sectors

The fishing sector in its present form is a relatively recent creation, post-dating the introduction of Nile perch and Nile tilapia into Lakes Victoria and Kyoga and the development of the export industry, and many fish catchers, processors and traders do not have a long term family history in the sector. This may mean that there is more mobility between fishing and other sectors. In fact the data collected by FIRRI and given in Table 5.1. show that on average about half the fishers have no alternative source of income, although the proportion varies from as many as 71%, at Kasenyi, a large landing site close to the factories, to 24%, at Bikunyu, a small and remote landing site on Lake Albert. Although one should be wary of drawing too much from small samples, the largest categories of alternative employment are farming and trading.

Table 5.3.1. Alternative livelihoods of fish catchers

Beach	None	Farming	Trading	Others	Total
Kansiira (L Kyoga)	30	41	15	15	100
Wansolo (L Kyoga)	38	29	12	21	100
Iremeria (L Kyoga)	50	33	0	17	100
Kabolwa (L Albert)	61	13	26	0	100
Somsio (L Albert)	64	18	18	0	100
Bikunyu (L Albert)	24	68	0	8	100
Dimmo (L Victoria)	43	29	24	5	100
Saanya (L Victoria)	40	53	0	7	100
Kasenyi (L Victoria)	71	14	14	0	100
Buwanzi (L Victoria)	54	36	0	10	100
Bwondha (L Victoria)	63	13	13	11	100
Bumeru (B) (L Victoria)	38	42	16	4	100

Strong links with other sectors are shown in the data for the source of capital invested in both fish catching and fish processing. As Tables 5.3.2. and 5.3.3. show the fishing sector itself provides the main source of capital for fish catchers, farming for fish processors. This confirms the view that catchers (men) are more exclusively committed to the industry than processors (mainly women) who may have joined the industry more recently and leave it more readily when incomes are lower. Although catchers and processors are often joined by family ties their interests are not identical and the Beach Management Unit (BMU) regulations ensuring separate representation for processors are to be applauded. While the strongly gender-based separation of roles continues every effort should be made to ensure the preferred 30% representation of women on the BMUs (DFR, 2003, p 18). This topic is further examined and a recommendation about the importance of maintaining and enhancing the position of women in the fishing community is made in section 5.4.

Table 5.3.2. Fish Catchers' Sources of capital

Beach	Fishing	Farming	Others	Total
Kansiira (L Kyoga)	35	58	8	100
Wansolo (L Kyoga)	31	42	28	100
Kabolwa (L Albert)	31	34	34	100
Somsio (L Albert)	64	36	0	100
Bikunyu (L Albert)	36	56	8	100
Dimmo (L Victoria)	48	32	20	100
Saanya (L Victoria)	60	33	7	100
Kasenyi (L Victoria)	52	14	34	100
Buwanzi (L Victoria)	45	45	9	100
Bwondha (L Victoria)	51	26	23	100
Bumeru (B) (L Victoria)	50	30	19	100

Table 5.3.3. Fish Processors' Sources of capital

Beach	Fishing	Farming	Others	Total
Kansiira (L Kyoga)	59	23	18	100
Wansolo (L Kyoga)	17	58	25	100
Kabolwa (L Albert)	9	46	45	100
Somsio (L Albert)	59	23	18	100
Bikunyu (L Albert)	50		50	100
Bwondha (L Victoria)		60	40	100

5.4. Efficiency and Competition

5.4.1. Competition and Efficiency in the Market Chains

The Ugandan government supports a competitive business environment, and has implemented a programme of liberalisation which has opened the economy to global competition. This policy is consistent with the UK government's policy (DFID, 2000) and in the discussion below the assumption is that competition is likely to promote efficiency and economic growth.

The Export Market Chain

The prime economic driver for the fishery as a whole is fish processing for export. Historically the growth of the Nile perch export fishery was largely demand driven. Because of the export demand the price increased, which in turn resulted in an increase in fishing effort and catch. The infrastructure for the industry developed in the 1990s. The problems associated with a dependence on a single market were illustrated by import bans imposed by the EU on health grounds. The first lasted from December 1997 to July 1998 and was imposed after the discovery of salmonella and cholera in imports to Spain. The EU response was to require hygiene certification from the East African exporters. A second EU ban was initiated in March 1999 following reports of the use of poisons to kill fish. The price of fish fell and motorised catching became uneconomic.

Where the driving power in the commodity chain lies is a moot point. It appears that the factories are largely price takers with very little scope for price bargaining with importers in the developed world or their agents ate Entebbe airport. Their export products can best be regarded as unbranded, undifferentiated products, typical of products where suppliers have little scope for influencing price. There are, in fact, a number of Ugandan white fish products. Rough cut skin-on fillets are exported to Israel while the American market is supplied with prime white meat fillets. The designation 'Nile perch' is a further distinguishing characteristic in some international markets. But, in general, Uganda's fish exports are in competition with white fish from producers in other parts of the world, especially in South East Asia. Processors do have the scope for a degree of initiative in developing new products for example for internal markets.

The export industry operates in a competitive international market. None of the exports are distinguished by branding. It is not even clear if Nile perch should always be regarded as the appropriate description of the product – it seems that some times the exports are sold under this name in Europe but sometimes not. In the latter case the product can best be regarded as undifferentiated white fish. As such it is under competition from other producers in other parts of the world. Most recently Vietnam has emerged as an important new player, exporting large quantities of inexpensive tilapia (see for example, Mgamba, 2004, p 18).

The price insecurity the industry faces in international markets emphasises the importance of both managing the natural resource effectively and ensuring post-harvest value-added.

At the beaches the classic conditions for competitive markets are rarely met in that there are only small numbers of buyers operating in most markets. At many small remote beaches there may be only one or two collectors buying, at most gazetted beaches there are only one or two factories buying (Kasenyi with five factories buying is quite exceptional), and at the airport there are only one or two agents buying. But sellers appear to have a good (although not perfect) knowledge of current prices. And, since knowledge of price extends beyond the individual landing site, there is regional competition. In general, there does not appear to evidence of collusion to hold the price down. The continuing nature of the markets – and the advantage to both parties of their future existence – probably ensure that market dominance is not pushed to an exploitative extreme.

Nevertheless there are some indications that traders and factories do demonstrate their greater power in some practices. Some transactions are cash transactions but it is reported that it is not unknown for traders/factories to unilaterally change the agreed price after the transaction is complete. It is also reported that obtaining cash settlements was difficult for some sellers. This is a serious impediment to market efficiency and one that should be addressed by the DFR perhaps through encouraging the BMUs to ensure proper documentation. (A further comment and recommendation is made on this in section 5.7.1.7.

The Domestic Market Chain

The fishery is relatively recently established – dating from the late 1980s – and perhaps for that reason many of the kinds of anti-competitive traditional ties seen in artisanal fisheries in other parts of sub-Saharan Africa are not present. In particular, there is no evidence of significant and continuing indebtedness of fish catchers to fish traders. Most decisions about buying and selling fish are made on a directly commercial basis in contrast to the situation in many sub-Saharan African countries.

At the largest beaches there are enough buyers and sellers to ensure a competitive market. At Ggaba, a large artisanal landing site near Kampala, for example, there are over 70 traders operating. At several beaches, including Ggaba, a large artisanal beach near Kampala, first sale is for cash by auction.

Except at the stage of final consumer, the number of buyers at markets in the domestic marketing chain is small at most markets. There may be as few as only one or two traders and only four or five fishers at some of the smallest beaches. In these there may not be equality of influence in the market but the knowledge of the wider market situation partly protects the less powerful seller.

5.4.2. Responsiveness to change in the sector

The sector has shown itself able to respond quickly to changing circumstances. We can refer to the emergence of the by-product processing industry as an example of change over the longer term, short term change is illustrated by the response to the Nile perch price fall of December 2003.

5.4.2.1. By-Products Processing

In the late 1980s/early 1990s factories began initially giving then selling by-products to local processors and traders. This formed the basis of a small but locally significant economic activity creating a product which is taken to upcountry areas in Uganda and even exported to Congo

Commercial Structure of the Industry. The sub-sector has a complex commercial structure with an advanced division of labour. Traders buy the by-products from the factories, sell to processors, who in turn sell on to wholesale distributors and then to retailers.

The economic actors in this chain are:
(1) Factories. Factories are in a strong trading position in the sale of by-products.
(2) Wholesale fresh by-product traders. These traders buy from the factories and sell to local processors. This link in the chain is relatively capital intensive. The traders need a significant amount of both working capital (as a financial deposit with the factories, to purchase materials each day, etc) and physical capital in the form of a pick up truck (which can be owned or leased).
(3) Processors. Processors are entirely artisanal but can operate at a number of different scales from very small, especially on retail markets, to large, like the bulk smokers at sites like Busego and Ggaba.
In the case of smoking the working and physical capital requirements are limited – cash to buy the by-products (and traders may extend short term credit) and fuel wood, and to secure the use of a kiln, which is a simple structure.
(4) Distributor traders. Traders purchase the smoked by- products and take them on to their markets up country or in the Congo.
(5) Retailers. Again the costs are low, generally the cost of a market stall.

Market efficiency. The number of buyers and sellers in this chain of markets is usually not sufficiently large for the markets to be demonstrably competitive, but on the other hand at most stages in the chain there is no evidence of restrictive practices to fix prices. At one bulk smoking site, Busego, the wholesale traders sell to the processors by auction, daily at 7.00 a.m. Such an obviously competitive market is unique and most prices are fixed by negotiation between individual buyers and sellers, but both parties have good knowledge of prices in general.

Consumption. Practically all the by-products are used for human food as snacks and meals at home. Smoked by-products are universally regarded as a food product for the poor. It is suggested in the FIRRI report that

> The main constraint has been the poor perception of the public, whereby some degree of stigma has been associated with dealing in and consuming the by-products. It is considered a matter of shame that the best parts of the fish should be sent to foreign consumers and Ugandans left to eat carcasses, skins, trimmings, etc

Most retail markets handle both processed (smoked and fried) and fresh products. The handling of the by-products during transport and their presentation at the retail stage is sometimes poor.

