RESEARCH REPORT

GLOBALISATION AND FISH UTILISATION AND MARKETING STUDY

SELECTED LANDING SITES ON LAKES KYOGA AND ALBERT

SOCIO-ECONOMICS SECTION

FISHERIES RESOURCES RESEARCH INSTITUTE

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ACCRONYMS

AFO	Assistant Fisheries Officer
DFID	Department for International Development
DFO	District Fisheries Officer
DFR	Department for Fisheries Resources
DRC	Democratic Republic of Congo
EPRC	Economic Policy Research Centre
FIRRI	Fisheries Resources Research Institute
MFPED	Ministry of Finance, Planning and Economic Development
PAF	Poverty Action Fund

DEFINITIONS

Basket trap	A traditional basket-like fishing gear made out of natural fibre or wires and set in papyrus shoreline waters.
Boat seine	A large encircling active net fitted with ropes at it's ends to haul it, fished from a boat.
Congo barque	A local word used to mean a big boat manually propelled
Kabalega	A local word used on Lake Albert to describe a very large outboard powered boat.
Kaganga	A fishing method used in the shoreline waters of Lake Albert and uses perforated troughs as fishing gear to trap *Alestes nurse*.
Mukene	A small pelagic fish caught using light and scientifically called *Rastreneobola argentea*
Parachute	A term used to refer to a three-planked small boat with a flat bottom manually propelled
Scoop net	A net fitted with a metallic ring and a rod used for catching mukene.
Ssesse	A local word widely used to mean a V-shaped boat with definite angles and a keel.

EXECUTIVE SUMMARY

Introduction

1. The Globalisation and Fish Utilisation and Marketing study is designed to examine the impact of the development of the export fishery on the fish producers, processors, traders and consumers in the artisanal fishery in Uganda. The purpose of this report is to provide field data relating to the livelihoods, in particular to income and revenue flows. It focuses on the economic structure of fish landing sites on Lakes Kyoga and Albert.
2. Data collection was carried out at Kansiira, Wansolo and Iremeria on Lake Kyoga and at Kabolwa, Somsio and Bikunyu on Lake Albert. Interviews were held with DFOs at the district headquarters, key informants at the beaches and with heads of the enterprises within the different fisheries sub-sectors.
3. On both Lakes Kyoga and Albert, chilled transport facilities arrived around November, 2001. The districts concerned have reported some positive effects associated with these facilities including increased revenues for the districts, higher earnings to fishers, creation of employment opportunities for youths and improved sanitation at the beaches.
4. The artisanal processors, traders and local consumers have, however, been negatively affected as they cannot compete for Nile perch with the refrigerated truck traders who are able to offer much higher prices. Factory agents are also involved in buying fish on the lake, which has affected the taking of catch statistics at landings and control over sale of fish by the boat owners.
5. In Nakasongola District, efforts have been made by the District Authorities to regulate the activities of the refrigerated trucks by allocating them to certain beaches and scheduling their operations. Similar measures are yet to be considered by the other districts surveyed.
6. The infrastructure and facilities at the beaches on both lakes were generally limited, consisting of poor access roads, schools, boreholes, public latrines, retail shops, food kiosk, drug shops and recreational facilities.

Fish production

7. Most respondents on both lakes targeted Nile perch, however at beaches were chilled transport facilities existed, the average price at which producers of Nile perch were selling a kilogram was higher than at beaches were chilled transport facilities did not exist.
8. Parachute and Ssesse boats are in use on Lake Kyoga while Congo barque and Kabalega are the main types on Lake Albert. The level of motorisation is low at all the beaches surveyed.
9. Gillnetting and long lining are the main production enterprises on both lakes, followed by boat seining and basket trapping for Lake Kyoga and *Kaganga* for Lake Albert.
10. The production enterprise with the highest net monthly returns is gillnetting for Nile perch, followed by boat seining, long lining, basket trapping and kaganga.
11. On Lake Kyoga beaches, most Nile perch is sold to factory agents and most tilapia is sold to pick-up traders. Bicycle traders and processors have difficulties in

obtaining fish supplies. On Lake Albert, most Nile perch is sold to factory agents while tilapia is sold to truck traders and processors in similar proportions.

Fish processing

12. The most processed fish species was Nile Tilapia, followed by Hydrocynus and Nile perch, however, at beaches were chilled transport facilities existed, the price of a kilogram of Nile perch destined for processing was much lower than that of Nile Tilapia meaning that processors were buying rejected Nile perch from the factory trucks.
13. Fish smoking is the main processing techniques at the beaches, with salting/sun drying being more significant on Lake Albert.
14. There is greater investment in smoking, involving construction of smoking kilns made of mud, bricks and wire mesh, than in salting/ sun drying, where often communal drying grounds are used.
15. Smoked fish is marketed within the urban areas in Uganda while salted/sun dried fish is sold in the DRC.
16. Returns on salting/sun drying are higher than those on fish smoking.

Fish marketing

17. The main types of fish traders on Lake Kyoga are boat traders (also factory agents), pick-up traders and bicycle traders. On Lake Albert, the main traders are processor/traders and factory agents.
18. Factory agents/boat traders mainly deal in Nile perch while other traders (processor/trader, bicycle and pick-up trader) deal in other species.
19. Factory agents/boat traders realise the highest net returns, followed by pick-up traders.

Fish consumption

20. Consumers can be distinguished between those who engage in fishery activities and those who do not, with the former hardly buying the fish they consume. Both consumers not involved in fishery activities and those involved commonly consumed Nile Tilapia, even at beaches were Nile perch was the most landed species. This could be attributed to preference or the fact that Nile perch fetches better prices and therefore put for sale other than consumption.
21. The average daily quantity of fish consumed by the beachside communities is 2.5 kg for Lake Kyoga and 3.0 kg for Lake Albert.
22. Most consumers believe that the quantities of fish and the frequency of consumption have decreased over the last one year.
23. Most consumers reported that the prices of fish for consumption had increased over the last one year.
24. The size of fish for consumption was also reported to have decreased over the last one year.
25. The most common substitute for fish reported was beans, followed by vegetables.

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REPORT OF THE GLOBALISATION AND UTILISATION AND FISH MARKETING STUDY ON LAKES KYOGA AND ALBERT

1. INTRODUCTION

The Globalisation and Fish Utilisation and Marketing Study is a collaboration between the Fisheries Resources Research Institute (FIRRI) and the Mike Dillon Associates Limited, with funding from the Department for International Development (DFID) of the Government of the United Kingdom. The study is designed to examine the impact of the development of the export fishery on the fish producers, processors, traders and consumers in the artisanal fishery in Uganda. FIRRI's role is to collect field data relating to the livelihoods of artisanal fish producers, processors, traders and consumers, in particular data relating to income and revenue flow. The initial focus is on the economic structure of fish landing sites.

During the first quarter, namely April to June, 2002, work was carried out on Lakes Kyoga and Albert and the focus was on the economic structure of fish landings.

1.1 Objectives

The objectives for this quarter will be to develop a sector-wide model and detailed models of selected landing sites on Lakes Kyoga and Albert. The specific objectives are as follows:

i) Identify three landing sites on Lake Kyoga and three on Lake Albert using the given criteria.

ii) Determine dates for field visits.

iii) Identify discrete economic sub-sectors within the artisanal sector for analysis.

iv) Collect data on individual or household incomes and costs and revenues of economic units, both aggregate and individual, for the landing sites sampled.

v) Prepare a research report on each landing site.

vi) Plan the continuation of the data collection process into the next quarter.

vii) Prepare a budget for the next quarter.

The purpose of this document is to provide research reports on each of the landing sites at which the research was conducted.

1.2 Conceptual Framework

Globalisation of the fisheries involves opening up of the nation's fisheries to the international market as well as to foreign investments. This transformation has the potential of creating new activities and bringing in new players on the scene. The fishery would evolve into new structures with new products and higher levels of production. It would also create new demands in terms of skills, facilities and services. All this would have implications for the livelihoods of the local communities.

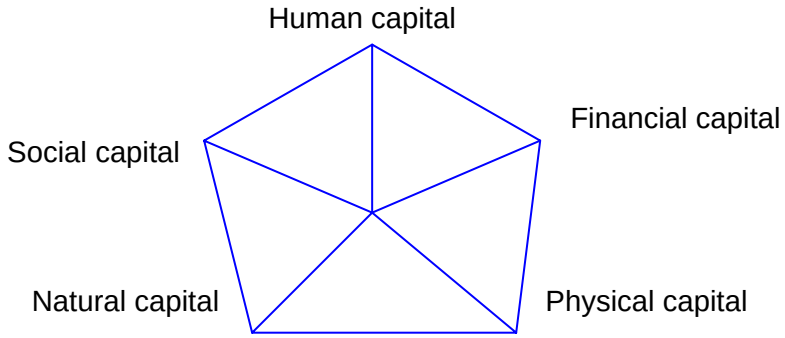
1.2.1 Livelihoods analysis

A definition of livelihood includes capabilities, assets and activities that contribute to local living. Desired livelihood outcomes of a community include food security, improved incomes and higher quality of life, reflected in high levels of educational and health achievements. Apart from improving the livelihood of a community, there

is need to ensure its sustainability. A livelihood is said to be sustainable “when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the national resource base” (Carney 1998). Reduced vulnerability and more sustainable use of the natural resource base are, therefore, other important livelihood outcomes.

Globalisation could enhance livelihoods in the fisheries by influencing the different elements of the pentagon of livelihood assets of the communities, as illustrated in Figure 1.1

Figure 1.1: The Pentagon of Livelihood Assets



Source: Carney 1998

The various livelihood assets of the fishing communities and how they are affected by globalisation are outlined below:

a) Human capital refers to the skills, knowledge, ability to work and to pursue different livelihood strategies as well as health. Through globalisation and the demands it creates, these qualities would be stimulated and considerable achievements made in human development in fisheries.

b) Financial capital includes financial resources available through earnings, savings and credit that could be channeled into livelihood activities. Fish exports would increase earnings among the fishery communities.

c) Physical capital refers to infrastructure, namely transport, water, electricity and communication, as well as production and processing equipment needed in pursuing livelihoods. Globalisation could create demand for infrastructure, stimulating response by the relevant state ministries and district authorities. Considerable improvement would also occur with respect to private fishing and fish processing equipment.

d) Natural capital concerns natural resource stocks from which resource flows that are useful for livelihoods are derived. Globalisation might exert strain on the fisheries resources, especially in the face of poor resource management by a weak fisheries institution. However, with globalisation, the lakes would attract greater official support, expertise and resources into the management of fisheries resources.

e) Social capital includes the support from social groups upon which people draw in pursuit of livelihoods. Fisherfolk organizations are needed to render different types of services to fishers, processors and traders, men and women. Through globalisation, fishers would have greater access to

knowledge, skills and resources for improved management of their community institutions.

Globalisation could, therefore, be important for fisheries by stimulating development of all the elements within the pentagon of livelihood assets.

1.2.2 Food security

One of the main elements of livelihood is food security. The importance of fish in the diet of local communities is widely recognized, as a healthy and nutritious food. Fish is said to be a source of easily digestible, high-quality protein. It is rich in amino acids and also contains calcium, phosphorus, iron and vitamin A and D. It is, therefore, able to enhance the diet of poor people, which may be dominated by cereals or tubers. It thus helps to prevent diseases associated with nutritional imbalances (Le Sann 1998). Fish is also generally cheaper than its main substitute, meat.

Globalisation of fisheries could have mixed impacts on food security as illustrated by the following observations:

a) Fishers could be motivated to minimize fish wastage, allowing better utilization of the resource.

b) They have opportunity to utilize their earnings from fish to buy other types of food, enabling them to attain a balanced diet.

c) With increasing fish export, however fishing households could suffer reduction in their consumption to below desirable levels, due to desire to maximize earnings from fish sale. The tendency is also for the best fish to be sold for cash.

d) Export of fish could also adversely affect local consumers by diverting supply away from them and increasing fish prices to levels unattainable by many locals.

1.2.3 Impact on income

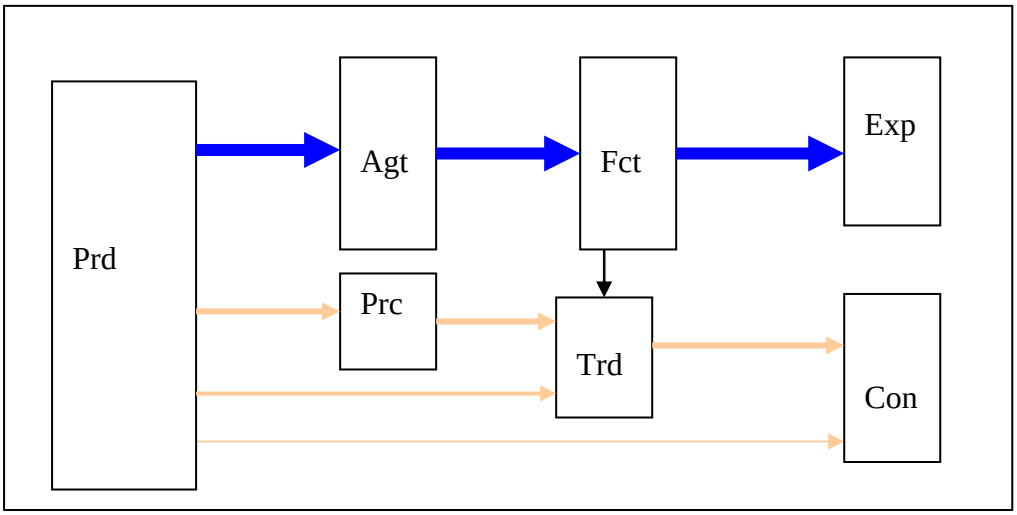
Another important element of livelihood is improved income, which enables one to meet ones' needs. These include the basic needs of food, clothing and shelter as well as the social needs. Globalisation of the fisheries could improve incomes of the local communities through increase in fish sales and/or prices as well as creation of job opportunities.

The impact of fisheries globalisation on livelihoods on Lakes Kyoga and Albert can be analysed through conceptualization of the fish commodity systems with the aid of a descriptive model, depicting two main flow channels for fish (Figure 1.2). The model can be used to identify the different activities carried out, thus showing the livelihood activities and opportunities created by the process of globalisation.

The first channel is that which serves the overseas export market. It involves larger scale operations than the other, bigger capital investments, better organisation, higher quality products, better facilities and is expected to generate greater earnings to operators. Within the channel, numerous artisanal fishers supply fish to the industrial processing plants directly or through factory agents. Chilled fillets of *L. niloticus* as well as frozen fish are exported mainly to destinations in Europe, Asia and USA. The by-products, namely fish frames and off-cuts are sold on the domestic market, often after some processing. Despite the high earnings associated with the trade, it is highly risky because of the frequent fish ban on the EU market, due to food safety concerns and other factors over which the country has little control.

The second channel is the domestic and regional marketing system for fish. Although it offers greater employment and supplies fish for domestic and regional consumers, it is said to be constrained by low returns, widespread unsustainable fishing practices, poor infrastructure and services and low purchasing power among consumers.

Figure 1.2: Fish Value Flow Model for Lakes Kyoga and Albert



Key:

Prd = Producers Agt = Factory Agenst Prc = Traditional Processors

Fct = Fish Factories Trd = Trader Con = Consumers Exp = Exports

1.2.4 Model Specification

This study seeks to develop an input-output model to relate income, the dependent variable to key independent variables, namely boat, gear, labour costs and other factors. Income is itself derived from quantities of fish produced and prices at which they are sold.

Availability of chilled transport facilities would affect income through the relevant variables, namely fish prices, availability of capital equipment, infrastructure and others to be established by the research.

A relationship between availability of chilled transport facilities and earnings would be established from the data. This is done by comparing earnings between the different categories of landing sites as well as the perceptions of the enterprise operators towards the chilled transport facilities.

1.3 Methodology

1.3.1 Study Area

The study was carried out on Lakes Kyoga and Albert. Three landing sites were selected on each lake on the basis of the following criteria:-

a) One landing site where chilled transport facilities already operate,

b) One where they are not available and probably will not be during the project's life of 18 months and

c) One where the facilities may become available during the project's life.

Based on these criteria, the landing sites given in Table 1.1 below were selected:

Table 1.1: Selected Landing Sites

Selection Criteria	**Landing Sites**	
	Lake Kyoga	**Lake Albert**
Chilled transport facilities already operate.	Kansiira	Kabolwa
No chilled transport facilities expected throughout project's life.	Iremeria	Somio
No chilled transport facilities but may become available during project's life.	Wansolo	Bikunyu

1.3.2 Economic Sub-sectors

The relevant enterprises under the production, processing and marketing were identified and examined, as listed in Table 1.2 below:

Table 1.2: Fishery Enterprises by Sub-sector

Sub-sectors	**Discrete Enterprises/ Categories**
Production	Gillnetting
	Long lining
	Hand lining
	Basket trapping
	Scoop netting
	Mosquito seining
	Boat seining
	Kaganga
	Cast netting
Processing	Smoking
	Salting & sundrying
	Sundrying
Marketing	Bicycle trader
	Pick-up trader
	Boat trader
	Factory agent

Sub-sectors	Discrete Enterprises/ Categories
	Processor / trader
Consumption	Consumers not engaged in fishery activity
	Consumers engaged in fish production
	Consumers engaged in fish processing
	Consumers engaged in fish trading

1.3.3 Sample Selection

The relevant fisheries sub-sectors were identified. Within each sub-sector, the available owners/ renters of fish production, fish processing and fish marketing units were interviewed.

1.3.4 Data Collection

Data collection involved the following activities:

i) Literature and reports related to the study were reviewed.

ii) Relevant records and reports at the district headquarters of Kamuli, Nakasongola and Apac for Lake Kyoga and Masindi and Hoima for Lake Albert were examined.

iii) Key informant interviews were carried out with Department for Fisheries Resources staff and beach leaders.

iv) Interviews were carried out with persons representing the enterprise units and categories within the identified sub-sectors by means of unit questionnaires.

The team spent one day at each of the relevant District headquarters meeting with district officials and reviewing records and reports. Thereafter, it proceeded to the beaches and spent 4 days on data collection at each of the large beaches served with chilled facilities and 3 days at the other beaches.

The variables covered under data collection at the aggregate and individual levels are given in Tables 1.3 and 1.4 below:

Table 1.3: Aggregate Level Data

Sub-sector	Information
Production	Infrastructure and facilities Production facilities Categories of fishers Number of persons employed Boat types and numbers Engine types and numbers Gear types and numbers Catch statistics

Processing	Infrastructure and facilities Types of fish processors Species processed Processing assets
Marketing	Infrastructure and facilities Fish handling facilities Weighing scales Transport services Water supply Iceboxes Availability of latrines Numbers of traders by type Species traded Main destinations

Table 1.4: Unit Level Data

Sub-sector Enterprises	**Variables**
Production	Personal characteristics Capital inputs and costs Labour inputs and costs Entrepreneurship costs Other costs Resource perceptions Catches and prices Sales data
Processing	Personal data Capital inputs and costs Labour inputs and costs Other inputs and costs Entrepreneurship costs Species, quantities and prices of fish processed and sold Sales data
Marketing	Personal data Capital inputs and costs Labour inputs and costs Transportation costs Ice/storage costs Entrepreneurship costs Species, quantities and prices of fish bought and sold Other sales data
Consumption	Fish species commonly eaten Frequency of consumption Prices and quantities Substitutes for fish.

1.3.5 Data Analysis

Both qualitative and quantitative data were collected. The qualitative data were analyzed using frequencies whereas the quantitative data was first transformed to

derive the target variables, which were analyzed using descriptive statistics particularly the mean. The SPSS Version 10.0 program was used in the data analysis.

2. KANSIIRA LANDING SITE

2.1 Background

Kansiira Landing Site, located in Lwabyata Sub-county in Nakasongola District was selected as the beach where chilled transport facilities already operate on Lake Kyoga. The population of the beach is approximately 600 people. The main economic activities at the beach are fishing, livestock keeping, crop farming and trading. Animals kept include cows, pigs, goats and sheep while the main crops grown are matooke (green banana), cassava, maize, potatoes and beans.

Nakasongola District is located on the South-western shores of Lake Kyoga. (see map) There are approximately 25 beaches in the district. In total, there are 1,265 fishermen and 702 boats in the district. The catch statistics for fish landed in 2001 and estimated value by fish species are given in Table 2.1 below:

Table 2.1: Estimated Fish Catch for Nakasongola District by Species, Weight and Value for 2001

Species	**Weight** (kgs)	**Value** (Shs)
Nile perch	21,326	26,739,600
Tilapia	82,264	114,863,700
Protopterus	636	508,800
Clarias	1,111	1,163,400
Momyrus	43	34,400
Barbus	6,190	8,020,800
Bagrus	68	68,000
Total	111,638	151,398,700

Source: Nakasongola District records

Fisheries provide a major source of economic activities for Nakasongola District, second only to livestock. The district generates public revenues from the fisheries annually, through licensing fees, tender of landing sites and graduated tax paid by fishers. The rates below have been charged for the various fishery activities and vessels. However, with the next financial year beginning on 1st July 2002, new rates will be charged, in accordance with the new legal instrument, The fishing (Amendment) Rules, 2001. In the new instrument, the rates are different depending on the lake, size of fishing vessel and tonnage of the truck. The collection of the specific licence fees on trucks trading in fish has also been decentralised to the district as a new source of revenue.

Existing rates are given in Table 2.2 while the new rates are given in Appendix 3.

Table 2.2: Current Rates Charged by Nakasongola District for the Various Fishery Activities and Fishing Vessels.

Type of Licence	**Rate** (Shs)
Fishing vessel	12,000
Fishing	3,000
Fish monger operating within district	10,000
Fish monger operating outside district	10,000
Processing permit	20,000

Source: Nakasongola District records

Chilled transport facilities arrived in Nakasongola District in November 2001 and at around the same time also arrived in Kansiira. There are 14 trucks operating in the district. Ten trucks buy Nile perch for fish factories while four trucks buy tilapia for the Rwandan market. Two trucks, namely from the Uganda Fish Packers Ltd. and Gomba Fish Processing Company, operate at Kansiira once a week. The chilled transport facilities exist at other beaches within the district namely; Kikalaganya, Lwampanga, Zengebe, Kibuye and Kikoiro.

Before the arrival of chilled transport facilities, the price of a kilogram of Nile perch was Shs 500, however, this increased tremendously to the present rate, which is Shs 1,500 per kg. As a result of the higher prices, there was resistance from the operators of small pick-ups who in addition thought that the refrigerated trucks would affect their supplies. However, arrangements were done where the trucks were allocated specific beaches and time schedules for the different companies.

The district has reported a number of positive impacts associated with the chilled facilities. Generally, the incomes of fishers in the district are said to have increased. There are also increased employment opportunities for many youths who used to be idle before the arrival of chilled transport facilities. A good number of them are now employed as crews, bait suppliers and casual fish labourers. There is also relatively improved sanitation and fish handling at beaches where these trucks are found. The district has benefited from the revenues that are promptly paid by the tenderers of beach markets and also expects to benefit from the specific licences that are to be paid by the factory trucks following the new legal instrument.

The artisanal processors, traders and local consumers, however, have been affected by this new development in that they cannot compete for Nile perch with the truck traders who are able to offer much higher prices. Factory agents are also involved in buying fish on the lake, which has affected the taking of catch statistics at landings.

The district authorities have responded to some of these problems by encouraging truck traders to form an association. This has helped to ensure that new ones are not allowed to come to Nakasongola. The communities have also been encouraged to formulate by-laws to deal with factory agents who buy fish at sea.

2.1.1 Infrastructure and Facilities

Below are the general facilities and infrastructure at Kansiira.

