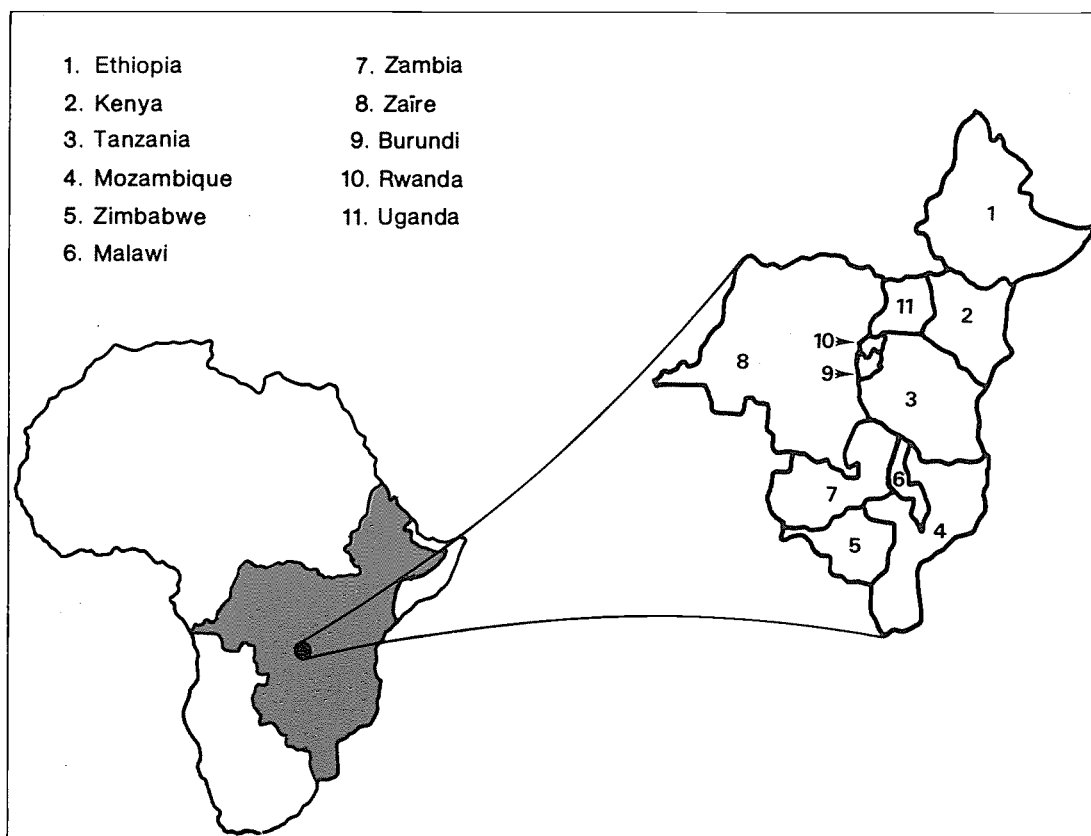


## IFIP PROJET

RAF/87/099-TD/22/91 (En)

June 1991

### Socio Economic Characteristics of the Artisanal Fishery in Kigoma region, Tanzania



UNITED NATIONS DEVELOPMENT PROGRAMME



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS



UNDP/FAO Regional Project  
for Inland Fisheries Planning  
Development and Management in  
Eastern/Central/Southern Africa  
RAF/87/099

and

Integrated Technical  
Assistance and Credit for  
Artisanal Fisheries,  
Lake Tanganyika  
GCP/URT/066/NET

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RAF/87/099-TD/22/91 (En)

June 1991

Socio Economic Characteristics of the Artisanal Fishery  
in Kigoma region, Tanzania

by

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
UNITED NATIONS DEVELOPMENT PROGRAMME  
Bujumbura, June 1991

The conclusions and recommendations given in this and other reports in the IFIP project series are those considered appropriate at the time of preparation. They may be modified in the light of further knowledge gained at subsequent stages of the Project. The designations employed and the presentation of material in this publication do not imply the expression of any opinion on the part of FAO or UNDP concerning the legal status of any country, territory, city or area, or concerning the determination of its frontiers or boundaries.

PREFACE

The IFIP project started in January 1989 with the main objective of promoting a more effective and rational exploitation of the fisheries resources of major water bodies of Eastern, Central and Southern Africa. The project is executed by the Food and Agriculture Organisation of the United Nations (FAO), and funded by the United Nations Development Programme (UNDP) for a duration of four years.

There are eleven countries and three intergovernmental organisations participating in the project: Burundi, Ethiopia, Kenya, Malawi, Mozambique, Uganda, Rwanda, Tanzania, Zambia, Zaire, Zimbabwe, The Communauté Economique des Pays des Grands Lacs (CEPGL), The Preferential Trade Area for Eastern and Southern African States (PTA) and the Southern African Development Coordination Conference (SADCC).

The immediate objectives of the project are: (i) to strengthen regional collaboration for the rational development and management of inland fisheries, particularly with respect to shared water bodies; (ii) to provide advisory services and assist Governments in sectoral and project planning; (iii) to strengthen technical capabilities through training; and (iv) to establish a regional information base.

...

The present document reviews the socio-economic characteristics of the Tanzanian fisheries of Lake Tanganyika, more specifically in the Kigoma region. It presents the results of a socio-economic baseline survey, conducted by the Regional Project for Inland Fisheries Planning (IFIP) in collaboration with the Kigoma based Integrated Technical Assistance and Credit for Artisanal Fisheries, Lake Tanganyika.

The objectives of the study were (a) to assess the socio-economic structure of the fishery in the region; (b) to get an insight into the performance of fishing units in the region; and (c) to benchmark data for assessment of the evolution in the fishery in the region. The report is accordingly structured as follows: introduction to the methodology, fisheries characteristics, socio-economic characteristics, and recommendations.

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IFIP PUBLICATIONS

Publications of the IFIP project are issued in two series:

A series of technical documents (RAF/87/099-TD) related to meetings, missions and research organized by the project.

A series of working papers (RAF/87/099-WP) related to more specific field and thematic investigations conducted in the framework of the project.

For both series, reference is further made to the document number (22), the year of publication (91) and the language in which the document is issued: English (En) or French (Fr).

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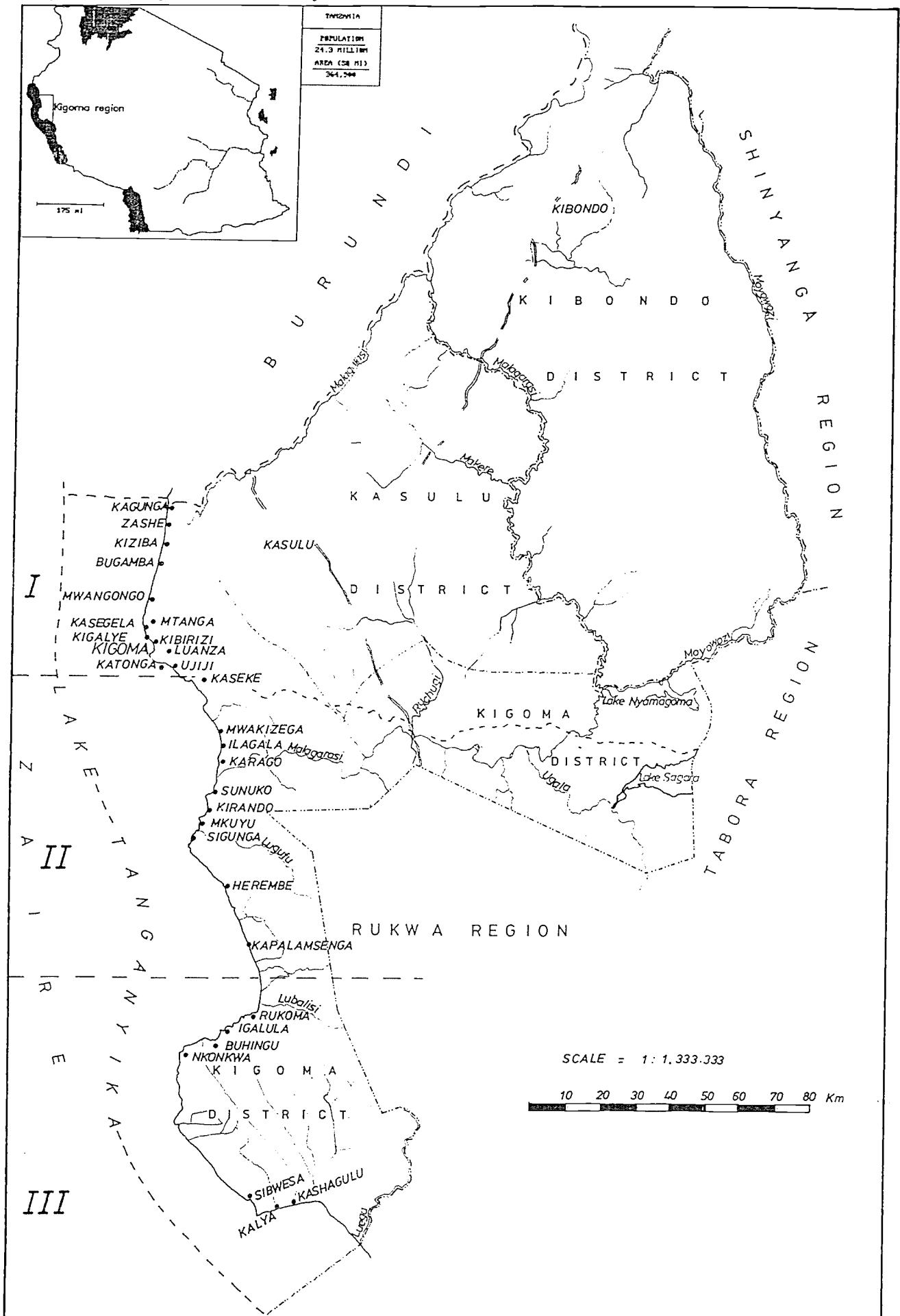
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Figure 1: Map of the survey area



## 1. INTRODUCTION

### 1.1 Background

The inland fisheries of Tanzania are of great importance to national protein consumption and local employment involving about 50,000 full time and twice as many part time fishermen and a multiple number of people engaged in fisheries infrastructure in the primary and secondary sectors.

Although landings increased rapidly during the eighties (as a result of the availability of better gear on Lake Tanganyika and the expanding Nile perch fishery on Lake Victoria) the development of the fishery overall has been constrained by lack of good management, supply and back up of inputs and services and poor infrastructure.

Fisheries development in Tanzania is conducted on five year plans. Two of the priorities of the current five year plan (1987-1992) are: "to enhance incomes for artisanal fishermen and their communities" and "the strengthening of the information base for the fisheries sector"<sup>1</sup>.

In order to enable management to take appropriate decisions to carry out these development objectives it is important that socio-economic information of the artisanal fisheries is obtained and assessed<sup>2</sup>. Towards this end the first of a series of socio-economic baseline studies on Lake Tanganyika was carried out in the Kigoma region between the 1st and 21st February 1991, the data collected during which forms the basis of this report.

### 1.2 Objectives

The objectives of this baseline study were (a) to assess the socio-economic structure of Tanzania fisheries on Lake Tanganyika; (b) to gain an insight into the performance of fishing units in the region in terms of the organization, investment costs, occupations, sharing system, status of the fishermen, problems confronted by the fishermen, etc; and (c) to benchmark data for assessment of evolution in fishery in the region in the future.

### 1.3 Report

The results of the study are presented in this report. The first chapter gives a summary of the background and objectives of the survey. The second chapter contains a description of the methodology used to conduct the survey and includes: stratification of the survey area, sampling method, preparations for the study, data collection system and processing of the data.

The third and fourth chapters present the results of the study. The third chapter covers general information on the fisheries including fishing boats, fishing gear, fish processing, marketing, sharing systems, and

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<sup>1</sup> see: Gréboval et al., 1989; and Bonzon, 1988.

<sup>2</sup> see also: Odoi Akersi, 1991.

migration. The fourth chapter deals with the socio-economic aspects of the fishery including: boat owners identification; investment and expenditure preferences; and attitudes towards fishing and problems affecting the fishermen.

In the final chapter, recommendations for follow-up activities are presented.

In the appendixes the reader will find a copy of the questionnaire used, a copy of the instructions given for the use of the questionnaires and a description of the data processing program. This program was originally developed by IFIP for a socio-economic baseline study on Lake Malawi in collaboration with another FAO project (MLW/86/013) and has since been adapted for the Kigoma region. The program is demonstrated by a printout of the data input and output screens. Furthermore, there is an explanation of how to transfer the data from the program to commercial programs (like Lotus 1-2-3 or Statgraphics) for a more in depth analysis of the results.

#### 1.4 Background to the study program

The study is the first of a series of socio-economic baseline studies to be carried out in the northern part of Lake Tanganyika. Further surveys will involve the Burundi and Zaire sectors of the lake. The studies are being conducted by the IFIP project in cooperation with appropriate national projects and organisations. The study in the Kigoma region presented here was a joint effort between IFIP and the Kigoma based Integrated Technical Assistance and Credit for Artisanal Fisheries, Lake Tanganyika - project (GCP/URT/066/NET). Prior to the survey two visits were made to Kigoma to carry out trial interviews with the questionnaires, to set up a sampling strategy and to make all necessary arrangements between the two projects. The Kigoma project provided a boat, fuel, camping equipment and four interviewers and the IFIP project provided a car and two staff members to assist and supervise the interviews.

#### 1.5 Acknowledgements

The close collaboration between the projects has been much appreciated. We would especially like to thank Mr G. Bowman, Project Coordinator in Kigoma for his logistical support; Mr Z. Ndugumbi, National Coordinator; Mr E. Mondoka, fish processing technologist; Mr H. Kamana, fisheries assistant, and Mr M.L. Mabula, fisheries assistant (all GCP/URT/066/NET) for executing the data collection in the villages; and Mr Nfamara Dampha, IFIP-Fish Technologist for his assistance during the fieldwork and Ms B. Cam for editing this script. Finally we would like to mention the village chairmen and fisheries attendants for their assistance in assembling the fishermen for the interviews.

## 2 METHODOLOGY

### 2.1 The survey area

The survey area consisted of the coastal settlements along Lake Tanganyika in the Kigoma region (see map). This region borders Burundi in the north, Rukwa region in the south, Tabora region in the southeast and Shinyanga region in the east. Being situated at the opposite side of Tanzania from the major urban areas (including Dar es Salaam and Mwanza) the Kigoma region is fairly isolated.

Communication in the region is poor with only two air and rail services between Kigoma town and Dar es Salaam, the capital, each week. It is also possible to get to the capital by road east from Kigoma town which links up to both the northern and southern routes. However the roads are very poor and both routes take several days. There is one road passing around Gombe National Park which, although connects Kigoma town to Burundi, does not connect with the fishing villages in stratum 1 and one south which only connects the fishing villages in stratum 2 up to Ilagala. Therefore the majority of the fishing settlements cannot be reached by road; most communication being by boat. There is a weekly boat service between Mpulungu (Zambia), Kigoma and Bujumbura (Burundi), a more regular service between the coastal villages in Tanzania and taxi boats commuting between Kigoma and Rumonge (Burundi).

The most densely populated areas are north of Kigoma and between Mwakizega and Sigunga villages. The most southern area around Mahale National Park (from Rukoma to Kashagulu villages) is the least populated and the most difficult to access.

### 2.2 Division of the study area (Stratification)

The study area was divided into three sectors (strata): Stratum I : north of Kigoma/Ujiji; Stratum II : south of Kigoma/Ujiji and Stratum III : the remote most southern area (Rukoma - Kashagulu).

The first stratum is influenced by the proximity of Burundi and although fairly isolated from Kigoma, due to the lack of roads and the position of Gombe National Park, it contains Kigoma town itself which has connections with important urban areas like Dar es Salaam.

Most of the villages in the second stratum can be reached by road and there is a regular bus service between Ilagala and Kigoma town with its market and other facilities.

The third villages of the stratum are the most difficult to access both due to its remoteness and, because of its geographical position in relation to the prevailing winds, poor navigability of the area. It is the least populated of all the areas and is dominated by the Mahale National Park.

## 2.3 Sampling method

Once the study area was stratified, the villages were classified into four classes according to the number of fishermen in the village<sup>1</sup>: 0 - 99, 100 - 249, 250 - 400, and 400+ (see table 1).

Table 1. Classification of villages per stratum

| Class<br>Stratum | 1<br>0-100                              | 2<br>100-250                  | 3<br>250-400                                       | 4<br>400+                                 | Total number<br>of fishermen<br>(sample size) |
|------------------|-----------------------------------------|-------------------------------|----------------------------------------------------|-------------------------------------------|-----------------------------------------------|
| I                | Ujiji                                   | Bugamba<br>Kibirizi<br>Luanza | Zashe<br>Kiziba<br>Mwangongo<br>Kigalye<br>Katonga | Kagunga<br>Kasegela<br>Mtanga             | 4118<br>(206)*                                |
| II               | Ilagala<br>Karago<br>Sunuka<br>Kirando  | Kaseke                        | Mkuyu<br>Herembe                                   | Mwakizega<br>Sigunga<br>Kapalam-<br>senga | 2515<br>(126)*                                |
| III              | Rukoma<br>Igalula<br>Kalya<br>Kashagulu | Buhinga                       | Sibwesa                                            | Nkonkwa                                   | 1039<br>(52)*                                 |

TOTAL : 7672  
(384)\*

\* : 5% of the total number of fishermen (per stratum)

After determining the total number of fishermen in the region at 7,672 it was decided to sample 5% of them. Four villages in each stratum, each representing one of the four classes were chosen at random. These villages were visited in turn and the proportionate number of fishermen, relating the number of fishermen in the village to the number in the stratum (see Table 2) were interviewed using a questionnaire (see Appendix 1).

<sup>1</sup> The data is abstracted from a fishery census conducted by the FAO Tanzanian fisheries statistics project (URT/87/016). Publication of these data is in preparation.

Table 2. Selected villages

| Class<br>Stratum | 1       | 2       | 3       | 4       | Total in<br>selected<br>villages |
|------------------|---------|---------|---------|---------|----------------------------------|
| I                | Ujiji   | Bugamba | Zashe   | Mtanga  |                                  |
| **               | 77      | 219     | 278     | 568     | 1142                             |
| ***              | 14      | 39      | 50      | 103     | 206                              |
| II               | Kirando | Kaseke  | Herembe | Sigunga |                                  |
| **               | 61      | 228     | 328     | 442     | 1059                             |
| ***              | 7       | 27      | 39      | 53      | 126                              |
| III              | Kalya   | Buhinga | Sibwesa | Nkonkwa |                                  |
| **               | 34      | 184     | 336     | 414     | 968                              |
| ***              | 2       | 10      | 18      | 22      | 52                               |

\*) selected village

\*\*) number of fishermen in the village

\*\*\*) number of fishermen in the sample (total 384)

It was intended to locate the individual fishermen using the Fisheries Register at the Regional Fisheries Office. However, the registration appeared to be inaccurate and not a suitable tool for sampling the population. Therefore it was decided to call upon local fisheries attendants and/or village chairmen to assist in assembling the fishermen for interview.

## 2.4 Preparations

The first outline of the questionnaire was discussed on an initial visit to Dar es Salaam with the Department of Fisheries and the Tanzania Fishery Research Institute (TAFIRI), and in Kigoma with TAFIRI and the counterpart project. The questionnaire was subsequently adapted (back in Bujumbura) accordingly.

On a second visit to Kigoma the questionnaire was tested in two villages (Kibirizi and Mwakizega respectively) that were representative of the northern and southern part of the region but were not included in the survey sample. This also provided the interviewers with some initial training and allowed them to become familiar with the questionnaire.

From the pilot survey it was estimated that each interview would take approximately 35 minutes. The total time reserved per interview (formalities and introduction included) was therefore 45 minutes. It was further estimated that 6 hours per working day could be spent on interviewing, the rest being necessary for time spent travelling and contacting the fishermen. This meant it was possible to achieve 8 interviews per interviewer per day and, with a team that consisted of 4 interviewers and 2 supervisors, it followed that an

average of a total of 32 interviews per day could be possible. It was therefore estimated that twelve working days, or two weeks, were needed to complete the total number of 384 interviews. A contingency of three days took the total field period up to two and a half weeks.

During this second visit, all arrangements between the two participating projects were made. With information gathered during the pilot survey, questions on religion, ethnic group, boats and gear, agricultural production, etc. could be pre-coded. Once back again in Bujumbura, the questionnaire and the sampling system were then finalized.

## 2.5 The questionnaire

The questionnaire produced after the final pilot study is presented in Appendix 1. The questions were grouped according to the following ten areas of information:

1. landing site;
2. fishermen and their backgrounds;
3. fishing boats and engines;
4. fishing gear;
5. sharing systems (per type of gear), the crew and the migration of fishermen;
6. marketing;
7. principal and secondary occupations;
8. family status and education;
9. farming activities;
10. attitudes regarding the fishery and problems confronted by the fishermen.

An instruction manual was also prepared for the interviewers (see Appendix 2). which includes a short instruction for each item in the questionnaire. Several items, not pre-coded in the questionnaire, were later pre-coded in the manual.

## 2.6 Data collection

The data collection started off in the first stratum and ended in the third. Data collection was only interrupted for two days, once due to heavy weather and once because of engine failure. Most of the travel was by boat; only two villages could be reached by car, Ujiji in the first stratum and Kaseke in the second.

Prior to data collection, one day was spent on training and instructing the interviewers. This left the supervisors free during the interviews to code the completed questionnaires, also making it possible to verify if all the questionnaires were fully completed and whether any additional information was required.

## 2.7 Data processing and analysis

The processing and analysis of the data was done in Bujumbura, where all necessary facilities were available.

The data processing program specifically adapted for the survey was originally developed by IFIP for a socio-economic baseline study in Lake Malawi. The program is menu driven, the computer screens are self explanatory, the data easy to compile and the program user friendly. The program also monitors input: only pre-coded codes are accepted and numeric inputs are limited by the number of figures; mistakes made in inputting data are easily rectified. The program mainly provides totals and averages which are sufficient for an initial analysis. While inputting the data, the program constructs a dBASE-file, which can easily be transferred to other commercial programs (like Lotus 1-2-3 or Statgraphics) for more in depth analysis of the data. A full program presentation is provided in Appendix 3.

Input of data into the data processing program took ten days and the computer processed the data in about two and a half hours, this depends however on the capacity of the computer used. The output consisted of four types of information:

1. Fishing boats and boat owners;
2. Fishing gear;
3. Sharing systems and marketing;
4. Socio-economic information.

The results and analysis of the survey are presented in the following chapters.

### 3 CHARACTERISTICS OF THE FISHERY

#### 3.1 Fishing boats

##### 3.1.1 Boat types

In general the fishing fleet used in the Kigoma region is made up of three types of boats: the dugout canoe, the planked canoe and the catamaran. In Kigoma town itself a few trimarans are also used.

To a large extent, the type of gear used determines the type of boat used. Lift nets are operated from catamarans. All the other types of gear used in the region can be operated from single canoes.

The majority (57%) of the boats are planked canoes, 29% are catamarans and 14% are dugout canoes. However, as indicated in Figure 2, the distribution of the three types of boats in the region is not uniform.

In the northern region the most common type of gear used are beach seines followed by a limited use of lift nets. Consequently the fleet in this stratum is dominated by canoes: 76% are planked canoes, 15% are dugout canoes and only 9% are catamarans.

In the second stratum, 60% of the gear used are lift nets and therefore the majority (60%) of the boats are catamarans. 32% of the other boats identified were planked canoes and only 8% were dugout canoes.

In the third stratum, the proportionate amount of each type of boat seems more balanced: planked canoes accounting for 44%, catamarans accounting for 31% and dugout canoes accounting for 25%. This pattern is also reflected in the types of gear used in the region.

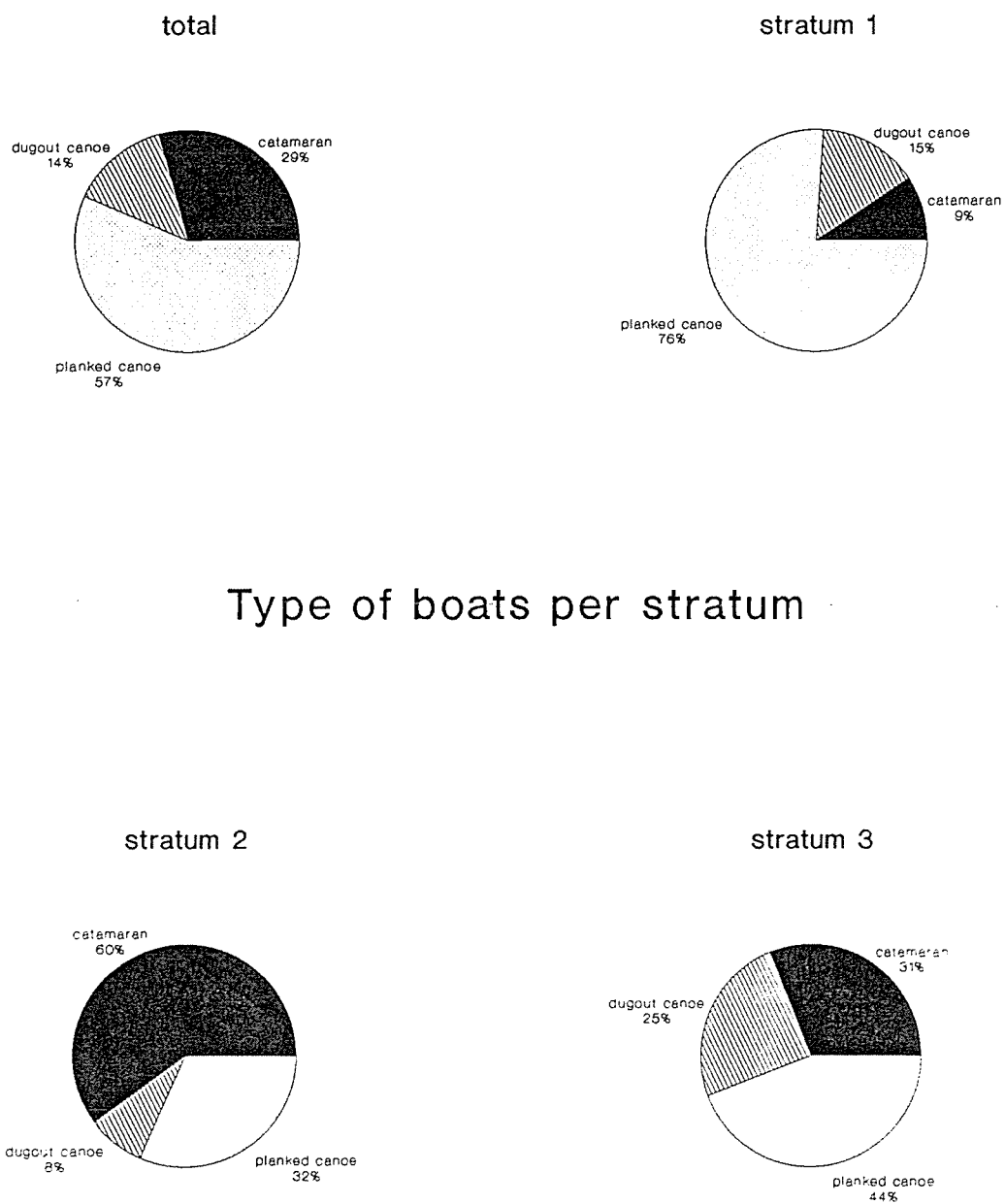


Figure 2

### 3.1.2 Length of boats

There is no major difference in the fishing operation from planked canoes and dugout canoes although generally hand lines are operated from the latter. This is indicative of the economics of the operation with the cheaper dugout canoes being used for long lining, the least costly of all the fishing methods.

However the two types of canoe do vary in length and age (see Figures 3 & 4). The length of the planked canoe varies between 4 and 5 metres with an average length of 4.6 metres. The dugout canoes are more variable with lengths between 3 and 7 metres and an average of 4.1 metres.

The catamaran, which consists of two planked canoes spaced apart by a pole at either end (with four net spreader poles at either corner), is usually longer. The length of the catamarans varies between 4.5 and 6 metres with an average of 5.3.

There are significant differences in the lengths of the boats between strata 1 and 2 and stratum 3. In the first two strata the dugout canoes are on average 4.3 and 4.6 long metres respectively. However in the third stratum they are considerably shorter with an average of 3.5 metres. The planked canoes and the catamarans show the reverse pattern with planked canoes having an average length of 4.4 and 4.8 metres in strata 1 and 2 and an average of 5.7 metres in the southern area; catamarans have an average length of 5.3 and 5.2 metres in strata 1 and 2 and an average of 5.9 in the southern area.

