

**LAKE VICTORIA  
FISHERIES RESEARCH PROJECT  
PHASE II**

**LVFRP/TECH/99/05**

**Technical Document No. 5**

The survey of Lake Victoria' s fishers

# LAKE VICTORIA FISHERIES RESEARCH PROJECT PHASE II

## THE SURVEY OF LAKE VICTORIA'S FISHERS

### Socio-economic data working group (SEDAWOG)

Fisheries Research  
Institute (Uganda)

J. Gongga  
M. Kyangwa  
C. Nyamwenge  
A. Nyapendi  
K. O. Odongkara

Kenya Marine  
and Fisheries  
Research  
Institute

R. Abila  
C. Lwenya  
R. Omwega  
S. Osewe-Odera  
E. Yongo

Tanzania  
Fisheries  
Research Institute

M. Medard  
E. Mlahagwa

University of  
Hull  
International  
Fisheries  
Institute

G. A. Rodriguez

UNECIA

K. Geheb

1999

## Abbreviations

FIRI	Fisheries Research Institute (Uganda)
KMFRI	Kenya Marine and Fisheries Research Institute
LVFRP	Lake Victoria Fisheries Research Institute
TAFIRI	Tanzania Fisheries Research Institute
SEDAWOG	Socio-economic Data Working Group
UNECIA	Universities of England Consortium for International Activities

The following currency conversion rates have been applied in this document:

US\$ 1 = 1,200 Uganda shillings

US\$ 1 = 60 Kenya shillings

US\$ 1 = 625 Tanzania shillings

This document may be cited as follows:

SEDAWOG, 1999. The survey of Lake Victoria's fishers. *LVFRP Technical document* No. 5. LVFRP/TECH/99/05. The Lake Victoria Fisheries Research Project, Jinja, Uganda.

## Table of Contents

	Page number
Executive summary	1
Results	1
Conclusions	2
Recommendations	2
1. Introduction	4
1.1. Preamble	4
1.2. Methodology	5
1.2.1. The questionnaires	5
1.2.2. Questionnaire testing	5
1.2.3. Respondents' typical reactions to the survey questionnaires	5
1.2.4. Questions which were ineffective	5
1.2.5. Words/phrases which caused difficulties	5
1.2.6. Sensitive areas for questioning	6
1.2.7. Recommendations for future survey design	6
1.3. Sample selection strategy and the dynamics of field work	6
1.4. Data collection	7
1.5. Data analysis	8
1.6. Report structure	10
2. Summary of findings: profile of a fishing boat owner/renter from Lake Victoria	11
3. Summary of findings: profile of a crew member from Lake Victoria	12
4. Areas for testing in the survey of fishers	13
5. Detailed analysis	17
6. Concluding comments	31
7. Questionnaire	32
8. References	37

## Tables

Table 1:	Interview sites for the survey of fishers	7
Table 2:	Age ranges of respondents by country and status	17
Table 3:	Spouses' activities by country	18
Table 4:	Other activities in which respondents are involved	19
Table 5:	Where respondents would invest their surpluses by status	23
Table 6:	Crew size by gear type	24
Table 7:	How respondents' prices are determined by country	27
Table 8:	How fishers of Nile perch, tilapia and dagaa determine their prices	27
Table 9:	Types of sales arrangements that fishers of Nile perch, tilapia and dagaa have with their buyers	28
Table 10:	Types of sales arrangements which fishers have with their buyers by country	28
Table 11:	Reasons for price increases by country	28
Table 12:	Reasons for price decreases by country	29
Table 13:	Main marketing problems of fishers of Nile perch, tilapia and dagaa	29

## Figures

Fig. 1	Map of survey sites for the survey of fishers	9
Fig. 2	Respondents' level of education by status	15
Fig. 3	Respondents' marital status	15
Fig. 4	Ranges of children by respondents' status	16
Fig. 5	Regional methods of labour remuneration for crews	18
Fig. 6	Ranges of estimated earnings in 'good' months	20
Fig. 7	Ranges of estimated earnings in 'bad' months	20
Fig. 8	Ranges of estimated earnings in 'good' months by status	21
Fig. 9	Ranges of estimated earnings in 'bad' months by status	21
Fig. 10	Fishing gear used to target Nile perch, tilapia and dagaa	23
Fig. 11	Main target species by country	25
Fig. 12	Buyers to whom fishers of Nile perch, tilapia and dagaa sell	26

## Executive summary

The survey of Lake Victoria's fishers sought to examine the relationships affecting supply flows of raw material on to the market, and to examine the characteristics of fishing activities and their effects on fish quality and distribution. Due to severe logistical problems, only a sample selected from the whole of the fisher's survey was utilised in the Marketing Survey Report (SEDAWOG, 1999). *The present report supercedes the chapter of the fisher's survey in the latter report.*

This report attempts, in part, to fill the void of comprehensive fish marketing data for the entire region of Lake Victoria. The marketing survey is the first research programme within the EU Lake Victoria Fisheries Research Project (LVFRP), carried out by a regional team of socio-economists from the Fisheries Research Institute (FIRI) of Uganda, the Kenya Marine and Fisheries Research Institute (KMFRI) and the Tanzania Fisheries Research Institute (TAFIRI). The results of this survey comprise, in part, a base-line data set which will facilitate further research, analysis and management decision-making in relation to stakeholders of the lake's resources. While the present report can be used and understood in isolation, readers are advised to utilise it in conjunction with the LVFRP Marketing Survey Report (SEDAWOG, 1999).

Fish marketing plays a vital role in the lives of much of the lake basin's population, both in terms of employment and nutrition. This report focuses on the survey of fishers and their place within the marketing chain.

## Results

All of the region's fishers are male, although some boat owners are female. Regionally, fisher's spouses are not normally engaged in fisheries-related activities.

Gill-nets are the most commonly employed gears in the fishery, utilised by 68% of fishers, followed by 21% who use purse seines (for the capture of a small, sardine-like fish, the 'dagaa' (*Rastrineobola argentea*)).

58% of the region's fishers target Nile perch, followed by 21% who target dagaa and 20% tilapia. Just 20% of the region's fishers target an additional fish species.

Fishers sell their catch to a variety of outlets: 27% to factory agents, 25% to buyers who came to the landing beach on bicycles and 17% sold to beach-side traders and processors. Of those selling to factory agents, 73% sell Nile perch and 15% sell dagaa (to fishmeal factory agents).

Regionally, most fishers do not typically have agreements to sell their catch to single buyers exclusively (just 19% do). Those who did have such supply agreements were distributed roughly equally between the three riparian countries.

## Conclusions

Existing data on fishers is more abundant than that for the other populations covered by the Marketing Survey. This data, however, is patchy, and focuses mainly on Kenya.

While the fishery provides employment for many of the region's males, it is somewhat different from many other fishing cultures in that males' spouses are rarely engaged in fisheries-related activities. Agriculture occupies most fisher's families and hence raises questions as to whether or not lake-shore communities can in fact be viewed as 'fishing communities'.

The very large biological and ecological changes that have affected Lake Victoria are reflected in the typically low diversity of targeted species. This is not only due to low species diversity within the lake, however, but also due to high regional and international demand for the lake's dominant species.

Fish scarcity is an issue that permeates this report, and affects all trade along the distribution chain. Whether these are merely seasonal or not is not clear from the data. Almost certainly, however, they arise as a result of a combined process of fishing pressure and increasing demand.

## Recommendations

- The quality and reliability of much of the data presented in this report is limited by the lack of current and complete population lists for the group. In order to draw a truly representative sample and to have confidence that resulting data indeed represent the whole population under study, then statistical information on the industry must be collected, maintained and regularly updated. As primary data collection is vital to research and development, the research institutes, FIRI, TAFIRI and KMFRI must work with Fisheries Departments to develop data bases for all related populations which are designed in such a way as to be regionally compatible and capable of facilitating lake-wide analysis. The data set should eventually be expanded to include pricing data. Certain key findings from these surveys must be extracted and recorded to comprise this regional data set. The same questions should be asked every five years. In this way time series data may be developed and marketing trends detected. The research institutes should take a coordinated responsibility for this activity.
- The study of the biology of the lake does not provide complete information on the fishery. Similarly, studies on fish distribution do not provide a complete picture of stakeholders' consumption and employment activities. This report shows the strong link between the local fishery and agricultural activities in terms of seasonal employment trend. This important relationship requires further study. There are temporal characteristics of farming which impinge on fish related activities, and hence have direct relevance to management. Such a research topic could be the subject of an MSc thesis.
- The lack of understanding of fish quality preservation issues, and the near absence of related equipment, is typical of many developing countries. Costs involved with

associated quality improvements may take the cost of fish out of the reach of many local consumers. Hence, quality preservation of fish destined for the export market must be analysed differently from quality preservation within local and regional markets. These parallel quality streams should be further researched. Fish handling procedures need to be analysed with a view to encouraging quality improvements, and a financial analysis of improved handling must be undertaken to persuade fishers of the requirement for change. This research could be the subject of an MSc thesis.



# 1. Introduction

## 1.1. Preamble

1.1.2. This document, the fifth in the LVFRP's technical series, draws upon the first socio-economic survey to be carried out under this project, between 1997 and 1998. The fisher's survey is just a single survey carried out under the marketing survey of the LVFRP (SEDAWOG, 1999), and is the largest socio-economic survey carried out under the project to date. The size of the survey has compounded the socio-economic team's ability to clean it and enter it. This process has additionally suffered from considerable logistical difficulties that have only recently been rectified. So as to ensure that the fishermen's survey had some representation in the Marketing Survey Report, a random sample was selected from the data set, entered and analysed. This document analyses data from the whole of the survey of fishers and supersedes the fisher's survey chapter in the Marketing Survey Report (SEDAWOG, 1999).

1.1.2. Because the sample of fishers in the Marketing Report was selected randomly, there were generally no large differences between results reported in the latter document and this one. Where differences do occur, these proceed the analysis given in the text. Only those results which are completely different, or that vary by  $\pm 5\%$  from results given in the Marketing Report, are commented upon.

1.1.3. The need for a marketing study of Lake Victoria's fisheries had already been identified in the national research priorities of the three riparian states sharing the lake, and were articulated during the first LVFRP workshop held in Mwanza, Tanzania, from June 23rd to 26th, 1997. The requirement for the study was additionally amplified by the wide-spread acknowledgement that management needs to be involved in the marketing of the lake's resources, as well as to be informed as to the type of intervention that should take. Fishers were identified as lying at the base of the marketing chain, and hence the requirement for this, first, survey.