Table 2.3. Infrastructure and Facilities

Infrastructure and Facilities	Number	Description
Retail shops	8	Mainly dealing in general merchandise
Food kiosks	12	Dealing in local dishes such as *matooke*, cassava, fish and meat
Drug shops	2	Providing drugs for first aid and sometimes involved in treatment of sick persons
Borehole	1	Established by the District Local Council
School	1	Kansiira Primary School has classes up to primary seven
Public latrine	1	However, a number of households have private latrines
Recreational facilities	2	Mobile video shows and the community shares a football pitch with the school

Source: FIRRI, survey data June 2002

2.2 Fish Production Sub-sector

2.2.1 Overview

Kansiira Landing Site has one facility in support of fish production, namely a boat making yard. The main type of fishery is basket trapping with approximately 40 fishers. Gillnetting, boat seining, long lining, and then cast netting follow, as shown in Table 2.4.

Table 2.4 Ranking of Production Enterprises by Number at Kansiira

Category of fisher	Rank	Number
Basket trapping	1	40
Gill netting	2	35
Boat seining	3	30
Long lining	4	20
Cast netting	5	1

Source: FIRRI, survey data June 2002

There are approximately 50 fishing unit owners, 20 fishing unit renters and 100 crew. There are 40 parachute 9 Ssesse and 1 dug-out canoe at Kansiira. There are 5 fishing boats with outboard motor engines of horsepower ranging from 2 to 15.

The main fish species landed is Nile perch with approximately 2500 kgs landed per week. This is followed by tilapia (1000 kgs), *Protopterus* (600 kgs), *Momyrus* (400 kgs), *Bagrus* (250 kgs), *Clarias* (100 kgs), and *Synodontis* (50 kgs).

2.2.2 Fishers' Characteristics

The sample in the production study at Kansiira consisted of 27 respondents, of whom one was female and their mean age was 37 years. The majority were of the Baruli tribe (51.9%) followed by Baganda (11.1%), Basoga (11.1%), Acholi (11.1%) and a number of other smaller tribes (14.8%). The majority were married with an average family size of 7 members. About 75% of fishers in the sample had attained primary education, 12.5% secondary and the remaining 12.5% had not gone to school at all. The mean number of years in fishing was 12 while number of years the respondent lived at Kansiira Beach was 10.

The most targeted fish species is Nile perch, followed by others as indicated in Table 2.5 below:

Table 2.5: Fish species most targeted by respondents at Kansiira Beach

Species	Count	Percentage
Nile perch	15	55.6
Tilapia	10	37.0
Protopterus	1	3.7
Others	1	3.7
Total	27	100.0

Source: FIRRI, survey data June 2002

The main alternative source of income for the respondents was farming, but many respondents reported having no such alternatives, as indicated in Table 2.6 below:

Table 2.6 Alternative sources of income

Income source	Count	Percentage
Trading	4	14.8
Farming	11	40.7
Live stock- keeping	4	14.8
None	8	29.7
Total	27	100.0

Source: FIRRI, survey data June 2002

2.2.3 Fishing Inputs and Costs

Boats and engines

55.6% of the fishers' own boats while 44.4% hire from individuals who own boats. The mean cost for hiring a boat is shillings 20,000 per month. The most common type of boat used is "parachute" and information on the boats used is given in the table below.

Table 2.7: Information on the Boats Owned

Type of boat	**Number of boats**	**Average period used** (years)	**Mean cost price** (Shs)	**Average useful life** (Years)	**Mean salvage value** (Shs)
Parachute	20	2.0	137,200	7.1	23,000
Ssesse	7	4.6	243,300	7.8	38,000

Source: FIRRI, survey data June 2002

Only one respondent reported that he owned an outboard engine. Information on the engine owned is given below.

Table 2.8: Information of outboard engine

Horse power	**Number of years**	**Cost price (Shs)**	**Useful life (**Years)	**Salvage value** (Shs)
2	0.5	1,460,000	15	637,500

Source: FIRRI, survey data June 2002

Fishing gear

The main types of gear used as reported by respondents are shown in Table 2.9 below.

Table 2.9 Main gear Types Used

Gear types	**Count**	**Percentage**
Hand lines	1	3.7
Long lines	6	22.2
Gillnets	17	63.0
Basket traps	3	11.1
Total	27	100.0

Source: FIRRI, survey data June 2002

Table 2.10: Information on Gear Types Used

Gear types	**Mean number** (Units)	**Average size**	**Period used** (Years)	**Cost price** (Shs)	**Useful life** (Months**)**	**Salvage value** (Shs)
Hand lines	60	7.0	0.5	100	--	00
Long lines	53	4.8	0.5	8,500	4.8	00
Gillnets	20	6.6	0.4	169,000	6.7	3,100
Basket traps	9	--	0.7	24,700	4.0	00

Source: FIRRI, survey data June 2002

The main source of initial capital for production enterprises is farming, as indicated in Table 2.11 below:

Table 2.11: Source of Initial Capital

Enterprise	**Source of Initial Capital**			**Total**
	Fishing	**Farming**	**Credit**	
Hand lines	1	--	--	1
Long lines	1	5	--	6
Gillnets	5	9	2	16
Basket traps	2	1	--	3
Total	9	15	2	26

Source: FIRRI, survey data June 2002

Labour costs

The data on average number of crew members per boat, modes of payment and number of days fished per week are provided in Table 2.12 below:

Table 2.12: Payments to Production Labour

Enterprise	**Average number of crew**	**Respondents employing % of revenue payment system**	**Amount paid** (% of revenue)	**Mean number of days worked per week**
Hand lines	1	1	40%	4.0
Long lines	1	3	43%	4.2
Gillnets	2	16	41%	4.5
Basket traps	1	1	25%	5.0

Source: FIRRI, survey data June 2002

Entrepreneurship

A few producers were able to value their entrepreneurship functions as indicated in Table 2.13 below:

Table 2.13: Valuation of Entrepreneurship by Type of Enterprise

Enterprise	**Value for entrepreneurship** (Shs/month)
Hand lines	--
Long lines	40,000
Gillnets	96,500
Basket traps	40,000

Source: FIRRI, survey data June 2002

Other costs

Other operational costs were identified in fish production and the information is summarized in Table 2.14. Boat and gear maintenance, particularly among gillnet fishers, were the main ones.

Table 2.14: Other Operational Costs in Production (Shs/month)

Enterprise	**Boat maintenance**	**Gear maintenance**	**Engine maintenance**
Hand lines	--	--	--
Long lines	--	2,000	--
Gillnets	36,670	32,500	10,000
Basket traps	7,500	--	--

Source: FIRRI, survey data June 2002

Based on the production data presented above, the monthly operating costs are computed as given by Table 2.15 below:

Table 2. 15 Summary of Monthly Production Costs

	Hand lines	Long lines	Gillnets	Basket traps
Capital Investment	6,000	450,500	821,088	175,500
Boat maintenance	--	--	6,470	2,500
Gear maintenance	--	333	7,647	--
Engine maintenance	--	--	588	--
Other costs	--	--	882	--
Labour cost	43,200	186,490	196,832	27,125
Fuel cost	--	32,000	120,000	--
Bait cost	28,800	43,000	--	--
Operating cost	72,000	127,578	196,322	16,062
Depreciation	100	22,712	13,258	3,406
Total monthly cost	72,100	150,290	209,580	19,469

Source: FIRRI, survey data June 2002

2.2.4 Earnings of the Production Enterprises

The fishers primarily target Nile perch and Nile tilapia with a few catching other species such as *Protopterus*, *Synodontis* and *Clarias*. Fish prices, monthly catches and revenues for the various enterprises and species are summarized in Table 2.16. Net revenues are derived by deducting monthly costs from gross revenues.

Table 2.16: Average catches and incomes of fishers by species.

	Hand lines	Long lines	Gillnets	Basket traps
Nile Perch				
Catch (kgs/month)	.	325.03	477.82	
Price (Shs/kg	.	1,200	1,170	
Gross revenue (Shs)	.	388,342	500,245	
Net revenue (Shs)	.	238,051	248,473	

Nile Tilapia				
Catch (kgs/month)	.	.	442.67	345.00
Price (Shs/kg)	.	.	733	750
Gross revenue (Shs)	.	.	317,217	268,250
Net revenue (Shs)	.	.	203,310	331,881
Other species				
Catch (kgs/month)	360.00	.	424.00	.
Price (Shs/kg)	300	.	500	.
Gross revenue (Shs)	108,000	.	212,000	.
Net revenue (Shs)	35,900	.	147,358	.

Nearly 94.7% of the Nile perch fishers sell their catch to factory agents whereas only 5.3% sell to beach processors. All Tilapia fishers interviewed sold their fish to pick-up traders. About 96.3% of the respondents interviewed sold their fish only at the beach. Those who sold their fish elsewhere gave reasons that such places offered better prices or were near their fishing ground. Most respondents (97.2%) had no other arrangements with their buyers such credit in terms of money and fishing inputs.

2.3 Fish Processing Sub-sector

2.3.1 Overview

There are no publicly owned fish processing facilities at Kansiira. There are approximately 25 privately owned smoking kilns and 3 drying racks. Fish smoking is the main fish processing method with approximately 25 people involved in it. Salting and sun-drying are the other methods, involving about 10 people who are mainly stationed on the suds close to the beach. Tilapia, followed by Nile perch is the most processed fish species. Other species such as *Momyrus, Clarias* and *Bagrus* are also smoked.

2.3.2 Fish Processors' Characteristics

A total of 22 fish processors who either smoked or sun dried/ salted fish were interviewed. Table 2.17 presents average age, household size and years spent at landing.

Table 2.17: Age Structure, Household Size and Years Spent at Landing

	Age (Years)	**Household Size**	**Years spent at landing**
Mean	36.7	6.9	6.3
Minimum	17.0	1.0	1.0
Maximum	80.0	19.0	20.0

Source: FIRRI, survey data June 2002

Nearly 50% of the fish processors interviewed had attained some level of primary education. However, only 27.3%% had advanced to the secondary school level. The remainder (22.7%) did not go to school at all.

In the sample, the Acholi tribe represented 40.9%, Langi (13.6%) and Baruli (13.6%). Other tribes included the Baganda (4.5%) and Basoga (9.1%). Over 81.8% of the respondents were married. The rest were single (9.1%), widowed (4.5%) or separated (4.5%). Almost 45.5% of the respondents were females.

2.3.3 Fish Processing Inputs and Costs

In the sample, 81.8% of the fish processors smoked fish while 18.8% salted/ sun dried it. Among the fish smokers, nearly 94.5% used low-technology ovens (smoking kilns) while some used smoking pits. For those who used smoking kilns and pits, 66.7% privately owned them, 27.8% hired them while 5.5% communally owned them. Those who salted and sun dried fish, on the other hand, entirely spread their salted fish on drying ground, which they neither owned nor rented but were communal.

Table 2.18: Distribution of Fish Processors by Type of Processing Facility and their Ownership Status

Facility	**Ownership**	**Smoking**	**Sun drying and Salting**
Smoking kiln/pit	Privately owned	66.7%	--
	Rented	27.8%	--
	Communally owned	5.5%	--
Drying ground	Privately owned	--	--
	Rented	--	--
	Communally owned	--	100.0%
Total		100.0%	100.0%

Source: FIRRI, survey data June 2002

Capital

The capital costs of the fish processors are generally low because of the simple technology in use. For owners of smoking kilns, the initial investment in construction of smoking kilns (made from mud, bricks and wire mesh) with an expected useful life of 5 years averaged Shs 74,583. Alternatively, smokers hired smoking kilns at about Shs 4,000 per month. In the case of processors who salt/ sun dry, given that they neither own nor rent the drying ground on which they spread their fish, their initial capital investment is insignificant. The processors obtained their 'start-up' capital from farming (59.1%), fishing (22.7%) and family sources.

Labour

Three sources of processing labour were identified, namely own-labour, hired and family labour. Nearly 63.6% of the fish processing units were owner-operated while

the rest were either family-run (18.4%) or operated by hired labour (18.4%). In the case of own and family labour, the opportunity cost of labour was derived on the basis of information on what the fish processors would have paid if the units were operated by hired labour. The number of labourers per fish processing unit was more or less the same (1-2) although large variations in the monthly labour costs by method of fish processing exist. Specifically, owners of salting/ sun drying units on the average spend Shs. 71,200 each month on labour or about 1.7 times higher than for fish smokers indicating that salting/ sun drying is relatively more labour intensive.

Other Costs

Quantitatively, the most important inputs used by traditional fish smokers and processors on a regular basis are firewood and salt respectively. On a monthly basis, fish smokers on the average spend Shs. 50,289 on firewood while those who salt/ sun-dry fish spend nearly Shs. 39,280 on salt. Generally, the traditional fish processors were also traders and transported their processed fish from the landing site to various market outlets. Wide variations in the monthly transport costs by method of processing were reported. Specifically, processors/ traders of salted fish spend roughly Shs 200,000 on transport charges or about 3.3 times higher than for fish smokers thereby suggesting that the former sell their fish in more distant markets.

Table 2.19: Monthly Input Costs of Fish Processing Units by Method of Processing

	Smoking (Shs)	**Sun drying and Salting** (Shs)
Capital investment	74,583	--
Rent for smoking kiln	4,000	--
Fuel wood cost	50,289	--
Salt cost	--	39,280
Labour cost	41,111	71,200
Transport cost	60,000	200,000
Operating cost	96,067	160,480
Depreciation	1,311	--
Total monthly cost	96,940	160,480

Source: FIRRI, survey data June 2002

2.3.4 Processors' Outputs and Incomes

The fish processors of Kansiira primarily process Nile Tilapia and Nile Perch as well as *Protopterus* to a much lesser extent. However, differences in the type of species processed by method of processing were reported. Specifically, the fish smokers processed Nile perch, Nile Tilapia and *Protopterus* whereas those who salted/ sun dried fish exclusively processed Nile tilapia. The average quantities of fish processed, buying and selling prices, cost of raw fish and gross revenues are presented in Table 2.20.

Table 2.20: Costs of Raw Fish and Revenues from Processed Fish by Species

	Smoking	Sundrying and salting
Nile perch		
Quantity processed (kgs/ month)	528.00	.
Buying price/ kg	620	.
Selling price/ kg	1,120	.
Cost of raw fish (shs/ month)	307,000	.
Gross revenue (Shs/ month)	523,600	.
Net revenue (Shs/ month)	105,588	.
Nile Tilapia		
Quantity processed (kgs/ month)	591.43	1,507.00
Buying price/ kg	843	675
Selling price/ kg	1,514	1,400
Cost of raw fish (shs/ month)	406,857	850,200
Gross revenue (Shs/ month)	841,714	2,060,300
Net revenue (Shs/ month)	360,288	1,049,620
Protopterus		
Quantity processed (kgs/ month)	120.00	.
Buying price/ kg	400	.
Selling price/ kg	1,000	.
Cost of raw fish (shs/ month)	48,000	.
Gross revenue (Shs/ month)	120,000	.
Net revenue (Shs/ month)	-40,824	.

Source: FIRRI, survey data June 2002

The fish processors of Kansiira largely sold their fish in two market outlets. Some 81.8% of the respondents, mostly engaged in fish smoking, sold to domestic urban markets in Gulu, Lira, Apac and Kampala. The others mainly involved in sun drying and salting, sold on the regional markets in Congo. Limited quantities of fish were sold to consumers at the beach or nearby rural markets. A close relationship exists between type of processed fish (smoked vs sun dried/ salted) and market outlets. Almost 87.2% of the fish smokers sell their fish locally while dealers in salted/sun dried fish sold in regional markets in Congo. This reflects differences in consumer preferences in the two market outlets.

2.5 Fish Marketing

2.4.1 Overview

Fish marketing at Kansiira is facilitated by the presence of three access roads, which are relatively in good condition and partly explain why chilled transport facilities easily access the beach. The roads go through the towns of Migyera, Lwampanga and Namasa. Kansiira can also be accessed by water from the neighbouring district of Apac. Blockades by mobile suds are not very frequent and whenever they occur, a way is created using dredging equipment provided under an Egyptian Government grant aid to Uganda.

There are approximately 25 beach-side retailers/processors, 3 bicycle traders, 2 pick-up traders and 2 truck traders. The two truck traders come from Uganda Fish Packers in Kampala and Gomba Fish Processing Industry in Jinja. There are 2 factory agents contracted by the truck traders to buy fish on their behalf. Truck

traders buy approximately 5.5 tons per week of Nile perch. The beach processors buy approximately 1 ton composed mainly of species other than Nile perch while bicycle traders buy approximately 300 kgs per week main composed of tilapia.

The main destinations of fresh Nile perch are the processing factories in Kampala and Jinja, while fresh tilapia is sold in Kampala City. Much of the processed fish is sold in Gulu, however a substantial amount of salted and sun-dried tilapia is sold in the Democratic Republic of Congo (DRC).

The average prices of fresh fish per kg for the various fish species landed at Kansiira are given below (Table 2.21).

Table 2.21. Fresh Fish Prices by Species

Fish species	**Prices** (Shs/kg)
Nile perch	1,500
Tilapia	1,000
Clarias	400
Protopterus	400
Synodontis	300

Source: FIRRI, survey data June 2002

2.4.2 Fish Traders' Characteristics

Eight traders were interviewed in the sample, all males, of average age of 33. Most had secondary education (62.5%) while others had primary schooling (37.5%). Fish traders were classified on the basis of the means of transport they use to transport their fish, and their distribution is given in Table 2.22. The relatively small number of fish traders interviewed is mainly attributed to the fact that most of them are non-resident at the landing site and were not, therefore, easily available.

Table 2.22: Distribution of Fish Traders in the Sample by Means of Transport

	Frequency	**Percentage**
Bicycle trader	1	12.5
Pickup trader	5	62.5
Boat trader	2	25.0
Total	8	100.0

Source: FIRRI, survey data June 2002

2.4.3 Inputs and Costs

Assets of individual fish traders consisted of bicycles, fish baskets and boats. The fish traders reported wide variations in the capital investment with boat traders approximately investing Shs 300,000 or nearly 4 times higher than that of bicycle traders. On the contrary, all the pick-up traders hired the services of the pick-ups either directly from the owners or from those who hired them. On average, they spent Shs. 564,000 for the hire of pick-ups per month. For those traders who directly hired the pick-ups, their monthly expenditures on fuel averaged Shs. 1,605,200.

Generally, pick-up traders had the highest labour costs (Shs 112,600) almost doubling that of the bicycle and boat traders. While all fish traders used own-labour, pick-up traders in addition used hired labour and, therefore, incurred higher labour costs as compared to the other traders. The costs and revenues associated with the fish trading enterprises are presented in Table 2.23

Table 2.23: Mean Input Costs of Fish Trading Units by Type of Trader

Mean Monthly Input Costs	**Bicycle trader** (Shs)	**Pickup trader** (Shs)	**Boat trader** (Shs)
Capital Investment	80,000	--.	300,000
Hire of pick-up	--.	564,000	--.
Fuel cost	--.	1,605,200	--.
Labour cost	50,000	112,600	63,000
Operating costs	50,000	2,281,800	63,000
Depreciation	3,125	.	2,976
Total monthly costs	53,125	2,281,800	64,488

Source: FIRRI, survey data June 2002

2.4.4 Output and Incomes

The processors of Kansira mainly trade in Nile perch and Nile tilapia. The bicycle and pick-up traders are essentially Nile tilapia dealers whereas boat traders specialize in the Nile perch. The boat traders buy and assemble Nile perch from individual fishermen on the lake and sell it in bulk to factory agents who operate at the landing. The boat trader business is mostly financed by the factory agents in a bid to secure regular supplies of fish. Table 2.26 presents the quantities of fish traded, buying and selling prices, cost of raw fish and gross revenues.

Table 2.24: Average Cost of Raw Fish and Revenues of Fish Traders by Species and Type of Trader

	Bicycle trader	Pick-up trader	Boat trader
Nile Perch			
Quantities traded (kg/month)	.	.	9,600
Buying price (Shs/kg	.	.	1,300
Selling price (Shs/kg	.	.	1,450
Cost of raw fish (Shs/month)	.	.	12,960,000
Gross revenue (Shs/month)			14,160,000
Net revenue (Shs/month)	.	.	1,135,512
Tilapia			
Quantities traded (kg/month)	160	35,104	.
Buying price (Shs/kg	1,000	840	.
Selling price (Shs/kg	2,200	1,480	.
Cost of raw fish (Shs/month)	160,000	34,340,800	.
Gross revenue (Shs/month)	352,000	52,328,000	
Net revenue (Shs/month)	138,875	1,545,400	.

Source: FIRRI, survey data June 2002

2.5 Fish Consumption

2.5.1 Consumers' characteristics

There were 69 fish consumers interviewed at Kansiira. They were of average age of 36 years and 74% were male while 26% were females. They were predominantly of the Baruli tribe (41%), followed by Acholi (20%), Baganda (15%), Soga (12%), and other tribes (12%). Most (84%) were married and had attained primary level education (61%) followed by those who had secondary level education (23%). The average household size of fish consumers at Kasiira was 7 family members and the respondent had lived at Kansiira for an average of 7 years.

2.5.2 Consumption Levels and Trends

Most respondents at Kansiira (83%) consumed tilapia, followed by Nile perch (14%) and other species (3%).

Table 2.25: Commonly Consumed Fish Species at Kansiira by Category of Consumer

Sub-sectors	Nile perch	Tilapia	Other	Total
Consumers not engaged in fishery activity	-	91.7%	8.3%	100%
Consumers engaged in fish production	7.4%	88.9%	3.7%	100%
Consumers engaged in fish processing	22.7%	77.3%	-	100%
Consumers engaged in fish trading	37.4%	62.5%	-	100%
All respondents	14%	83%	3%	100%

Source: FIRRI, survey data June 2002

Quantities of fish consumed

The average daily quantity consumed by Kansiira respondents was 2.7 kgs and this ranged between 0.25 to 9 kgs. However, this varied between sub-sectors. Consumers not engaged in fishery activity ate on average 2.3 kgs of fish. Table 2.26 provides the results of consumption by sub-sector of consumers.

Table 2.26. Average Daily Weight of Fish Consumed at Kansiira by Type of Consumer (in kg)

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	6	0.40	2.3
Consumers engaged in fish production	9	0.25	3.0
Consumers engaged in fish processing	6	0.50	2.4
Consumers engaged in fish trading	5	0.25	2.9
All respondents	9	0.25	2.7

Source: FIRRI, survey data June 2002

Respondents were asked whether or not there had been a change over the years in the quantities of fish eaten. Most of them (71%) agreed that there was a change, while only (29%) did not agree. Most of those who agreed that there was a change (81%) said that the quantities consumed by their families had decreased. Only 19% said that the quantities had increased.

Frequency of fish consumption

On average consumers at Kansiira ate fish 4.2 times a week and this ranged between 1 to 7 times. However, this varied between sub-sectors, as given in Table 2.27.

Table 2.27: Average Number of Times Fish is Consumed in a Week at Kansiira by Type of Consumer

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	6	2	3.1
Consumers engaged in fish production	7	2	4.4
Consumers engaged in fish processing	7	1	4.6
Consumers engaged in fish trading	7	2	4.3
All respondents	7	1	4.2

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the frequency of fish consumption had changed over the past year. Most consumers (62%) agreed that there had been a change in the frequency of fish consumption at Kansiira. For those who agreed that consumption frequency had changed, 91% said it had reduced. A few (9%), however, said it had increased.

Size of fish for consumption

Respondents were asked whether or not the sizes of fish they ate with their families had changed over the past year. Most (73%) agreed to this and (74%) of these said that the sizes had decreased and 26% said the sizes had increased.

Table 2.28: Respondents Reporting Reduction in Sizes of Fish for Consumption at Kansiira

Fish species	Yes	No	Total
Nile perch	80%	20%	100%
Tilapia	72%	28%	100%
Others	50%	50%	100%

Source: FIRRI, survey data June 2002

Substitutes for fish

A majority of respondents at Kansiira (73%) mentioned beans as the main substitute to fish followed by vegetables (13%), meat (12%) and other substitutes.