## Length of Fishing Boats

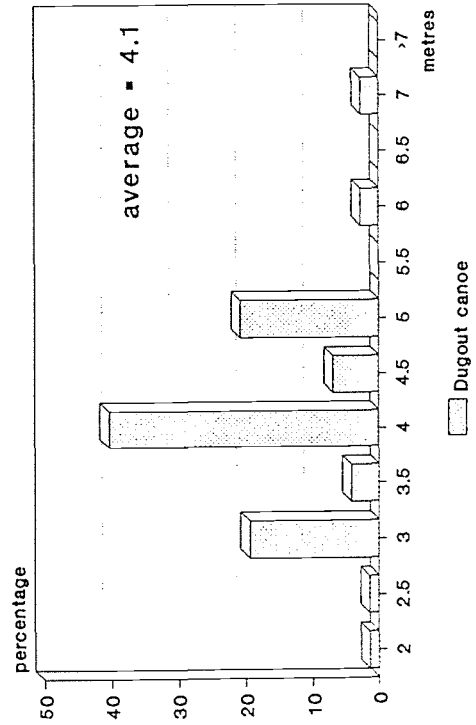
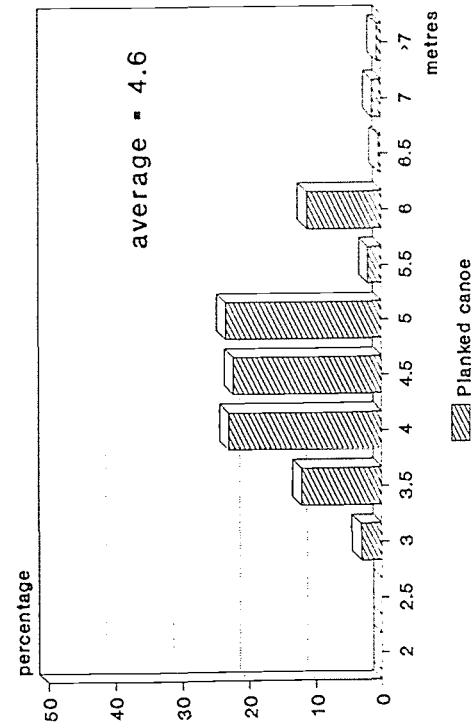
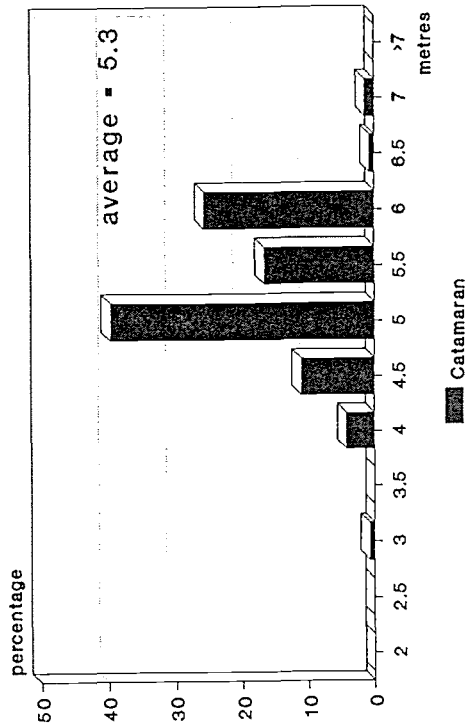


Figure 3

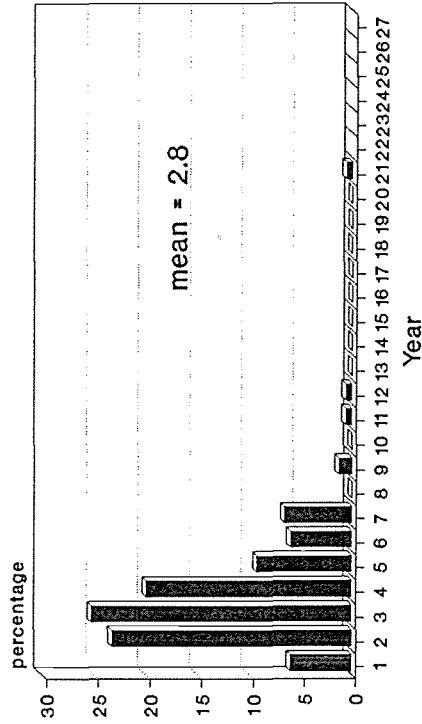
### 3.1.3 Age of boats

The age of the different types of boats are generally inversely proportional to their length and the catamarans are generally younger than the single canoes. The most traditional dugout canoes are generally the oldest, on average 5.6 years old although they vary between 2 and 11 years old. The planked canoes are more variable in age but are on average 4.2 years old. The catamarans vary the most from 2 to 7 years of age with an average of 2.8 years old. This pattern is the same throughout the region with a slight deviation in the third stratum where the catamarans are on average 2 years old and the planked canoes and dugout canoes both on average 4 years old.

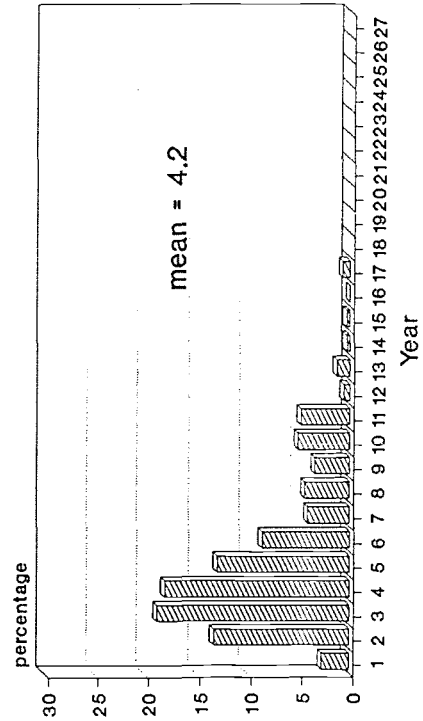
This trend can be explained by the progression of the fisheries: the most traditional and therefore most original and oldest of the fishing boats are the dugout canoes from which the planked canoe was developed. The introduction of the lift net fishery and hence the catamaran has only been a recent event.

A notable phenomenon is the recent sharp decline in the amount of boat building in the region which peaked in 1987/88 (years 3 & 4 on the graph).

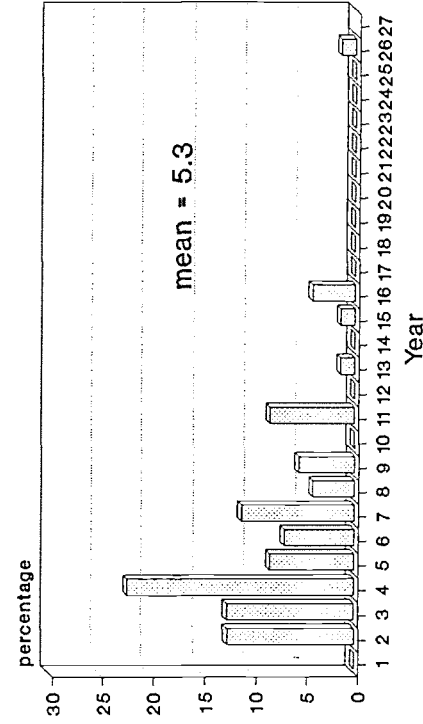
## Age of Fishing Boats



Catamaran



Planked canoe



Dugout canoe

Figure 4

### 3.1.4 Boat costs

The replacement costs of the different types of boats (see Figure 5) varies from an average of Tshs 23,125<sup>1</sup> for dugout canoes to Tshs 73,190 for catamarans. As a catamaran is constructed from two planked canoes, it is reasonable to find that the cost of a planked canoe is approximately half of the former.

From the data it would seem that the differences in the replacement costs of each of the types of boat is not determined by the length of the craft but by geographical location: the further south the lower the cost. For example, although the catamarans in stratum 1 are shorter than those in stratum 3 their replacement costs are generally Tshs 15,000 higher.

The equivalent trend is found in maintenance costs for each type of boat; where the southern area, being less populated and dominated by Mahale National Park, offers a larger supply of wood for boat building, repair etc. than the northern areas. One notable exception is the unusually high price of planked canoes in the 3rd stratum which are almost 40% more expensive to replace than in the other two strata.

### 3.1.5 General summary

Table 3 gives a compilation of the information recorded about fishing boats in the region.

Table 3. Summary of information about boats

| Boat type     | Stratum    | %  | Length (m) | Age (yrs) | Repl.costs (Tshs) | Maint.costs /year (Tshs) |
|---------------|------------|----|------------|-----------|-------------------|--------------------------|
| Catamaran     | 1          | 9  | 5.3        | 3         | 85,400            | 13,100                   |
|               | 2          | 60 | 5.2        | 3         | 71,025            | 9,825                    |
|               | 3          | 31 | 5.9        | 2         | 69,583            | 7,750                    |
|               | all strata | 29 | 5.3        | 3         | 73,190            | 10,039                   |
| Planked canoe | 1          | 76 | 4.4        | 4         | 34,287            | 7,156                    |
|               | 2          | 32 | 4.8        | 4         | 34,109            | 5,875                    |
|               | 3          | 44 | 5.7        | 4         | 47,324            | 6,559                    |
|               | all strata | 57 | 4.6        | 4         | 35,788            | 6,851                    |
| Dugout canoe  | 1          | 15 | 4.3        | 6         | 26,282            | 3,118                    |
|               | 2          | 8  | 4.6        | 6         | 25,214            | 3,507                    |
|               | 3          | 25 | 3.5        | 4         | 15,105            | 2,805                    |
|               | all strata | 14 | 4.1        | 5         | 23,125            | 3,111                    |

Note: Length, age, replacement and maintenance costs are all averages.

<sup>1</sup> US\$ 1 = Tshs 200 (February 1991)

## Replacement Costs

per type of boat

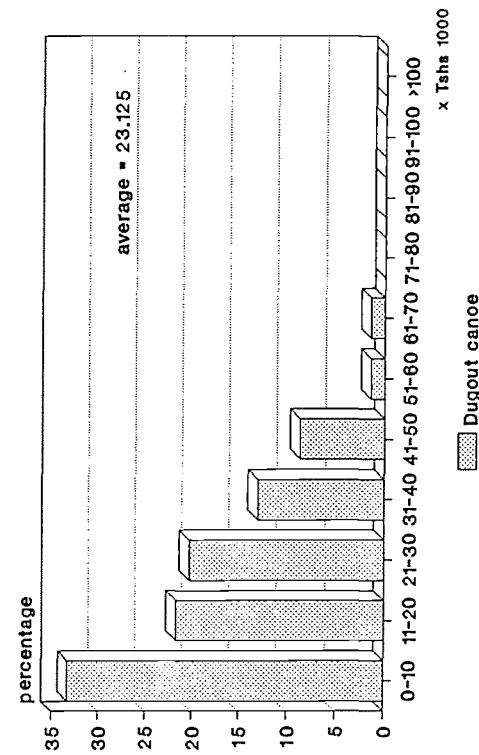
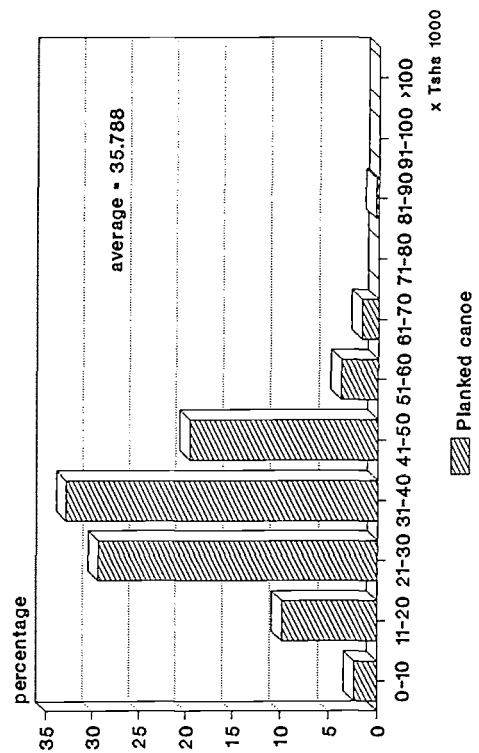
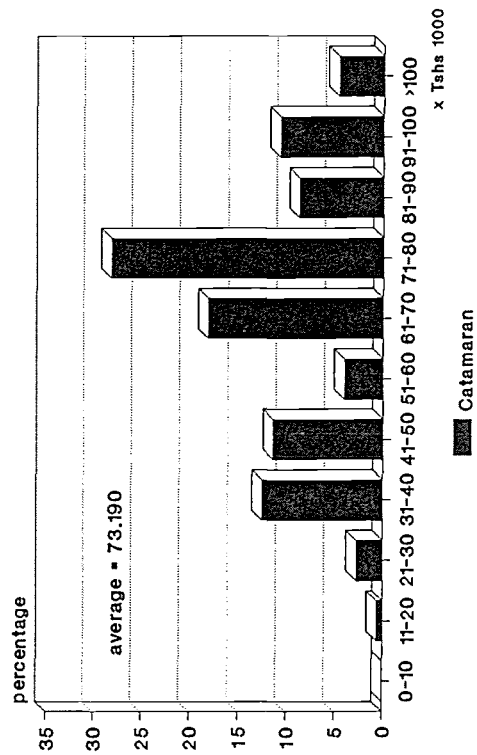


Figure 5

### 3.2 Fishing gear

#### 3.2.1 Types of gear

The main types of fishing gear in Kigoma region are beach seines, scoop nets and lift nets although in Ujiji (in the first stratum) and Nkonkwa (in the third) a concentration of gill nets is also apparent. The type of gear used is governed to a large extent by the ecology of the area where, for example, the coastline (in the first stratum) is found to be suitable for operating beach seines, while the shallow waters in the Ujiji bay and near Nkonkwa are suitable for gill netting. Figure 6 illustrates how ecological differences influence the type of gear used.

The three main types of gear used (beach seines, scoop nets and lift nets) are fishing methods catching the three most common pelagic species Stolothrissa tanganicae ('dagaa'), Lates maria ('sangala') and Luciolates stappersii ('mikebuka'). Pelagic fishing is generally carried out at night, using pressure lamps to attract fish. An exception is beach seining in the south (around Sibwesa and Kalya) which is carried out around late afternoon and early evening (with the advantage that pressure lamps do not have to be used). Up to six lamps are used for lift netting and generally two are used for scoop netting and beach seining.

Demersal fishing methods used in the region include hook and line and gill netting. These methods are entirely artisanal and village based.<sup>1</sup>

The three most important types of gear are lift nets (35% of the total gear used), beach seines (27%) and scoop nets (17%). Gill netting, although specific to only certain areas, account for 6% of the gear used. The remaining 14% of the gear used consists of various types of hook and line fishing of which the bottom hand line (at 7%) is the most common.

As already mentioned, the first stratum offers the greatest opportunity for beach seining (accounting for 46% of the gear used) followed by the third stratum (where it accounts of 39%). However, in the second stratum beach seining is under represented accounting for only 1% of the gear used.

The distribution in the operation of lift nets is a reverse to that of beach seining accounting for 13% of the gear used in stratum 1, 60% of the gear used in stratum 2 and 35% of the gear used in stratum 3 (similar to the average for the whole region).

Although accounting for 17% of the total gear used, the scoop net is not represented in the third stratum but contributes 29% of the gear in the second.

As indicated, gill netting is only suitable in two specific areas: Ujiji bay and near Nkonkwa, which accounts for it mainly being found in the first and third strata (accounting for only 2% of the gear in the second strata).

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<sup>1</sup>see: Dampha, 1990.

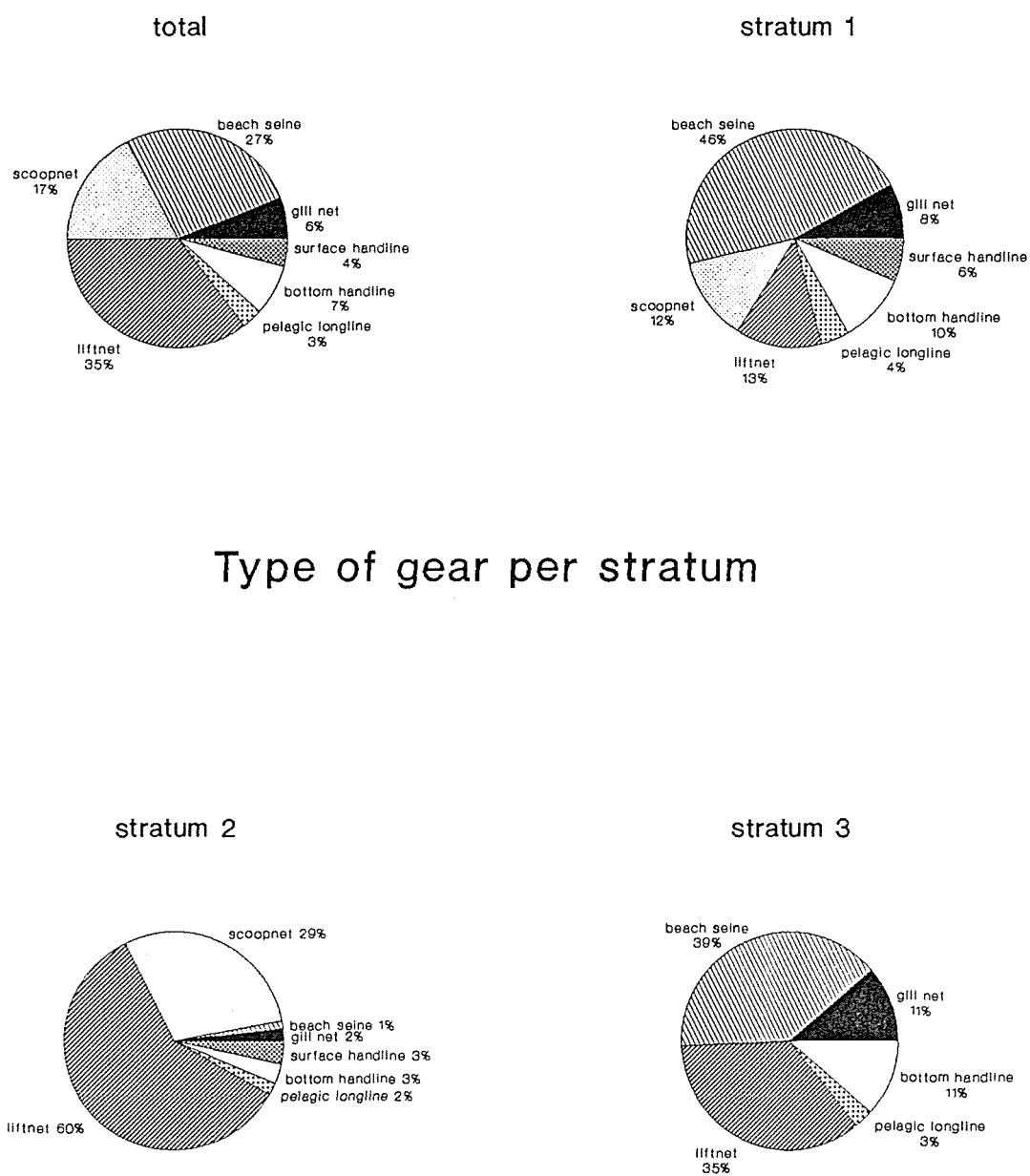


Figure 6

The use of hooks and lines, although more evenly distributed than any other type of gear used, is limited in all the strata except for the use of bottom hand lines which accounts for 10% of the gear used in the first stratum and 11% in the second.

### 3.2.2 Length of fishing gear

Figure 7 identifies the length of the main gear used (except for the length of scoop nets and surface hand lines which are not applicable).

Operational gill nets are generally composed of a combination of whole or parts of 100 metre units. 38% of the gill nets therefore consist of more than one unit while the average length of the gill nets is 436 metres.

The majority (69%) of the beach seines are between 100 and 149 metres, 13% are between 50 and 99 metres and 12% between 150 and 199 metres. It follows that 94% of the operational beach seines are between 50 and 199 metres and the average length is 117 metres. The average depth of beach seine nets is 16.7 metres.

The length of lift nets is a measure of the square perimeter of the net. Most of the nets were found to have a 'length' between 30 metres and 70 metres although the average was 64 metres. Using this figure, the average square area of lift nets would be (16x16 metres or) 256 m<sup>2</sup>. The average depth at which the lift nets are operated is around 17 metres.

Investigating hook and line gear it is estimated that the majority of bottom hand lines are between 200 and 300 metres long with an average length of 182 metres; pelagic long lines show a greater variation (ranging between 50 and 600 metres) with an average length of 246 metres.

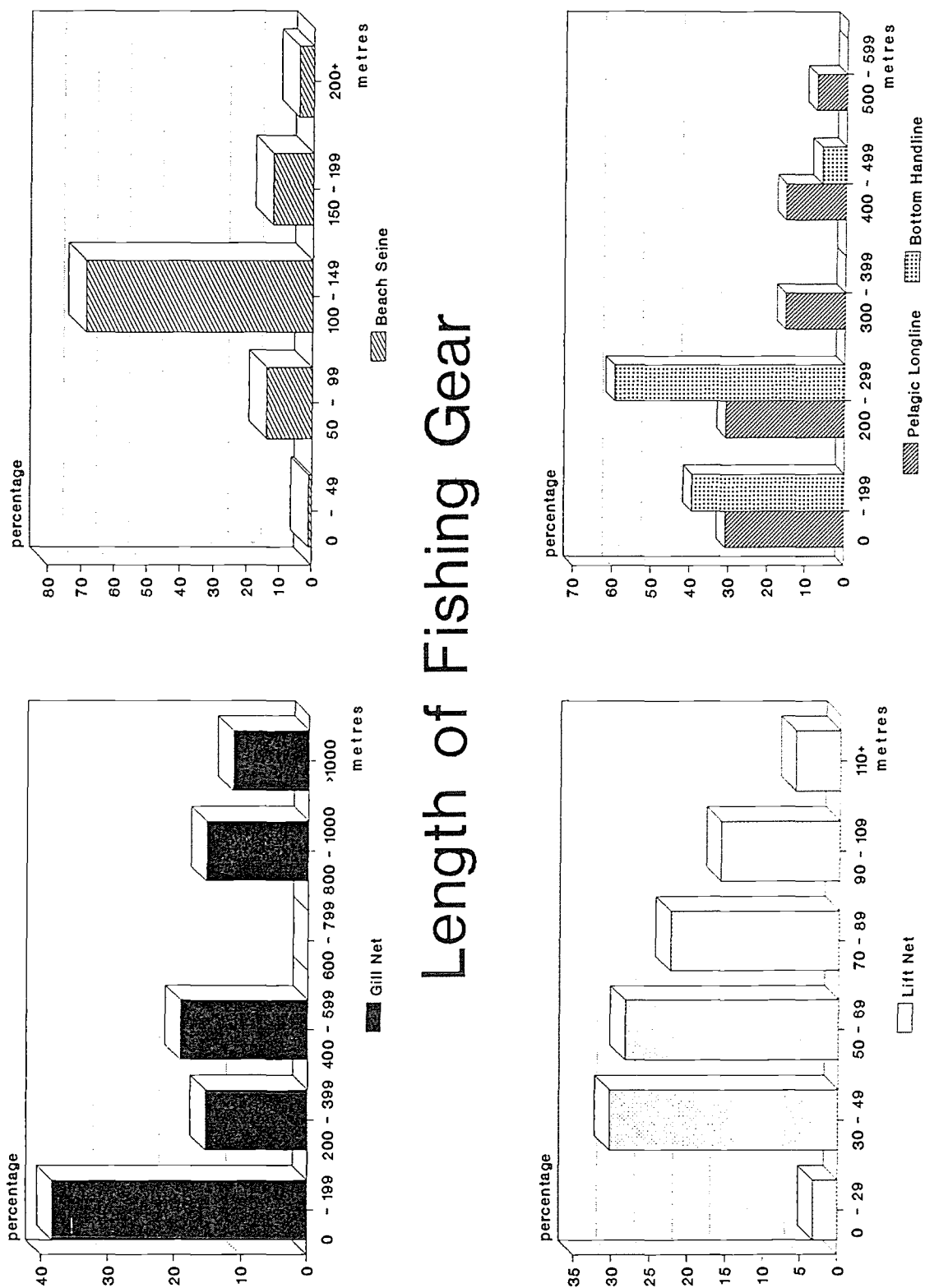


Figure 7

### 3.2.3 Age

As shown in Figure 8, the relative ages of the fishing gear generally indicates the same trends as found in the age of the boats i.e. that, after a peak in 1988, new investments in fishing equipment (boats and gear) have decreased in the last two years.

With a break down of the ages of the different gears it can be seen that this general trend is mostly influenced by the decline in the procurement of beach seines and scoop nets; in recent years the procurement of gill nets and lift nets has been stable. Hooks and lines seem to be of recent acquisition but this is due to the fact that they are highly consumable and have a short lifespan. Also in the area surveyed in general the age of the lines used are less than that of the nets.

A distinction can be made between gill and lift nets in the first instance and scoop nets and beach seines in the second. The former group appears to be younger with a relative increase in numbers in the last 6 years. The latter group are generally relatively older and appear in the last three years to be decreasing in popularity.

# Age of Fishing Gear

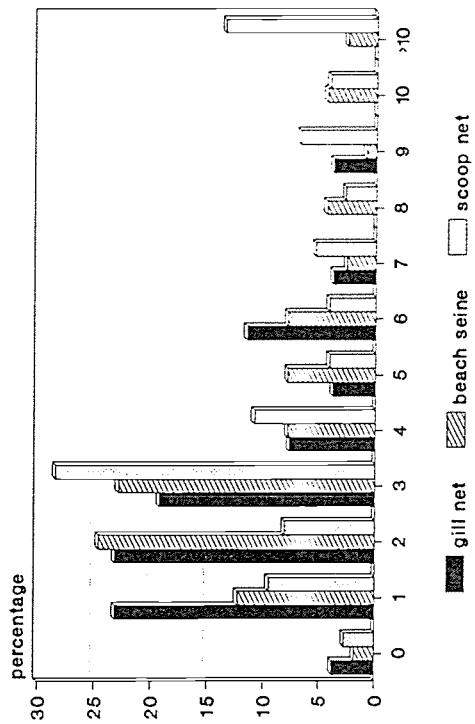
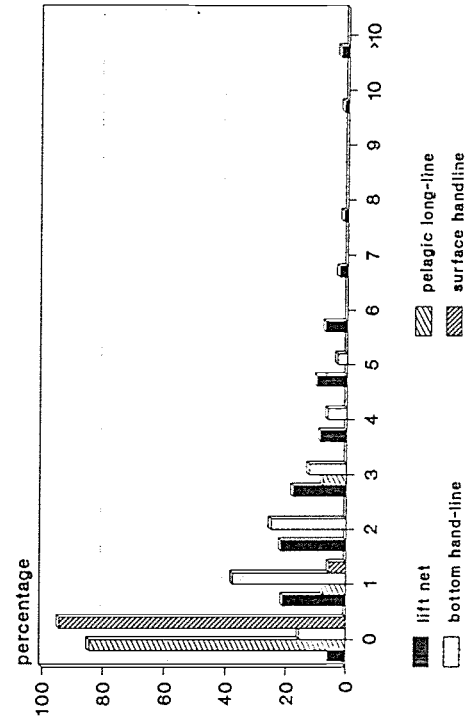
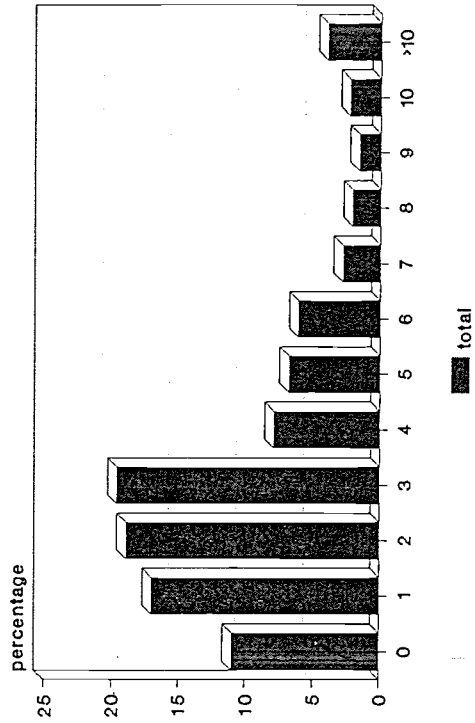


Figure 8

#### 3.2.4 Costs

The replacement costs of the main types of fishing gear (Figure 9) varies greatly from an average of Tshs 15 723 for scoop nets to Tshs 364 631 for beach seines. Of interest is the extreme difference between beach seines and lift nets in the first instance and scoop nets and gill nets in the second.

Except for gill nets, generally the various types of fishing gear show a concentration in a small range of costs. The replacement cost of gill nets is, on average, Tshs 27 962 but ranges from Tshs 5000 to more than Tshs 50 000. Beach seines range between Tshs 25 000 and Tshs 54 000, scoop nets between Tshs 10 000 and Tshs 25 000 and lift nets between Tshs 20 000 and Tshs 45 000.

Like fishing boats, most of the gear (77%) is bought with cash, 4% is bought with credit from relatives, 6% with credit from a bank and 3% through the Kigoma Project. This project, in alliance with the Cooperative Rural Development Bank (CRDB) is of note as it is supplying fishermen and women groups with credit in order to increase fishing productivity. Since no other institutional credit schemes/facilities exists in the region, it can be concluded that 9% of the gear procured is with varying assistance from this project.

Of the gear used 90% is owned by the operator. Of the remaining, 3% is owned by the operators' father, 4% by other relatives, 1% by middlemen and 2% by cooperatives.

One surprising fact is the vastly different replacement costs for the various gear in each of the different strata (see 3.2.5). Beach seines, for example, appear much cheaper to replace in the second stratum than in the other two; gill nets are more expensive to replace in the south. In general, according to geography of the area, there is no logical pattern to the differences. However, one can imagine that two factors influenced the data, namely price anticipation by the respondents and availability of gear in the region.

