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AERIAL FRAME SURVEY OF LAKE TANGANYIKA FISHERIES

by

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PREFACE

The Research for the Management of the Fisheries on Lake Tanganyika project (Lake Tanganyika Research) became fully operational in January 1992. It is executed by the Food and Agriculture organization of the United Nations (FAO) and funded by the Finnish International Development Agency (FINNIDA).

This project aims at the determination of the biological basis for fish production on Lake Tanganyika, in order to permit the formulation of a coherent lake-wide fisheries management policy for the four riparian States (Burundi, Tanzania, Zaïre and Zambia).

Particular attention will be also given to the reinforcement of the skills and physical facilities of the fisheries research units in all four beneficiary countries as well as to the buildup of effective coordination mechanisms to ensure full collaboration between the Governments concerned.

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EXECUTIVE SUMMARY

1. The first ever aerial frame survey of Lake Tanganyika fisheries has been organized and executed from 29.09.1992 to 03.10.1992 with the following objectives: (1) to verify the length of shoreline for each country; (2) to determine the number and density of fishing craft/km of shoreline for each country; (3) to classify fish landing sites; and (5) to benchmark data for future assessment of Lake Tanganyika fisheries evolution.

2. The survey area consisted of the entire shoreline of Lake Tanganyika and its numerous islands. It took a total of 9 hours and 55 minutes of flying time during which a total of 7 hours and 45 minutes of video recordings was made.

3. Lake Tanganyika fisheries is briefly described, providing the main characteristics for its three types i.e. industrial, artisanal and traditional fisheries.

4. The length of Lake Tanganyika shoreline has been verified. A significant difference *vis-à-vis* previously published reports and publications was registered: a total length of Lake Tanganyika's shoreline of 1,838 km i.e. 383 km or 22.5% longer than previously stated.

5. Four categories of fishing craft were distinguished as follows: (1) canoes; (2) catamarans; (3) trimarans; and (4) industrial fishing units. Full details on the numbers and location of these four categories of fishing craft as well as of transport vessels are given in Appendices 1 - 4. The density of artisanal fishing craft i.e. an indicator of fishing pressure has also been calculated. A total of 13,976 canoes was counted; 1,802 in Burundi, 3,839 in Tanzania, 765 in Zambia and 7,570 in Zaïre. The highest density of canoes per kilometre of shoreline by country was recorded for Burundi (11.3 canoes/km) followed by Zaïre (10.3), Tanzania (6.0) and Zambia (3.6).

6. A total of 459 fish landing sites was recorded as follows: 34 in Burundi, 127 in Tanzania, 41 in Zambia and 257 in Zaïre. Most fish landing sites (192 or 41.8%) around the lake were classified into Category II i.e. having between 11 and 30 canoes each. Further, some 147 or one third of all fish landing sites around Lake Tanganyika were classified into Category I i.e. having between 1 and 10 canoes each; in Zambia, however, the percentage of this category accounted for almost half of all fish landing sites there. Largest percentage of largest fish landing sites i.e. those with more than 81 canoes each was recorded for Burundi where 8 such sites are located.

7. The density of landing sites per 10 km of shoreline's length was calculated. The average density of landing sites for the entire Lake Tanganyika was 2.5 landing sites per 10 km of shoreline i.e. 1 landing site for each 4 km of shoreline. By

country, the density per 10 km was as follows: in Burundi 2.1, in Tanzania 1.9, in Zambia 1.9 and 3.2 in Zaïre. The highest density of landing sites i.e. 6.8 landing sites per 10 km of shoreline was found close to the town of Moba while the lowest was recorded in stratum V in Tanzania i.e. the northernmost part of Rukwa Region.

1 INTRODUCTION

1.1 Background

Only a few efforts were made recently to determine the structural and/or socio-economic characteristics of the Lake Tanganyika fisheries. Because of particular, mainly logistical difficulties, these studies were carried out only where the access to the Lake's shoreline was possible i.e. in Burundi (Bellemans, 1991; Horemans, 1992) or in Zambia (Hoekstra and Lupikisha, 1992; Pearce, 1992). It should be noted that the combined shoreline of these two countries is only 21% of Lake Tanganyika's total shoreline of about 1,835 km.

