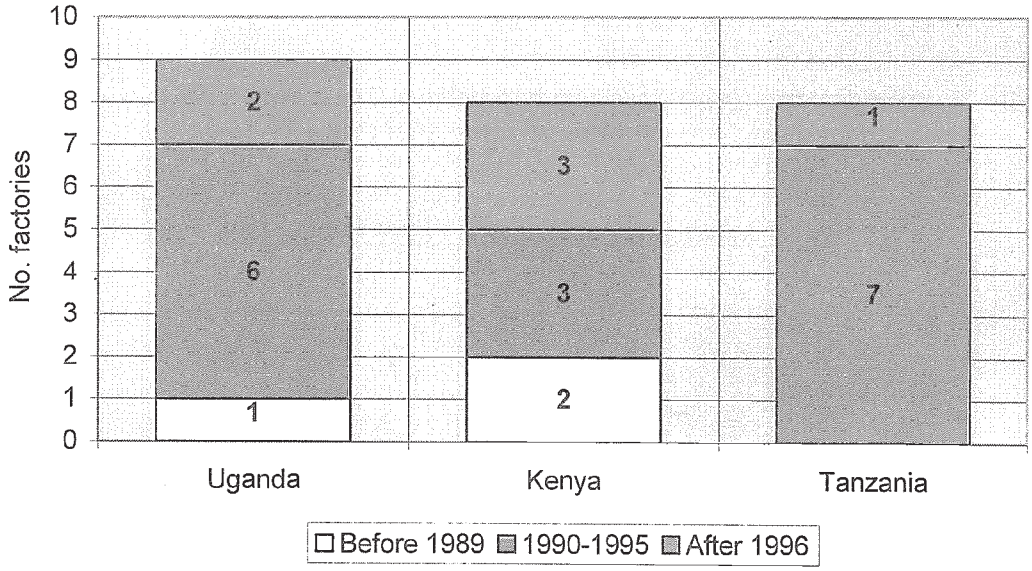
Chapter 4. The survey of industrial processors

4.1. Summary of findings: a profile of a typical Nile perch industrial processing company

4.1.1. Most of the 25 fish processing factories which make up the sample are located within 60km of the lake – only two visited for this survey are located in Nairobi. Access to two of the factories within the 60 km. boundary could not be obtained. As 91% of the population of factories within this geographical boundary were interviewed, however, the answers are taken as being representative, at least to that same level (Fig. 42).

4.1.2. Factories established since 1990 comprise 88% of the sample, whilst the remainder were established between 1970 and 1989 (Fig. 33).

Fig.33: Year factories were established

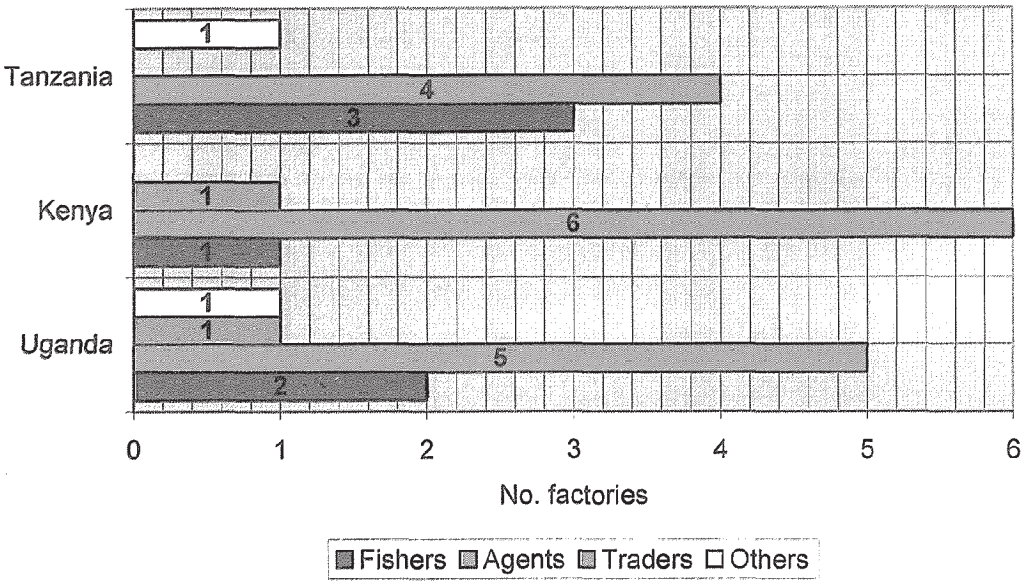


4.1.3. 84% of factories buy their Nile perch from agents and fishers (Fig. 34). Both types of suppliers will either be employed or contracted the factory (52%) or will have a long standing trading relationship with the factory (40%; Table 40).

Table 40: Relationships which factories have with their suppliers:

Relationship	Frequency	%
Employed by factory	2	8.0
Contracted by factory	11	44.0
Long-standing relationship with factory	10	40.0
Other	2	8.0
Total	25	100

Fig. 34: Factories' suppliers by country



4.1.4. 21 of the factories experience supply problems. These were primarily attributed to low catch levels and transport-related difficulties (Fig.s 35-36).

Fig.35: Whether or not factories have supply problems

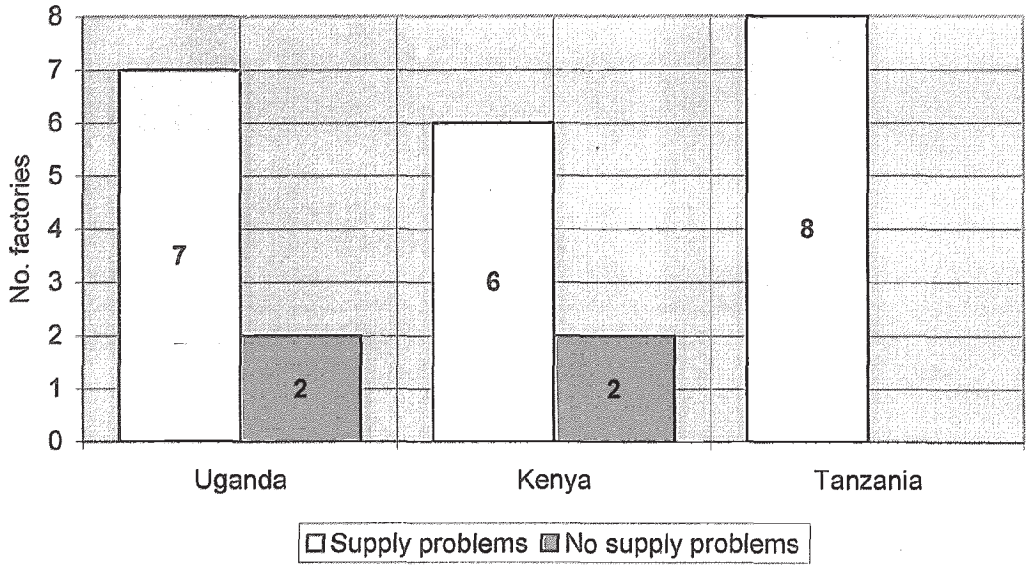
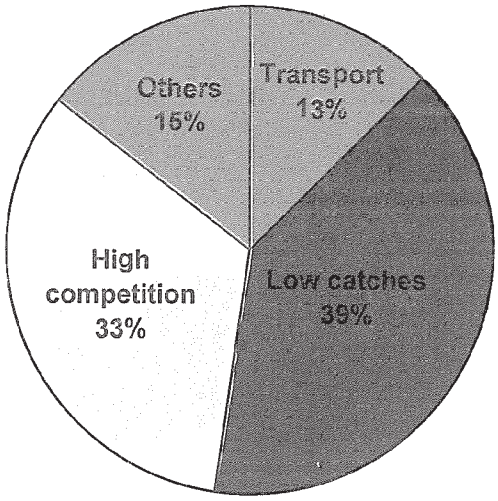


Fig.36: Factories' reasons for supply problems



4.1.5. The modal answer for volume of fish intake over 24 hours is 20 tonnes. The combined 25 industrial processors interviewed have a potential volume intake of 823 tonnes over a 24 hour period (Fig. 37). The mean capacity at which these factories operate is 57% making the actual volume intake figure to be 469 tonnes/24 hours, or 19 tonnes per factory per 24 hours. Assuming that factories operate 260 days a year, this throughput represents a regional annual fish intake of 121,940 tonnes of Nile perch.

4.1.6. 40% of the factories record a highest price paid per kilo of US$ 1.21 when purchasing Nile perch supplies. 60% of factories record a lowest price range of under US$ 0.50 a kilo.

4.1.7. 15 factories closed down during the last 24 months, 12 for renovation in response to EU quality control demands. Duration of closure ranged from 10 days to 14 months with the longer closures being related to renovation and the shorter ones to the EU ban on fish from the region.

4.1.8. Both organoleptic testing and laboratory tests are used to check the quality of incoming fish in 17 factories, while the remaining 8 use organoleptic testing alone. There is an even spread of these methods throughout the region. The mean percentage of fish rejected over month prior to the interview due to poor quality was 4.4%, some 450 tonnes of fish in total (Fig. 38).

Fig. 37: Regional daily factory capacity (m.t.) by country

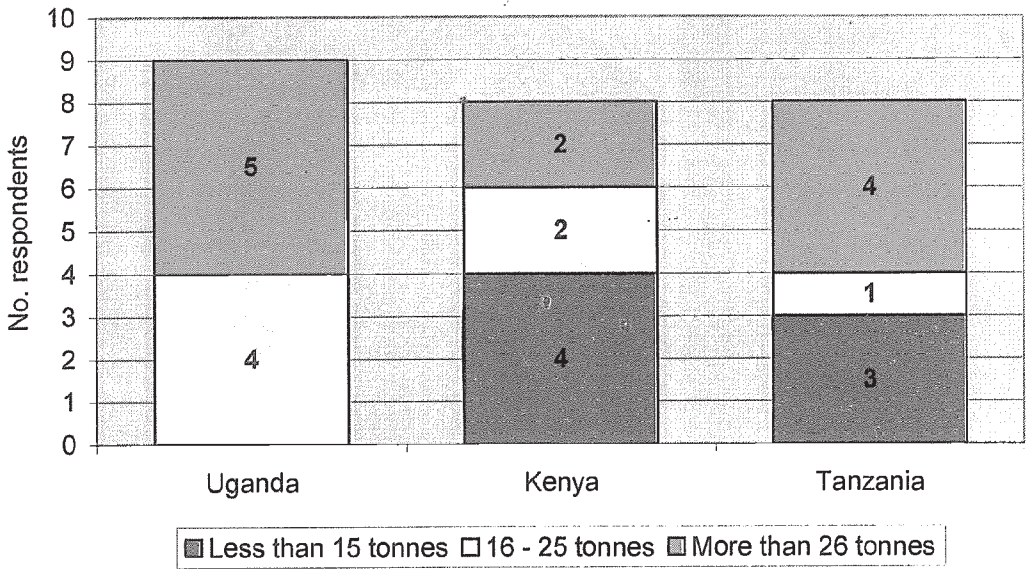
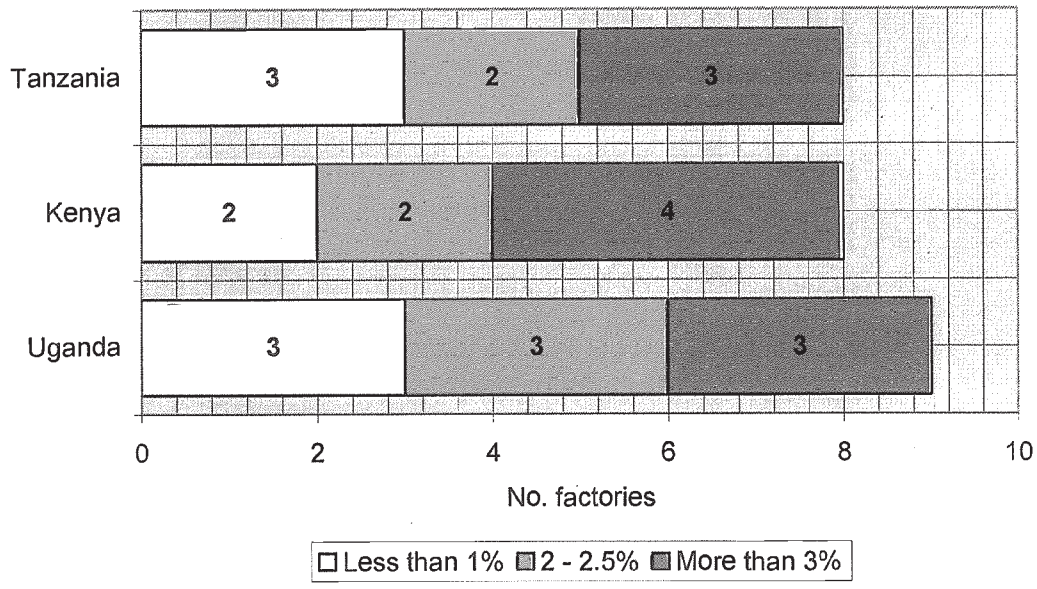


Fig.38: Ranges of factories' rejection rates by country



4.1.9. The most frequently mentioned export markets were Europe, (which included specific mentions of Italy, West Germany and Holland) followed by the Far East. Other markets mentioned were the USA, the Middle East and Australia (Fig 39). The product range entering the above markets include: chilled fillets, frozen fillets, portions, head-on gutted fish, head-off gutted fish and kosher products (Fig. 40). Price ranges for these products varies from US$ 2-4.5 per kilo. Buyers are mainly wholesalers, and demand is described as 'high'. Demand is expected to remain high over the next five years (Table 41).