2.5.3 Pricing Levels and Trends

Most respondents at Kansiira (66%) usually bought the fish they ate with their families while 34% did not. Unlike most consumers engaged in fish production (76%)

who did not buy the fish they ate, most consumers not engaged in fishery activity (75%), most consumers engaged in fish processing (96%) as well as all consumers engaged in fish trading usually bought the fish they ate with their families. For those who bought fish, the average price mentioned was Shs 763 and it ranged between Shs 300 – 1,000. The average price mentioned by consumers of Nile perch was Shs 800 while that for Tilapia was Shs 762.

Table 2.29: Prices of Fish Species for Consumption at Kansiira (in Shs)

Fish species	Maximum	Minimum	Mean
Nile perch	1,000	300	800
Tilapia	1,000	500	762
Others	500	500	500
All respondents	1,000	300	763

Source: FIRRI, survey data June 2002

Respondents were asked whether or not the prices of fish for consumption had changed over the past year. Most of them (69%) agreed that the prices had increased and most of these (93%) said it had increased.

2.6 Community Perceptions towards Chilled Transport Facilities

Consumers associated the coming of factory trucks to Kansiira with some positive changes to their community. Most respondents (49%) said it led to the increase in incomes of fishers, followed by ready market for fish (13%), beach development (12%) and employment opportunities for beach community (9%).

However, the major negative impacts mentioned by a large proportion of respondents were the high cost of fresh fish (37%) followed by reduced fish supplies to local traders/ processors and consumers (22%), processing of juvenile fish (7%) and selling of fish on the lake (4%). Some consumers (30%) did not associate any negative impact with factory trucks.

3. WANSOLO LANDING SITE

3.1 Background

Wansolo Landing Site is located in Alaro Parish, Akokoro Sub-county of Apac District (see map). It was selected as the landing site where chilled facilities had not reached but were expected during the lifetime of the project. The population of the beach is approximately 1,300 people. The main economic activities at and around the beach are fishing, animal keeping, crop farming and trading.

Apac District lies on the Northern side of Lake Kwania, which is connected to L.Kyoga. There are approximately 38 beaches in the district. In total there are 1,039 fishermen and 518 boats in the district. The catch statistics for fish landed in 2001 and estimated value by fish species are given in Table3.1 below:

Table 3.1: Estimated Fish Catches by Weight and Value for Apac District, 2001

Fish species	**Weight** (kg)	**Value** (Shs)
Nile perch	62,700,684	379,852,360
Tilapia	4,664,125	15,706,536
Protopterus	671,165	709,974
Momyrus	2,664,779	921,411,568
Bagrus	98,259	13,619,436
Total	70,119,102	1,331,299,874

Source: Apac District records

The rates given in Table 3.2 below have been charged for the various fishery activities and vessels. However, with the new financial year beginning 1st July 2002, the rates in the new statutory instrument, The Fishing (Amendment) Rules, 2001, will be charged (Appendix 3).

Table 3.2: Rates on Various Fishery Activities and Fishing Vessels.

Item	**Existing Rates** (Shs)
Fishing vessel licence	12,000
Fishing licence	No charge
Fish monger's licence operating within district	10,000
Fish monger's licence operating outside district	10,000
Processing permit (per smoking kiln)	2,500

Source: Apac District records

Perceptions on chilled transport facilities

Chilled transport facilities arrived at Apac District in October 2001. There are 3 trucks operating in the district. All the trucks are buy Nile perch for fish factories in Kampala, Entebbe and JinJa namely Greenfields Ltd, Ngege Ltd and Marine and Agro Fish Processing Company. There are no trucks at Wansolo because of the poor access road, however, they do operate at Kayei and Wigweng. At the moment boat traders buy Nile perch from Wansolo and ferry it to beaches either in Nakasongola or Apac that have factory trucks.

Before the arrival of boat traders, the price of a Kilogram of Nile perch at Wansolo was Shs 300 , however, this increased tremendously to the present rate which is Shs 1,200 per kg.

Generally, the fishers have ready market for their fish and as such their incomes have increased with better prices. Some fishers have also adopted the use of gillnets of big mesh sizes to catch Nile perch and as such abandoning the use of illegal gears. There are also plans by the district to gazette some beaches in order to improve fish handling

As expected, the artisanal processors, traders and local consumers, however, are not happy with the boat traders who offer better prices for all the Nile perch. The fishing unit owners are also not happy with the practice of selling fish at sea.

The District Fisheries Officer called for detailed study of this new development to understand its socio-economic impacts and it's likely impacts on the fish stocks of Lakes Kyoga and Kwania.

3.1.1 Infrastructure and Facilities

The general facilities and infrastructure available at Wansolo Beach are given in table 3.3 below:

Table 3.3. General Facilities and Infrastructure Available at Wansolo

Facilities and Infrastructure	Number	Description
Retail shops	8	Mainly dealing in general merchandise
Food kiosks	6	Dealing in local dishes such as Cassava and fish, millet bread and meat
Drug shops	2	Dealing in drugs for first aid
School	1	Primary school with classes up to primary two
Recreational facilities	2	One video hall and one football pitch

Source: FIRRI, survey data June 2002

3.2 Fish Production

3.2.1 Overview

There are no public facilities related to fish production such as boat yard and fish handling facilities found at Wansolo. The main type of fishery at Wansolo is

gillnetting with approximately 25 fishers. Boat seining (12 people) and then basket trapping (3 person) follow this (Table 3.2).

Table 3.4 Rank and Number of Production Enterprises by Category at Wansolo

Enterprises	**Rank**	**Number**
Gillnetting	1	25
Boat seining	2	12
Basket trapping	3	3

Source: FIRRI, survey data June 2002

There are approximately 40 fishing unit owners, 10 fishing unit renters and 102 crewmembers. There are 43 Ssesse and 5 parachute boats at Wansolo. There are 4 boats with outboard engines of 2-15 Hp engaged in fishing and water transport.

The main fish species landed is Nile perch with approximately 560 Kgs landed per week. This is followed by tilapia and *Clarias*.

3.2.2 Fishers' Characteristics

A sample of 26 production operators were interviewed at Wansolo Landing Site, most were males (96%), of average age of 34 years and married. The majority were of the Langi tribe (88%), with 46.2% of the respondents reporting having attained only primary level of education while 46.2% having reached secondary. The main targeted fish species is Nile perch (68.0% of respondents), followed by tilapia 28%. On average fishers interviewed had fished for 7 years, lived at the Wansolo Landing Site for 13 years and had average household size of 7 family members. Their main alternative source of livelihood was in trading, as indicated in table 3.5.

Table 3.5 Alternative Sources of Livelihood

	Frequency	**Percentage**
Trading	3	12.5
Farming	7	29.2
Livestock keeping	2	8.3
Salaried	2	8.3
None	9	37.5
Others	1	4.2
Total	24	100.0

Source: FIRRI, survey data June 2002

3.2.4 Fishing Inputs and Costs

Boats and Engines

The majority of Wansolo fishers (92.0%) own the boats they use. However, some 8.0% hire them from other individuals, spending an average of Shs 20,000 for boat hire per month. The main types of boats encountered are Ssesse (60%) and parachute (40%). Information on boats owned is given in Table 3.6.

Table 3.6: Selected Information on Boats Owned by Respondents

Boat Type	**Number in sample**	**Years old**	**Average cost price** (Shs)	**Useful life** (Years)	**Salvage value** (Shs)
Parachute	10	3.9	158,330	3.9	0.0
Ssesse	16	2.8	193,330	6.9	54,660

Source: FIRRI, survey data June 2002

Only 3 of the 26 respondents own out board engines while the rest use oars for boat propulsion. Information on the engines is provided in table 3.7

Table 3.7: Summary Information on Outboard Engines at Wansolo

Horse power	**Years taken**	**Cost price** (Shs)	**Useful life**	**Salvage value** (Shs)
10	5	1,400,000	14	516,666

Source: FIRRI, survey data June 2002

The mean cost of fuel per working day is shillings 20,000 for those using engines.

Different types of gear are used at the beach. In the sample, 84.6% of the fishers use gillnets, 11.5% boat seines and 3.8% fish with long lines. Information on the gear types is provided in Table 3.8

Table 3.8: Information on Gear Types

Number	**Mean number**	**Average size**	**Years taken**	**Average cost price** (Shs)	**Useful life** (Years)	**Salvage value** (Shs)
Long lines (Hooks)	100	8.0	.5	10,000	6.0	0.0
Gillnets	22	6.5	1.0	18,630	3.6	0.0
Boat seines	1	3.0	1.0	250,000	6.3	0.0

Source: FIRRI, survey data June 2002

Most fishers reported that capital for starting business was got from farming (42.3%), followed by fishing (30.8%), credits and family capital (7.7%) and lastly, other sources 11.5%.

Labour

On average there are 2 crew members per boat. Different systems of labour payments exist including percentage of revenue (76.0%) and percentage of net revenue, where all the costs are deducted before sharing (20.0%).

Entrepreneurship

The production enterprises are self managed. In order to get an estimate of the value of entrepreneurship, respondents were asked how much they would be prepared to receive for managing the enterprises. They reported an average of Shs 56,400 per month.

3.2.4 Perceptions to the Resource

Most respondents reported that the catch levels were poor (69.2%) while others said it was fair (23.1%) or good (7.7%). The reasons why it was said to be poor were because of changes in seasons (34.8%), too many competitors (17.4%) and suds washing away the nets (17.4%).

A summary of the monthly costs is presented in Table 3.9 below:

Table 3.9: Summary of Monthly Production Costs by Enterprise

	Long lines	Gillnets	Boat seines
Capital Investment	1,150,000	666,762	343,333
Boat maintenance	--	2,667	6,667
Gear maintenance	--	2,190	1,000
Engine maintenance	--	3,571	--
Other costs	--	--	--
Labour cost	--	148,339	105,741
Fuel cost	--	322,667	--
Bait cost	--	--	--
Operating cost	--	202,863	113,407
Depreciation	15,278	16,761	7,060
Total monthly cost	15,278	219,625	120,467

Source: FIRRI, survey data June 2002

3.2.5 Enterprise Earnings

Fish prices, monthly catches and revenues for the various enterprises and species are summarized in Table 3.10. Net revenues are derived by deducting monthly costs from gross revenues.

Table 3.10: Summary Monthly Revenues for the Enterprises by Species

	Long lines	Gillnets	Boat Seines
Nile perch			
Catch (kg/month)	.	277.20	812.70
Price (Shs/kg	.	1,173	1,300
Gross revenue (Shs)	.	326,292	1,056,510
Net revenue (Shs)	.	128,199	840,485
Nile tilapia			
Catch (kg/month)	.	338.67	268.00
Price (Shs/kg)	.	767	700
Gross revenue (Shs)	.	289,900	200,000

Net revenue (Shs)	.	107,584	127,310
Other species			
Catch (kgs/month)	115.20	.	.
Price (Shs/kg)	500	.	.
Gross revenue (Shs)	57,600	.	.
Net revenue (Shs)	42,322	.	.

Source: FIRRI, survey data June 2002

Of the 17 Nile perch fishers interviewed, all sold their catch by weight to boat traders and 80.8% sold only at Wansolo Landing Site. Some 16.0% of the respondents had arrangements with their buyers to provide fishing inputs to them while the majority 84.05 had no arrangements at all. 62.5% of tilapia fishers reported that they sold their catch by weight, (12.5%) in bundles and (25.0%) sold per head. The other species were sold per head.

3.5 Fish Processing

3.3.1 Overview

There are no publicly owned fish processing facilities at Wansolo. There are approximately 35 privately owned smoking kilns. Fish smoking is the main fish processing method with approximately 60 people involved in it followed by salting and sun-drying with 4 people. Nile perch, followed by tilapia are the most processed fish species.

3.3.2 Fish Processing Inputs and Costs

There were 12 respondents in the sample of processors, of average age of 36. Males formed 75% and females 25%. Most were Langi (83.3%), married with household average of 7 persons. They had lived at Wansolo for 8 years on average. Most had primary education (58.3%) while others had secondary schooling (33.3%). Fish smoking and salting/ sun drying are the main methods of fish processing at Wansolo. In the sample of 12 respondents, 75% of the fish processors smoked fish while 25% salted/ sun dried fish. The type of facilities used are given in Table 3.11 below:

Table 3.11: Distribution of Fish Processors by Type of Processing Facility and Ownership

Facility	**Ownership**	**Smoking**	**Sun drying and Salting**
Smoking kiln/pit	Privately owned	66.7	--
	Rented	22.2	--
	Communally owned	11.1	--
Drying ground	Privately owned	--	--
	Rented	--	--
	Communally owned	--	100.0
Total		100.0	100.0

Source: FIRRI, survey data June 2002

Capital

Owners of smoking kilns on the average invest Shs 94,800 in the construction of the low-technology ovens made from local materials. On the contrary, smokers who hire smoking kilns spend about Shs 2,700 on a monthly basis. Since processors who salt/ dry fish spread it on 'communal land', for which they don't pay rent, their initial capital outlay is rather insignificant. The majority of the fish processors obtained their 'start-up' capital from farming (58.3%), fishing (16.7%) and other sources (25%).

Labour

Three sources of labour, namely own-labour, hired and family labour operate the fish processing units. Nearly 63.6% of the fish processing units were owner-operated while the remainder were either family-run (18.2%) or operated by hired labour (18.2%). Fish smoking units are largely owner-operated whereas unit owners together with hired labour jointly operate salting/ sun drying processing units. Owners of salting/ sun drying units on the average spend Shs 101,300 each month on labour or about 2.6 times higher than for fish smokers indicating that salting/ sun drying is relatively more labour intensive.

Other Costs

Firewood and salt are basically the most important inputs used by fish smokers and salters/ sun driers on a regular basis. Nonetheless, the cost of firewood and salt are very small. Fish smokers on the average spend Shs 19,700 each month on day-to-day purchase of fuel wood while salters/ sun driers spend roughly Shs 21,200 on salt. The traditional fish processors are to a large extent also traders and transport their processed fish from the landing site to various market outlets. Processors/ traders of salted fish spend roughly Shs 192,000 on transport charges or about 4.8 times higher than for fish smokers. This is because the former sell their fish in more distant markets.

Table 3.12: Input Costs of Fish Processing Units by Method of Processing

	Smoking (Shs)	**Sun drying and salting** (Shs)
Capital investment	94,833	--
Hire of smoking kiln	2,667	--
Fuel wood	19,778	--
Salt	--	21,200
Labour	39,111	101,333
Transport	40,000	192,000
Monthly operating costs	64,222	179,467
Monthly depreciation	1,021	--
Monthly total costs	64,903	179,467

Source: FIRRI, survey data June 2002

3.3.3 Processing Outputs and Income

The main species processed at Wansolo are Nile tilapia and Nile Perch. In the sample, 66.7% of the respondents were primarily Nile tilapia processors whereas 33.3% mainly processed Nile perch. Individual Nile perch processors on the average processed about 360 kgs while Nile tilapia processors handled up to 1,595 kg each month. The average price at which Nile tilapia processors purchased their fish from the fishermen approximated Shs 625 per kg whereas that of Nile perch averaged Shs 600. The corresponding monthly cost of raw fish for Nile perch and Tilapia processors was Shs. 203,000 and Shs 984,500 respectively. The average price at which Nile perch processors sold their processed fish in the various market outlets averaged Shs 1,050 per kg while that of Nile tilapia processors amounted to Shs 1,025 per kg. The corresponding monthly gross incomes of Nile perch and Nile tilapia processors averaged Shs 400,000 and Shs 1,658,250 respectively.

Table 3.13: Cost of Raw Fish and Revenues from Processed Fish by Species

	Smoking	Sun drying and salting
Nile perch		
Quantity processed (kgs/ month)	360.00	.
Buying price/ kg	600	.
Selling price/ kg	1,050	.
Cost of raw fish (shs/ month)	203,000	.
Gross revenue (Shs/ month)	400,000	.
Net revenue	116,593	.
Nile tilapia		
Quantity processed (kgs/ month)	608.00	3240.00
Buying price/ kg	620	633
Selling price/ kg	990	1,083
Cost of raw fish (shs/ month)	392,000	1,972,000
Gross revenue (Shs/ month)	667,200	3,310,000
Net revenue	222,701	1,158,533

The fish processors of Wansolo largely sell their fish at urban (66.7%), regional (25%) and neighbouring rural markets (8.3%). Variations in the fish distribution channels by form of processed fish exist with smoked fish mainly ending up in urban markets whereas salted/ sun dried fish is exclusively destined for regional markets in Congo.

3.6 Fish Marketing

3.4.1 Overview

Wansolo can be accessed by water from the neighbouring districts, although once in a while they are faced with the problem of beach blockage by suds. There are two access roads to Wansolo that are in a poor state.

There are approximately 60 beach-side retailers/processors, 4 bicycle traders and 2 boat traders. The main destinations of fresh Nile perch are the processing factories in Kampala and Jinja, while fresh tilapia is sold in Apac Town. Most of the processed fish is sold in Gulu.

The average prices of fresh fish per kg for the various fish species landed at Wansolo are given below (Table 3.14).

Table 3.14: Prices of Fresh Fish by Species

Fish species	**Prices** (Shs/kg)
Nile perch	1,200
Tilapia	700

Source: FIRRI, survey data June 2002

3.4.2 Fish Traders' Characteristics

A total of 5 fish traders, all male, with mean age of 33 were interviewed at Wansolo. Three of them had primary education while the remaining two had secondary and university education. Three were bicycle traders while 2 were pick-up traders. Their average household was 7 persons and they had been at the beach for 7 years, on average. Unlike fish producers and processors, fish traders are usually non-resident and operate only for a limited time. They are, therefore, less easily accessed, thus explaining their small numbers in the sample.

Table 3.15: Distribution of Fish Traders by Means of Transport

	Frequency	**Percentage**
Bicycle trader	3	60.0
Pickup trader	2	40.0
Total	5	100.0

Source: FIRRI, survey data June 2002

3.4.3 Fish Marketing Inputs and Costs

Table 3.18 summarizes the input costs associated with bicycle and pick-up trading fish enterprises. The pick-up traders essentially hire pick-ups either directly (hires pick-up) or indirectly (pays those who hire pick-ups) and therefore do not spend on capital inputs. For those who hire pick-ups directly, they incur considerable hiring (Shs. 150,000) and fuel costs (Shs. 720,000) whereas those who hire pick-ups indirectly pay about Shs. 100,000 each month as transport costs. Overall, pick-up traders incurred monthly expenses amounting to Shs. 540,000 or about 8.6 times higher than bicycle traders.

Table 3.16: Input Costs of Fish Trading Units by Type of Trader

	Bicycle trader (Shs)	**Pick-up trader** (Shs)
Capital Investment	86,000	--.
Transport costs	--.	100,000
Hire of pick-up	--.	150,000
Fuel cost	--.	720,000
Labour cost	62,333	55,000
Operating cost	62,333	540,000
Depreciation	576	--.
Total monthly cost	62,909	540,000

Source: FIRRI, survey data June 2002

3.4.4 Marketing Outputs and Income

The fish traders mainly trade in Nile Tilapia with a few dealing in *Protopterus*. Table 3.17 presents the quantities of fish traded, buying and selling prices, cost of raw fish and gross revenues. Overall, pick-up traders traded in larger quantities of fish and enjoyed wider price margins. The pick-up traders mainly sold their fish in urban markets (2) while the bicycle traders (3) mostly sold their fish in rural markets.

Table 3.17: Cost of Inputs and Revenues for Fish Marketing

	Bicycle trader	**Pick-up trader**
Nile Tilapia		
Quantity traded (kgs/ month)	1,100	7,200
Buying price (Shs/kg	750	800
Selling price (Shs/kg	1,250	1,500
Cost of raw fish (Shs/month)	840,000	5,760,000
Gross revenue (Shs/month)	1,450,000	10,800,000
Net revenue (Shs/month)	525,878	4,110,000
Protopterus		
Quantity traded (kgs/month)	320	120
Buying price (Shs/kg	650	500
Selling price (Shs/kg	1,000	600
Cost of raw fish (Shs/month)	208,000	60,000
Gross revenue (Shs/month)	320,000	72,000
Net revenue (Shs/month)	91,517	-138,000

Source: FIRRI, survey data June 2002

3.5 Fish Consumption

3.5.1 Consumers' characteristics

There were 55 fish consumers interviewed at Wansolo. They had an average age of 33 years and 86% were male while 15% were females. They were dominantly Langi (46%), followed by Baganda (8%) and other tribes comprised 46%. Most consumers (86%) were married and most (55%) had attained primary level education followed by those who had secondary level education (36%). The average household size of fish consumers at Wansolo was 7 family members and the respondent had lived at Wansolo for an average of 9 years.

3.5.2 Consumption Levels and Trends

Most fish respondents at Wansolo (72%) commonly ate tilapia, followed by Nile perch (22%), Mukene (2%), *Protopterus* (2%) and other species (2%).

Table 3.18: Commonly Consumed Fish Species at Wansolo by Type of Consumer

Sub-sectors	Nile perch	Tilapia	Mukene	Protopterus	Other	Total
Consumers not engaged in fishery activity	33.3%	66.7%	-	-	-	100%
Consumers engaged in fish production	26.9%	69.2%	3.8%	-	-	100%
Consumers engaged in fish processing	-	100%	-	-	-	100%
Consumers engaged in fish trading	20%	40%	-	20%	20%	100%
All respondents	22%	72%	2%	2%	2%	100%

Source: FIRRI, survey data June 2002

Quantities consumed

The average daily quantity consumed by Wansolo respondents was 2.4 kgs and this ranged between 0.5 to 6 kgs. However, this varied between sub-sector consumers as given in Table 3.19.

Table 3.19: Average Quantities of Fish Consumed at Wansolo by Type of Consumer (kg/day)

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	4	0.5	2
Consumers engaged in fish production	6	1	2.4
Consumers engaged in fish processing	6	0.5	2.6
Consumers engaged in fish trading	4	2	3
All respondents	6	0.5	2.4

Source: FIRRI, survey data June 2002

Consumers were asked whether or not there had been a change over the years in the quantities of fish eaten. Most respondents (72%) agreed that there was a change, while only (28%) did not agree. Most of those who recognised the change (84%) said that the quantities consumed by their families had decreased. Only 16% said that the quantities had increased.

Frequency of fish consumption

On average respondents at Wansolo ate fish 3.6 times a week and this ranged between 1 to 7 times. However, this varied between sub-sector respondents as given in Table 3.20

Table 3.20: Average Number of Times Fish is Consumed in a Week at Wansolo by Type of Consumer

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	7	1	3.33
Consumers engaged in fish production	7	1	3.54
Consumers engaged in fish processing	7	2	4.17
Consumers engaged in fish trading	7	1	3.60
All respondents	7	1	3.64

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the frequency of fish consumption had changed over the past year. Most respondents (60%) agreed that there had been a change in the frequency of fish consumption at Wansolo. For those who agreed that

frequency in consumption had changed, 87% said it had reduced. A few (13%), however, said it had increased.

Size of fish for consumption

Consumers were asked whether or not the sizes of fish they ate with their families had changed over the past year. Most respondents (73%) agreed to this and 71% (of those who agreed) said that the sizes had decreased and 29% said the sizes had increased.

Table 3.21: Respondents Reporting Reduction in Sizes of Fish for Consumption at Wansolo

Fish species	**Yes**	**No**	**Total**
Nile perch	75%	25%	100%
Tilapia	75%	25%	100%
Mukene	-	100%	100%
Protopterus	-	100%	100%
Others	100%	-	100%
Total	73%	27%	100%

Source: FIRRI, survey data 2002

Substitutes for fish

A majority of respondents (86%) mentioned beans as the main substitute to fish, followed by vegetables and meat (Table 3.22).