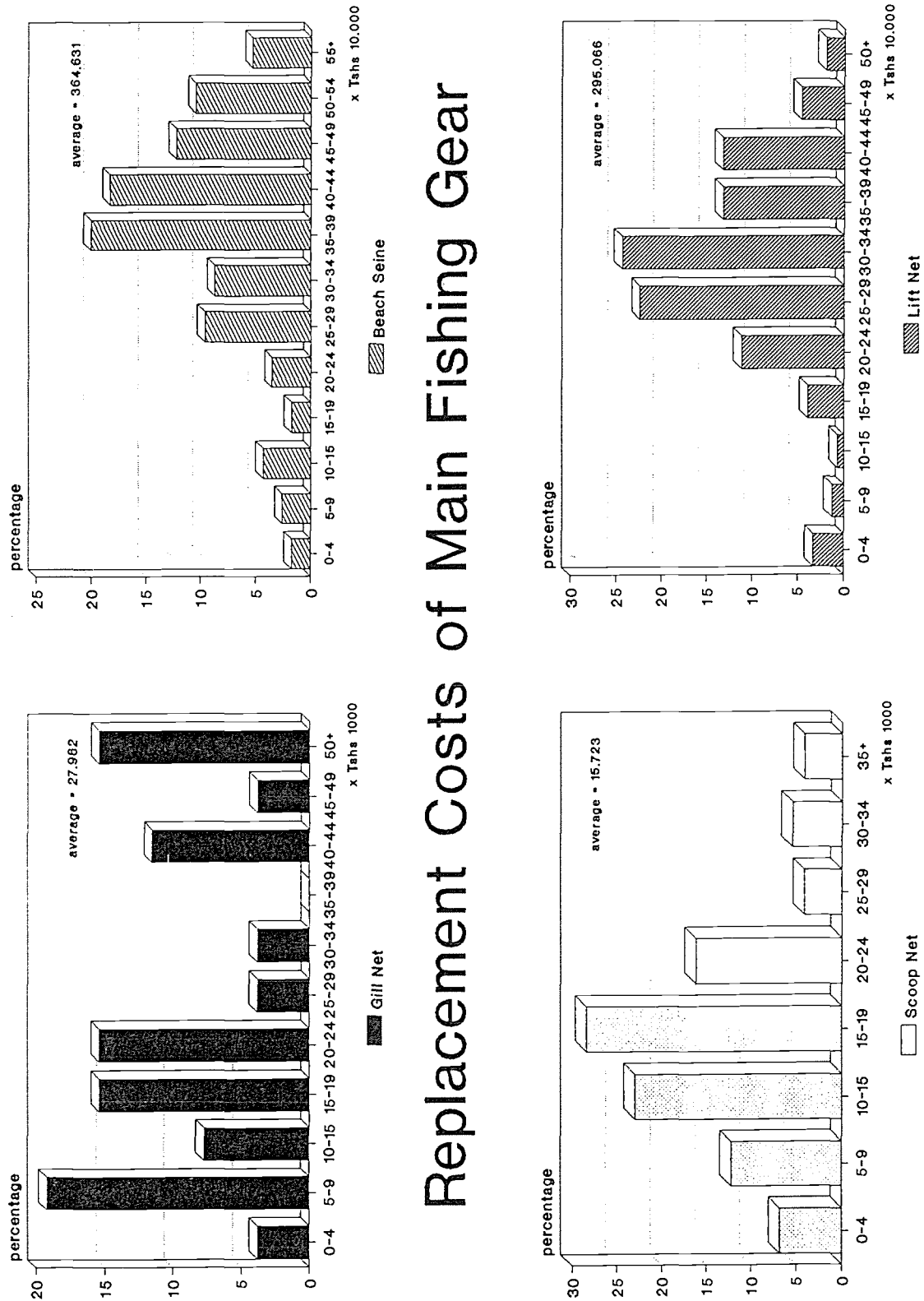


Figure 9

### 3.2.5 General Summary

Table 4 gives a compilation of the information recorded for the main fishing gear in Kigoma region.

Table 4 : Summary of information on fishing gear

| Gear Type    | Stratum    | %  | Length<br>(m) | Depth<br>(m) | Age<br>(yrs) | Replacement<br>Cost (Tshs) |
|--------------|------------|----|---------------|--------------|--------------|----------------------------|
| Gill Nets    | 1          | 8  | 569           | 5.5          | 3.1          | 22 333                     |
|              | 2          | 2  | 506           | 4.7          | 2.7          | 29 000                     |
|              | 3          | 11 | 161           | 4.2          | 3.1          | 38 125                     |
|              | all strata | 6  | 436           | 5.0          | 3.1          | 27 962                     |
| Beach Seines | 1          | 46 | 114           | 18.1         | 4.5          | 363 912                    |
|              | 2          | 1  | 135           | 10.0         | 6.0          | 275 000                    |
|              | 3          | 39 | 126           | 13.1         | 2.9          | 373 214                    |
|              | all strata | 27 | 117           | 16.7         | 4.1          | 364 631                    |
| Scoop Nets   | 1          | 12 | 11            | 11.2         | 6.6          | 14 804                     |
|              | 2          | 29 | 6             | 4.2          | 5.4          | 16 137                     |
|              | 3          | 0  | 0             | 0.0          | 0.0          | 0                          |
|              | all strata | 17 | 8             | 6.4          | 5.8          | 15 723                     |
| Lift Nets    | 1          | 13 | 66            | 19.3         | 3.7          | 314 583                    |
|              | 2          | 60 | 65            | 16.6         | 4.0          | 289 417                    |
|              | 3          | 35 | 62            | 15.2         | 2.3          | 299 600                    |
|              | all strata | 35 | 64            | 16.8         | 3.7          | 295 066                    |

Note: Length, age, replacement and maintenance costs are all averages.



### 3.2.6 Engines

It appears that, to a large extent, fishing activities in Kigoma region are not mechanised. Out of 387 respondents, 29 owned engines and of these, because of fuel and maintenance problems, 31% did not use them regularly. Less than 1% rented engines.

The average replacement cost of the engines generally used is Tshs 357,875 with 60% of the engines costing in between Tshs 300,000 and Tshs 450,000. A significant number (17%) cost more than Tshs 500,000.

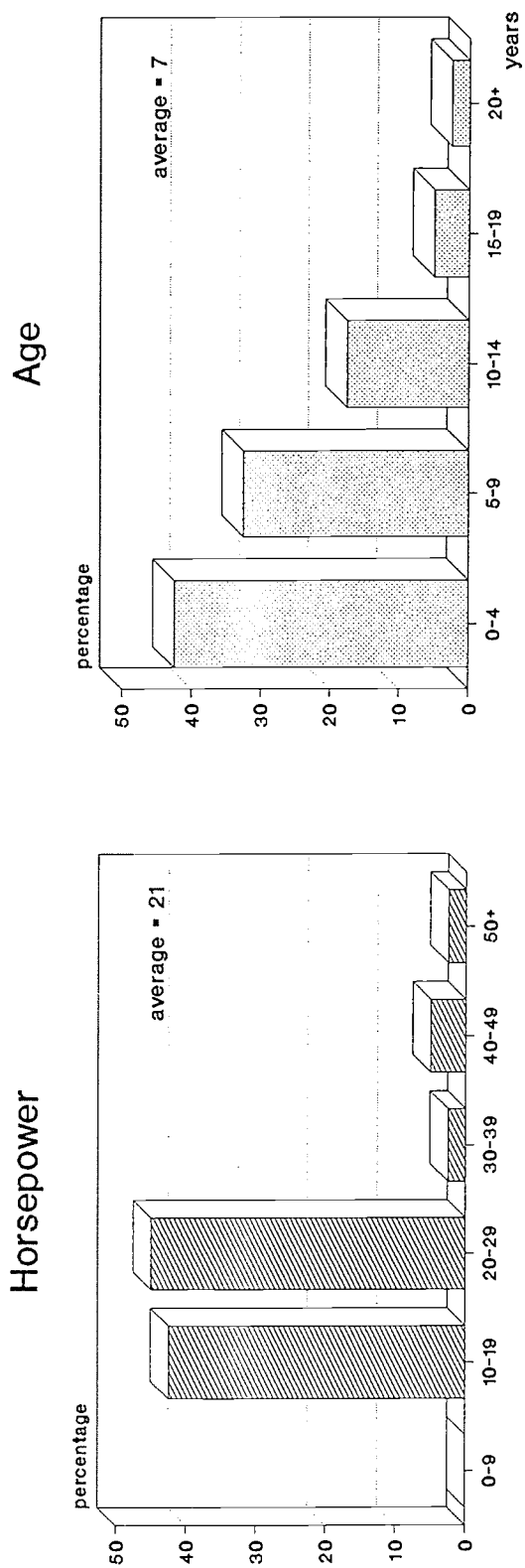
The annual maintenance costs are relatively high (see Figure 10) costing on average Tshs 64,905. This is approximately 20% of the average replacement cost of the engine. It should be noted that there is a notable dip in maintenance costs between Tshs 75 000 and Tshs 100 000.

38% of the engines are maintained by dealers, 34% by relatives and 28% by the fishermen themselves.

Most of the engines have been acquired recently with 42% of the engines being less than 4 years old and 74% being less than 10 years. It is notable that there are engines of more than 20 years old still operating in the region.

In view of the artisanal character of the fishery, the majority of the engines are quite powerful; on average they are 21 horsepower engines with 87% between 10 and 30 horsepower.

Most engines (74%) are bought with cash, 17% are bought with credit (5% through relatives and 12% through institutional credit agencies like projects and banks). 9% of the engines are not bought by the operator but by relatives.



## Information on Engines

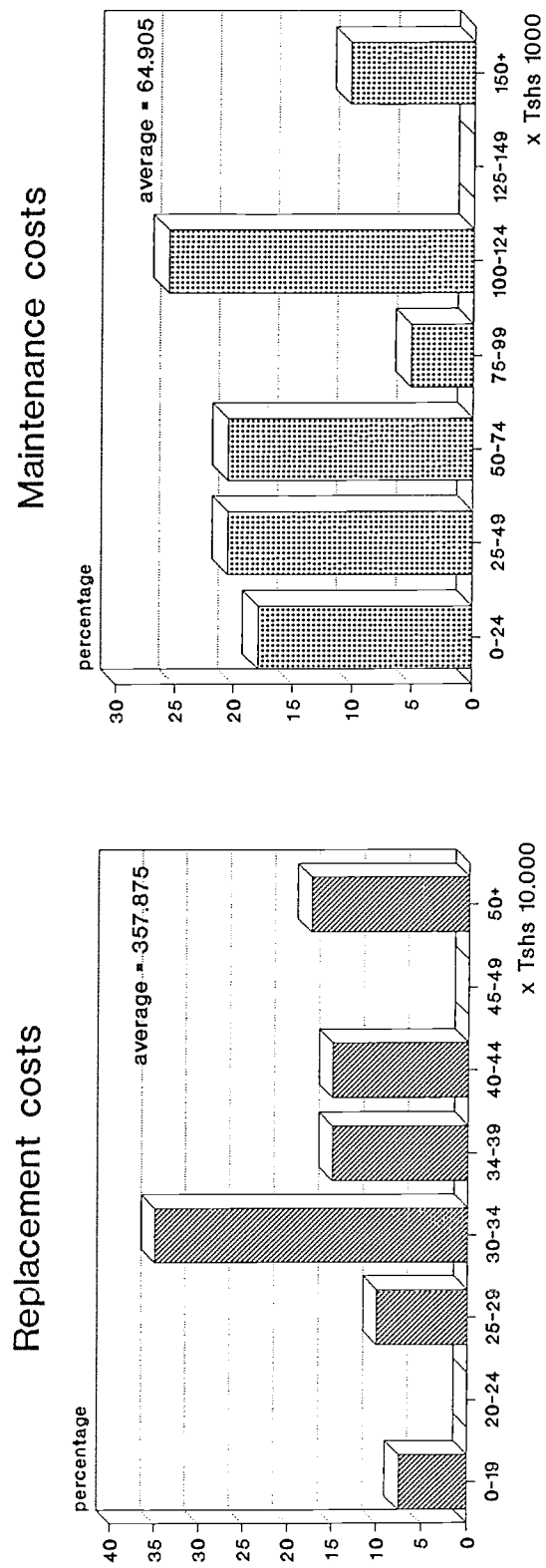


Figure 10

### 3.3 Fish processing

Three traditional fish processing methods exist: drying; smoking and frying<sup>1</sup>. Processing of fish was carried out by 60% of the respondents and/or their wives. (See Figure 11.)

The most widely used method for processing small fish (like dagaa) is simple sun drying where the fish is spread out on the beach and left to dry under natural conditions; this takes between one and three days depending on the climatic conditions. The longer the drying takes the greater are the post harvest losses. Generally the area allocated for fish drying is covered with gravel and levelled. However in the most southern area (around Sibwesa) the fish is simply spread out on the sandy beach.

In general, drying needs no capital input. However in some areas where suitable ground for fish drying is limited, ground may be rented out to the processors.

Frying is mostly used to process mikebuka and dagaa using palm oil which is easily available in the Kigoma region. One problem with frying is that fish can not be kept for long. Also storage facilities in the region are very poor. Fish is therefore fried in small quantities with the intention of being sold at market or used at home the same day.

Frying is more capital intensive than drying, it needs assets (for equipment like frying pans and cans) and working capital for running costs (to buy fire wood and oil). These costs however are generally recovered quickly with the fish being sold the same day and as processing and selling is rapid, post harvest losses are limited.

The most effective of the traditional processing methods for preserving dagaa and mikebuka is smoking. This is because the fish are of a suitable size and the end products have a long shelf life. As the fish are smoked in enclosed spaces over open smoky fires which are difficult to control often resulting in burned and blackened fish, there are major problems which include post harvest losses and also health hazards affecting the processors. The Kigoma Project, in cooperation with the IFIP Project, introduced the Chorkor oven which are easier to handle, are not enclosed (and therefore less of a health hazard), are more economical on fire wood and produce a much better end product with decreased harvest losses.

The capital involved in smoking is much greater than in drying or frying. The traditional installations themselves had significant costs but the new smokers need even more investment to cover material and construction costs. However, the returns on these investments are great.

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<sup>1</sup>see also: Leendertse, 1990.

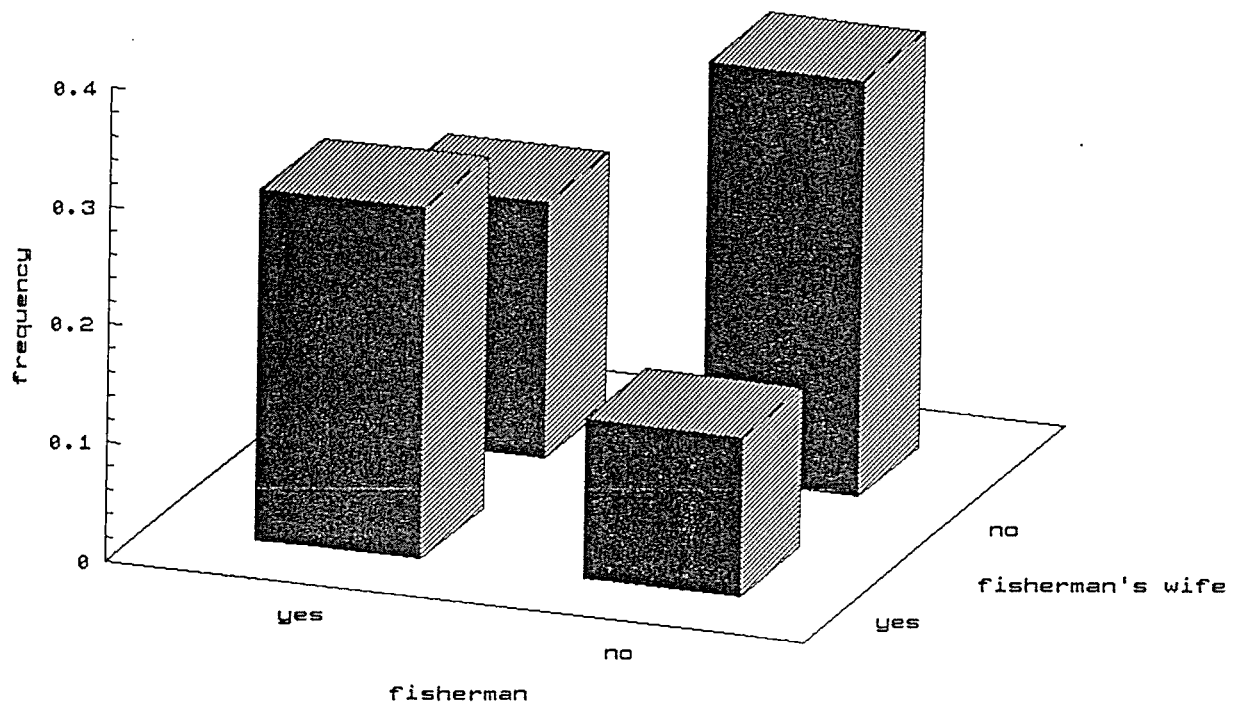


Figure 11: Fish processing activities

### 3.4 Marketing

The fishermen seem remarkably homogenous in their habits of selling their catch: 94% of the fishermen sell all or part of their catch to private traders; 75% of the fishermen sell their catch on the beach directly to consumers; 61% sell the catch directly to processors; 30% sell their catch at the market and finally 1% sell it through family members.

Therefore it is obvious that the fish is seldom marketed through only one channel. The most common combination is selling fish to private traders and consumers, the remainder being sold in the market. Generally the private trader is also a processor. This links to information gained from the data which indicates that the combination of selling to both groups is common.

The relationship that the fishermen have with buyers is purely economical; 98% of the fishermen have no other relationship with the trader other than to sell their fish. Only two cases were found of traders lending money to fishermen or providing a boat and there was only one case when a trader provided gear. This is why, in general, the fishermen do not feel any obligation to traders: only 2% selling to the same trader, 98% changing frequently, generally selling to the buyer that offers the best price.

### 3.5 Sharing systems

Crew members are very rarely paid on a fixed salary basis but are paid a share of the sales after deduction of operation costs. This can be on a daily basis or at the end of the fishing season (determined by the lunar twenty four day cycle).

The sharing systems for the seven different types of gear used in the region has been identified. In general, the sharing formula is either 50% to the crew members and 50% for the owner, or 33% for the crew members, 67% for the owner(s). On average, this has resulted in the following share ratio for the different gear types:

#### 3.5.1 Gill nets

The average share of revenue for crew (two members) of the gill net fishery standing at 36% (64% for the boat/gear owners) is the lowest in relation to the other types of fishing. However this is balanced by the limited size of the crew.

#### 3.5.2 Scoop nets

The average share of revenue for crew of the scoop nets fishery is similar to the gill nets fishery standing at 40% (60% for the boat/gear owners). However again there is only on average a crew of two.

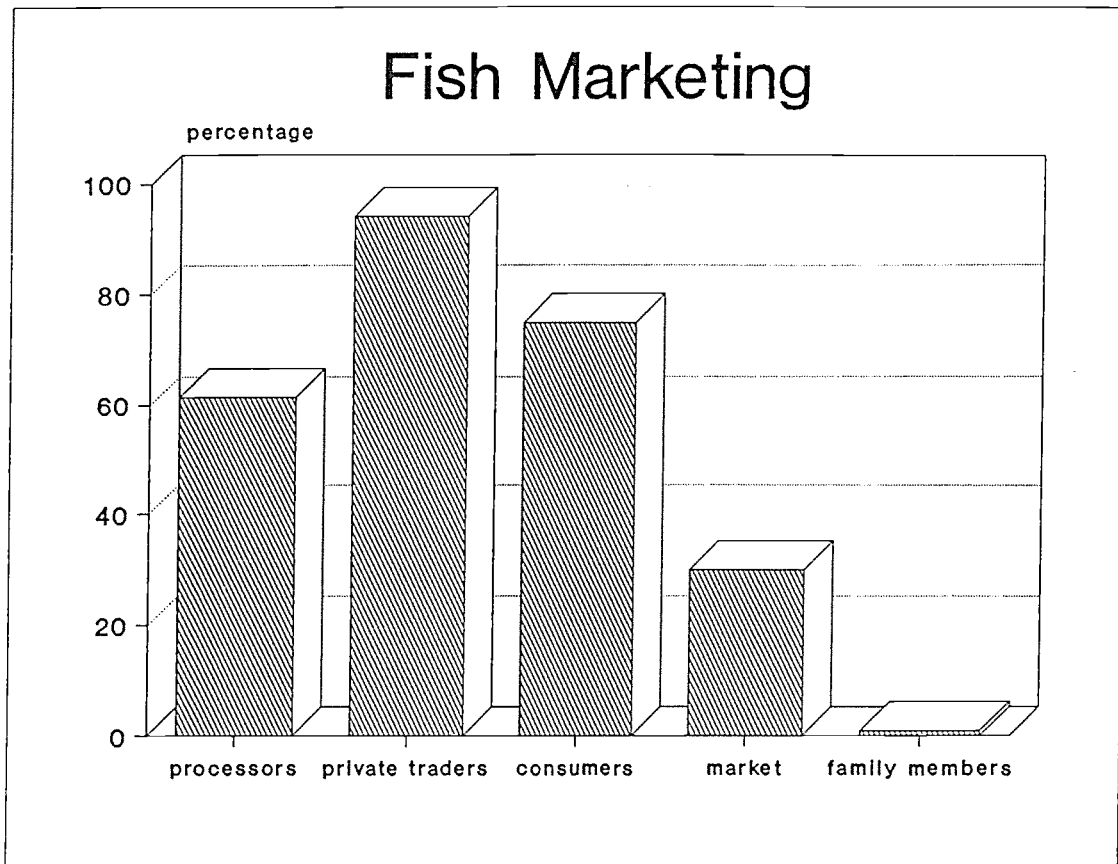


Figure 12

### 3.5.3 Beach seines

Due to the more complex ownership situation in the beach seine fishery the share system is more intricate. Generally in the beach seine fishery is one fisherman who owns the net (which may or may not be operated from a canoe) and one fisherman who owns the canoe carrying the light. The average 9 crew members share 42% of the revenue and boat/gear owners and lamp carrier share 58%.

The fishery is generally operated with each two crew in the lamp carrying and net pulling canoes and, depending on the size of the net, between 4 and 12 (average 7) crew on the beach. After landing, the catch is usually divided either equally or 1/3 : 2/3 between the lamp carrier and the boat/gear owner. The above ratios also then apply to the share between crew and owners.

### 3.5.4 Lift nets

The average crew size in the lift net fishery is 4. With a few exceptional cases generally the revenue from the fish sales are divided approximately equally among crew members and boat/gear owners with the crew dividing 49% and the owners 51% of the revenue.

### 3.5.5 Lines

Although all three types of line fishing that exist have an average of two crew, they differ in their proportional shares between owners and crew. The average ratio for: surface hand lines is 48% for the crew (52% for the owners); pelagic long lines is 50% for the crew (50% for the owner); and bottom hand lines is 45% for the crew (55% for the owners).

In 20% of the cases the crew bring their own gear; 77% bringing bottom lines and 22% bringing hand lines. In these cases, the catch is either divided 50/50 or the owner does not share in the catch caught by the crews gear.

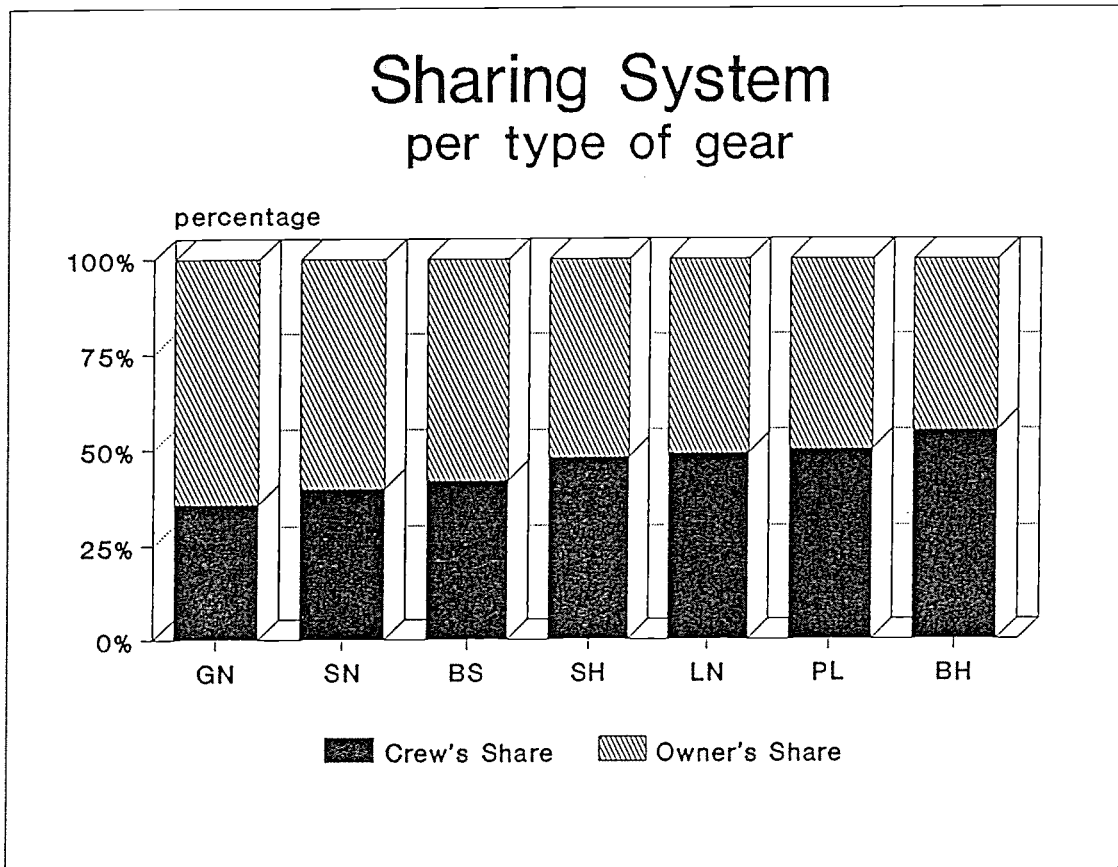


Figure 13

### 3.6 Crew changes

The majority (51%) of the crew stay with their normal fishing units. Of the rest, 7% change each day, 6% change each week and 36% change each new fishing season. The relationship of crew changes to strata can be seen in Figure 14. In the first stratum, where mainly beach seines are operated, the crew appear to be more steady than in the other two strata with 65% staying with their normal unit, 23% changing seasonally, 5% weekly and 7% daily. In the second stratum, only 33% of the fishermen stay with their original units, 54% change seasonally, 6% change weekly and 7% daily. In the third stratum 40% of the fishermen stay with their original units, 42% change seasonally, 12% change weekly and 6% daily. This is easily related to the migration patterns described in 3.7.

It appears in general that crew of lift net fishing are more itinerant than crew of beach seine fishing.

### 3.7 Seasonal migration

Although fishermen do not migrate permanently, in the second and third stratum fishermen do migrate seasonally, mainly during the low fishing season (from April to October) to more profitable fishing grounds. The ability to do so depends to a large extent on the gear operated: beach seine fishing, due to its necessary geographical characteristics, is less flexible than other gear used and therefore fishermen in stratum 1 (where most beach seine fishing is carried out) appear to be less migratory than their counterparts further south. The fishermen in the first strata who do operate in other locations are mainly fishermen who have exclusive rights to fish off beaches in Gombe Park and are therefore able to migrate to these extra fishing grounds.

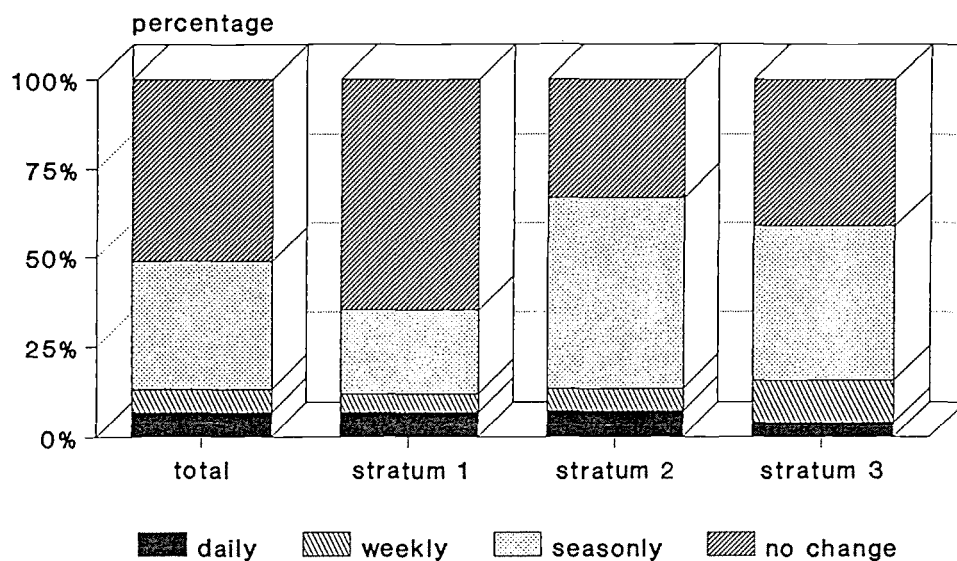
According to the data, it appears that the low season appears earlier in the third strata than in the second. It is therefore assumed that fish migrate from south to north. According to F. Roest (pers. comm.) this reflects the recorded fish migrating pattern in Lake Tanganyika.

In general, the fishermen in the second stratum appear to be the most migratory with fluctuations between 2% of the fishermen migrating in November/December and 25% of the fishermen in June. In the third stratum 1% of the population migrates in December and 23% in August. In the first stratum total migration is limited to between 6 and 8% throughout the year.

Figure 14

- 35 -

## Crew Changes per stratum



## Seasonal Migration per stratum/month

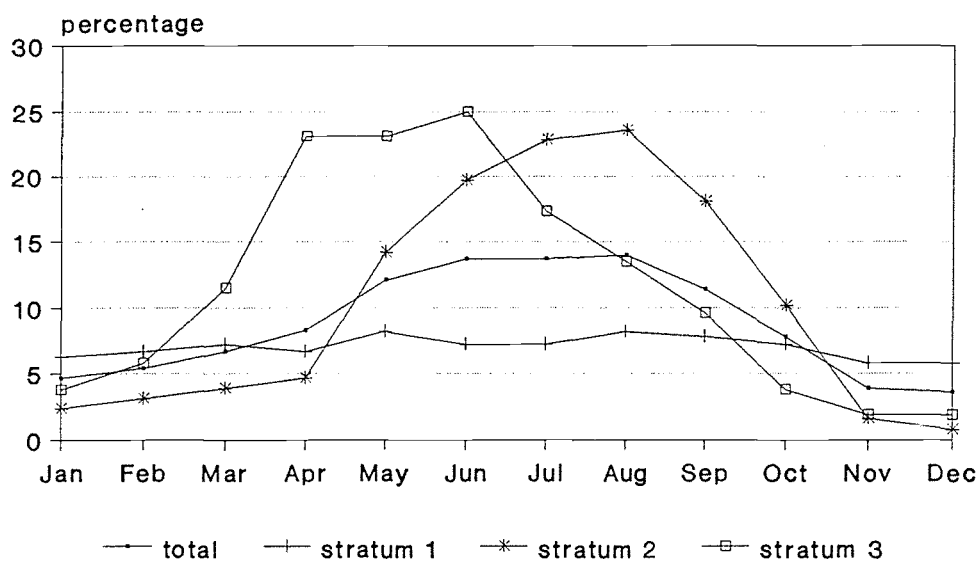


Figure 15

#### 4 SOCIO-ECONOMIC CHARACTERISTICS OF THE FISHERY

##### 4.1 The Kigoma Boat Owners

###### 4.1.1 Employment

Table 5 identifies the fishermen's employment status which shows great homogeneity: 89% of the respondents are full time fishermen (identified as being employed in fishing more than ten days per month); only 1% are part time fishermen (identified as being employed in fishing five to ten days per month) and there are no occasional fishermen (identified as being employed in fishing less than 5 days a month).