Fig.39: Factories' export markets

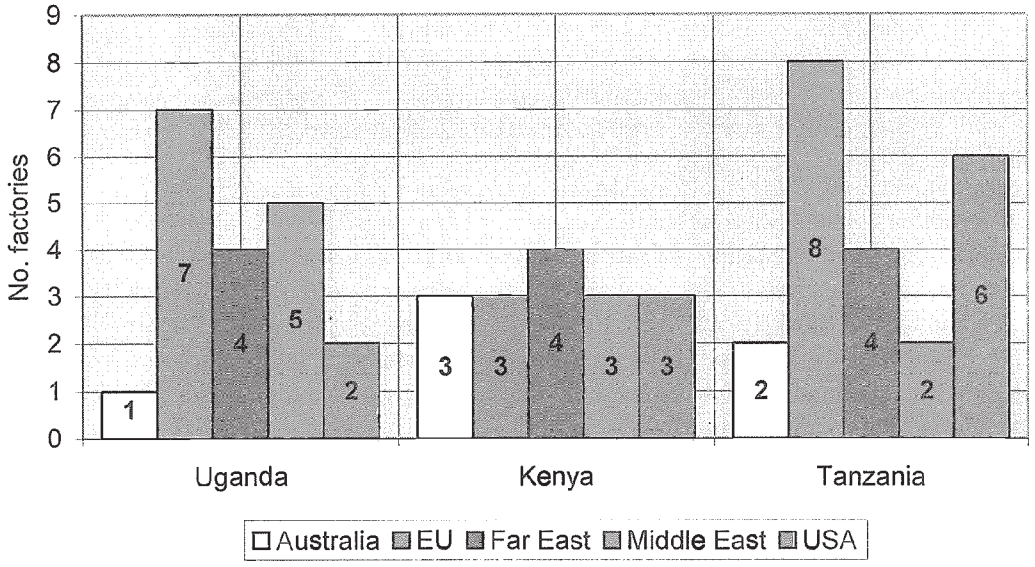
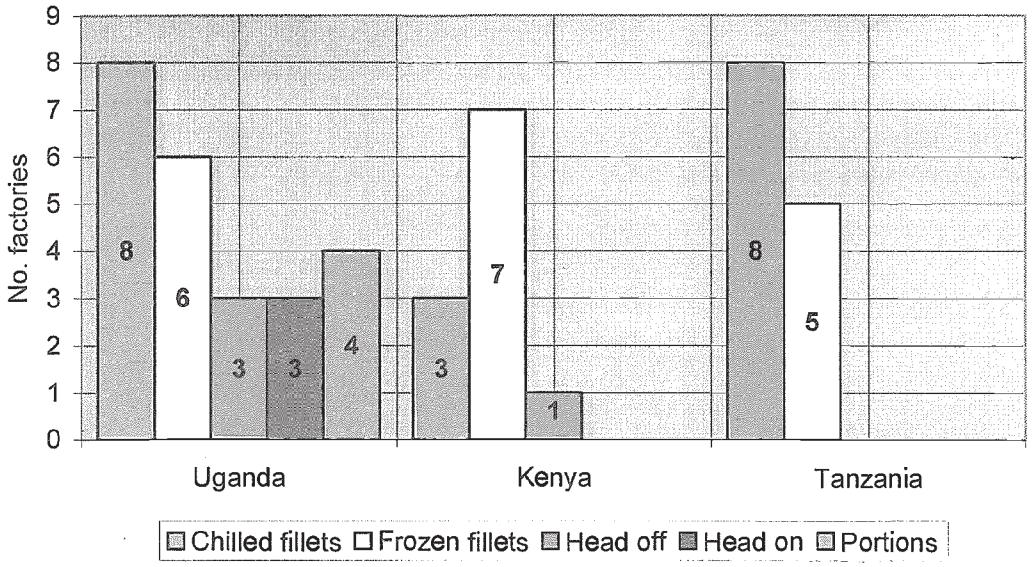


Fig. 40: Regional factory products



4.1.10. By-products include skin, oil, swim bladders and fish frames. Maws are exported to Far Eastern markets while all other by-products are sold locally. These products sell for US$ 0.01–12 per kg, the higher prices being for maws and lowest for skin. Purchasers of by-products include wholesalers, artisanal processors and fish meal factories. Demand for by-products is rated as high and expected to remain so for the next five years (Table 41).

4.1.11. Ugandan processors obtain advice on the import regulations of external markets from the Bureau of Standards. Kenyan processors appear not to rely on anyone for such information, while Tanzanian filleting factories cited buyers and the Fisheries Department as sources of information. The main problem cited in relation to fulfilling import regulations was lack of appropriate skills (Tables 42-43).

4.1.12. Industrial fish processors felt that they had contributed to national development by providing employment, improving fish handling services, and by providing infrastructural facilities to landing sites (Table 44).

Product	Destination market	Sales price range per kilo		Types of buyers at destination	Levels of demand	Expected future market demand
Main product 1.Chilled fillets: 19 2.Frozen fillets: 18 3.Portions: 5 4.Head on gutted: 3 5.Head off gutted: 1 6.Kosher: 1	EU: 18 Far east: 12 Middle east: 10 U.S.A: 11 Australia: 6 South Africa: 1 Local market: 1	**Highest** $4.5	**Lowest** $2.5	1. Middlemen: 5 2. Wholesalers: 15 3. Supermarkets: 2 4. Others: 4	1. High: 15 2. Medium: 6 3. Low: 4	1 High: 18 2. Medium: 4 3. Low: 1
By-products 1. Skin 2. Oil 3. Swim bladder 4. Frame 5. Other	Local: 25 Far East: 5	$12 (swim bladder)[1]	$0.01 (skin)	1. Middlemen: 25 2. Retailers: 13 3. Artisanal processors: 10 4.Wholesalers: 14 5. F/meal factories: 11 6. Others: 6	1 High: 14 2. Medium: 3 3. Low: 4	1. High: 14 2. Medium: 3 3. Low: 4

Table 41: The survey of industrial processors: summary table of findings

[1] Swim bladders are the most expensive by-product (US$ 12) and are mainly exported to the Far East. The skin is the cheapest product (US$ 0.01). Some factories throw away the by-products. Most by-products are sold to local buyers.

Table 42: Factories' sources of advice on the import regulations of their markets

	Country			
Source of advice	Uganda	Kenya	Tanzania	Total
Customer	3	-	2	5
Uganda National Bureau of Standards	8	-	-	8
Fisheries Dept.	3	-	4	7
Other	1	1	2	4
Total	15	1	8	24

Table 43: Factories' problems implementing the import regulations of their markets

	Country			
Problem	Uganda	Kenya	Tanzania	Total
Lack of skills	3	3	2	8
Other	5	2	1	8
No problems	-	-	5	5
Total	8	5	8	21

Table 44: Ways factories feel they have contributed to national development (total exceeds 25 because factories offered various options)

	Country			
Developmental contribution	Uganda	Kenya	Tanzania	Total
Contribute to fishers' incomes	7	1	6	14
Employment generation	1	7	4	12
Hyacinth removal	7	1	-	8
By-products sold to artisanal processors	-	2	1	3
Provide gear/fisheries inputs	-	-	3	3
Provision of landing infrastructure	5	1	-	6
Other	2	4	3	9
Total	22	16	17	55

4.1.13. The main problems identified by fish processors were inadequate or irregular fish supplies, infrastructural problems and fluctuating costs (Table 45).

Table 45: Factories' problems (Total exceeds 25 because factories offered various options).

	Country			
Problem	Uganda	Kenya	Tanzania	Total
Poor infrastructure	1	5	5	11
Taxes too high	-	1	6	7
No government assistance	3	2	1	6
Poor handling at landings	1	1	1	3
Fish supply fluctuations/declines	4	3	1	8
Lack of qualified personnel	-	-	3	3
Other	8	7	5	20
Total	17	19	22	58

4.2. Objectives of the survey of industrial processors

a. To investigate the quality of supply and sources of fish to the processing industry.

b. To examine the marketing channels and distribution of fish.

c. To study the development of product ranges of fish to the factory.

d. To investigate the marketing of the final products and by-products.

4.3. Detailed analysis

4.3.1. The development of the Nile perch processing industry commenced in Kenya, where, in 1987, 10 factories processed Nile perch products (Reynolds and Greboval, 1988; Gibbon, 1997). These have since changed hands and company names, which accounts for the fact that six of the eight Kenyan factories visited for this survey were established after 1990 (Fig. 33). All Tanzanian factories opened after 1990, the majority having opened between 1990 and 1995. The history of investment in Tanzania commenced in the early 1990's as world demands for high quality fish soared following a temporary shortage of Atlantic cod (Gibbon, 1997; Harris *et al.* 1995). Initial Kenyan entry into the Tanzania market came about with the search for additional supplies of fish. Between 1991 and 1992, however, Tanzania implemented laws banning the export of whole and 'semi-processed' fish. These laws coincided with the creation of a number of Tanzanian investment incentives, including various types of tax incentives, as well as significant devaluation of the Tanzanian shilling and the repeal of labour protection laws (Gibbon, 1997). By 1991 there were 15 filleting plants in operation in Tanzania (van der Hoevan and Budeba 1992), and in 1996, there were 7 plants in operation in Mwanza and one in Musoma (Gibbon, 1997). Less is known about early developments in Nile perch processing capacity in Uganda. In 1990, there were five Uganda-based Nile perch processing plants with an annual processing capacity of 15,000 tonnes of whole fish (Ssali *et al.* 1991). Seven of the Ugandan plants visited during this survey were established between 1990 and 1995 (Fig. 33).

4.3.2. Factories almost always procure fish supplies via agents who they have either contracted or with whom they have a long standing relationship (Fig. 34). In this way, the cost of rejected fish can be transferred to the agent. In Tanzania, more factories obtain their supplies directly from fishers than do Ugandan or Kenyan-based companies. In Tanzania, the investment by factories in the fishing fleet has been considerable, such that whole fleets exist dedicated to supplying one or more factories with fish (Gibbon 1997). Typically, Tanzanian factories will have contractual arrangements with the *tajiri* (proprietor) in charge of these fleets (Gibbon 1997). There is no evidence of this system of procurement in Kenya nor Uganda.

4.3.3. Despite these kinds of arrangements, factories still encounter supply problems. Of the 25 factories visited throughout the region, only 4 claimed not to have supply problems (2 in Kenya and 2 in Uganda). When questioned as to why such problems occurred, 48 responses were obtained, of which the most common were low catches (40% of responses) and competition for limited fish supplies (33%) (Fig.s 35-36).

4.3.4. Regionally, prices for Nile perch at landing sites was highest in Uganda, where seven out of nine factories visited reported an average maximum beach price of over US$ 1.21 per kilo in 1998. Maximum prices were lowest in Tanzania where 6 out of eight factories reported maximum prices at under US$ 0.87 per kilo. Minimum prices show far greater variability throughout the region and no clear trends. Taking the mean of highest and lowest prices combined, lowest Nile perch prices are obtained in Tanzania at US$ 0.65 a kilo, and highest prices in Kenya at US$ 0.98. Ugandan prices came to an average of US$ 0.87.

4.3.5. On average, the fish processing plants sampled have the capacity to process 823 tonnes of whole fish a day, or 33 tonnes per factory. Combined capacity is highest in Tanzania where the eight factories visited had a capacity of 402 tonnes of whole fish (Fig. 37). Generally, however, the region's factories rarely operate to full capacity. Just two Tanzanian factories claimed to operate at 100% capacity. Tanzanian factories presently operate at an average of 69% of total capacity, the highest in the region, which is equivalent to 35 tonnes of whole fish per day per factory, worth around US$ 22,750 per factory. Total Ugandan capacity was 285 tonnes intake per day. On average, Ugandan factories operated at 45% of a total capacity, or 14 tonnes whole fish per day per factory, worth some US$ 12,180 per factory. Average operating capacity in Kenya is 49% out of a total daily intake capacity of 136 tonnes of whole fish. Kenyan factories purchase an average of 8 tonnes whole Nile perch each per day worth around US$ 7,840.

4.3.6. As more and more of the region's factories have turned to exploit the European Union market, so too more and more of them have been subjected to EU marketing regulations. Over the past two years 15 out of the 25 factories visited within the region have been obliged to close, primarily to comply with EU processing regulations. Regionally, average closure times were four months, although with wide variation. Presently, factories typically maintain quality through a combination of organoleptic testing and laboratory tests. On average, 4% of fish arriving at the factory door is rejected, although one factory claimed to reject up to 30% of fish arriving at its gates. In Kenya, 50% of factories reject 3% and over of the fish they receive (Fig. 38). 68% of the region's factories sell their rejects to local processors and/or traders. Just 3 factories sold their rejected fish to the fish meal industry (Table 41).

4.3.7. The region's main markets are in the EU, the Far East and the Middle East. 7 out of 8 Ugandan factories sold to the EU, as did all Tanzanian factories. Following severe difficulties in meeting EU quality standards, just 3 Kenyan factories claimed to export to the EU. The main Kenya markets lay in the Far East (Fig. 39). Regionally, average minimum international prices were US$ 2.8 per kilo of fillet, and maximum prices US$ 3.3 per kilo of fillet, or a combined average of US$ 3.1 per kilo. The most expensive fillets come from Uganda, where combined average came to US$ 3.35 per kilo of fillet, while Kenyan and Tanzanian prices were far more similar at US$ 2.95 and 2.97 per kilo of fillet respectively (untabulated data). If the calculation

(combined daily output) x (260 working days) x (US$/kg)

is followed, in which combined daily output is calculated as 33% of stated daily intake, then the value of the Kenyan export market is the smallest in the region at US$ 34.8 million, followed by Uganda's at US$ 81.9 million. Tanzania's is the largest in the region at US$ 102.7 million.

4.3.8. The region's factories' main products are frozen fillets and chilled (fresh) fillets. In Uganda, all factories sold chilled (fresh) fillets, 6 sold frozen fillets. In Kenya, 7 factories sold frozen fillets, while 3 sold chilled fillets. In Tanzania, all factories sold chilled fillets, while 5 sold frozen fillets (Fig. 40).

4.3.9. 15 out of 22 factories dealt with wholesale distributors in their markets, followed by 5 who dealt with 'middlemen'. 60% of the region's factories gauged current demand for their main products to be 'high', and 78% expected demand to remain at this level (Table 41).

4.3.10. All factories surveyed generated by-products which, with the exception of maws, they disposed of on local markets. When questioned as to whom they sold by-products to, 91 responses were obtained, of which 'middle men' was the most common (28%) followed by local processors (24%). Sales to fishmeal factories gained 12% of responses, most of which were Kenyan in origin (8%). Ugandan plants do not appear to sell by-products to fishmeal factories (Table 41). The trade in Nile perch frames has attracted much recent attention (Abila 1994, 1995, 1996; Gibbon, 1997; Abila and Jansen, 1997; Jansen, 1997). 19 factories visited for this survey sold frames on to the local market. Kenyan plants sold most of theirs to middlemen and fishmeal factories, Ugandan plants sold theirs mainly to local processors and wholesalers, while Tanzanian plants sold most of their frames to similar outlets (Table 41). Factories throughout the region rated current demand for by-products to be high (67%: Table 41), and expected demand to remain at this level into the future (67%: Table 41).