Conclusion. The consumption of by-products is regarded as a socially degrading activity and there have been calls for, and the implementation of, local bans on the trade. This would be undesirable in that an income generating activity and a source of nutrition for the poor would be banned. The sub-sector is better regarded as a creditable innovative response to an opportunity offered by unused resources**. It is RECOMMENDED that Local Councils are reminded of the merits of the by-products processing sub-sector and be dissuaded from acting to discourage it.**

5.4.2.2. Response to the Nile Perch Price Fall of December 2003.

The price of Nile Perch fell to 1000 Ugsh or less at Kasenyi, where there is particularly good quality data available, between 15 and 24 December 2003, almost certainly the lowest price at that beach for several years. The low price is a result of a combination of two trends, first a secular trend of falling prices, and second a regular negative seasonal variation before Christmas. These two trends are examined in the next section and finally the way in which the industry copes is discussed.

Data for the selling price of Nile perch at Kasenyi suggest that prices are under pressure. The daily data for 2003 show a declining trend in price for the second half of the year. (Figure 5.4.1. shows prices on an end-of-the-year constant price basis, although inflation was not especially fast during 2003.). In the years before 2003 the price had tended to rise rather than fall.

The data in Figure 5.4.2. confirms the regular nature of the pre-Christmas down-turn but also shows the relative lowness of the 2003 price. Two explanations for the seasonal slump are extant in the industry; first, reduced demand from the factories, as a result of a reduction in demand in their overseas markets; and second, the wish of the practitioners in the industry, some of whom may have home villages some distance from the lakes, to enjoy Christmas as a holiday season. Of the two explanations the demand-side one is more convincing. Tilapia, with its domestic market, does not show similar seasonal patterns. Certainly the fall in price in 2003 appears to be the result of an unusually low demand from the export markets.

Figure 5.4.1. Price of Nile Perch at Kasenyi, 2003 (Constant price)

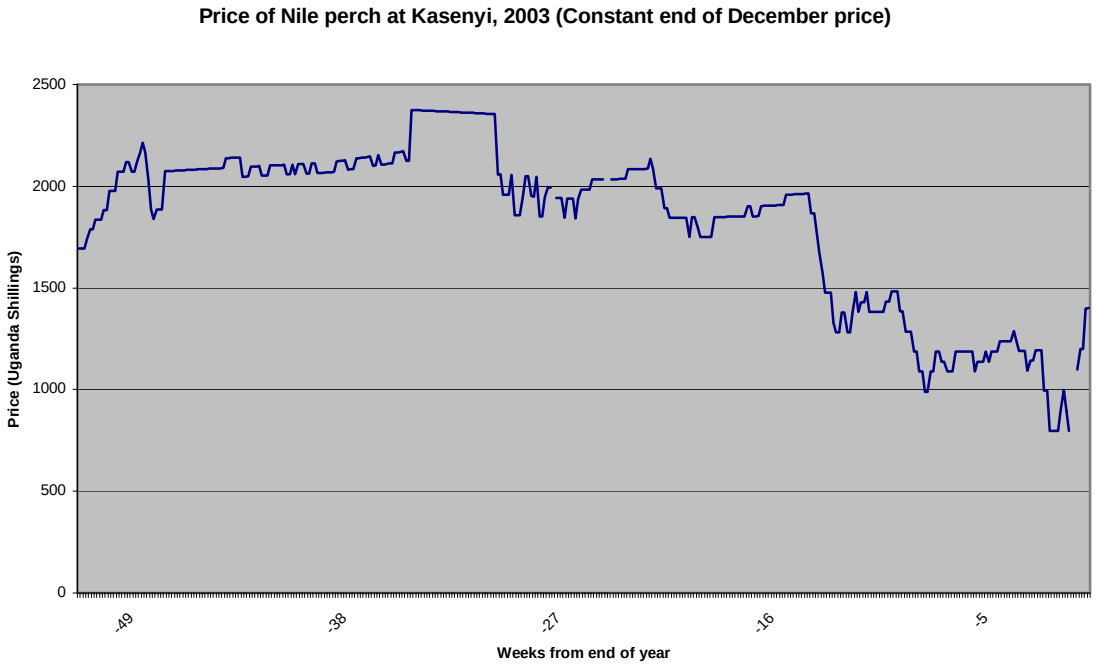
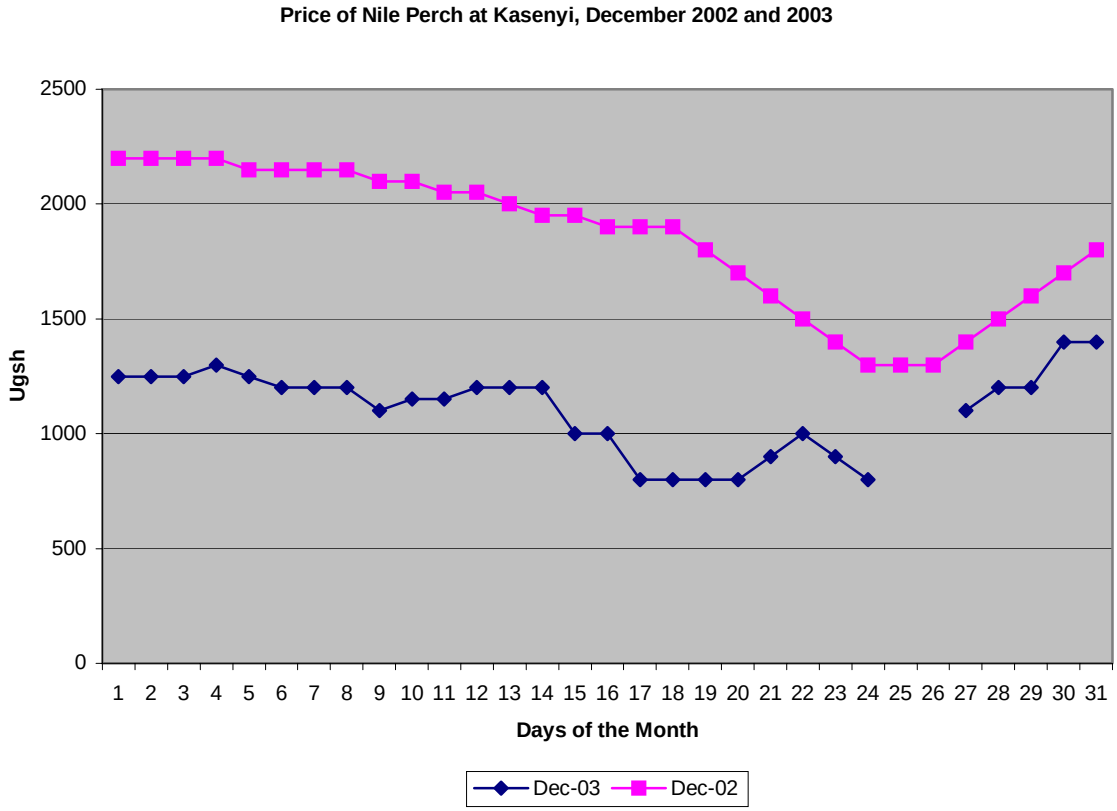


Figure 5.4.2. Price of Nile Perch at Kasenyi, December 2002 and 2003.



The December 2003 prices were so low that some operatives would have barely covered their marginal costs. The response to that we might have expected to have seen was a significant reduction of Nile perch catches and sales. In fact in fieldwork some fishers at Kasenyi reported a reduced frequency of fishing from five times a week to once or twice. But the catch data do not confirm that this was a common response (Figure 5.4.3.). The trend up to Christmas is constant and soon recovers after. The data for fresh Nile perch sales (i.e. mainly fish brought to Kasenyi by collector boats) does suggest that collectors are more price responsive. Sales are very low when the price is below 1000 Ugsh (Figure 5.4.4.).

Figure 5.4.3. Nile perch catches, Kasenyi, December 2003.

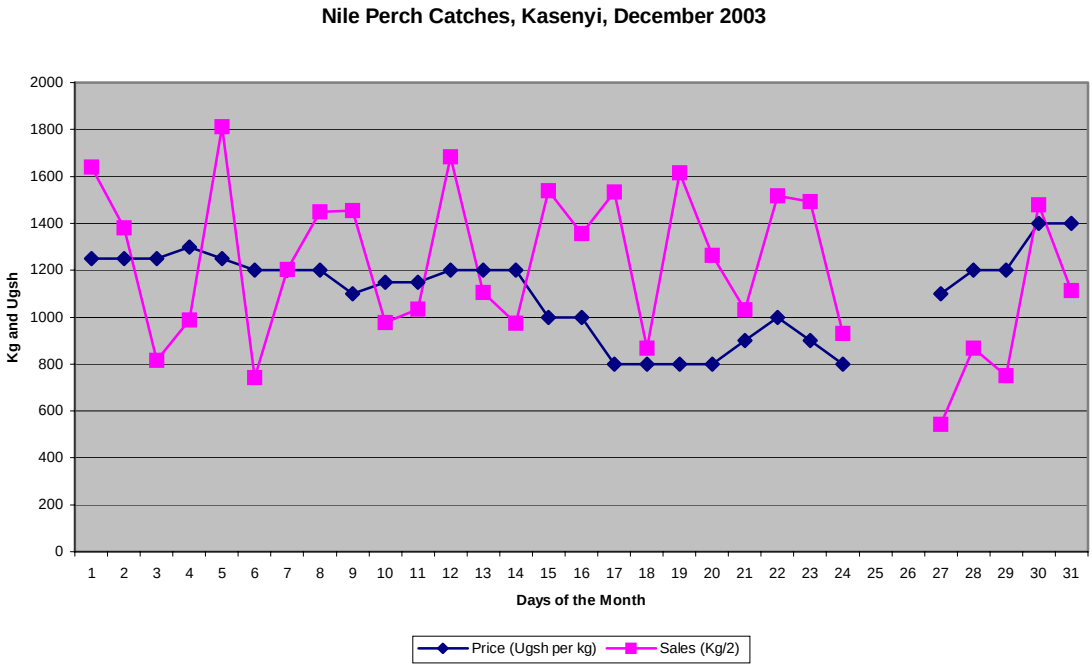
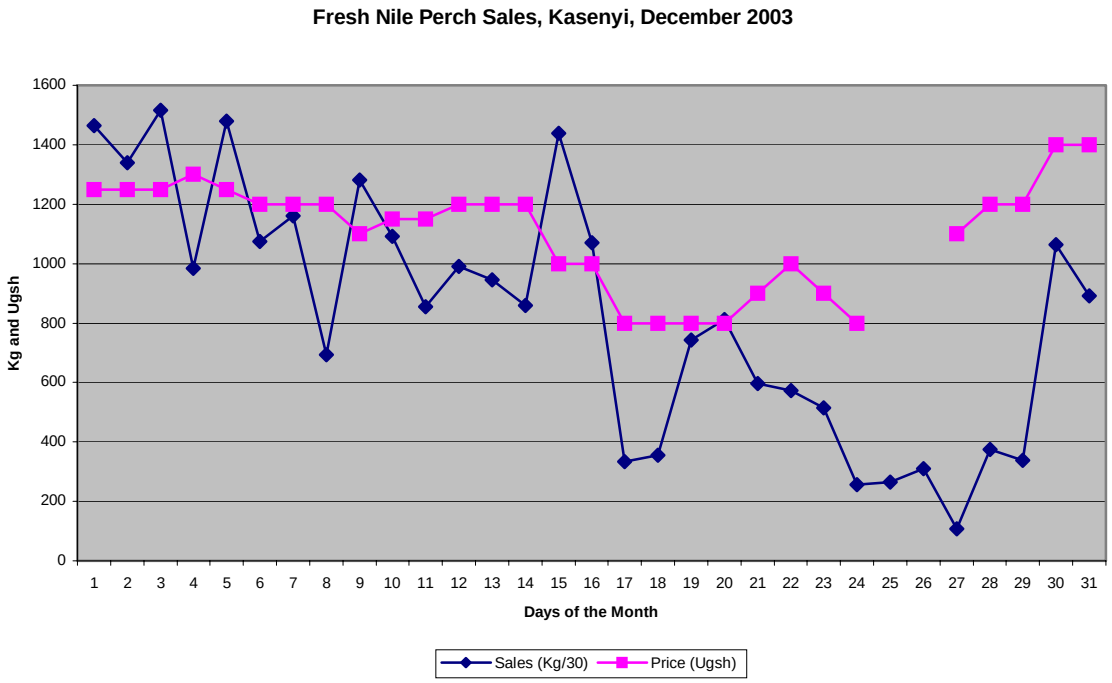