1.1.4. At the Mwanza meeting the marketing sub-project objected was defined as:

*the description, analysis and evaluation of marketing channels for fish and fish products in each of the riparian countries.*

1.1.5. The objectives of the fisher's survey were defined to be:

- 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.

## 1.2. Methodology.

### 1.2.1. *The questionnaires*

- (a) The fisher's survey was based on questionnaires containing, for the most part, questions to which a list of possible answers were attached. Open-ended questions were included in the questionnaire but these have mainly been excluded from this analysis due to categorisation difficulties. Questions to be posed were decided upon by at a meeting held in Kisumu from August 1<sup>st</sup> to August 11<sup>th</sup>, 1997 comprising most socio-economists from the region's fisheries research institutes.

### 1.2.2. *Questionnaire testing*

- (a) 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.

### 1.2.3. *Respondents' typical reactions to the survey questionnaires*

- (a) 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.
- (b) Respondents also expected assistance from enumerators, be it loans, fishing gear and technical advice.

### 1.2.4. *Questions which were ineffective (the fisher's questionnaire is contained in the rear of this report).*

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

### 1.2.5. *Words/phrases which caused difficulties.*

- (a) 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.
- (b) 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.

#### 1.2.6. *Sensitive areas for questioning.*

- (a) After winning the confidence of respondents by a series of straight forward questions, other questions on issues such as marital status, age, where money was invested and/or saved, incomes etc. could be answered.

#### 1.2.7. *Recommendations for future survey design*

- (a) Careful attention must be given to testing the questionnaire before fieldwork is undertaken.
- (b) Questionnaires should be short and specific and answer defined objectives.
- (c) Setting up and reaching agreement on standard codes should be done before field work is commenced and checked during questionnaire testing.
- (d) Separate studies targeting fish factory agents and crews alone should be carried out.

#### 1.3. Sample selection strategy and the dynamics of field work

- (a) It soon became apparent to the research teams that population lists have not been compiled or were very out of date. In terms of sampling over a wide geographical area landing sites were similarly not listed reliably, some of these being permanent and some not. As a result, the sample drawn was not random.
- (b) Sample sizes for data collection could not be agreed upon. 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. This sampling strategy was far from ideal given that the largest portion of Lake Victoria lies within Tanzania's borders.
- (c) 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. In all, just 50 transport boat owners were encountered. Boat owners and renters are grouped together and crew with gear placed in to the 'crew' category.
- (d) 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 thought that the information being gathered would be used to levy taxes upon 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.

#### 1.4. Data Collection

- (a) The data collection phase was successful in obtaining a large number of completed interviews. In all, 1,583 respondents were subsequently interviewed under the fisher's survey, most of whom were Ugandans, and least of whom were Tanzanians. This sample is biased in favour of Uganda by 50% and against Tanzania by 22%: 840 respondents were interviewed in Uganda, 417 in Kenya and 326 in Tanzania. Additional biases occurred during the selection of respondents: most (1,131) of those interviewed had access to a fishing boat (either owning or renting), while 378 respondents were crew members and the remainder fell in to 'other' categories.
- (b) Researchers were cut off from some areas by rains and impassable roads, cholera outbreaks and lack of vessels. Nonetheless, a comprehensive coverage of the riparian area was achieved (see Map, p.9). 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.
- (c) In all, 81 landing sites were visited for this study, which are as follows:

Table 1: Interview sites for the survey of fishers

Site i.d.	Survey site	Site i.d.	Survey site
Uganda		Uganda	
<i>Zone 1</i>		<i>Zone 3</i>	
1	Ddimbo	19	Kijaka
2	Namirembe	20	Lingira
3	Bulingo	21	Bubaale
4	Lambu	22	Kigaya
<i>Zone 2</i>		23	Lwanika
5	Tubi	24	Bwondha
6	Mutambala	25	Bukoba
7	Lwanabatya	26	Lubya
8	Kagonya	27	Lugala
9	Mulabana	28	Busiro
10	Kakyanga	29	Wakawaka
11	Kitobo	30	Majanji
12	Banda	31	Madwa
13	Ssenyi	Kenya	
14	Ggolo	<i>Zone 4</i>	
15	Kyanvubu	32	Sio Port
16	Gerenge	33	Mulukoba

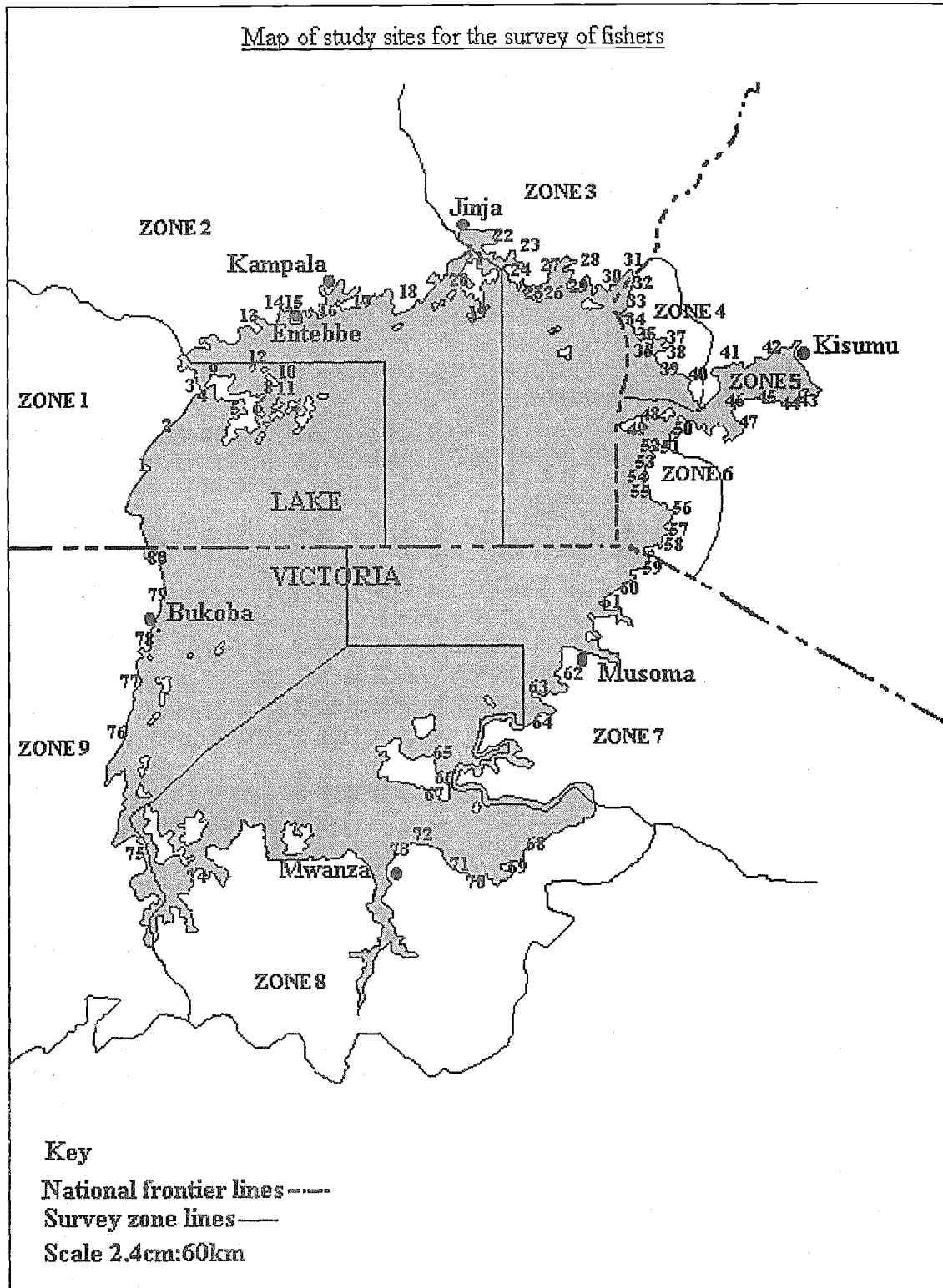
Site i.d.	Survey site	Site i.d.	Survey site
<b>Kenya</b>		<b>Tanzania</b>	
<i>Zone 4 (cont.)</i>		<i>Zone 7</i>	
17	Kigundu	34	Mavenga
18	Nangoma	35	Osieko
36	Nambo	59	Juakali
37	Uhanya	60	Nyang'ombe
38	Liunda/Ndeda	61	Busanga
39	Wichlum	62	Mgango
40	Osindo	63	Bwai
41	Asembo Bay	64	Suguti
<i>Zone 5</i>		<i>Zone 8</i>	
42	Asat	65	Nyalusurya
43	Rakwaro	66	Lugezi
44	Kendu-bay	67	Nansio
45	Obaria	68	Bukome
46	Homalime/Kowuor	69	Ihale
47	Ngegu	70	Nyakasenge
48	Mbita	71	Kayenze
<i>Zone 6</i>		72	Kabangaja
49	Nyagina	73	Igombe
50	Tabla	74	Nkome-mchangani
51	Gingo	<i>Zone 9</i>	
52	Kabwao	75	Mganza
53	Kinda	76	Kifungu
54	Rasira	77	Kyamkwikwi
55	Luanda Konyango	78	Nyamkazi
56	Got Kachola	79	Igabilo
57	Nyangwina	80	Ruhanga
58	Ngore	81	Malehe

- (d) Efforts were made to ensure that sampling covered the entire riparian region without concentrating in certain areas. To this end the lake shore was divided into 9 zones between which efforts were divided. A map indicating the location of survey sites occurs below.

#### 1.5. Data Analysis

- (a) At a workshop held in Kisumu in February 1999, the initial sample from the data set was drawn, entered and subsequently analysed. Data entry for the whole of the fisher's survey was only completed in July, 1999, and analysis completed soon afterwards.
- (b) The results provide a broad description of the typical members of the fishing population of Lake Victoria, their activities as part of the distribution channel, as well as their opinions on certain key themes.