Due to mainly limited and difficult access to Lake's shorelines of Tanzania and Zaïre these studies were carried out in only very small sections of these two countries i.e. a small section of Kigoma Region, Tanzania (Leenderste and Horemans, 1991) and similarly small sections of Zaire's northern shoreline (Leenderste and Mambona wa Bazolana, 1992; Maes et al., 1991). In view of the above, it was not possible up to now to even estimate the number of fishing craft in these two countries which, together, share 79% of Lake Tanganyika's shoreline (Tanzania: 669 km or 36 % and Zaïre 795 km or 43%).

It became apparent that to carry out either a comprehensive frame survey and/or a full census of Lake Tanganyika fisheries in all four riparian states other than by 'classical means' (=use of vessels, data collectors, etc.) an alternative approach had to be found simply because the extent of the Lake's shoreline alone made the 'classical approach' impractical. It was therefore decided that the only way the much needed data could be obtained was to use a small plane and video-record the entire Lake's shoreline.

1.2 Objectives

One of the project's key objectives is 'the establishment of uniform methods throughout the lake for the subsequent longer-term collection, analysis and interpretation of statistical data on fish yields and fisheries in general by the four participating countries'. Consequently, it was decided that the first step leading towards the proper execution of the above mentioned objective is to carry out an aerial census of Lake Tanganyika's fisheries in order to (1) verify the length of the shoreline by country; (2) determine the density of fishing craft units/km of shoreline in each country; (3) classify landing sites by size in each country; (4) determine the density of landing sites/km in each country; and (5) to benchmark data for future assessment of its fisheries evolution.

1.3 Structure of report

The results of this study are presented as follows. It starts with an executive summary which provides the summary of results and recommendations. The first chapter follows and provides a summary of the background and objectives of the study. The second chapter contains a description of the methodology used to conduct the census and includes: material and methods, data collection system and processing of the data, stratification of the survey area.

The third chapter presents the results of the study. It covers the general information on the fisheries, including the types of fisheries and fishing and transport craft units. It further details the results on density of fishing units as well as presents information on the size and density of fish landing sites and/or settlements in each country. Lastly, several maps and tables are also included.

1.4 Acknowledgements

We would like to thank to Mr. Marc Lekeu of Malek Aviation who did all the flying, superbly, and who got us back, safely!!!; to the authorities and to the FAO Representations of all four riparian states who, respectively, allowed us to carry out this study and obtained all required permissions.

2 METHODOLOGY

2.1 The survey area

The survey area consisted of the entire shoreline of Lake Tanganyika i.e. 1,838 km and its numerous islands. Lake Tanganyika is situated at an altitude of 773 m, in the north-south direction, between the latitudes of 3°20' and 8°48' S and the longitudes of 29°03' to 31°12' E. The Lake is 673 km long from north to south and has a maximum width of 48 km. With a maximum depth of 1,470 m, Lake Tanganyika is the second deepest lake in the world. Its average depth is 570 m and the lake volume is estimated to be some 18,800 km^3. The Lake is shared by four riparian states i.e. Burundi, Tanzania, Zaïre and Zambia (FIGURE 1).