Table 3.22: Main Substitutes to Fish at Wansolo

Substitutes	**Count**	**Percentage**
Beans	47	86
Meat	1	2
Vegetables	7	12
Chicken	-	-
Total	55	100

Source: FIRRI, survey data 2002

3.5.4 Price Levels and Trends

Most respondents at Wansolo (51%) usually did not buy the fish they ate with their families while 49% did. Unlike most consumers engaged in fish production (83%) who did not buy the fish they ate, most consumers not engaged in fishery activity (83%), most consumers engaged in fish processing (80%) as well as most consumers engaged in fish trading (60%) usually bought the fish they ate with their families. For those who bought fish, the average price mentioned was Shs 672 as given in Table 3.23.

Table 3.23: Prices of Fish Species in Shs for Consumption at Wansolo

Fish species	Maximum	Minimum	Mean
Nile perch	900	500	700
Tilapia	1,000	300	665
All species	1,000	300	672

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the prices of fish for consumption had changed over the past year. Most respondents (61%) said it changed and all of them said it had increased.

3.6 Community Perceptions towards Chilled Transport Facilities

Although there were no factory trucks at Wansolo, consumers where able to associate factory trucks with some positive changes to any beach community where they existed. Most fishers (57%) said it could lead to increased incomes of fishers, followed by beach development (17%), ready market for fish (10%). Some consumers (11%) did not know of any positive change they would associate with factory trucks**.**

However, the major negative impacts mentioned by a large proportion of consumers were the high cost of fresh fish (47%) followed by reduced fish supplies to local traders/ processors and consumers (11%), selling of fish on the lake (9%) and processing of juvenile fish (2%). Some consumers (31%) did not associate any negative impact with factory trucks.

4. IREMERIA LANDING SITE

4.1 Background

Iremeria Landing Site is located on the southern side of Lake Kyoga in Kamuli District. It was selected as a beach where no chilled transport facilities are expected throughout project's life. There are approximately 29 beaches in the district. The total catch landed for all fish species in 2001 was about 2,582 tonnes, valued at Shs. one billion.

The rates below in Table 4.1 below, decided by Kamuli District Administration, have been charged for the various fishery activities and vessels. However, with the new financial year beginning 1st July 2002, the new rates in the recently introduced legal new instrument, The fishing (Amendment) Rules, 2001, will be charged (Appendix).

Table 4.1 Previous Revenue Rates Charged at Iremeria Landing Site

Items	**Rates** (Shs)
Fishing vessel licence	10,000
Fishing licence	Nil
Fish monger's licence operating	10,000
Processing permit	20,000

Source: Kamuli District records

Chilled transport facilities arrived in Kamuli District in March 2001. There are 14 trucks operating in the district. Twelve trucks buy Nile perch for fish factories in JinJa and two buy tilapia for the market in Rwanda. Some trucks are found at trading centres near beaches such as Ndolwa while other reach accessible beaches such as Iyingo, Kiribarya, Bukungu and Nawampiti. There are no trucks at Iremeria because of the poor access road.

Before the arrival of trucks, the price of a Kilogram of Nile perch at the beaches was Shs 300. However, this increased tremendously to Shs 1,000 per Kg.

The fishers have ready market for their fish and as such their incomes have increased with better prices. There is also a reduction in the use of illegal gears due to the demand for big sized Nile perch by factory agents. The taking of catch statistics has greatly improved because truck traders have provided the necessary facilities such as weighing shades and scales. The truck traders have also provided fishing gear on credit. There are plans to train some fisheries inspectors to be deployed in the field and to mobilise LMCs to fight sale of fish at sea.

Iremeria Fish Landing is located in Wesunire Parish, Buyende Sub-county in Kamuli District. The population of the beach is approximately 40 people. The main economic activities are fishing, animal keeping, crop farming and trading.

4.1.1 Infrastructure and Facilities

There are very limited infrastructure and facilities at Iremeria as indicated in Table 4.2 below:

Table 4.2: Number and Description of Facilities and Infrastructure at Iremeria

Facilities and Infrastructure	Number	Description
Retail shops	1	Mainly dealing in general merchandise
Schools	1	Primary school with classes up to primary seven

Source: FIRRI, survey data June 2002

4.3 Fish Production

4.2.1 Overview

There are no public facilities related to fish production at Iremeria. The main type of fishery at Iremeria is mosquito netting with approximately 6 fishers involved in it. Gillnetting (4 fishers), long lining (3 fishers), basket trapping (2 people), boat seining (2 people) and then cast netting (1 person) (Table 4.3).

Table 4.3: Rank and Number per Category of Fishers at Iremeria

Category of Fisher	Rank	Number
Mosquito netting	1	6
Gillnetting	2	4
Long lining	3	3
Basket trapping	4	2
Boat seining	5	2
Cast netting	6	1
Total	--	18

Source: FIRRI, survey data June 2002

There are approximately 14 fishing unit owners and 26 crewmembers. There are 7 parachute boats at Iremeria. There is no use of the outboard engine for fishing or transportation here.

The main fish species landed is mukene with approximately 5,000 kgs landed per month, followed by Nile perch (3,600 kgs), tilapia 600 kgs and *Protopterus* (270 kg).

4.2.2 Fishers' Characteristics

The sample had only 6 fishers of average age of 44-years and only 1 of them female. The main tribe was the Bakenye (3 persons) followed by the Basoga (2). Three out of the 6 interviewed had attained primary education while the rest had no schooling at all. The most targeted species is mukene (5 respondents) followed by Nile perch (1). On average the fishers had fished for 8 years, lived at the landing for 21 years and had family size of 10 people. The majority (3 of the respondents) had no alternative source of income while 2 reported practicing subsistence farming. All the fishers interviewed owned boats.

4.2.3 Fishing Inputs and Costs

Boats and Engines

Five of the boats used in production here are 'parachute' type and only one is 'Ssesse'. Each boat has an average of 2 crewmembers.

Table 4.4: Information on Fishing Boats

Type	**Years taken**	**Cost price** (Shs)	**Useful life** (Years)	**Salvage value** (Shs)
Parachute	1.2	117,600	4.2	20,000
Ssesse	1.0	200,000	4.0	0

Source: FIRRI, survey data June 2002

Mosquito nets are the main type of fishing gear, used by 4 of the boats, followed by long lines and boat seines. Information on the gear types is provided in Table 4.5:

Table 4.5: Information on Gear Types Used

Gear Type	**Number**	**Size**	**Years used**	**Cost price** (Shs)	**Useful life** (Years)	**Salvage value** (Shs)
Long lines	20.0	6.0	0.0	5,000	1.0	0.0
Mosquito nets	1.0	--	0.3	190,000	3.1	0.0
Boat seines	1.0	--	0.0	300,0000	1.0	0.0

Source: FIRRI, survey data June 2002

Labour

20% of crewmembers are paid a percentage of gross revenue while 80% are paid a percentage of net revenue. The proportion is 50% for crew and 50% for unit owner. The average number of working days is 5 per week.

Other costs

Among the other costs, the main item was kerosene, required for the pressure lamps used in the process of fishing mukene and on average, it cost Shs 1,405 per day. The information available indicates that the other costs born by fishers at Iremeria were not important.

The catch levels are reported to be poor by 4 respondents while 2 consider it fair. The poor catch is attributed to changes in season and poor fishing methods.

Table 4.6: Monthly Summary of Production Costs

	Long lines	Mosquito nets	Boat seines
Capital Investment	108,000	368,000	430,000
Boat maintenance	--	--	--
Gear maintenance	--	--	--
Engine maintenance	--	--	--
Other costs	--	--	--
Labour cost	.	80,897	160,000
Fuel cost	.	43,100	24,000
Bait cost	64,000	--	--
Operating cost	64,000	135,997	184,000
Depreciation	9,000	150,072	27,167
Total monthly cost	73,000	151,070	186,167

Source: FIRRI, survey data June 2002

4.2.4 Earnings of Production Enterprises

The fishers of Iremeria mainly target Nile perch and Mukene. A summary of the revenues for the different types of production enterprises is given in Table 4.7:

Table 4.7: Summary of Monthly Revenues by Type of Enterprise

	Long lines	Mosquito nets	Boat seine
Nile perch			
Catch (kg/month)	75.00	.	
Price (Shs/kg)	1,000	.	
Gross revenue (Shs)	75,000	.	
Net revenue (Shs)	2,000	.	

Mukene			
Catch (kg/month)	.	280.90	
Price (Shs/kg)	.	630	
Gross revenue (Shs)	.	183,435	
Net revenue (Shs)	.	42,365	
Other species			
Catch (kg/month)	.		200.00
Price (Shs/kg)	.		250
Gross revenue (Shs)	.		50,000
Net revenue (Shs)	.		136,167

Source: FIRRI, survey data June 2002

Nile perch is weighed in kilograms before sale while mukene is measured in troughs /basins of about 4kg for sale. All the fish is sold to bicycle traders who collect it from the beach. The results indicate that 5 of the respondents reported that they had no arrangements with the buyers, while 1 said that the buyers provided fishing inputs.

4.3 Fish Processing

4.3.1 Overview

There are no publicly owned fish processing facilities at Iremeria. Sun-drying is the only fish processing method with approximately 6 people involved in it. Mukene is the only processed fish species. Processors of other fish species were not interviewed because they operate for only limited hours and are basically non-resident at the landing.

4.4 Fish Marketing

4.4.1 Overview

There is one poor access road to Iremeria. There are 2 bicycle traders at Iremeria. The main destination of fresh Nile perch is Ndolwa Trading Centre, where the bicycle traders take the fish. Approximately 300 kgs per week are bought from Iremeria. Fresh tilapia is also taken to Ndolwa Trading Centre for the local market while processed mukene is taken by whole sale traders to Palisa. (Table 4.8).

Table 4.8: Main Destinations of Fish Species and Product Forms from Iremeria

Fish species	**Main destinations**	
	Fresh	**Processed**
Nile perch	Ndolwa Trading Centre	None
Tilapia and *Protopterus*	Ndolwa Trading Centre	None
Mukene	None	Palisa

Source: FIRRI, survey data June 2002

The average prices of fresh fish per kg for the various fish species landed at Iremeria are given below (Table 4.9).

Table 4.9: Average Fish Prices at Iremeria

Fish species	**Prices** (Shs/kg)
Nile perch	1,000
Tilapia	800
Protopterus	500
Mukene	250

Source: FIRRI, survey data June 2002

4.5 Fish Consumption

4.5.1 Consumers' characteristics

There were 15 fish consumers interviewed at Iremeria. They had an average age of 35 years and 87% were male while 13% were females. They were dominantly Soga (73%) followed by Bakenye (20%) and Langi (7%). Most respondents (87%) were married and (53%) had attained primary level education followed by those who had no schooling (27%). The average household size of fish consumers at Iremeria was 8 family members and the respondent had lived at Iremeria for an average of 17 years.

4.5.2 Consumption Levels and Trends

The most commonly consumed species was Tilapia, followed by Nile perch as shown in Table 4.10.

Table 4.10: Commonly Consumed Fish Species at Iremeria by Category of Consumer

Sub-sectors	**Nile perch**	**Tilapia**	**Total**
Consumers not engaged in fishery activity	22.2%	77.8%	100%
Consumers engaged in fish production	-	100%	100%
All respondents	13%	87%	100%

Source: FIRRI, survey data June 2002

Quantities consumed

The average daily quantity consumed by Iremeria respondents was 2 kgs and this ranged between 1 to 3 kgs. However, this varied between sub-sectors, as given in Table 4.11.

Table 4.11: Average Quantity of Fish Consumed at Iremeria by Type of Consumer (kg/day)

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	3	1	2
Consumers engaged in fish production	3	1	2
All respondents	3	1	2

Source: FIRRI, survey data June 2002

Consumers were asked whether or not there had been a change over the years in the quantities of fish eaten. Most respondents (80%) agreed that there was a change, while only (20%) did not agree. All those who recognised the change said that the quantities consumed by their families had decreased.

Frequency of fish consumption

On average, respondents at Iremeria ate fish 2.07 times a week and this ranged between 1 to 5 times. However, this varied between sub-sectors. Consumers not engaged in fishery activity on average ate fish 1.78 times a week while consumers engaged in fish production on average ate fish 2.60 times a week.

Table 4.12: Average Number of Times Fish is Consumed in a Week at Iremeria by Type of Consumer

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	3	1	1.78
Consumers engaged in fish production	5	1	2.60
All respondents	5	1	2.07

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the frequency of fish consumption had changed over the past year. Most consumers (87%) agreed that there had been a change in the frequency of fish consumption at Iremeria. For those who agreed that frequency in consumption had changed, all respondents said it had reduced.

Size of fish for consumption

Consumers were asked whether or not the sizes of fish they ate with their families had changed over the past year. Most consumers (64%) agreed to this and 89% (of those who agreed) said that the sizes had decreased and 11% said the sizes had increased.

Table 4.13: Respondents Reporting Reduction in Sizes of Fish for Consumption at Iremeria

Fish species	Yes	No	Total
Nile perch	50%	50%	1005
Tilapia	67%	33%	100%
Total	64%	36%	100%

Source: FIRRI, survey data June 2002

Substitutes for fish

A majority of respondents at Iremeria (53%) mentioned vegetables as the main substitute to fish, followed by beans, meat and other substitutes (Table 4.17).

Table 4.14: Main Substitute to Fish at Iremeria

Substitutes	Count	Percentage
Beans	5	33
Meat	1	7
Vegetables	8	53
Chicken	-	-
Other	1	7
Total	15	100

Source: FIRRI, survey data June 2002

4.5.3 Price Levels and Trends

All consumers at Iremeria usually bought the fish they ate with their families. The average price mentioned was Shs 693 and it ranged between Shs 500 – 1,000. The average price mentioned by consumers of Nile perch was Shs 750 while that for Tilapia was Shs 684.

Table 4.15: Prices of Fish Species in Shs for Consumption at Iremeria

Fish species	Maximum	Minimum	Mean
Nile perch	1,000	500	750
Tilapia	1,000	500	684
All species	1,000	500	693

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the prices of fish for consumption had changed over the past year. Most consumers (93%) at Iremeria and most of them (93%) said it had increased.

4.6 Community Perceptions towards Chilled Transport Facilities

A proportion (36%) of respondents at Iremeria did not associate any positive change with factory trucks. Although there were no factory trucks at Iremeria, consumers where able to associate factory trucks with some changes to any beach community where they existed such as increased incomes of fishers (29% of the respondents), followed by ready market for fish (21%) and beach development (7%).

However, the major negative impacts mentioned by a large proportion of consumers were the high cost of fresh fish (55%) followed by reduced fish supplies to local traders/ processors and consumers (18%) and selling of fish on the lake (9%). Some consumers (18%) did not associate any negative impact with factory trucks.

5. KABOLWA LANDING SITE

5.1 Background

Kabolwa Landing Site, located in Kisyabi Parish in Buliisa Sub-county in Masindi District was selected as a beach where chilled transport facilities already operate. The population of the beach is approximately 1430 people. The main economic activities at the beach are fishing, Livestock keeping, crop farming and trading. Animals kept include cows, pigs, goats and sheep while the main crops grown are cassava, maize, potatoes and beans.

Masindi District is located on the western side of Lake Albert (see map). There are approximately 18 beaches in the district. In total there are 2655 fishermen and 885 boats in the district. The estimated annual catch (2001) was estimated at 18,295 tonnes

The rates below have been charged for the various fishery activities and vessels (Table 1.1). The specific licence for trucks in the new instrument (The fishing (Amendment) Rules, 2001) is already being implemented. The specific licence varies according the tonnage of the truck. In total there are 8 factory trucks operating in Masindi. On average, each truck takes 5 tonnes per week. The district has benefited from specific licences charged on the trucks as a new source of revenue.

Table 5.1: Rates Charged on Fishery Activities and Fishing Vessels.

Item	**Old Rates** (Shs)
Fishing vessel licence	10,000
Fishing licence	No charge
Fish monger's licence operating	20,000
Processing permit	No charge

Source: FIRRI, survey data June 2002

Chilled transport facilities arrived in Masindi District in August 2001 and begun operating at Kabolwa by October 2001. Two trucks operate at each of these beaches; Kabolwa, Butiaba and Bugoigo while one truck operate at each of these beaches; Wanseko and Songa Lendu. The trucks come from Ngege Ltd, Hwan Sung Fishing Industry, Marine and Agro, Byansi Fish Processors and Uganda Fish Packers Ltd.

Before the arrival of chilled transport facilities, the price of a kilogram of Nile perch was Shs 500, however, this increased tremendously to the present rate, which is Shs. 1,200 per kg. This has tremendously raised the incomes of fishers

New toilets have been constructed at Bugoigo, Butiaba and Kabolwa as a way of improving sanitation at the beaches were chilled transport facilities operate. The district has also graded roads to Butiaba and Bugoigo beaches. There are plans to gazette the beaches where these trucks are operating.

The local processors, traders and consumers have raised complaints to the District Fisheries Officers that much of the fish is being taken away by the truck traders leaving them unemployed and with little supplies of Nile perch. There has also been

an increase in the use of illegal gears such as beach seines that catch juveniles that have ready market from the local processors, traders and local consumers.

The district authorities have responded to some of the problems above by sensitising the fishers against the use of illegal gears and also increasing the number of operations to arrest illegal gear users.

5.1.1 Infrastructure and Facilities at Kabolwa

Table 5.2 below gives the general facilities and infrastructure at Kabolwa.

Table 5.2. Facilities and Infrastructure at Kabolwa

Infrastructure/facilities	No.	Description
Retail shops	15	Dealing in general merchandise
Food kiosks	3	Dealing in local dishes such as Matooke, Cassava, fish and meat
Drug shops	1	Dealing in drugs for first aid and sometimes involved in treatment of sick persons
Borehole	1	Established by the District Local Council
Schools	1	There is Kabolwa Primary school with classes up to primary four
Latrines	1	There is one unfinished public latrine, however a number of households have private ones
Recreational facilities	2	One video hall and the community shares a football pitch with the school

Source: FIRRI, survey data June 2002

5.2 Fish Production Sub-sector

5.2.1 Overview

There are no support facilities for fish production at Kabolwa. The main type of fishery is gillnetting with approximately 100 fishers. *Kaganga* (70 people) and then Long lining (25 fishers) follow as shown in Table 1.3.

Table 5.3. Ranking of Production Enterprises by Number at Kabolwa

Category of fishers	**Rank**	**Number**
Gill netting	1	100
Kaganga	2	70
Longlining	3	25

Source: FIRRI, survey data June 2002

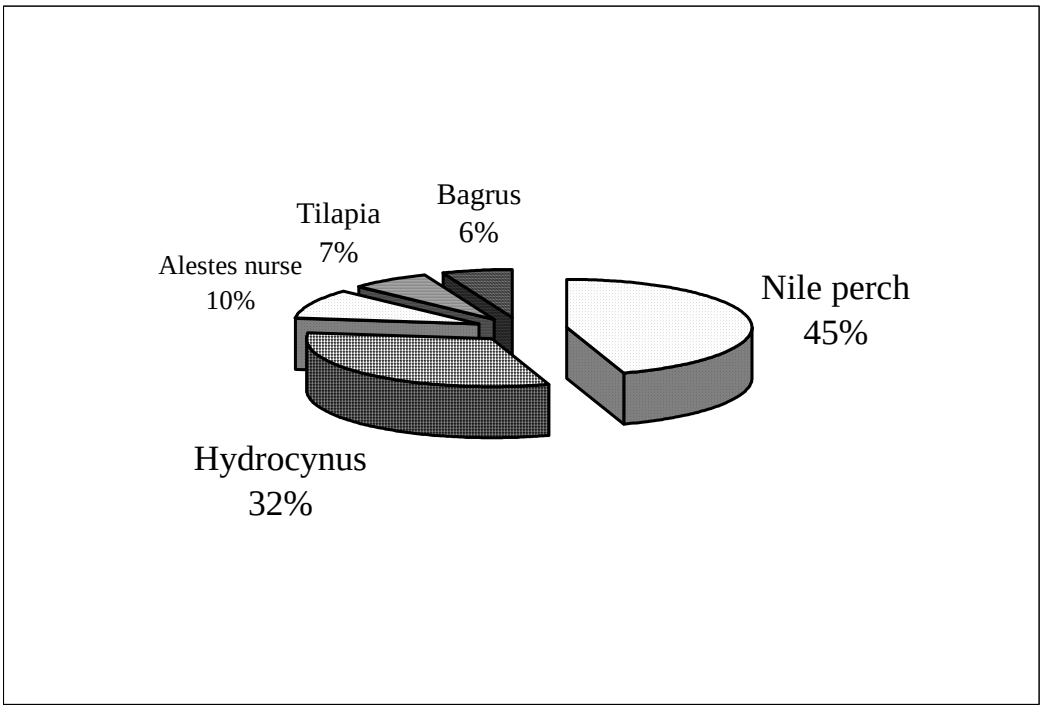
There are approximately 70 fishing unit owners, 30 fishing unit renters and 140 crew. There are 70 'Congo Barque' boats at Kabolwa. There are 4 transport boats with outboard motor engines of horsepower ranging from 4 to 15.

The main fish species landed is *Hydrocynus* Spp. This is followed by Nile perch, *Alestes nurse*, *Alestes baremose* and tilapia.

5.2.2 Fishers' Characteristics

There were 31 fish producers interviewed at Kabolwa. They had an average age of 35 years and 84% were male while 16% were females. They were dominantly of the Alur tribe (51%), followed by Bagungu (32%), Banyoro (7%), Baganda (7%) and other tribes (3%). Most fishers (90%) were married and most (48%) had attained primary level education followed by those who had secondary level education (31%). A large proportion of fishers (45%) targeted Nile perch, followed by those who targeted *Hydrocynus* (32%). Other species targeted included *Alestes nurse* (10%), Tilapia (7%) and *Bagrus spp* (6%). Respondents had fished for an average of 9 years and had stayed at Kabolwa for an average of 11 years. The average household size of fishers was 10 people. Their main alternative sources of income were trading (26%) and crop farming (13%). Most fishers (61%) had no alternative source of income.

Figure 5.1: Main Species Targeted by Producers at Kabolwa



Source: FIRRI, Survey data June 2002

5.2.3 Fishing inputs and Costs

Boats and outboard engines

Of the interviewed fishers, 87% owned boats while 13% hired the boats they used for fishing. Fishers who hired fishing boats spent an average of Shs. 25,250/= per month. However, this ranged between Shs 15,000 to Shs 40,000/= per month. The boat type either rented or owned by most fishers (97%) was the Congo barque, a few (3%) fished using 'Scoul Kabalega'. Congo barque boats had been owned for an average of 2 years. The average cost of the Congo barque boat was Shs 94,961 with an average expected useful life of 4 years and an average salvage value of Shs 33,750/=. Scoul Kabalega boat had been owned for an average of 1 year. Its cost was Shs 2,000,000 with an average expected useful life of 4 year and an average salvage value of Shs 500,000.

Table 5.4: Information on Boats Owned at Kabolwa.

Type	**Number in sample**	**Ownership period** (Years)	**Cost price** (Shs)	**Useful life** (Years)	**Salvage value** (Shs)
School Kabalega	1	1	2,000,000	4	500,000
Congo barque	26	2	94,961	4	26,600

Source: FIRRI, survey data 2002

One of the interviewed fishers at Kabolwa owned an outboard motor engine and none of the fishers hired an outboard motor engine. The outboard motor engine had a Horse power of 15. It had been owned for 1.5 years and had cost Shs 2,200,000. The expected useful life was 10 years and a salvage value of Shs 1,000,000.