Map of study sites for the survey of fishers



- (c) The use of frequencies within the text allows the identification of common features and sub-groupings within the sample of each population. These were used to compile a profile of a typical member of each population under study.
- (d) Cross tabulations and Chi squared tests allow for the association between largely nominal variables to be measured. The large samples obtained enabled valid results to be gained with Chi squared. Occasionally categories gaining few responses were merged. This approach allowed for the testing of key conceptions/misconceptions about the industry.
- (e) Charts were developed for presentation purposes to give a rapid visual understanding of much of the data collected.
- (f) The desire to take up the quantitative results collected and presented here and feed them in to quantitative models in order to produce solutions, must be resisted. This survey method is limited, not least by local respondents' unfamiliarity with the requirements of the process, but also through the procedures of questionnaire design in which results are predicted early on in the survey design.

#### 1.6. Report structure

- (a) This report contains, in its introduction, a section explaining data collection, methods and research difficulties. In the sections that follow, a profile of a boat owner/renter is given, followed by a profile of a crew member. Proceeding these is a section on areas of testing under the fisher's survey followed by a section of more detailed analysis. This latter section ends with concluding remarks, and the questionnaire utilised during the survey is given at the end of this document.
- (b) Wherever possible, comparable data is introduced into the document. Most of this comes from Kenya where many similar studies have been carried out.
- (c) The document attempts in as many cases as possible to follow the same format as that employed in the Marketing Survey Report. Insofar as the data is concerned, this is to ensure that comparisons are facilitated between the two data sets. Otherwise, the comparable format exists so that this document is able to stand on its own. In some cases, it has been necessary to recalibrate certain figures – in particular, those involving ranges – which does not readily allow for comparisons between the two reports. Attention is given to this and other differences between the two data sets within the text that follows.

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

- 2.1. The typical fishing boat owner/renter will be male, aged 27 or older, and educated to primary level only. He will be married to one wife and have three or more children. Typically, his spouse will not be engaged in a fisheries-related activity (Fig.s 1-3; Tables 2-3).
- 2.2. Most fishing boat owners/renters will own one 'sesse' canoe, over 7 metres in length and without an outboard engine. The boat will have two to four crew members who will target Nile perch using gill-nets (Table 6; Fig.s 9 - 10).
- 2.3. Most fishing boat owners/renters will not use any fish preservation techniques. Of the small proportion (13%) who do, placing the fish under some cover is the most common method (untabulated data).
- 2.4. Crew earnings will be defined as a flat proportion per member after expenses have been deducted (Fig. 4). For most boat owners and renters, highest earnings will be over US\$ 114 per month and lowest earnings will be over US\$ 16 per month (Fig.s 7 - 8).
- 2.5. Fishing boat owners/renters will invest their profits back into the fishery or buy livestock (Table 5).
- 2.6. 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 sales agreement (Fig. 11; Tables 9 - 10).
- 2.7. Fish prices received by boat owners and/or renters will be determined by the size and/or weight of the fish (34%), set by the buyer (25%), or established through bargaining (20%: Table 7).
- 2.8. 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 11 - 12).



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

- 3.1. The typical fishing crew member is a male of under 27 years old years and educated to primary level only. He will be married to one wife and have none or one child (Fig.s 1 - 3; Table 2).
- 3.2. 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 (Table 6).
- 3.3. Most crew members target Nile perch (Fig. 10) and no quality preservation techniques will be used.
- 3.4. Crew earnings are defined as a flat proportion per member after expenses have been deducted (Fig. 4). For most crew members, highest earnings will be up to US\$ 113 per month and lowest earnings will be up to US\$ 16 per month (Fig.s 7 - 8).
- 3.5. If crew members have a surpluses to invest, they will either buy livestock or re-invest them in the fishery (Table 5).
- 3.6. Most fishing crew members say that they sell their catch at one beach only, to agents with whom they will not have any sales agreement (Fig. 11; Table 9 - 10).
- 3.7. Fishing crew members state that fish prices are determined by the size or weight of the fish (see Table 7).
- 3.8. 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 (see Tables 11 and 12).

#### 4. 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 1,273 responses. 35% of responses identified agents as a sales outlet. Traders coming to the landings on bicycles drew 25% of responses, followed by resident beach-side traders, which accounted for 15% of responses (Fig. 11).

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

Questions concerning to whom catches were sold elicited 1,005 responses from tilapia and dagaa fishers. Of 456 responses from tilapia fishers, 16% claimed that, amongst their buyers, were factory agents. Dagaa fishers provided 549 responses, of which 17% identified factory agents as sales outlets (Fig. 11).

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

Out of 1,005 responses, just 29 tilapia and dagaa fishers identified co-operatives as a sales outlet (untabulated data).

*Fishers do not use cooperatives.*

Out of 2,434 responses, co-operatives were mentioned as sales outlets just 55 times (untabulated data).

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

When questioned, tilapia and dagaa fishers provided 1,005 responses. 456 responses were obtained from tilapia

fishers, of which 33% identified bicycle traders as buyers. Out of 549 responses from dagaa fishers, 18% identified bicycle traders as amongst their buyers (Fig. 11). 22% of tilapia fishers identified consumers as amongst their buyers as did 12% of dagaa fishers (Fig. 11).

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

Only 131 Nile perch fishers sold their fish at more than one beach. Of these, only 28% 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, 260 respondents targeted tilapia as their principal species, and 305 targeted dagaa as their principal species. 92% of tilapia fishers sold at one beach alone, while 89% of dagaa fishers sold at one beach alone (untabulated data).

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

Of 1,259 responses to questions on this issue, 81% claimed not to have any agreements with their buyers (Table 9).

*Fish prices are determined by buyers rather than fishers.*

Of 1,367 responses to this issue, only 4% of respondents claimed to set the price of the fish they sold (Table 8).

*The buyer always sets the price, irrespective of species.*

Of 350 respondents who claimed that buyers set the prices of fish, 71% targeted Nile perch. Of 255 tilapia fishers, 41% set their prices by the size or weight of the fish. Of 297 dagaa fishers, 28% set their price through bargaining and 26% who said prices were set by buyers (Table 8).

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

Respondents were asked what they believed that they earned in 'good' and 'bad' months and averages derived (trimmed at 5%) and multiplied by 12 to obtain estimated annual earnings. Nile perch fishers estimated their annual earnings to be US\$ 2,294 (n=789), compared to tilapia fishers who estimated their earnings at US\$ 926 (n=238) and dagaa fishers who estimated their earnings to be US\$ 2,179 (untabulated data).

*Kenyan believe that they earn less than Ugandans or Tanzanians.*

Kenyan estimated that they earned an average of US\$ 3,268 per year (n=392), compared to Tanzanians who estimated that they earned an average of US\$ 2,294 a year (n=300) and Ugandans who estimated that they earned US\$ 1,156 a year (n=766; all means trimmed to 5%; see Figs 5 - 6).

*Most fishers have undergone primary education.*

45% of our sample of 1,572 fishers had had some primary education (Fig. 1).

*Higher income fishers use fish quality preservation techniques.*

Of 185 respondents who used preservation techniques, 46% estimated their annual earnings to be over US\$ 1,751, while 26% estimated that they earned between US\$ 624 and 1,750 a year. In all cases, the most common preservation technique mentioned was 'covering' (untabulated data).

*Most boat owners are under 35 years old.*

Out of 1,128 boat owners and renters in our sample, the largest proportion (58%) were under 35, while the remainder were 35 and over (Table 2).

*Most fishers have bank accounts.*

Respondents were questioned as to where they invested their earnings, and provided 1,649 responses. Of these, bank and/or co-operative savings accounts attracted 14% of responses (Table 5).

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

Out of 1,362 married respondents, 35% had one or more spouses engaged in a fisheries related activity, of which fish trading and/or processing was the most common (Table 3).