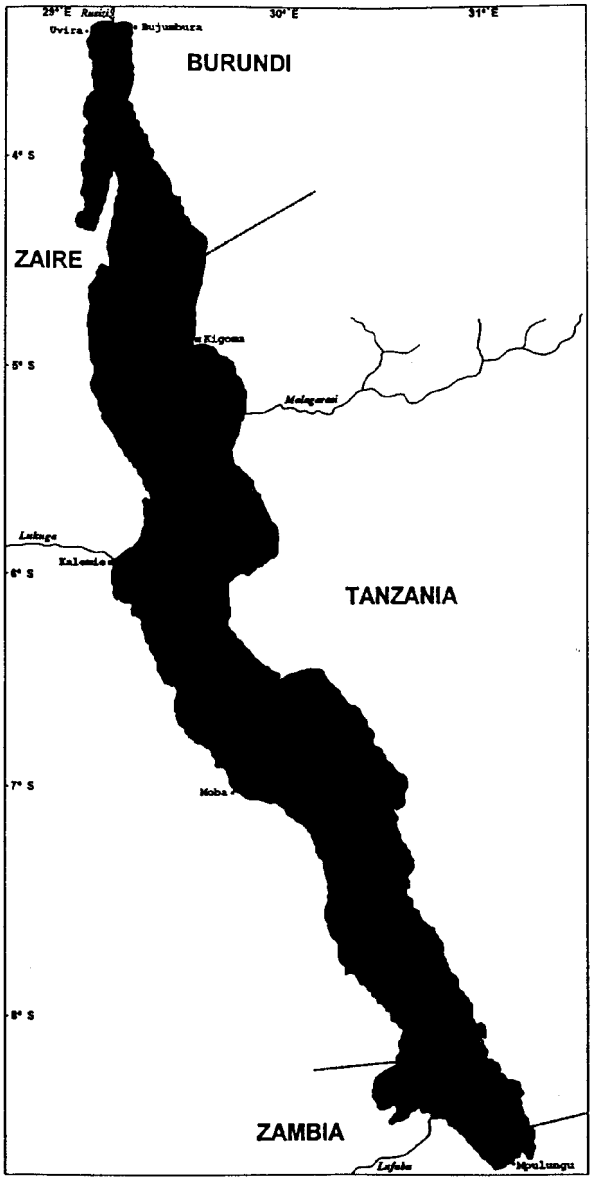

FIGURE 1: Map of Lake Tanganyika.

2.2 Material

The following equipment was employed:

Plane - single engine 6-seater plane (PA-32-300 Cherokee.6.300 HP 540 in^3) from Malek Aviation;

Video equipment - Sony CCD-V800E Handycam Hi8 Camrecorder with all options, a number of spare batteries, cassettes and external stereo microphone;

Charts and Maps - 1:50,000 charts of the entire shoreline were on board but those of 1:250,000 proved to be the most useful;

2.3 Preparation

A test flight of some two hours duration took place in June 1992 covering the most northern portion of the Burundese shoreline. As the quality of video recordings was good and the type and the number of fishing craft were clearly identifiable, all required video-equipment was ordered. The authorities of all four riparian states were approached for necessary permissions to both overfly their territories and video-record their respective shorelines of Lake Tanganyika.

2.4 Data collection

The data collection started on 29.09.1992 in stratum I of Burundi following the Lake's shoreline of Burundi, Tanzania and partially of Zambia southwards before turning westwards and northwards along the shoreline of Zambia and Zaïre, completing the mission on 03.10.1992 in Bujumbura. TABLE 1 details the actual itinerary and flying and filming durations of the survey. Mr. Marc Lekeu from Malek Aviation was the pilot; Eric Coenen was seated on port side in the last row with his seat facing the plane door which was removed to facilitate the filming; and George Hanek was in the middle, using a remote microphone to record positions from plane's GPS, recording time and canoes and other fishing craft in the open water and making general comments on type of shoreline, etc. As apparent from TABLE 2, all efforts were made to fly early in the mornings to both record all returning fishing craft and to avoid dangerous turbulence and storms. All flying was done at 600 to 700 ft level (180-200 m) and from 90 to 110 miles/hour (140-180 km/hour), very close above the shoreline allowing to video-record the entire beach as well as some 150-200 m of the Lake's watersurface along the beach.

TABLE 1: Itinerary, flying and filming times.