4.3.11. All factories were aware of the import regulations in place in their destination markets, and all claimed to implement these. Ugandan processing plants appeared to obtain most advice on what regulations to implement, mainly from the Ugandan National Bureau of Standards and their customers. Tanzanian plants obtained advice from their customers and the Tanzanian Fisheries Department. Kenyan plants appeared to receive very little advice (Table 42). Most factories admitted to difficulties in implementing the regulations that affected them, of which lack of skills was considered the worst problem (38%: Table 43).

4.3.12. Nile perch processing plants were questioned as to the various taxes they were obliged to pay, and 53 responses were obtained. In Uganda 22 responses were obtained, of which the main ones were import taxes (6), VAT (5) and corporate taxes (7). Kenyan plants provided 9 responses, but no one tax type dominated. Tanzanian plants paid a very high diversity of taxes, of which royalties were the most important 8 out of 22 responses: Table 46).

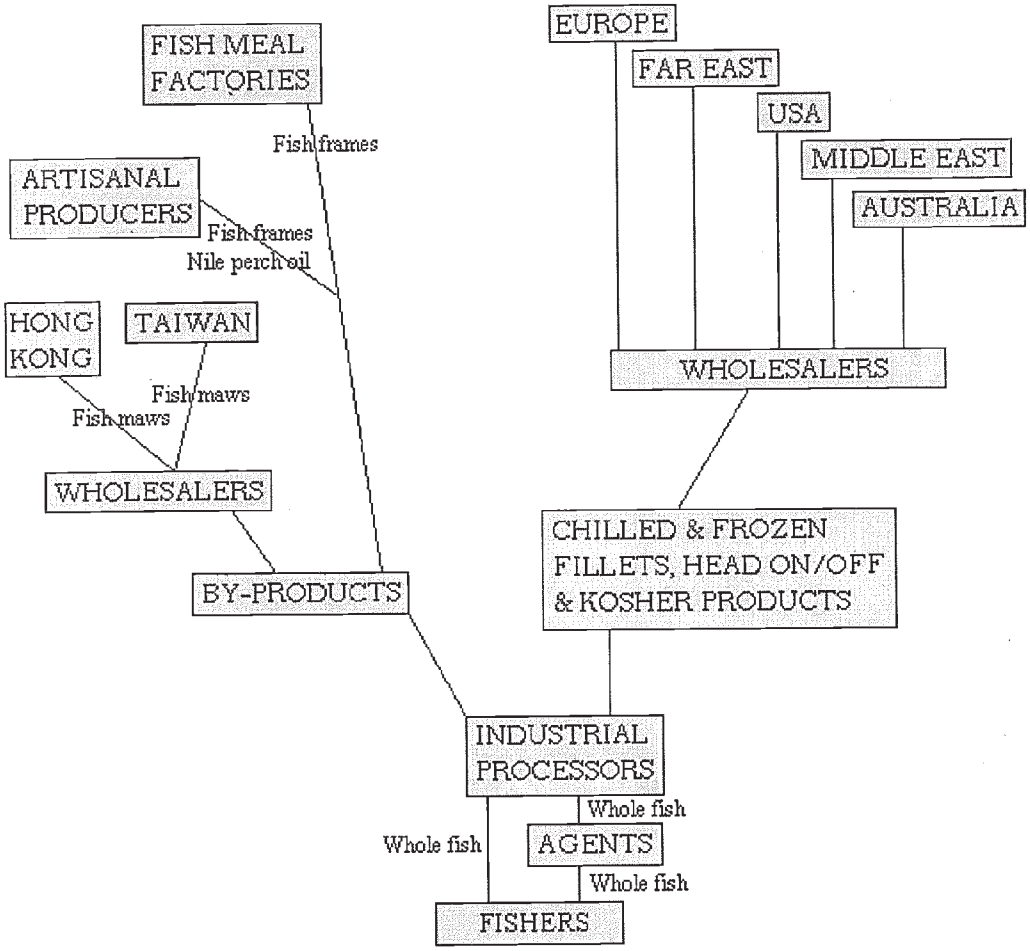
Table 46: Taxes paid by the region's factories (Total exceeds 25 because factories offered various options).

	Country			
Tax	Uganda	Kenya	Tanzania	Total
Corporate tax	7	-	-	7
VAT	5	1	1	7
Import taxes	6	1	-	7
Fish trading licenses	1	2	-	3
Royalties	-	-	8	8
Industrial cess	-	-	5	5
Other	3	5	8	16
Total	22	9	22	53

4.3.13. Industrial processors were questioned on the ways in which they considered they had contributed to national development, and 55 responses were obtained. The largest proportion of factories felt that their input had come in the form of contributions to fisher's incomes (25% of responses) and through the provision of employment (22% of responses). Most Ugandan factories felt that their contribution came in the form of hyacinth removal (32% out of 22 responses), while most Kenyan factories felt their main contribution was through employment (44% of 16 responses). In Tanzania, plants highlighted their contributions to fishers' incomes (35% out of 17 responses) and through employment generation (23%: Table 44).

4.2.14. Industrial processors were questioned on the kinds of problems they encountered, and 58 responses were obtained (Table 45). Regionally, the main problems mentioned were the state of road infrastructure (19%), fish supply fluctuations and declining supplies (14%) and taxes being too high (12%). Kenyan plants complained mainly of poor infrastructure (26% out of 19 responses) and fish supply problems and fluctuations (16%). Ugandan plants complained of fish supply problems and fluctuations (24% of 17 responses) and lack of government assistance (18%, despite also claiming to receive information about foreign markets from the Uganda Bureau of Standards). Out of 22 Tanzanian responses, the main concerns were high taxes (27%) and poor infrastructure (23%).

Fig. 41: The industrial distribution channel for Nile perch



4.4. The survey of industrial processors: sampling strategies, field difficulties, possible areas of bias and recommendations

4.4.1. The sample selection strategy.

a. Given the wide dispersion of factories and the absence of a current list of operative factories, it was difficult to select factories for the survey without actually visiting them. Some factories were permanently closed, while others were closed for renovation following the EU import ban. In addition, some factories were too weary of outsiders to permit entrance. As a result, the total sample was smaller than originally anticipated.

4.4.2. Sample selection strategy and the dynamics of fieldwork.

a. Ideally, the questionnaire should have been answered by two or more respondents so as to better answer the questions posed – possibly a panel of key informants. Some areas of the questionnaire related to the quantity of volume throughput, some to quality and some to financial matters. It was difficult for single respondents to provide information on all these areas.

4.4.3. Fieldwork

a. Difficulties arose for the same reasons mentioned in 4.4.4. and 4.4.5. below.

4.4.4. Respondents' typical reaction to the survey questionnaires.

a. Respondents found questions relating to taxation difficult and did not want to reveal financial information.

b. In some instances, worried about EU export regulations, respondents were unwilling to provide information.

c. Some factories were unwilling to allow researchers in, while others were suspicious of outsiders.

d. Because the factories have rarely received assistance from Fisheries Department staff, they are reluctant to talk to anyone with governmental connections.

4.4.5. Possible areas of bias

a. If the factory manager was not there, his/her employees were reluctant to give out information. If respondents with whom appointments had been made were absent, enumerators were obliged to speak with anyone who was willing to speak with them.

b. The latter problem was exacerbated by the survey being carried out during the period of an EU ban on fish exports.

c. Q 7: Please provide the highest price and the lowest price of fish on the beaches. Respondents may have inflated these prices to give the impression that they were paying out more than they really were.

d. Q 18 & 19: Refer to what taxes the companies pay. Factories were sensitive to these questions because they thought that, by posing questions on taxes, they were somehow under investigation. They sometimes complained that they did not know what taxes they paid and referred interviewers to Customs and Excise Departments.

4.4.6. Questionnaire testing

a. There were concerns about questionnaire testing given the small population size and because the nature of the interview was akin to a structured discussion. No questionnaire testing was carried out as a result.

4.4.7. Questions which were ineffective.

a. Respondents were often reluctant to disclose information concerning fish prices. Variation amongst responses suggests that these questions may not have been effective.

4.4.8. Recommendations for future survey design

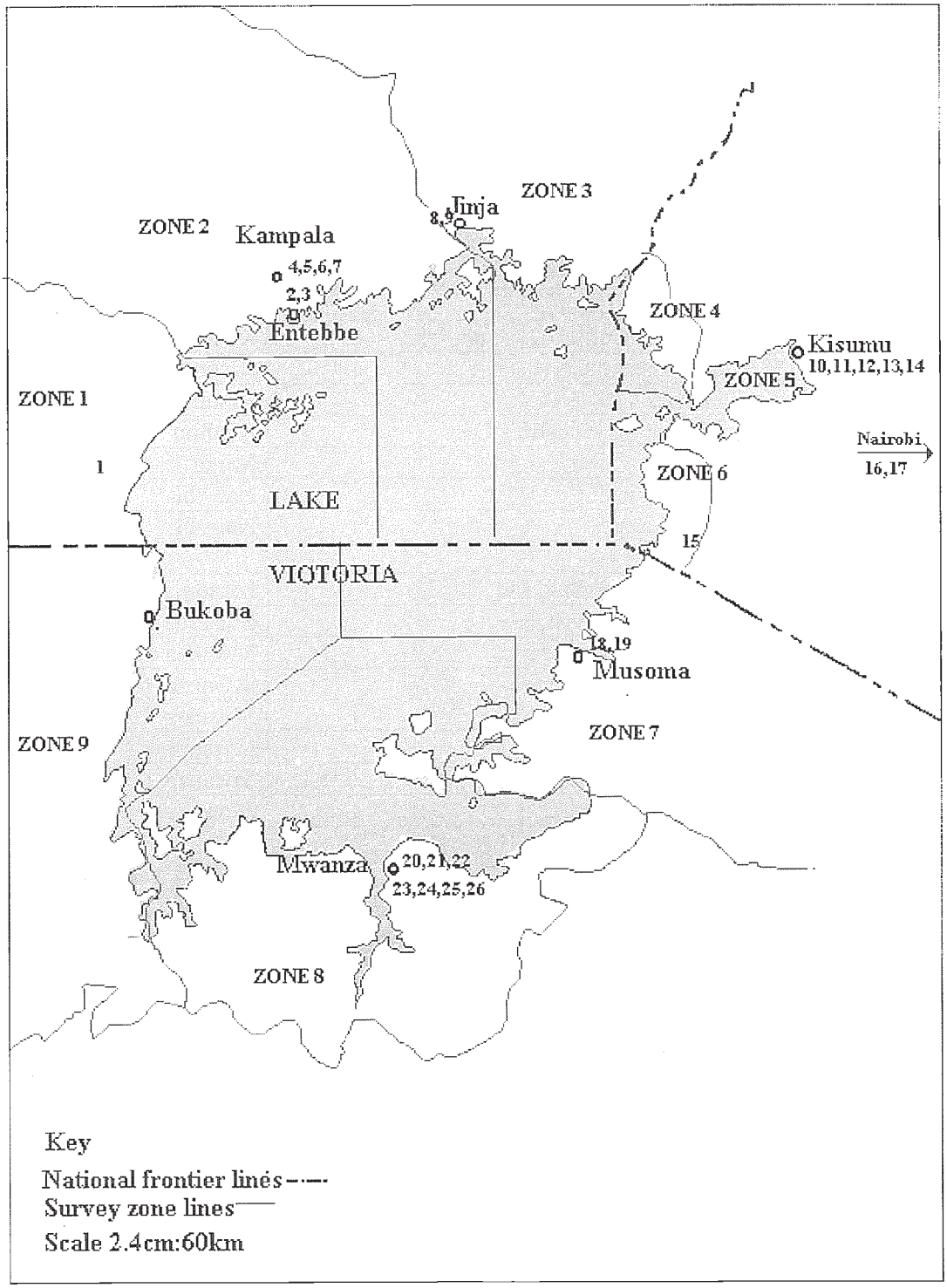
a. Other agencies, such as the region's Customs and Excise Departments, fish processors and exporters associations and fisheries departments should have been visited during the survey preparation phase in case they held key information.

b. Results of the survey should be presented at stakeholder workshops. Rapid dissemination of results should be encouraged. Stakeholders ought to be involved in the planning phase.

4.4.9. Interview sites for the survey of industrial processors

Site i.d.	Factory name	Location
Uganda		
1	Byansi Fisheries Co. Ltd.	Kalisizo
2	Green Fields Co. Ltd.	Entebbe
3	Clovergem Fish and Food Ltd.	Entebbe
4	Ngege Ltd.	Kampala/Port Bell
5	Uganda Fish Packers	Kampala/Nakawa
6	Hwan Sung Ltd.	Kampala/Ntinda
7	Uganda Marine Products	Kampala/Mpelerwe
8	Gomba Fishing Industries Ltd.	Jinja
9	Marine and Agro. Export Processing Ltd.	Jinja
Kenya		
10	Tropical Foods Co.	Kisumu
11	Star Fisheries Co.	Kisumu
12	Kendag Fisheries Co.	Kisumu
13	Peche Foods Co.	Kisumu
14	Morden Fishing Industries Co.	Kisumu
15	Prinsal Co.	Migori
16	Tilley Industries	Nairobi
17	Samaki Industries	Nairobi
Tanzania		
18	Fish Filleters Tanzania Ltd.	Musoma
19	Fish Pak International	Musoma
20	Nile perch Industrial	Mwanza
21	Mwanza Fish Industrics	Mwanza
22	Vic Fish	Mwanza
23	Victoria Industrial	Mwanza
24	Tanzania Fishing Processor	Mwanza
25	Omega Industrial	Mwanza

FIG 42 MAP OF STUDY SITES FOR THE SURVEY OF INDUSTRIAL PROCESSORS



LAKE VICTORIA FISHERIES RESEARCH PROJECT
Industrial Processor's Questionnaire

Case No.:

Name of enumerator: _____

Date: _____

Town: _____

Factory name: _____

Respondent's status within factory: _____

1. Country code: [1] Uganda
[2] Kenya
[3] Tanzania

1

2. When was this factory established?

2

Fish supply

3. What species of fish do you process at this factory?

Species	Main sources (beaches)	Main suppliers	Relationship with supplier
[1] Nile perch			
[2] Tilapia			
[3] Dagaa			

3-6

7-10

Supplier codes

[1] Fishermen
[2] Agents
[3] Traders
[4] Other factories
[5] Cooperatives
[6] Other: _____

Relationship with supplier codes

[1] An employee
[2] Contracted by factory
[3] Long-standing relationship with factory.
[4] Other: _____

4. Do you have fish supply problems? [1] Yes
[2] No (Go to Q7)

11

5. If you do have fish supply problems, what are they and in which months do they generally occur (3 options only)?

Cause of problems	Months of the year	
[1] Transport		16-17
[2] Low catches		18-19
[3] High competition for supplies		
[4] Dishonest agents		20-21
[5] Fishermen refuse to sell us fish		
[6] Others:		

6. In the past year, what has been the highest and lowest cost (per kilo) for fish at your supply beaches?

	Price Shs./kg.		Month		
Species	Highest	Lowest	Highest	Lowest	22-26
[1] Nile perch					
[2] Tilapia					27-31
[3] Dagaa					
[4] Other					

Processing at factory

7. At maximum production capacity, what is your volume intake over 24 hours?

	32

8. At what percentage do you operate at most times?

	33

9. What is your maximum storage capacity per day?

	34

10a. Is there any time over the past year that your factory has shut down?