Table 5.5: Information on Outboard Engine at Kabolwa

Horse power	**Period of ownership** (Years)	**Cost price** (Shs)	**Expected useful life** (Years)	**Salvage value** (Shs)
15	1.5	2,200,000	10	1,000,000

Source: FIRRI, survey data 2002

Fishing gear

Respondents used the gear types shown in Table 5.6 below:

Table 5.6: Gear Types Used by Respondents

Gear types used	**Frequency**	**Percentage**
Long line	8	25.8
Gilnets	20	64.5
Kaganga	3	9.7
Total	31	100.0

Source: FIRRI, survey data June 2002

Information on the characteristics of the common gear types in use is given in Table 5.7 below:

Table 5.7: Information on Gear Owned.

Gear type	**Number owned**	**Size**	**Years taken**	**Cost price** (Shs)	**Useful life** (Months)	**Salvage value** (Shs)
Long lines	2,063	13	0.6	13,862	1.5	0.0
Gillnets	21	4	1.2	20,025	10.7	0.0
Kaganga	2	--	--	6,166	2.1	0.0

Source: FIRRI, survey data June 2002

Most respondents obtained their initial capital for fishing from farming activities as shown by Table 5.8 below:

Table 5.8: Sources of Initial Capital for Fishing

Source of Capital	**Frequency**	**Percentage**
Fishing	9	31.0
Farming	10	34.5
Credit	1	3.4
Others	5	17.2
Family capital	4	13.8
Total	29	100.0

Source: FIRRI, survey data June 2002

Labour

On average each boat has 2 crewmembers that work for 4 days in a week.

The method of payment in Kabolwa to crewmembers is by percentage of revenue (96.4%) before any costs are deducted and (3.6%) percentage of net revenue after deductions.

Entrepreneurship

One would on average be paid 33,421 per month for managing a fishing unit enterprise although the minimum amount expected is shillings 10,000 to a maximum of shillings 150, 000 per month.

Other costs

The fishing unit owner at kabolwa reported other operating cost including maintenance of outboard engine, boats, gear as well as baits as given in table 5. 9.

Resource base

Some 12.9% of the respondents said that the catches are good while 48.4% said it was fair only and 38.7% reported that the catches are poor. The reasons attributed to the poor catches are changes in seasons (62.5%), not enough fish available at the lake (33.3%) and lack of capital (4.2%).

The monthly summary of production costs is given in Table 5.9:

Table 5.9: Monthly Summary of Production Costs

	Long lines	**Gillnets**	**Kaganga**
Capital Investment	632,375	555,175	14,500
Boat maintenance	3,250	4,400	--
Gear maintenance	5,500	6,230	--
Engine maintenance	--	--	--
Other costs	--	--	1,500
Labour cost	154,516	141,526	141,000
Fuel cost	.	420,000	.
Bait cost	40,800	.	.
Operating cost	180,016	162,526	141,000
Depreciation	20,947	12,065	942
Total monthly cost	195,259	185,220	49,442

Source: FIRRI, survey data June 2002

5.2.4 Earnings of the Production Enterprises

Calculations based on costs and revenue data show that gillnet enterprises fishing Nile perch realised the highest net revenues, followed by long liners also catching Nile perch, as shown in Table 5.10.

Table 5.10: Average catches and incomes of fishers by species

	Long lines	**Gillnets**	**Kaganga**
Nile perch			
Catch (kg/month)	343.87	863.25	--
Price/ kg	1,086	950	--
Gross revenue	382,460	834,750	--
Net revenue	150,978	350,975	--
Nile tilapia			
Catch (kg/month)	--	119.25	--
Price (Shs/kg)	--	475	--
Gross revenue (Shs)	--	57,825	--
Net revenue (Shs)	--	15,257	--
Bagrus bayad			
Catch (kg/month)	--	216	--
Price (Shs/kg)	--	500	--
Gross revenue (Shs)	--	108,000	--
Net revenue (Shs)	--	33,227	--
Hydrocynus			
Catch (kg/month)	132.40	258.48	--
Price (Shs/kg	700	435	--
Gross revenue (Shs)	92,680	104,671	--
Net revenue (Shs)	52,483	47,961	--
Other species			
Catch (kg/month)	--	--	1,430.00
Price (Shs/kg	--	--	250
Gross revenue (Shs)	--	--	470,000
Net revenue (Shs)	--	--	326,500

Source: FIRRI survey data June 2002

All respondents reported selling Nile perch in kilograms; tilapia both in kilograms (50%) and per head (50%). *Bagrus* is sold in bundles and per head for the big ones

while the remaining species are sold per head. Most respondents (61.5%) reported that Nile perch is sold to factory agents, 30.8% to truck traders and 7.7% are sold to bicycle traders. Tilapia is mainly sold to bicycle traders (50%) and beach processors (50%). The same applies to the remaining species. Some 60% of the respondents who caught *Hydrocynus* fish sold to beach processors, 20% sold to beach consumers and truck traders took the rest. All the fish is sold at the beach. Most fishers (96.3%) have no arrangements with their buyers other than buying and selling fish.

5.3 Fish Processing Sub-sector

5.3.1 Overview

There are no publicly owned facilities to support fish processing at Kabolwa. There are approximately 30 privately owned smoking kilns and 20 drying racks. Sun-drying is the main fish processing method. This is followed by smoking and then salting and sun-drying. *Alestes nurse*, *Hydrocynus,* tilapia, Nile perch and *Alestes baremose* are the most processed fish species. *Alestes nurse* is sun-dried while the other species are either smoked or salted and sun-dried.

5.3.2 Fish Processors characteristics

There were 11 respondents in the sample of processors. They were mostly Alur (72.7%) and mostly females (90.9%) of average age 32. Most had primary education (45.5%) but some 27.3% had no schooling. Their average household size was 6 persons and they had been at the beach for 11 years on average.

5.3.3 Fish Processing Inputs and Costs

In the sample, 63.6% of the fish processors smoked fish while 36.4% salted/ sun dried fish. Almost all the fish smokers used smoking kilns to process their fish, which are either privately (71.4%) or communally (28.6%) owned. Among the processors who salt/ sun dry fish, 66.7% used privately owned drying racks whilst 33.3% spread their fish on 'communally' owned bare land for which they do not pay rent.

Table 5.11: Distribution of Fish Processors by Type of Processing Facility and Ownership

		Smoking	**Sun drying and Salting**
Smoking kiln/pit	Privately owned	71.4%	--
	Rented	--	--
	Communally owned	28.6%	--
Drying racks	Privately owned	--	66.7%
	Rented	--	--
	Communally owned	--	--
Drying ground	Privately owned	--	--
	Rented	--	--
	Communally owned	--	33.3%
Total		100.0%	100.0%

Source: FIRRI, survey data June 2002

Capital

For owners of smoking kilns, the average initial capital investment used for the construction of smoking kilns with an estimated useful life of 5 years amounted to Shs. 74,600. Alternatively, smokers who hire smoking kilns spend about Shs. 4,000 each month. For fish processors who salt/ sundry fish or use smoking pits, their initial capital investment is very small. The majority of the fish processors obtained their 'start-up' capital from farming (45.5%), fishing (9.1%) and family sources (27.3%).

Labour

Nearly 54.5% of the fish processing units were owner-operated, while the remainder were either family-run (27.3%) or operated by hired labour (18.2%). Owners of salting/ sun drying units on the average spend Shs. 71,200 each month on labour or about 1.7 times higher than for fish smokers indicating that salting/ sun drying is relatively more labour intensive.

Other Costs

Firewood and salt account for the bulk of operating costs for fish smokers and salters/ sun driers respectively. On a monthly basis, fish smokers on the average spend Shs. 50,300 on firewood while those who salt/ sun-dry fish spend nearly Shs. 39,300 on salt. Processors/ traders of salted fish spend roughly Shs. 200,000 on transport charges or about 3.3 times higher than for fish smokers thereby suggesting that the former sell their fish in more distant markets.

Table 5.12: Monthly Input Costs of Fish Processing Units by Method of Processing

	Smoking	**Sun drying and Salting**
Capital investment	43,100	16,000
Monthly rent for smoking kiln	4,000	--
Monthly fuel wood cost	10,286	--
Monthly salt cost	--	20,800
Monthly labour cost	69,143	186,667
Monthly transport cost	--	120,000
Monthly operating costs	80,000	247,467
Monthly depreciation	686	--
Total monthly costs	80,686	247,467

Source: FIRRI, survey data June 2002

5.3.4 Processors' Outputs and Incomes

The fish processors of Kabolwa mainly process *Hydrocynus* (45.5%), Nile Tilapia (18.2%), *Alestes baremose* (18.2%) and Nile prch (9.1%). The monthly quantities of

fish processed, buying and selling prices, costs and revenues are presented in Table 10. The processed fish that is either transported by the processors themselves (72.7%) or traders who operate at the beach (27.3%) usually ends up in urban markets in the neighbouring districts such as Nebbi, Pakwach and Arua.

Table 5.13: Costs of Raw Fish and Revenues from Processed Fish by Species

	N. perch	Tilapia	*Hydrocynus*	*Alestes baremose*	*Alestes nurse*
Quantity processed (kg/month)	440	500	560	300	400
Buying price (Shs/kg)	1,000	750	380	450	600
Selling price (Shs/kg)	2,000	1,650	880	800	1,000
Monthly cost of raw fish (Shs)	440,000	330,000	217,600	140,000	240,000
Monthly gross revenue (Shs)	880,000	780,000	504,000	240,000	400,000

Source: FIRRI, survey data June 2002

5.4 Fish Marketing Sub-sector

5.4.1 Overview

Fish marketing at Kabolwa is facilitated by a relatively good access road. This explains why chilled transport facilities can easily get access to the beach. Kabolwa can also be accessed by water from the neighbouring beaches such as Butiaba and Bugoigo.

There are approximately 13 beachside retailers/processors, 4 factory agents and 3 bicycle traders. The factory agents buy fish for the truck traders coming fish processing plants. Truck traders buy approximately 5 tonnes per week of Nile perch followed by beach processors and then bicycle traders.

The main destinations for fresh Nile perch are the processing factories in Kampala and Jinja, while fresh tilapia, *Alestes baremose* and *Hydrocynus* are mainly sold at the beach. Processed *Alestes nurse* is sold to wholesale buyers from Kampala. Processed forms of the other species are mainly sold in Arua

Table 5.14. Main destinations of fish species and product forms

Fish species	Main destination	
	Fresh	**Processed**
Nile perch	Processing plants	Arua
Tilapia	Beach	Arua
Alestes baremose	Beach	Arua
Hydrocynus	Beach	Arua
Alestes nurse	-	Whole sale buyers from Kampala

Source: FIRRI, survey data June 2002

The average prices of fresh fish per kg for the various fish species landed at Kabolwa are given in Table 5.15 below.

Table 5.15. Fresh Fish Prices per kg by Species

Fish species	**Prices** (Shs/kg)
Nile perch	1,200
Tilapia	800
Alestes b6aremose	800
Hydrocynus	800
Alestes nurse	300

Source: FIRRI, survey data June 2002

5.4.2 Fish Traders Characteristics

There were 6 respondents, 4 of them males and average age of 36. Most had primary education (83.3%) and had lived at the beach for 13 years. Fish traders here are also processors. Nearly all the processed fish is sold in urban markets.

Table 5.16: Distributions of Fish Traders by Means of Transport

	Frequency	**Percentage**
Processor/ trader	5	83.3
Other	1	16.7
Total	6	100.0

Source: FIRRI, survey data June 2002

5.4.3 Inputs and Costs

The fish traders transport their processed fish mainly by public means either by water or road to urban markets in the nearby districts. The fish processors essentially spend on two cost items, namely; transport and labour. Table 5.17 presents the input costs by type of processor.

Table 5.17: Monthly Input Costs of Fish Trading Units by Type of Trader

	Processor/ trader	**Other**
Transport costs (Shs/month)	116,000	30,000
Labour cost (Shs/month)	34,000	40,000
Operating cost (Shs/month)	80,400	70,000
Total monthly cost (Shs)	80,400	70,000

Source: FIRRI, survey data June 2002

5.4.4 Outputs and Incomes

Most of the fish dealers trade in the Nile perch and Nile tilapia with a few dealing in *Alestes nurse*. Table 5.18 presents the quantities traded, buying and selling prices, cost of raw fish and gross revenues.

Table 5.18: Cost of Fish and Revenues of Fish Traders by Species and Type of Trader

	Processor/ trader	**Other**
Nile Perch		
Quantity traded (kg/month)	550	--
Buying price (Shs/kg	500	--
Selling price (Shs/kg	950	--
Cost of fish (Shs/month)	275,000	--
Gross revenue (Shs/month)	505,000	
Net revenue (Shs/month)	139,500	--
Nile Tilapia		
Quantity traded (kg/month)	1,200	--
Buying price (Shs/kg	650	--
Selling price (Shs/kg	1,050	--
Cost of fish (Shs/month)	720,000	--
Gross revenue (Shs/month)	1,280,000	

Net revenue (Shs/month)	409,000	--
Alestes nurse		
Quantity traded (kg/ month)	1,200	1,000
Buying price (Shs/kg	600	250
Selling price (Shs/kg	1,000	400
Cost of fish (Shs/month)	720,000	250,000
Gross revenue (Shs/month)	1,200,000	400,000
	440,000	80,000

Source: FIRRI, survey data June 2002

5.5 Fish Consumption

5.5.1 Consumers' characteristics

There were 59 fish consumers interviewed at Kabolwa. They had an average age of 34 years and 63% were male while 37% were females. They were predominantly Alur (63%), followed by Bagungu (22%), Banyoro (5%), Baganda (3%) and other tribes (7%). Most consumers (83%) were married and a large proportion (42%) had attained primary level education followed by those who had no schooling (25%) and secondary level education (25%). The average household size of fish consumers at Kabolwa was 6 family members and the respondent had lived at Kabolwa for an average of 9 years.

5.5.2 Consumption Levels and Trends

A large proportion of respondents at Kabolwa (46%) commonly ate Tilapia, followed by *Hydrocynus* (28%), Nile perch (14%), *Alestes baremose* (7%), *Bagrus spp* (3%) and *Alestes nurse* (2%).

Table 5.19: Commonly Consumed Fish Species at Kabolwa by Type of Consumer

Sub sectors	Nile perch	Tilapia	*Hydrocynus*	*Alestes baremose*	*Bagrus Spp*	*Alestes nurse*	Total
Consumers engaged in fishery activity	-	63.6%	18.2%	18.2%	-	-	100%
Consumers engaged in fish production	19.4%	32.3%	36%	3.2%	6.5%	3.2%	100%
Consumers engaged in fish processing	9.1%	55%	27.3%	9.1%	-	-	100%
Consumers engaged in fish trading	16.7%	67%	17%	-	-	-	100%
All respondents	14%	46%	28%	7%	3%	2%	100%

Source: FIRRI, survey data June 2002

Quantities consumed

The average daily quantity consumed by Kabolwa respondents was 3.03 kgs and this ranged between 0.5 to 16 kgs. However, this varied between sub-sectors as given in Table 5.20.

Table 5.20: Quantities of Fish Consumed at Kabolwa by Type of Consumer (kg/day)

Sub sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	4	0.5	2.1
Consumers engaged in fish production	16	1	3.7
Consumers engaged in fish processing	3	1	2.3
Consumers engaged in fish trading	3	2	2.7
All respondents	16	0.5	3.0

Source: FIRRI, survey data June 2002

Consumers were asked whether or not there had been a change over the years in the quantities of fish eaten. Most respondents (60%) agreed that there was a change, while only (40%) did not agree. Most of those who recognised the change (92%) said that the quantities consumed by their families had decreased. Only 8% said that the quantities had increased.

Frequency of fish consumption

On average consumers at Kabolwa ate fish 4.31 times a week and this ranged between 2 to 7 times. However, this varied between sub-sectors as given in Table 5.21.

Table 5.21: Average Number of Times Fish is Consumed in a Week at Kabolwa by Type of Consumer

Sub sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	7	2	4.1
Consumers engaged in fish production	7	2	4.5
Consumers engaged in fish processing	7	2	3.7
Consumers engaged in fish trading	7	2	5.0
Total of whole beach	7	2	4.3

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the frequency of fish consumption had changed over the past year. Most respondents (51%) disagreed that there had been a change in the frequency of fish consumption at Kabolwa. However, for those who agreed that frequency in consumption had changed, all respondents said it had reduced.

Size of Fish for Consumption

Consumers were asked whether or not the sizes of fish they ate with their families had changed over the past year. Most respondents (56%) agreed to this and 88% (of those who agreed) said that the sizes had decreased and 12% said the sizes had increased.

Table 5.22: Respondents Reporting Reduction in Sizes of Fish for Consumption at Kabolwa

Fish species	**Yes**	**No**	**Total**
Nile perch	87%	13%	100%
Tilapia	44%	56%	100%
Hydrocynus	59%	41%	100%
Alestes baremose	25%	75%	100%
Bagrus spp	100%	-	100%
Alestes nurse	100%	-	100%
All species	56	44	

Source: FIRRI, survey data June 2002

Substitutes for Fish

A majority of respondents (88%) mentioned beans as the main substitute to fish, followed by vegetables, meat and other substitutes (5.22).

Table 5.23: Main Substitutes to Fish at Kabolwa

Substitutes	**Count**	**Percentage**
Beans	52	88
Meat	1	2
Vegetables	5	8
Chicken	1	2
Total	59	100

Source: FIRRI, survey data June 2002

5.5.3 Price Levels and Trends

Most respondents at Kabolwa (65%) usually bought the fish they ate with their families while 35% did not. Unlike most consumers engaged in fish production (59%) who did not buy the fish they ate, most consumers not engaged in fishery activity (91%), most consumers engaged in fish processing (91%) as well as most consumers engaged in fish trading (83%) usually bought the fish they ate with their families. For those who bought fish, the average price mentioned was Shs 698 as given in Table 5.24.

Table 5.24: Prices of Fish for Consumption at Kabolwa (Shs/kg)

Fish species	**Maximum**	**Minimum**	**Mean**
Nile perch	800	800	800
Tilapia	1,000	350	693
Hydrocynus	1,000	500	627
Alestes baremose	1,500	400	966
All species	1,500	350	698

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the prices of fish for consumption had changed over the past year. Most consumers (69%) said it had increased.

5.6 Community Perceptions Towards Chilled Transport Facilities

Consumers associated the coming of factory trucks to Kabolwa with some positive changes to their community. Most respondents (45%) said it increased incomes of fishers, followed by beach development (16%), ready market for fish (14%). Some consumers (22%) did not associate any positive change with the coming of factory trucks.

However, the major negative impacts mentioned by a large proportion of consumers were reduced fish supplies to local traders/ processors and consumers (40%), followed by high price of fresh fish (28%) and selling of fish on the lake (13%). Some consumers (17%) did not associate any negative impact with factory trucks.

6. SOMSIO LANDING SITE

6.1 Background

Somsio Landing Site, located in Butiaba Parish, Biso Sub-county in Masindi District was selected as a beach were no chilled transport facilities are expected throughout project's life. The population of the beach is approximately 150 people. The main economic activities at the beach are fishing, animal keeping and trading.

6.1.1 Infrastructure and Facilities

Table 6.1 below shows that very limited facilities and infrastructure are available at Somsio.

Table 6.1. Infrastructure and Facilities at Somsio Landing Site.

Infrastructure and Facilities	Number	Description
Retail shops	3	Mainly dealing in general merchandise
Borehole	1	One borehole as the main source of drinking water
School	1	Primary school with classes up to primary seven

Source: FIRRI, survey data June 2002

6.2 Fish Production Sub-sector

6.2.1 Overview

There are no facilities to support fish production such as boat yards, racks, weighing shades at Somsio. The main type of enterprise at Somsio is gillnetting with approximately 22 fishers involved in it. *Kaganga* (7 fishers) and boat seining (2 people) follow this (Table 6.2).

Table 6.2. Ranking of Production Enterprises by Number at Somsio

Category of fishers	Rank	Number
Gillnetting	1	22
Kaganga	2	7
Boat seining	3	2

Source: FIRRI, survey data June 2002

There are approximately 27 fishing unit owners and 60 crewmembers. There are 27 Congo Barque boats at Somsio. There are no outboard motor engines used in fishing or transporting of people.

The main fish species landed is *Alestes nurse* with approximately 4,000 kgs landed per week, followed by *Alestes baremose* (3200 kgs), *Hydrocynus* (800 kgs) and then Nile perch (200 kgs) as shown in Table 6.3.

Table 6.3. Ranking of Species Landed at Somsio

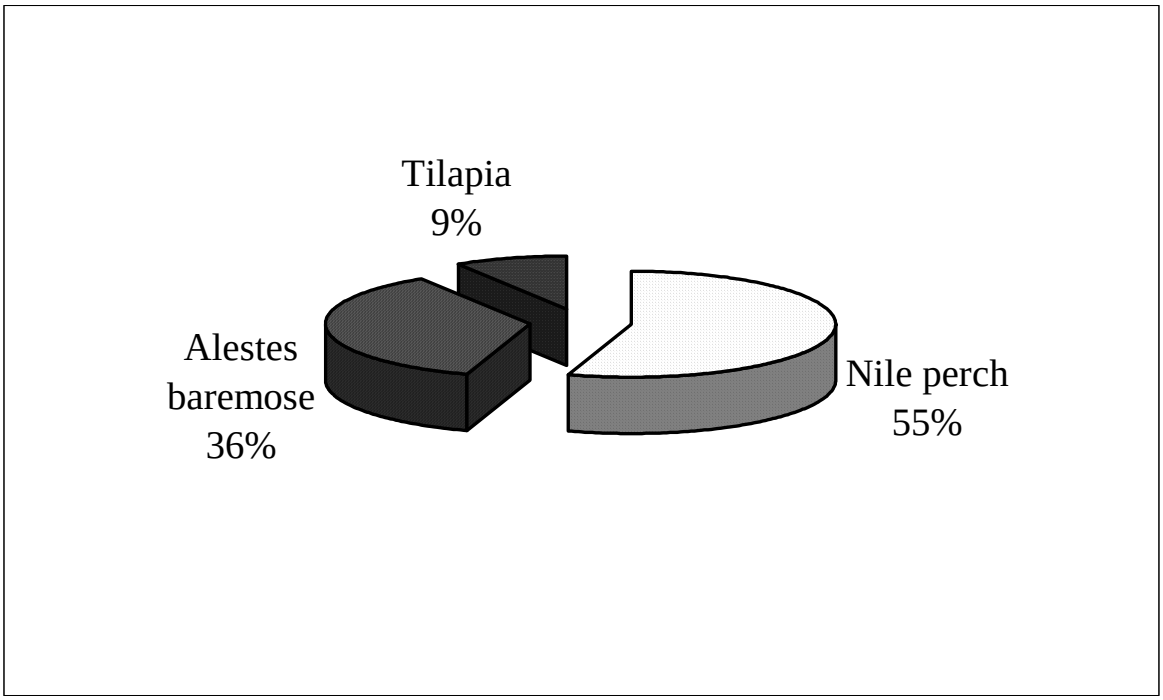
Fish species	**Rank**	**Qty. Landed per week** (kg)
Alestes nurse	1	4,000
Alestes baremose	2	3,200
Hyrocynus	3	800
Nile perch	4	200

Source: FIRRI, survey data June 2002

6.2.2 Fishers' Characteristics

Eleven fishers were interviewed at Somsio. All of them were males of ages between 24 and 50 years and had an average age of 38 years. Fishers were dominantly of the Alur tribe (91%), followed by Acholi (9%). All the interviewed fishers were married and most (82%) had primary level education followed by those who had no schooling (9%) and secondary level education (9%). Most fishers (55%) targeted Nile perch, followed by those who targeted A*lestes baremose* (36%) and tilapia (9%). Respondents had fished for an average of 12 years and had lived at Somsio for an average of 21 years. The average household size of fishers was 11 people. Most fishers (64%) had no alternative source of income. For those who had alternative sources of income, farming crops (18%) and trading (18%) were mentioned.