The remaining 10% of the respondents were boat and/or gear owners who did not go out fishing themselves. No significant differences in this pattern has been found between the three strata.

###### 4.1.2 Ethnic background and religion

With regard to ethnic background or religious beliefs (see Table 5), the fishermen population in Kigoma region is not homogenous with eighteen different ethnic groups identified, the majority (51%) being Muha. Table 5 also shows that 26% of the respondents are not of Tanzanian origin: 19% are Mbembe from the Zairian side of the lake and 7% are Mrundi from Burundi.

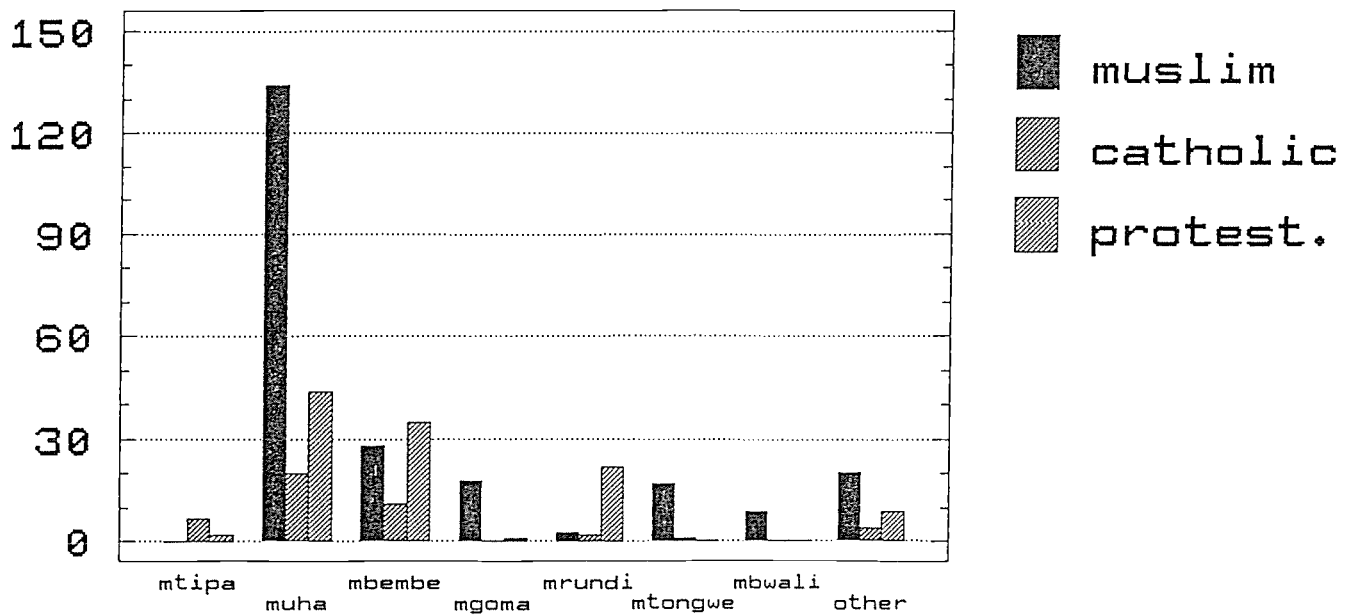
The religious backgrounds of the fishermen are also diverse with Muslims in the majority at 59%, followed by Protestants at 29% and Catholics at 12%. No other religions have been identified although the Protestant population is divided into several different sects for example Pentecost and Seventh Day Adventists.

Figure 16 relates ethnic background to religious beliefs. It shows that the most numerous ethnic group (i.e. Muha) also represents the majority of the Muslim population. Except for the Mtipa, Mbembe and Mrundi, all ethnic groups are predominantly Muslim inferring that the non-Tanzanian population mainly contributes to the Protestant and not the Muslim population. This is surprising as in Zaire and Burundi, the majority of the population is Catholic. The Mtipa is the only ethnic group which is dominated by Catholics.

Table 5: Fishermens identification according to religion, etchnic origin and employment status (%)

|           | total | %         | str1 | %         | 1  | 2  | 3  | 4   | str2 | %         | 5 | 6  | 7  | 8  | str3 | %         | 9 | 10 | 11 | 12 |
|-----------|-------|-----------|------|-----------|----|----|----|-----|------|-----------|---|----|----|----|------|-----------|---|----|----|----|
| muslim    | 229   | <b>59</b> | 140  | <b>67</b> | 13 | 36 | 29 | 62  | 54   | <b>43</b> | 2 | 8  | 16 | 28 | 35   | <b>67</b> | 1 | 4  | 9  | 21 |
| cath      | 45    | <b>12</b> | 20   | <b>10</b> | 1  | 1  | 14 | 4   | 14   | <b>11</b> | 3 | 2  | 5  | 4  | 11   | <b>21</b> | 1 | 1  | 9  | 0  |
| prot      | 113   | <b>29</b> | 48   | <b>23</b> | 0  | 2  | 9  | 37  | 59   | <b>46</b> | 2 | 18 | 18 | 21 | 6    | <b>12</b> | 0 | 5  | 0  | 1  |
| mtipa     | 9     | <b>2</b>  | 1    | <b>1</b>  | 1  | 0  | 0  | 0   | 0    | <b>0</b>  | 0 | 0  | 0  | 0  | 8    | <b>15</b> | 0 | 3  | 5  | 0  |
| muha      | 198   | <b>51</b> | 133  | <b>64</b> | 3  | 31 | 50 | 49  | 54   | <b>43</b> | 0 | 6  | 30 | 18 | 11   | <b>21</b> | 0 | 0  | 0  | 11 |
| mbembe    | 74    | <b>19</b> | 40   | <b>19</b> | 1  | 2  | 1  | 36  | 28   | <b>22</b> | 4 | 11 | 2  | 11 | 6    | <b>12</b> | 1 | 3  | 2  | 0  |
| mgoma     | 19    | <b>5</b>  | 5    | <b>2</b>  | 3  | 0  | 0  | 2   | 7    | <b>6</b>  | 0 | 2  | 0  | 5  | 7    | <b>13</b> | 0 | 1  | 6  | 0  |
| mrundi    | 27    | <b>7</b>  | 13   | <b>6</b>  | 0  | 5  | 1  | 7   | 14   | <b>11</b> | 0 | 0  | 3  | 11 | 0    | <b>0</b>  | 0 | 0  | 0  | 0  |
| mtongwe   | 18    | <b>5</b>  | 0    | <b>0</b>  | 0  | 0  | 0  | 0   | 8    | <b>6</b>  | 2 | 0  | 2  | 4  | 10   | <b>19</b> | 0 | 0  | 1  | 9  |
| mbwali    | 9     | <b>2</b>  | 4    | <b>2</b>  | 3  | 0  | 0  | 1   | 1    | <b>1</b>  | 0 | 1  | 0  | 0  | 4    | <b>8</b>  | 0 | 0  | 2  | 2  |
| other     | 33    | <b>8</b>  | 12   | <b>6</b>  | 3  | 1  | 0  | 8   | 15   | <b>12</b> | 1 | 8  | 2  | 4  | 6    | <b>12</b> | 1 | 3  | 2  | 0  |
| full time | 346   | <b>89</b> | 190  | <b>91</b> | 13 | 34 | 47 | 96  | 112  | <b>88</b> | 7 | 25 | 37 | 73 | 44   | <b>85</b> | 2 | 6  | 15 | 21 |
| part time | 2     | <b>1</b>  | 2    | <b>1</b>  | 0  | 1  | 1  | 0   | 0    | <b>0</b>  | 0 | 0  | 0  | 0  | 0    | <b>0</b>  | 0 | 0  | 0  | 0  |
| non-fish. | 39    | <b>10</b> | 16   | <b>8</b>  | 1  | 4  | 4  | 7   | 15   | <b>12</b> | 0 | 3  | 2  | 10 | 8    | <b>15</b> | 0 | 4  | 3  | 1  |
| total     | 387   |           | 208  |           | 14 | 39 | 52 | 103 | 127  |           | 7 | 28 | 39 | 53 | 52   |           | 2 | 10 | 18 | 22 |

Figure 16: Religion related to ethnic group

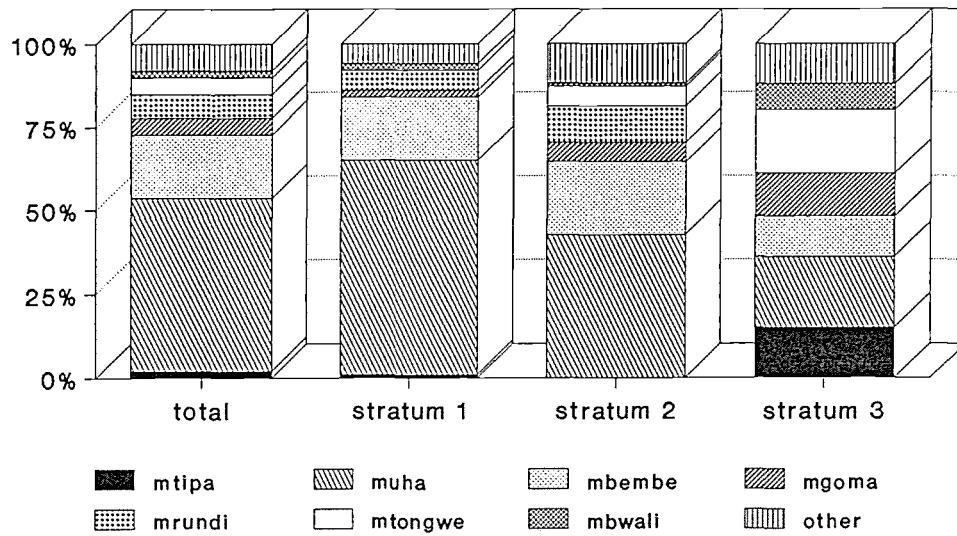


When the relationship of ethnic background to religious beliefs is examined in relation to stratum (see Figure 17), it is apparent that neither the ethnic groups nor the religious groups are evenly distributed.

In the first and third strata, the Muha are in the majority but with 64% in the first and 21% in the third. The Mrundi, on the other hand, represent 6% of the population in the first stratum, 11% in the second and are not present in the third. The Mbembe are the most evenly spread in the region (varying between 19%, 22% and 12% in strata 1 to 3 respectively). In general it appears that the dominance of the Muha decreases from north to south with an increasing tendency towards equal representation of all ethnic groups.

In stratum 2 the proportion of Muslims and Christians are not the same as in stratum 1 and 3. In the second stratum the Protestants are dominant with nearly 50% of the population while, in the other two strata, Muslims are in the absolute majority. Relating ethnic group per stratum to religion by ethnic group, the dominance of the Protestants in the second stratum is explained by the presence of the Mbembe and Mrundi in the area. The Catholics are always a minority group although in the third stratum they are more numerous than the Protestants.

## Ethnic group per stratum



## Religion per stratum

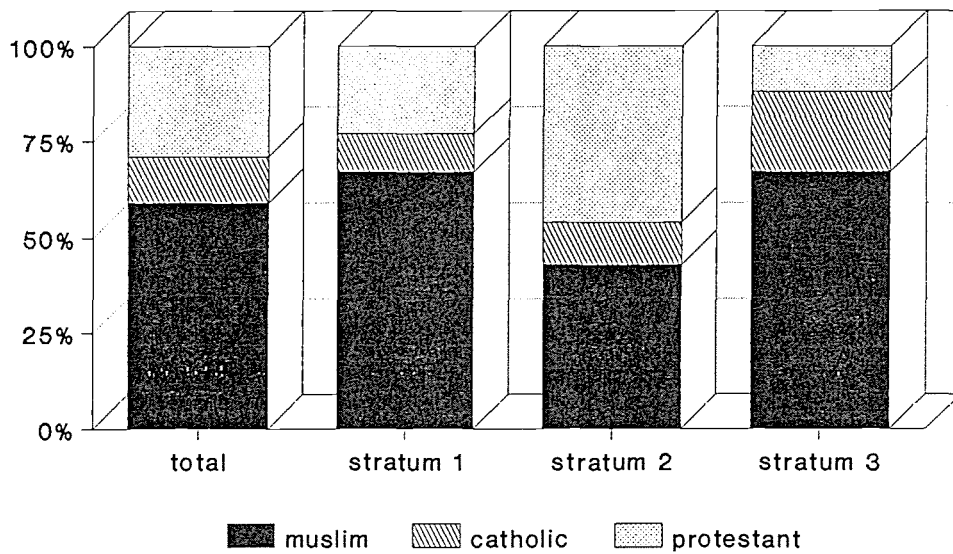


Figure 17

#### 4.1.3 Age

Figure 18 shows the relative age structure of the respondents. 70% of the fishermen are aged between 20 and 40 years old, with 22% between 25 to 30 years old, which forms the largest age class. The average age of all the fishermen is 36. Age distribution is homogeneous throughout the region. No significant differences have been identified on a geographical, religious or ethnic basis.

In Figure 19, the age of the fishermen is related to the number of years they have been engaged in fishing. It shows that, in general, fishermen start fishing relatively young: in the 20 to 30 year old age group 25% of the fishermen began fishing 0-10 years ago and 10% of the fishermen started fishing between 10 and 20 years ago.

On average all fishermen began fishing 14 years ago. Relating this to the average age of fishermen (which is 36 years old) the average age for entering fishing is 22 years old.

This trend also relates to the fact that for 38% of the fishermen, fishing was their first profession, while 50% of fishermen started in farming in which they are still engaged as a principal or secondary occupation.

Figure 18

Relative age structure

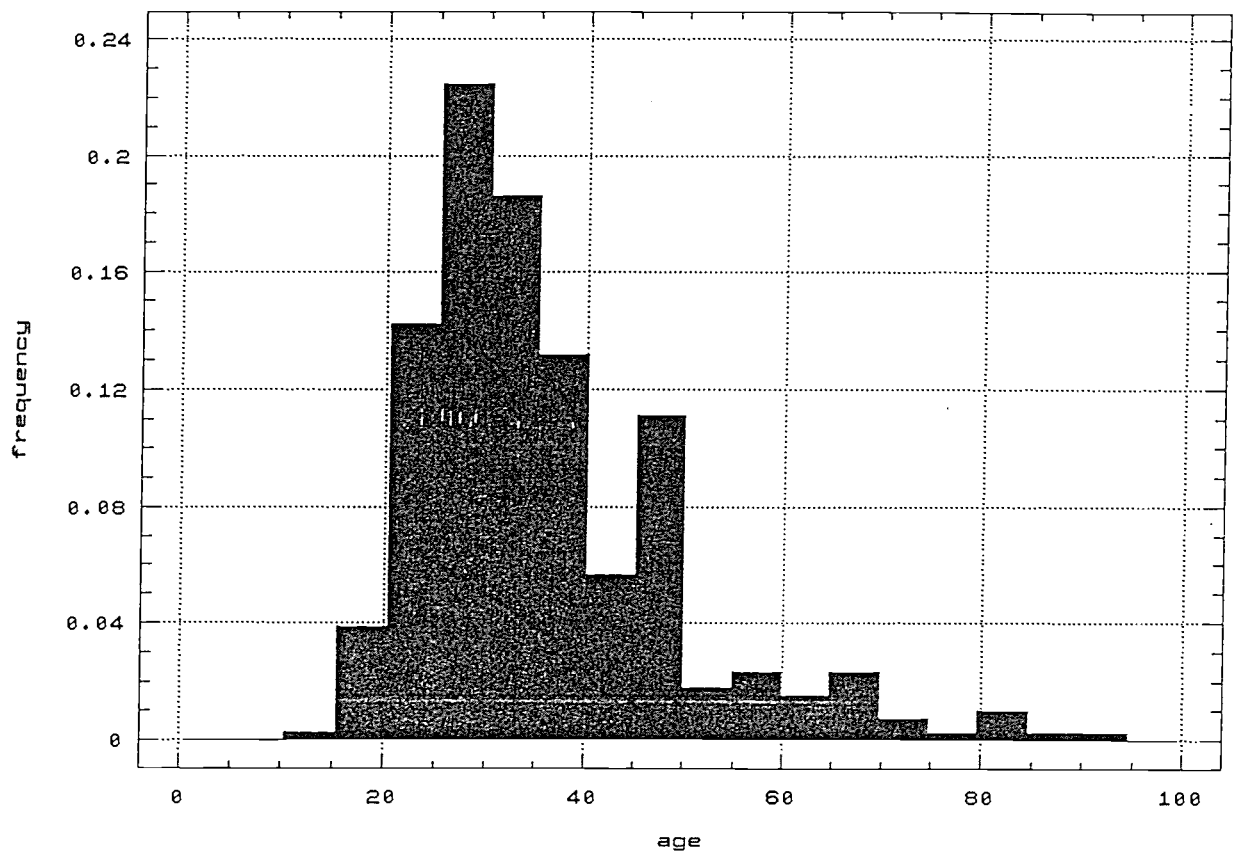
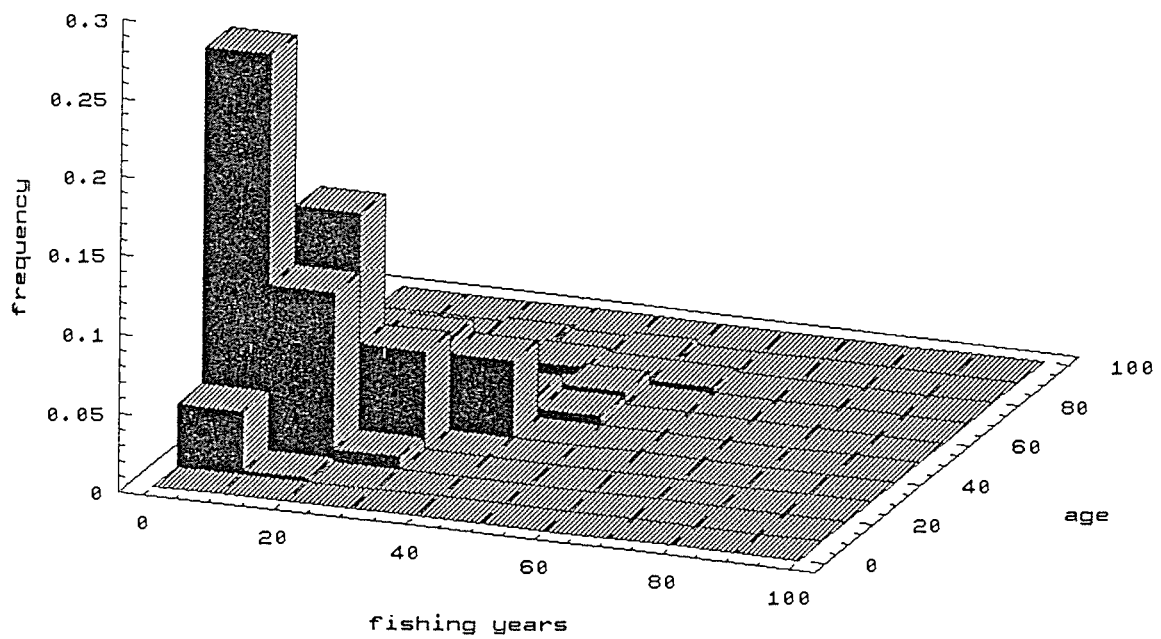


Figure 19: Age related to fishing years



The next figure: age correlated to employment status of the respondents indicates that non-fishermen i.e. boat and/or gear owners who do not go out fishing themselves, are generally slightly older than the full time fishermen. Their age range however is smaller, mainly ranging between 25 to 65 years of age in contrast to the fishermen themselves whose ages range between 15 and 80 years of age. The number of part time fishermen is too small to indicate any definitive trend.

Age related to length of residence (Figure 21) indicates that permanent migration is relatively scarce demonstrating the sedentary nature of the fishermen. (Exceptions to this rule are mostly found among the non-Tanzanian respondents: the Mbembe and Mrundi.) Seasonal migration due to fishing activities however is a common phenomenon which is discussed in the next chapter.

Figure 20: Age related to employment status

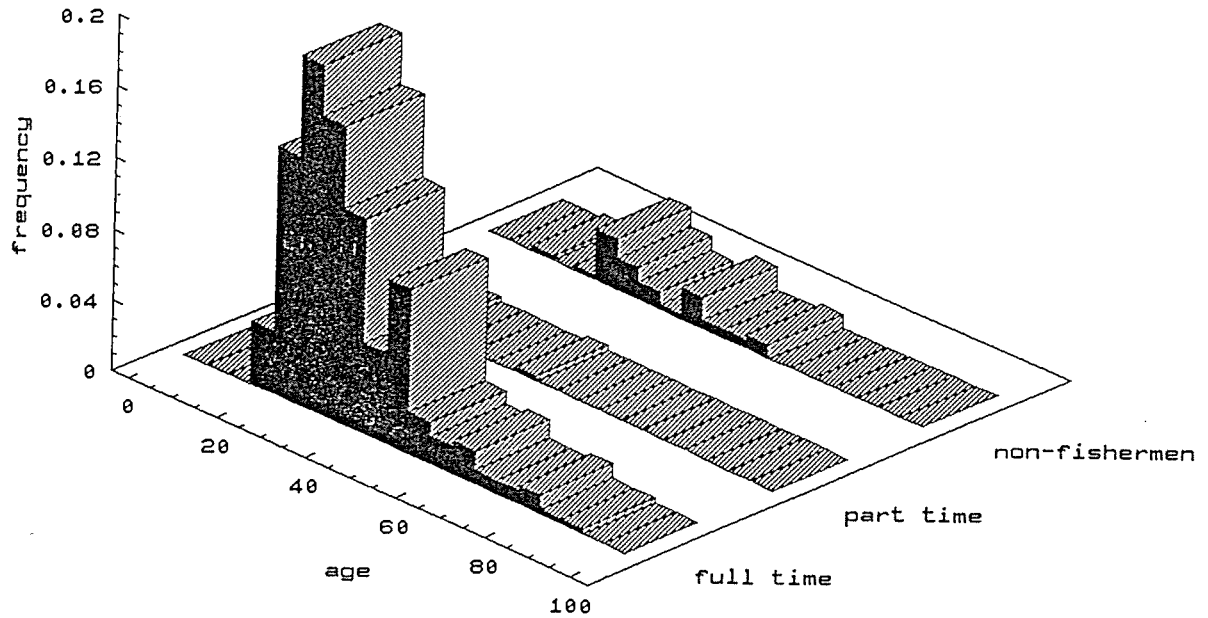
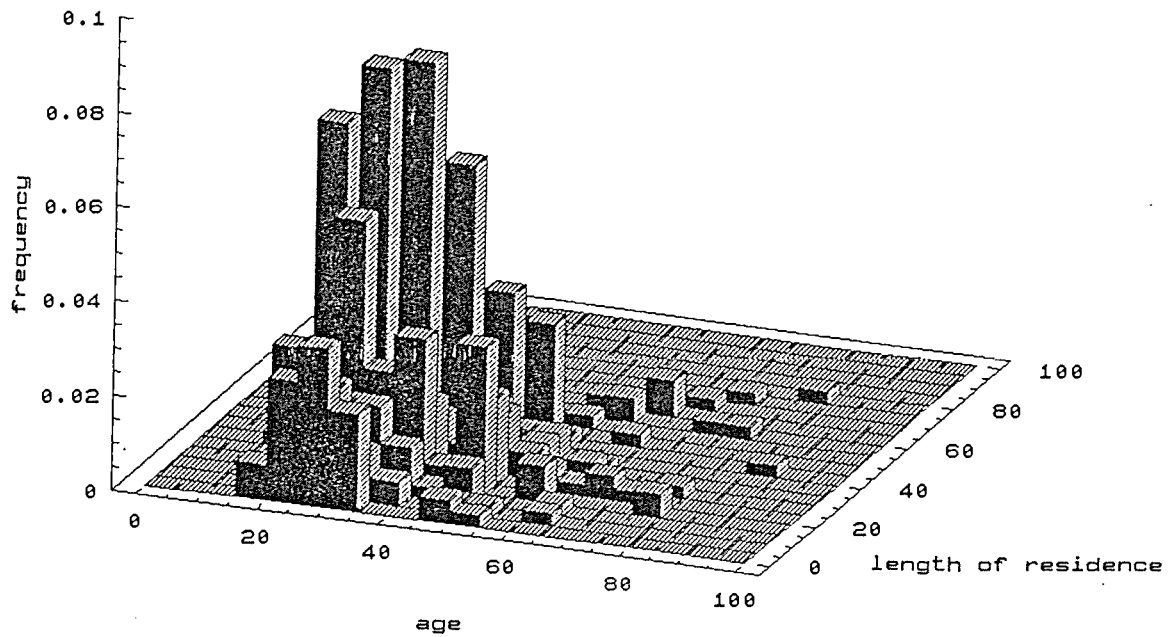


Figure 21: Age related to length of residence



#### 4.1.4 Education

The vast majority (83%) of the fishermen had followed an education and therefore can be considered literate. Education was classified into three options: basic primary education (completion up to form four); advanced primary education (completion of forms five to nine); and higher or adult education. 42% of the respondents had followed basic primary education, 38% had also followed advanced primary education while a further 3% had followed either higher or adult education.

Differences in level of education can be distinguished between the three strata (Figure 22). Stratum 1 has the highest percentage of non educated fishermen, stratum 3 the lowest. Of the total population that followed an education, the fishermen in stratum 2 seem to be the highest educated: 8% having a higher or adult education; 39% having advanced primary education; 37% having a basic primary education and only 16% have had no education at all. In stratum 3 no fishermen were found who had a higher or further education, 42% of the fishermen had an advanced primary education, 50% had a primary school education and 8% had no education at all.

In the first stratum the pattern of education approaches the most the pattern in the whole region; only 3 (i.e. 1%) had higher or further education; 36% had an advanced primary education; 43% had a basic primary education and 20% had no education.

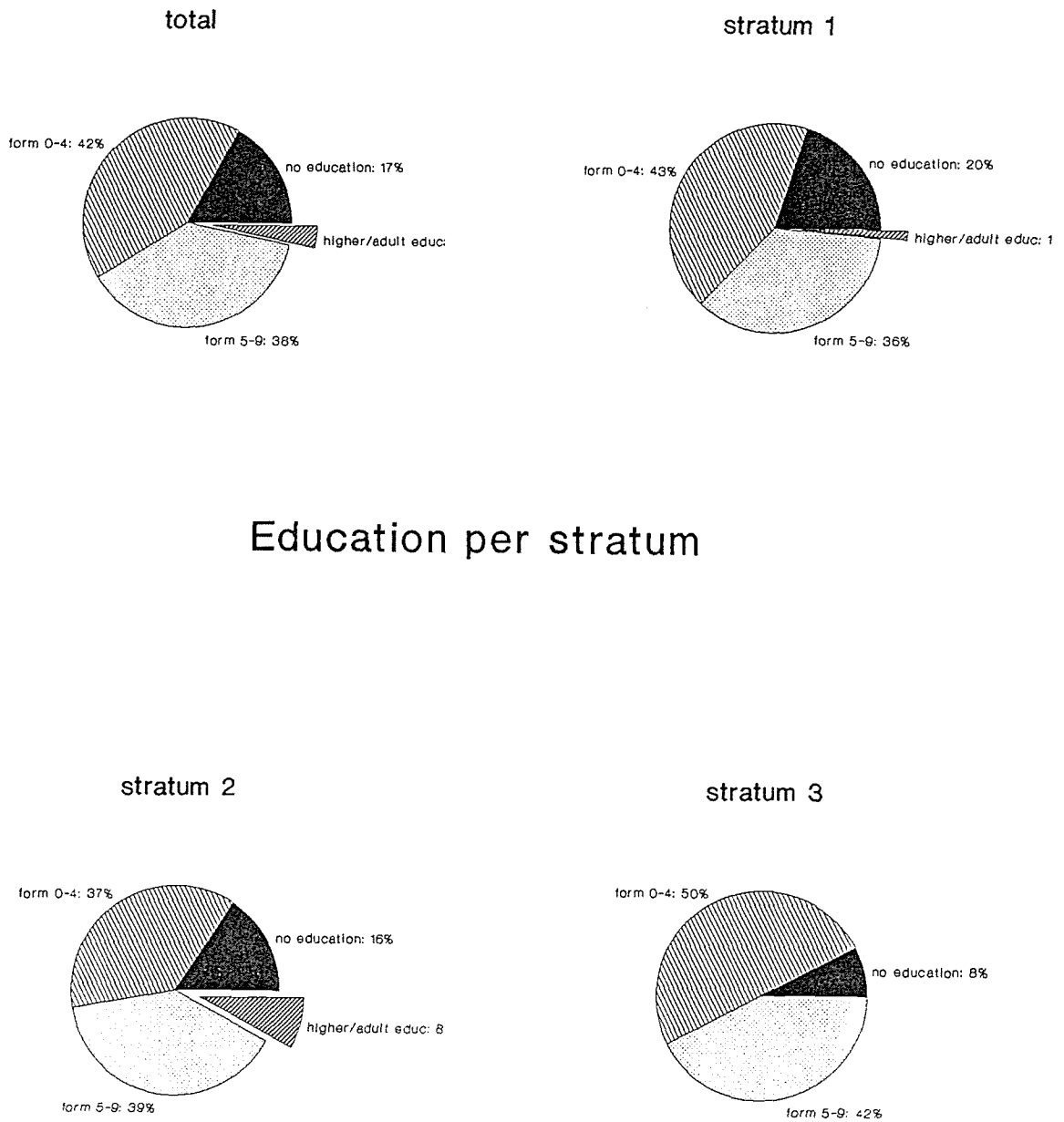


Figure 22

Differences in the amount of education received also varies with the age of the respondent (see Figure 23 and Table 6), the younger age groups tending to have had more education than the older age groups.