	Itinerary	**Departure**	**Arrival**	**Flying Time (minutes)**	**Filming Time (minutes)**
DAY 1	Bujumbura Kigoma	29.09.92 at 08.17H	29.09.92 at 09.45H	88	77
DAY 2	Kigoma Kasaba B.	30.09.92 at 06.12H	30.09.92 at 09.48H	216	155
DAY 3	Kasaba B. Mpulungu	01.10.92 at 07.35H	01.10.92 at 19.25H	BY BOAT	BY BOAT
DAY 4	Kasaba B. Kalemie	02.10.92 at 08.17H	02.10.92 at 10.51H	154	138
DAY 5	Kalemie Bujumbura	03.10.92 at 07.08H	03.10.92 at 09.25H	137	95
				9H55M	7H45M

2.5 Coverage size

As apparent from TABLE 1 there was almost a total coverage of all strata; the entire shoreline of Lake Tanganyika as well as of its numerous islands were surveyed and thus almost 100% of all fishing craft, active on Lake Tanganyika between 29.09. and 03.10.1992, were accounted for. Nevertheless, very small portions of the shoreline in Tanzania, Zaïre and Zambia were not filmed due to either strong turbulence and a dangerous storm which surprised us early in the morning of the last day of our census.

2.6 Data processing and analysis

Using a SONY KY-3400D Large Screen Multi System TV, a SONY VHS-SLV-X95 Multi System Video Recorder, charts, maps and notes taken during the flight, all 7 hours and 45 minutes of video tapes were first copied onto large videotapes (=working copies), after which each tape was carefully analyzed. Video tapes had to be screened several times, frame by frame, in order to obtain and record all information. Almost all of this very consuming task has been carried out by Pekka Kotilainen. The information was processed by computer and the output consists of the following information:

1. length of Lake Tanganyika shoreline for each riparian state;

2. number and types of fishing craft;

3. density of fishing and other craft/km and per stratum for each riparian state; and

4. classification, number and density of landing sites per stratum for each riparian state.

2.7 Stratification of the survey area

Lake Tanganyika was divided into 29 sectors (strata) as follows: in Burundi: 3 strata; in Tanzania: 9 strata; in Zaïre: 12 strata; and in Zambia: 5 strata. This division follows the stratification established and used in the collection of fisheries statistical data of Burundi and Zambia by Bellemans (1991) and Pearce (1992) respectively. In the absence of similar divisions in both Tanzania and Zaïre their respective shorelines were divided, accepting their respective administrative divisions(TABLE 2).

Table 2. Stratification, length of shoreline, and coverage per stratum

COUNTRY/ STRATUM	LATITUDE	SHORELINE KM	PERCENTAGE	KM NOT COUNTED	PERCENTAGE NOT COUNTED
BURUNDI					
I	03°20'30" S - 03°39'00" S	51	32,08	0	0,00
II	03°39'00" S - 04°00'20" S	46	28,93	0	0,00
III	04°00'20" S - 04°26'40" S	62	38,99	0	0,00
TOTAL		159	100,00	0	0,00
TANZANIA					
I	04°26'40" S - 05°00'00" S	86	12,86	0	0,00
II	05°00'00" S - 05°30'00" S	70	10,46	0	0,00
III	05°30'00" S - 06°00'00" S	76	11,36	0	0,00
IV	06°00'00" S - 06°30'00" S	80	11,96	0	0,00
V	06°30'00" S - 07°00'00" S	76	11,36	0	0,00
VI	07°00'00" S - 07°30'00" S	84	12,56	0	0,00
VII	07°30'00" S - 08°00'00" S	82	12,26	0	0,00
VIII	08°00'00" S - 08°30'00" S	100	14,95	28	28,00
IX	08°30'00" S - 08°36'00" S	15	2,24	0	0,00
TOTAL		669	100,00	28	4,19
ZAMBIA					
I	08°36'00" S - 08°43'40" S	26	12,09	0	0,00
II	08°43'40" S - 08°48'35" S	26	12,09	0	0,00
III	08°48'30" S - 08°29'10" S	64	29,77	0	0,00
IV	08°29'10" S - 08°17'30" S	89	41,40	0	0,00
V	08°17'30" S - 08°13'45" S	10	4,65	0	0,00
TOTAL		215	100,00	0	0,00
ZAIRE					
I	08°13'40" S - 08°00'00" S	35	4,40	0	0,00
II	08°00'00" S - 07°30'00" S	69	8,68	0	0,00
III	07°30'00" S - 07°00'00" S	108	13,58	0	0,00
IV	07°00'00" S - 06°30'00" S	78	9,81	0	0,00
V	06°30'00" S - 06°00'00" S	68	8,55	0	0,00
VI	06°00'00" S - 05°30'00" S	79	9,94	0	0,00
VII	05°30'00" S - 05°00'00" S	63	7,92	42	66,67
VIII	05°00'00" S - 04°30'00" S	63	7,92	19	30,16
IX	04°30'00" S - 04°02'50" S	53	6,67	0	0,00
X	04°02'50" S - 04°00'00" S	89	11,19	0	0,00
XI	04°00'00" S - 03°30'00" S	66	8,30	0	0,00
XII	03°30'00" S - 03°21'00" S	24	3,02	0	0,00
TOTAL		795	100,00	61	7,67
GRAND TOTAL		1838	100.00	89	4,84