Figure 5.4.4. Fresh Nile perch sales, Kasenyi, December 2003



5.5. Costs and Revenues in the Fishery

Details of the costs and revenues at the selected beaches are given in the FIRRI reports. In this section data for Kasenyi are extracted from FIRRI (2002b) as an introduction to the sector as a whole.

5.5.1. Fish Production Sub-sector

5.5.1.1 Overview

Kasenyi Landing Site has the following facilities in support of fish production:
(1) Two boat making yards
(2) Seven fish handling platforms, privately owned by the fish processing plants operating at Kasenyi
(3) Four wooden stalls for handling of other species of fish than the Nile perch
The main type of fishery is gill netting with approximately 30 fishers. Some fishers also use long lines. In all, there are approximately 36 fishing unit owners at Kasenyi.
There are 65 fishing boats of the Ssesse type and approximately 52 fishing boats have out board engines. There are 15 transport boats with outboard motor engines of 15 horsepower. 60 boats are involved in gill netting and 5 are involved in long lining. The main fish species landed is Nile perch followed by tilapia.

5.5.1.2. Fishing Inputs and Costs

Boats and Engines. The vast majority of the fish producers own their boats although a small minority rent them.

Table 5.5.1. Boat Characteristics at Kasenyi (Means)

Cost price (Shs)	505,000
Salvage value (Shs)	48,750
Useful life (Years)	5
Years in operation	3

Three-quarters of the boats are motorized using 8-15HP outboard engines and one quarter paddle-powered. For the owners of motorized boats, approximately two-thirds own the outboard engines and one third hire them.

Table 5.5.2. Outboard Engine Characteristics at Kasenyi (Means)

Cost price (Shs)	2,007,143
Salvage value (Shs)	169,231
Useful life (Years)	10
Years in operation	4

Fishing Gear. Nine tenths of the fish producers use gill nets with the rest using long lines or mosquito seines.

Table 5.5.3. Characteristics of Gears Used at Kasenyi (Means)

	Long lines	**Gill nets**	**Mosquito seines**
Number per boat	300	145	1
Size	9	7	.
Unit cost price (Shs)	100	37,237	400,000
Useful life (Years)		2	
Salvage value (Shs)	0	0	0

Capital. Half the fish producers derived their initial capital from fishing. Farming and credit together were the capital sources for a quarter and the remaining quarter got heir capital from other sources. Owners of motorized gill net fishing units on the average had invested Shs. 5.5-6.0m in their enterprises roughly double that of non-motorized gill net and mosquito seine fishing units and about 25 times higher than for longline fishing units.

Labour. Most gill net and longline fishing units employ 2 crew members per boat while Mosquito seine fishing unit employ 4 crew members per boat. The majority of non-motorized fishing unit owners employ a '% of gross revenue' system to remunerate their crew members whereas owners of motorized and mosquito seine fishing units primarily employed a '% of net revenue' system.

Table 5.5.4. Crew Members per Boat and their Share Proportions (Means)

	Motorized gill netters	**Non-motorized gill netters**	**Long liners**	**Mosquito seines**
Crew per boat	2.20	2.00	1.00	4.00
Crew Share (%)	28.00	37.50	30.00	50.00

Other Costs. These were the costs incurred on a day-to-day basis. These included fuel, bait and boat-gear-engine maintenance. The annual fees charged by the District are given in Table 5.5.5.

Table 5.5.5. Fees charged.

Type of licence	**Rate** (Shs)
Fishing vessel (Parachute <5 Metres)	20,000
Fishing vessel (Ssesse >5 metres)	30,000
Fishing permits	Not Charged
Specific licence fees	250,000

5.5.1.3. Earnings of Fish Production Enterprises

Nine tenths of the fishers primarily target Nile perch with only a few catching Nile Tilapia or mukene.

Table 5.5.6. Mean monthly costs and revenues of fisheries production enterprises at Kasenyi.

	Motorised gill netting for Nile perch	**Non-motorised gill netting for Nile perch**	**Non-motorised gill netting for tilapia**	**Long lining for Nile perch**	**Mosquito netting for Mukene**
Sample size	15	3	1	1	1
Capital investment	5,798,000	3,306,667	75,000	230,000	2,770,000
Labour cost	313,665	159,267	49,000	114,000	267,300
Fuel	417,829	.		.	440,640
Bait	.	.		1,000	
Boat maintenance	6,667	11,500		.	
Gear maintenance	2,000	.		.	
Engine maintenance	18,667	.		.	
Other costs	5,600				7,000
Monthly operating costs	764,428	170,766	49,000	115,000	714,940
Monthly depreciation	243,532	136,055	12,500	10,417	103,889
Monthly total costs	1,007,960	306,822	61,500	125,417	818,828
Catch (kg/ month)	540.7	248.3	140	190	
Price/ kg	2,047	2,000	700	2,000	
Gross revenue (Shs/ month)	1,110,853	496,667	98,000	380,000	
Net revenue (Shs/ month)	102,893	189,845	36,500	254,583	

Although comparison with other landing sites on lake Victoria is difficult because of the small sample sizes (see Table 5.5.7.), it seems likely that enterprises engaged in motorised gill-netting for Nile perch tend to be larger at Kasenyi and Dimmo, both of which are gazetted landing sites.

Table 5.5.7. Sizes of fish catching enterprises at sampled landing sites as percentage of the Lake Victoria average

	Motorised gill netting for Nile perch	Non-motorised gill netting for Nile perch	Non-motorised gill netting for tilapia	Trolling for Nile perch	Long lining for Nile perch	Mosquito netting for Mukene
Kasenyi						
Sample size	15	3	1		1	1
Capital investment	+7%	+144%	-54%		+92%	+166%
Monthly operating costs	-15%	+25	-33%		-64%	+110%
Dimmo						
Sample size	16	1				4
Capital investment	+1%	+99%				-22%
Monthly operating costs	+18%	-1%				-0%
Ssanya						
Sample size			14			
Capital investment			-64%			
Monthly operating costs			-46%			
Buwanzi						
Sample size			6		5	
Capital investment			-16%		+6%	
Monthly operating costs			+46%		+90%	
Bwondha						
Sample size	1	6	12	2	17	1
Capital investment	-64%	-85%	-16%	+45%	-26%	-38%
Monthly operating costs	-51%	-23%	+19%	+51%	-19%	-49%
Bumeru B						
Sample size	2	2	8	5	8	1
Capital investment	-25%	-10%	+156%	-18%	+39%	-36%
Monthly operating costs	-3%	+20%	+21%	-20%	-8%	-61%

Most fish producers sell their fish to factory agents operating at the beach and largely report that they had no special arrangement with the fish buyers such as provision of fishing inputs or credit. Three quarters of the fish producers do not have alternative sources of income but a few engage in small-scale trading and farming.

5.5.2. Fish Processing Sub-Sector

5.5.2.1. Overview

The sample only picked up a small number of processors (see Table 5.5.8.). There were more smoking enterprises sampled than any other sort but deep-frying is the most common processing method at Kasenyi.

Table 5.5.8. Number of processing enterprises sampled.

	Processing Method			
	Smoking	Sundrying	Frying	Total
Kasenyi	2		5	7
Dimmo	1	1		2
Bwondha	10			10
Total	13	1	5	19

5.5.2.2. Fish Processing Inputs and Costs

Capital. Fish processors have very low capital investments because of the simple technologies employed in the artisanal processing. Capital was obtained from a number of sources: relatives, farming or fishing. Fish smokers own on average 1 smoking kiln with average expected useful life of 7 years. The average cost of a kiln is Shs.100, 000. For those who deep-fry fish in hot oil, they own on average 1 frying pan costing Shs.3,500 and expected useful lifespan of 4 months, with no salvage value.

Labour. There are 3 categories of labour: own labour, family labour and hired labour. The average number of labourers per processing unit is 1 for self and 2 for hired or family labour units. Owners of smoking kiln spend on average Shs.30, 000 compared to the deep-frying processors who spend Shs 8,000 on average per month on labour.

Other costs. Generally, traditional processors incur costs on a daily basis to transform fresh fish into dried products. At Kasenyi, they use firewood, which costs Shs 34,000 and Shs 28,500 for smoking and deep-frying respectively. Deep-frying requires additional expense of cooking oil of Shs.72,000 per month.

5.5.2.3. Fish Processors' Outputs and Incomes

Kasenyi processors only process Nile Perch rejected by factory trucks. Because of its low quality, the prices compared to the high quality fish required by factory trucks, is relatively low. Even after making allowances for the small sample sizes, there seems to be evidence that enterprises are larger in the more open market of Kasenyi than at other landing sites (see Table 5.5.10).