Figure 6.1: Main Fish Species Targeted by Fish Producers at Somsio



Source: FIRRI, Survey data June 2002

6.2.3 Inputs and Costs

Boat and outboard engines

All fishers interviewed owned fishing boat. The boat type owned was the 'Congo barque' type. Boats had been owned for an average of 2 years. The average cost of the boat was Shs 155,100/=, with an average expected useful life of 3.6 years and having no salvage value at all.

Table 6.4: Information on Boat Types Owned at Somsio

Type	**Average period owned** (Years)	**Average cost price** (Shs)	**Average useful life** (Years)
Congo barque	2	155,100	3.6

Source: FIRRI, survey data June 2002

None of the interviewed fishers at Somsio used an outboard motor engine to fish.

Fishing Gear

Most fishers (82%) use gillnets followed by those who used boat seines (9%) and long lines (9%). Gillnets used at Somsio had an average mesh size 4.5 inches while

hooks used on long lines had an average size of 13.5 inches. The gillnets and hooks had been used for an average of 12 months, while boat seine and scoop nets had been used for 6 months. The average cost of gillnets was Shs. 7800, that of hooks on long lines was Shs 43, scoop net was Shs 2560 and boat seine was Shs 143,000. The average expected useful life for gillnets was reported to be 7 months, long lines was reported to be 12 scoop nets 6 and boat seine 14 months. There was no salvage value given for any gear.

Table 6.5: Information on Gear Types Owned

Type	**Percentage**	**No.**	*Size*	*Period used* ***(Years)***	**Cost price** (Shs)	**Expected useful life** (Months)	**Salvage value** (Shs)
Gillnets	82	16	3.5	4	9,200	16	0
Boat seines	9	1	-	7	880,000	15	0
Hooks on Long lines	9	600	12	12	50	24	0

Source: FIRRI, survey data June 2002

The majority of the gillnet fishers obtained their initial capital from fishing (67%) and farming (33%). All the boat seine fishers obtained their initial capital from farming while all the longline fishers obtained their initial capital from fishing. None of the fishers obtained the initial capital from credit.

Table 6.6: Number of Respondents Reporting the Different Sources of Initial Capital

Enterprise	*Source of initial capital*			*Total*
	Fishing	*Farming*	*Credit*	
Gillnets	***6 (67%)***	***3 (33%)***	***-***	***9 (100%)***
Boat seines	***-***	***1 (100%)***	***-***	***1 (100%)***
Long lines	***1 (100%)***	***-***	***-***	***1 (100%)***

Source: FIRRI, survey data June 2002

Labour costs

All the interviewed fishers at Somsio employ crew on their fishing boats. The gill net fishers employed an average of 3 crew per fishing boat. The boat seine net fishers employed an average of 4 crew while the longline fishers employed an average of 3 crew. All fishers at Somsio paid their crew a percentage of revenue. Gillnets fishers worked for an average of 5 days per week and paid their crew an average of 40% of

daily revenue. Boat seine net fishers worked for an average of 5 days per week and paid their crew an average of 50% of daily revenue. The longline fishers operated for an average of 3 days per week and paid their crew an average of 45% of daily revenue.

Table 6.7: Number of Crews, Modes of Payment and Days Worked per Week

Enterprise	*Average no. of crew*	*Respondents employing % of revenue payment system*	*Average number of days worked (**per week)***	*Amount paid **(% of revenue)***
Gillnets	***3***	***9 (100%)***	***5***	***40%***
Boat seines	***4***	***1 (100%)***	***5***	***50%***
Long lines	***3***	***1 (100%)***	***3***	***45%***

Source: FIRRI, survey data June 2002

Entrepreneurship

Fishers were asked to mention a minimum amount of money they would wish to ask for per month for managing their fishing enterprises. Only 8-gill net fishers were able to evaluate their entrepreneurship functions at Somsio. They mentioned an average valuation of Shs. 45,000 per month.

Other costs

Some of the costs met by fishers at Somsio include; baits bought by those who use long lines and maintenance of boats and gear. The boat seine net fishers did not have any other operational cost. The average cost spent on baits by longline fishers was Shs. 12,000 for the days fished in a month while gillnet fishers spent an average of Shs 2,500 and Shs 3,300 on maintenance of boats and gear per month respectively.

Perception of the resource base

Most fishers (54%) assessed the level of catch as not good while the rest (36%) described it as good. Most fishers (50%) mentioned changes in seasons as the main reason as to why their level of catches were not good. Other mentioned 'not enough fish in the lake (33%) and lack of capital (17%) as the reasons to why the levels of catch were not good.

Table 6.8: Assessment of the Resource Base at Somsio

Assessment	**Frequency**	**Percentage**
Good	4	36
Not good	7	54
Total	11	100

Source: FIRRI, survey data June 2002

The monthly production costs are summarised in Table 6.9:

Table 6.9: Monthly Summary of Production Costs

	Long lines	**Gillnets**	**Boat seines**
Capital Investment	110,000	309,911	1,030,000
Boat maintenance	--	278	--
Gear maintenance	--	1,111	--
Engine maintenance	--	--	--
Other costs	--	--	--
Labour cost	56,781	377,366	93,700
Fuel cost	--	--	--
Bait cost	12,000	--	--
Operating cost	68,781	378,755	93,700
Depreciation	2,722	4,995	7,667
Total monthly cost	71,503	383,749	101,367

Source: FIRRI, survey data June 2002

6.2.4 Earnings of the Production Enterprises

The data on fish catches and prices were used to compute earnings for the different types of enterprises by species. The results show that gillnetters realized the highest net revenues in fishing Nile perch, followed by *Alestes baremose* and then tilapia. Net earnings of boat seiners and long liners were rather less (Table 6.10)

Table 6.10: Average Catches and Incomes of Fishers by Species

	Long lines	**Gillnets**	**Boat Seines**
Nile perch			
Catch (kg/month)	210.30	1,434.28	468.50
Price (Shs/kg)	600	800	400
Gross revenue (Shs)	126,180	1,518,883	187,400
Net revenue (Shs)	54,676	904,287	86,033
Nile tilapia			
Catch (kg/month)	.	285.00	.
Price (Shs/kg)	.	800	.
Gross revenue (Shs)	.	228,000	.
Net revenue (Shs)	.	126,875	.
Alestes baremose			
Catch (kg/month)	.	427.00	.
Price (Shs/kg)	.	1,225	.
Gross revenue (Shs)	.	546,800	.
Net revenue (Shs)	.	323,240	.

Source: FIRRI, survey data June 2002

Nile perch fishers sell their catch per head (50%), weighed in kilograms (33%) and in bundles (17%) and all tilapia fishers sell their catch by weighing it in kilograms. Other species such as *Hydrocynus* and *Alestes baremose* are sold in bundles (75%) or per head (25%). Most Nile perch fishers (83%) sell their catch to beach retailers and the rest (17%) sell it to bicycle traders. All tilapia fishers sell their catch to mostly to pick up traders. Other species such as *Hydrocynus* and *Alestes baremose* are sold mostly to beach consumers (75%) or pick-up traders (25%). All fishers interviewed at Somsio sell their catch at their beach. All fishers did not have any arrangement with the buyers.

6.3 Fish Processing Sub-sector

6.3.1 Overview

There are no publicly owned facilities to support fish processing at Somsio . Sun-drying is the main fish processing method and followed by fish smoking. The main processed fish species is *Alestes nurse*, followed by *Hydrocynus* and *Alestes baremose*. There are approximately 7 smoking kilns and several drying grounds at Somsio.

6.3.2 Fish Processors Characteristics

Eight processors were interviewed, most of whom were females (87.5%) and average age of 33. Majority were Alur (87.5%), and had primary education (75%). Their mean household size was 6 persons and they had lived at the beach for 17 years on average. Fish smoking and salting/ sun drying are the main methods of processing at Somsio and appear to be of equal importance as indicated by the equal representation of fish smokers and salters/ sun driers in the sample.

6.3.3 Fish Processing Inputs and Costs

The fish smokers entirely use low-technology ovens (smoking kilns), which are either privately owned (75%) or hired (25%). On the other hand, those who salt and sun dry fish spread their fish on privately owned drying racks.

Table 6.11: Distribution of Fish Processors by Type of Processing Facility and their Ownership Status

Facility	**Ownership**	**Smoking**	**Sun drying and Salting**
Smoking kiln	Privately owned	75%	--
	Rented	25%	--
	Communally owned	--	--
Drying racks	Privately owned	--	100%
	Rented	--	--
	Communally owned		--
Total		100.0%	100.0%

Source: FIRRI, survey data June 2002

Capital

Owners of smoking kilns on the average invest Shs. 26,800 in the construction of the low-technology ovens. On the contrary, smokers who hire smoking kilns spend about Shs 4,000 each month. In comparison, owners of fish drying racks spend about Shs 17,500 towards the construction of each unit using local materials such as rids,

wooden poles and fibre. The majority of the fish processors obtained their 'start-up' capital from farming (59.1%), fishing (22.7%) and informal loans (4.5%).

Labour

All the fish processing units were owner-operated. Owners of salting/ sun drying units on the average spend Shs 70,000 each month on labour or about 1.8 times higher than for fish smokers.

Other costs

Fish smokers on the average spend Shs 17,500 each month on day-to-day purchase of fuel wood while salters/ sun driers spend roughly Shs 16,650 on salt

Table 6.12: Monthly Input Costs of Fish Processing Units by Method of Processing

	Smoking	**Sun drying and Salting**
Capital investment	26,833	4,750
Monthly rent for smoking kiln	4,000	--
Monthly fuel wood cost	17,500	--
Monthly salt cost	--	16,650
Monthly labour cost	42,000	70,000
Monthly transport cost	--	--
Monthly operating costs	60,500	86,650
Monthly depreciation	298	--
Total monthly costs	60,798	86,650

Source: FIRRI, survey data June 2002

6.3.4 Processors' Outputs and Incomes

The fish processors of Somsio mainly process *Hydrocynus* (37.5%), Nile Tilapia (37.5%), *Alestes barimose* (12.5%) and Nile Perch (12.5%). The monthly quantities of fish processed, buying and selling prices, costs and revenues are presented in Table 13. The majority of the fish processors also sell their processed fish at various urban (25%) and rural markets (37.5%) while the remainder (37.5%) sell their fish to fish traders who operate at the landing.

Table 6.13: Costs and Revenues of Processors by Species

	Nile perch	**Tilapia**	***Hydrocynus***	***Alestes baremose***
Quantities processed (kg/month)	353	204	267	140
Buying price (Shs/kg)	667	1,400	1,000	1,000
Selling price (Shs/kg)	1,000	1,900	1,500	1,500
Monthly cost of raw fish (Shs)	200,667	146,400	166,667	140,000
Monthly gross revenue (Shs)	320,000	192,000	250,000	210,000

Source: FIRRI, survey data June 2002

The fish processors of Somsio largely sell their fish at urban (66.7%), regional (25%) and neighbouring rural markets (8.3%). The fish smokers entirely sold their fish in urban markets whereas the salters/ sun driers exclusively sold their fish in regional markets in Congo.

6.4 Fish Marketing Sub-sectors

6.4.1 Overview

Fish marketing at Somsio is facilitated by a relatively good access road. Somsio can also be accessed by water from the neighbouring beaches such as Butiaba, Nyamukuta, Kobolwa and Bugoigo.

There are approximately 13 beach-side retailers/processors and 2 bicycle traders. Fresh Nile perch is bought by bicycle traders who ferry it to the factory agents at the beaches of Bugoigo and Kabolwa while fresh tilapia, *Alestes baremose* and *Hydrocynus* are mainly sold at the beach to processors although some is taken away by bicycle traders. Processed *Alestes nurse* and other species are sold in Panyimur in Nebbi District.

Table 6.14. Main Destinations of Fish Species and Product Forms

Fish species	**Main destinations**	
	Fresh	**Processed**
Nile perch	To factory trucks at Bugoigo and Kabolwa	Panyimur
Tilapia	Beach	Panyimur
Alestes baremose	Beach	Panyimur
Hydrocynus	Beach	Panyimur
Alestes nurse		Panyimur

Source: FIRRI, survey data June 2002

The average prices of fresh fish per kg for the various fish species landed at Somsio are given below.

Table 6.15. Fresh Fish Prices by Species

Fish species	**Prices** (Shs/kg)
Nile perch	800
Alestes baremose	500
Hydrocynus	500
Alestes nurse	250

Source: FIRRI, survey data June 2002

6.5 Fish Consumption

6.5.1 Consumers' characteristics

There were 24 fish consumers interviewed at Somsio. They had an average age of 35 years and 71% were male while 29% were females. They were dominantly Alur (88%), followed by Acholi (8%) and other tribes (4%). Most consumers (88%) were married and most (75%) had attained primary level education followed by those who had no schooling (12.5%) and secondary level education (12.5%). The average household size of fish consumers at Somsio was 6 family members and the respondent had lived at Somsio for an average of 18 years.

6.5.2 Consumption Levels and Trends

A large proportion of fish consumers (42%) at Somsio commonly ate *Alestes baremose* followed by Nile perch (33%), Tilapia (21%) and *Hydrocynus* (4%).

Table 6.16: Commonly Consumed Fish Species at Somsio by Type of Consumer

Sub-sectors	**Nile perch**	**Tilapia**	***Hydrocynus***	***Alestes Baremose***	**Total**
Consumers not engaged in fishery activity	40%	40%	-	20%	100%
Consumers engaged in fish production	36.4%	9.1%	-	54.5%	100%
Consumers engaged in fish processing	25%	25%	12.5%	37.5%	100%
All respondents	33%	21%	4%	42%	100%

Source: FIRRI, survey data June 2002

Quantities consumed

The average daily quantity consumed by Somsio respondents was 2.38 kgs and this ranged between 0.5 to 5 kgs. However, this varied between sub-sectors as given in Table 6.17.

Table 6.17: Quantities of Fish Consumed at Somsio by Type of Consumer (kg/day)

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	3	0.5	1.2
Consumers engaged in fish production	5	1	2.9
Consumers engaged in fish processing	5	0.7	2.4
Total of whole beach	5	0.5	2.4

Source: FIRRI, survey data 2002

Consumers were asked whether or not there had been a change over the years in the quantities of fish eaten. Most consumers (63%) agreed that there was a change, while only (37%) did not agree. Most of those who recognised the change (87%) said that the quantities consumed by their families had decreased. Only 13% said that the quantities had increased.

Frequency of fish consumption

On average consumers at Somsio ate fish 3.83 times a week and this ranged between 2 to 7 times. However, this varied between sub-sectors as given in Table 6.18.

Table 6.18: Average Number of Times Fish is Consumed in a Week at Somsio by Type of Consumer

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	7	2	4.4
Consumers engaged in fish production	7	2	3.8
Consumers engaged in fish processing	7	1	3.5
All respondents	7	1	3.8

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the frequency of fish consumption had changed over the past year. 50% of the respondent agreed that there had been a change in the frequency of fish consumption at Somsio and an equal proportion did not agree. For those who agreed that frequency in consumption had changed, all of them said it had reduced.

Size of fish for consumption

Consumers were asked whether or not the sizes of fish they ate with their families had changed over the past year. 50% of the respondents agreed to this and an equal proportion did not agreed. Most respondents (83%) said that the sizes had decreased but 16% said the sizes had increased.

Table 6.19: Respondents Reporting Reduction in Sizes of Fish for Consumption at Somsio

Fish species	*Yes*	**No**	**Total**
Nile perch	63%	37%	100%
Tilapia	60%	40%	100%
Hydrocynus	-	100%	100%
Alestes baremose	40%	60%	100%
All species	50%	50%	100%

Source: FIRRI, survey data June 2002

Substitutes for fish

A majority of respondents (88%) mentioned beans as the main substitute to fish, followed by vegetables and then other food items (Table 6.20)

Table 6.20: Main Substitutes to Fish at Somsio

Substitutes	**Count**	**Percentage**
Beans	21	88
Meat	-	-
Vegetables	2	8
Chicken	-	-
Other	1	4
Total	24	100

Source: FIRRI, survey data June 2002

6.5.3 Price Levels and Trends

Most respondents (57%) did not usually buy the fish they ate with their families while 43% did. Unlike all respondents engaged in fish production who did not buy the fish they ate, most consumers not engaged in fishery activity (60%) and all consumers engaged in fish processing usually bought the fish they ate with their families. For those who bought fish, the average price mentioned was Shs 972 and it ranged between Shs. 800 – 1,200. The average prices are given in Table 6.21.

Table 6.21: Prices of Fish Species for Consumption at Somsio (Shs)

Fish species	**Maximum**	**Minimum**	**Mean**
Nile perch	1,000	800	900
Tilapia	1,200	800	975
Hydrocynus	1,000	1,000	1,000
Alestes baremose	1,000	1,000	1,000
All species	1,200	800	972

Source: FIRRI, survey data 2002

Consumers were asked whether or not the prices of fish for consumption had changed over the past year. Most respondents (83%) said it did and most of these (93%) said it had increased.

6.6 Community Perceptions towards Chilled Transport Facilities

Although there were no factory trucks at Somsui, consumers where able to associate factory trucks with some positive changes to any beach community where they existed. Most fishers (57%) said it could lead to increased incomes of fishers, followed by ready market for fish (4%) and increased employment opportunities (4%). Some consumers (35%) did not know any positive change they would associate with factory trucks.

A large proportion of consumers (46%) did not associate any negative impact with factory trucks. However, some negative impacts mentioned were reduced fish supplies to local traders/ processors and consumers (27%) and high price of fresh fish (27%).

7 BIKUNYU LANDING SITE

7.1 Background

Bikunyu Landing Site, located in Kiganja Parish, Kigorobya Sub-county in Hoima District was selected as a beach were no chilled transport facilities operate but may become available during the project's life. The population of the beach is approximately 300 people. The main economic activities at the beach and around are fishing and animal keeping.

Hoima District lies on the Western side of Lake Albert, covering approximately 75% of the shoreline on the Ugandan side. There are approximately 2,652 fishermen and 1400 boats in the district. Approximately 17,399.1 metric tonnes were landed at beaches in Hoima in 2001.

The rates below have been charged for the various fishery activities and vessels (Table 3.1). The specific licence for trucks in the new instrument (The fishing (Amendment) Rules, 2001) is not being implemented because of the impediment by the escarpment to access beaches directly.

Table 7.1: Rates Charged on Fishery Activities and Fishing Vessels.

Item	**Old rates** (Shs)
Fishing vessel licence	10,000
Fishing licence	No charge
Fish monger's licence operating	No charge
Processing permit	No charge

Source: FIRRI, survey data June 2002

Chilled transport facilities arrived in Hoima District in August 2001 and begun operating at Kabolwa by October 2001. The trucks are parked at trading centres nearest to the beaches. These towns are Buseruka (2 trucks), Kaseta (one truck) and Kyangwali (2 trucks). Three trucks are also parked at the nearest accessible point to Runga Landing Site. In total there are seven trucks operating in Hoima District coming from Ngege Ltd, Hwan Sung Fishing Industry and Uganda Fish Packers. On average each truck buys approximately 3 tons per week.

Before the arrival of chilled transport facilities, the price of a Kilogram of Nile perch was Shs 250, however, this increased tremendously to the present rate which is Shs 1,100 per Kg. This has tremendously raised the incomes of fishers, increased employment opportunities at beaches. The Factory truck traders also offer fishing inputs to fishers.

In light of the new development that had come to the District, the DFO called a conference of fishers and other stakeholders in March 2001 to sensitise them on improved fish handling and use of good gear to target Nile perch. Kigorobya Sub-county has graded the road up to the nearest accessible point to Runga Landing Site. There are plans to grade the road up to Runga and eventually to other beaches such as Bikunyu and Kibiro. Shs 4.6 million under the Poverty Action Fund (PAF)

funds have been set aside to construct fish handling facilities at three beaches that are yet to be identified.

The local processors, traders and consumers have raised complaints because of the raise in prices of Nile perch and subsequently other species of fish. There has been an increase in the targeting of juvenile fish that has ready market from the local processors, traders and local consumers.

The district authorities have responded to some of the problems above by sensitising the fishers against the use of illegal gears and encouraging local traders and producers to deal in other species. Under the Poverty Action Funds, there are plans to assist farmers to invest in aquaculture.

7.1.1 Infrastructure and Facilities at Bikunyu

Very limited facilities are available at Bikunyu, as indicated by Table 7.2:

Table 7.2. Infrastructure and Facilities at Bikunyu

Infrastructure and facilities	**Number**	**Description**
Retail shops	2	Mainly dealing in general merchandise
Food kiosks	3	Dealing in local dishes such as Cassava and fish, millet bread and meat

Source: FIRRI, survey data June 2002

7.2 Fish Production Sub-sector

7.2.1 Overview

There are no public facilities to support fish production such as boat yards and fish handling facilities found at Bikunyu. The main type of fishery at Bikunyu is gillnetting with approximately 40 fishers. *Kaganga* (20 people) and then long lining (5 persons) follow as shown in Table 7.3

Table 7.3. Ranking of Production Enterprises by Number at Bikunyu Landing Site

Category of fisher	**Rank**	**Number**
Gill nets	1	40
Kaganga	2	20
Long lining	3	5

Source: Survey data June 2002

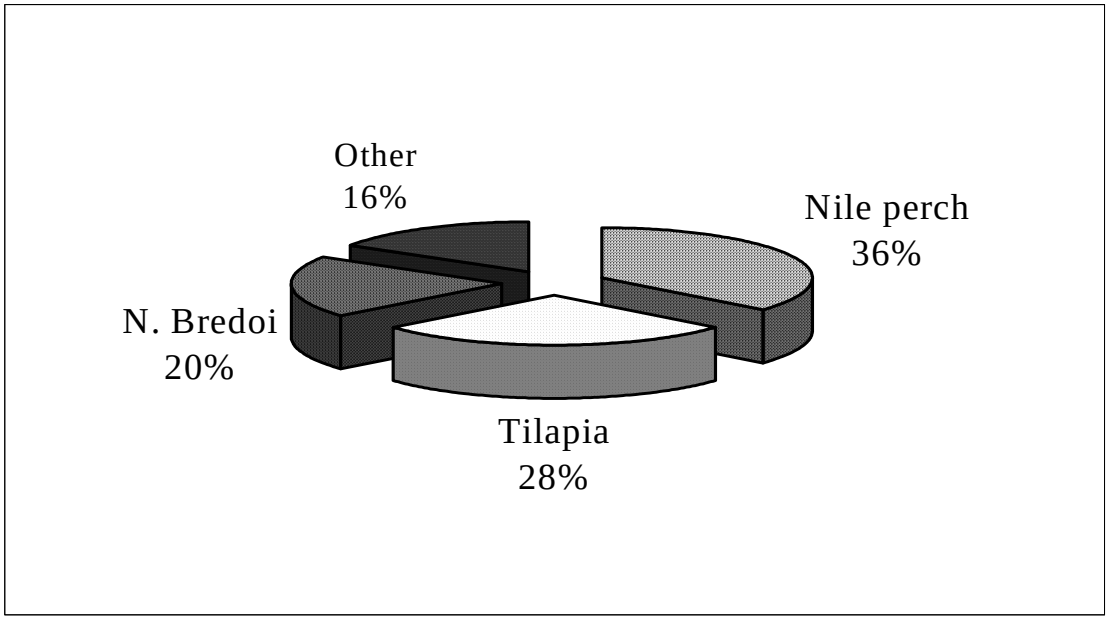
There are approximately 32 fishing unit owners and 60 crew. There are 32 Congo barque boats at Bikunyu. There are neither fishing nor transport boats with outboard motor engines at Bikunyu.