[1] Yes
[2] No (Go to Q11)

35

10b. Why (Up to 3 reasons)?

_____ 36-38

_____

_____

10c. When was this? _____ 39

10d. For how long? _____

12. When your fish arrives at the factory, how do you determine its quality (1 option only)?

[1] By observation of gills, eyes, skin, touch, other.
[2] Laboratory tests
[3] Both 1 and 2 above
[4] Other _____

40

13. In the past month, what percentage of fish arriving at the factory have you rejected as bad quality? _____

41

14. What do you do with the fish you reject (1 option only)?

[1] Sell to local processor/trader
[2] Sell to a fish meal factory
[3] Destroy/bury
[4] Other: _____

42

15. Which of your markets' import regulations affect you?

Import regulation	Do you implement it? [1] Yes [2] No	Where may you receive help to implement the regulation?

43-45	46-48	49-51	52-54

16. What problems do you encounter implementing these regulations (1 option only)

55

[1] Lack of skills
[2] Plant capacity
[3] Processing technology
[4] Other: _____

17. List your final products, their destination markets, their price ranges and the levels of demand you expect for these items.

Products	Destination market	Price range		Type of buyers	*Level of demand* [1] High [2] Medium [3] Low	*Expected demand over next 5 yrs.* [1] High [2] Medium [3] Low
		High	Lowest			
Main products (list 5)						
By-products						
[1] Skin						
[2] Oil/fat						
[3] Maws						
[4] Frame						
[5] Other						

Codes for types of buyers

[1] Institutions (e.g. hotels/schools)
[2] Middlemen
[3] Retailers
[4] Artisanal processors
[5] Wholesalers
[6] Super markets
[7] Fish meal factories
[8] Others: _____

56-62	63-69	70-76	77-83	84-90

91-97	98-104	105-111	112-119	120-126

18. What types of taxes do you pay (3 options)?

Type of tax	Based on	127-128
		129-130
		131-132

19. What proportion of the company's income do you pay as taxes? 133

20. In what ways do you think your factory has contributed to the development of Lake Victoria's fisheries (2 options only)? 134-135

21. Please provide the three most important problems that you face as an industrial processor: 136-138

Chapter 5. The survey of fishers

(Note: the current sub-sample is biased in favour of Uganda by 60% and against Kenya by 11%)

5.1. Summary of findings: profile of a fishing boat owner/renter from Lake Victoria

5.1.1. The typical fishing boat owner/renter will be male, aged 28 or older, and educated to primary level only. He will be married to one wife and have one or two children. Typically, his spouse will not be engaged in a fisheries-related activity (Fig.s 40-43; Tables 47-48).

5.1.2. Most fishing boat owners/renters will use one 'sesse' canoe, up to 9 metres in length and without an outboard engine. The boat will have two to four crew members who will target Nile perch (Tables 51). The main gear type is gill nets (Fig.s 51-52)

5.1.3. Most fishing boat owners/renters will not use any fish preservation techniques. Of the small proportion (15%) who do, placing the fish in the shade is the most common method (untabulated data).

5.1.4. The earnings of crew will be defined as a flat proportion per member after expenses have been deducted. For most owners, highest earnings will be over US$ 250 per month and lowest earnings will be over US$ 50 per month (Fig.s 48-51).

5.1.5. Fishing boat owners/renters will invest their profits back into the fishery or buy livestock or place them in a bank or co-operative society (Table 49).

5.1.6. Most fishing boat owners/renters said that they sold their catch at one beach only, where their main buyers were agents with whom they did not have any agreement or indebtedness (Fig. 55; Tables 54-55).

5.1.7. The price received by the fishing boat owner will be set by the buyer (37%), achieved through bargaining (26%), or determined by the size and/or weight of the fish (24%: Table 52-53).

5.1.8. Most fishing boat owners attribute high prices to low catches or high demand. Low prices are the consequence of abundant catches or low demand (Tables 56-57).

5.2. Summary of findings: profile of a crew member from Lake Victoria

(Note: the current sub-sample is biased in favour of Uganda by 60% and against Kenya by 11%)

5.2.1. The typical fishing crew member is a male aged between 16 and 27 years and educated to primary level only. He will be married to one wife and have none or one child (Fig.s 43-46; Table 47).

5.2.2. Most crew members will work on a sesse or flat-hulled canoe of under 9 metres in length which does not have an outboard engine. Most crews comprise two to four members (Tables 51).

5.2.3. The target species for most crew members is Nile perch (Fig. 54) and no quality preservation techniques will be used.

5.2.4. Crew earnings are defined as a flat proportion per member after expenses have been deducted. For most crew members, highest earnings will be up to US$ 80 per month and lowest earnings will be up to US$ 16.5 per month (Fig. 47).

5.2.5. Very few responses (27) were gained from crew as to where any surplus funds were invested. This may be a reflection of the relatively low income they receive (see Table 50).

5.2.6. Most fishing crew members say that they sell their catch at one beach only, to agents with whom they will not have any agreement and/or indebtedness (Fig. 55; Table 54-55).

5.2.7. Fishing crew members - unlike boat owners - state that fish prices are determined by the size or weight of the fish (untabulated data).

5.2.8. Most fishing crew members state that low catches or high demand result in higher prices being paid. Low prices, conversely, are the consequence of abundant catches or low demand (untabulated data).

5.2. Objectives of the survey of fishers

a. To identify the major factors affecting fish supply points.

b. To examine the structure of marketing at the beach level.

c. To examine primary quality on preservation methods used.

d. To examine the characteristics of the people involved.

5.3. Areas for testing in the survey of fishers

Nile perch fishers sell only to fish agents.

Nile perch fishers sell to a variety of buyers. When questioned, our sample of Nile perch fishers elicited 358 responses. 46% of responses identified agents as a sales outlet. Traders coming to the landings on bicycles drew 23% of responses, followed by resident beach-side traders, which accounted for 21% of responses (Fig. 55).

Non-Nile perch fishers do not sell their fish to agents.

Questions concerning to whom catches were sold elicited 287 responses from tilapia and dagaa fishers. Of 107 responses from tilapia fishers, 15% claimed that, amongst their buyers, were factory agents. Dagaa traders provided 180 responses, of which 17% identified factory agents as sales outlets (Fig. 55).

Non-Nile perch fishers are more likely to use a cooperative.

Out of 645 responses, just 14 tilapia and dagaa fishers identified co-operatives as a sales outlet (untabulated data).

Fishers do not use cooperatives.

Out of 645 responses, co-operatives were mentioned as sales outlets just 31 times (untabulated data).

Tilapia and dagaa fishers sell their catch to bicycle traders and consumers.

When questioned, tilapia and dagaa fishers provided 287 responses. 107 responses were obtained from tilapia fishers, of which 33% identified bicycle traders as buyers. Out of 180 responses from dagaa fishers, 23% identified bicycle traders as amongst their buyers (Fig. 55). Very few of these respondents identified consumers amongst their buyers out of the latter set of 287 responses, just 31 mentioned consumers as their buyers.

Nile perch fishers land at those beaches where prices are highest.

Only 54 Nile perch fishers sold their fish at more than one beach. Of these, only 9% claimed that the main reason for this was because they might obtain higher prices at a second beach (untabulated data).

Dagaa and tilapia fishers sell at one beach only.

Of our sample, 74 respondents targeted tilapia as their principal species, and 103 targeted dagaa as their principal species. 95% of tilapia fishers sold at one beach alone, while 88% of dagaa fishers sold at one beach alone (untabulated data).

Fishers prefer to sell to people with whom they have agreements (informal contracts).

Of 381 responses to questions on this issue, 80% claimed not to have any agreements with their buyers (Table 55).

Fish prices are determined by buyers rather than fishers.

Of 400 responses to this issue, only 7% of respondents claimed to set the price of the fish they sold (Table 53).
The buyer always sets the price, irrespective of species.

Of 135 respondents who claimed that buyers set the prices of fish, 76% targeted Nile perch. Of 65 tilapia fishers, 42% set their prices by the size or weight of the fish. Of 83 dagaa fishers, 46% set their price through bargaining (Table 53).

Fishers targeting some species earn more than those targeting other species.

Of 154 respondents who claimed to earn US$250 and over during 'good' months, 61% were Nile perch fishers. Of 162 respondents who claimed to earn more than US$50 during 'bad' months, 59% fished for Nile perch (untabulated data).

Kenyans believe that they earn less than Ugandans or Tanzanians.

Respondents were asked what they thought they made in 'good' months and 'bad' months. Within the region, 167 respondents claimed that they earned US$250 and over during 'good' months. 45% (the largest proportion) of this latter group were Kenyan respondents. Out of 174 respondents who claimed to earn US$50 and over during 'bad' months, 48% were Kenyan respondents (Fig.s 48-49).

Most fishers have undergone primary education.

68% of our sample of 437 fishers had had some primary education (Fig. 43).

Higher income fishers use fish quality preservation techniques.

Of 70 respondents who used preservation techniques, 53% estimated that they earned US$250 and over in 'good' months, while 52% out of 69 respondents estimated that they earned US$50 and over in 'bad' months. The most common preservation technique mentioned in both cases was 'shading' (untabulated data).

Most boat owners are under 35 years old.

Out of 343 boat owners and renters in our sample, the largest proportion (58%) were under 35, while the remainder were 36 and over (Fig. 46).

Most fishers have bank accounts.

Respondent's were questioned as to where they invested their earnings, and provided 416 responses. Of these, bank and/or co-operative savings accounts attracted 22% of responses (Table 50).

Fishers's spouses also engage in fisheries-related activities.

Out of 387 married respondents, 28% had one or more spouses engaged in a fisheries related activity, of which fish trading and/or processing was the most common (Table 48).

Fig.43: Respondents' level of education by status

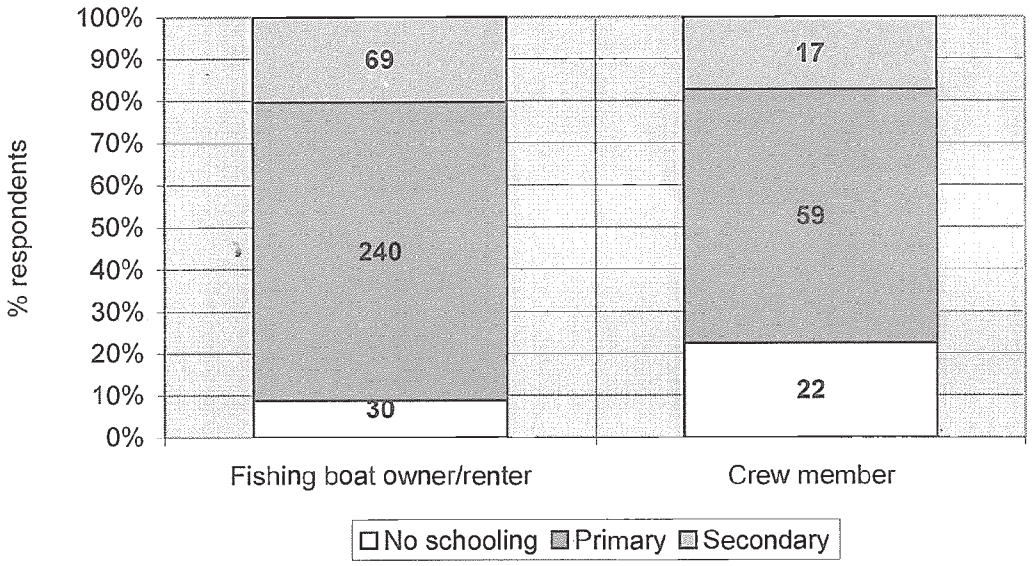


Fig.44: Respondents' marital status

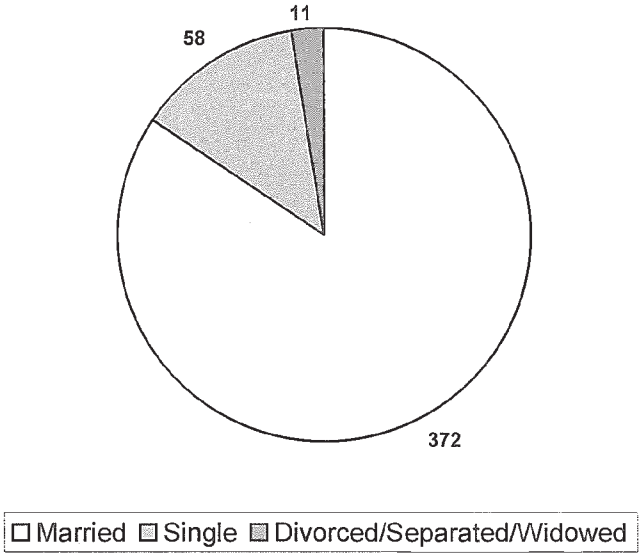
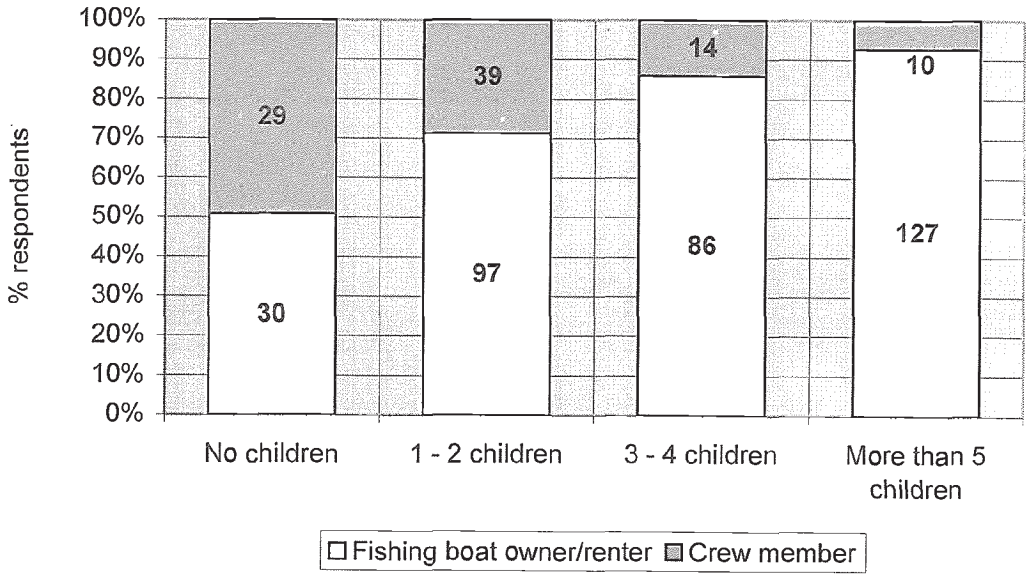


Fig.45: Ranges of children by respondents' status



5.5. Detailed analysis

5.5.1. Boat owners and renters are typically older than crew members – 89% of those respondents who were 36 and over had access to a boat. Just 13% of crew members were 36 and over (Fig. 46). The most youthful of the region's fishers are to be found in Uganda, where 50% of the 155 fishers in the region were of 27 years and under. Of the 154 respondents interviewed who were between 28 and 35 years of age, 34% were also encountered in Uganda. In Kenya, over half (57%) of the 157 respondents interviewed there were 36 years old and over (Table 47).