Table 5.5.9. Mean Monthly costs and revenues of fish processors

	Smoking Nile perch	**Frying Nile perch**
Sample size	2	5
Capital investment	100,000	3,500
Fuel wood	34,000	28,500
Frying oil	.	72,800
Maintenance of smoking kiln	10,000	.
Labour	30,000	8,000
Operating costs	64,000	30,500
Depreciation	458	420
Total cost	64,458	24,820
Quantity processed (kg/ month)	60	116
Buying price (Shs/kg)	850	900
Selling price (Shs/kg)	1,100	1,420
Cost of raw fish (Shs)	54,000	107,200
Gross revenue (Shs)	68,000	173,200
Net revenue (Shs)	-50,458	41,179

Table 5.5.10. Mean monthly total costs of processing enterprises.

	Smoking	Frying	Sundrying
Kasenyi	64,458	24,821	
Dimmo	9,000		5,600
Bwondha	19,076		

5.5.3. Fish Marketing

5.5.3.1. Overview

In Kasenyi there are approximately 5 bicycle traders, 20 traders who hire 4 pick-ups and seven truck traders. The main fish species traded in are Nile perch and tilapia. The main destinations of fresh tilapia are in Kampala by pick-up traders while much of the Nile perch is taken to factories by factory agents. All the fish that is processed (fried) is locally consumed at the beach. Bicycle traders at Kasenyi and other landing sites meet local needs. The number of different types of traders sampled at the six Lake Victoria landing sites surveyed is given in Table 5.5.11.

Table 5.5.11. Number of fish trading enterprises sampled.

	Kasenyi	Dimmo	Ssanya	Bumeru	Buwazi	Bwondha	Total
Bicycle trader	1	1	11	3		1	17
Motorcycle trader			4				4
Beach side trader	1					4	5
Factory agent	6	9					15
Pick-up trader	11			2		5	18
Boat trader			1	1	2		4
Total	19	10	16	6	2	10	63

5.5.3.2. Fish Traders' Characteristics.

Initial capital mainly came from family members, followed by farming and fishing. Other sources of capital included loans and other means. The two categories of labour are own-labour and hired labour.

5.5.3.3. Fish Marketing Inputs and Costs

Fish traders who operate in Kasenyi consists of bicycle traders with average capital investment of Shs 80,000; beachside retailers, factory agents and pick up traders without assets but hire premises/vehicles who therefore incur other expenses like labour and transport cost. A factory agent who hires a pick up to supply a factory spends on average Shs 112,000.

5.5.3.4. Fish Marketing Outputs and Incomes

The main species of fish traded are Nile perch and Nile Tilapia. The bicycle traders, beachside retailers and factory agents are the main dealers in Nile perch while pick up traders essentially buy Nile tilapia.

Table 5.5.12 . Mean monthly costs and revenues of traders at Kasenyi

	Bicycle trading in Nile perch	**Beach side trading in Nile perch**	**Factory agent dealing in Nile perch**	**Pick-up trading in tilapia**
Sample size	1	1	6	11
Capital Investment	80,000	.	.	.
Transport	.	.	4,667	36,255
Labour	6,000	6,000	42,083	9,477
Operating costs	6,000	6,000	46,750	45,732
Depreciation	191	.	.	
Total costs	6,191	6,000	46,750	45,732
Quantities traded (kg/month)	380	80	983	150
Buying price (Shs. /kg)	1,800	800	2,042	945
Selling price (Shs./kg)	1,900	900	2,155	1,182
Cost of raw fish (Shs./month)	684,000	64,000	1,993,333	162,000
Gross revenue (Shs./month)	722,000	72,000	2,130,167	198,091
Net revenue (Shs./month)	31,809	2,000	90,083	-9,641

More traders trade Nile perch than tilapia although the factories take much larger volumes.

5.6. Modelling the Sector

5.6.1. Introduction

The intention is to use MS Excel to obtain method to combine data on the prices of fish and fish products at successive stages in the marketing chain with data on the cost structures of enterprises to obtain estimates of factor incomes at the local level, and to aggregate these data at lake and national levels. Initially the main focus is on the Lake Victoria Nile perch fishery. Since the export price of Nile perch is the driving force in the economy of the sector, that price will drive the model although other prices will also be introduced.

5.6.2. Modelling Local Factor Incomes

5.6.2.1. Principles of the model and application to the Lake Victoria Based Nile Perch Export Chain

The financial flows in the export chain are, at their most straightforward, relatively simple: the factory agents pay the collectors who pay the fishers. The data used and the models developed are shown in Table 5.6.1. The first two rows state typical prices and the last four (in italics) illustrate two types of modelling – multiplicative and additive.

Table 5.6.1. Observed and Predicted Prices (Ugsh) in the Nile perch (export) chain

	Catchers	**Collectors**		**Factory agents**	
	Sell	**Buy**	**Sell**	**Buy**	**Sell**
Price	1600	1600	2000	2000	2100
Value Added	1600		4000		100
Multiplicative Model Coefficient	*0.8*		*0.95*		*1*
Multiplicative Model Predicted Price	*1596*		*1995*		*2100*
Additive Model Constant	*-400*		*-100*		*0*
Additive Model Predicted Price	*1600*		*2000*		*2100*

Notes on the rows:
1. A best estimate of the prices typically paid for Nile perch destined for export at beaches on Lake Victoria. The prices are based on those paid in late 2002 and early 2003, i.e. are much higher than the price in December 2003. There is a large measure of approximation in the prices used since the prices reported by interviewees varied greatly. Prices were adjusted where buying and selling prices at successive stages in the chain did not match.
2. The value added at each stage of the chain, i.e. the difference between buying and selling price.
3. The coefficients show the relationship between the selling prices at successive stages. E.g. catchers sell at 1600 Ugsh, which is 0.8 of the collectors' selling price of 2000 Ugsh.
4. The predicted prices are obtained by applying the coefficients to the factory agents selling price of 2100 Ugsh. They do not exactly match the observed selling prices because of the rounding of the coefficients.

5 and 6. The alternative additive model is presented but not proceeded with. Most of the costs are multiplicative rather than additive, although some combination of the two may be more appropriate. To illustrate the two models consider the situation if prices were to fall to 850 Ugsh. In this case prices paid to catchers would fall to 646 Ugsh and 350 Ugsh under the multiplicative and additive models, respectively.

The intention in the modelling process is to extend the estimates to the factors of production used in the industry. Table 5.6.2. does this.

Table 5.6.2. Estimated Factor Incomes.

	Catching		**Collecting**			**Total**
	(1) Coefficient	(2) Estimated Factor Income per kg	(3) Coefficient	(4) Estimated Factor Income per kg	(5) Catching Factor Income Reallocated	(6) Estimated Factor Income per kg
Marginal Costs						
Labour	*0.107*	*171*	*0.013*	*26*	*117*	*143*
Fuel	*0.52*	*830*	*0.047*	*94*	*571*	*664*
Market Fee	*0.006*	*10*	*0.001*	*2*	*7*	*9*
Ice Transport and Porterage			*0.008*	*16*		*16*
Fish			*0.55*	*1097*		
Porterage of fish	*0.029*	*46*	*0.005*	*10*	*32*	*42*
Contribution and profit	*0.339*	*541*	*0.376*	*750*	*372*	*1122*
Total	*1.000*	*1598*	*1.000*	*1995*	*1097*	*1996*

Notes on the columns.
(1) and (3) are derived from the cost estimates collected in fieldwork. Again, it should be noted that the field data showed a wide range of patterns of expenditure.
(2) and (4) are the product of the coefficient and the selling price.
(6) is the factor income associated with a kilogram of Nile perch entering the export chain. Labour in the sector can expect to receive 143 Ugsh, the cost of fuel will be 664 Ugsh, etc.
(5) is shown to demonstrate how the payment made to catchers by collectors is reallocated. The 1097 Ugsh payment is divided in proportion to the factor costs of catching. I.e. the data are the product of the income allocated to fish and the relevant catching coefficient.
If the price paid by factory agents is reduced to 850 Ugsh, labour will receive 58 Ugsh, the fuel sector 269 Ugsh, etc

5.6.2.2. Other Marketing Chains

Table 5.6.3. Lake Victoria fresh Nile perch Local Domestic Market Chain

	Catching	**Bicycle trader**		**Local Consumers**
	Sell	**Buy**	**Sell**	**Buy**
Price	1000	1000	1600	1600
Value Added	1000		600	
Multiplicative Model Coefficient	*0.625*		*1*	
Multiplicative Model Predicted Price	*1000*		*1600*	

	Catching		**Bicycle Trading**			**Total**
	Coefficient	Estimated Factor Income per kg	Coefficient	Estimated Factor Income per kg	Catching Factor Income Reallocated	Estimated Factor Income per kg
Marginal Costs						
Labour	*0.107*	*107*	*0.06*	*96*	*137*	*233*
Fuel	*0.52*	*520*		*0*	*666*	*666*
Market Fee	*0.006*	*6*		*0*	*8*	*8*
Fish			*0.8*	*1280*	*0*	
Porterage of fish	*0.029*	*29*		*0*	*37*	*37*
Contribution and profit	*0.339*	*339*	*0.14*	*224*	*434*	*658*
Total	*1.000*	*1000*	*1.000*	*1600*	*1280*	*1601*

Table 5.6.4. Lake Victoria Smoked Nile Perch Market Chain

	Catching	**Processing**		**Local Consumers**
	Sell	**Buy**	**Sell**	**Buy**
	875	875	1300	1300
Value Added	875		425	
Multiplicative Model Coefficient	*0.673*		*1*	
Multiplicative Model Predicted Price	*874.9*		*1300*	

	Catching		**Processing**			**Total**
	Coefficient	Estimated Factor Income per kg	Coefficient	Estimated Factor Income per kg	Catching Factor Income Reallocated	Estimated Factor Income per kg
Marginal Costs						
Labour	*0.107*	*94*	*0.05*	*65*	*111*	*176*
Fuel (petrol)	*0.52*	*455*			*541*	*541*
Fuelwood			*0.1*	*130*		*130*
Market Fee	*0.006*	*5*		*0*	*6*	*6*
Fish			*0.8*	*1040*	*0*	
Porterage of fish	*0.029*	*25*		*0*	*30*	*30*
Contribution and profit	*0.339*	*297*	*0.05*	*65*	*353*	*418*
Total	*1.000*	*875*	*1.000*	*1300*	*1040*	*1301*

The data collected in the fieldwork suggested that Smoking was a relatively unprofitable activity. The data may be exceptional.