Fig. 1: Respondents' level of education by status

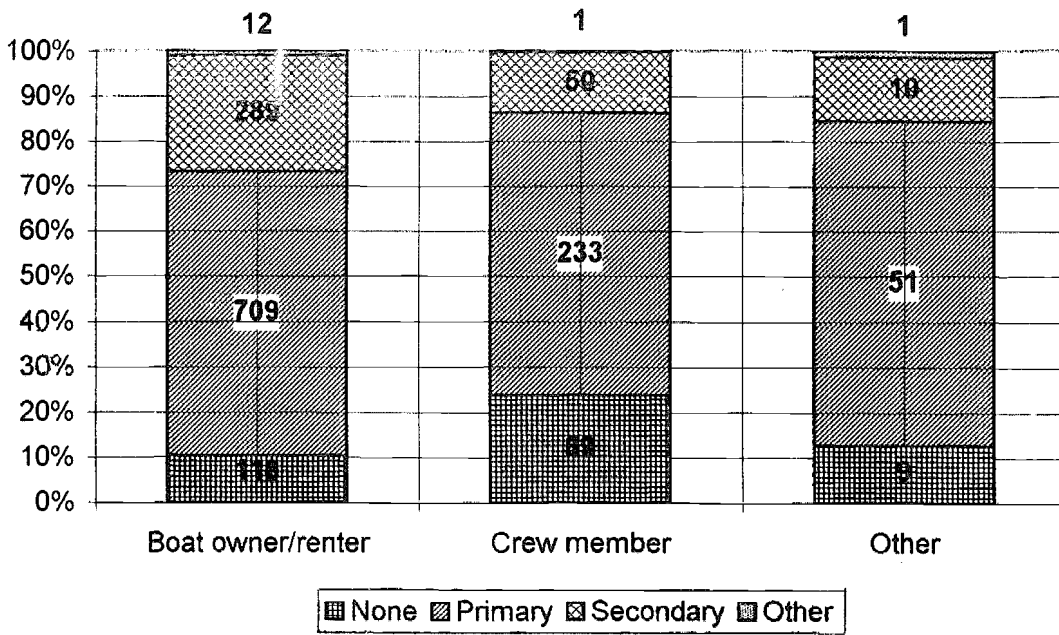


Fig. 2: Respondents' marital status

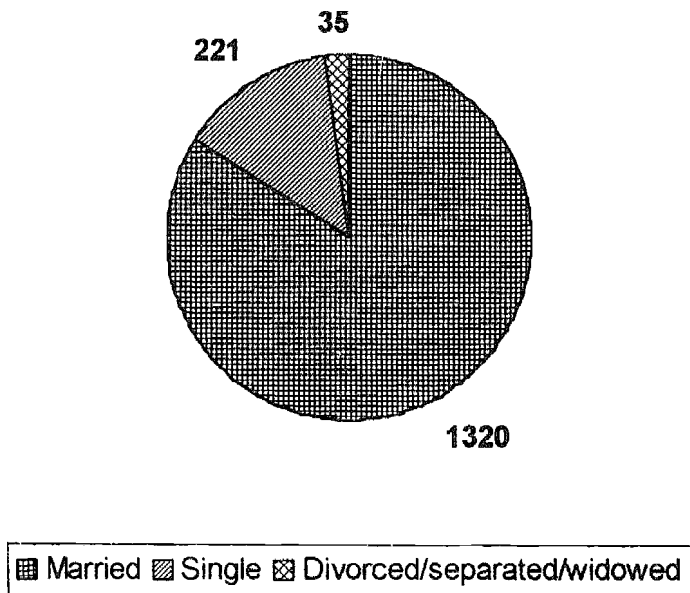
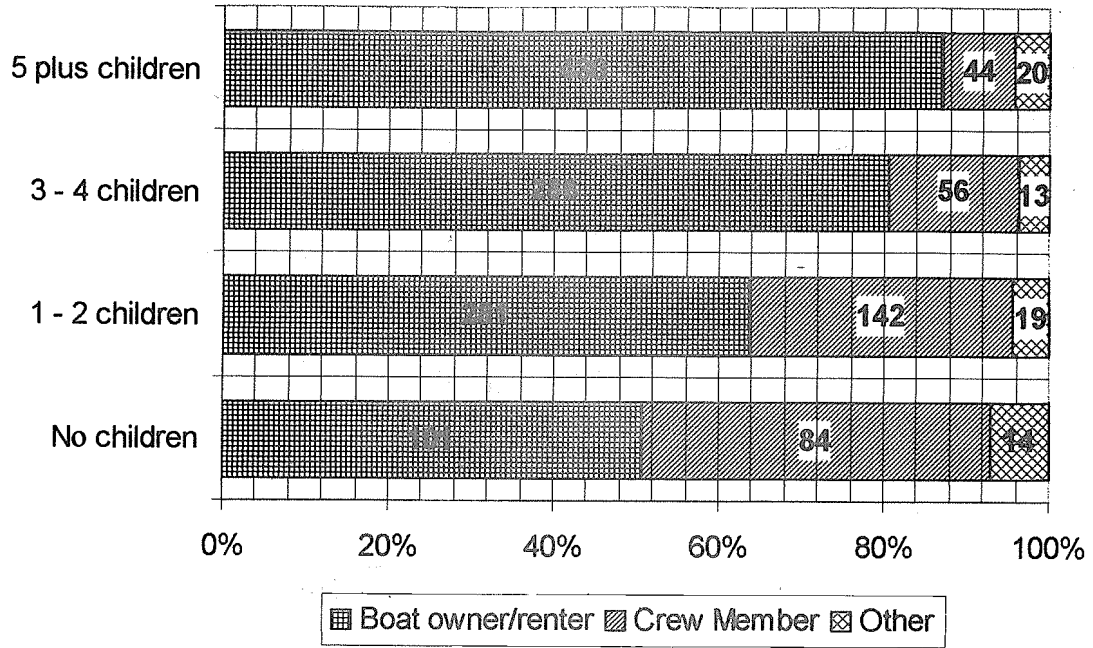


Fig. 3: Ranges of children by respondent's status



## 5. Detailed analysis

- 5.1. Boat owners and renters are typically older than crew members – 86% of those respondents who were 35 and over had access to a boat. Just 15% of crew members were 35 and over (Table 2). 508 fishers interviewed were 26 years old and under. 70% of these fishers were encountered in Uganda. The latter figure is higher than that reported in the Marketing Report, where it was stated that half of those fishers of under 27 years of age were encountered in Uganda. In Kenya, over half (60%) of the 416 respondents interviewed there were 36 years old and over (Table 2).

Table 2: Age ranges of respondents by country and status

Age range	Status			Total
	Boat owner/ renter	Crew member	Other	
<i>Uganda</i>				
< 26	183	158	15	356
27 – 34	192	96	7	295
> 35	149	30	5	184
<i>Kenya</i>				
< 26	53	6	3	62
27 – 34	90	6	9	105
> 35	223	15	11	249
<i>Tanzania</i>				
< 26	52	29	9	90
27 – 34	86	26	6	118
> 35	100	11	6	117
<b>Total</b>	1128	377	71	1576

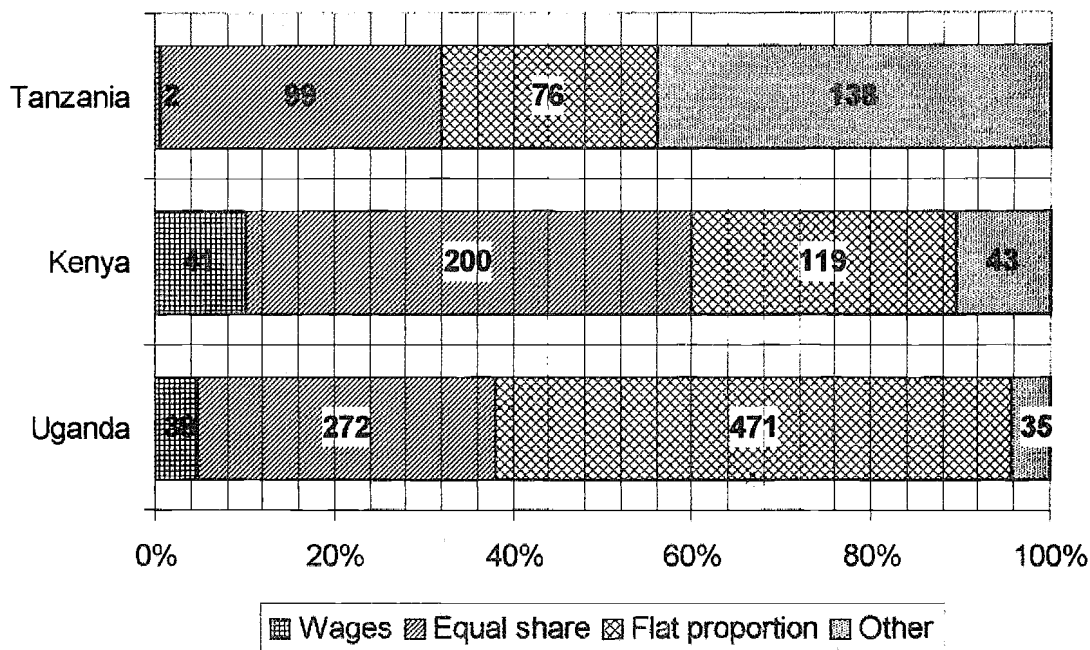
- 5.2. Regionally, 63% of fishers have had primary school education, 22% have had some secondary school education, while 14% have had no schooling at all (n=1,574; Fig. 1). Proportionally, the highest rates of primary school education amongst fishers occurred in Tanzania, where 82% of respondents had had some primary school education (n=325). The highest rates of secondary schooling were encountered in Kenya, where 33% of respondents had attended secondary school (n=417), while Uganda had the highest rates of non-attendance in the region, with 20% of respondents having had no education at all (n=832; untabulated data).
- 5.3. Regionally, fishers' spouses are not engaged in fisheries-related activities. Out of 1,362 respondents, just 26% had a spouses engaged in a fisheries related-activity. In Kenya, however, 53% out of 395 respondents did have wives engaged in a fisheries-related activity. 96% of this latter group were involved in fish processing and trading (Table 3). 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 3: Spouses' activities by country

Activity	Country			Total
	Uganda	Kenya	Tanzania	
Trade/process fish	85	203	35	323
Fishing	11	6	5	22
Other	2	2	1	5
Spouse not engaged in fisheries	616	184	212	1012
<b>Total</b>	<b>714</b>	<b>395</b>	<b>253</b>	<b>1362</b>

5.4. Outboard engines are not common in Lake Victoria's fishery – just 276 (22%; n=1,261) of respondents worked boats with an engine (untabulated data). 90% of those boats with outboard engines targeted Nile perch. 62% of the engines encountered during this study were located in Uganda (untabulated data).

Fig. 4: Regional methods of labour remuneration for fishing crews



5.5. Regionally, the most common method of paying crew was to divide the catch value into agreed upon portions after deducting the cost of expenses. This regional trend, however, is determined by the very large number of Ugandans who employ it. In Tanzania, the largest proportion of respondents (31%, n=315) used a system of dividing the catch value equally in half, after deducting expenses, half going to the boat owner and the other half to be divided amongst the crew (Fig. 4). This differs from the result reported in the Marketing Report where 40% of Tanzanian respondents used a system of payment where the catch value went to the crew on certain days, and to the boat owner on others. 50% of Kenyan crews were paid half the catch value to divide amongst themselves (n=403; Fig. 4).

- 5.6. Throughout the region, fishers are typically also involved in several other activities besides fishing. When questioned, 1,130 responses were obtained. The most common activities are farming and herding, attracting 68% of responses. This is less than the 76% provided in the Marketing Report. Respondents were also engaged in alternative businesses (19% of responses) and in renting out rooms and/or houses (5% of responses: Table 4).

Table 4: Other activities in which respondents were involved

Activity	Uganda	Kenya	Tanzania	Total
Farming/livestock	309	245	216	770
Owns shop/hotel and/or trades	55	113	44	212
Rents out rooms/houses	-	53	3	56
Other	34	30	28	92
<b>Total</b>	<b>398</b>	<b>441</b>	<b>291</b>	<b>1,130</b>

- 5.7. Respondents did not really know what income they 'earned', given that incomes tend to vary from day to day and demands on income also fluctuate depending on domestic requirements or the demands of the wider community. Questions regarding income, therefore, generated a wide range of answers which are unlikely to portray 'true' income. The importance of these figures, however, lies in the differences that respondents perceive between countries and between themselves and other status groups operating within the fishery. The largest proportion of Kenyan respondents believed that they earned more than US\$ 306 in 'good' months (44%; n=393), while the largest proportion of Ugandan respondents (49%; n=772) and Tanzanian respondents (46%; n=308) believed that they earned less than US\$ 113 in 'good' months. Kenyans also believed that they earned more than their regional neighbours in 'bad' months, with the largest proportion believing that they earned more than US\$ 65 during such periods (48%; n=394). The largest proportion of Ugandans (43%; n=764) and Tanzanians (38%; n=301) believed that they earned less than US\$ 16 at such times. (Figs 5 - 6). These latter figures cannot be compared to those provided in the Marketing Report because of the recalibration of the income ranges involved. Estimates of annual income may be derived from these figures by obtaining the mean of estimated earnings in 'good' and 'bad' months and multiplying them by 12. Kenyan fishers estimated that they earned US\$ 3,268 per year, while Tanzanian respondents estimated that they earned US\$ 2,294 and Ugandans earned US\$ 1,157 a year (all means expressed are trimmed by 5%).