Fig. 46: Age ranges of Respondents by status in the fishery

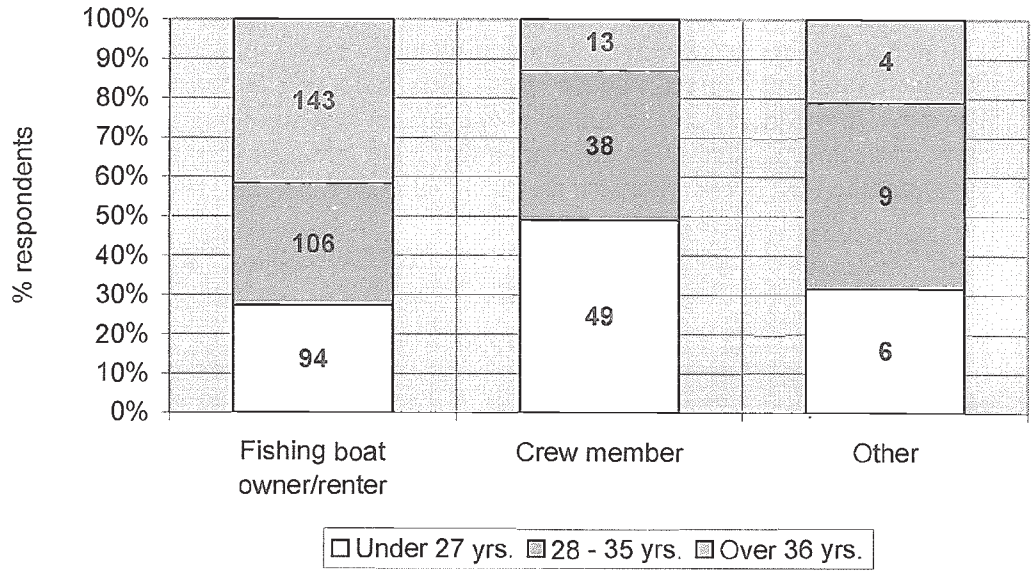


Table 47: Respondents' age by country

	Country			
Age range	**Uganda**	**Kenya**	**Tanzania**	**Total**
< 27	78	24	53	155
28 – 35	52	43	59	154
> 36	28	90	45	163
Total	158	157	157	472

5.5.2. Regionally, fishers' spouses are not engaged in fisheries-related activities. Out of 387 respondents, just 28% had a spouses engaged in a fisheries related-activity. In Kenya, however, 48% out of 136 respondents did have wives engaged in a fisheries-related activity. 91% of this latter group were involved in fish processing and trading (Table 48). In 1991, 40% of Kenyan boat owners' wives were involved in fish processing, mainly dagaa (n=360; Hoekstra 1992). Between 1994 and 1995, 45% of Kenyan fishers were married to women who traded fish (Geheb 1997).

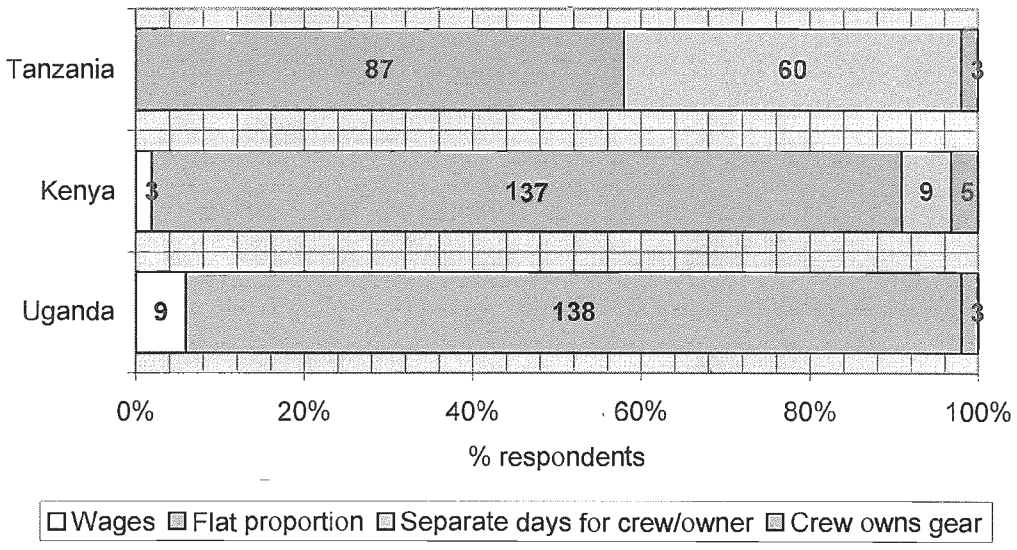
Table 48: Spouses' activities by country

	Country			
Activity	**Uganda**	**Kenya**	**Tanzania**	**Total**
Trade fish	15	1	1	17
Process fish	9	60	13	82
Fishing	2	2	5	9
Other		2		2
Spouse not engaged in fisheries	98	71	108	277
Total	124	136	127	387

5.5.3. Outboard engines are not common in Lake Victoria's fishery – just 73 (22%; n=410) of respondents owned one or more engines (untabulated data).

5.5.4. Throughout the region, the most common method of crew payment is by dividing the catch value into agreed upon portions after deducting the cost of expenses. In Tanzania, however, 40% of 150 respondents used a system of payment whereby the crew was allocated the total catch value to divide amongst themselves on certain days, and the boat owner allocated the catch value on other days (Fig. 47).

Fig.47: Regional methods of labour remuneration for fishing crews



5.5.5. Throughout the region, fishers are typically also involved in several other activities besides fishing. When questioned, 342 responses were obtained. The most common activities are farming and herding, attracting 76% of responses. Respondents were also engaged in alternative businesses (19% of responses) and in renting out rooms and/or houses (5% of responses: Table 49).

Table 49: Other activities in which respondents were involved

Activity	Frequency	%
Farming/livestock	260	76.0
Owns shop/hotel and/or trades	66	19.3
Rents out rooms/houses	16	4.7
Total	342	100

5.5.6. Respondents did not really know what income they 'earned', given that it varied from day to day and demands on income also fluctuated depending on domestic requirements or those of the wider community. Questions regarding income, therefore, generated a wide range of answers. Hence, 51% of Kenyans (n=146) and 40% of Tanzanians (n=150) estimated that in 'good' months they earned US$250 and over. Of 141 Ugandan fishers, 49% of Ugandan estimated that they earned between US$ 1 and 80 in 'good months. Ugandans also perceived that they earned less than their Kenyan and Tanzanian colleagues in 'bad' months, while 40% estimated that they earned between US$ 0 and 16.5 in such months (n=139). Most Kenyans, on the other hand, believed that they earned over US$ 50 in 'bad' months (57% of 148 respondents), as did the highest proportion of Tanzanians (42% of 146 respondents: Fig.s 48-49).

Fig. 48: Ranges of estimated earnings in 'good' months

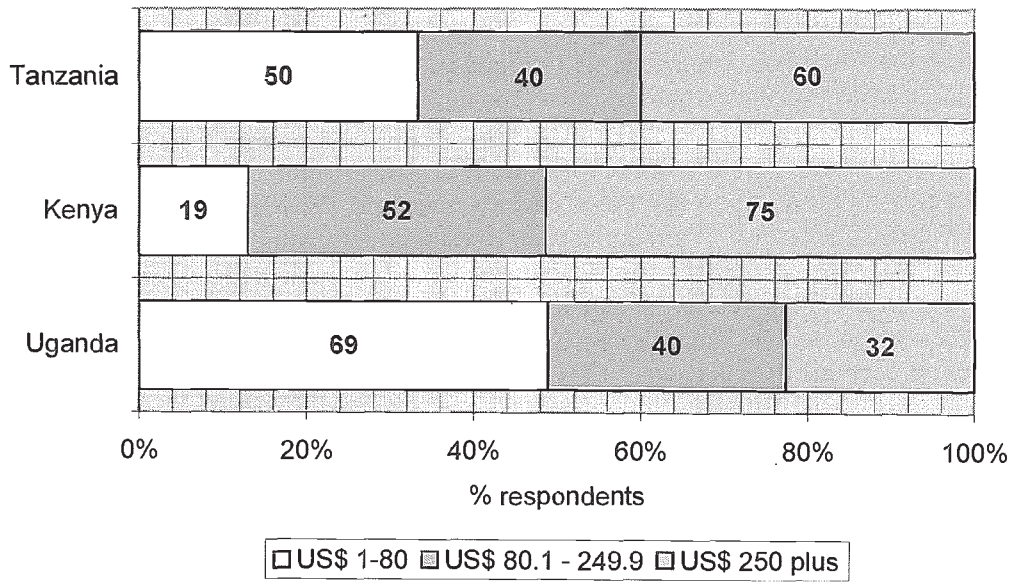
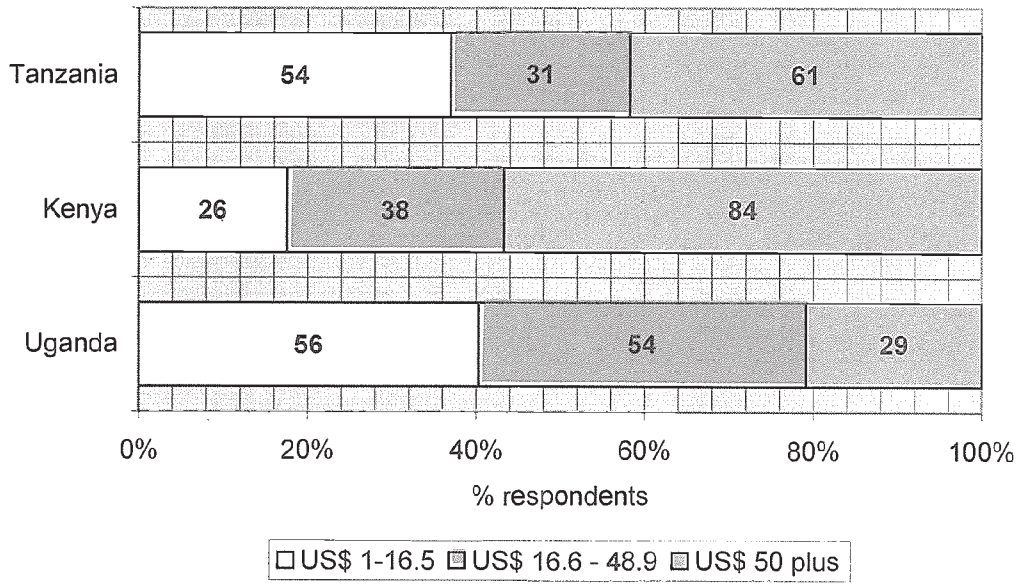


Fig. 49: Ranges of estimated earnings in 'bad' months



5.5.7. Such perceived income differences are also affected by the respondent's status in the fishery. Out of 323 boat owners/renters, the largest proportion (46%) estimated that they earned US$ 250 plus in 'good' months. Conversely, only 11% of 89 crew members believed that they earned US$ 250 and over in 'good' months, while 64% of them believed that they earned US$ 80 and less at such times. Out of 319 regional boat owners/renters, 49% believed that they earned US$ 50 and above during 'bad' months, while 54% of 89 crew members believed that they earned US$ 0-6.5 at such times (Fig.s 50-51).

5.5.8. Respondents were questioned as to where they would invest their money in the event that they had a surplus. 412 responses were obtained, of which the most common was that they would re-invest the money in the fishery (45%), followed by investments in livestock (33%) and, finally, 90 (22%) who would save their money in a bank or co-operative account (Table 50). 92% of those who would save their money in banks or co-operative society accounts were boat owners. 43% of Kenyans would invest their surpluses in livestock (compared to 28% of Tanzanians and 18% of Ugandans). Most Ugandans would re-invest their earnings in the fishery (64% compared to 35% of Kenyans and 49% of Tanzanians). A marginally higher proportion of Tanzanians would save their money in a bank or cooperative society account than Kenyans (23% compared to 22% of Kenyans and 18% of Ugandans: Table 50[1]).

[1] Due to the low value of these figures, the tables are not Chi squared tested.