Table 5.6.5. Lake Victoria Fresh Tilapia Local Market Chain

	Catching	**Pick Up Trading**		**Local Consumers**
	Sell	**Buy**	**Sell**	**Buy**
	700	700	1200	1200
Value Added	700		500	
Multiplicative Model Coefficient	*0.583*		*1*	
Multiplicative Model Predicted Price	*699.6*		*1200*	

	Catching		**Pick Up Trading**			**Total**
	Coefficient	Estimated Factor Income per kg	Coefficient	Estimated Factor Income per kg	Catching Factor Income Reallocated	Estimated Factor Income per kg
Marginal Costs						
Labour	*0.43*	*301*	*0.15*	*180*	*372*	*552*
Market Fee	*0.01*	*7*			*9*	*9*
Fish			*0.72*	*864*		
Porterage of fish	*0.03*	*21*			*26*	*26*
Contribution and profit	*0.53*	*371*	*0.13*	*156*	*458*	*614*
Total	*1.000*	*700*	*1.000*	*1200*	*864*	*1200*

The catching costs used in the next example, smoked Nile perch from Lake Kyoga, are for the long line fishery.

Table 5.6.6. Lake Kyoga Smoked Nile Perch Market Chain

	Catching	**Processing**		**Local Consumers**
	Sell	**Buy**	**Sell**	**Buy**
	740	740	1900	1900
Value Added	740		1260	
Multiplicative Model Coefficient	*0.39*		*1*	
Multiplicative Model Predicted Price	*741*		*1900*	

	Catching		**Processing**			**Total**
	Coefficient	Estimated Factor Income per kg	Coefficient	Estimated Factor Income per kg	Catching Factor Income Reallocated	Estimated Factor Income per kg
Marginal Costs						
Labour	*0.404*	*299*	*0.11*	*209*	*457*	*666*
Transport			*0.105*	*200*		*200*
Fuelwood			*0.015*	*29*		*29*
Market Fee	*0.005*	*4*		*0*	*6*	*6*
Bait	*0.107*	*79*			*121*	*121*
Fish			*0.595*	*1131*		
Porterage of fish	*0.01*	*7*			*11*	*11*
Contribution and profit	*0.474*	*351*	*0.18*	*333*	*536*	*868*
Total	*1.000*	*741*	*1.000*	*1900*	*1131*	*1900*

5.6.3. Modelling Aggregate Regional and National Sector Incomes

The intention of this set of calculations is to aggregate the sub-sector data to generate a picture of the effect of local changes at the regional and national level. Where data are available from the first stage of the modelling process these data are used (sections 5.6.1. to 5.6.2. above), but in many cases estimates from other sources are used.

Table 5.6.7. Lake Victoria

	Price	Propor-tion	Price per kg (Ugsh)	Quantity (t)	Value (Ugsh)
Nile perch			1360.5	101433.7	138,000,548,850.00
Export	1995	0.4			
Domestic fresh	1000	0.3			
Smoked	875	0.3			
Tilapia			700	65298.19	45,708,733,000.00
Other species			600	8593.31	5,155,986,000.00
Total					188,865,267,850.00

Notes
1. The prices for the three Nile perch products and tilapia were obtained from sections 2.1. to 2.4.; the price for other species was estimated from other sources. The combined Nile perch price is based on the proportions of the fish going to different markets. These data can be changed as circumstances change and new information becomes available.
2. The quantity data were form the official records for fish production in 2003. These data can be changed as data are revised each year or to prepare an estimate of a future situation if quantities are expected to change.
3. The final column is the product of the preceding two.

Table 5.6.8. Lake Kyoga

	Price	Proportion	Price per kg (Ugsh)	Quantity (t)	Value (Ugsh)
Nile perch			1076	8577.94	9,229,863,440.00
Export	1500	0.4			
Domestic fresh	900	0.2			
Smoked	740	0.4			
Tilapia			700	19492.26	13,644,582,000.00
Other species			600	4818.94	2,891,364,000.00
Total					25,765,809,440.00

Table 5.6.9. Lake Albert

	Price	Proportion	Price per kg (Ugsh)	Quantity (t)	Value (Ugsh)
Nile perch			935	2792.54	2,611,024,900.00
Export	1350	0.3			
Domestic fresh	800	0.4			
Smoked	700	0.3			
Tilapia			650	2360.3	1,534,195,000.00
Other spp			650	14307.85	9,300,102,500.00
Total					13,445,322,400.00

Table 5.6.10. Lakes George and Edward

	Price per kg (Ugsh)	Quantity (t)	Value (Ugsh)
Tilapia	550	2095.51	1,152,530,500.00
Other spp	550	3764.9	2,070,695,000.00
Total			3,223,225,500.00

Table 5.6.11. Minor Water Bodies

	Price per kg (Ugsh)	Quantity (t)	Value (Ugsh)
Tilapia	91	7825.39	712,110,490.00
Other spp	128	447.07	57,224,960.00
Total			769,335,450.00

Table 5.6.12. Uganda Total

	Quantity (t)	Value (Ugsh)
Nile perch	112804.2	149,841,437,190.00
Tilapia	97071.65	62,752,150,990.00
Other spp	31932.07	19,475,372,460.00
Total		232,068,960,640.00

Note that the entries in this table are the sums of the individual values in the separate lake tables.

5.6.4. Processing Sub-Sector Incomes

The present fisheries statistics system in Uganda (as in other countries) does not give an indication of the contribution of fish processing to the district or national economy. Yet processing is an important part of the economy of lakeside areas. This model uses knowledge of the value-added by processing (see section 5.6.1), together with estimates of the proportion of the catch going to be processed, to give an estimate of the overall value added by the processing sub-sector.

Column (1) is an estimate of the proportion of the catches of Nile perch, tilapia and other species which are processed for local sale. Column (2), the value added by processing are derived from survey data or are estimates. These values need refining. The third column, the quantity of catches by lake and species, are the same as the data used in section 5.6.3 above.

The data in (4) are the product of columns (1), (2) and (3). They give the total value added by processing. They represent an additional contribution that fishing makes to the regional economy, over and above the values in section 3 above, which relate to fish catching only.

The coefficients in column (5) are an estimate of how the processing added value should be divided between factors. Scarcity of data has made it difficult to do more than apply some limited Lake Victoria data to other lakes.

The last table in this section (Table 5.6.15) is an estimate of the contribution to the national economy. Unsurprisingly, the value added is small compared with the catching sub-sector, 43m Ugsh compared with 232,069m Ugsh.

Table 5.6.13. Lake Victoria – Processing Sector

	(1) Proportion	(2) Value Added per kg (Ugsh)	(3) Quantity (t)	(4) Value (Ugsh)
Nile perch	0.3	425	101433.7	12,932,796.75
Tilapia	0.5	340	65298.19	11,100,692.30
Other spp	0.5	292	8593.31	1,254,623.26
Total				25,288,112.31

	(5) Processing Coefficient	(6) Factor Income (Ugsh)
Labour	*0.25*	6322028
Fuelwood	*0.5*	12644056
Contribution and profit	*0.25*	6322028
Total	*1.000*	25288112

Table 5.6.14. Lake Kyoga – Processing Sector

	Proportion	Value Added per kg (Ugsh)	Quantity (t)	Value (Ugsh)
Nile perch	0.4	1260	8577.94	4,323,281.76
Tilapia	0.6	450	19492.26	5,262,910.20
Other spp	0.6	400	4818.94	1,156,545.60
Total				10,742,737.56

	Processing Coefficient	Factor Income (Ugsh)
Labour	*0.25*	2685684
Fuelwood	*0.5*	5371369
Contribution and profit	*0.25*	2685684
Total	*1.000*	10742738

Table 5.6.15. Lake Albert – Processing Sector

	Proportion	Value Added per kg (Ugsh)	Quantity (t)	Value (Ugsh)
Nile perch	0.3	1000	2792.54	837,762.00
Tilapia	0.6	400	2360.3	566,472.00
Other spp	0.6	400	14307.85	3,433,884.00
Total				4,838,118.00

	Processing Coefficient	Factor Income (Ugsh)
Labour	*0.25*	1209530
Fuelwood	*0.5*	2419059
Contribution and profit	*0.25*	1209530
Total	*1.000*	4838118

Table 5.6.16. Lakes Edward and George – Processing Sector

	Proportion	Value Added per kg (Ugsh)	Quantity (t)	Value (Ugsh)
Tilapia	0.5	400	2095.51	419,102.00
Other spp	0.5	400	3764.9	752,980.00
Total				1,172,082.00

	Processing Coefficient	Factor Income (Ugsh)
Labour	*0.25*	293020.5
Fuelwood	*0.5*	586041
Contribution and profit	*0.25*	293020.5
Total	*1.000*	1172082

Table 5.6.17. Minor Water Bodies – Processing Sector

	Propor-tion	Value Added per kg (Ugsh)	Quantity (t)	Value (Ugsh)
Tilapia	0.5	200	7825.39	782,539.00
Other spp	0.5	200	4470.7	447,070.00
Total				1,229,609.00

	Processing Coefficient	Factor Income (Ugsh)
Labour	*0.25*	307402.3
Fuelwood	*0.5*	614804.5
Contribution and profit	*0.25*	307402.3
Total	*1.000*	1229609

Table 5.6.17. Uganda Total

	Factor Income (Ugsh)
Labour	10,817,664.72
Fuelwood	21,635,329.44
Contribution and profit	10,817,664.72
Total	43,270,658.87

The model is a potentially useful information source for policy makers and we **RECOMMEND (1) that it is tested and refined particularly through improvements in its calibration and (2) the DFR explores how it can be more fully integrated with the fisheries statistics system.**

5.7. Policy Consultations

The export industry is exposed to international pressures outside its control. Some of these considerations arte discussed in Section 5.7.1. In Section 5.7.2. the inception and activities of a policy working group is outlined.

Fisherfolk and their leaders were consulted at the landing sites. Special efforts were made to note the views of women, whose processing activities may have been adversely affected by the growth of exports. Some of their comments and suggestions are examined in Section 5.7.3. The staff of the Department of Fisheries and other stakeholders also contributed ideas (Section 5.7.4.). Finally the Poverty Assessment Exercises already undertaken are reported as one way in which fishing communities are able to make their voices heard (Section 5.7.5.).