Fig. 5: Ranges of estimated earnings in 'good' months

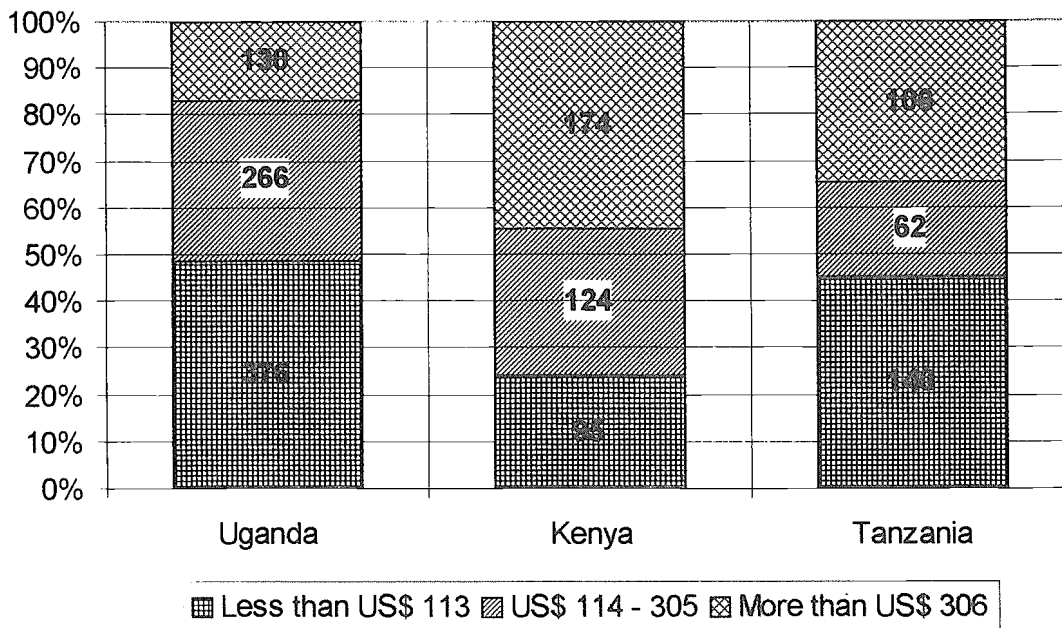
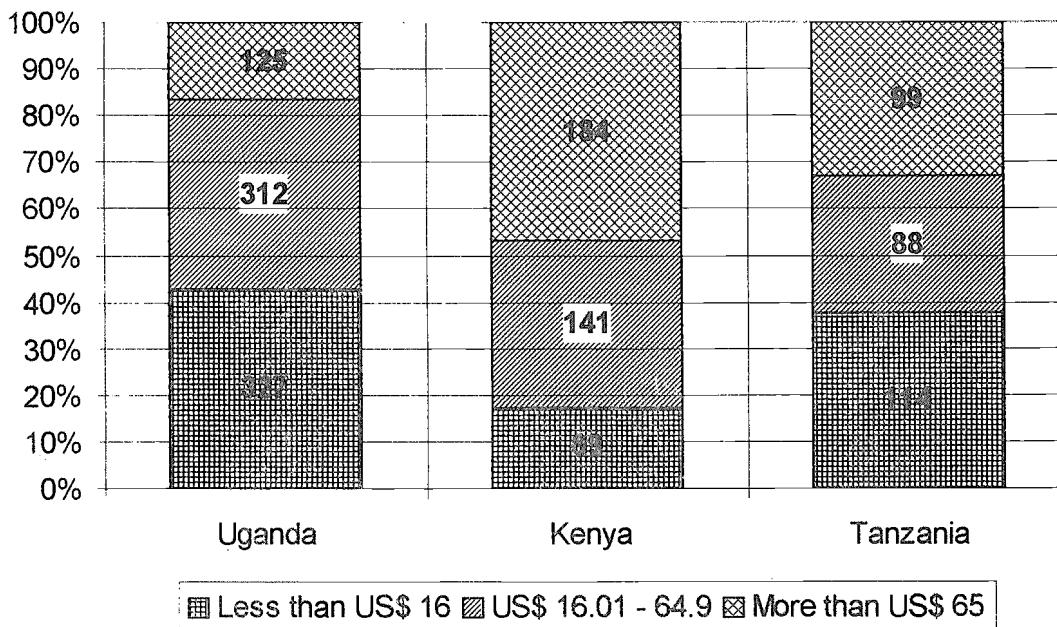


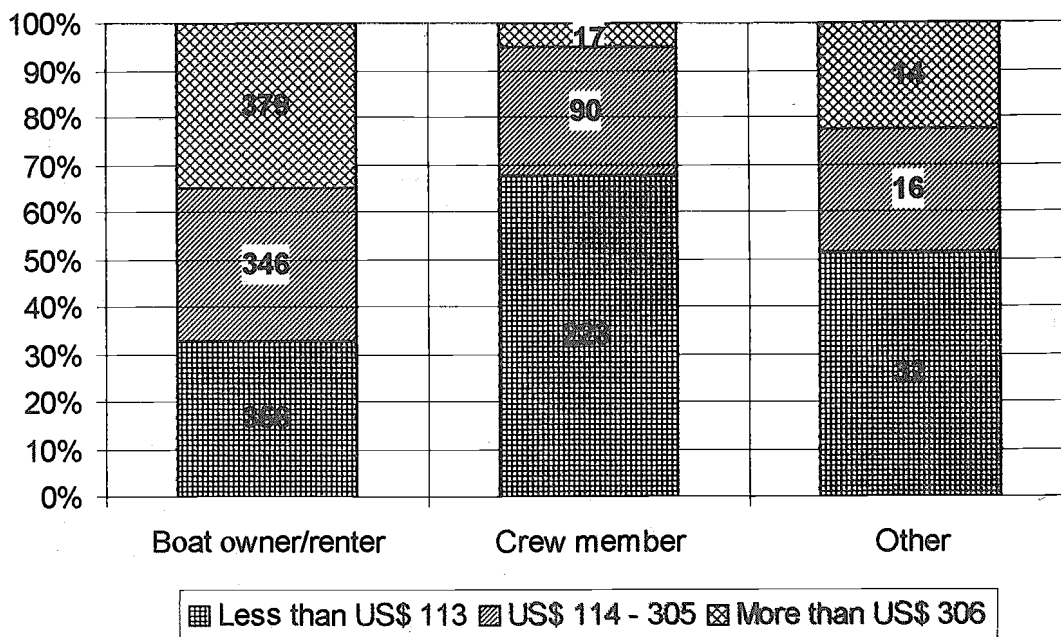
Fig. 6: Ranges of estimated earnings in 'bad' months



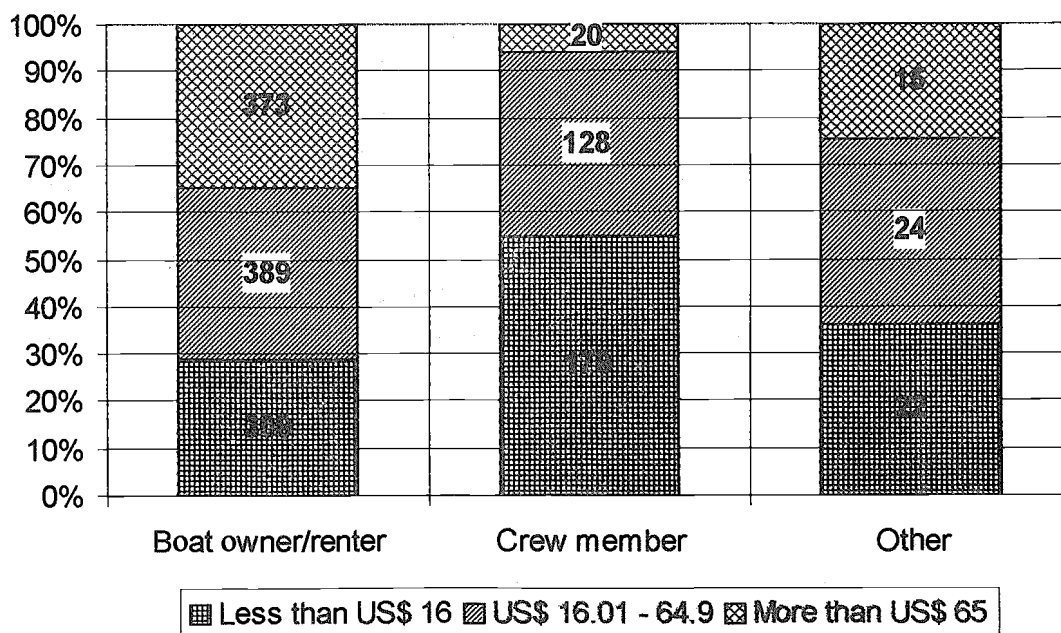
Perceived income differences are also affected by the respondent's status in the fishery. Out of 1,081 boat owners/renters, the largest proportion (35%) estimated that they earned US\$ 306 and over in 'good' months. Conversely, only 5% of 330 crew members believed that their earnings fell in to the same bracket. These

perceived differences are reflected in estimates of earnings during 'bad' months, with the largest proportion of boat owners estimating that they earned over US\$ 16 during such times (71%; n=1,071), and most crew members believing that they earned less than US\$ 16 at such times (55% n=327; Figs 7 - 8). Comparison of these figures with those given in the Marketing Report is inappropriate given the re-calibration of income ranges. Mean annual earnings for crew members were US\$ 638, fully 73% less than the US\$ 2,353 estimated annual average earnings for boat owners and renters (means given are trimmed to 5%).