3 RESULTS

3.1 Characteristics of Lake Tanganyika fisheries

Lake Tanganyika fisheries have been described in detail by a number of authors (Bellemans, 1991; Coulter, 1991; Mann and Ngomirakiza, 1973; Pearce, 1985; Roest, 1987; etc.). Consequently, only a brief summary of its characteristics are presented here in order to facilitate better understanding of the data obtained during our aerial frame survey.

Most fishing is done at night and virtually all fishing methods (lift nets, beach seines, scoop nets, etc.) rely on attracting mainly clupeids to fishing lamps. This is the reason why fishing activities virtually cease every month during full

moon. Fishing activities are also adversely affected by strong winds and/or rain which also diminishes light intensity and thus the fishing gear effectiveness.

Generally there are three types of fisheries i.e. traditional, artisanal and industrial. The latter started in 1954, when a number of Greek nationals introduced the purse seine to the lake. A typical industrial fishing unit consists of a 16 to 20 m long steel purse seiner, a fish net carrying steel boat, 4 to 5 lamp boats and a crew of 30 to 40 fishermen. A number of these industrial fishing units was established around the lake over the years. Presently there are 17 units based in Burundi, 3 in Kigoma, 14 in Mpulungu, 4 in Moba, and 17 in Kalemie; while the number of these units is decreasing in Burundi (reason: low catches), it is almost constant in the other countries.

The artisanal fishery is carried out in the northern portion of the lake by mainly catamarans and to some degree by trimarans, although the latter disappeared totally from Burundi (Bellemans, 1991). A typical fishing unit catamaran consists of two (three for trimarans) mainly wooden plank hulls, with an average of 1.5 lamps/unit (there were 13 such units which employed lamp skiffs), lift net and an average of 4.7 fishermen/catamaran. The catamarans were introduced to the lake in the late 1950's (Collart, per.comm.). The period from 1962 to 1972 in Burundi was characterized by a sustained growth with an average of some 3.3 catamaran units entering the fishery every month. There was even more intensive growth during 1972 and 1978, when almost 11 catamaran units entered the fishery every month. Over the last 12 years an average of 0.4 catamaran units entered the fishery on a monthly basis. Although the total number of catamaran units did not increase much during this last period, it should be realised that the efficiency of the fleet has increased through (a) the introduction of larger nets, (b) the use of larger canoes, (c) an increase in the distance between the two boats of the units, (d) an increase in the light attraction power on each unit, (e) their motorization, and (f) through the introduction of 'Appollo' lift-nets which have a fishing power nearly equivalent to an industrial fishing unit (Bellemans, 1991).
'Appollo' fishing units were introduced in 1990 in Burundi. These units are large catamarans using canoes of 7 to 9 m long and a net of up to 100 m of opening circumference i.e. almost twice as large as that of a typical catamaran. Fourteen to nineteen lamps are employed, of which two have the same power as those used by the lamp boats of the industrial fishery. Each of these 'Appollo' units is operated by a crew of 8 to 11 fishermen. During the 1990 census, three such units were recorded; their number reached 35 in 1991 (Bellemans, 1991).