5.7.1. Major Global Challenges - WTO and the Precautionary Principle

The impact of the emerging "precautionary principle" approach being practised by the EU has raised concerns around sanitary and phytosanitary (SPS) issues being used to prevent trade (i.e. acting as a technical barrier to trade) [3]. The lack of objective methodology within HACCP and the inability to scientifically justify all risk assessment leaves an opportunity for political /trade groups to lobby to prevent the free movement of goods under the banner of unsafe food. Dillon *et al* (2001) previously reviewed the significant economic impact of food contamination incidents to food trade. Further the specific impact of WTO in relation to requirements for equivalent food safety is key to globalisation. [4] The contaminated feed (Di-oxin) incident resulted in a major loss to the specific multi-national concerned which triggered or accelerated the development of the European Food Safety Authority. Further the new raft of legislation from the EU encompasses increased requirements for evidence of "scientific control" and "traceability" within the target export chains

EU/International Food Policy

The research work undertaken in Uganda under the auspices of this project was designed to inform and support a "policy working group" drawn from the Investment Authority, Department of Fisheries, Fisheries Export group and United Nations Industrial Development Organisation (UNIDO) (see Section 5.7.2.). The Strategic Export Plan, *The Plan for Modernisation of Agriculture* and the Medium Term Competitiveness Strategy were all key elements of the policy group discussions as well as the existing Fisheries Regulations (1998) and the mechanism of the proposed Fisheries Authority. Further the investment being made under the African Development Bank loan and proposed benefits

[3] The work by SIPA reported in 2003 and 2004 investigated the recent contamination incidents reported to be occurring within seafood exports. An important series of contaminated incidents were the precautionary principle was raised was based on the presence of chloramphenicol in shrimp exported from China and South East Asia. SIPA commissioned independent scientific research undertaken by ---, . This work highlighted the problems associated with the current EU legislation based on the precautionary principle. The 2nd investigation triggered via SIPA has focused on role of nitro furans and scientific approach to setting risk levels (2003). This report highlights the increasing importance of contamination legislation

[4] The 1994 Vancouver discussions covering the impact of GATT was hosted by the FAO Standards group. The one of the authors served as an expert member of the group and consistently raised the negative impact on enterprises wishing to export fish faced with meeting the new HACCP based legislation which was not objectively defined nor sufficiently scientifically based. (Add report details)

would be studied through this group. [5] The group met on a number of occasions to discuss this project and the associated micro-economic trials being completed within the UNIDO project and the DFID seed corn project.

The objectives set for the group were to:
(i) Develop robust data collection and trial protocols
(ii) Map existing supply chains
(iii) Develop a tool for policy makers to use to evaluate impact of agreed scenarios on target sectors of the fisheries chain

Previous work evaluation emerging EU policy (the Single European Market and the Single European Document) was reported in Dillon (1991). Further the impact of specific fisheries and food safety legislation was presented and discussed at the International Conference on Fish Quality in Hull in 1993. Dillon has also documented the potential impact of emerging legislation to fisheries exporting nations (Dillon et al 2001, Dillon 2004).[6]

This work has catalogued the increasing pressure on Government and industry to ensure there food control systems are "scientifically based". Further as will be explored in the project the need to have mechanisms to capture micro-economic and social impact data for market closure for scenario setting by policy makers is of increasing interest as global market expands and restrictive practices potentially increase.

New Technology Impacts

The rapid development of modern communication systems including digital camera, Internet, and email has combined to enable news stories and rumours to travel instantaneously to the markets. A lack of proper control of news in developing countries may result in pressure to close the market when no real food control incident occurred

5.7.2. Policy Working Group

A specific policy working group was constructed to consider the future policy implications of this research. The group consisted of DFR, UNBS, UFPEA, PMU, and MDA and was chaired by the Commissioner of Fisheries. This group (or specific members) were in attendance at a series of meetings through the project and consistently expressed interest in the role of the models in analysing specific scenarios. The issues

[5] The 2nd report by the UK Food group (Options for Reform and their potential impact, July,2002- see p4 Table) reported on the three proposed CAP reform models ranging from modified Status Quo, through Cork model to radical liberalisation. The impact on developing countries of all models appears to be positive but is fully described in the report

[6] The Hague conference held by IAFI (2003) involved a workshop specifically around traceability and emerging legislation and impact on trade. One of the authors chaired the meeting where a representative from the EU provided an update on Nitro furan incident. A UK team from the Institute of Food and fisheries led by one of the authors presented current work on practical traceability management system. The previous work completed in Uganda around IT systems in use by the Fisheries Department. This work was reported by Hannah et al in 98 in Uganda and again in 2001 at the traceability event held in Grimsby were papers were presented by the East African Fisheries sector (Tanzania and Uganda). This work highlighted the need for control in the chain because of global pressure specifically precautionary principle. Further discussions of the work in Tanzania resulted in

raised at the initial meeting included a review of impact of by-product strategy being encouraged via COMESA project and impact on the various stakeholders, future international legislation which could close the fishery, new fishing approaches and logisitics e.g larger vessels, investment strategy led by ADB programme causing ice availability on key landing sites and Islands etc.

COMESA has resulted in the creation of a specific factory which is now capable of processing all of the by-product from existing factories thus impacting on the availability for local processors.

This group wished to review the cash flow scenarios of the sector and further to use the quantified model to trace the direct and in-direct impact of the changes in the export sector back to the small-scale sector. Previous closure of fishery and policy changes would be studied using these models – especially adverse impacts of EU closures and determination of specific policy's to reduce this likelihood of recurrence

Outputs

Preliminary discussions of the findings from the micro-economic modelling were discussed with the Commissioner and appointed ADB project manager within DFR during the mission in March 2004. The team were excited by the findings of the Ice-IT studies and wished to adopt this tool as a Decision Support Tool within the Fisheries Department. Further they specifically wished to model elements of the interventions planned within the ADB project using both the Macro and Micro economic tools

The UNIDO Food Programme Manager has also agreed to adopt elements of the project findings related to beneficial upstream interventions and include them in the Phase 2 of the UNIDO Integrated Programme scheduled to begin October 2004

The issue of "incident management" arose during the final visit as the DFID project was requested to assist DFR in investigating a potential adverse incident, which occurred in the export fishery. The result of the incident was series of recommendations, which included the formal adoption of incident management procedures, which would be gazetted and included in the Standard Operational Procedures of DFR.

A further recommendation was the permanent organization of a policy-working group based around the Global issues considered in this project. This was independently requested by UFPEA, DFR and UNIDO and again was to be placed as part of the Phase 2 UNIDO project.

In conclusion this policy-working group considered specific elements of the project related to impact of adverse international trade issues and their impact on Uganda's macro and micro economy. The tools and findings of the project are therefore seen as crucial to a range of ongoing policy initiatives being undertaken within the Department, Industry and wider community. Transparent and objective analysis of possible impact can

enable clear dialogue between partners in the local and international supply chains to ensure optimum returns for the appropriate stakeholders.

It is strongly RECOMMENDED that a dissemination workshop is created around these scenarios and used to inform the policy makers of the findings of the research and role for the tools.

5.7.3. Community Attitudes: Suggestions from the landing sites

The group discussion exercise conducted by the Fisheries Training Institute generated a number of ideas varying in specificity and realism. Further reactions were collected by FIRRI fieldworkers. The range of ideas suggested inevitably reflects both the social characteristics of the members of the group and their individual personal interests. It should be noted that women were (intentionally) over-represented in the groups and the prompts used by the field workers focused on women's economic positions and environmental issues. The high number of suggestions in these areas reflects the way the discussions were organised.

Generally respondents at most beaches associated access to the factory marketing chain with beneficial impacts – increased incomes for fishers, securer market for fish, and hence beach development and increased employment. Even in those beaches where factory agents were not operating there was an anticipation of potential benefits in income if the facility were to become available. In most places there were fewer respondents who associated no positive changes with factory agents than no negative changes. Interestingly, the beaches where respondents were less positive were often beaches where the impact of the factories had not yet been felt. The most frequently referred to negative impact was the high cost of fish for domestic consumption. Processors also unanimously regretted the reduced supplies for local traders and processors.

The balance of replies often appears to be largely a reflection of the balance of the sample – more fish catchers resulted in a more positive response, more local processors a more negative response. If the traders in the sample served the factories their incomes had benefited and the responses were more positive.

5.7.3.1. Fish stocks, fishing methods and regulations

Several responses were concerned with fish stock management, fishing methods and regulations. Suggestions of more community involvement are timely in that Beach Management Units have been generally established (July 2003) sharing fisheries management responsibilities with the Department of Fisheries Resources and the District administrations. Calls for this development may have been influenced by the fact that the Integrated Lake Management project had been active on Lake George for some time by the date of our survey and had done some work on Lakes Edward and Kyoga.

There were calls for stronger enforcement including stopping the use of illegal gears and protecting breeding grounds. More specific – and expensive – was the call for a full time

patrol on Lake Victoria, especially at night. The suggestion that Districts (on lake Kyoga) collaborate to enforce fisheries regulations can be regarded as a request for more efficient enforcement. The suggestion that the manufacture of illegal gears be stopped may deserve further consideration.

More controversially, there were also suggestions to change the regulations: specifically that fishermen should keep small fish instead of throwing back, and that the mesh size for tilapia should be lowered to 4" to capture small but mature fish (Lake Victoria). The first of these proposals reflects the debate current in many places where minimum size regulations are enforced by the return of undersized fish. The defence of the usual practice (requiring the return of undersized fish) is that it prevents the deliberate catching of undersized individuals. The response to the second depends on scientific knowledge on the size at which maturity is reached and the growth rate of the fish.

There was a call for (in one respect at least) increased regulation, that is, through the control of the number of fishermen (Lake Albert). Unless it could be managed through the BMUs this might require a significant administrative structure, disproportionately expensive in view of the limited reduction of effort it might bring in the short run.

Fish stock managers will be sympathetic with the wish for better education of the community on sustainable fishing (Lake Edward).