Fig. 50: Ranges of estimated earnings in 'good' months by status

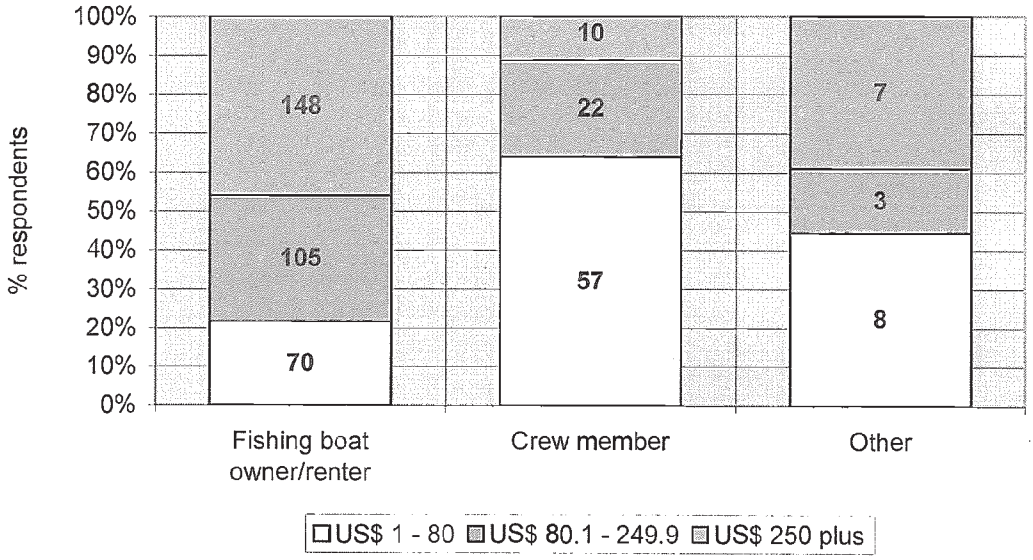


Fig. 51: Ranges of estimated earnings in 'bad' months by status

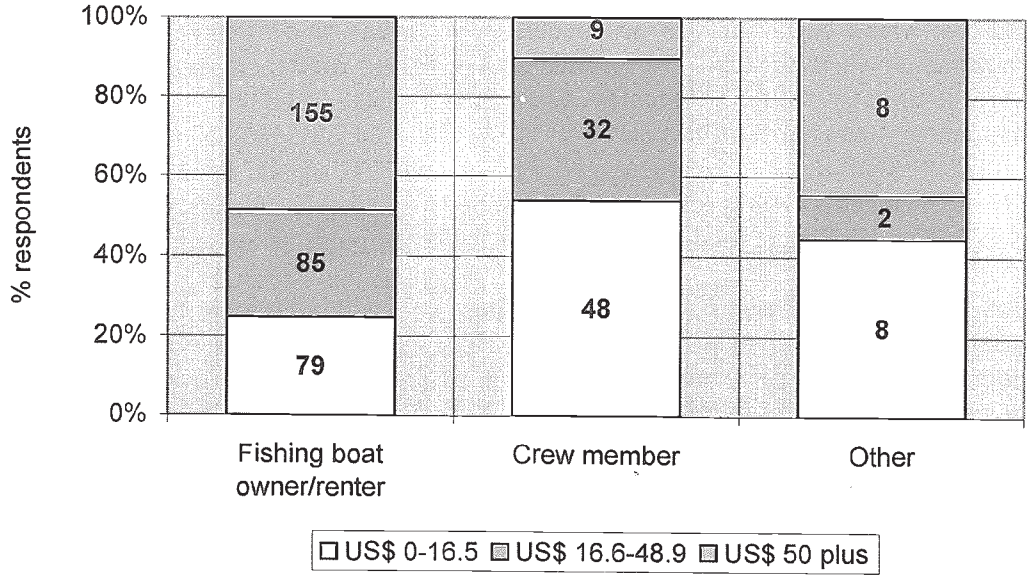


Table 50: Where respondents would invest their earnings by status

	Respondents' status			
	Boat owner/ renter	Crew member	Other	Total
Uganda				
Re-invest in fishery	34	2	-	36
Buy livestock	8	2	-	10
Save in bank/co-op. society	8	2	-	10
Kenya				
Re-invest in fishery	59	1	3	63
Buy livestock	69	4	3	76
Save in bank/co-op. society	38	1	-	39
Tanzania				
Re-invest in fishery	81	2	5	88
Buy livestock	36	7	6	49
Save in bank/co-op. society	37	4	-	41
Total	370	25	17	412

5.5.9. Out of 362 regional respondents, the most commonly utilised gear in the fishery are gill-nets, used by 64% of the sample, followed by purse seines, used by 24% of the sample (Fig. 52). Regionally, most fishers did use a second gear type – only 39% out of 455 respondents did not. Most of those who did use second gears were Ugandans and Tanzanians. 91% of Kenyan respondents used no second gear type (untabulated data). Out of 220 Nile perch fishers, 76% used gill-nets. Out of 66 tilapia fishers, 97% used gill-nets. Virtually all (99%) of the 76 dagaa fishers sampled used purse seines (Fig. 52). Gill-nets are most commonly employed in Uganda where 86% (of 120 respondents) of fishers used them, followed by Tanzanians, where 65% (of 124 respondents) of fishers used them. In Kenya, gears were distributed roughly equally between gill-nets (used by 41%, of 148 respondents) and purse-seines (used by 40%: Fig. 53). In 1991, 53% of Kenya's fishers used gill-nets (36% targeting Nile perch and 17% tilapia; n=337) (Hoekstra, 1992). In Geheb's (1997) survey carried out between March 1994 and March 1995, 36% of Kenyan fishers used gill-nets, while 25% used purse seines (n=216).

5.5.10. Out of 238 gill-net owners, 40% operated these nets with a crew of 3, followed by 26% who operated them with a crew of 2. Beach seine owners normally operated their nets with a crew of over 5, while 61% of (90) purse seine owners operated their gear on a crew of 4. Of 31 long-liners, 39% operated these gear on a crew of 3 (Table 51).

Fig. 52: Fishing gear used to target Nile perch, tilapia and dagaa

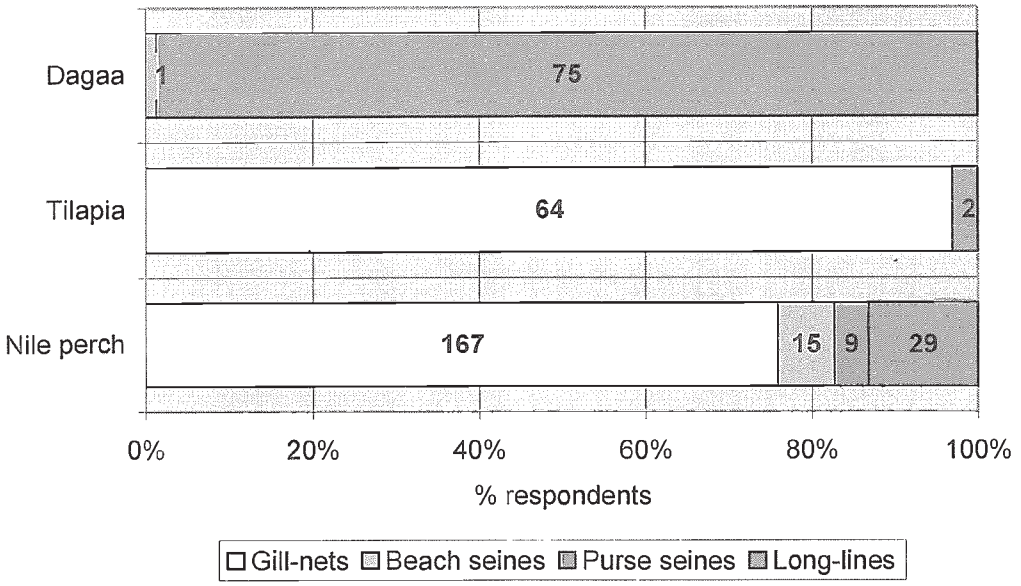


Fig.53: Main gear types by country

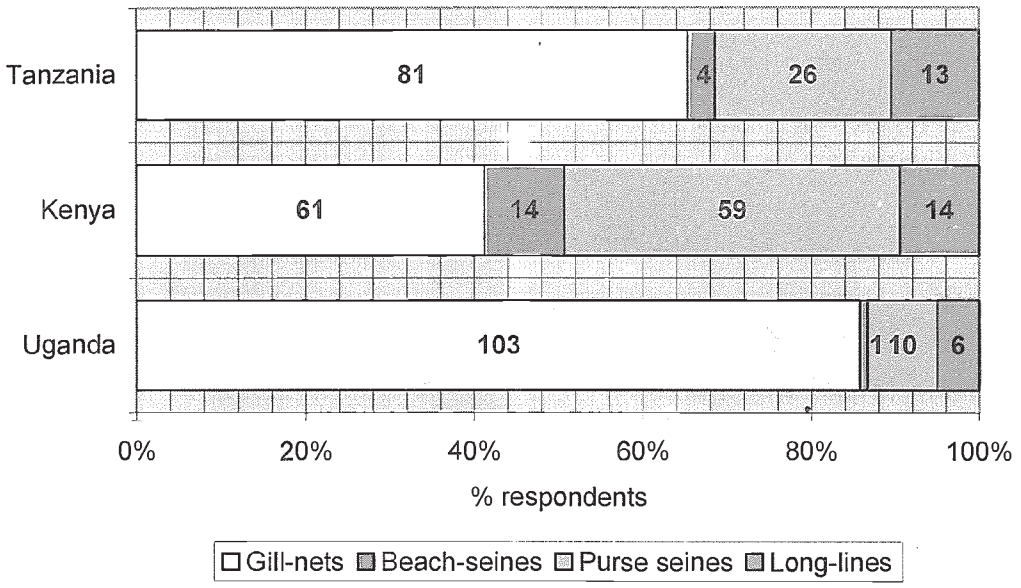
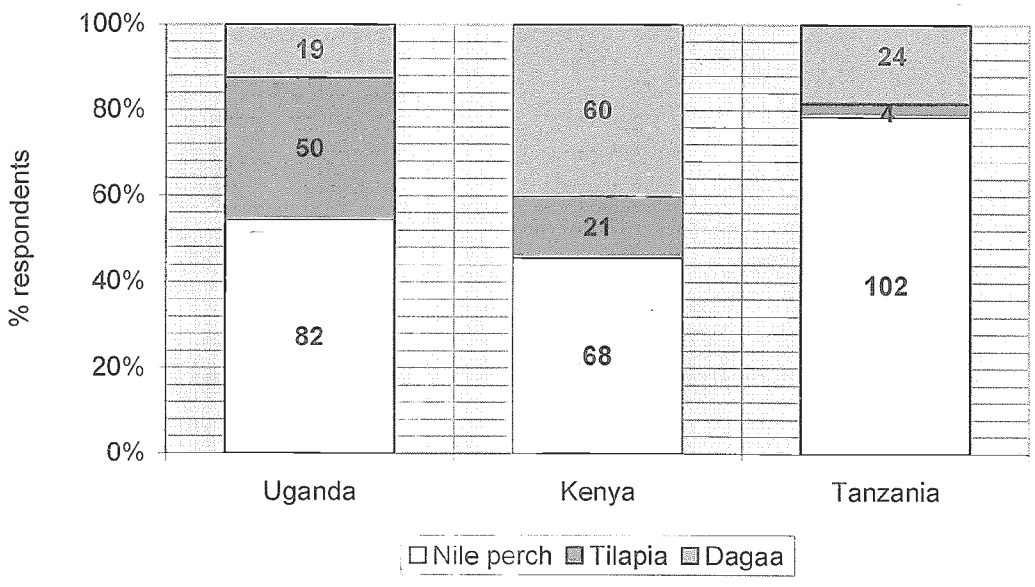


Table 51: Crew size by gear type

	Gear type				
No. crew	**Gill nets**	**Beach seines**	**Purse seines**	**Long-lines**	**Total**
1	8	-	-	-	8
2	63	1	9	8	81
3	95	1	1	12	109
4	43	2	55	3	103
5+	29	12	25	8	74
Total	238	16	90	31	375

5.5.11. Out of 430 respondents, the most commonly targeted species was Nile perch, sought by 59% of respondents, followed by dagaa (24%) and tilapia (17%: Fig.54). Generally, most respondents targeted just a single species – only 20% out of 474 respondents sought an additional fish species, of which the most common was Nile perch (sought by 66% of those targeting an additional species). Most Tanzanian (79% of 130) and Ugandan (54% of 151) fishers targeted Nile perch. In Kenya, the largest proportion of fishers (46% of 149) also targeted Nile perch, followed by those who targeted dagaa (40%: Fig. 54). These figures appear to indicate an increase in Nile perch fishing. In the census of boats carried out in Kenya's Lake Victoria fishery in 1991, 34% of boats targeted Nile perch, while 18% targeted dagaa and 18% targeted tilapia (n=6,229; Hoekstra *et al.*, 1991). Out of 240 boats sampled between March 1994 and March 1995, 33% targeted Nile perch, while 27% targeted dagaa (Geheb, 1997).

Fig.54: Main target species by country



5.5.12. Generally, fishers sold their fish at only one beach – out of 426 respondents, just 16% sold their catch at more than one beach. Of those who did sell at more than one beach, 77% fished for Nile perch, while 17% fished for dagaa (n=70). The principal reason supplied for selling at more that one beach was that other beaches often offered better markets (mentioned by 44% out of 62 respondents), and that other beaches offered better prices than home beaches (mentioned by 21% of respondents). Of 346 boat owners interviewed in Kenya in 1991, 63% sold their catch at other than their home beach (Hoekstra, 1992). In this survey, just 19% (out of 156 respondents) of Kenyan fishers sold their catches at more than one beach (untabulated data).

5.5.13. Fishers disposed of their catch to a variety of outlets, and when questioned, provided 645 responses. The largest proportion of fishers sold their catch to agents of fish companies (33%), followed by resident beach-side traders and/or processors (27%), traders coming to, or operating from, the beach on bicycles (25%), and traders from outside the landing, and coming to it on foot (16%: Fig. 52).

5.5.14. Of 211 respondents who sold their catch to factory agents, 78% sold Nile perch, while 14% sold dagaa (to agents from fish meal factories). Of the 160 respondents who sold their fish to bicycle traders, 52% sold Nile perch, 26% sold dagaa and 22% sold tilapia. Of the 107 responses to be obtained from tilapia fishers, 32% sold to resident beach-side traders and/or processors, 33% sold to bicycle traders, 21% sold to off-beach traders who came to them on foot, and 15% sold to factory agents. Of the 180 responses to be obtained from dagaa traders, 36% sold to resident beach-side traders and/or processors, 23% sold to bicycle traders and 36% sold to off-beach traders coming to the landing on foot (Fig. 55[2]).

5.5.15. Out of 394 fishers, the largest proportion claimed that their fish prices were most often dictated by the buyer (37%), followed by bargaining (26%) or set depending on the size or the weight of the fish (24%; Tables 52-53). Of 216 Nile perch fishers, 48% claimed that their fish prices are determined by the buyer. The highest proportion of 65 tilapia fishers (42%) sold their fish by size or weight, while the highest proportion of 83 dagaa fishers (45%) determined their prices through bargaining. Out of 147 Kenyan fishers, 46% claimed to have the prices of their fish determined by their buyers, followed by 32% who bargained. Out of 130 Tanzanian fishers 59% had their prices set by their buyers, while in Uganda, it was the size or the weight of the fish that mattered (56% out of 117 fishers: Tables 52-53).