There were some 590 active catamarans in Burundi in 1991 (Bellemans, 1991), 739 of these units in Kigoma Region and the northern portion of Rukwa Region (Chakraborty et al., 1992) and some 450 catamarans in Zaïre (Uvira and Fizi zones) (Maes et al., 1991). There are virtually no catamarans in the southern portion

of the Lake. The large majority of fishing units in the southern portion of Tanzania, in Zambia and in the southern portion of Zaïre (up to Kalemie) are beach seine units operating at night in association with lights targeting the clupeids (Hoekstra and Lupikisha, 1992).

The traditional fishery sector is basically a subsistence fishing activity. A wide variety of fishing gear is used (gill nets, hook and line, longlines, traps, mosquito nets, etc); while the fishing techniques are generally inefficient, the traditional fishery sector absorbs a large number of people around the lake.

3.2 Length of Lake Tanganyika shoreline

The verification of the length of Lake Tanganyika shoreline for each riparian state was one of the objectives of this study. Careful analysis of all available maps was made; for Burundi, Tanzania and Zambia maps of scale 1:50,000 were used and for Zaïre only those of scale 1:200,000 were available. TABLE 3 and FIGURE 2a provide the details.

TABLE 3. Lake Tanganyika: comparison of shoreline measurements.

COUNTRY	Previous reports (km)	(%)	Our data (km)	(%)
BURUNDI	135	9	159	9
TANZANIA	540	36	669	36
ZAMBIA	150	10	215	12
ZAÏRE	675	45	795	43
TOTAL	1,500	100	1,838	100

All recent reports quote either Corsi (1988), Mikkola and Lindqvist (1989) or Roest (1987) who all give a total length of 1,500 km for Lake Tanganyika's shoreline. We have found a significant difference: a total length of Lake Tanganyika shoreline of 1,838 km i.e. 383 km or 22.5% longer than previously stated. There is only a very minor difference as far as the division of the shoreline among the four riparian states is concerned (TABLE 3).

3.3 Number, type and density of fishing craft

The following types of fishing craft were distinguished: (1) canoes; (2) catamarans; (3) trimarans; and (4) industrial fishing units. While TABLE 4 provides the summaries of numbers and densities of these four types of fishing craft for each stratum and for each country, the detailed observations, including those on transport vessels, are given in Appendix 1 for Burundi, in

Appendix 2 for Tanzania, in Appendix 3 for Zambia and in Appendix 4 for Zaïre.

It should be noted that the number of catamarans and/or trimarans is only indicative and does not reflect the actual numbers since most fishermen disarm these fishing units almost immediately upon reaching their landing site. Some even disarm these units once fishing is completed and use one canoe to transport the fish to the market as it is faster. Consequently, the number and density of catamarans and/or trimarans is only indicative. Thus in order to provide a better indicator of traditional/artisanal fishing craft densities i.e. an indicator of fishing pressure we now present TABLE 5 in which the number and density of canoes for each stratum are given; we use the same data as given in TABLE 4 but express the catamarans and trimarans as canoes by simply doubling and tripling their numbers respectively (see also FIGURE 2b).

A total of 13,976 canoes was counted during our frame survey. The highest density of canoes per kilometre of shoreline by country was recorded for Burundi (11.3 canoes/km) followed by Zaïre (10.3), Tanzania (6.0) and Zambia (3.6), as shown in FIGURE 2c. Generally, a very high densities of canoes were recorded in strata with large towns, the highest being the one for Uvira, Zaïre with 29.2 canoes/km; the lowest density was recorded for the southernmost stratum of Tanzania, Rukwa Region with 0.5 canoes/km.