**Fig. 7: Ranges of estimated earnings in 'good' months by status**



**Fig. 8: Ranges of estimated earnings in 'bad months' by status**



- 5.9. Perceived income differences are also affected by species targeted. Nile perch fishers estimated their annual average earnings to be US\$ 2,294 as compared to tilapia fishers who estimate theirs to be US\$ 926, and dagaa fishers who estimate theirs to be US\$ 2,179 (means trimmed to 5%). Perceived incomes amongst boat owners and renters is also a function of the number of boats operated. There were 747 respondents surveyed who owned or rented a single boat, and almost a third believed that they earned less than US\$ 623 a year, a third between US\$ 624 and 1,750 and a third over US\$ 1,751. Amongst the 187 respondents who operated two boats each, 55% believed that they earned over US\$ 1,751 a year; of 120 respondents operating 3 or more boats, 73% believed that they earned over US\$ 1,751 annually (untabulated data).
- 5.10. Respondents were questioned as to where they would invest their money in the event that they had a surplus. 1,649 responses were obtained, of which the most common was that they would re-invest the money in the fishery (33%), followed by investments in livestock (25%) and, finally, 14% who would save their money in a bank or co-operative account (Table 5). In the Marketing Report, the latter investment options obtained 45%, 33% and 22% respectively. 97% of those who would save their money in banks or co-operative society accounts were boat owners (n=233). The most popular investment option in Kenya is livestock, which obtained 36% of responses (compared to 22% of Tanzanians and 19% of Ugandans), slightly less than the 43% quoted in the Marketing Report. 40% of Ugandan responses were that reinvestments would be made in the fishery, as were 45% of Tanzanian responses and 15% of Kenyan responses. In the Marketing Report, 64% of Ugandans said they would reinvest their earnings in the fishery, as would 35% of Kenyans and 49% of Tanzanian fishers. Saving surpluses in a bank or cooperative society was an option that gained 233 positive responses, of which 45% came from Kenya, 31% from Tanzania and 24% from Uganda (Table 5<sup>1</sup>). Figures from the Marketing Report showed 18% of Ugandan responses, 22% of Kenyan responses and 23% of Tanzanian responses to be that fishers' surpluses would be invested in bank or cooperative society accounts.
- 5.11. Out of 1,387 regional respondents, the most commonly utilised gear in the fishery were gill-nets, used by 68% of the sample, followed by purse seines, used by 21% of the sample (Fig. 9). Regionally, most fishers did not use a second gear type – only 6% out of 1,583 respondents did. Most of those who did use second gears were Kenyan, where 67% of those using second gear types were encountered. (untabulated data). These data are contrary to figures published in the Marketing Report which showed 61% of fishers utilising a second gear type. Out of 828 Nile perch fishers, 86% used gill-nets, 10% more than reported in the Marketing Report. Out of 261 tilapia fishers, 87% used gill-nets, 10% less than reported in the Marketing Report. Virtually all (96%) of the 298 dagaa fishers sampled used purse seines (Fig. 9).

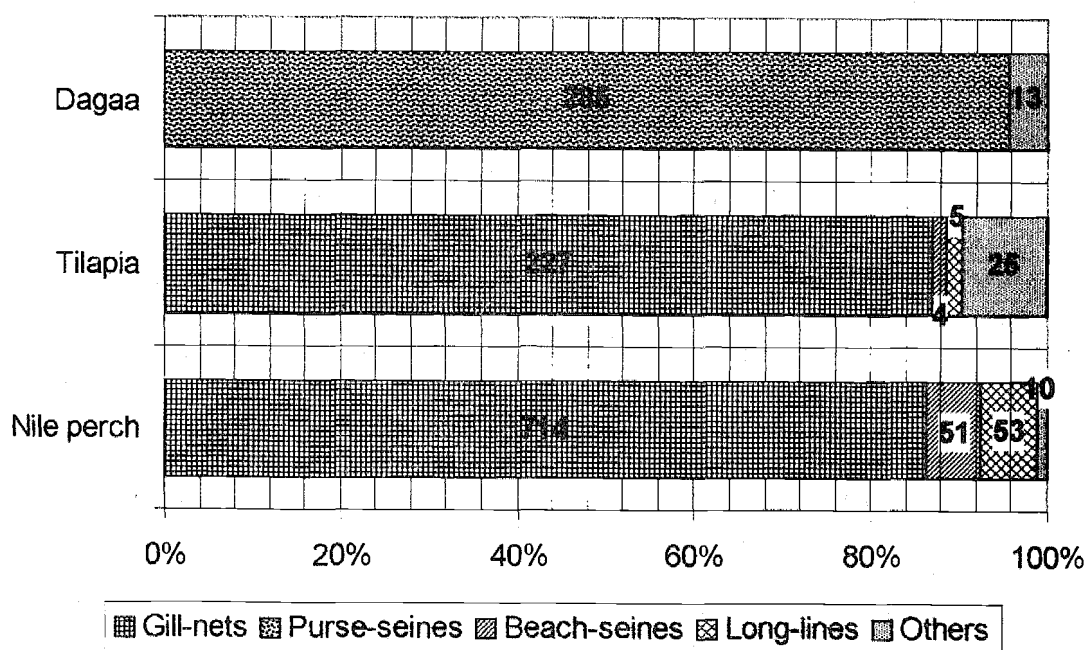
---

<sup>1</sup> Due to the low value of these figures, the tables are not Chi squared tested.

Table 5: Where respondents would invest their earnings by status

	Respondents' status			Total
	Boat owner/ renter	Crew member	Other	
<i>Uganda</i>				
Re-invest in fishery	251	13	9	273
Buy livestock	118	4	6	128
Save in bank/co-op. society	53	-	3	56
Others	177	39	7	223
<i>Kenya</i>				
Re-invest in fishery	67	2	10	79
Buy livestock	175	11	8	194
Save in bank/co-op. society	100	-	4	104
Others	132	16	11	159
<i>Tanzania</i>				
Re-invest in fishery	181	5	7	193
Buy livestock	75	11	8	94
Save in bank/co-op. society	63	6	4	73
Others	60	11	2	73
<b>Total</b>	<b>1452</b>	<b>118</b>	<b>79</b>	<b>1649</b>

Fig. 9: Fishing gear used to target Nile perch, tilapia and dagaa



- 5.12. Proportionately, gill-nets are most commonly employed in Uganda where 79% (of 763 respondents) of fishers used them (7% less than indicated in the Marketing Report). In Tanzania, 71% (of 266 respondents) of fishers used gill-nets (6% more than indicated in the Marketing Report). In Kenya, gears were distributed between gill-nets (used by 46%, of 390 respondents) and purse-seines (used by 36%: untabulated data).

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). Othina and Osewe-Odera (1996) estimate that 18% of fishing gears used in Kenya's Lake Victoria fishery were gill-nets in 1995. Purse-seines comprised 51% of gears, beach seines comprised 25% and long-lines comprised 6% (Othina and Osewe-Odera, 1996).

- 5.13. Of 969 gill-net owners, 75% operated these on a crew of 2 - 3, followed by 12% who operated them on a crew of 4. Beach seine owners normally operated their nets with a crew of over 5, while 55% of (283) purse seine owners operated their gear on a crew of 4. Of 66 long-liners, 71% operated on a crew of 2 - 3 (Table 6). Comparisons with the Marketing Report are not possible here due to the re-calibration of crew size ranges.

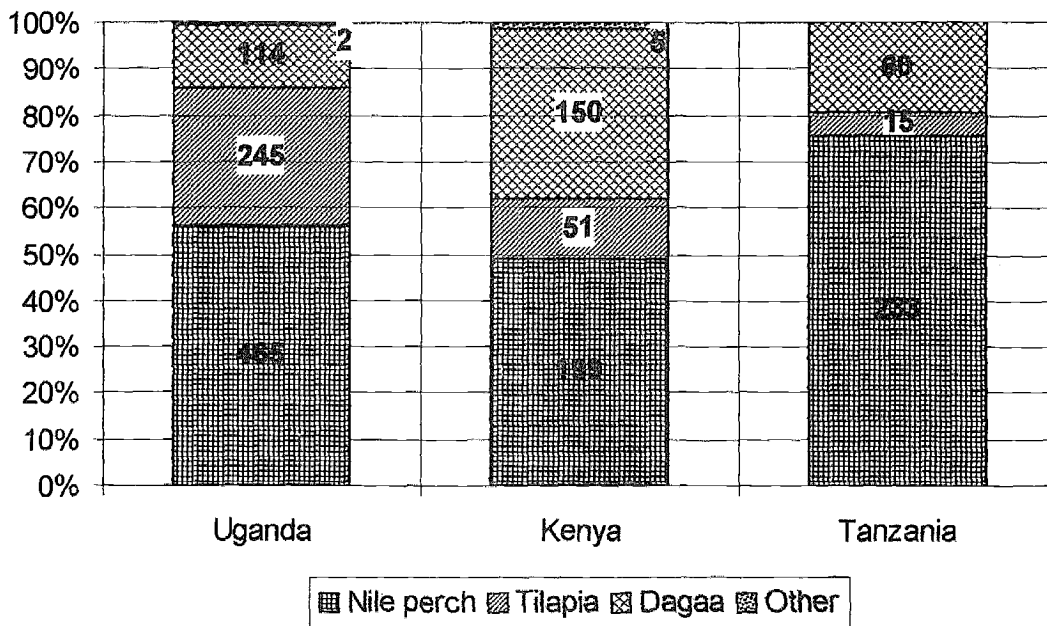
Table 6: Crew size by gear type

No. crew	Gear type					Total
	Gill nets	Beach seines	Purse seines	Long-lines	Others	
1	38	-	2	1	3	44
2	366	2	41	21	41	471
3	364	3	20	26	5	418
4	115	12	155	5	-	287
5+	86	35	65	13	-	199
<b>Total</b>	<b>969</b>	<b>52</b>	<b>283</b>	<b>66</b>	<b>49</b>	<b>1419</b>

- 5.14. 58% of respondents targeted Nile perch, followed by 21% who sought dagaa and 20% who targeted tilapia (n=1,539; Fig. 10). Generally, most respondents targeted just a single species – only 20% out of 1,583 respondents sought an additional species, of which the most common was Nile perch (sought by 62% of those targeting an additional species). Most Tanzanian (76% of 308) and Ugandan (56% of 826) fishers targeted Nile perch. In Kenya, the 49% of fishers also targeted Nile perch, followed by 37% who targeted dagaa (n=405; Fig. 10).