But those involved in stock management may be concerned at the implied complaint in one suggestion: that there should be no favouritism in application of fishing regulations, (Lake Victoria). If there is any hint of justification in this implied accusation it undermines the whole basis of honest and effective fisheries management. Again, BMUs may help in the resolution of this issue**. It is strongly RECOMMENDED that the DFR works with the Districts and the BMUs to ensure that the regulations are operated fairly and efficiently.**

5.7.3.2. Manage the operation of the market for fresh fish

There were several proposals to interfere with market for fresh fish (to the advantage of local traders). Some were general in nature suggesting controls on the export market. But others were more specific. They included fixing the maximum price of fish at first sale, limiting how much a factory agent could buy from a fisherman, limiting the number of factory agents at any landing, limit the quantities taken by factories, restrict factory traders to specified landing sites, having diiferent size regualtions for factories than foir domestic. Most unrealistically, in view of the contribution to the industry to Uganda's exports, some discussants suggested stopping or controlling exporting, reducig the number of or limiting the capacity of factories.

Although it is appropriate to note the concerns expressed by the discussants these ideas are not consistent with the economic policies followed in Uganda. Any of these proposals would be a deliberate introduction of inefficiency into the market for fish at first point of sale. The ideas are likely to favour domestic traders and processors – and were generally made by women – but would disadvantage fish catchers. The restriction of factory agents

to certain landings or reducing their number at any landing would reduce the competition for fresh fish and introduce a monopsonistic situation where a single dominant buyer could pay less for the fish, although still pay enough to out-compete local buyers. The total income of fishing communities could well be reduced by this. Moves of this nature would not be consistent with the liberalised economic structure chosen by the Ugandan government. (Nor, incidentally, with the aims of the UK government.)

5.7.3.3. Financial changes – taxation and government expenditure

Several discussants raised issues relating to taxes and license fees on the one hand and government subsidies and loans on the other.

Reduction of taxes/fees on fisherfolk. Most of the statements calling for a reduction of taxes/fees paid by fisherfolk – reported from several beaches - can be explained as evidence of understandable self-interest. But two were more specific and policy makers could consider (1) how far dues can be related to catch and (2) if the charges are being managed in a fully honest and transparent way. (The relevant request was that roadblocks should be banned or fishermen provided with right documents.) Malpractice is, of course, one cause of malfunctioning in the market and should be avoided on grounds of both equity and efficiency.

Introduce subsidies. In the 1990s the government went through a painful process of removing market-distorting subsidies as part of the economic liberalisation programme and is not likely to wish to explore this route again. The call for a subsidy on gear is an understandable desire to reduce the costs of a major input in a fishing enterprise. The suggestion that the Government should subsidise life jackets for fishermen (Lake Victoria) perhaps shows an interesting shift of attention form basic costs to higher welfare considerations.

Introduce loan schemes. The frequency with which loan schemes were mentioned at landing sites on four lakes suggests it is important – particularly to women who appeared to propose it most. As one of the suggestions says previous government schemes were not effective but as a concept entandikwa remains attractive to our discussants. There may be a possibility of district fisheries officers adopting a more active role in administering such schemes – see section 5.7.3.where a recommendation about anti-poverty polices is made.

5.7.3.4. Improve infrastructure and operation of landing sites

Several responses related to the conditions on the landing sites themselves: permanent market structure, public latrines, disposal sites, improvements in sanitation, hygiene and garbage disposal. While the comment from one beach was looking to the government to finance investment needs the two others recognised, more realistically, that the initiative is likely to be local. Hence the suggested weekly cleaning of landing by residents and charging a levy or tax.

5.7.3.5. Fish farming

Proposals to develop fish farming came from two adjacent landing sites on Lake Kyoga.

5.7.3.6. Processing/marketing equipment

Two specific suggestions show an awareness of the need to improve product quality as did other comments made during the interviewing. The specific suggestions, both from Lake Kyoga, were the construction of metal drying racks instead of wood/papyrus and the use of plastic instead of papyrus baskets for fish transport. The proposed alternatives would probably be more expensive so feasibility studies would be necessary to assess their practicality.

5.7.3.7. New markets

There was one proposal for marketing support for fish catchers and one for processors. There now seems to be a real possibility of an export market in smoked fish to the EU developing (*Economic News*, 2004a and b; Kamuze, 2004, p 19)

5.7.3.8. Trading business procedures

It was proposed that factory purchasers should issue receipts to fishermen and fish traders. This proposal appears reasonable and easy to implement. If underpayment is occurring that represents a serious malfunction in the market and should be corrected. **It is RECOMMENDED that training be provided to BMUs, fisherfolk's groups and other community groups about the importance of contractual arrangements and (if appropriate) proper documentation. . This training programme could be included in the dissemination strategy.**

5.7.3.9. Restock lake

Proposals to stock the lake with new species and to restock lake with species not attractive to export show a simplified conception of the food chain in the lake and how susceptible to management it is.

5.7.3.10. Broader concerns

The environment in general. The structure used by the FTI data collectors specifically asked about the environment so there were several proposals relating to environmental issues. Most of these are not central to the project although it should be noted that the introduction of BMUs will strengthen the potential role of local decision makers (along with LC1s) to manage the local environment.

Social considerations. There were suggestions relating to education and health.

Position of women. There were specific discussion stimulii about the position of women so a number of suggestions were made. These included offering a legally advantageous position for women in the local fish trade to increase their employment. While measures to artificially protect women or any other economic group are not to be recommended since they promote inefficiency, it is to be **RECOMMENDED that training and loans be made available to women and other poor fisherfolk and that as much local management as possible be given to these funds.**

5.7.4. Views from other stakeholders

The regional consultations undertaken by the Commissioner for Fisheries and the Fisheries Economist were directed at local administrators and managers, fisheries officers and local community management.

Many of the district officials emphasised the importance of fisheries a management policies, some suggesting that in the past there had not been a strong enough focus on monitoring control and surveillance. The export trade has increased the fisherman income through increased fish prices. This in turn has acted as an incentive for members of other communities to enter the fishery and the number of people with fishing licenses and fishing permits has increased.

The expansion of the industry has had he effect of removing fish from the domestic market and gains in income have to be set against loss in nutrition.

Similar observations were made in fishing communities. Community members believe that the global fish trade has brought both benefits and problems. Most fishing communities believe that fish exports have generated more money for boat owners and fishermen. In most of the landing sites where Nile perch fishery is common, there is an evidence of infrastructure development in form of shops, bigger boats and local fish processing facilities. Some fishermen and boat owners acknowledge that the fish trade has raised their standards of living. On the other hand, fishing communities believe that the export of most species of fish have increased fish prices and therefore some communities that largely depended on fish as a source of food have suffered. On issues of returns to fishermen, fishing communities report that before fish export boom, returns at the time were low due to low fish prices. During the boom period, the returns from fish have increased. This issue can also be linked to the fish prices are household incomes.

Members of the fishing communities also note that the change within the fisheries sector has seen more people migrating to fishing communities especially at fish landing sites and also increasing the number of fishermen and boat owners. But in general welfare levels have increased. There more activities at landing sites such as local fish processing, local fish trade, boat building thereby increasing the total employment numbers.

Fishing communities also report that the fish export trade has boosted other forms of business. This includes business such as transport of fish from landing sites to fish markets and also to fish processing factories. Some of the landing sites have attracted private sector investment like petroleum stations e.g. in Kalangala.

With regard to local association a number of communities indicated that they were already adopting Beach Management Units.

Other field discussions in fish landing places reveal a common pattern of fishers regretting the enforcement of measures to conserve fish stocks, but (those who catch Nile perch) welcoming the high price that factories offer for fish for export; and processors

reporting a shortage of Nile perch to smoke. There is widespread acknowledgement that prices (and average incomes) are higher but that some members of the communities have lost out.

5.7.5. Poverty Assessment Exercises

Up to the early or mid 1990s the Ugandan government treated poverty as a residual issue rather than a structural problem requiring specific attention. But by the late 1990s there was a general acceptance of the need to address poverty directly enshrined in the Poverty Eradication Action Plan (PEAP) of 1997, revised in 2000, and *The Plan for the Modernisation of Agriculture* (MAAIF and MFPED, 2000). Now the government is strongly committed to poverty alleviation policies based on the World Bank's approach. This requires a degree of community-based consultation which is entirely consistent with government preferences.

Uganda is now engaged in a major Poverty Reduction Strategy Paper preparation exercise with the views of poor communities in nine Districts being ascertained. Some of these exercises have involved districts with fisheries interests. For example, Masindi where ActionAid Uganda has lead the Participatory Poverty Assessment exercise. In Kalangala District interventions have been undertaken at the request of fishing communities. (Palfremen and Marriott, 2003)

DFR is involved in offering technical advise to a similar programme for community–identified developments funded by the Lake Victoria Environmental Management Programme. Familiarity with community based poverty alleviation programmes is likely to be increasingly important in Uganda and we **RECOMMEND that relevant DFR and district fisheries staff be trained in this approach**.

5.8. Identification of Interventions

A number of suggested interventions of varying degrees of practicability were raised with the project. Two suggestions were examined more fully. One of these is a technical approach to adding value, that is, the improvement of methods of handling fish throughout the chain between catching and consumption, particularly through the use of ice (Section 5.8.1.). The other is organisational, that is, the collection of local economic data to help inform local decision makers (Section 5.8.2.).

5.8.1 Improved Methods of Handling Fish: intervention studies using ICE-IT tool and protocols

Poor fisherfolk and other stakeholders have suggested means of increasing value-added and incomes through the product chain. One of these – improved handling of fish at all stages, including storage on ice – has been tested in this and preceding projects.

The previous DFID research programme had created a software tool (ICE-IT), which studied interventions within the fishery chain and projected their quality and economic impact. The trials undertaken included studies of modified transport vehicles, boats, impact of supplier training, impact of supply chain(s) and icing at relevant stages. The studies were linked to reject rates, quality scores and cost impact and are held on the central database. Full descriptions of these field studies are given in a separate 60-page Annex to this report (Hannah, 2004).

These studies highlight real economic gains from specific interventions e.g. icing (see Hannah, 2004, p10- Tables 1-3) averaging 1.7% in Tilapia over 30,000-ton trial and 2.5% on a 30,000-ton trial with Nile Perch. Hannah (2004, p 11) describes the significant loss reduction at landing sites post-training of suppliers (p11, Table2) ranging from 2.3% to 5.9%. This implies that on a 100 tonne a day factory reception site there will be an additional 2.3 to 5.9 tonnes moving into the added value chain. (These studies are based on tonnes of product as opposed to small box trials but are still only indicative and demonstrate the potential of these interventions.)

Individual reports of studies on fishing ground interventions also highlight the impact of immediate icing on the fishing ground to initial rejects and final yield (e.g. 1.7% losses removed at first capture point with an overall gain of 7.8% in yield - which is in fact a 25% gain from the initial yield of 33%, p 23). Further the relative gains from specific interventions are expressed on a per kilo basis at specific stages in the trials. There is, for example, a gross gain resulting from improved handling and immediate icing and demonstrates a return of an additional 185 to 194 Shillings per kilo on the trip (p 22, Table 9).