Table 6. General level of education received for various age groups (%)

| Educational level<br>Age group | 1  | 2  | 3  | 4 |
|--------------------------------|----|----|----|---|
| 10 - 29                        | 7  | 39 | 49 | 5 |
| 30 - 49                        | 15 | 45 | 35 | 5 |
| 50 - 69                        | 40 | 38 | 18 | 4 |
| 70+                            | 67 | 22 | 11 | 0 |

Where: 1 = no education

2 = basic primary education (form 0-4)

3 = advanced primary education (form 5-9)

4 = higher or adult education

Differences in the amount of education received also varies with ethnic origin (Figure 24). Of significance is the level of education of the Mrundi, the Mbwali and other ethnic groups. These ethnic groups are relatively more educated than the remaining ethnic groups with increasingly more respondents having an education up to advanced primary education while the other groups with a decreasing amount of respondents with an education greater than basic primary education.

Figure 23: Education related to age

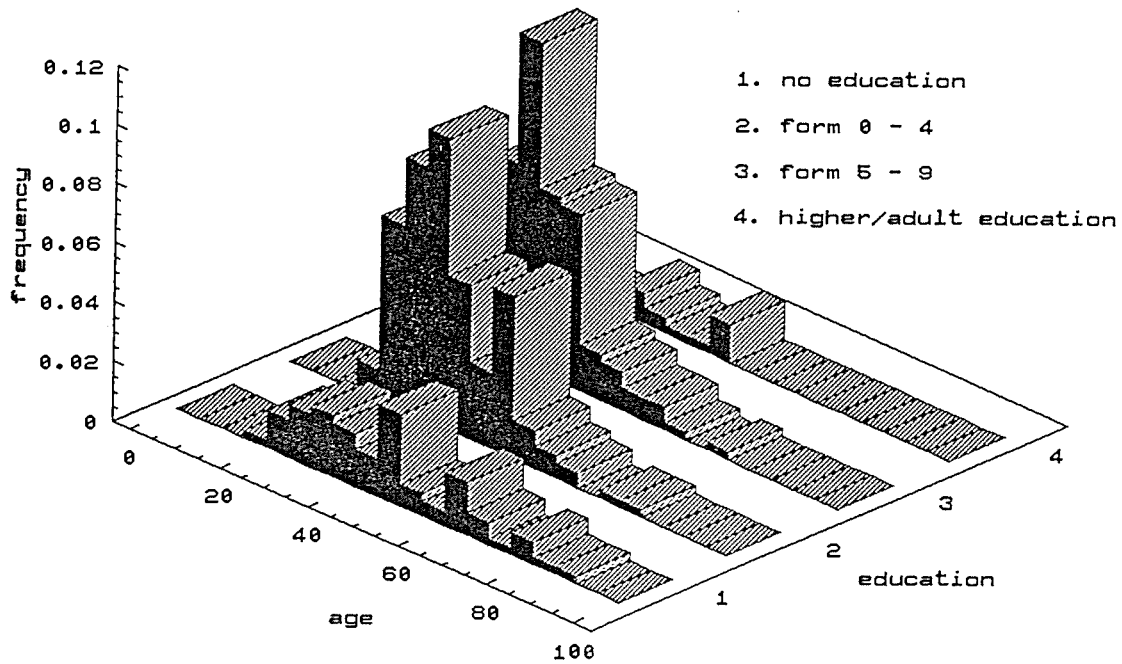
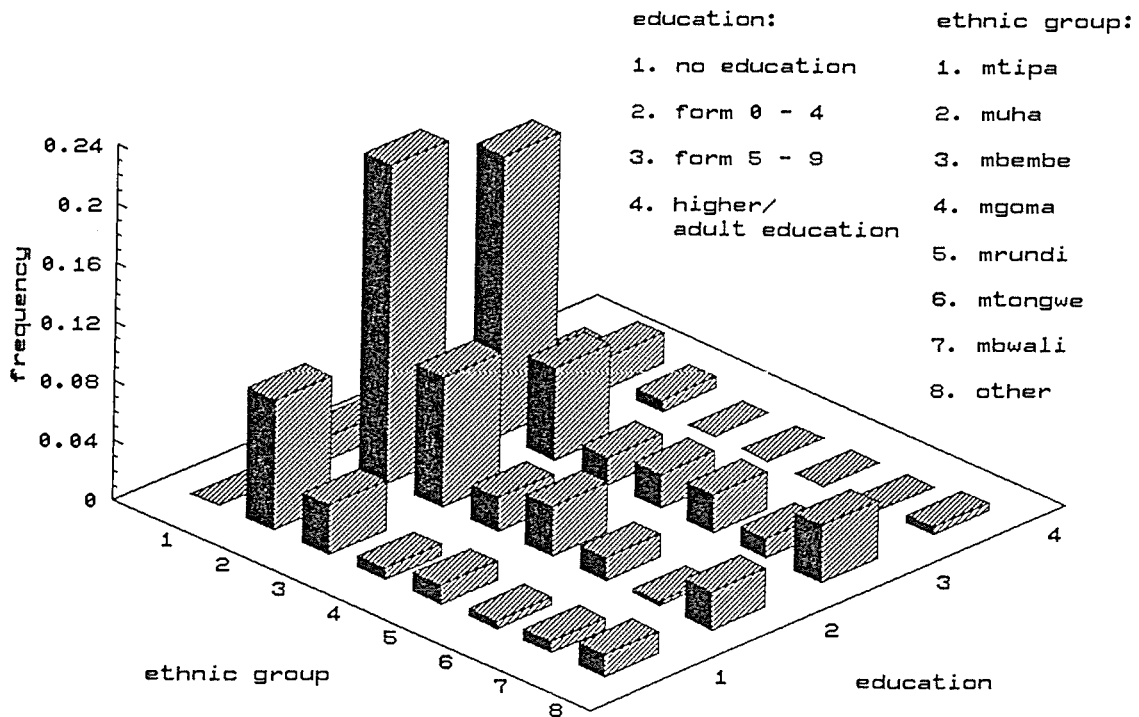


Figure 24: Education related to ethnic group



No significant differences have been found in amount of education received relating to religion although it seems that Muslims are generally slightly less educated than the other religious groups (Figure 25). However, this might be biased by the fact that information on coranic education has not been recorded.

It is interesting to note the relationship of the amount of education received related to the father of the fishermen's profession (limited to the two main occupations of the population: farming and fishing). With a fisherman as a father, the chances of having an education is higher than having a farmer as father. However if an education was gained with a father as a farmer than the probability is that the level of education gained would be higher (Figure 26).

Figure 25: Education related to religion

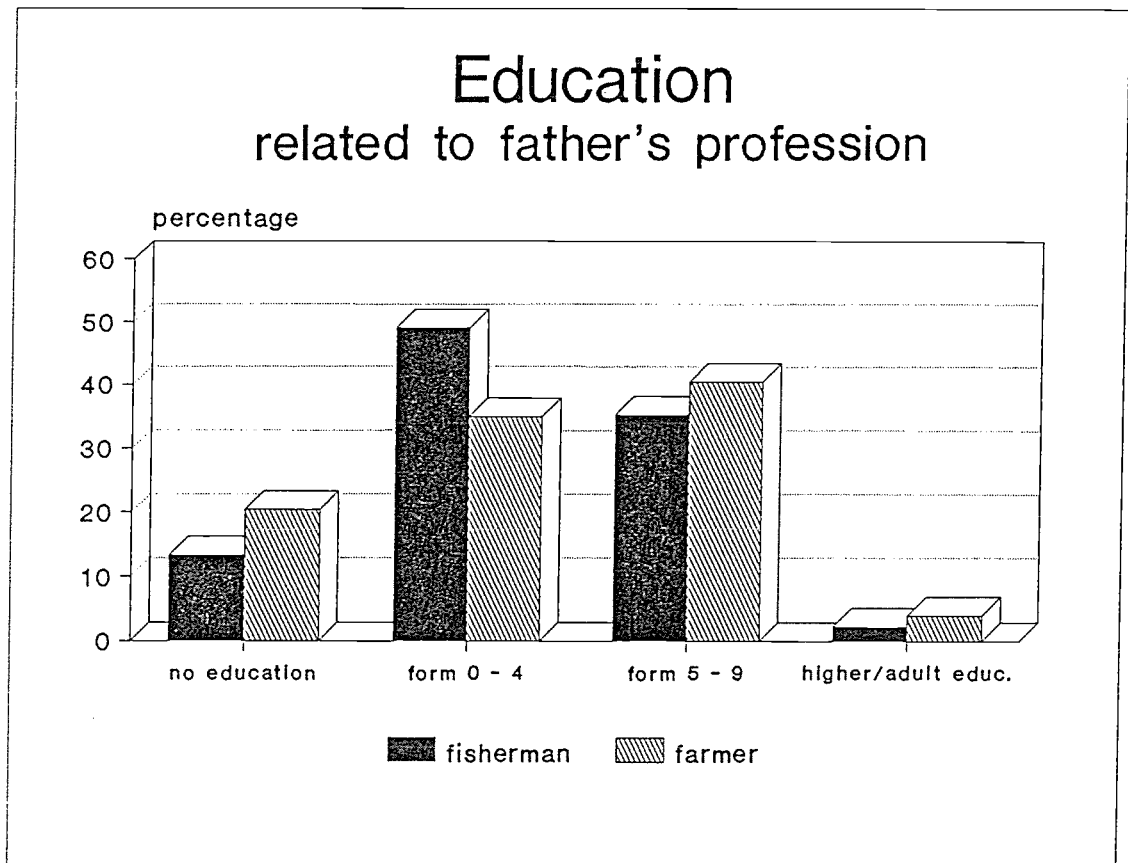
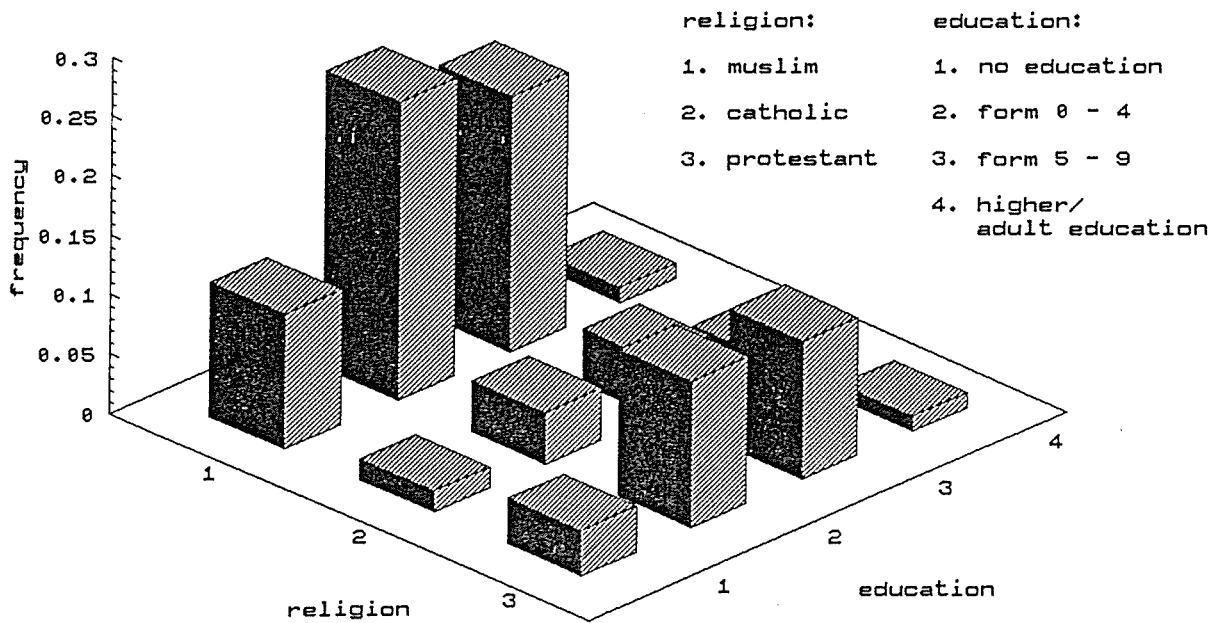


Figure 26

#### 4.1.5 The fisherman's family

Information has been gathered on the marital status of the fishermen, the number of wives (if they are married), the number of dependant children (if they have any) and, if so, how many of them are working in the fishery.

On average, the Kigoma fisherman is married, has more than one wife (1.5 in average) and six dependant children (although the range is between 0 to 57 children) of which 8% of the sons and 1% of the daughters are working in the fishery.

Figure 27 shows that 88% of the respondents are married, 8% are single, 2% widowed and 2% separated. It is interesting to note in Figure 28 that the number of wives a fisherman has correlates to his religion: although it is generally the Muslims that have more than one wife, there are also Catholics and Protestants who have two or more wives.

Figure 27

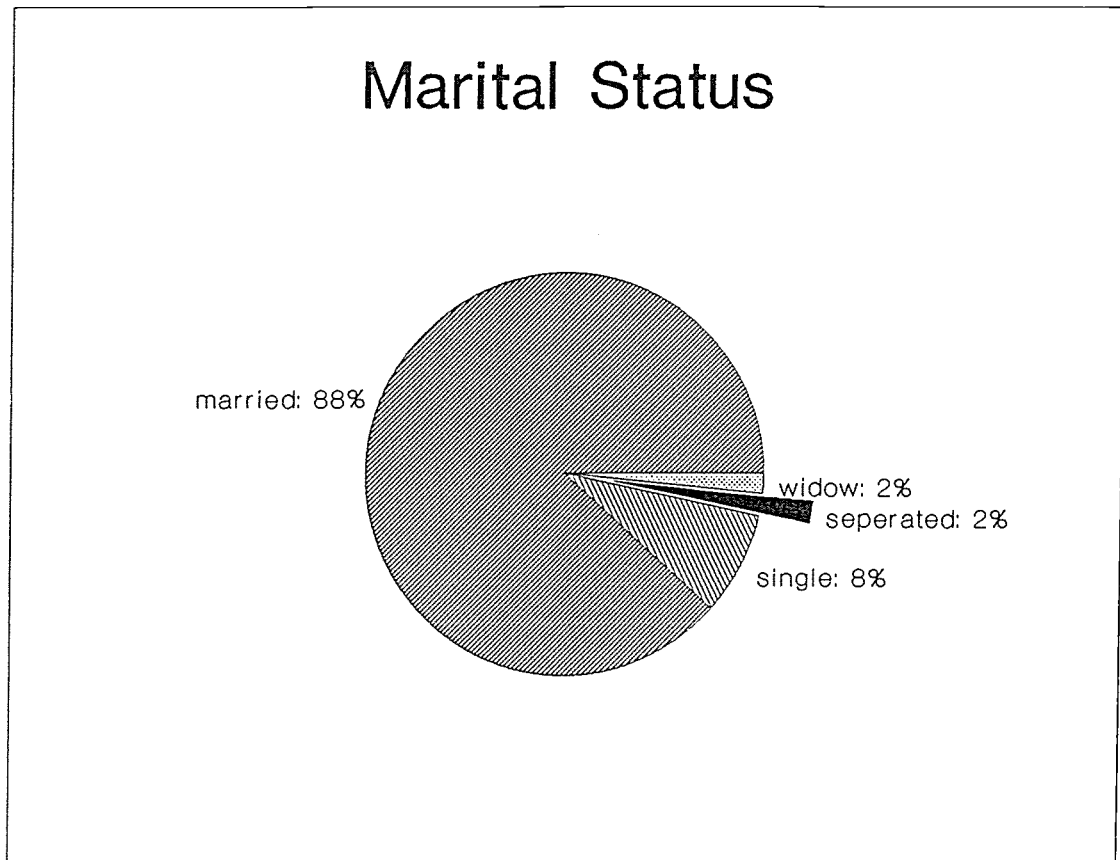
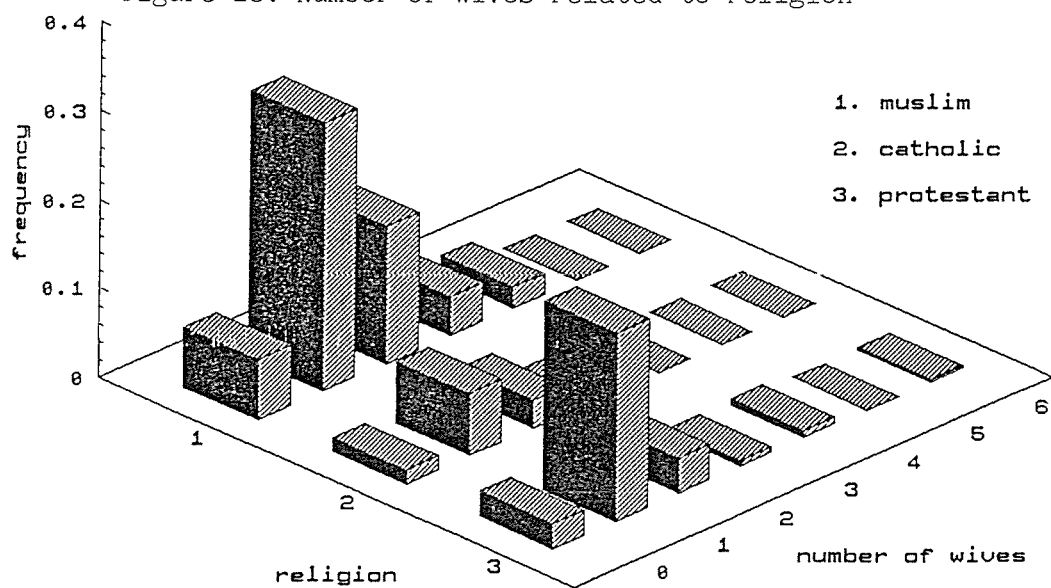


Figure 28: Number of wives related to religion



#### 4.2 Occupations

According to both income and time spent, it is very obvious from the graphs on the opposite page that the vast majority of the respondents fish as their principal and farm as their secondary occupations.

Table 7: Principal and secondary occupations according to income and time spent (%).

|           | income (Tshs) |    |   |   | time spent (hrs) |    |   |   |
|-----------|---------------|----|---|---|------------------|----|---|---|
|           | 1             | 2  | 3 | 4 | 1                | 2  | 3 | 4 |
| principal | 89            | 8  | 2 | 1 | 83               | 13 | 3 | 1 |
| secondary | 10            | 86 | 3 | 2 | 16               | 79 | 3 | 2 |

Where: 1 = fisherman; 2 = farmer; 3 = trader; 4 = other

Table 7 shows that 94% of the respondents use farming as a very important source of income. Notable is the fact that only 3 respondents (less than 1%) did not have a secondary occupation and were therefore fully dependant on fishing.

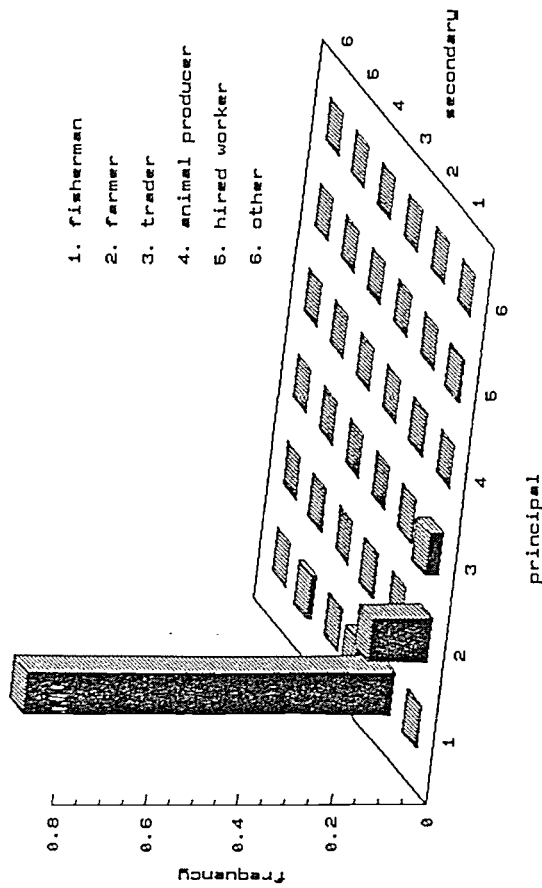


Figure 29: Principal occupations according to income and time spent

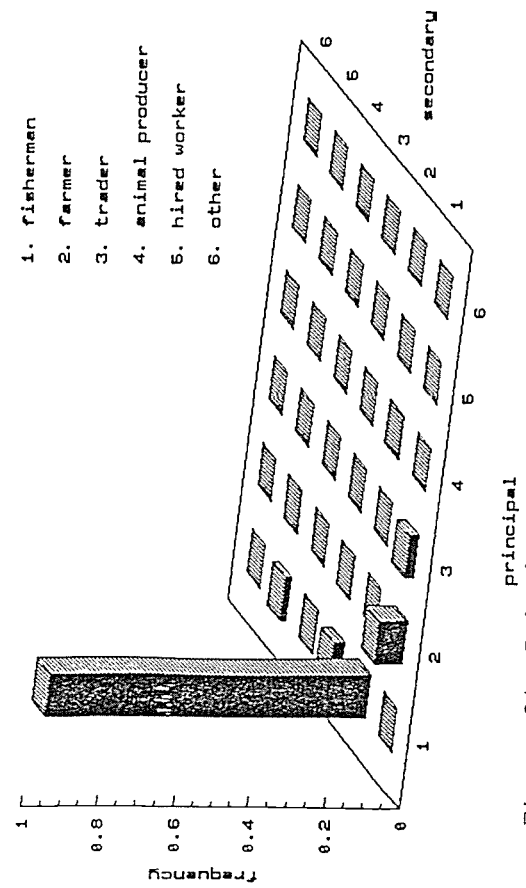


Figure 31: Principal and secondary occupations according to income

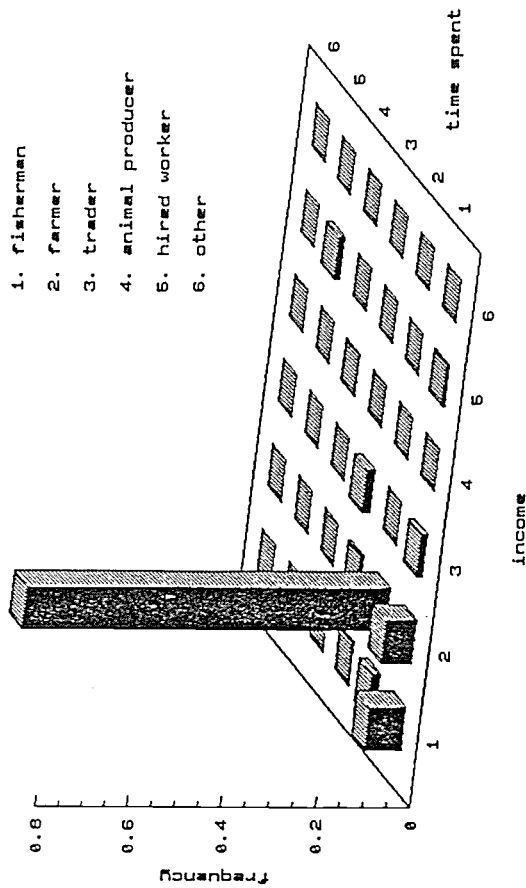


Figure 30: Secondary occupations according to income and time spent

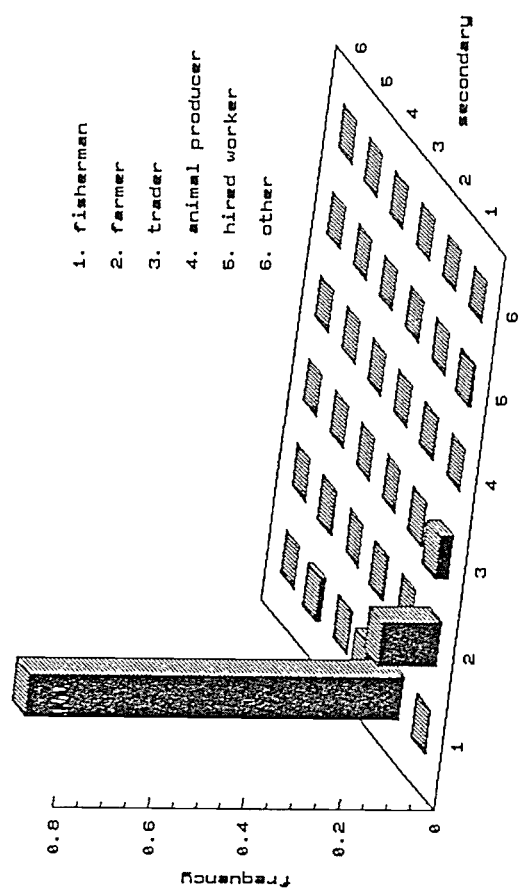


Figure 32: Principal and secondary occupations according to time spent

#### 4.2.1 History

Figure 33 shows that, over the years, there has been a gradual change in major employment in the region from farming to fishing. Approximately 50% of the fishermen's fathers and grandfathers farmed as their main occupation. For more than 10% of the respondents whose fathers had been fisherman their grandfathers had been farmers. Slightly less than 30% of the fishermen came from families where both their father and grandfathers' main occupation was fishing.

In respect of the fisherman's fathers' occupation, the fisherman's former profession shows a similar pattern i.e. most of the respondents whose fathers were fishermen tended to come straight into the profession, whereas those whose fathers were farmers tended to be farmers before they entered fishing as a professional occupation.

#### 4.2.2 Seasonality

Firstly, according to income, 14% of the principal occupations and 84% of the secondary occupations are considered seasonal. Secondly, according to time spent in the occupation, 18% of the principal occupations and 79% of the secondary occupations are considered seasonal.

Figure 35 shows the seasonality of these occupations. Unexpectedly it appears that, in terms of period of operation, the secondary occupation is not supplementary to the principal occupation. This is explained by the fact that both fishing and farming are dependant on natural factors both having a low season between May and September.