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).

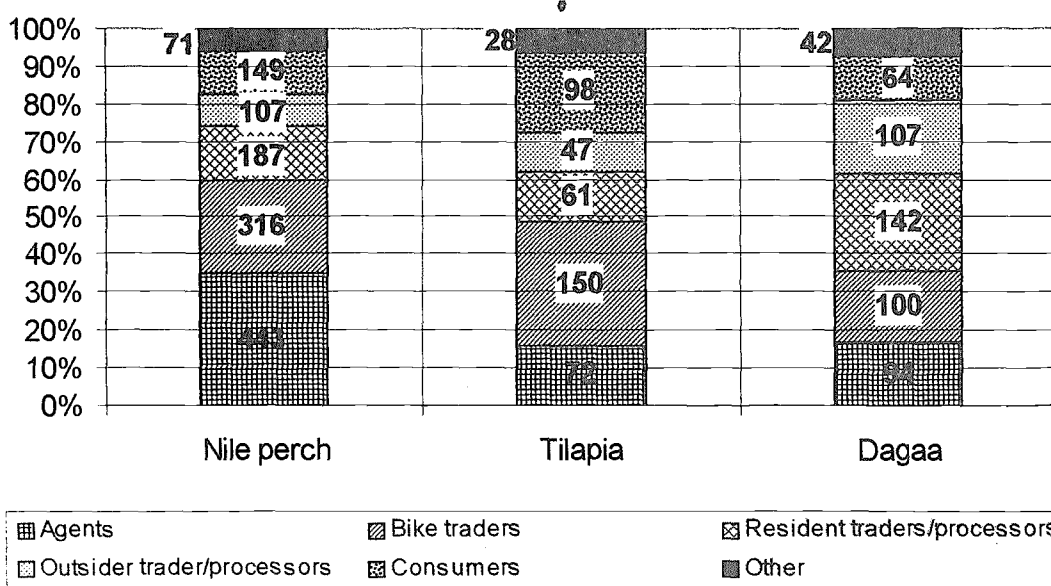
Fig. 10: Main target species by country



- 5.15. Generally, fishers sold their fish at only one beach – out of 1,559 respondents, just 13% sold their catch at more than one beach. Out of 189 respondents who did sell at more than one beach, 69% fished for Nile perch (8% less than indicated in the Marketing Report), while 18% fished for dagaa. The principal reason supplied for selling at more than one beach was that other beaches often offered better prices (28% of 187 responses) and that other beaches offered better markets than home beaches (26% of responses: untabulated data). In the Marketing Report, 44% of respondents indicated that they sold at more than one beach because of better markets elsewhere. 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 410) of Kenyan fishers sold their catches at more than one beach (untabulated data).
- 5.16. Fishers disposed of their catch to a variety of outlets, and when questioned, provided 2,278 responses. The largest proportion of fishers sold their catch to agents of fish companies (27%, compared to 33% in the Marketing Report), followed by traders coming to, or operating from, the beach on bicycles (25%), resident beach-side traders and/or processors (17%, compared to 27% in the Marketing Report) and traders from outside the landing coming to it on foot (11%: Fig. 11<sup>2</sup>).

<sup>2</sup> Due to the low value of some of the variables in this figure, Chi squared results are neither significant nor valid.

Fig. 11: Buyers to whom fishers of Nile perch, tilapia and dagaa sell



5.17. Of 609 respondents who sold their catch to factory agents, 73% sold Nile perch, while 15% sold dagaa (to agents from fish meal factories). Of the 566 respondents who sold their fish to bicycle traders, 56% sold Nile perch, 27% sold tilapia and 18% sold dagaa (compared to 26% in the Marketing Report). Of the 456 responses to be obtained from tilapia fishers, 33% sold to bicycle traders, 22% sold to consumers, 16% claimed to sell their fish to factory agents, and 13% resident traders and/or processors. More than 5% variance with Marketing Report results occurs with consumers, who did not feature as a sales outlet, and 32% who sold their fish to resident beach-side traders and/or processors. Of the 549 responses to be obtained from dagaa traders, 26% sold to resident beach-side traders and/or processors (10% less than in the Marketing Report), 18% sold to bicycle traders and 20% sold to off-beach traders coming to the landing on foot (16% less than in the Marketing Report; Fig. 11).

5.18. Out of 1,376 fishers, the largest proportion claimed that their fish prices were most often determined by the size or weight of the fish (32%), followed by those who felt that the buyer determined the fish price (25%) or arrived at it through bargaining (21%; Table 6). In the Marketing Report, 37% claimed that their prices were set by buyers, 26% established their prices through bargaining and 26% whose prices were determined by the size or weight of their fish. Of 815 Nile perch fishers, 35% claimed that their fish prices were determined by the buyer (13% less than stated in the Marketing Report). The largest proportion of 225 tilapia fishers (41%) sold their fish by size or weight, while the highest proportion of 297 dagaa fishers (28%) determined their prices through bargaining (as compared to 45% in the Marketing Report: Table 8). Out of 384 Kenyan fishers, 33% claimed to arrive at their fish prices through bargaining with their customers (in the Marketing Report 46% of fishers claimed to have their prices set by their buyers). Out of 274

Tanzanian fishers 49% had their prices set by their buyers (10% less than in the Marketing Report), while in Uganda, it was the size or the weight of the fish that mattered (53% out of 718 fishers: Table 7).

Table 7: How respondents' prices are determined by country

Price determinant	Country			Total
	Uganda	Kenya	Tanzania	
Bargaining	114	128	51	293
Buyer sets price	145	71	134	350
Size/weight of fish	382	17	41	440
Seller sets price	3	40	8	51
Catch size	33	3	24	60
Other	41	125	16	182
<b>Total</b>	<b>718</b>	<b>384</b>	<b>274</b>	<b>1,376</b>

Table 8: How fishers of Nile perch, tilapia and dagaa determine their prices

Price determinant	Species			Total
	Nile perch	Tilapia	Dagaa	
Bargaining	118	86	84	288
Buyer sets price	250	24	76	350
Size/weight of fish	282	105	52	439
Seller sets price	23	8	20	51
Catch size	35	11	13	59
Other	107	21	52	180
<b>Total</b>	<b>815</b>	<b>255</b>	<b>297</b>	<b>1367</b>

- 5.19. Regionally, fishers do not typically set up sales agreements with buyers. Out of 1,259 respondents, just 19% had any such arrangements. Out of 238 respondents who did have such arrangements, the most common agreement was that the fisher sold his/her fish to one buyer exclusively and received credit and/or loans in return (51%, compared to 71% in the Marketing Report). 66% of those who had such sales arrangements were Nile perch fishers (Table 9). Out of 239 respondents with such sales arrangements, 36% were encountered in Uganda, 33% in Kenya and 31% in Tanzania (unlike in the Marketing Report where most fishers with arrangement were encountered in Tanzania: Table 10).

In Hoekstra's 1991 study, 12% of 374 Kenyan 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 Kenyan fishers had some kind of sales agreement with their buyers (Geheb, 1997).



Table 9: Types of sales arrangements that fishers of Nile perch, tilapia and dagaa have with their buyers

Arrangement	Species			Total
	Nile perch	Tilapia	Dagaa	
Buyer provides credit/cash/loans	78	20	23	121
Buyer provides gear	42	9	6	57
Other	36	14	10	60
No arrangement	575	208	238	1021
<b>Total</b>	<b>731</b>	<b>251</b>	<b>277</b>	<b>1259</b>

Table 10: Types of sales arrangements which fishers have with their buyers by country

Arrangement	Country			Total
	Uganda	Kenya	Tanzania	
Buyer provides credit/cash/loans	51	43	27	121
Buyer provides gear	20	27	10	57
Other	15	8	38	61
No arrangement	624	308	97	1029
<b>Total</b>	<b>710</b>	<b>386</b>	<b>172</b>	<b>1268</b>

- 5.20. Respondents were questioned as to what made their fish prices rise and fall. Questions on price rises generated 1,981 responses, of which the most common were that prices rose when catches were low (44%), followed by price rises due to high demand (36%: Table 11). In Tanzania, however, the most common response was that price increases occurred with high demand (37% out of 383 responses, as compared to 30% indicated in the Marketing Report).

Table 11: Reasons for price increases by country

Reason	Country			Total
	Uganda	Kenya	Tanzania	
Poor catches	511	263	89	863
High demand	356	215	143	714
Weather/seasonal variables	61	88	58	207
Good prices/markets abroad	20	34	45	99
Others	42	8	48	98
<b>Total</b>	<b>990</b>	<b>608</b>	<b>383</b>	<b>1981</b>

- 5.21. Questions concerning price declines prompted 2,074 responses, of which the most common were good catches (47%, 9% more than in the Marketing Report), followed by low demand (32%: Table 12). 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 (32% out of 408 responses, compared to 25% in the Marketing Report).

Table 12: Reasons for price decreases by country

Reason	Country			Total
	Uganda	Kenya	Tanzania	
Good catches	632	262	84	978
Weather/seasonal variables	78	22	72	172
Low demand	249	290	131	670
Poor markets/prices abroad	40	28	56	124
Other	49	16	65	130
<b>Total</b>	<b>1048</b>	<b>618</b>	<b>408</b>	<b>2074</b>

- 5.22. Questioning on marketing problems resulted in 2,730 responses, of which the most common complaint regarded price fluctuations (29%), followed by transport problems (21%), and low demand (21%). These responses were cross-tabulated against targeted fish species. Out of 1,727 responses obtained from Nile perch fishers, the worst marketing problems faced were price fluctuations (29%) and transport problems (20%). In the Marketing Report, Nile perch fishers are quoted as citing low demand as their second most common problem. Tilapia fishers yielded 444 responses, of which transport problems, low demand and price fluctuations attracted the greatest proportion of responses (24%, 28% and 29% respectively). Out of 559 responses to be obtained from dagaa fishers, 28% were price fluctuation problems, followed by 22% of responses concerning transport difficulties and 21% worrying about low demand (Table 13).