The main fish species landed is tilapia with approximately 1400 Kgs landed per week. This is followed by *N. bredoi* (1000 kgs), Nile perch (200 kgs), *Hydrocynus* (140 kgs)

7.2.2 Fishers' Characteristics

Twenty-five fish producers were interviewed at Bikunyu. All of them were males of ages between 17 and 62 years and had an average age of 40 years. They were dominantly of the Alur tribe (36%), followed by Banyoro (32%), and the Bagungu (28%). Most fishers (92%) were married and most (64%) had attained primary level education followed by those who had secondary level education (32%). A large proportion of fishers (36%) targeted Nile perch, followed by those who targeted tilapia (28%) and *N. bredoi* (20%). Other species targeted included *Alestes baremose* (8%), *Hydrocynus* (4%) and *Bagrus spp* (4%). Respondents had fished for an average of 12 years and had stayed at Bikunyu for an average of 7 years. The average household size of fishers was 8 people. Their main alternative sources of income were crop farming (68%) and livestock keeping (8%). Some fishers (24%) had no alternative source of income.

Figure 7.1: Main Fish Species Targeted by Fish Producers at Bikunyu



Source: FIRRI, survey data 2002

7.2.3 Fishing Inputs and Costs

Boats and outboard engines

Of the interviewed fishers, 52% owned boats while 48% hired the boats they used for fishing. Fishers who hired fishing boats spent an average of Shs. 18**,**000/= per month. However, this ranged between Shs 15,000 to Shs 40,000/= per month. The boat type either rented or owned was the Congo barque type. Boats had been owned for an average of 4 years. The average cost of the boat was U. Shs 87,000/=, with an average expected useful life of 4 years and an average salvage value of Shs 4200/=. The salvage value ranged between 0 to Shs 25,000/=.

Table 7.4: Information on Boats Owned at Bikunyu

Boat type	**Average no. of years of ownership**	**Average cost price** (Shs)	**Average expected useful life** (Years)	**Average salvage value** (Shs)
Congo barque	4	87,000	4	4,200

Source: FIRRI, survey data 2002

None of the interviewed fishers at Bikunyu used an outboard motor engine to fish.

Fishing gears

Most fishers (68%) used gillnets followed by those who used boat seines (12%), scoop nets (12%) and long lines (8%). Gillnets used at Bikunyu had an average mesh size 4.5 inches while hooks used on long lines had an average size of 13.5 inches. The gillnets and hooks had been used for an average of 12 months, while boat seine and scoop nets had been used for 6 months. The average cost of gillnets was Shs. 7800, that of hooks on long lines was Shs 43, scoop net was Shs 2560 and boat seine was Shs 143,000. The average expected useful life for gillnets was reported to be 7 months, long lines was reported to be 12 scoop nets 6 and boat seine 14 months. There was no salvage value given for any gear.

Table 7.5: Summary Information on Gear Types

Gear type	**Percentage**	**No.**	*Size*	*Period used* ***(Years)***	**Cost price** (Shs)	**Expected useful life** (Months)	**Salvage value** (Shs)
Gillnets	68	19	4.5	12	7800	7	0.0
Boat seines	12	1		6	143,000	14	0.0
Scoop nets	12	1		6	2560	6	0.0
Hooks on Long lines	8	1700	13.5	12	43	12	0.0

Source: FIRRI, survey data 2002

The majority of the gillnet fishers obtained their initial capital from farming (65%) and fishing (35%). The majority of the boat seine fishers obtained their initial capital from fishing (67%). and credit (33%). The majority of the scoop net fishers obtained their initial capital from farming (67%) and credit (33%) while the longline fishers obtained their initial capital from farming (50%) and fishing (50%).

Table 7.6: Number of Respondents Reporting the Different Sources of Initial Capital

Enterprise	*Source of initial capital*			*Total*
	Fishing	*Farming*	*Credit*	
Gillnets	***6 (35%)***	***11 (65%)***	***-***	***17 (100%)***
Boat seines	***2 (67%)***	***-***	***1 (33%)***	***3 (100%)***
Scoop nets	***-***	***2 (67%)***	***1 (33%)***	***3 (100%)***
Long lines	***1 (50%)***	***1 (50%)***	***-***	***2 (100%)***

Source: FIRRI, survey data 2002

Labour costs

Twenty-four of the twenty-five fishers at Bikunyu employ crew on their fishing boats. The gill net fishers employed an average of 2 crewmembers per fishing boat. The boat seine net fishers employed an average of 3 crewmembers. The scoop net fishers employed an average of 1 crew per fishing while the longline fishers employed an average of 4 crew. Most gill net fishers (94%) paid their crew a percentage of revenue and the remaining (6%) paid a percentage of net revenue. Most boat seine net fishers (67%) paid a percentage of net revenue and the rest (6%) paid a percentage of revenue. All Scoop net fishers paid a percentage of net while all longline fishers paid their crew a percentage of revenue. Gillnets fishers worked for an average of 5 days per week and paid their crew an average of 33.5%

of either revenue or net revenue. Boat seine net fishers worked for an average of 4 days per week and paid their crew an average of 43% of either revenue or net revenue. The scoop net and longline fishers operated for an average of 6 and 4 days per week respectively. Scoop net fishers paid their crew an average 40 percent of net revenue while longline fishers paid their crew an average of 41% of their revenue.

Table 7.7: Information on the Crew and Modes of Payment

Enterprise	*Average no. of crew*	*Crew payment as percentage of revenue*	*Average number of days worked per week*	*Amount paid (% of revenue or net revenue)*	*Total*
Gillnets	***2***	***15 (94%)***	***5***	***33.5%***	***16 (100%)***
Boat seines	***3***	***1 (33%)***	***4***	***43%***	***3 (100%)***
Scoop nets	***1***	***-***	***6***	***40%***	***3 (100%)***
Long lines	***4***	***2 (100%)***	***4***	***41%***	***2 (100%)***

Source: FIRRI, survey data 2002

Entrepreneurship

Fishers were asked to mention a minimum amount of money they would wish to ask for per month for managing their fishing enterprises. Seventeen fishers out of the twenty-five were able to evaluate their entrepreneurship functions at Bikunyu. Gillnet fishers gave an average valuation of Shs. 23,000. Boat seine fishers gave an average valuation of Shs. 13,000. Scoop net fishers mentioned an average valuation of Shs. 41,600 while longline fishers mentioned Shs. 10,000.

Table 7.8: Valuation of Entrepreneurship by Type of Enterprise

Enterprise	*Average monthly value* ***(Shs)***
Gillnets	***23,000***
Boat seines	***13,300***
Scoop nets	***41,600***
Long lines	***10,000***

Source: FIRRI, survey data 2002

Other costs

Fish producers at Bikunyu were also able to mention other operational costs they met and these included; fuel used in lamps when targeting *N. bredoi* at night, baits bought by those who use long lines and maintenance of boats and gear. Maintenance of boats is Shs 7,750 and maintenance of gear is Shs 9,500 per month.

Table 7.9: Other Operational Costs in a Fishing Enterprise at Bikunyu (Shs/month)

Enterprise	*Maintenance of boat*	*Maintenance of gear*
Gillnets	***6,500***	***11,000***
Boat seines	***10,000***	***5,000***
Scoop nets	***-***	***-***
Long lines	***8,000***	***8,000***

Source: FIRRI, survey data 2002

Perception of the resource base

Most fishers (92%) at Bikunyu assessed the level of catch as not good while the rest (8%) perceived it as good. Most fishers (50%) mentioned changes in seasons as the main reason as to why their level of catch was not good. Others mentioned 'not enough fish in the lake (23%), lack of capital (23%) and 'too many competitors' (6%) among others.

Table 7.10: Assessment of the Resource Base at Bikunyu

Assessment	**Frequency**	**Percentage**
Good	2	8
Not good	23	92
Total	25	100

Source: FIRRI, survey data June 2002

A summary of the monthly production costs is given in table 7.11:

Table 7.11: Monthly Summary of Production Costs

	Long lines	Gillnets	Boat seines	Scoop nets
Capital Investment	162,400	166,741	160,000	6,833
Boat maintenance	4,000	765	3,333	--
Gear maintenance	4,000	2,588	1,667	--
Engine maintenance	--	--	--	--
Other costs	--	--	--	--
Labour cost	94,502	79,109	99,082	.
Fuel cost	.	.	.	40,000
Bait cost	35,000	.	.	.
Operating cost	151,072	77,808	82,093	13,333
Depreciation	5,867	5,296	1,182	250
Total monthly cost	81,403	83,105	83,276	13,583

Source: FIRRI, survey data June 2002

7.24 Earnings of the Production Enterprises

Net earnings of the different enterprises were calculated. The results showed that boat seining for tilapia yielded the highest net revenues, followed by gillnetting for Nile perch and long lining for the Nile perch. The information is provided in table 7.12.

Table 7.12: Average Catches and Incomes of Fishers by Species

	Long lines	Gillnets	Boat Seines
Nile perch			
Catch (kg/month)	363.55	393.08	--
Price (Shs/kg)	650	692	--
Gross revenue (Shs)	236,685	288,144	--
Net revenue (Shs)	155,282	181,098	--
Nile tilapia			
Catch (kg/month)	--	385.71	826.00
Price (Shs)/kg	--	629	700
Gross revenue (Shs)	--	228,829	578,200
Net revenue (Shs)	--	135,005	330,803
Bagrus bayad			
Catch (kg/month)	--	116.50	--
Price (Shs/kg)	--	575	--
Gross revenue (Shs)	--	68,700	--
Net revenue (Shs)	--	77,387	--
Hydrocynus			
Catch (kg/month)	--	146.80	--
Price (Shs/kg	--	600	--
Gross revenue (Shs)	--	88,080	--
Net revenue (Shs)	--	52,403	--
Alestes baremose			
Catch (kg/month)	--	118.00	--
Price (Shs/kg	--	525	--
Gross revenue (Shs)	--	70,000	--
Net revenue (Shs)	--	37,926	--

Source: FIRRI, survey data June 2002

Nile perch fishers sell their catch in kilograms (33.3%), in bundles (33.3%) and per head (33.3%). All tilapia is sold in bundles and *N. bredoi* in troughs/basins. Other species such as *Hydrocynus* and *Alestes baremose* are sold in bundles (50%) or per head (50%). Fifty percent of the fishers sell their Nile perch catch to bicycle traders and an equal percentage sell it to beach retailers. All fishers interviewed at Bikunyu sell their catch at their beach. Most fishers (92%) did not have any arrangement with

the buyers. Only a few fisher (8%) had any arrangement such as 'buyer provides money' (4%) or buyer provides fishing inputs (4%).

7.3 Fish Processing Sub-sector

7.3.1 Overview

There are no publicly owned facilities to support fish processing at Bikunyu. There are 3 privately owned smoking kilns and several drying grounds for *N. bredoi*. Sun-drying is the main fish processing method with approximately 20 people involved in it, followed by smoking, with 5 people involved. *N. bredoi*, followed by tilapia are the main processed fish species. *N. bredoi* is sun-dried while tilapia is smoked.

7.4 Fish Marketing Sub-sector

7.4.1 Overview

Bikunyu can be easily accessed by water from the neighbouring beaches such as Runga. Bikunya is approximately 4 kms from Runga. However, the path is poor and most traders use bicycles from Runga while some from Kigorobya access the landing site on foot down the escarpment. There are plans to grade a road up to Bukunyu through Runga.

There are 10 traders who operate at Bikunyu sometimes on foot or using bicycles. The main destination of fresh and processed tilapia, Nile perch, *Hydrocynus* and *Alestes baremose* is Kigorobya Trading Centre while processed *N. bredoi* goes to Kampala (Table 7.13).

Table 7.13: Main Destinations of Fish Species and Product Forms

Fish species	**Main destinations**	
	Fresh	**Processed**
N. bredoi	--	Kampala
Tilapia	Kigorobya Trading centre	Kigorobya Trading Centre
Alestes Baremose	Kigorobya Trading centre	Kigorobya Trading Centre
Nile perch	Kigorobya Trading centre	Kigorobya Trading Centre
Hydrocynus	Kigorobya Trading centre	Kigorobya Trading Centre

Source: FIRRI, survey data June 2002

The average prices of fresh fish per kg for the various fish species landed at Bikunyu are given below (Table 7.14).

Table 7.14. Prices of Fish by Species

Fish species	**Prices** (Shs/kg)
Tilapia	700
N. bredoi	250
Alestes baremose	400
Nile perch	800
Hydrocynus	400

Source: FIRRI, survey data June 2002

7.4.2 Fish Traders' Characteristics

Six fish traders were interviewed, of whom 4 were females. Their mean age was 38, married and most had primary education (66.7%). Their average household size was 9 persons

Fish marketing is largely carried out by bicycle traders and fish processors who in addition to processing, market the processed fish. Among the fish traders, 3 sold their fish in urban markets, 2 in rural markets and 1 to factory agents operating at a neighbouring landing site.

Table 7.15: Distributions of Fish Traders by Means of Transport

	Frequency	**Percentage**
Bicycle trader	2	33.3
Processor/ trader	4	66.7
Total	6	100.0

Source: FIRRI, survey data June 2002

7.4.3 Inputs and Costs

Generally, the marketing costs incurred by the fish traders are very small, mainly because they do not incur direct transport costs given that the fish is owner-transported either by bicycle or by foot. Table 7.16 presents the input costs associated with fish marketing at Bikunyu.

Table 7.16: Mean Input Costs of Fish Trading Units by Type of Trader

	Bicycle trader	**Processor/ trade**
Capital Investment	76,000	.
Labour cost (Shs/month)	23,000	34,000
Operating cost (Shs/month)	23,000	34,000
Depreciation	778	.
Total monthly cost	23,778	34,000

Source: FIRRI, survey data June 2002

7.4.4 Outputs and Incomes

Respondents reported trading mostly in Nile tilapia (3) and Nile perch (3. Table 7.18 presents the quantities traded, buying and selling prices, cost of raw fish and gross revenues.

Table 7.17: Average Cost of Raw Fish and Revenues of Fish Traders by Species and Type of Trader

	Bicycle trader	**Processor/ trader**
Nile Perch		
Quantity traded (kg/ month)	1,260	1,200
Buying price (Shs/kg	550	1,000
Selling price (Shs/kg	1,250	2,000
Cost of fish (Shs/month)	750,000	1,200,000
Gross revenue (Shs/month)	1,290,000	2,400,000
Net revenue (Shs/month)	516,222	1,140,000
Nile Tilapia		
Quantity traded (kg/ month)	160	1,600
Buying price (Shs/kg	500	500
Selling price (Shs/kg	1,500	1,000
Cost of fish (Shs/month)	80,000	800,000
Gross revenue (Shs/month)	240,000	1,600,000
Net revenue (Shs/month)	143,111	790,000
Other species		
Quantity traded (kg/ month)		3,100
Buying price (Shs/kg		215

Selling price (Shs/kg		265
Cost of fish (Shs/month)		579,000
Gross revenue (Shs/month)		784,000
Net revenue (Shs/month)		172,000

Source: FIRRI, survey data June 2002

7.5 Fish Consumption

7.5.1 Consumers' characteristics

There were 38 fish consumers interviewed at Bikunyu. They had an average age of 40 years and 87% were male while 13% were females. They were dominantly Alur (37%), followed by Banyoro (34%), Bagungu (24%) and other tribes (5%). Most consumers (76%) were married and most (63%) had attained primary level education followed by those who had secondary level education (29%). The average household size of fish consumers at Bikunyu was 6 family members and the respondent had lived at Bikunyu for an average of 6 years.

7.5.2 Consumption Levels and Trends

A large proportion of fish consumers (55%) at Bikunyu commonly ate Tilapia, followed by Nile perch (32%), *Hydrocynus* (5%),*Alestes baremose* (5%) and *Bagrus spp* (3%).

Table 7.18: Commonly Consumed Fish Species at Bikunyu by Type of Consumer

Sub sectors	Nile perch	Tilapia	Hydrocynus	Alestes Baremose	Bagrus Spp	Total
Consumers not engaged in fishery activity	33.3%	66.7%	-	-	-	100%
Consumers engaged in fish production	32%	48%	8%	8%	4%	100%
Consumers engaged in fish processing	100%	-	-	-	-	100%
Consumers engaged in fish trading	16.7%	83.3%	-	-	-	100%
All respondents	32%	55%	5%	5%	3%	100%

Source: FIRRI, survey data 2002

Quantities consumed

The average daily quantity consumed by Bikunyu respondents was 2.35 kgs and this ranged between 0.25 to 6 kgs. However, this varied between sub-sectors as given in Table 7.19

Table 7.19: Quantities of Fish Consumed at Bikunyu by Type of Consumer (kg/day

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	3	0.5	1.4
Consumers engaged in fish production	6	0.3	2.5
Consumers engaged in fish processing	2	2.0	2.0
Consumers engaged in fish trading	4	2.0	2.7
All respondents	6	0.3	2.4

Source: FIRRI, survey data 2002

Consumers were asked whether or not there had been a change over the years in the quantities of fish eaten. 50% of the consumers agreed that there was a change and an equal proportion (50%) disagreed. Most of those who recognised the change (83%) said that the quantities consumed by their families had decreased. Only 17% said that the quantities had increased.

Frequency of fish consumption

On average consumers at Bikunyu ate fish 5.13 times a week and this ranged between 2 to 7 times. However, this varied between sub-sectors as given in Table 7.20.

Table 7.20: Average Number of Times Fish is consumed in a Week at Bikunyu by Type of Consumer

Sub-sectors	Maximum	Minimum	Mean
Consumers not engaged in fishery activity	7	3	6
Consumers engaged in fish production	7	2	5
Consumers engaged in fish processing	2	2	2
Consumers engaged in fish trading	7	2	5
All respondents	7	2	5

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the frequency of fish consumption had changed over the past year. Most consumers (69%) did not agree that there had been a change in the frequency of fish consumption at Bikunyu. The few (31%) who

agreed that frequency in consumption had changed, 91% said it had reduced. Some (9%), however, said it had increased.

Size of fish for consumption

Consumers were asked whether or not the sizes of fish they ate with their families had changed over the past year. 50% of the respondents agreed to this and an equal proportion did not agreed. Most consumers (79%) said that the sizes had decreased but 21% said they had increased (Table 7.21).

Table 7.21: Respondents Reporting Reduction in Sizes of Fish for Consumption at Bikunyu

Fish species	**Yes**	**No**	**Total**
Nile perch	67	33	100%
Tilapia	38	62	100%
Hydrocynus	50	50	100%
Alestes baremose	50	50	100%
Bagrus spp	100	-	100%
All species	50	50	100%

Source: FIRRI, survey data June 2002

Substitutes for fish

A majority of respondents (84%) mentioned beans as the main substitute to fish, followed by vegetables and meat (Table 7.22).

Table 7.22: Main Substitute to Fish at Bikunyu

Substitutes	**Count**	**Percentage**
Beans	32	84
Meat	1	3
Vegetables	1	3
Chicken	-	-
Other	4	10
Total	28	100

Source: FIRRI, survey data June 2002

7.5.3 Pricing Levels and Trends

Most respondents (52%) did not usually buy the fish they ate with their families while 48% did. Unlike most respondents engaged in fish production (58%) who did not buy the fish they ate, 50% of consumers not engaged in fishery activity, all consumers engaged in fish processing as well as most consumers engaged in fish trading (67%) usually bought the fish they ate with their families. For those who bought fish, the average price mentioned was Shs 777 and it ranged between Shs. 300 – 1,500, as given in Table 7.23.

Table 7.23: Prices of Fish Species for Consumption at Bikunyu (Shs)

Fish species	**Maximum**	**Minimum**	**Mean**
Nile perch	900	700	750
Tilapia	1,500	500	841
Hydrocynus	600	600	600
Alestes baremose	300	300	300
All species	1,500	300	777

Source: FIRRI, survey data June 2002

Consumers were asked whether or not the prices of fish for consumption had changed over the past year. Most respondents (68%) said it had increased.

7.6 Community Perceptions Towards Chilled Transport Facilities

Although there were no factory trucks at Bikunyu, consumers where able to associate factory trucks with some positive changes to a beach community where they existed. Most fishers (57%) said it could lead to increased incomes of fishers, followed by ready market for fish (25%). Some respondents (14%), however, did not know any positive change they would associate with factory trucks**.**

However, the major negative impacts mentioned by a large proportion of consumers were reduced fish supplies to local traders/ processors and consumers (30%), and high price of fresh fish (25%). A proportion of consumers (45%) did not associate any negative impact with factory trucks.

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Appendix 1: PRINCIPAL PERSONS MET

Name	Designation
Mr. Nsamba David	DFO, Nakasongola
Mr. Ogwang D. C	DFO, Apac
Mr. Musenero Richard	DFO, Kamuli
Mr. Baguma Richard	DFO, Masindi
Mr. Rugadya Richard	DFO, Hoima
Mr. Twesigye Bosco	AFO, Kansiira
Mr. Adoko Jimmy	AFO, Wansolo
Mr. Owori George	AFO, Irimeria
Mr. Sande Samuel	Centre Master, Bikunyu landing site
Mr. Adubango Festo	Chairman LC1, Kabolwa landing site
Mr. Azaria Weli	Centre Master, Somsui landing site

Appendix 2a: INFORMATION FROM THE DISTRICT FISHERIES OFFICERS

A. Statistics for the District for the Last One Year

Species	**Tonnes**	**Values**
1) Nile perch		
2) Tilapia		
3) Mukene		
4) Hyrocynus-		
5) Alestes-baremose		
6) Alestes nurse		
7) Bagrus		
8) Protopterus		
9) Others		

B. Statistics for the Selected Beach for the Last One Year

Species	**Tones**	**Values**
10) Nile perch		
11) Tilapia		
12) Mukene		
13) Hyrocynus-		
14) Alestes-baremose		
15) Alestee nurse		
16) Bagrus		
17) Protopterus		
18) Others		

C. Information on Licences/Fees/Dues

Item	Cost
19) Boat licence	
20) Boat registration fee	
21) Crew permit	
22) Processing permit	
23) Trading permit	
24) Market dues	
25) Other fees	

D. Information about Chilled Transport Facilities

26. Please tell us about the arrival of chilled transport facilities to your district (Month/year, beaches where they exist, any fees charged on them etc.)
_____
_____

27. How has the District responded to this new development?
_____
_____

28. State positive changes that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach
_____
_____

29. State negative changes that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach
_____
_____
_____

30. Suggest solutions to the negative changes mentioned above
_____
_____

Appendix 2b: KEY INFORMANT INTERVIEWS

A. Background Information

1) Date _____
2) Name of enumerator _____
3) Lake _____
4) District _____
5) Sub county _____
6) Name of beach _____
7) Tittle of respondent _____
8) Population of the beach _____

B. Infrastructure/Facilities (No. and description)

Retail shops _____

Restaurants _____

9) Boreholes/protected wells/springs _____

10) Healthy centres/clinics _____

11) Drug shops _____

12) Schools _____

13) Latrines _____

14) Administration (LC1, LC2 _____

15) Police station _____

16) Recreational facilities _____

17) Main economic activities _____

C. Production Sub-sector

18) Boat making yard _____

19) Fish handling facilities

a) Racks_____

b) Wooden stalls _____

c) Weighing shade _____

d) Raised platform __ _____

e) Ice boxes _____

Fill in the information below about rank and number per category of fishers at this beach

Category of fisher	**Rank**	**Number**
20) Gill nets		
21) Handline		
22) Longline		
23) Basket traps		
24) Boat seine		
25) Beach seine		
26) Cast nets		
27) Mosquito nets		
28) *Kaganga* (perforated troughs)		
29) Scoop nets		
30) Other		

Fill in the information below about rank and number per category of fishery related employment at this beach

Category of employment	**Rank**	**Number**
31) Crews		
32) Fishing unit owners		
33) Fishing unit renters		
34) Bait suppliers		
35) Carrying fish		
36) Other		

Fill in the information below about type, rank and number of boats at this beach

Type of boat	**Rank**	**No.**
37) Parachute		
38) Ssesse		
39) Congo barike		
40) Dugout canoe		
41) Other		