Figure 33: Father's and grandfathers' main profession

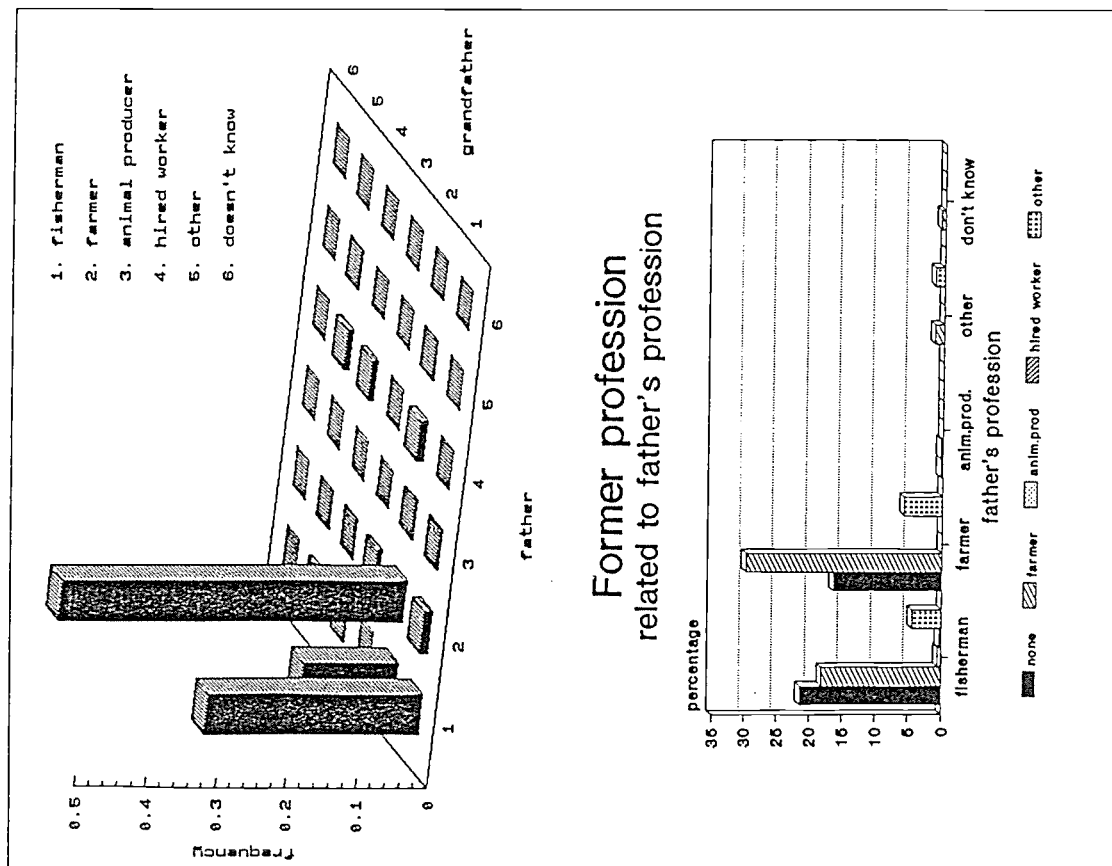


Figure 34

### Former profession related to father's profession

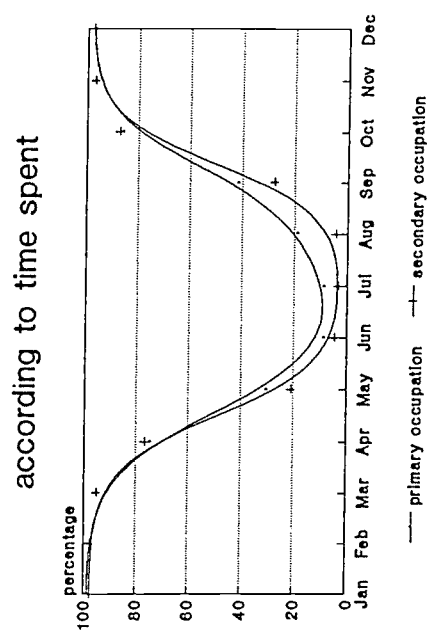
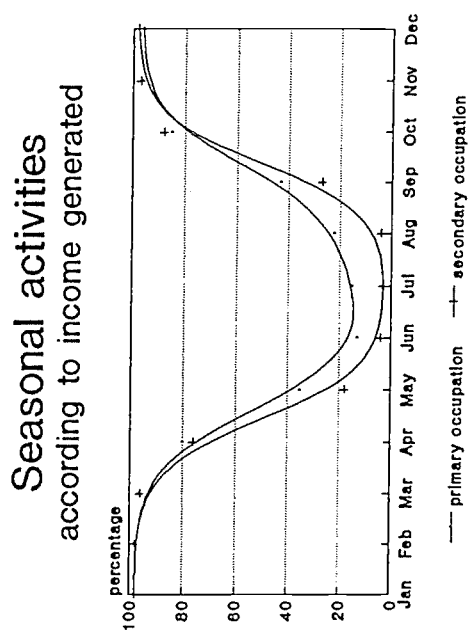
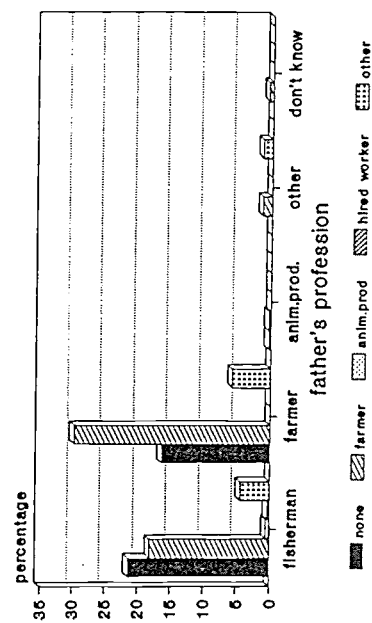


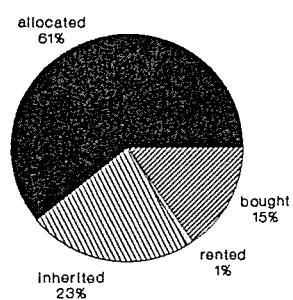
Figure 35

#### 4.2.3 Farming

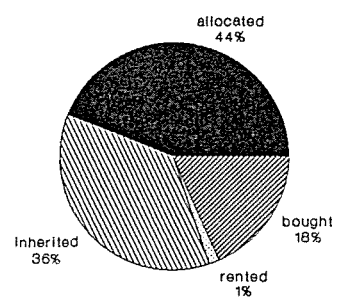
As previously mentioned (see 4.2) the most common combination of occupations is fishing and farming together and this combination has been found to the same extent throughout the region.

Table 7 showed that 94% of the population is engaged in farming. On average the farmer owns 4 fields totalling on average 5 acres. The way of obtaining land differs in each stratum (see Figure 36) with, on average, 61% of the fields allocated by the village chairman; 25% inherited; 15% bought and 1% rented. In the first stratum however, 44% are allocated by the village chairman, 36% are inherited, 18% are bought and 1% are rented. In the second stratum 80% of the fields are allocated, 12% are bought, 8% are inherited and less than 0.5% rented. The third stratum generally follows the average pattern with 56% allocated by the village chairman, 35% inherited and only 8% bought.

total

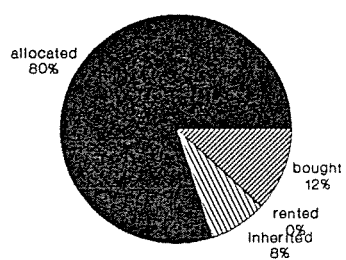


stratum 1



## Field allocation per stratum

stratum 2



stratum 3

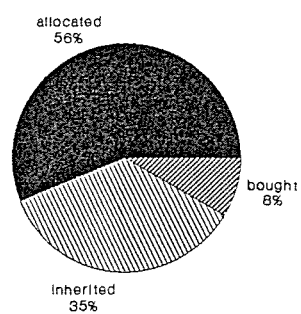
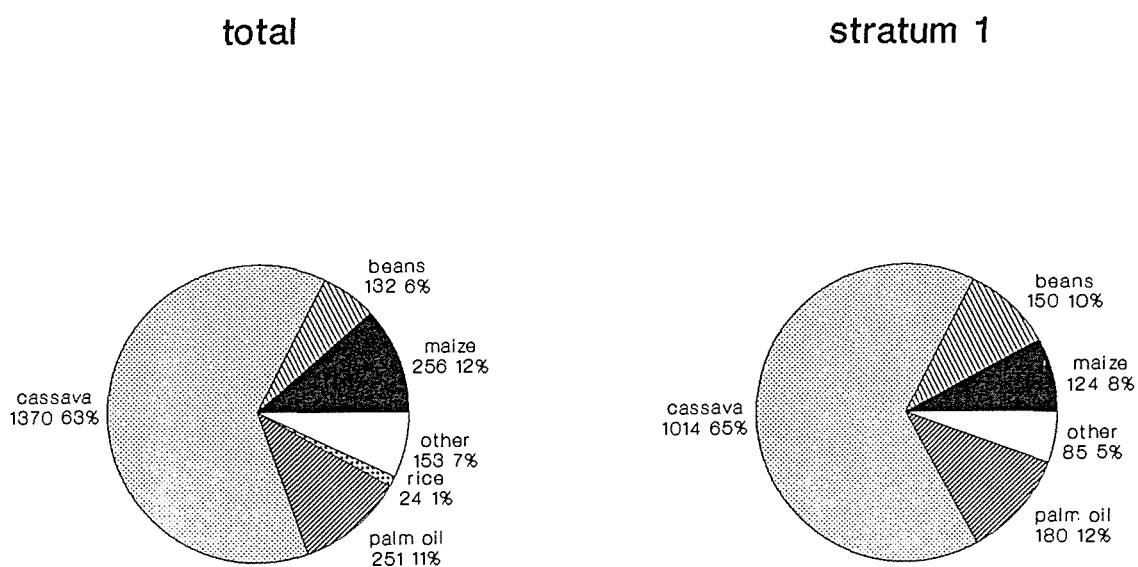


Figure 36

Cassava is the staple food of the region representing 63% of the total regional crop with each farmer producing, on average, 1370 kg/year. Palm oil accounts for 11% of the annual production, maize for 12%, beans for 6% and rice for 1%. Other crops (for example bananas) account for 7% or 153 kg per producer.

Although the composition of crop production and average acreage does not differ throughout the region the amount each farmer produces does vary according to strata increasing towards the south; production in stratum 3 exceeds stratum 1 by more than 130% and stratum 2 by more than 35%.

Since no differences have been identified in occupational structure between the strata, possible explanations for this phenomenon is differences in geography.



## Average annual crop production

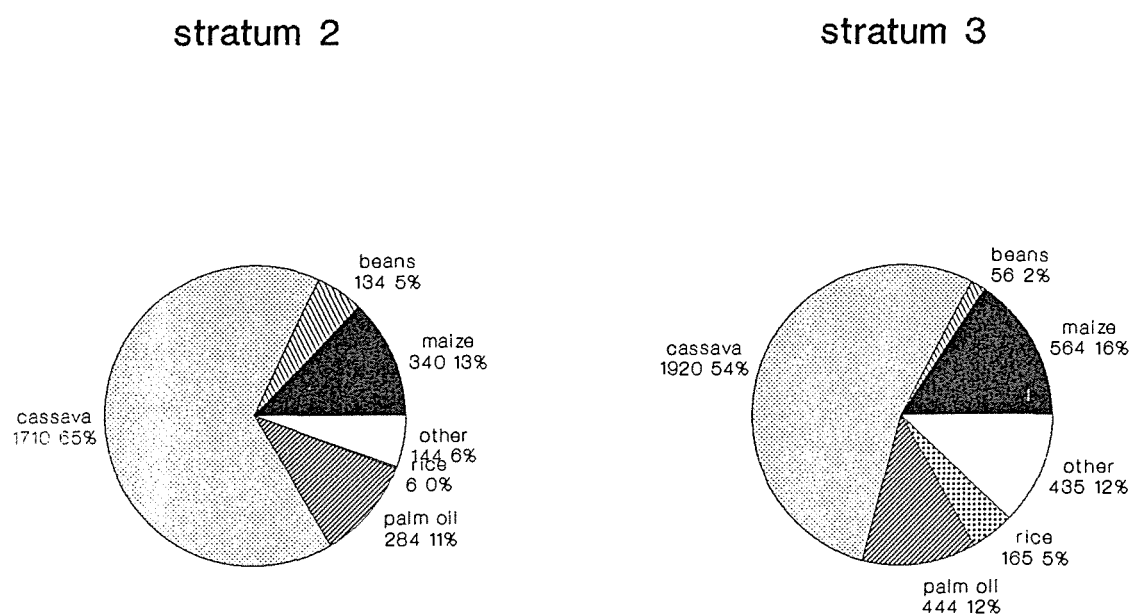


Figure 37

### 4.3 Fishermen's preferences

#### 4.3.1 Attitudes towards fishing

It would seem that even if other employment opportunities appeared, the majority (i.e. 78%) of the fishermen would stay in fishing. Two major reasons given for this attitude are either the fisherman has no skills other than fishing or fishing has proved itself to be profitable. For various reasons however 21% of the fishermen would change in favour of another profession. Reasons given include: they feel that they have already stayed too long in fishing and, fishing is giving them too many problems.

It is interesting to note the attitudes towards fishing related to the education of the respondents (Figure 38). The majority (i.e. 81%) of fishermen without an education are the most likely to stay in fishing, fishermen with a basic primary education are more eager to leave and unexpectedly, fishermen with a more advanced education appear to be more committed to fishing.

Fishermen in the first stratum seem to be the less committed to fishing: 25% leaving fishing if other possibilities arose. Only 13% would leave in the 2nd stratum and 19% in the third.

In relation to attitudes concerning the future of their sons': 53% of the fishermen wanted their sons to become fishermen; 17% preferred that their sons' choose another profession; and 30% had no opinion on the issue. Correlating these attitudes to their own employment preferences, the majority of fishermen that preferred to stay in fishing either wanted their sons' to go into fishing or, they had no opinion on the matter. It is surprising to note that a relatively large number of those fishermen who would prefer to leave fishing would actually like their sons' to go into fishing (Figure 39). This could confirm the impression that these respondents would leave more because of personal than economic reasons.

Figure 38

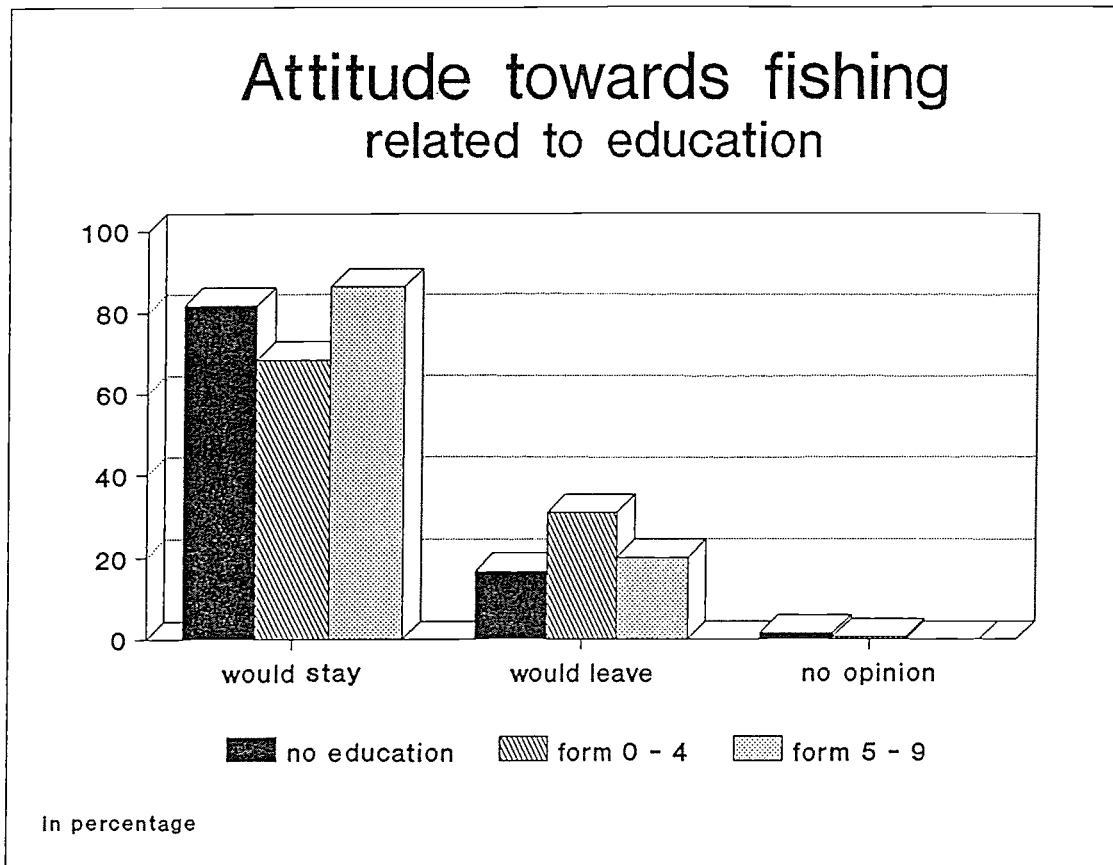
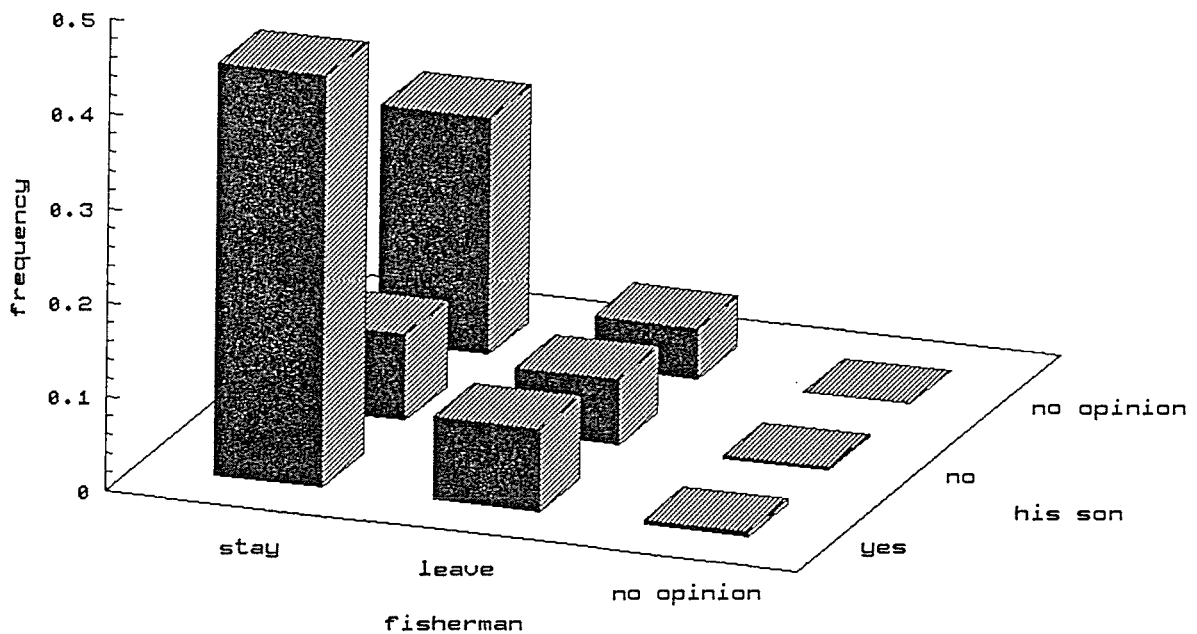


Figure 39: Attitude towards fishing related to preferences regarding sons' profession



#### 4.3.2 Investment preferences

When asked for their investment priorities (in the instance of applying for a loan), 81% of the fishermen thought they would first invest in fishing, 12% would first invest in farming, while 6% would first invest in other activities (e.g. building a house or buying a grinding mill). For their second investment priority, the majority (i.e.) 65% would invest in farming, 13% in fishing and 10% in other activities. It would seem that animal husbandry was very low down of the fishermen's list of priorities (Figure 40).

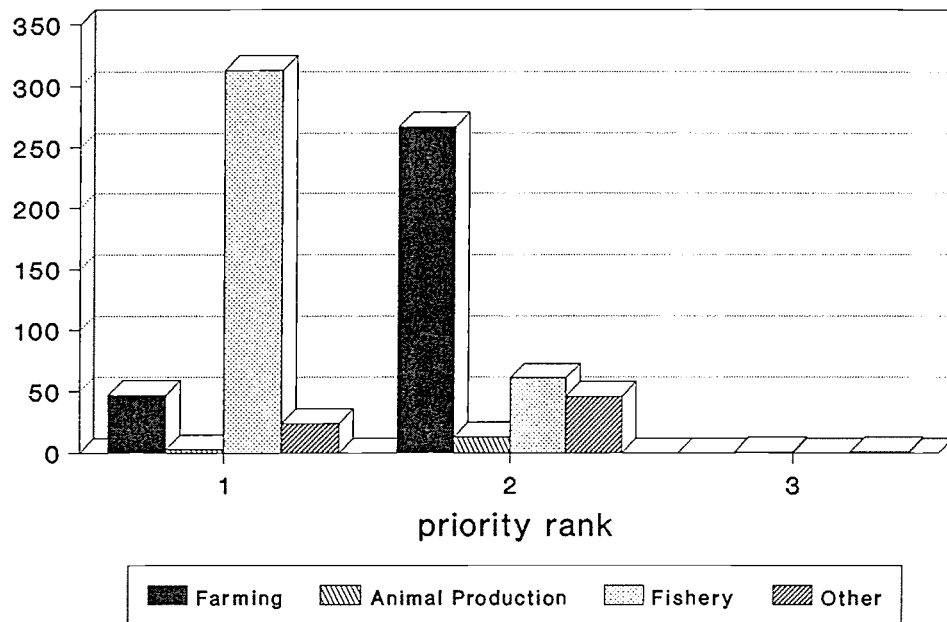
#### 4.3.3 Expenditure preferences

When asked what they would spend on more if they had more money (from greater fishing revenues) 61% of the respondents said that they would use it to buy new boats and/or gear; 23% would use it for their children's education (indicating that their children education was their first priority); 7% would use it for farming; and 8% had other preferences (e.g. building a house).

As a second priority, 41% of the fishermen would then spend money on farming and 25% on fishing. Therefore a total of 86% of fishermen have buying new gear and/or boats for fishing as either their first or second priority. Their children education also seems to be important to fishermen.

Low on their priority scale were investments in animal husbandry, buying consumer goods or marry either a first or another wife. The latter seems to be biased by the respondents' anticipation to answer expectations as fishermen in the region are known to marry other wives as soon as money is available (Figure 41).

## Investment preferences



## Expenditure preferences

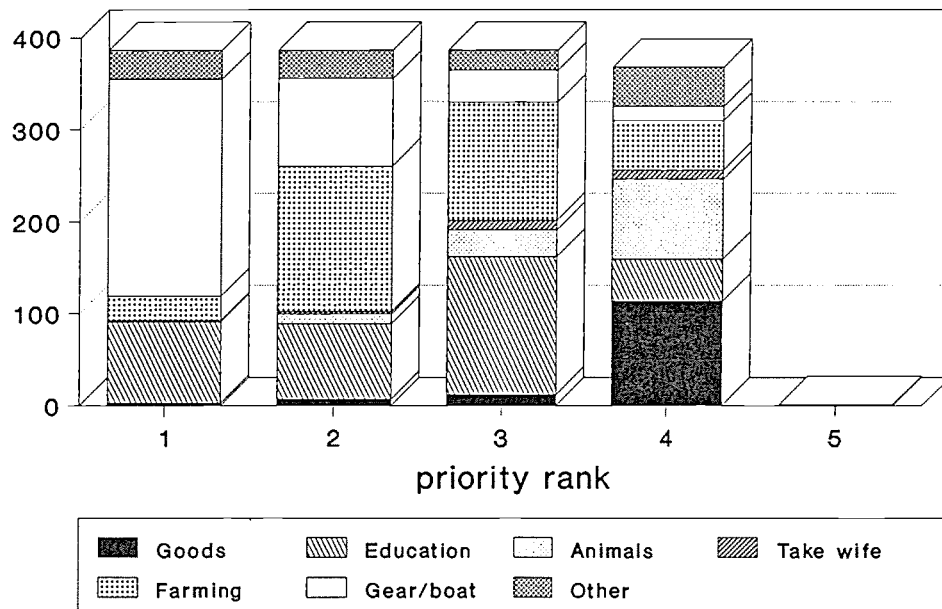


Figure 41

#### 4.4 Problems identified within the fishery

The isolated situation of Kigoma region is reflected in the first ranking of problems identified by the fishermen: 73% of the respondents main problems were related to lack of supplies: 43% to fuel supplies; 16% to availability of gear; and 14% to the price of gear.

These problems, along with lack of investment money, also presented themselves in the second and third ranking of problems (Figure 42).

Only at the bottom ranking of problems identified did different problems like low and irregular catches, the price of fish, or the number of people to feed at home appear to be important. Not one respondent mentioned problems with crew. Also fisheries administration did not appear to obstruct fishing activities.

## Main problems identified

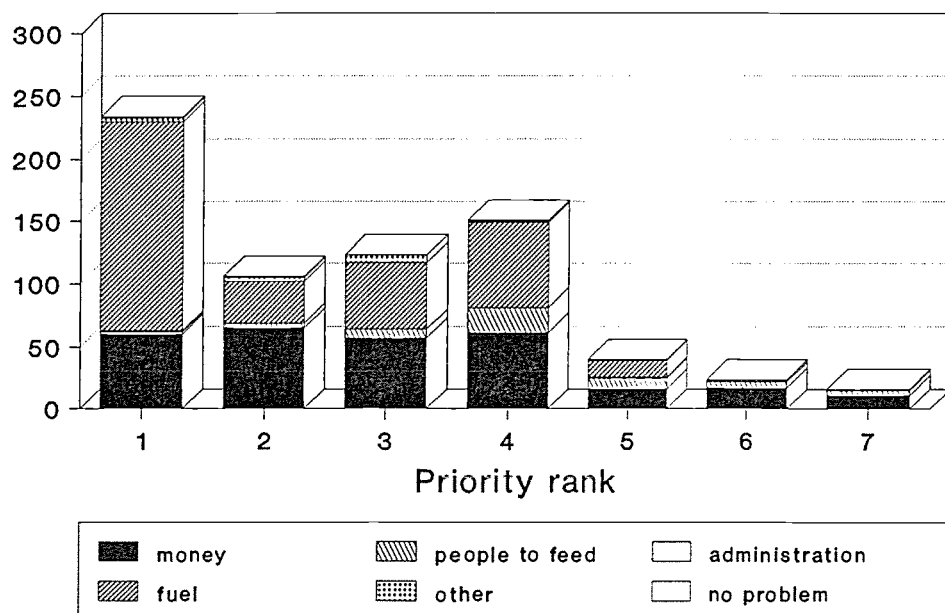
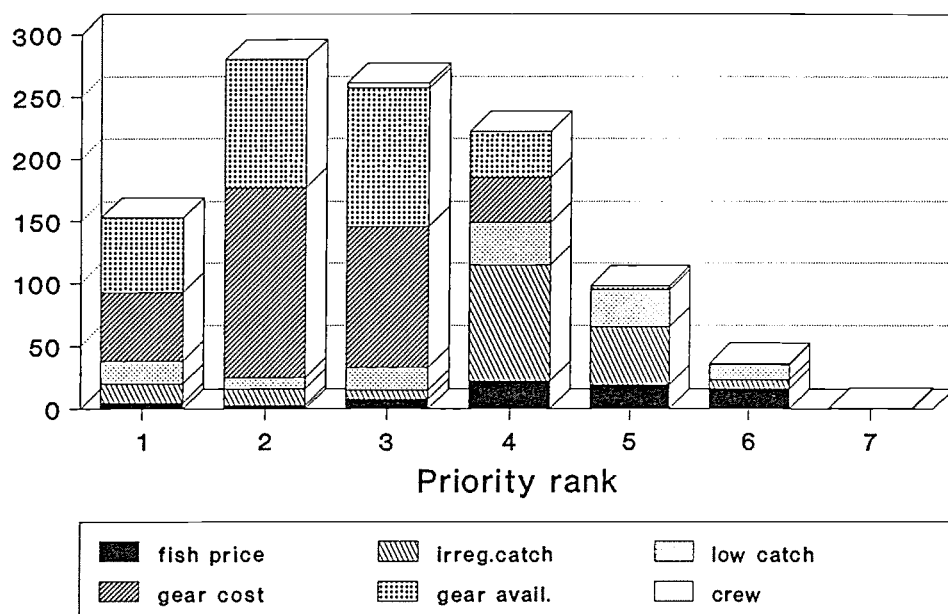


Figure 42

## 5. RECOMMENDATIONS

The characteristics of the fishery in Kigoma region indicates that it is a small scale artisanal fishery. To assess the evolution of the fishery it is recommended that this survey be repeated in three-year cycles.

In order to assess the relative performance and socio-economic structure of the fishery it is recommended that similar surveys be conducted in other main fishing regions in Tanzania as well as in other countries in the region. For this purpose, similar surveys are being conducted in Burundi and Zaire, which will provide comparative information for the northern part of Lake Tanganyika. However more surveys are needed to determine the status of the fishery in a broader regional context.

The data presented in this report represents the main socio-economic characteristics of the region which can be used as a basis for more specific investigations on, for example, marketing, costs and earning and sociological profiles.

The main problems identified, especially in terms of fuel and gear supply, are related to the isolated nature of the region. This underlines the need for the kind of assistance which is provided by the FAO fisheries project in Kigoma. It is recommended that use be made of the data for project identification and monitoring purposes in order to concentrate on these problems. A repetition of the survey in due course will indicate the impact of the efforts made to improve the situation for the Kigoma fishermen.

Decision makers are recommended to use this report as a tool for fisheries management purposes in view of the fisheries situation of the Kigoma region as described in this report.

## Appendix 1: The Questionnaire

|                        |                          |
|------------------------|--------------------------|
| Date : ____/____/ 1991 | Interviewer's name:..... |
|------------------------|--------------------------|

### A. Landing Place

- |                                           |                |       |
|-------------------------------------------|----------------|-------|
| 1. Stratum n°: ____/                      | A <sub>1</sub> | _____ |
| 2. Name of the village: ..... Code: ____/ | A <sub>2</sub> | _____ |
| 3. Fishing units code: ____/              | A <sub>3</sub> | _____ |

### B. Fisherman's identification

1. Is he full-time fisherman? (>10 days/month) \_\_\_\_\_/1  
part-time " (5< <10 days/month) \_\_\_\_\_/2  
occasional " (<5 days/month) \_\_\_\_\_/3  
not fisherman? \_\_\_\_\_/4
2. Tribe: .....
3. Religion: .....
4. Place of birth: .....
5. He is living in this village since \_\_\_\_/ years  
Where was he living before:.....
6. Did he have another profession before?  
yes \_\_\_\_/1 No \_\_\_\_/2  
|  
| Farmer \_\_\_\_\_/1  
| Animal producer \_\_\_\_\_/2  
| Hired worker \_\_\_\_\_/3  
| Other (specify) \_\_\_\_\_/4.....
7. How many years ago did he start fishing? \_\_\_\_/ years
8. Which was his father's main profession?  
Fisherman \_\_\_\_\_/1  
Farmer \_\_\_\_\_/2  
Animal producer \_\_\_\_\_/3  
Hired worker \_\_\_\_\_/4  
Other (specify) \_\_\_\_\_/5.....  
Doesn't know \_\_\_\_\_/6

9. Which was his grandfather's main profession?

Fisherman \_\_\_\_\_/1  
 Farmer \_\_\_\_\_/2  
 Animal producer \_\_\_\_\_/3  
 Hired worker \_\_\_\_\_/4  
 Other (specify) \_\_\_\_\_/5 .....  
 Doesn't know \_\_\_\_\_/6

B<sub>9</sub> | \_\_\_\_\_ |

C. Fishing boat information

| 1. Type | Length | Age<br>(years) | Replacement<br>costs | Cost of<br>maintenance |
|---------|--------|----------------|----------------------|------------------------|
|---------|--------|----------------|----------------------|------------------------|

|      |      |      |      |         |
|------|------|------|------|---------|
| ____ | ____ | ____ | ____ | ____ /y |
| ____ | ____ | ____ | ____ | ____ /y |
| ____ | ____ | ____ | ____ | ____ /y |
| ____ | ____ | ____ | ____ | ____ /y |
| ____ | ____ | ____ | ____ | ____ /y |

C<sub>1A1</sub>, C<sub>1A2</sub>, C<sub>1A3</sub>, C<sub>1A4</sub>,  
 C<sub>1A5</sub>  
 C<sub>1B1</sub>, C<sub>1B2</sub>, C<sub>1B3</sub>, C<sub>1B4</sub>,  
 C<sub>1B5</sub>  
 C<sub>1C1</sub>, C<sub>1C2</sub>, C<sub>1C3</sub>, C<sub>1C4</sub>,  
 C<sub>1C5</sub>  
 C<sub>1D1</sub>, C<sub>1D2</sub>, C<sub>1D3</sub>, C<sub>1D4</sub>,  
 C<sub>1D5</sub>  
 C<sub>1E1</sub>, C<sub>1E2</sub>, C<sub>1E3</sub>, C<sub>1E4</sub>,  
 C<sub>1E5</sub>

Note: CA = Catamaran  
 TM = Trimaran  
 PS = Purse Seiner

DC = Dugout Canoe  
 PC = Planked Canoe

2. Does he hire the boat out sometimes?

Yes \_\_\_\_/1 No \_\_\_\_/2

\_\_\_\_\_ payment received in cash: ...../day

or in fish: ...../day

C<sub>2A</sub> | \_\_\_\_\_ |

C<sub>2B</sub> | \_\_\_\_\_ |

C<sub>2B</sub> | \_\_\_\_\_ |

3. Does he own an outboard engine?

Yes \_\_\_\_/1 No \_\_\_\_/2

\_\_\_\_\_ does he rent one? Yes \_\_\_\_/1 No \_\_\_\_/2

at which cost/day? .....