The policy-working group has already expressed interest in attending a workshop, which gives a further analysis and a summary presentation of the findings from these trials and how the interventions can be modeled and considered at macro-level in line with future Government of Uganda initiatives e.g. ADB. **It is RECOMMENDED that the future**

dissemination workshop should include training in the use of this tool and associated protocols for DFR and other interested organisations.

5.8.2. Development of Fishery Local Information System

The present fisheries data collection system in Uganda is modeled on the approach recommended by FAO and well-established in the developing world. This system is designed primarily to generate data for fish stock management purposes. Stock management is typically a function of the central administration. Uganda has adopted a highly decentralised administrative system. Fisheries data collection is the responsibility of the Districts, although the Districts have few policy making powers for the industry.

In July 2003 fisheries decentralisation was taken a stage further with the adoption of Beach Management Units as the preferred method of local management at all gazetted landing sites. The constitution of BMU Committees requires the representation of four stakeholder groups: 30% boat owners, 30% crew, 30% other and 10% fishmongers. The voice of women is protected by the constitution. At many of most landing sites fish processors will be the dominant group among the other stakeholders group. Women are also disproportionately represented in the fishmongers group. In addition it is hoped that women will comprise at least 30% of the BMU Committee (although without the benefit of a specific constituency).

The project has developed and tested form designs which (1) strengthen the data on the value of fish catches and (2) include, for the first time, data on the value and quantity of fish processed at the landing site. In addition, forms have been designed to collect data on the processing of factory by-products, which is concentrated at two locations. Taken together this information will provide a strong basis for decision making by BMUs – and contribute towards improved quality of nationally collated data.

The small-scale/artisanal fishery. Data needs addressed are:
1. Fish landings. The project has worked on draft Catch Assessment forms devised in the Integrated Lake Management project to make them appropriate for Lake Victoria (and other lakes). This system is able to generate good quality data on both the quantity and value of landings.
2. Fish processing (smoking, salting, sun-drying etc). A newly drafted form can capture data on both quantity and value of processed fish products at landing sites. The form is still being tested and will be revised in the light of experience.
3. Processing of by-products. A newly prepared form can collect data on both quantity and value of processed fish by-products from factories. It is being tested at Ggaba.

Factory landing sites. Good quality data are collected here on fish catches, but the economic data seems to depend on the local fish inspector. Excellent data on value are collected at Kasenyi for example, but at some others no value data at all appears to be collected. The project suggests that this could be improved by:
1. Revising the Daily Fish Inspection Form at Landing Sites by including a column for price (together with a column for Grade).

2. Designing a form for the monthly summary.

The work in these areas is particularly timely in view of the statutory establishment of Beach Management Units, but there is one other contemporary development which the fisheries data collection system has not been able to influence, as yet. This is LOGICS (the Local Government Information and Communication System). The intention is to establish a national system driven by the perceived needs of local councils. Local councils have identified a set of key indicators, although there is disappointingly little interest shown in fisheries indicators. Understandably many of the indicators capture important demographic and social conditions but the only fisheries indicator is the number of fisheries landing sites. This is, of course, not likely to change at all quickly as conditions in the industry change so is not useful as an indicator of change.

The intention of LOGICS is to facilitate the aggregation of data up from LC1 (the lowest level local council) to LC5 (Districts) and on to the central government. Computers have been supplied to pilot LCs enable this. To facilitate accessibility to the data a One Stop Centre containing the data is to be available on line. The data management system is specifically linked with development planning. Any future development of fisheries statistics should be in liaison with LOGICS. A computerised system like LOGICS fits comfortably with the model developed in section 8 and we **RECOMMEND that DFR explores with the Ministry of Local Government (1) the poor choice of indicator for fisheries development and (2) the long term linking of LOGICS data and the sectoral model.**

6. Contribution of Outputs

6.1. Contribution to DFID Goal

The goal is given by DFID: Benefits for poor people generated by the application of new knowledge to the utilisation for human consumption of fish from coastal fisheries in South Asia and coastal and inland fisheries in East and West Africa.

The project goals and planned outputs have broadly been achieved (but note the comment about the value of forecasting sales of the sector in Section 5.1.). There is especial merit in the systems for the provision of local economic information for local managers, i.e. the officers of BMUs. This information can and should feed into the District fisheries data collection systems on which the national data are based.

6.2. Recommendations

It is appropriate to draw particular attention to some findings of the project where action is particularly recommended. These are:

Market efficiency and economic development
(1) That Local Councils should be reminded that the by-products processing sub-sector is making a useful contribution to the economy (in terms of resource use and employment generation) and they should not act to discourage the production or marketing of by-products.

(Section 5.4.2.1., page 22)

(2) That the DFR, the Districts and the BMUs work together to ensure that the fisheries management regulations are operated fairly and efficiently.

(Section 5.7.3.1. page 47)

(3) That, in view of reports of reports of malpractice in trading relations, training be provided to BMUs, fisherfolk's groups and other community groups about the importance of contractual arrangements and (if appropriate) proper documentation. This training could be part of the dissemination strategy.

(Section 5.7.3.8. page 49)

(4) That the promising nature of the results on the trials on the use of improved methods of fish handling be reviewed by the DFR, UFPEA and interested factories with a view to encouraging their commercial adoption.

(Section 5.8.1. page 45)

(5) That a workshop is created to examine scenarios in which external or internal events require incident management. And that the findings of the research and role fo**r** the tools is demonstrated to policy makers.

(Section 5.7.2.2 page 46)

The Model and fisheries data
(6) That the full potential benefits of the model be maximised through testing and refinement particularly through improvements in its calibration

(Section 5.6., page 36)

(7) That the DFR explores with the districts how the model can be more fully integrated with the present fisheries statistics system and with the Ministry of Local Government how it can contribute to LOGICS in the long term.

(Section 8, page 36; section 5.8.2 page 54)

(8) That the future dissemination workshop should include training in the use of the Ice-IT tool and associated protocols for DFR and other interested organisations.

(Section 5.8.1, page 53)

(9) That DFR discusses with the Ministry of Local Government the poor choice of indicator for fisheries development and if the model could be used to generate an alternative indicator.

(Section 5.8.2., page 54)

Support for women and the poor

(10) That while measures to artificially protect women or any other economic group are not to be recommended since they promote inefficiency, it is to be recommended that training and loans be made available to women and other poor fisherfolk and that as much local management as possible be given to these funds.

(Section 5.7.3.5.8. page 49)

(11) That, in view of the importance of poverty alleviation policies in Uganda, relevant DFR and district fisheries staff be trained in the community based approach to minor project identification, implementation and management.

(Section 5.7.5. page 51)

(12) That Local Councils should be reminded that the sale of by-products makes a useful contribution to nutrition and that the benefits are disproportionately felt by the poor. Local Councils do nothing to discourage the consumption of by-products.

(Section 5.4.2.1., page 22)

6.3. Reports

The reports prepared by the project are:

FIRRI (Fisheries Resources Research Institute) (2002a) *Selected Landing Sites on Lakes Kyoga and Albert* Jinja

FIRRI (2002b) *Economic Profiles of Selected Landing Sites on Lake Victoria* Jinja

FIRRI (2003a) *The Fish By-Product Sub-Sector and Livelihoods in Uganda* Jinja

FIRRI (2003b*) Off-Beach Fish Marketing and Livelihoods in Uganda* Jinja

FIRRI (2003c) *Fish Exports and Livelihoods: Monitoring Surveys on Lakes Kyoga and Albert* Jinja

FIRRI (2003d) *Workshop Report: Globalisation and Fish Utilisation and Marketing Study* Jinja

Fisheries Training Institute (2004) *Uganda: Selected Fish Landing Sites and Fishing Communities*

Hannah, Shaun (2004) *Uganda Globalisation Project: The micro-economic data on icing and handling interventions* Grimsby

Marriott, Alan (2004) *Marketing of Factory By-Products in the Lake George Area*

Nyeko, Dick and Keizire, Boaz B. (2003a) *Policies on Poverty and the Fisheries Sector in Uganda* Entebbe

Nyeko, Dick and Keizire, Boaz B. (2003b) *Consultation with District Administrators and Local Fisheries Management Institutions* Entebbe

Note: (1) Marriott (2004) is a joint output with the Integrated Lake Management Project.
(2) There are Annual, Quarterly and Back to Office Reports throughout the project's life.

6.4. Dissemination and Follow-up Activities

End of project dissemination activities were not held because of the delay in completing the research activities

In fact, only one dissemination activity was held, a Workshop in February 2003 intended for economic researchers. Economists and social researchers were invited to discuss issues relating to globalisation and the fishery in East Africa, the micro-economy of the Ugandan fishery, and fishery development and management policies (FIRRI, 2003d). Delegates were mainly from Uganda, but there were two from Kenya and one from Tanzania. The papers were well received and there was a lively discussion. This was additional to the initial outputs and separately funded.

The internal reports listed above have been made available to other researchers even before the formal completion of the project. For example, financial data (especially in FIRRI, 2002a and b) were made available to a DFID consultant, based at the Integrated Lake Management Project, advising the Department of Fisheries Resources on the establishment of the proposed Uganda Fisheries Authority.

There are a number of different aspects to the research and different follow-up activities are appropriate to each.

1. Some of the policy discussions undertaken and structures established by the project should be reported to senior members of the Uganda administration at ministerial and private secretary level. This is best accomplished by the policy expert on the project team together with the Commissioner of Fisheries. Although the Ministry of Agriculture, Animal Industries and Fisheries will be the main audience, other ministries responsible for export industries built on small-scale primary producers (i.e. most export industries) will also be interested.

2. A number of the project outputs are directly relevant to the activities of small-scale producers, processors and traders and they should be disseminated at the level of local administration, i.e. BTUs (plus Local Council 1, village, to LC5, district). The proposal is for a series of day workshops for BTU officers, other local representatives and District Fisheries staff planned by Manufacturing Improvement International and Department of Fisheries Resources staff, and run by DFR staff.

3. In view of the success of the 2003 workshop for researchers, a similar meeting for researchers and policy advisers (as distinct from decision makers) should be held to consider the research and advisory process. The audience should be East African.

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* An output of this project or the separately funded Workshop and available as an annex to this report.