Fill in the information below about category and number of out board engines at this beach

Category of engine	**Horse power**	**No.**
42) Fishing		
43) Transport		
44) Other		

Fill in the information below about category, number and rank of fishing gears at this beach

Category of gears	**Rank**	**No.**
45) Gill nets		
46) Handline		
47) Longline		
48) Basket traps		
49) Beach seines		
50) Cast nets		
51) Mosquito nets		
52) Pressure lamps		
53) *Kaganga* (troughs)		
54) Scoop nets		
55) Other		

Fill in the information below about fish species, rank and quantities landed per week

Fish species	**Rank**	**Qty. Landed per week**
56) Nile perch		
57) Tilapia		
58) Mukene		
59) Hyrocynus		
60) Alestes baromous (angara)		
61) Alestes nurse		
62) Bagrus		
63) Protopterus		
64) Other		

D. Processing Sub-sector

Publicly owned processing facilities _____

Fill in the information below about number by category of fish processing method

Types of fish processors by method	**Rank**	**No**
65) Smoking		
66) Sun-drying and salting		
67) Sun-drying		
68) Other		

Fill in the information below about number by category and rank of fish species processed

Types of fish processors by species	**Rank**	**No**
69) Nile perch		
70) Tilapia		
71) Mukene		
72) Hyrocynus		
73) Alestes baremose (angara)		
74) Alestes nurse		
75) Bagrus		
76) Protopterus		
77) Other		

Fill in information below about number of processing assets

Processing assets	**No**
78) Smoking kiln	
79) Drying rack	
80) Drying grounds	
81) Smoking pits	
82) Other	

E. Marketing Sub-sector

83) Description of access roads _____

Fill in the information below about number by category, assets and rank of fish trader

Type of trader	**Rank**	**No**	**Type of equipment**	**No.**
84) Bicycle trader			[1] Bicycle	
85) Truck trader			[2] Truck	
86) Boat trader			[3] Trading Boats	
87) Factory agent			[4] engines	
88) Beach side retailer			[5] Stalls	
89) Other			[7] Other	

Fill in the information below about quantity of fish taken by category and rank of fish trader

Type of trader	**Rank**	**Qty of fish taken weekly**
90) Bicycle trader		
91) Truck trader		
92) Boat trader		
93) Factory agent		
94) Beach side retailer		
95) Other		

Fill in the information below about main destinations of processed fish species

Fish species	**Main destination**	
	Fresh	**Processed**
96) Nile perch		
97) Tilapia		
98) Mukene		
99) Hyrocynus		
100) Alestes baremose (angara)		
101) Alestes nurse		
102) Bagrus		
103) Protopterus		
104) Other		

G. For beaches where chilled transport facilities already exist

105) When did chilled transport facilities first come to your beach? ____Month/year

106) Which fish processing company (ies) do they come from? _____

107) Have you seen them at other beaches? [1] Yes [2] No

108) If yes, mention them _____

109) State positive changes that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach _____

110) State negative changes that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach _____

111) Suggest solutions to the negative change mentioned above _____
_____

H. For beaches where chilled transport facilities do not exist

112) What positive changes do you associate with chilled transport facilities?
_____

113) What negative changes do you associate with chilled transport facilities?
_____

Appendix 2c: **UNIT QUESTIONNAIRE FOR PRODUCTION SUB-SECTOR ENTERPRISES**

A. BACKGROUND INFORMATION

1) Date _____

2) Name of enumerator _____

3) Lake _____

4) District _____

5) Sub county _____

6) Name of beach _____

B. PERSONAL DATA

7) Name of respondent _____

8) Age _____ years

9) Sex [1] Male [2] Female

10) Tribe:
[1] Ganda [2] Soga [3] Mugungu [4] Munyoro [5] Teso
[6] Mukenye [7] Acholi [8] Adhola [9] Alur [10] Other ____

11) Marital Status:
[1] Married [2] Single [3] Divorced [4] Separated [5] Widowed
[6] Other ___

12) What is your level of education?
[1] No schooling [2] Primary [3] Secondary [4] Tertiary
[5] University [6] Other _____

13) What is the main fish species that you target?
[1] Nile perch [2]Tilapia [3] Mukene [4]*Hyrocynus* [5]*Alestes* (angara)
[6] *Alestes nurse* [7] *Bagrus* [8] *Protopterus* [9] Other _____

14) For how long have you fished? _____ **years**

15) How long have you been at this landing? _____ years

16) Household size _____

17) What is your *main* alternative source of income?
[1] Trading [2] Farming [3] Livestock keeping [4] Salaried employment
[5] None [6] Other (Specify) _____

C. INPUT/COST

Capital

18) Do you own a boat? [1] Yes [2] No .

19) If no, do you rent a boat? [1] Yes [2] No

20) If rented, how much do you pay for renting the boat? Shs. _____(Per day/ Week/ Month)

21) If rented, what type of boat do you rent?
[1] Dug-out [2] Parachute [3] Ssesse [4] Congo barike [5] Other _____

Fill in information about the boat your own

22) Type	***23) Year of acquisition***	24) Cost price	25) Expected useful life	26) Salvage value

27) Does the boat you own/ rent use an outboard engine? [1] Yes [2] No=> *Go to Qu35*

28) If yes, do you own or hire the outboard engine?
[1] Own => *Go to Qu30* [2] Hire.

29) If hire, how much do you pay for hiring the outboard engine? Shs. _____(Per day/ Week/ Month)

30) What is the power rating of the outboard engine you hire? _____ Horse Power

Fill in information about the outboard your own

31) Horse power	***32) Year of acquisition***	33) Cost price	34) Expected useful life	35) Salvage value

36) What is the main type of fishing gear you use?
[1] Handlines [2] Longlines [3] Gill nets [4] Basket traps [5] Cast nets [6] Mosquito nets [7] Beach seines [8] Boat seine [9] *Kaganga* (perforated troughs) [10] Scoop nets [11] Other (Specify) _____

Fill in information on gears owned

37) Number	***38) Size (where applicable)***	***39) Year of acquisition***	40) Cost price	41) Expected useful life	42) Salvage value

43) Where did you get capital for starting your enterprise above?
[1] Fishing [2] Farming [3] Credit [4] Others_____

Labour

44) How many crews do you employ per boat? _____

45) How is the crew on your boat remunerated?
[1] Fixed wage rate: Mention amount _____ per day/week/month

[2] %age of revenue: %age _____
[3] %age of net revenue: %age _____
[4] Other _____

46) How many days in a week do your crews work? _____ days

Entrepreneurship

47) (If owner of enterprise), if you are to be paid for managing the enterprise, what is the minimum you would ask for _____ per month
48) (If manager of enterprise), how much are you paid for managing the enterprise _____ per month

Other costs

Fill in information on other costs involved

Item	**Cost per fishing day/week/month**
49) Fuel	
50) Baits	
51) Maintenance of boat	
52) Maintenance of gear	
53) Maintenance of engine	
54) Ice	
55) Other	

Resource base

56) Assess you level of catch? [1] Good => *Go to Qu57* [2] Fair [3] Poor

57) If not good, give reasons?
[1] No enough fish available in lake [2] Too many competitors of my kind
[3] Lack of capital [4] Others (specify)_____

D. OUTPUT/INCOME

Fill in information in table below

Species	**Average daily Quantity sold (in Kgs)**				**Selling price (in Kgs)**			
	Good day	Bad day	Yesterday	Today	Good day	Bad day	Yesterday	today
58) Nile perch								
59) Tilapia								
60) Mukene								
61) *Hyrocynus-*								
62) Alestes-baremose								
63) Alestes nurse								
64) Bagrus								
65) Protopterus								
66) Other								

67) How do you sell your fish?

[1] Weighed in Kgs [2] Bundle [3] Per head [4] Troughs/basins
[5] Other _____

68) To whom do you usually sell your catch?
[1] Factory agent [2] Bicycle trader [3] Beach retailer
[4] Truck trader [5] Boat trader [6] Beach consumer
[7] Beach processor [8] Other _____

69) Do you sell your catch at [1] Only at this beach [2] Sometimes at another beach
[3] Always at another beach [4] Other _____

70) If sometimes at another beach, give one main reason
[1] Better prices offered [2] Near to my fishing grounds
[3] Other _____

71) Do you have any of the following arrangements with your buyers?
[1] Buyer provides money [2] Buyer provides fishing inputs
[3] Other_____[4] No arrangement

D. CONSUMPTION

71) What fish species do you most commonly eat at home?
[1] Nile perch (pete) [2] Tilapia [3] Mukene [4] *Hyrocynus* F (tiger)
[5] *Alestes- baremose* (angara) [6] *Bagrus bayad* (lanya) [7] *Alestes nurse*
[8] *Protopterus* [9] Others (specify)_____

72) How much fish does your family eat each day? _____ Kgs

73) Over the past year, has there been any change in the quantity of fish eaten by your family?
[1] Yes [2] No=> *Go to Qu75*
74) If yes, what change?
[1] Increased [2] Decreased

75) How often does your family eat fish per week? _____

76) Over the past year, has there been any change in the frequency of fish eaten by your family?
[1] Yes [2] No=> *Go to Qu78*

77) If yes, what change?
[1] Increased [2] Decreased

78) Do you buy the fish you eat?
[1] Yes [2] No=> *Go to Qu82*

79) If yes, at what price per kg? Shs. _____

80) Over the past year, has there been any change in the price at which you buy fish for home consumption?
[1] Yes [2] No

81) If yes, what change?
[1] Increased [2] Decreased

82) Over the past year, have the sizes of fish eaten by your family changed?
[1] Yes [2] No=> *Go to Qu84*

83) If yes, what change?
[1] Increased [2] Decreased

84) What is your substitute for fish?
[1] Beans [2] Meat [3] Vegetables
[4] Chicken [5] Others (specify) _____

E. PERCEPTIONS TOWARDS CHILLED TRANSPORT FACILITIES

For beaches where chilled transport facilities already exist

85) State one major positive change that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach

_____

86) State one major negative change that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach

_____

Suggest one main solution to the negative change mentioned above

_____

For beaches where chilled transport facilities do not exist

87) What is the major positive change you associate with chilled transport facilities?

_____

88) What is the major negative change you associate with chilled transport facilities?

Appendix 2d: **UNIT QUESTIONNAIRE FOR FISH PROCESSORS**

Name of enumerator _____

Date _____

1. Lake _____
2. District _____
3. Sub county _____
4. Landing _____

A. PERSONAL DATA

5. Name of respondent _____
6. Age _____ years
7. Sex [1] Male
   [2] Female
8. Tribe
   [1] Ganda [2] Soga [3] Mugungu
   [4] Munyoro [5] Teso [6] Mukenye
   [7] Acholi [8] Adhola [9] Alur
   [10] Other (Specify) _____

9. Marital Status:
   [1] Married [2] Single [3] Divorced
   [4] Separated [5] Widowed
   [6] Other (Specify) _____

10. What is your level of education?
   [1] No schooling [2] Primary [3] Secondary
   [4] Tertiary [5] University
   [6] Other (Specify) _____

11. Household size _____

12. How long have you been at this landing? _____ Years

B. INPUT /COST

Capital

13. What method of fish processing do you employ?
   [1] Smoking [2] Sun drying and salting
   [3] Sun drying [4] Other (Specify) _____

14. What fish processing facilities do you use?
   [1] Smoking kiln [2] Smoking pit
   [3] Drying rack [4] Other (Specify) _____

15. What is the status of ownership of the fish processing unit?
   [1] Privately owned [2] Communally owned

[3] Hired [4] Other (Specify) _____

16. If privately owned, provide the following information:

Asset	*Qty*	*Year of acquisition*	**Cost price** (Shs)	**Expected useful life** (Years)	**Salvage value**
1. Smoking kiln					
2. Drying rack					
3. Wire mesh					
4.					
5.					

17. If hired/ communal, how much do pay? Shs._____ per day/ week/ month

18. Where did you get capital for starting your business?
[1] Fishing [2] Farming [3] Family-capital (inherited)
[4] Loan [5] Other (Specify) _____

19. What other inputs do you use and how much do you pay?

ITEM	**QTY**	**UNIT COST (Shs)**
Firewood		
Salt		
Storage fee (Specify period)		
Packaging material		
Maintenance of processing equipment		
Other		

Labour

20. What sources of labour do you use?
[1] Self-employment [2] Family labour
[3] Hired labour [4] Other (Specify) _____

21. Provide the information below:

SOURCE OF LABOUR	**NUMBER**	**UNIT COST/ DAY/WK/MONTH**
[1] Self-employment		
[2] Family labour		
[3] Hired labour		
[4] Other		

Entrepreneurship

22. If you are to pay someone for managing the fish processing unit, how much would you pay?

Shs. _____per month

23. Assess the supply of raw fish?
[1] Good [2] Fair [3] Poor

24. If poor, give reason for score?
[1] Low catches [2] Too many local competitors
[3] Demand by factory agents [4] Transport problems
[5] Other (Specify) _____

C. OUTPUT/ INCOME

25. What is the most common fish species you process?
[1] Nile perch [2] Tilapia [3] Mukene
[4] Hyrocynus [5] Alestes baromous [6] Bagrus bayad
[7] Alestes nurse [8] Protopterus
[9] Other (Specify) _____

26. Provide the information

Species	Average Weekly Quantity Processed (kgs)	Buying Prices (Shs/kg)	Selling Prices (Shs/kg)
[1] Nile perch			
[2] Tilapia			
[3] Mukene			
[4] Hyrocynus-			
[5]Alestes-baromous			
[6]Aleste nurse			
[7] Bagrus bayad			
[8] Protopterus			

27. To whom do you usually sell your processed fish?
[1] Fish meal factory agent [2] Bicycle trader
[3] Wholesale traders [4] Consumers in outside markets
[5] Consumers at landing [6] Other (Specify) _____

28. Where do you sell your products?
[1] Beach [2] Rural Markets [3] Urban Markets
[4] Regional markets [5] Other (Specify) _____

29. What is your *main* alternative source of income?
[1] Trading [2] Farming
[3] Livestock keeping [4] Salaried employment [5] None
[6] Other (Specify) _____

D. CONSUMPTION

26. What fish species do you most commonly eat at home?

[1] Nile perch (pete) [2] Tilapia [3] Mukene
[4] Hyrocynus F (tiger) [5] Alestes- baromous(angara)
[6] Bagrus bayad(lanya) [7] Alestes nurse
[8] Proteptorus [9] Others (specify)_____

27. How much fish does your family eat each day? _____ Kgs

28. Over the past year, has there been any change in the quantity of fish eaten by your family?
[1] Yes [2] No

29. If yes, what change?
[1] Increased [2] Decreased

30. How often does your family eat fish per week? _____

31. Over the past year, has there been any change in the frequency of fish eaten by your family?
[1] Yes [2] No

32. If yes, what change?
[1] Increased [2] Decreased

33. Do you buy the fish you eat?
[1] Yes [2] No

34. If yes, at what price per kg? Shs. _____

35. Over the past year, has there been any change in the price at which you buy fish for home consumption?
[1] Yes [2] No

36. If yes, what change?
[1] Increased [2] Decreased

37. Over the past year, have the sizes of fish eaten by your family changed?
[1] Yes [2] No

38. If yes, what change?
[1] Increased [2] Decreased

39. What is your substitute for fish?
[1] Beans [2] Meat [3] Vegetables
[4] Chicken [5] Others (specify) _____

E. PERCEPTIONS IN RELATION TO CHILLED TRANSPORT FACILITIES

For Beaches where Chilled Transport Facilities Operate

40. State one major positive change that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach

_____
_____

41. State one major negative change that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach

_____

42. Suggest one main solution to the negative change mentioned above

_____

For beaches where chilled transport facilities do not exist

43. What is the major positive change you associate with chilled transport facilities?

_____

44. What is the major negative change you associate with chilled transport facilities?

_____

Appendix 2e: UNIT QUESTIONNAIRE FOR FISH MARKETING SUB-SECTOR

Name of enumerator _____

Date _____

1. Lake _____
2. District _____
3. Sub county _____
4. Landing _____

A. PERSONAL DATA

5. Name of respondent _____
6. Age _____ years
7. Sex [1] Male
   [2] Female
8. Tribe
   [1] Ganda [2] Soga [3] Mugungu
   [4] Munyoro [5] Teso [6] Mukenye
   [7] Acholi [8] Adhola [9] Alur [10] Other (Specify) _____

9. Marital Status:
   [1] Married [2] Single [3] Divorced
   [4] Separated [5] Widowed [6] Other (Specify) _____

10. What is your level of education?
   [1] No schooling [2] Primary [3] Secondary
   [4] Tertiary [5] University [6] Other (Specify) _____

11. How long have you been at this landing? _____ Years

B. INPUTS/ COSTS

Capital

12. What type of trader are you?
   [1] Bicycle trader [2] pick-up trader [3] Boat trader
   [4] Factory agent [5] Beach side retailer [6] Other (Specify) _____

13. What fish trading assets do you own?

Asset	*Year Of Acquisition*	**Cost Price**	**Expected Useful Life**	**Salvage Value**
[1] Bicycle				
[2] Basket				
[3] Ice boxes				
[4] Truck				
[5] Boat				

[6] Engine				
[7] Stall/slab				

14. What other inputs do you use and what are their costs?

Input	Qty	Unit Cost
Fuel		
Ice		

15. How many days a week do you operate? _____

16. Where did you get capital for starting your business?
    [1] Fishing [2] Farming [3] Family-capital (inherited) [4] Loans
    [5] Others_____

Labour

17. What sources of labour do you use?
    [1] Self-employment
    [2] Family labour
    [3] Hired labour
    [4] Other

18. Provide the information below:

Source Of Labour	Number	Unit Cost/ Day/ Wk/Month
[1] Self-employment		
[2] Family labour		
[3] Hired labour		
[4] Other		

Entrepreneurship

19. If you were to pay someone for managing your trading business, how much would you spend? Shs. _____ per month

20. Assess the supply of fish?
    [1] Good [2] Fair [3] Poor
21. If poor, give reasons for score?
    [1] Low catches [2] Too many local competitors
    [3] Demand by factory agents [4] Transport problems
    [5] Other (Specify) _____

OUTPUT/ INCOME

22. What is the main fish species that you trade in?
    [1] Nile perch [2]Tilapia [3] Mukene

[4]*Hyrocynus* [5]*Alestes baromous* [6] *Alestes nurse*
[7] *Bagrus bayad* [8] *Protopterus*
[9] Other (Specify) _____

23. Provide the information below:

Species	Average Weekly Quantity Traded (kg)	Buying Prices (Shs/kg)	Selling Prices (Shs/kg)
[1] Nile perch			
[2] Tilapia			
[3] Mukene			
[4] *Hyrocynus-*			
[5*]Alestes-baromous*			
[6*]Aleste nurse*			
[7] *Bagrus bayad*			
[8] *Protopterus*			
[7] Other			

24. Where do you sell your fish?
[1] Beach consumers [2] Rural markets [3] Urban markets
[4] Regional markets [5] Other (Specify) _____-

Thank you

Appendix 2f: UNIT QUESTIONNAIRE FOR FISH CONSUMERS

Name of enumerator _____

Date _____

5. Lake _____
6. District _____
7. Sub county _____
8. Landing ___-_____

A. PERSONAL DATA

8. Name of respondent _____
9. Age _____ years
10. Sex [1] Male
    [2] Female
10. Tribe
    [1] Ganda [2] Soga [3] Mugungu
    [4] Munyoro [5] Teso [6] Mukenye
    [7] Acholi [8] Adhola [9] Alur
    [10] Other (Specify) _____

11. Marital Status:
    [1] Married [2] Single [3] Divorced
    [4] Separated [5] Widowed
    [6] Other (Specify) _____

19. What is your level of education?
    [1] No schooling [2] Primary [3] Secondary
    [4] Tertiary [5] University [6] Other (Specify) _____

20. Household size _____

21. How long have you been at this landing? _____ Years

B. CONSUMPTION

29. What fish species do you most commonly eat at home?
    [1] Nile perch (pete) [2] Tilapia [3] Mukene
    [4] *Hyrocynus* F (tiger) [5] *Alestes- baremose* (angara)
    [6] *Bagrus bayad* (lanya) [7] *Alestes nurse*
    [8] *Proteptorus* [9] Others (specify)_____

30. How much fish does your family eat each day? _____ Kgs

31. Over the past year, has there been any change in the quantity of fish eaten by your family?
    [1] Yes [2] No

32. If yes, what change?

[1] Increased [2] Decreased

33. How often does your family eat fish per week? _____

34. Over the past year, has there been any change in the frequency of fish eaten by your family?
    [1] Yes [2] No

36. If yes, what change?
    [1] Increased [2] Decreased

37. Do you buy the fish you eat?
    [1] Yes [2] No

38. If yes, at what price per kg? Shs. _____

39. Over the past year, has there been any change in the price at which you buy fish for home consumption?
    [1] Yes [2] No

45. If yes, what change?
    [1] Increased [2] Decreased

46. Over the past year, have the sizes of fish eaten by your family changed?
    [1] Yes [2] No

47. If yes, what change?
    [1] Increased [2] Decreased

48. What is your substitute for fish?
    [1] Beans [2] Meat [3] Vegetables
    [4] Chicken [5] Others (specify) _____

C. PERCEPTIONS IN RELATION TO CHILLED TRANSPORT FACILITIES

For Beaches where Chilled Transport Facilities Operate

49. State one major positive change that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach

_____

50. State one major negative change that you have noticed ever since chilled transport facilities for Nile perch started coming to this beach

_____

51. Suggest one main solution to the negative change mentioned above

_____

For beaches where chilled transport facilities do not exist

52. What is the major positive change you associate with chilled transport facilities?

53. What is the major negative change you associate with chilled transport facilities?

Appendix 3: EXTRACT FROM THE FISHING (AMENDMENT) RULES, 2001 FOR LAKES ALBERT, KYOGA AND KWANIA

STATUTORY INSTRUMENTS
SUPPLEMENT No. 41 7th December,2001

STATUTORY INSTRUMENTS SUPPLEMENT

to The Uganda Gazette No. 78 Volume XCIV dated 7th December, 2001.

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S T A T U T O R Y I N S T R U M E N T S
2001 No. 73
The Fishing (Amendment) Rules, 2001.

(Mode under section 43 of the Fish Act, Cap. 228)

IN EXERCISE of the powers conferred upon the Minister responsible for fisheries by section 43 of the Fish Act, these Rules are made this 28th day of November 2001. Cap. 228.

1. These Rules may be cited as the Fishing (Amendment) Rules, 2001 and shall be read as one with the Fishing Rules, 1964 Title. S.1.228-6

2. The Fourth Schedule to the Fishing Rules, 1964 is repealed and substituted with the Schedule to these Rules Substitution of Fourth Schedule

SCHEDULE
FOURTH SCHEDULE
PART 1

Waters	Fishing Vessel Licence section 7(1)a of the Act			Specific Licence section 9(2) of the Act		
	CITIZENS			NON CITIZENS		
	LOA<5m	LOA5-11m	LOA>11m	LOA<5m	LOA5-11m	LOA>11m
L. Albert	10,000	20,000	30,000	Prohibited	500,000	1,000,000
L. Kyoga	5,000	10,000	15,000	Prohibited	500,000	1,000,000
L. Kwania	5,000	10,000	15,000	Prohibited	500,000	1,000,000

Waters	PART II					
	SPECIFIC LICENCES section 8(1)b of the Act					
	TRUCK BASED			VESSEL BASED		
	GRT<5t	GRT5-10t	GRT>10t	LOA<11m	LOA11-15m	LOA>15m
L. Albert	130,000	150,000	200,000	130,000	150,000	250,000
L. Kyoga	130,000	150,000	200,000	130,000	150,000	250,000
L.Kwania	130,000	150,000	200,000	130,000	150,000	250,000