[2] Due to the low value of some of the variables in this figure, Chi squared results are neither significant nor valid.

Fig.55: Buyers to whom fishers of Nile perch, tilapia and dagaa sell

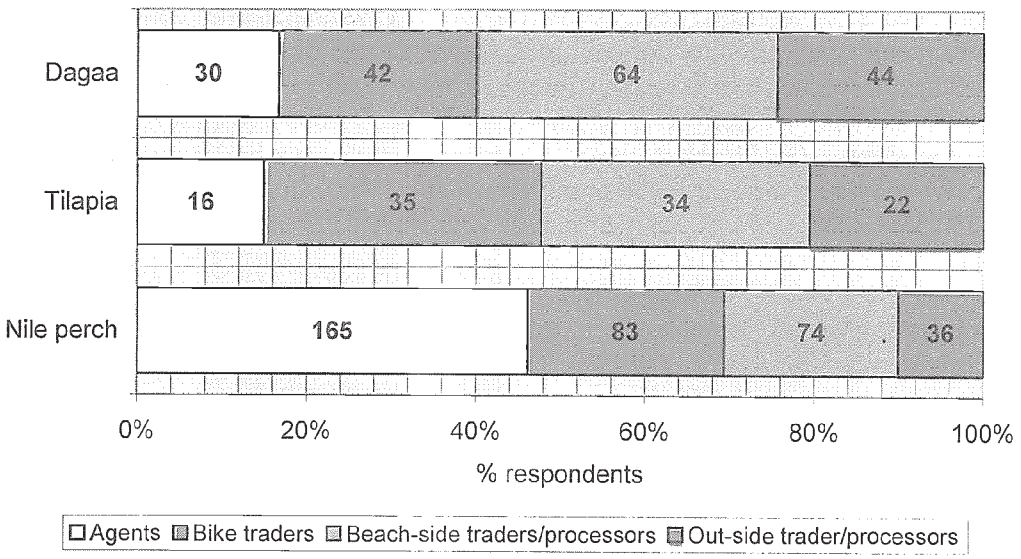


Table 52: How respondents' prices are determined by country

	Country			
Price determinant	**Uganda**	**Kenya**	**Tanzania**	**Total**
Bargaining	37	47	17	101
Buyer sets price	3	67	76	146
Size/weight of fish	66	10	17	93
Seller sets price	2	22	6	30
Catch size	9	1	14	24
Total	117	147	130	394

Table 53: How respondents' prices are determined by species

	Species			
Price determinant	**Nile perch**	**Tilapia**	**Dagaa**	**Total**
Bargaining	33	24	37	94
Buyer sets price	103	4	28	135
Size/weight of fish	53	27	5	85
Seller sets price	14	6	8	28
Catch size	13	4	5	22
Total	216	65	83	400

5.5.16. Regionally, fishers do not typically set up sales agreements with buyers. Out of 351 respondents, just 20% had any such arrangements. Out of 70 respondents who did have such arrangements, the most common agreement was that the fisher sold his fish to one buyer exclusively and received credit and/or loans in return (71%). Out of 70 fishers that had arrangements, 63% were Nile perch fishers (Table 54). Arrangements of this variety were most common in Tanzania where 44% of 89

fishers had some kind of arrangement with their buyers. Just 15% of Kenyan buyers had such arrangements (Table 55). In Hoekstra's 1991 study, 12% of 374 boat owners had received credit or had received a boat or gear from their buyers (Hoekstra, 1992). In Geheb's 1995-95 study, 44% of 120 fishers had some kind of sales agreement with their buyers (Geheb, 1997).

Table 54: Types of sales arrangements that fishers have with their buyers by species

	Species			
Arrangement	Nile perch	Tilapia	Dagaa	Total
Buyer provides credit/cash/loans	29	8	13	50
Buyer provides gear	15	2	3	20
No arrangement	153	53	75	281
Total	197	63	91	351

Table 55: Types of sales arrangements which fishers have with their buyers by country

	Country			
Arrangement	Uganda	Kenya	Tanzania	Total
Buyer provides credit/cash/loans	12	11	33	56
Buyer provides gear	2	12	6	20
No arrangement	129	126	50	305
Total	143	149	89	381

5.5.17. Respondents were questioned as to what made their fish prices rise and fall. Questions on price rises generated 599 responses, of which the most common was that prices rose when catches were low (40%), followed by price rises due to high demand (32%: Table 56). In Tanzania, however, the most common response was that price increases occurred with high demand (30% out of 188 responses).

Table 56: Reasons for price increases by country

	Country			
Reason	Uganda	Kenya	Tanzania	Total
Poor catches	104	90	44	238
High demand	54	83	57	194
The weather	14	34	25	73
Good prices/markets abroad	6	11	26	43
Others	3	12	36	51
Total	181	230	188	599

5.5.18. Questions concerning price declines prompted 646 responses, of which the most common were good catches (38%), followed by low demand (29%: Table 57). High supplies were also the most commonly cited reason for price declines in Kenya and Uganda, while in Tanzania the largest proportion of responses attributed price declines to low demand (25% out of 213 responses).

Table 57: Reasons for price decreases by country

	Country			
Reason	Uganda	Kenya	Tanzania	Total
Good catches	112	93	40	245
The weather	22	36	30	88
Low demand	48	85	54	187
Poor markets/prices abroad	13	10	33	56
Other	2	12	56	70
Total	197	236	213	646

5.5.19. Questioning on marketing problems resulted in 865 responses. The most common concerns were price fluctuations (26%); transport problems (22%); and low demand (20%). These responses were cross-tabulated against targeted fish species. Out of 538 responses obtained from Nile perch fishers, the worst marketing problems faced were price fluctuations (26%) and low demand (19%). Tilapia fishers yielded 127 responses, of which transport problems, low demand and price fluctuations attracted the greatest proportion of responses (24%, 25% and 26% respectively). Out of 200 responses to be obtained from dagaa fishers 25% were price fluctuation problems, followed by 20% of responses concerning low demand (Table 58).

Table 58: Respondents' main marketing problems

	Species			
Problem	Nile perch	Tilapia	Dagaa	Total
Transport problems	116	31	47	194
Price fluctuations	138	33	50	221
Too few buyers	101	32	40	173
Lack of information on prices	45	4	9	58
Dishonest traders	31	7	16	54
Lack of cold storage/ice	68	9	16	93
Others	39	11	22	71
Total	538	127	200	865

5.6. The survey of fishers: sampling strategies, field difficulties, possible areas of bias and recommendations for future survey design

5.6.1. Sample selection strategy

The three states could not agree on the sample size for data collection. Resulting sample sizes were based largely on staffing capabilities, with Tanzania yielding the smallest population size because of TAFIRI's small numbers of socio-economic staff.

Target groups were identified on the basis of gear and/or boat ownership. Hence, respondents were grouped into classes (boat owners, boat renters, crews, crews with gear and transport/collector-boat owners) based on pre-expected ownership patterns. Transport owners are not discussed in this report, while boat owners and renters are grouped together and crew with gear placed in to the 'others' category.

5.6.2. Sample selection strategy and the dynamics of field work.

The reception which greeted interviewers on different beaches varied considerably:

At some landing sites the respondents were amiable and eager to cooperate in anticipation of government assistance in the form of loans, subsidised gear or other economic assistance.

At other landings fishers were suspicious and had misinterpreted the motives behind the survey as having tax repercussions for them. Normally, after a briefing on the true motives of the study, respondents would co-operate.

On other beaches the beach leader, as a stakeholder, showed interest in having feedback as the study developed.

Some landing sites had to be excluded due to heavy rains, rendering roads inaccessible during the survey period.

5.6.3. Fieldwork

On occasions, researchers were forced to abandon attempts to reach beaches because access roads were washed out due to heavy rains. Where this occurred in Tanzania, research moved to the nearest district where access to landings was available, while in Kenya research would move to the closest accessible beach to that excluded.

5.6.4. Respondents' typical reactions to the survey questionnaires

Most respondents were weary of speaking to enumerators because some were worried about being found out and arrested for using illegal gear, for violating closed seasons or for not complying with health standards. This problem was

countered by clearly explaining to respondents precisely why enumerators were there and what the study aimed to achieve.

Respondents also expected assistance from enumerators, be it loans, fishing gear and technical advice.

5.6.5. Possible areas of bias

The sample was biased in favour of boat owners because they knew more about the details of fishing and fish sales than their crew or other categories of respondents.

On questions about age, some respondents were reluctant to give their actual age, particularly female respondents. Ages were then derived either through developing a rapport with the respondent, or re-phrasing the question, such as buy asking in what year he/she was born, or uncovering events that happened in the year s/he was born.

5.6.6. Questionnaire testing

Kenyan and Tanzanian groups carried out the testing of the questionnaire in the field and later developed a revised questionnaire. Unfortunately there was no time for the Ugandan group to test this new version before field work commenced.

5.6.7. Questions which were ineffective

Q12 (boat details - lifespan, length, maintenance costs per month etc.): it was found that respondents were not very clear about these details and could not give precise answers.

Q18 (monthly income): respondents could not typically place their monthly incomes. As a result, daily incomes were obtained, and multiplied by 30.

5.6.8. Words/phrases which caused difficulties.

When asked the boat length, some respondents would give answers in feet and others in metres. A conversion table would have been useful at the interview site.

When determining the price of fish, some respondents gave the weight of fish in kilos although they had no weighing scales, suggesting that weights were based on guesses, and that fish weights given should be treated with caution.

5.6.9. Sensitive areas for questioning.

After winning the confidence of respondents, questions on such issues marital status, age, where money was invested and/or saved, incomes etc. could be answered.

5.6.10. Recommendations for future survey design

Careful attention must be given to testing the questionnaire before fieldwork is undertaken.

Questionnaires should be short and specific and answer defined objectives.

Setting up and reaching agreement on standard codes should be done before field work is commenced and checked during questionnaire testing.

A study targeting fish factory agents should be carried out.

A study focussing on crews alone should be carried out.

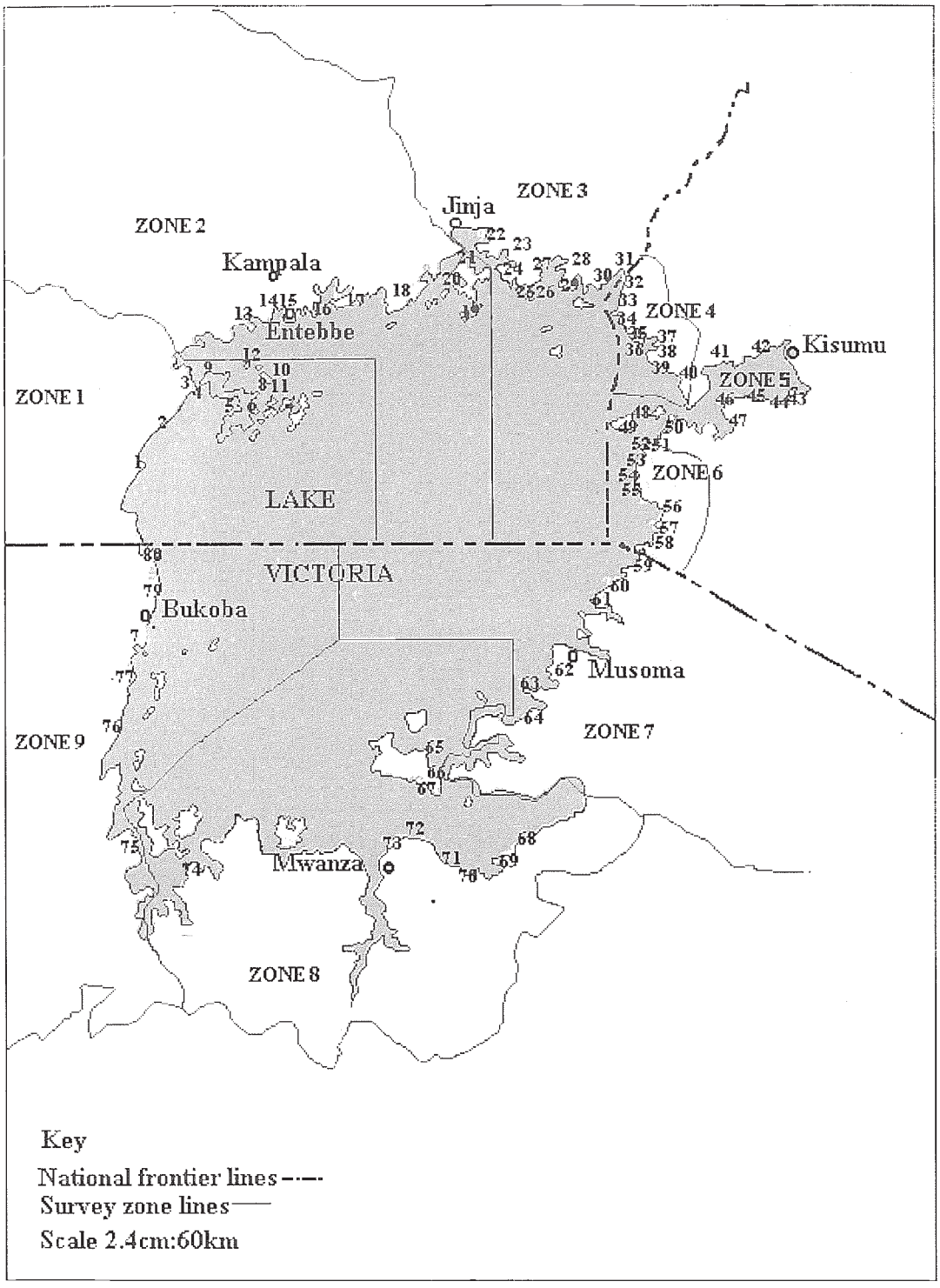
5.6.11. Interview sites for the survey of fishers

Site i.d.	Survey site	Site i.d.	Survey site
Uganda		**Uganda**	
Zone 1		*Zone 3*	
1	Ddimo	27	Lugala
2	Namirembe	28	Busiro
3	Bulingo	29	Wakawaka
4	Lambu	30	Majanji
Zone 2		31	Madwa
5	Tubi	**Kenya**	
6	Mutambala	*Zone 4*	
7	Lwanabatya	32	Sio Port
8	Kagonya	33	Mulukoba
9	Mulabana	34	Mavenga
10	Kakyanga	35	Osieko
11	Kitobo	36	Nambo
12	Banda	37	Uhanya
13	Ssenyi	38	Liunda/Ndeda
14	Ggolo	39	Wichlum
15	Kyanvubu	40	Osindo
16	Gerenge	41	Asembo Bay
17	Kigundu	*Zone 5*	
18	Nangoma	42	Asat
Zone 3		43	Rakwaro
19	Kijaka	44	Kendu-bay
20	Lingira	45	Obaria
21	Bubaale	46	Homalime/Kowuor
22	Kigaya	47	Ngegu
23	Lwanika	48	Mbita
24	Bwondha	*Zone 6*	
25	Bukoba	49	Nyagina
26	Lubya	50	Tabla

Site i.d.	Survey site
Kenya	
Zone 6 (cont.)	
51	Gingo
52	Kabwao
53	Kinda
54	Rasira
55	Luanda Konyango
56	Got Kachola
57	Nyangwina
58	Ngore
Tanzania	
Zone 7	
59	Juakali
60	Nyang'ombe
61	Busanga
62	Mgango
63	Bwai
64	Suguti
Zone 8	
65	Nyalusurya
66	Lugezi
67	Nansio
68	Bukome

Site i.d.	Survey site
Tanzania	
Zone 8 (cont.)	
69	Ihale
70	Nyakasenge
71	Kayenze
72	Kabangaja
73	Igombe
74	Nkome-machangani
Zone 9	
75	Mganza
76	Kifungu
77	Kyamkwikwi
78	Nyamkazi
79	Igabilo
80	Ruhanga
81	Malehe

FIG. 56 MAP OF STUDY SITES FOR THE SURVEY OF FISHERS



LAKE VICTORIA FISHERIES RESEARCH PROJECT
Fishermen's Questionnaire

1. Name of enumerator: _____
2. Date: _____
3. Beach: _____

Section 1: Respondent's personal details.