\_\_\_\_\_ does he use it regularly? Yes \_\_\_\_/1 No \_\_\_\_/2

Why? \_\_\_\_\_

.....

C<sub>3A</sub> | \_\_\_\_\_ |

C<sub>3B</sub> | \_\_\_\_\_ |

C<sub>3C</sub> | \_\_\_\_\_ |

C<sub>3D</sub> | \_\_\_\_\_ |

|

4. Give the following information about the engine(s):

| Brand | Horse Power | Age (years ) | Replacement costs | Cost of maintenance |
|-------|-------------|--------------|-------------------|---------------------|
|       |             |              |                   | /Y                  |
|       |             |              |                   | /Y                  |
|       |             |              |                   | /Y                  |

C<sub>4A1</sub>, C<sub>4A2</sub>, C<sub>4A3</sub>, C<sub>1A4</sub>,  
C<sub>4A5</sub>,  
C<sub>4B1</sub>, C<sub>4B2</sub>, C<sub>4B3</sub>, C<sub>1B4</sub>,  
C<sub>4B5</sub>,  
C<sub>4C1</sub>, C<sub>4C2</sub>, C<sub>4C3</sub>, C<sub>1C4</sub>,  
C<sub>4C5</sub>

5. Who is maintaining the engine(s)?

himself \_\_\_\_\_/1  
relatives \_\_\_\_\_/2  
dealer \_\_\_\_\_/3  
others \_\_\_\_\_/4

C<sub>5</sub> | |

#### D. Fishing gears information

| 1. Type | Length (m) | Depth (m) | Replacement costs | Age (years) | Period of use |
|---------|------------|-----------|-------------------|-------------|---------------|
|         |            |           |                   |             | jfmamjjasond  |
|         |            |           |                   |             | jfmamjjasond  |
|         |            |           |                   |             | jfmamjjasond  |
|         |            |           |                   |             | jfmamjjasond  |
|         |            |           |                   |             | jfmamjjasond  |
|         |            |           |                   |             | jfmamjjasond  |
|         |            |           |                   |             | jfmamjjasond  |

D<sub>1A1</sub>, D<sub>1A2</sub>, D<sub>1A3</sub>, D<sub>1A4</sub>,  
D<sub>1A5</sub>, D<sub>1A6</sub>,  
D<sub>1B1</sub>, D<sub>1B2</sub>, D<sub>1B3</sub>, D<sub>1B4</sub>,  
D<sub>1B5</sub>, D<sub>1B6</sub>,  
D<sub>1C1</sub>, D<sub>1C2</sub>, D<sub>1C3</sub>, D<sub>1C4</sub>,  
D<sub>1C5</sub>, D<sub>1C6</sub>,  
D<sub>1D1</sub>, D<sub>1D2</sub>, D<sub>1D3</sub>, D<sub>1D4</sub>,  
D<sub>1D5</sub>, D<sub>1D6</sub>,  
D<sub>1E1</sub>, D<sub>1E2</sub>, D<sub>1E3</sub>, D<sub>1E4</sub>,  
D<sub>1E5</sub>, D<sub>1E6</sub>,  
D<sub>1F1</sub>, D<sub>1F2</sub>, D<sub>1F3</sub>, D<sub>1F4</sub>,  
D<sub>1F5</sub>, D<sub>1F6</sub>,  
D<sub>1G1</sub>, D<sub>1G2</sub>, D<sub>1G3</sub>, D<sub>1G4</sub>,  
D<sub>1G5</sub>, D<sub>1G6</sub>

Note: GN: gillnet BL: bottom long-line  
BS: beach seine PL: pelagic long-line  
PS: purse seine BH: bottom hand-line  
SN: scoopnet SH: surface hand-line  
LN: liftnet TL: trolling line

2. How did he buy: boat(A) engine(B) gear(C)

|                   |        |        |        |                        |
|-------------------|--------|--------|--------|------------------------|
| - cash:           | ____/1 | ____/1 | ____/1 |                        |
| - on credit from: |        |        |        |                        |
| relatives         | ____/2 | ____/2 | ____/2 |                        |
| bank              | ____/3 | ____/3 | ____/3 |                        |
| project           | ____/4 | ____/4 | ____/4 | D <sub>2A</sub>   ____ |
| fish-trader       | ____/5 | ____/5 | ____/5 | D <sub>2B</sub>   ____ |
| other (specify)   | ____/6 | ____/6 | ____/6 | D <sub>2C</sub>   ____ |
| .....             | .....  | .....  | .....  |                        |

If he didn't buy, who is the owner?

|                 |         |           |         |                        |
|-----------------|---------|-----------|---------|------------------------|
|                 | boat(A) | engine(B) | gear(C) |                        |
| father          | ____/1  | ____/1    | ____/1  | D <sub>2D</sub>   ____ |
| other relatives | ____/2  | ____/2    | ____/2  |                        |
| middleman       | ____/3  | ____/3    | ____/3  | D <sub>2E</sub>   ____ |
| cooperative     | ____/4  | ____/4    | ____/4  |                        |
| other (specify) | ____/5  | ____/5    | ____/5  | D <sub>2F</sub>   ____ |
| .....           | .....   | .....     | .....   |                        |

#### E. Sharing system

1. For each kind of fishing gear used, indicate:

| Type | Crew size | Wage/crew member<br>/day or /month | Crew share*<br>(% of catch) | Share for net/<br>boat/lamps * |                                                                           |
|------|-----------|------------------------------------|-----------------------------|--------------------------------|---------------------------------------------------------------------------|
| GN   | .....     | .....                              | .....                       | .....                          | E <sub>1A1</sub> , E <sub>1A2</sub> , E <sub>1A3</sub> , E <sub>1A4</sub> |
| BS   | .....     | .....                              | .....                       | .....                          | E <sub>1B1</sub> , E <sub>1B2</sub> , E <sub>1B3</sub> , E <sub>1B4</sub> |
| PS   | .....     | .....                              | .....                       | .....                          | E <sub>1C1</sub> , E <sub>1C2</sub> , E <sub>1C3</sub> , E <sub>1C4</sub> |
| SN   | .....     | .....                              | .....                       | .....                          | E <sub>1D1</sub> , E <sub>1D2</sub> , E <sub>1D3</sub> , E <sub>1D4</sub> |
| LN   | .....     | .....                              | .....                       | .....                          | E <sub>1E1</sub> , E <sub>1E2</sub> , E <sub>1E3</sub> , E <sub>1E4</sub> |
| BL   | .....     | .....                              | .....                       | .....                          | E <sub>1F1</sub> , E <sub>1F2</sub> , E <sub>1F3</sub> , E <sub>1F4</sub> |
| PL   | .....     | .....                              | .....                       | .....                          | E <sub>1G1</sub> , E <sub>1G2</sub> , E <sub>1G3</sub> , E <sub>1G4</sub> |
| BH   | .....     | .....                              | .....                       | .....                          | E <sub>1H1</sub> , E <sub>1H2</sub> , E <sub>1H3</sub> , E <sub>1H4</sub> |
| SH   | .....     | .....                              | .....                       | .....                          | E <sub>1I1</sub> , E <sub>1I2</sub> , E <sub>1I3</sub> , E <sub>1I4</sub> |
| TL   | .....     | .....                              | .....                       | .....                          | E <sub>1J1</sub> , E <sub>1J2</sub> , E <sub>1J3</sub> , E <sub>1J4</sub> |

\* after deduction of operational costs

2. Does the crew bring its own fishing gears?  
Yes, always \_\_\_\_/1 Yes, sometimes \_\_\_\_/2 No \_\_\_\_/3 E<sub>2A</sub> | \_\_\_\_ |  
|\_\_\_\_\_|  
|\_\_\_\_\_| which kind of gear? \_\_\_\_/ E<sub>2B</sub> | \_\_\_\_ |  
|\_\_\_\_\_| how does he share the catch, in this case?  
|\_\_\_\_\_| .....  
|\_\_\_\_\_| ..... E<sub>2C</sub> | \_\_\_\_ |
3. Do the crew members change from this boat(s) to another? |  
Yes, from day to day \_\_\_\_/1  
Yes, from week to week \_\_\_\_/2  
Yes, from season to season \_\_\_\_/3  
No \_\_\_\_/4 E<sub>3</sub> | \_\_\_\_ |
4. Does he go fishing in another village during some period  
of the year? Yes \_\_\_\_/1 No \_\_\_\_/2 E<sub>4A</sub> | \_\_\_\_ |  
|\_\_\_\_\_| during which period? ..... E<sub>4B</sub> | \_\_\_\_ |  
|\_\_\_\_\_| with which fishing gear? ..... E<sub>4C</sub> | \_\_\_\_ |  
|\_\_\_\_\_| where? ..... E<sub>4D</sub> | \_\_\_\_ |  
|\_\_\_\_\_| why? ..... E<sub>4E</sub> | \_\_\_\_ |
5. Does he has to pay to the village government to fish?  
in this village Yes \_\_\_\_/1 No \_\_\_\_/2 E<sub>5A</sub> | \_\_\_\_ |  
if he fishes from another village Yes \_\_\_\_/1 No \_\_\_\_/2 E<sub>5B</sub> | \_\_\_\_ |  
if yes, how much? in cash: ...../day E<sub>5C</sub> | \_\_\_\_ |  
fish: ...../day | E<sub>5D</sub> | \_\_\_\_ |
6. Does he have exclusive rights to fish from a certain  
beach or to set his nets in a certain area?  
Yes \_\_\_\_/1 No \_\_\_\_/2 E<sub>6</sub> | \_\_\_\_ |

F. Destination of the catch

1. To whom does he sell the catch?  
- processors \_\_\_\_/1  
- private trader on the beach \_\_\_\_/2  
- consumer on the beach \_\_\_\_/3  
- fish market \_\_\_\_/4  
- a family member who will sell \_\_\_\_/5  
- he barterers \_\_\_\_/6  
- other (specify)..... \_\_\_\_/7 F<sub>1</sub> | \_\_\_\_ |
2. How much fish does he keep weekly for home consumption?  
..... kg/week F<sub>2</sub> | \_\_\_\_ |

3. Does he process fish? Yes \_\_\_/1 No \_\_\_/2  
or his wife(ves)? Yes \_\_\_/1 No \_\_\_/2  
If yes, permanent \_\_\_/1 seasonal \_\_\_/2 occasional \_\_\_/3  
F<sub>3A</sub> | \_\_\_ |  
F<sub>3B</sub> | \_\_\_ |
4. What is his relationship with fish-traders?  
- only to sell fish \_\_\_/1  
- they loan money \_\_\_/2  
- they provide fishing boat \_\_\_/3  
- they provide fishing gears \_\_\_/4  
F<sub>4</sub> | \_\_\_ |
5. Does he sell generally to the same fish-trader?  
Yes \_\_\_/1 No \_\_\_/2  
F<sub>5A</sub> | \_\_\_ |  
Why? ..... F<sub>5B</sub>

G. Principal and secondary occupation

1. According to income generated, which is his principal occupation during the year?  
fisherman: \_\_\_/1 farmer: \_\_\_/2 trader: \_\_\_/3  
animal producer: \_\_\_/4 hired worker: \_\_\_/5  
other: ..... \_\_\_/6  
G<sub>1</sub> | \_\_\_ |
2. According to income generated, which is his secondary occupation during the year?  
fisherman: \_\_\_/1 farmer: \_\_\_/2 trader: \_\_\_/3  
animal producer: \_\_\_/4 hired worker: \_\_\_/5  
other: ..... \_\_\_/6  
G<sub>2</sub> | \_\_\_ |
3. Are these occupations: permanent seasonal casual?  
principal: \_\_\_/1 \_\_\_/2 \_\_\_/3  
secondary: \_\_\_/1 \_\_\_/2 \_\_\_/3  
G<sub>3A</sub> | \_\_\_ |  
G<sub>3B</sub> | \_\_\_ |
4. If the occupation is seasonal indicate during which month  
principal: /\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/  
J F M A M J J A S O N D  
G<sub>4A</sub>  
secondary: /\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_/  
J F M A M J J A S O N D  
G<sub>4B</sub>
5. According to time spent, which is his principal occupation during the year?  
fisherman: \_\_\_/1 farmer: \_\_\_/2 trader: \_\_\_/3  
animal producer: \_\_\_/4 hired worker: \_\_\_/4  
other: ..... \_\_\_/5  
G<sub>5</sub> | \_\_\_ |

6. According to time spent, which is his secondary occupation during the year?

fisherman: \_\_\_\_/1      farmer: \_\_\_\_/2      trader: \_\_\_\_/3  
animal producer: \_\_\_\_/4      hired worker: \_\_\_\_/5  
other: ..... \_\_\_\_/6

$$G_6 \quad | \quad |$$

7. Are these occupations: permanent seasonal casual  
principal: \_\_\_\_\_/1 \_\_\_\_\_/2 \_\_\_\_\_/3

G<sub>7A</sub> | |

secondary:           \_\_\_/1           \_\_\_/2           \_\_\_/3

G<sub>7B</sub> | |

8. If the occupation is seasonal indicate during which month

principal: /\_/ /\_/ /\_/ /\_/ /\_/ /\_/ /\_/ /\_/ /\_/ /\_/ /\_/ /\_/

G<sub>8A</sub>

secondary: /\_/\_/\_/\_/\_/\_/\_/\_/\_/\_/\_/\_/  
J F M A M J J A S O N D

G<sub>8B</sub>

## H. Information on fisherman's family

1. Give following information about fisherman:

Age:                    /        years

$$H_{1A} \quad | \quad |$$

Married /1 single /2 widower /3 separated \_\_/4

H<sub>18</sub> | |

If married, how many wives:    /

$$\text{H}_1\text{C} \begin{array}{c} | \\ \text{---} \\ | \end{array}$$

Education: none \_\_\_\_/1 form 0-4 \_\_\_\_/2 form 5-9 \_\_\_\_/3  
higher (specify) ..... /4

$$H_{10} \quad | \quad |$$

2. How many dependent children does he have? \_\_\_\_/

$$H_{2A1} \quad | \quad \underline{\hspace{1cm}}$$

How many are working in fishery? male: \_\_\_/ female: \_\_\_/

$$H_{2D1} \quad | \quad \underline{\hspace{1cm}} \quad | \quad H_{2D2} \quad | \quad \underline{\hspace{1cm}} \quad |$$

## I. Farming and breeding activities

1. How many fields does he and/or his wife(ves) hold? \_\_\_\_\_/

$$I_{1A} \quad | \quad |$$

Total surface of the fields: ..... acres

$$I_{1B} \quad | \quad \underline{\quad} \quad |$$

How did he acquire these fields:

allocated by village headman: \_\_\_\_/1    inherited \_\_\_\_/2  
rented: \_\_\_\_/3    bought: \_\_\_\_/4    other (specify): \_\_\_\_/5

I<sub>1C</sub> | |

2. Indicate his three main cultures: ..... 1 I<sub>2A</sub> | \_\_\_\_\_ |  
..... 2 I<sub>2B</sub> | \_\_\_\_\_ |  
..... 3 I<sub>2C</sub> | \_\_\_\_\_ |
3. Production culture 1 kg/year: ..... I<sub>3A</sub> | \_\_\_\_\_ |  
Production culture 2 kg/year: ..... I<sub>3B</sub> | \_\_\_\_\_ |  
Production culture 3 kg/year: ..... I<sub>3C</sub> | \_\_\_\_\_ |
4. Which kind of animal does he and/or his wife keep?
- |                          | Number |                         |
|--------------------------|--------|-------------------------|
| a) Beef                  | ____/  | I <sub>4A</sub>   _____ |
| b) Goat                  | ____/  | I <sub>4B</sub>   _____ |
| c) Lamb                  | ____/  | I <sub>4C</sub>   _____ |
| d) Pig                   | ____/  | I <sub>4D</sub>   _____ |
| e) Poultry               | ____/  | I <sub>4E</sub>   _____ |
| f) Other (specify) _____ | ____/  | I <sub>4F</sub>   _____ |

J. Attitude regarding fishery

1. If he had other employment possibilities:  
a) would he stay in fisheries \_\_\_\_/1  
b) would he change profession \_\_\_\_/2  
c) he doesn't know \_\_\_\_/3  
J<sub>1A</sub> | \_\_\_\_\_ |
- Explain why? .....  
..... J<sub>1B</sub>
2. Would he like his sons to be fishermen?  
Yes \_\_\_\_/1 No \_\_\_\_/2 No opinion \_\_\_\_/3  
J<sub>2</sub> | \_\_\_\_\_ |
3. If he earned much money from fishing, he would use it to:  
(rank in order of priority, min.4)
- |                                  |       |                         |
|----------------------------------|-------|-------------------------|
| a) buy consumer goods            | ____/ | J <sub>3A</sub>   _____ |
| b) better education for children | ____/ | J <sub>3B</sub>   _____ |
| c) buy animals                   | ____/ | J <sub>3C</sub>   _____ |
| d) take an other wife            | ____/ | J <sub>3D</sub>   _____ |
| e) invest in farming             | ____/ | J <sub>3E</sub>   _____ |
| f) buy new gears/boat            | ____/ | J <sub>3F</sub>   _____ |
| g) other (specify) _____         | ____/ | J <sub>3G</sub>   _____ |

4. If he would apply for a loan, he would invest it in:  
(rank in order of priority, min.2)

- |                      |               |                 |       |
|----------------------|---------------|-----------------|-------|
| a) farming           | _____ /       | J <sub>4A</sub> | _____ |
| b) animal production | _____ /       | J <sub>4B</sub> | _____ |
| c) fishery           | _____ /       | J <sub>4C</sub> | _____ |
| d) other specify)    | _____ / ..... | J <sub>4D</sub> | _____ |

5. Which are his main problems regarding fishing activities:  
(rank in order of priority)

- |                                           |                 |       |
|-------------------------------------------|-----------------|-------|
| a) fish price too low                     | J <sub>5A</sub> | _____ |
| b) catches too irregular                  | J <sub>5B</sub> | _____ |
| c) catches too low                        | J <sub>5C</sub> | _____ |
| d) fishing gears too expensive            | J <sub>5D</sub> | _____ |
| e) poor availability of gears             | J <sub>5E</sub> | _____ |
| f) instability of the crew                | J <sub>5F</sub> | _____ |
| g) not enough money to invest             | J <sub>5G</sub> | _____ |
| h) too many people to feed at home        | J <sub>5H</sub> | _____ |
| i) problems with fisheries administration | J <sub>5I</sub> | _____ |
| j) problems with fuel                     | J <sub>5J</sub> | _____ |
| k) no problems                            | J <sub>5K</sub> | _____ |
| l) other (describe) .....                 |                 |       |
| .....                                     |                 |       |
| .....                                     |                 |       |
| .....                                     | J <sub>5L</sub> | _____ |

6. What would he need to improve his situation?

- |       |                |
|-------|----------------|
| ..... |                |
| ..... |                |
| ..... |                |
| ..... | J <sub>6</sub> |

## Appendix 2: Interviewers' Manual

## INSTRUCTION

In order to be able to process the data it is important that every question on the forms is answered and that the forms are completed according to the instructions below:

- A**
1. Strata I : north of Ujiji  
II : Kaseke - Kapalamsenga  
III: South of Kapalamsenga
  2. Village codes:  
01: Ujiji      04: Mtanga      07: Herembe      10: Buhinga  
02: Bugamba      05: Kirando      08: Sigunga      11: Sibwesa  
03: Zashe      06: Kaseke      09: Kalya      12: Nkonkwa
  3. Fishing units code = registration number
- B**
1. Mark
  2. Codes: 01: Mtipa      04: Mgoma      07: Mbwali  
02: Muha      05: Mrundi      08: Other  
03: Mbembe      06: Mtongwe  
but pls put the name of the tribe
  3. Religion codes: 01: Muslim      03: Protestant  
02: Catholic      04: Animist
  4. Name of the place
  5. Number of years
  6. Mark
  7. Number of years
  8. Mark
  9. Mark
- C**
1. Type: use codes in Note  
Length: length of the boat in meters  
Age: in years  
Replacement costs: what will it cost in shillings to replace the boat by another one of the same standard  
Cost of maintenance: what does it cost per year in shillings to keep the boat in good shape
  2. Mark  
Pls quantify payment in fish also in shillings
  3. Mark
  4. Brand: give the name  
Number of horsepower

Age: in years

Replacement costs: what will it cost in shillings to replace the engine(s) by another one of the same standard

Cost of maintenance: what does it cost per year in shillings to keep the engine(s) in good shape

5. Mark

- D
1. Type: use codes in Note  
Length and Depth in meters  
Replacement costs: what will it cost in shillings to replace the gear by another one of the same standard  
Age: in years  
Mark the months of the year in which this particular gear is in use
  2. Please mark for every single boat, gear and/or engine the mode of payment  
  
Please mark the relation between the interviewed fisherman and the owner of boat, gear and/or engine
- E
1. Pls note for every type of gear the average crew size, the salary per crew member (and note per day or per month) in shillings, the share of the total crew in % of the catch, and the share for net/boat/lamps in % of the catch (after deduction of the operational costs)
  2. Mark, use the codes in D1
  3. Mark
  4. Mark period of the year (f.e. nov-jan), the name of the other village, and the reason why
  5. Mark (pls quantify fish in shillings)
  6. Mark
- F
1. It is possible to mark more alternatives
  2. In kilograms
  3. Mark
  4. Here it is also possible to mark more alternatives (f.e. if the trader provides the boat as well as gear, pls mark 3 and 4)
  5. Pls mark and give the reason
- G
1. Pls mark the occupation that offers the main part of his income
  2. Pls mark the occupation that follows secondly in terms of income (leave blanc if no secondary occupation)
  3. Mark here for both 1 and 2 if these occupations are permanent (all the year round), seasonal (a certain period of the year), or only

casual

4. If you marked above for 1 or 2 or both "seasonal", you mark here the months of the year
  5. Pls mark the occupation on which he spends the major part of his working hours
  6. And mark here the one that follows secondly (leave blanc if no secondary occupation)
  7. Mark here for both 5 and 6 if these occupations are permanent (all the year round), seasonal (a certain period of the year), or only casual
  8. If you marked above for 5 or 6 or both "seasonal", you mark here the months of the year
- H
1. This is to get an average profile of the fisherman, so pls mark
  2. Idem
- I
1. - Total number of fields  
- Pls mark in acres  
- Pls mark for every field separately, the sum must correspond with the total number of fields
  2. Pls put the names of the crops, but note that the following codes are used:

|           |              |              |           |
|-----------|--------------|--------------|-----------|
| 01: Maize | 03: Cassava  | 05: Rice     | 07: Other |
| 02: Beans | 04: Palm oil | 06: Potatoes |           |
  3. Pls mark in kilograms; if answered in baskets, drums, bundles or whatever, pls quantify this in kg's
  4. Mark here the total number of each kind of animal
- J
1. Pls mark and give the reason
  2. Mark
  3. Rank in order of priority (1 = first priority, 2 = second, etc.) for at least four of the alternatives
  4. Idem, but only for two
  5. Idem, but only as far as the main problems go
  6. Open question

Finally, on the last page there is space to put any relevant remarks or observations.

### Appendix 3: The Data Processing Program

## THE DATA PROCESSING PROGRAM

In 1990, a computer program was developed by the project economist and a local consultant, expert in programming in dBASE III+. This exercise was co-financed by another FAO project (MLW/86/013). This program was designed to store and process the data of a socio-economic survey on Lake Malawi. It has since been adapted for the Kigoma region.

For the first time data of the pilot survey, conducted in November 1990, were used to try out the program. The field testing results and subsequent continuous communication with the researcher allowed the programmer to make necessary arrangements to facilitate the input of the collected data. With the eleven trial interviews the program was also tested on its processing capabilities. Some "bugs" appeared and were removed from the program. In this way, the program was ready to receive and process all data before data collection in the field.

The program will be used shortly with some minor modifications to process data from similar baseline surveys in Burundi, Zaire, Kenya, and possibly Zambia and Tanzania (Lake Victoria). It is the intention of the IFIP project to develop, with the experiences from these studies, a general questionnaire applicable to every survey area. The program will be modified to process the data from this general questionnaire in a way that allows researchers to enter specific situational characteristics such as boat and gear types. IFIP intends to present the results of this exercise in an English and a French version by the end of 1991.

### Characteristics of the program

The program, although powerful (290 Ko), has been designed to be operated by non-computer specialists and is therefore very user friendly. It is menu driven and the computer screens are self explanatory. The program also monitors the input: only pre-coded codes are accepted and numeric inputs are limited by the number of figures. Mistakes made in inputting are easily rectified. Besides the checking and control of data, the user is protected by warning messages, mentioning the reason why he/she has been warned and subsequent instruction if he/she wishes to continue with the action.

The program being accessible to non-computer specialists allows repetitions of the same exercise in a three-year cycles (as has been recommended, see 5) in order to assess the evolution of the fishery in the study area.

The program mainly provides averages and totals for the total sample or by subgroup, which are sufficient for an initial analysis. For a more in depth analysis of the results a basic knowledge of existing commercial programs (like Lotus 1-2-3, dBASE or Statgraphics) is required. While inputting the data, the program constructs dBASE files, which can easily be transferred to other compatible programs. It is important to know that due to the amount of data collected, four files are constructed in dBASE, so that transferring the data means transferring four .dbf files.

For example, to analyse the results of the Kigoma survey, use has been made of dBASE and Statgraphics. Since the program constructs four dBASE files,

in dBASE the file to be used should be opened ('use <filename>') after which the usual dBASE commands are applicable.

Transferring the data to Statgraphics is most simply done through the Statgraphics menu. In the main menu the user should chose "System Environment", whereafter the option "System Profile" is applicable. Then in "Import Path" the repertory and the file to be imported should be defined. Through "Data Management" in the main menu, in "Import Files" the root should be defined (dBASE) and the name of the file to be imported with the extension (<filename>.DBF). Finally, a filename should be given to the new Statgraphics file, it is recommended to use the same filename. With the F6 'Go'-command, the file is now imported and ready for use.

Statgraphics also offers the opportunity to import parts of a file (by columns or by rows), which enables the researcher to analyse the data for example stratumwise or villagewise. For this purpose, it is necessary to identify in dBASE how the .dbf files are organized.

As mentioned, the data can be transferred to any program that imports dBASE files.

## Menus

To enter the program and to avoid unauthorized use, one should give the appropriate password. After three failures, access will be denied (see presentation screen (1)).<sup>1</sup>

The main menu presents the five working areas of the program (besides the "End of the Job"-escape): codification; data entry; data processing and editing; reindex files; and backup and restore files (2).

### 1. Codification

The codification option allows the user to input and/or edit codes of tables (3). When the input option is chosen, the user is warned not to do this after data input (4). If the choice is confirmed, codes can be inputted by defining the starting and ending code. Here also the user is asked to confirm before saving (5).

The option edit codes brings the user to the tables management (6), where codes can be entered for the five codifiable variables. For example, if 03 is chosen, the user can enter the codes for the various ethnic groups (7), where he/she gives a number and describes the group.

### 2. Data entry

The option data entry in the main menu, brings the user to the input screens (8-11). These screens follow the outline of the questionnaire. If the interview forms are correctly coded, inputting data takes approximately ten minutes per interview.

---

<sup>1</sup> The numbers between brackets refer to the screens presented below.

### 3. Data processing and editing

This menu option (12) should be followed after having input all data to actually process them. When this option in the submenu is chosen, the program warns the user and gives instructions for after the processing (13). The time it takes to process the data depends to a large extent on the number of interviews and the capacity of the computer used. The 387 Kigoma interviews took 2.5 hours to be processed. In any case, processing time can easily be estimated, the program showing on the screen which form it presently processes.

Processed data can be retrieved through the edit menu (18). The output consist of four types of information:

- Fishing boats and boat-owners (20);
- Fishing gear (21);
- Crew/marketing (22);
- Socio-economic information (23).

After the needed type of information is chosen, the user can define the stratum, the village, the employment status, the ethnic group, and the religion of the respondents he/she wants the information on. If this is not defined, the program delivers the information for the whole sample (19).

The data of the input files is reorganized and grouped in the four sources of information, mentioned above. The results of the Kigoma survey for all strata, all villages, all boat-owners, all ethnic groups, and all religions are here presented (20-23).

### 4. Reindex files

Before and after data processing the dBASE files need to be reindexed, i.e. reorganized on the index code based on stratum, village, etc. This is done through the main menu option, but the program asks for confirmation (14).