Table 13: Main marketing problems of fishers of Nile perch, tilapia and dagaa

Problem	Nile perch	Tilapia	Dagaa	Total
Transport problems	349	107	124	580
Price fluctuations	493	129	158	780
Too few buyers	330	124	117	571
Lack of information on prices	104	13	27	144
Dishonest traders	133	17	47	197
Lack of cold storage/ice	200	29	31	260
Others	118	25	55	198
<b>Total</b>	<b>1727</b>	<b>444</b>	<b>559</b>	<b>2730</b>

- 5.23. Researchers elsewhere have indicated the rising importance of fish collection and distribution by boat (Gibbon, 1997; Odongkara, 1992). As fleets have been driven further and further off-shore in search of better fish supplies, coupled with sustained demand abroad, so too a new service has grown upon the lake: the collection of fish from distant fleets by boat and ferrying it back to factories or to beaches and even countries where prices are better. In Tanzania in particular, where infrastructural facilities are very poor, these boats provide the backbone of fish distribution upon the lake and between markets. This survey failed to interview as many transport boat operators as was desired, primarily because of the transient nature of many of these boat operators. In most cases, those interviewed dealt in Nile perch, although those dealing in tilapia and dagaa, as well as those combining

their fish trade with the movement of other goods and passengers, were encountered. In the majority of cases, boats had a capacity of between 0 and 5 tonnes (75% out of 40 respondents). Typically, the fish traded is fresh. Because the area over which these boats operate may be very large, the use of preservation techniques amongst such operators is far higher than amongst fishers. 54% out of 50 respondents said that they did preserve the fish they transported, the most common method employed was ice boxes (48% out of 27 respondents who preserved their fish). Like fishers, transport boat operators do not often have sales arrangements with buyers – 50% (out of 24) did, although no clear indication was obtained as to the rewards of such agreements. The most common buyers of fish brought in by collection boat were independent traders on beaches (33%) and private agents with their own refrigerated trucks (33%; n=40 responses).

## 6. Concluding comments

- 6.1. The survey of fishers shows Lake Victoria's fishery to be one of very limited diversity. Throughout the survey, fishers recount that they consistently target one or more of the three most common species within the lake and very rarely consider any other species types. While this can in part be explained by availability, it is also in large measure explained by demand. As the Nile perch export industry grows and demand from abroad continues to increase, we find the largest proportion of fishers on the lake to be Nile perch fishers. There is considerable demand for this species, and hence fishers have little incentive to either target alternative fish species, nor to try and establish firm marketing outlets through the creation of arrangements with their principal buyers. In every case, these are agents from fish factories.
- 6.2. The dominance of the Nile perch within this fishery is not everywhere in evidence. In Kenyan waters the number of Nile perch fishers is equaled, if not exceeded, by the number of dagaa fishers. The rise to prominence of this species has been noted in the past, although it has not received the attention it, perhaps, deserves. This small, palagic, fish now commands a considerable portion of the market for fish from Lake Victoria through its availability as well as its relatively low prices. In Uganda, however, the reasons for the growth in the fishery are different. Here, fish meal factories dominate demand for this fish, and consumers of the lake's fish are here more inclined to eat Nile perch frames than they are dagaa.
- 6.3. Dagaa is normally captured with purse seines set around floating pressure lamps during the night. Setting and hauling the net is not simple, and a dagaa crew is large, comprising between three and six crew members. As a result, it is this fishery that has the potential to attract the greatest numbers of casual labourers.
- 6.4. Elsewhere, we have shown that the regional consumer of Lake Victoria's fish overwhelmingly favours tilapia (SEDAWOG, 1999). This fishery, however, is in decline, and in all three riparian states would not appear to be attracting investment almost certainly as a result of declining catches.
- 6.5. For many of those working this fishery, the problems faced appear most often to be associated with the vagaries of an unstable market which may rise or fall depending on the state of the international market or the state of access roads to fish landings. In both cases, demand may crash with little or no notice, and in both cases fishers have very little control over such events.

**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<br>[2] Female  | <table border="1" style="width: 100%; height: 20px; margin-bottom: 5px;"><tr><td style="text-align: center;">1</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table>  | 1     |  |       |  |  |
| 1     |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
| 5.    | Age: _____   | <table border="1" style="width: 100%; height: 20px; margin-bottom: 5px;"><tr><td style="text-align: center;">2</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table>  | 2     |  |       |  |  |
| 2     |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
| 6.    | Marital status:    [1] Married; no. wives: _____<br>[2] Single<br>[3] Divorced<br>[4] Separated<br>[5] Widowed   | <table border="1" style="width: 100%; height: 20px; margin-bottom: 5px;"><tr><td style="text-align: center;">3-4</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table>   | 3-4   |  |       |  |  |
| 3-4   |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
| 7.    | If married, is spouse engaged in a fisheries related activity?<br>[1]    Yes (select one option):<br>[1] Trades fish only<br>[2] Trades and processes fish<br>[3] Fishes<br>[4] Other: _____<br>[2] No (Go to Q8)  | <table border="1" style="width: 100%; height: 20px; margin-bottom: 5px;"><tr><td style="text-align: center;">5</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table> <table border="1" style="width: 100%; height: 20px; margin-top: 10px;"><tr><td style="text-align: center;">6</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table>  | 5     |  | 6     |  |  |
| 5     |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
| 6     |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
| 8.    | How many children do you have? _____   | <table border="1" style="width: 100%; height: 20px; margin-bottom: 5px;"><tr><td style="text-align: center;">7</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table>  | 7     |  |       |  |  |
| 7     |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
| 9.    | What is your level of education? (selected highest grade reached)<br>[1] No schooling<br>[2] Primary level<br>[3] Secondary level<br>[4] University level<br>[5] Other: _____  | <table border="1" style="width: 100%; height: 20px; margin-bottom: 5px;"><tr><td style="text-align: center;">8</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table>  | 8     |  |       |  |  |
| 8     |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
| 10.   | Besides fishing are you and/your spouse involved in any other activities?<br>[1]    Yes<br>[1] Farming/livestock<br>[2] Owns shop/hotel/trades in agricultural produce or other goods<br>[3] Rents out rooms/houses<br>[4] Other: _____<br>[2] No (Go to Q11)  | <table border="1" style="width: 100%; height: 20px; margin-bottom: 5px;"><tr><td style="text-align: center;">9</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table> <table border="1" style="width: 100%; height: 20px; margin-top: 10px;"><tr><td style="text-align: center;">10-13</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table> | 9     |  | 10-13 |  |  |
| 9     |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
| 10-13 |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
|       |  |  |       |  |       |  |  |
| 11.   | Respondent's status in the fishery:<br>[1] Fishing boat owner. No. boats owned: _____<br>[2] Fishing boat renter. No. boats rented: _____<br>[3] Transport/collection boat owner. No. boats owned: _____<br>[4] Gear owner, no boat.<br>[5] Crew member<br>[6] Transport/collection boat renter.<br>[7] Other: _____ | <table border="1" style="width: 100%; height: 20px; margin-bottom: 5px;"><tr><td style="text-align: center;">14-17</td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table> <table border="1" style="width: 100%; height: 20px;"><tr><td style="text-align: center;"> </td></tr></table>  | 14-17 |  |       |  |  |
| 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	
Boat type			18-22
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?

[1] Yes (Select 1 only).

[2] No (Go to Q14).

[1] Empty boxes

[2] Ice boxes

[3] Shading

[4] Other: \_\_\_\_\_

25

26

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

[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: \_\_\_\_\_

27

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

Gear type	Target species	
[1] Gillnet		28-29
[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 [1] Yes  
2. Boat registration [2] No  
3. Crew license  
4. Private mark
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):
- |       |
|-------|
| 44-45 |
|       |
|       |
|       |
|       |
| 46-49 |
|       |
|       |
|       |
|       |
- |   |  |
|---|--|
| Prices up:<br>[1] Low supply/catches<br>[2] High demand/many buyers<br>[3] State of the weather<br>[4] High prices on foreign markets<br>[5] Ice available<br>[6] Full moon<br>[7] Other: _____ | Prices down:<br>[1] High supply/catches<br>[2] Low demand/few buyers<br>[3] State of the weather<br>[4] Low prices on foreign markets<br>[5] Ice unavailable<br>[6] No moon<br>[7] Low prices on other beaches<br>[8] Other: _____ |
|---|--|

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:
- |       |
|-------|
| 57-58 |
|       |
|       |
- |        | Capacity (tonnes) | Main species |
|--------|-------------------|--------------|
| Boat 1 |                   |              |
| Boat 2 |                   |              |

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: \_\_\_\_\_

## 7. References

GEHEB, K. 1997. *The Regulators and the regulated: fisheries management, options and dynamics in Kenya's Lake Victoria Fishery*; D.Phil. Thesis submitted to the University of Sussex; University of Sussex, Falmer, Brighton, U.K.

GIBBON, P. 1997. Of saviours and punks: the political economy of the Nile perch marketing chain in Tanzania. *CDR Working Paper 97.3*. Copenhagen: Centre for Development Research, June 1997.

HOEKSTRA, T. M. 1992. *The artisanal capture fisheries of Lake Victoria, Kenya: major socioeconomic characteristics of its fishermen and their fishing units*. UNDP/FAO Regional Project for Inland Fisheries Planning (IFIP), RAF/87/099-TD/39/92 (En.): 78p.

HOEKSTRA, T. M., ASILA, A., RABOUR, C. and RAMBIRI, O. 1991. *Report of a census of fishing boats and gear in the Kenyan waters of Lake Victoria*, FAO/UNDP Regional Project for Inland Fisheries Planning Development in Eastern/Central/ Southern Africa, Bujumbura (Burundi): FAO/UNDP RAF/87/099-TD/26/91 (En.), Food and Agricultural Organisation, Rome.

ODONGKARA, K. O. 1992. *The implications of the changing fishing pattern of Lake Victoria, Uganda for fish marketing development*. Paper presented at the Sixth Session of CIFA Sub-committee for Development and Management of Lake Victoria fisheries, February 1992, Jinja.

OTHINA, A. N. and OSEWE-ODERA, S. 1996. *Catch and effort assessment survey for the artisanal fisheries of Lake Victoria (Kenya waters)*; Annual Report – 1995; Kenya Marine and Fisheries Research Institute, Kisumu Research Centre; August 1996.

SEDAWOG (Socio-economic Data Working Group), 1999. Marketing Survey Report. LVFRP/TECH/99/02; *Technical Document No. 2*; Jinja: the Lake Victoria Fisheries Research Project.