4. Sex [1] Male [2] Female | 1 |

5. Age: _____ | 2 |

6. Marital status: [1] Married; no. wives: _____ [2] Single [3] Divorced [4] Separated [5] Widowed | 3-4 |

7. If married, is spouse engaged in a fisheries related activity? | 5 |

[1] Yes (select one option): [2] No (Go to Q8)

[1] Trades fish only
[2] Trades and processes fish
[3] Fishes
[4] Other: _____ | 6 |

8. How many children do you have? _____ | 7 |

9. What is your level of education? (selected highest grade reached) | 8 |

[1] No schooling
[2] Primary level
[3] Secondary level
[4] University level
[5] Other: _____

10 Besides fishing are you and/your spouse involved in any other activities? | 9 |

[1] Yes [2] No (Go to Q11)

[1] Farming/livestock
[2] Owns shop/hotel/trades in agricultural produce or other goods
[3] Rents out rooms/houses
[4] Other: _____ | 10-13 |

11. Respondent's status in the fishery:

[1] Fishing boat owner. No. boats owned: _____
[2] Fishing boat renter. No. boats rented: _____
[3] Transport/collection boat owner. No. boats owned: _____
[4] Gear owner, no boat.
[5] Crew member
[6] Transport/collection boat renter.
[7] Other: _____ | 14-17 |

Section 2: Fish boat owners, gear owners, crew members

12. If the respondent owns a boat, rents a boat or is a crew member, fill out the following details about the boat owned, rented or on which the respondent is employed. If the respondent owns/rents more than two boats, fill in details about the 2 newest.

Question	Boat 1	Boat 2	18-22
Boat type			
Length of boat			
Out board engine [1] Yes [2] None			
No. of crew			
Target species			

Codes: Boat types

[1] Sesse
[2] Transport/collection
[3] Flat hulled
[4] Dug out
[5] Taruma
[6] Karua
[7] Other: _____

Target species

[1] Nile perch
[2] Tilapia
[3] Dagaa
[4] Fulu
[5] Other: _____

23-24

13 Do you use any preservation techniques? 25

[1] Yes (Select 1 only). [2] No (Go to Q14).

26

[1] Empty boxes
[2] Ice boxes
[3] Shading
[4] Other: _____

14. After returning from a fishing trip, how is the crew on your boat paid (1 option only)? 27

[1] Wages
[2] Equal share of catch after expenses
[3] Flat proportion after expenses
[4] Separate days for owner/crew
[5] No share: crew owns gear
[6] Crew given gear
[7] Other: _____

15. If the respondent owns any gear, supply the following details for his/her two most important gear types:

Gear type	Target species	28-29
[1] Gillnet		
[2] Beach seine		
[3] Mosquito seines		
[4] Purse seine		30-31
[5] Long lines		
[6] Fishing rod		
[7] Traps		
[8] Others: _____		

Target species codes: [1] Nile perch [2] Tilapia [3] Dagaa [4] Others: _____

16. If the respondent rents a boat, is the rent shared with others? [1] Yes [2] No | 32 |

17. If the respondent owns or rents a boat, does s/he have any of the following? | 33 |

1. Fishing license
2. Boat registration
3. Crew license
4. Private mark

[1] Yes
[2] No

18. How much do you earn per month? | 34 |

In good months: _____
In bad months: _____

19. What do you do with your surplus money? | 35 |

[1] Re-invest in the fishery
[2] Invest in livestock
[3] Save it in a bank
[4] Other: _____

20. Do you sell you catch at [1] Just 1 beach (Go to Q21) [2] More than one beach | 36 |

If more than one beach record two reasons why: _____ | 37-38 |

_____

_____

21. To whom do you sell your catch (3 options only)? | 39-41 |

[1] Agents
[2] Bicycle traders
[3] Resident beach-side traders/processors
[4] Traders who come from outside the beach on foot
[5] Consumers on the beach
[6] Through the co-operative society
[7] Others: _____

22. Do you have any of the following arrangements with your buyers (1 option only)? | 42 |

[1] Buyer provides credit/loans/gear
[2] Buyer provides food/boat/outboard engine
[3] Others: _____
[4] No arrangement with buyer

23. What determines the price of your fish (1 option only)? | 43 |

[1] Through negotiation with the buyer
[2] The buyer sets the price
[3] By the fish's size/weight
[4] Seller sets the price
[5] By the catch size
[7] Number of buyers
[8] The state of the weather
[9] Others: _____

24. What makes the price of fish go up or down (4 options for each only):

Prices up:	Prices down:
[1] Low supply/catches	[1] High supply/catches
[2] High demand/many buyers	[2] Low demand/few buyers
[3] State of the weather	[3] State of the weather
[4] High prices on foreign markets	[4] Low prices on foreign markets
[5] Ice available	[5] Ice unavailable
[6] Full moon	[6] No moon
[7] Other: _____	[7] Low prices on other beaches
	[8] Other: _____

44-45 | 46-49

25. When marketing your fish, what do you consider your main problems to be?

50-56

[1] Transport problems
[2] Price fluctuations
[3] Too few buyers
[4] Lack of information on prices
[5] Lack of ice/cold storage
[6] Dishonest traders
[7] Other: _____

Section 3: Transport/collection boat owners

26. Give the following details about your boat/the boat on which you work:

	Capacity (tonnes)	Main species
Boat 1		
Boat 2		

57-58

Species codes: [1] Nile perch [2] Tilapia [3] Dagaa

[4] Other: _____

59-60

27. Do you use any preservation techniques when transporting fish?

61

[1] Yes (1 option only)

62

[1] Empty boxes without ice
[2] Ice containers
[3] Shading
[4] Other: _____

[2] No (Go to Q28).

28. Do you buy fish from fishermen with whom you have an agreement?

63

[1] Yes

Do you provide the fisherman with any of the following (1 option only)?

64

[1] Loans
[2] Consumer goods on your return journey
[3] Gear/boat
[4] Other: _____

[2] No (Go to Q28).

29. What factors determine where it is that you take your supplies (1 option only)? | 65 |

[1] High demand
[2] Good prices
[3] Others: _____

30. What are the main products you supply? | 66-72 |

[1] Fresh Nile perch
[2] Fresh tilapia
[3] Fresh dagaa
[4] Processed Nile perch
[5] Processed tilapia
[6] Processed dagaa
[7] Other: _____

31. Who are your most important buyers? | 73-77 |

[1] Traders on beaches
[2] Filleting factories
[3] Private agents with refrigerated trucks
[4] Agents from fish meal factories
[5] Other: _____

32. If you supply filleting factories or fish meal factories, do you have a supply agreement with any of them? | 78 |

[1] Yes (1 option only). | 75 |

[1] Loans/credit
[2] Outboard engines
[3] Boat(s)
[4] Other: _____

[2] No

33. After returning from a collection trip, how is the crew on your boat paid (1 option only)? | 79 |

[1] Wages
[2] Equal share of catch after expenses
[3] Flat proportion after expenses
[4] Separate days for owner/crew
[5] No share: crew owns gear
[6] Crew given gear
[7] Other: _____

Chapter 6: Concluding comments

Previous work on the market for Lake Victoria's fish have rarely taken into account the consumer as a component in the marketing chain. As one of the first studies to do so, the LVFRP's Marketing Survey breaks new ground. Data from the study, as well as that from the traders' and processors' study, the industrial processors' study and the fisher's study, provide a bench mark for future work and a basis from which analysis of similar trends can occur.

The study has shown that for regional consumers, tilapia is the favoured fish species. This is not, however, applicable nationally: in Tanzania, consumers express a preference for Nile perch. The region's least favoured fish is the dagaa – in Uganda, consumers would appear to eat Nile perch frames in preference for this small fish, while the fishery that pursues it exports its catch to Kenya and elsewhere, where demand is greater. Indeed, consumers in Kenya would appear to eat far more of this fish than their regional neighbours in Uganda and Tanzania.

The study has also examined consumption patterns and trends. Lake-side consumption appears to very high with consumers buying fish at least every other day. Tanzanian consumers appear to benefit from the fishery far more than their riparian neighbours, with fish prices being lower there than in either Kenya or Uganda, and the amount of fish consumed far higher than either of these two countries. In Uganda, conversely, consumption is the second highest in the region, and average fish prices the highest. These latter results are of importance to management for they may indicate the progression of the biggest influencing factor in access to fish, its price.

Tanzanian fish processors also appear to benefit from the region's cheapest fish. Estimated outputs for the region include assessments of plant capacity, normal operating capacity and the value of exports from the region. These are almost twice as high in Tanzania than in Kenya and Uganda. Despite suffering from high taxes and the affects of a decaying road infrastructure, Tanzanian fish processors appear to out-perform their regional competitors in almost every regard.

The region's fish processors and traders are usually men. In Kenya, however, they are usually women. For most of the region's small-scale traders and processors, experience within the industry is relatively short – most have operated within it for less that five years. This suggests that the industry is still able to attract new entrants into the sector, and also suggests that amongst the communities involved in the industry, the fish trade is still viewed as being able to generate an income for those willing to participate in it. The implications of such trends are multi-fold. They would appear to indicate that while fish traders and processors do encounter supply difficulties these are not so severe as to prevent further entry into the fishery. For most traders, the chosen fish to trade is the Nile perch, despite large amounts of perch leaving the region for the international market. Monitoring systems present on the lake probably fail to capture the volume of fish that does not pass through formal fish marketing channels such as those established by the industrial processing factories.

Local standards of quality appear to be juxtaposed against those of the Nile perch industrial filleting industry. Much of the Nile perch that appears on local markets is that rejected by

the filleting industries. So too, by-products of this industry appear on local markets, including Nile perch frames. Rates of quality preservation throughout the local industry are low. Very few fish processors and traders consider using any methods of preservation, despite high proportions of them dealing in fresh fish. While many fishers claim to use preservation techniques, in most cases these turn out to be little more than 'shade'. The low levels of fish preservation indicated by this study may be because local markets close to the lake shore will absorb most of this fresh fish sufficiently fast to erode any incentives to preserve it. It may also mean that this study failed to capture the extent of fish preservation given its restriction to a 60 km. radius around the lake shores, with most processed fish going to points far beyond the lake's basin.

The agricultural cycle within the region appears to play a very important role in determining fish consumption patterns. Traders indicated that consumption rates tended to peak just before harvest when households ran out of farm produce. In both the case of fish traders and fishers, agriculture is the most important alternative activity in which they are involved outside of the fishery. Its role may well determine labour entry in to the fishery, as well as when fish consumers will eat fish (cf. Geheb and Binns, 1997).

The international export of Nile perch is very large, and represents an important income source for the region. Kenyan factories tend to concentrate on markets outside of the European Union, while Tanzanian and Ugandan factories have very large interests in this latter market. Kenyan factories did previously have access to the EU. However, stringent quality control requirements have probably forced these factories to look elsewhere for marketing outlets. Indeed, most factories within the region have been obliged to close down for up to five months over the past two years so as to refurbish factories to bring them in to line with EU requirements.

The contribution of the international trade in Nile perch has had a profound impact at the local level. It is almost certainly the reason why most fishers are involved in this fishery, despite regional consumer preferences for tilapia. It has almost certainly the largest contributor to employment, development and expansion within the fishery. However, the international market for Nile perch may also have negative affects, particularly if it means that so much Nile perch is removed from the region as to make it unobtainable to local consumers, or if it forces prices to rise to such a level as to push them out of reach of local benefactors. The rise of the trade of Nile perch frames should be carefully studied so as to determine whether or not it is the result of decreased access to adequate Nile perch supplies for the urban consumer, or if it has merely found a market segment of urban poor occasioned by high population rates and/or difficult regional economic conditions.

The very large bio-ecological changes that have affected Lake Victoria may well have played an important part in determining the structure of the market for its fish. Certainly, the low diversity of species upon the market is a symptom of this. At the same time, however, it should be borne in mind that demand for most of the fish species from the lake is high and is likely to increase. In view of the lake's current ability to meet these demands, it may be suggested that while the lake may well be an ecological disaster, it is in no small measure a social and economic success.

This study has provided a background upon which fisheries management occurs. It has identified the trends and processes that determine the routes followed by fish between

point of capture to consumer. It is within this realm that management must seek to find its niche, either in terms of providing economic measures with which to regulate fish production and catching techniques, or else in terms of exposing points of fish loss which can then be remedied. As has been mentioned elsewhere in this study, a fishery is not a fishery without the human benefactors that exploit it (McGoodwin, 1990). It is amongst these communities that management solutions to the lake's dilemmas may be found. It is from this point of departure that other the other surveys under this project will seek to identify management solutions for the fishery.

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