### 5. Backup and restore files

The program automaticly backs up the inputted data on a floppy disk when this option is chosen (15) and after confirmation (16). The same counts for restoring data from the disk into the program (17). It is highly recommended to backup files every day during data input process.

```

      BASELINE SURVEY OF THE ARTISANAL FISHERIES
ON LAKE TANGANYIKA (KIGOMA REGION) - February 1991 -
=====
NETHERLANDS/FAO PROJECT                                UNDP/FAO PROJECT
GCP/URT/066/NET                                         RAF/87/099 (IFIP)

```

Date of the day is : 06/10/91

Give a password please :

(1)

```

      BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991)
=====
NETHERLANDS/FAO PROJECT                                UNDP/FAO PROJECT
GCP/URT/066/NET                                         RAF/87/099 (IFIP)

```

M A I N M E N U

```

End of the job
Codification
Data Entry
Data Processing and Editing
Reindex files
Backup & Restore files

```

(2)

|                                                                      |                   |
|----------------------------------------------------------------------|-------------------|
| BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991) |                   |
| =====                                                                |                   |
| NETHERLANDS/FAO PROJECT                                              | UNDP/FAO PROJECT  |
| GCP/URT/066/NET                                                      | RAF/87/099 (IFIP) |

|                        |                          |
|------------------------|--------------------------|
| M A I N M E N U        |                          |
| End of the job         | Codification             |
| Codification           | Return to previous menu  |
| Data Entry             | Input codes of the table |
| Data Processing a      | Edit codes of the table  |
| Reindex files          |                          |
| Backup & Restore files |                          |

(3)

|                                                                      |                   |
|----------------------------------------------------------------------|-------------------|
| BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991) |                   |
| =====                                                                |                   |
| NETHERLANDS/FAO PROJECT                                              | UNDP/FAO PROJECT  |
| GCP/URT/066/NET                                                      | RAF/87/099 (IFIP) |

|                        |                          |
|------------------------|--------------------------|
| M A I N M E N U        |                          |
| End of the job         | Codification             |
| Codification           | Return to previous menu  |
| Data Entry             | Input codes of the table |
| Data Processing a      | Edit codes of the table  |
| Reindex files          |                          |
| Backup & Restore files |                          |

|                                                                   |
|-------------------------------------------------------------------|
| PLEASE BE CAREFULL !!                                             |
| MODIFYING YOUR TABLES                                             |
| DON'T DO THIS AFTER HAVING INPUT DATA                             |
| DON'T FORGET YOU WILL HAVE TO REORGANISE YOUR FILES JUST AFTER !! |
| PLEASE CONFIRM YOUR CHOICE (Y/N)                                  |

(4)

BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991)

NETHERLANDS/FAO PROJECT  
GCP/URT/066/NET

Codification

UNDP/FAO PROJECT  
RAF/87/099 (IFIP)

starting code : /  
ending code : \*\*/\*\*  
Output on (S)creen or (P)rinter \*  
(0 = accept, a = abort, e = end : \*)

(5)

BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991)

NETHERLANDS/FAO PROJECT  
GCP/URT/066/NET

Tables management

UNDP/FAO PROJECT  
RAF/87/099 (IFIP)

00 return to previous menu  
01 code stratum  
02 code beach  
03 code ethnic group  
04 code religion  
05 code crops culture

-----  
your choice : 00

(6)

|                                                                      |                   |                   |
|----------------------------------------------------------------------|-------------------|-------------------|
| BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991) |                   |                   |
| =====                                                                |                   |                   |
| NETHERLANDS/FAO PROJECT                                              |                   | UNDP/FAO PROJECT  |
| GCP/URT/066/NET                                                      | Tables management | RAF/87/099 (IFIP) |

ethnic group codification

|               |                             |
|---------------|-----------------------------|
| code :        | 03/                         |
| description : |                             |
| -----         |                             |
| your choice : | (0=accept A=abort D=delete) |

(7)

```

01) A. Landing Place : 01/01/0001    stratum : STRATUM 01
                                village : UJIJI
02) B. Boat-owner identification B1 - (1/2/3/4) : 1
03) B2 - : 04 MGOMA                04) B3 - : 01 MUSLIM
05) B4 - place of birth : UJIJI
06) B5 - He is living in this village since      : 72 / years
07) B6a - (1/2) : 1      B6b - (1/2/3/4) : 1
08) B7 - How many years ago did he start fishing ? : 40 / years
09) B8 - (1/2/3/4/5/6) : 1      B9 - (1/2/3/4/5/6) : 1
    C. Fishing boat information
10) C1a1: DC  C1a2: 4.5  C1a3: 2  C1a4: 25000  C1a5: 5000
    C1b1:      C1b2: 0.0  C1b3: 0  C1b4:      0  C1b5:      0
    C1c1:      C1c2: 0.0  C1c3: 0  C1c4:      0  C1c5:      0
    C1d1:      C1d2: 0.0  C1d3: 0  C1d4:      0  C1d5:      0
    C1e1:      C1e2: 0.0  C1e3: 0  C1e4:      0  C1e5:      0
11) C2a (1/2) : 2      C2b :      0      C2c :      0
12) C3a (1/2) : 2      C3b (1/2) : 2      C3c :      0      C3d (1/2) :
13) C4a1:      C4a2: 0  C4a3: 0  C4a4:      0  C4a5:      0
    C4b1:      C4b2: 0  C4b3: 0  C4b4:      0  C4b5:      0
    C4c1:      C4c2: 0  C4c3: 0  C4c4:      0  C4c5:      0
14) Engine maintenance C5: (1/2/3) :

(0= to accept, 2-14 to modify, a= to abort, your choice: )

```

(8)

```

A. Landing Place : 01/01/0001    stratum : STRATUM 01
                                village : UJIJI
    D. Fishing gear information :
                                JFMAMJJASOND
1) d1a1: GN  d1a2: 350  d1a3: 12  d1a4: 7500  d1a5: 1  d1a6: 111111111111
    d1b1:      d1b2: 0  d1b3: 0  d1b4:      0  d1b5: 0  d1b6: 000000000000
    d1c1:      d1c2: 0  d1c3: 0  d1c4:      0  d1c5: 0  d1c6:
    d1d1:      d1d2: 0  d1d3: 0  d1d4:      0  d1d5: 0  d1d6:
    d1e1:      d1e2: 0  d1e3: 0  d1e4:      0  d1e5: 0  d1e6:
    d1f1:      d1f2: 0  d1f3: 0  d1f4:      0  d1f5: 0  d1f6:
    d1g1:      d1g2: 0  d1g3: 0  d1g4:      0  d1g5: 0  d1g6:
    d1h1:      d1h2: 0  d1h3: 0  d1h4:      0  d1h5: 0  d1h6:
2) Boat:  cash: 1      credit/relatives: 0      c/bank: 0      c/project: 0
    c/trader: 0      c/other: 0
    d2d1: 0      d2d2: 0      d2d3: 0      d2d4: 0      d2d5: 0
3) Engine: cash: 0      credit/relatives: 0      c/bank: 0      c/project: 0
    c/trader: 0      c/other: 0
    d2e1: 0      d2e2: 0      d2e3: 0      d2e4: 0      d2e5: 0
4) Gear:  cash: 1      credit/relatives: 0      c/bank: 0      c/project: 0
    c/trader: 0      c/other: 0
    d2f1: 0      d2f2: 0      d2f3: 0      d2f4: 0      d2f5: 0

( 0 = to accept, 1-4 to modify, a = to abort, your choice: )

```

(9)

|                                                                |                   |                                        |                       |
|----------------------------------------------------------------|-------------------|----------------------------------------|-----------------------|
| A. Landing Place : 01/01/0001                                  |                   | stratum : STRATUM 01                   |                       |
|                                                                |                   | village : UJIJI                        |                       |
| E. Sharing system :                                            |                   |                                        |                       |
| 01) Gill net:                                                  | E1a1: 2           | E1a2: 0                                | E1a3: 50 % E1a4: 50 % |
| 02) Beach seine:                                               | E1b1: 0           | E1b2: 0                                | E1b3: 0 % E1b4: 0 %   |
| 03) Purse seine:                                               | E1c1: 0           | E1c2: 0                                | E1c3: 0 % E1c4: 0 %   |
| 04) Scoopnet:                                                  | E1d1: 0           | E1d2: 0                                | E1d3: 0 % E1d4: 0 %   |
| 05) Liftnet:                                                   | E1e1: 0           | E1e2: 0                                | E1e3: 0 % E1e4: 0 %   |
| 06) Bottom long-line:                                          | E1f1: 0           | E1f2: 0                                | E1f3: 0 % E1f4: 0 %   |
| 07) Pelagic long-line:                                         | E1g1: 0           | E1g2: 0                                | E1g3: 0 % E1g4: 0 %   |
| 08) Bottom hand-line:                                          | E1h1: 0           | E1h2: 0                                | E1h3: 0 % E1h4: 0 %   |
| 09) Surface hand-line:                                         | E1i1: 0           | E1i2: 0                                | E1i3: 0 % E1i4: 0 %   |
| 10) Trolling line:                                             | E1j1: 0           | E1j2: 0                                | E1j3: 0 % E1j4: 0 %   |
| 11) E2a (1/2/3) : 3                                            | Which gear? E2b : |                                        | E3 (1/2/3/4) : 4      |
| JFMAMJJASOND                                                   |                   |                                        |                       |
| 12) E4a (1/2) : 2                                              | E4b :             | E4c :                                  | E4d :                 |
| 13) E5a (1/2) : 2                                              | E5b (1/2) : 2     | E5c : 0                                | E5d : 0 E6 (1/2) : 1  |
| F. Destination of the catch                                    |                   |                                        |                       |
| 14) To whom does he sell the catch ? F1 (1-7) : 13             |                   |                                        |                       |
| 15) Fish kept - F2 : 8 kg/week                                 |                   | 16) Process: F3a (1/2): 1 F3b (1/2): 2 |                       |
| 17) Fish-traders relationship - F4 (1-4) : 1                   |                   | F5 (1/2) : 1                           |                       |
| ( 0 = to accept, 01-17 to modify, a = to abort, your choice: ) |                   |                                        |                       |

(10)

|                                                                |                      |                                         |                           |
|----------------------------------------------------------------|----------------------|-----------------------------------------|---------------------------|
| A. Landing Place : 01/01/0001                                  |                      | stratum : STRATUM 01                    |                           |
|                                                                |                      | village : UJIJI                         |                           |
| G. Principal and secondary occupation                          |                      |                                         |                           |
| 01) Income - G1 (1/2/3/4/5/6) : 1                              | G2 (1/2/3/4/5/6) : 2 |                                         | G3a (1/2/3) : 1           |
|                                                                |                      | JFMAMJJASOND                            |                           |
|                                                                | G3b (1/2/3) : 2      | G4a :                                   | G4b : 111100000111        |
| 02) Time - G5 (1/2/3/4/5/6) : 1                                | G6 (1/2/3/4/5/6) : 2 |                                         | G7a (1/2/3) : 1           |
|                                                                | G7b (1/2/3) : 2      | G8a :                                   | G8b : 111100000111        |
| H. Information on boat-owner's family                          |                      |                                         |                           |
| 03) Age - H1a : 72                                             | H1b (1/2/3/4) : 1    | H1c : 1                                 | H1d (1/2/3/4) : 2         |
| 04) Dependent children - H2a : 7                               |                      |                                         |                           |
| Working in fishery: - male H2b1: 2 - female H2b2: 0            |                      |                                         |                           |
| I. Farming and breeding                                        |                      |                                         |                           |
| 05) Fields - I1a : 2                                           | I1b : 2              | I1c1: 0 I1c2: 2 I1c3: 0 I1c4: 0 I1c5: 0 |                           |
| 06) Cultures - I2a: 02 BEANS                                   | I2b: 03 CASSAVA      |                                         | I2c: 01 MAIZE             |
| 07) Production-I3a: 90                                         | I3b: 180             |                                         | I3c: 45                   |
| 08) Animals - I4a : 0                                          | I4b : 0              | I4c : 0                                 | I4d : 0 I4e : 10 I4f : 10 |
| J. Attitude regarding fishery                                  |                      |                                         |                           |
| 09) Employment - J1a (1/2/3) : 1                               |                      | J2 (1/2/3) : 3                          |                           |
| 10) If much money - J3 (a-g) : 0/4/2/0/3/1/0                   |                      | 11) If loan - J4 (a-d) : 2/0/1/0        |                           |
| 12) Problems - J5 (a-l) : 4/0/0/3/0/0/2/0/0/1/0/0              |                      |                                         |                           |
| ( 0 = to accept, 01-12 to modify, a = to abort, your choice: ) |                      |                                         |                           |

(11)

|                                                                      |                   |
|----------------------------------------------------------------------|-------------------|
| BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991) |                   |
| =====                                                                |                   |
| NETHERLANDS/FAO PROJECT                                              | UNDP/FAO PROJECT  |
| GCP/URT/066/NET                                                      | RAF/87/099 (IFIP) |

|                        |                             |
|------------------------|-----------------------------|
| M A I N M E N U        |                             |
| End of the job         | Data Processing and Editing |
| Codification           | Return to previous menu     |
| Data Entry             | Data processing             |
| Data Processing a      | Edit Menu                   |
| Reindex files          |                             |
| Backup & Restore files |                             |

(12)

|                                                                      |                   |
|----------------------------------------------------------------------|-------------------|
| BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991) |                   |
| =====                                                                |                   |
| NETHERLANDS/FAO PROJECT                                              | UNDP/FAO PROJECT  |
| GCP/URT/066/NET                                                      | RAF/87/099 (IFIP) |

|                        |                             |
|------------------------|-----------------------------|
| M A I N M E N U        |                             |
| End of the job         | Data Processing and Editing |
| Codification           | Return to previous menu     |
| Data Entry             | Data processing             |
| Data Processing a      | Edit Menu                   |
| Reindex files          |                             |
| Backup & Restore files |                             |

|                                                                       |
|-----------------------------------------------------------------------|
| ARE YOU REALLY SURE THAT<br>YOU WANT TO DO THIS ?                     |
| IT WILL TAKE A LONG TIME !                                            |
| DON'T FORGET THAT THE FILES MUST<br>BE REORGANISED BEFORE AND AFTER ! |
| PLEASE CONFIRM YOUR CHOICE (Y/N)                                      |

(13)

|                                                                      |                   |
|----------------------------------------------------------------------|-------------------|
| BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991) |                   |
| =====                                                                |                   |
| NETHERLANDS/FAO PROJECT                                              | UNDP/FAO PROJECT  |
| GCP/URT/066/NET                                                      | RAF/87/099 (IFIP) |

|                             |
|-----------------------------|
| MAIN MENU                   |
| End of the job              |
| Codification                |
| Data Entry                  |
| Data Processing and Editing |
| Reindex files               |
| Backup & Restore files      |

|                                  |
|----------------------------------|
| PLEASE BE CAREFULL !!            |
| REBUILDING INDEX FOR YOUR FILES  |
| DON'T STOP IT !!                 |
| ARE YOU REALLY SURE THAT         |
| YOU WANT TO DO THIS ?            |
| PLEASE CONFIRM YOUR CHOICE (Y/N) |

(14)

|                                                                      |                   |
|----------------------------------------------------------------------|-------------------|
| BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991) |                   |
| =====                                                                |                   |
| NETHERLANDS/FAO PROJECT                                              | UNDP/FAO PROJECT  |
| GCP/URT/066/NET                                                      | RAF/87/099 (IFIP) |

|                        |                         |
|------------------------|-------------------------|
| MAIN MENU              |                         |
| End of the job         | backup & restore files  |
| Codification           | Return to previous menu |
| Data Entry             | Backup files            |
| Data Processing a      | Restore files           |
| Reindex files          |                         |
| Backup & Restore files |                         |

(15)

BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991)

NETHERLANDS/FAO PROJECT  
GCP/URT/066/NET

UNDP/FAO PROJECT  
RAF/87/099 (IFIP)

M A I N M E N U

End of the job

Codification

Data Entry

Data Processing a

Reindex files

Backup & Restore files

backup & restore files  
Return to previous menu

Backup files  
Restore files

PLEASE CONFIRM YOUR CHOICE (Y/N)

(16)

backup & restore files  
Return to previous menu  
  
Backup files  
Restore files

PLEASE CONFIRM YOUR CHOICE (Y/N)

(17)

|                                                                      |                   |
|----------------------------------------------------------------------|-------------------|
| BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991) |                   |
| =====                                                                |                   |
| NETHERLANDS/FAO PROJECT                                              | UNDP/FAO PROJECT  |
| GCP/URT/066/NET                                                      | RAF/87/099 (IFIP) |

|                        |                             |
|------------------------|-----------------------------|
| M A I N M E N U        |                             |
| End of the job         | Data Processing and Editing |
| Codification           | Return to previous menu     |
| Data Entry             | Data processing             |
| Data Processing a      | Edit Menu                   |
| Reindex files          | Edit Menu                   |
| Backup & Restore files | Return to previous menu     |
|                        | Fishing boats information   |
|                        | Fishing gears information   |
|                        | Crew/Marketing information  |
|                        | Socio-economic information  |

(18)

|                                                                      |                   |
|----------------------------------------------------------------------|-------------------|
| BASELINE SURVEY OF THE ARTISANAL FISHERIES ON LAKE TANGANYIKA (1991) |                   |
| =====                                                                |                   |
| NETHERLANDS/FAO PROJECT                                              | UNDP/FAO PROJECT  |
| GCP/URT/066/NET                                                      | RAF/87/099 (IFIP) |
| Fishing boats information                                            |                   |

|                                      |                           |
|--------------------------------------|---------------------------|
| village code :                       | Description               |
| employment level :                   | -----                     |
| ethnic code :                        | stratum : all strata      |
| religion code :                      | village : all villages    |
| Output on (S)creen or (P)rinter      | all boat-owners           |
| (0 = accept, a = abort, e = end : *) | ethnic group : all groups |
|                                      | religion :all religions   |

BOAT-OWNERS AND FISHING BOATS INFORMATION

Stratum: all strata  
 Boat-owners are: all boat-owners  
 Religion: all religions  
 Village : all villages  
 Ethnic group: all groups  
 Number of records: 387

Number of boat-owners living in the village since :  
 0 - 5 years : 37      6 - 19 years : 108      20 years or more : 242

Did they have another profession before : Yes: 240      No: 147  
 Farmer: 193      Animal producer: 2      Hired worker: 1      other: 44

Number of boat-owners fishing since :  
 0 - 5 years : 105      6 - 19 years : 168      20 years or more : 114

Their father was - fisherman: 173      farmer: 200      animal producer: 2  
                          hired worker: 0      other: 10      don't know: 2

Their grandfather was - fisherman: 124      farmer: 248      animal producer: 3  
                          hired worker: 0      other: 5      don't know: 7

1. Catamaran  
 Number      Length      Age      Replacement cost      Maintenance cost  
 150          5.3          3          73190          10039

2. Trimaran  
 Number      Length      Age      Replacement cost      Maintenance cost  
 0            0.0          0          0            0

3. Purse seiner  
 Number      Length      Age      Replacement cost      Maintenance cost  
 0            0.0          0          0            0

4. Dugout Canoe  
 Number      Length      Age      Replacement cost      Maintenance cost  
 72          4.1          5          23125          3111

5. Planked Canoe  
 Number      Length      Age      Replacement cost      Maintenance cost  
 289          4.6          4          35788          6851

Do they hire their boat - Yes : 27      No : 360  
 Owners of engine : 29      Using it regularly - Yes : 22      No: 7  
 Not owners of engine : 358      Renting an engine - Yes : 3      No: 355

6. Outboard engines  
 Number      HP      Age      Replacement cost      Maintenance cost  
 40          21      7          357875          64905

The engines are maintained by: a) themselves: 9  
                                          b) relatives: 11      c) dealer: 12

## FISHING GEARS INFORMATION

Village : all villages

Religion: all religions

Religion: all religions

| Description       | Number of Owners | Gears | Average Length | Depth | Average cost of Replacement | Average Age |
|-------------------|------------------|-------|----------------|-------|-----------------------------|-------------|
| Gill net          | 24               | 26    | 436            | 5.0   | 27962                       | 3.1         |
| Beach seine       | 105              | 115   | 117            | 16.7  | 364631                      | 4.1         |
| Purse seine       | 0                | 0     | 0              | 0.0   | 0                           | 0.0         |
| Scoopnet          | 62               | 74    | 8              | 6.4   | 15723                       | 5.8         |
| Liftnet           | 115              | 152   | 64             | 16.8  | 295066                      | 3.7         |
| Bottom long-line  | 0                | 0     | 0              | 0.0   | 0                           | 0.0         |
| Pelagic long-line | 12               | 13    | 246            | 0.0   | 2746                        | 0.3         |
| Bottom hand-line  | 32               | 32    | 182            | 0.0   | 2214                        | 1.7         |
| Surface hand-line | 18               | 18    | 0              | 0.0   | 2708                        | 0.1         |
| Trolling line     | 0                | 0     | 0              | 0.0   | 0                           | 0.0         |

[illegible]

Number of boats bought: - cash: 444 with a credit from - a) relatives: 22  
b) bank: 1 c) project: 4 d) fish trader: 0 e) other: 1  
Number of boats owned by: a) father: 16 b) other relatives: 10  
c) middleman: 2 d) cooperative: 3 e) other: 3

Number of engines bought: - cash: 31 with a credit from - a) relatives: 2  
b) bank: 1 c) project: 4 d) fish trader: 0 e) other: 0  
Number of engines owned by: a) father: 0 b) other relatives: 4  
c) middleman: 0 d) cooperative: 0 e) other: 0

Number of gears bought: - cash: 333 with a credit from - a) relatives: 18  
b) bank: 25 c) project: 14 d) fish trader: 1 e) other: 1  
Number of gears owned by: a) father: 13 b) other relatives: 19  
c) middleman: 3 d) cooperative: 6 e) other: 0

# SHARING SYSTEMS AND MARKETING INFORMATION

=====

Stratum: all strata  
 Boat-owner are: all boat-owners  
 Ethnic group: all groups  
 Village : all villages  
 Religion: all religions

| Description       | Number of responses | Average crew size | Crew wages | Crew share (%) | Net/boat/lamps share (%) |
|-------------------|---------------------|-------------------|------------|----------------|--------------------------|
| Gill net          | 24                  | 2                 | 700        | 36             | 64                       |
| Beach seine       | 150                 | 9                 | 0          | 42             | 58                       |
| Purse seine       | 0                   | 0                 | 0          | 0              | 0                        |
| Scoopnet          | 62                  | 2                 | 0          | 40             | 60                       |
| Liftnet           | 115                 | 4                 | 0          | 49             | 51                       |
| Bottom long-line  | 0                   | 0                 | 0          | 0              | 0                        |
| Pelagic long-line | 12                  | 2                 | 568        | 50             | 50                       |
| Bottom hand-line  | 33                  | 2                 | 0          | 55             | 45                       |
| Surface hand-line | 15                  | 2                 | 0          | 48             | 52                       |
| Trolling line     | 0                   | 0                 | 0          | 0              | 0                        |

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Owner's crew bringing its own gears - Yes : 56 Sometimes : 23 No : 308

Type - GN : 1 BS : 0 PS : 0 SN : 0 LN : 0  
 Type - BL : 0 PL : 0 BH : 61 SH : 17 TN : 0

Changes in crew - day to day : 26 week to week : 25  
 season to season : 138 no change : 198

Owners fishing in another village - Yes : 76 No : 311

|          |     |     |     |     |     |     |     |     |     |     |     |     |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| During : | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|          | 18  | 21  | 26  | 32  | 47  | 53  | 53  | 54  | 44  | 30  | 15  | 14  |

Type - GN : 2 BS : 30 PS : 0 SN : 5 LN : 34  
 Type - BL : 0 PL : 0 BH : 5 SH : 0 TN : 0

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Paying village government to fish in their village - Yes : 8 No : 379  
 in another village - Yes : 16 No : 371

Boat-owners having exclusive rights to fish - Yes : 222 No : 165

Catch is - sold to processors : 238 private trader: 364 consumer:290  
 market : 116 family member: 4 bartered: 1 other : 0

They process fish - Yes : 199 No : 188  
 Thir wife process fish - Yes : 167 No : 220

Relationship with fish-traders - only buy fish : 378 loan money : 2  
 provide fishing boat : 2 provide fishing gears : 1

They sell generally to the same fish-trader - Yes : 7 No : 380

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## SOCIO-ECONOMIC INFORMATION

Stratum: all strata

Village : all villages

Boat-owner are: all boat-owners

Religion: all religions

Ethnic group: all groups

According to income generated their principal occupation is -

|                 |   |     |              |   |    |        |   |   |
|-----------------|---|-----|--------------|---|----|--------|---|---|
| fisherman       | : | 346 | farmer       | : | 31 | trader | : | 9 |
| animal producer | : | 1   | hired worker | : | 0  | other  | : | 0 |

This occupation is - permanent : 333    seasonal : 54    casual : 0

|               |     |     |     |     |     |     |     |     |     |     |     |     |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Seasonal in : | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|               | 53  | 53  | 52  | 43  | 19  | 7   | 8   | 12  | 23  | 46  | 52  | 52  |

According to income generated their secondary occupation is -

|                 |   |    |              |   |     |        |   |    |
|-----------------|---|----|--------------|---|-----|--------|---|----|
| fisherman       | : | 38 | farmer       | : | 326 | trader | : | 12 |
| animal producer | : | 1  | hired worker | : | 0   | other  | : | 7  |

This occupation is - permanent : 42      seasonal : 339      casual : 3

| Seasonal in : | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|               | 331 | 332 | 324 | 256 | 61  | 13  | 9   | 13  | 93  | 300 | 330 | 332 |

According to time spent their principal occupation is -

|                 |       |              |      |        |      |
|-----------------|-------|--------------|------|--------|------|
| fisherman       | : 320 | farmer       | : 51 | trader | : 13 |
| animal producer | : 0   | hired worker | : 1  | other  | : 2  |

This occupation is - permanent : 317      seasonal : 70      casual : 0

|               |     |     |     |     |     |     |     |     |     |     |     |     |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Seasonal in : | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|               | 69  | 69  | 66  | 52  | 21  | 6   | 6   | 13  | 29  | 60  | 68  | 68  |

According to time spent their secondary occupation is -

|                 |   |    |              |   |     |        |   |    |
|-----------------|---|----|--------------|---|-----|--------|---|----|
| fisherman       | : | 62 | farmer       | : | 304 | trader | : | 11 |
| animal producer | : | 1  | hired worker | : | 0   | other  | : | 5  |

This occupation is - permanent : 54      seasonal : 326      casual : 3

|               |     |     |     |     |     |     |     |     |     |     |     |     |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Seasonal in : | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|               | 318 | 318 | 310 | 250 | 68  | 15  | 11  | 14  | 89  | 284 | 316 | 318 |

In average, they are 36 years old

342 are married, 32 are single, 6 are widowers, 7 are separated

They have 510 wives, in average per man married or separated : 1.5

They received - no education : 66 an education form 0-4 :162

an education form 5-9 : 146                      a higher education :        13

They have 6 dependent children in average

Out of which : 194 males and 31 females are working in fishery

(23a)

## SOCIO-ECONOMIC INFORMATION (cont'd)

|                                 |                         |
|---------------------------------|-------------------------|
| Stratum: all strata             | Village : all villages  |
| Boat-owner are: all boat-owners |                         |
| Ethnic group: all groups        | Religion: all religions |

They have a total of : 1417 fields, in average : 4 per owner  
Average superficie per owner is : 5

These fields are - allocated by village headman : 861      inherited    :324  
rented :                 12                 bought :          218      other        :        2

|                                            |         |          |         |           |          |
|--------------------------------------------|---------|----------|---------|-----------|----------|
| Their average annual crops production is : |         |          |         |           |          |
| maize :                                    | 256 kgs | beans :  | 132 kgs | cassava : | 1370 kgs |
| palm oil :                                 | 251 kgs | banana : | 24 kgs  | potatoe : | 7 kgs    |
| other :                                    | 146     |          |         |           |          |

|                       |                       |            |                   |         |
|-----------------------|-----------------------|------------|-------------------|---------|
| They own a total of : | 14 cows,              | 914 goats, | 113 lambs,        | 10 pigs |
|                       | 2653 poultry animals, |            | 887 other animals |         |
| They own in average : | 1 cows,               | 44 goats,  | 5 lambs,          | 0 pigs  |
|                       | 126 poultry animals,  |            | 42 other animals  |         |

If they had other employment possibilities - would stay in fisheries : 302  
would change profession : 82 don't know : 3

They would like their sons to be fishermen - Yes : 205 No : 64  
don't know : 118

|                                                                            |          |    |     |                           |        |
|----------------------------------------------------------------------------|----------|----|-----|---------------------------|--------|
| If they earned more money from fishing, they would use it in priority to : |          |    |     |                           |        |
|                                                                            | Priority | No | 1   | 2                         |        |
| buy consumer goods :                                                       |          | 3  | 7   | give a better education : | 88 82  |
| buy animals :                                                              |          | 1  | 10  | take an other wife :      | 0 3    |
| invest in farming :                                                        |          | 27 | 158 | buy new gears/boat :      | 236 96 |
| other :                                                                    |          | 32 | 31  |                           |        |

If they received a loan, they would invest in first priority in :  
 farming : 47    animal production : 3    fishery : 313    other : 24

| The main problems regarding fishing activities are perceived as follows : |          |    |     |     |     |
|---------------------------------------------------------------------------|----------|----|-----|-----|-----|
|                                                                           | Priority | No | 1   | 2   |     |
| fish price too low :                                                      |          | 5  | 3   |     |     |
| catches too low :                                                         |          | 18 | 9   |     |     |
| gear availability :                                                       |          | 60 | 103 |     |     |
| no money to invest :                                                      |          | 60 | 65  |     |     |
| with administration:                                                      |          | 1  | 0   |     |     |
| no problems :                                                             |          | 1  | 1   |     |     |
|                                                                           |          |    |     |     |     |
| catches irregular :                                                       |          |    |     | 15  | 13  |
| gear too expensive :                                                      |          |    |     | 55  | 152 |
| instability of crew :                                                     |          |    |     | 0   | 0   |
| many people to feed :                                                     |          |    |     | 2   | 4   |
| problems with fuel :                                                      |          |    |     | 167 | 33  |
| other :                                                                   |          |    |     | 3   | 3   |

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