3.4 Classification, number and density of landing sites

Five categories of landing sites were established as follows: I - 1 to 10 canoes/landing site; II - 11 to 30 canoes/landing site; III - 31 to 50 canoes/landing site; IV - 51 to 80 canoes/landing site; and V - over 81 canoes/landing site. TABLE 6 provides the details.

A total of 459 fish landing sites was recorded as follows: 34 in Burundi, 127 in Tanzania, 41 in Zambia and 257 in Zaïre. Most fish landing sites (192 or 41.8%) around the lake were classified into Category II i.e. having between 11 and 30 canoes each. Further, some 140 or one third of all fish landing sites around Lake Tanganyika were classified into Category I i.e. having between 1 and 10 canoes each; in Zambia, however, the percentage of this category accounted for almost a half of all fish landing sites there. Largest percentage of largest fish landing sites i.e. those with more than 81 canoes each was recorded for Burundi where 8 such sites are located (FIGURE 3).

The density of landing sites per 10 km of shoreline's length was calculated (TABLE 5). The average density of landing sites for the entire Lake Tanganyika was 2.5 landing sites per 10 km of shoreline i.e. 1 landing site for each 4 km of shoreline. By country, the density per 10 km was as follows: in Burundi 2.1, in Tanzania 1.9, in Zambia 1.9 and 3.2 in Zaïre. The highest density

of landing sites i.e. 6.8 landing sites per 10 km of shoreline was found close to the town of Moba while the lowest was recorded in stratum V in Tanzania i.e. the northernmost part of Rukwa Region.

Fig. 2a : LENGTH OF SHORELINE (in KM).

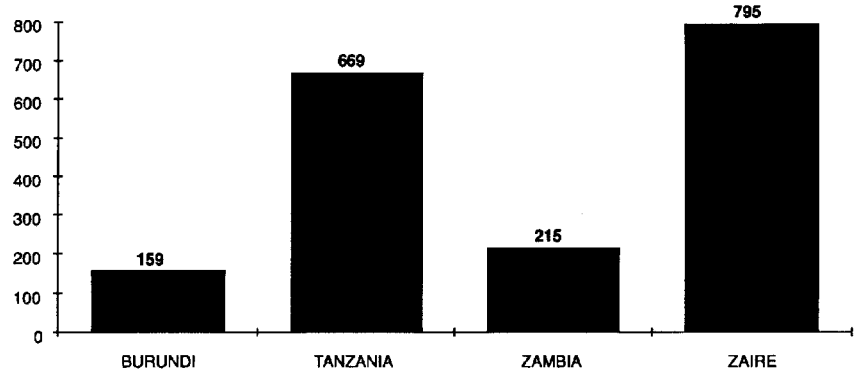

Fig. 2b : NO. OF CANOES.

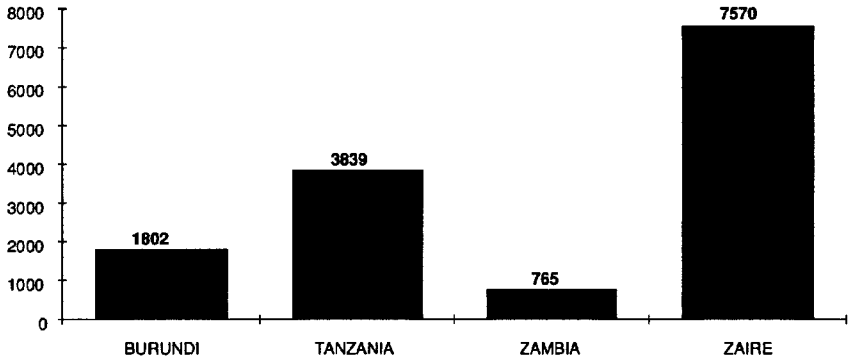

Fig. 2c : DENSITY OF CANOES.

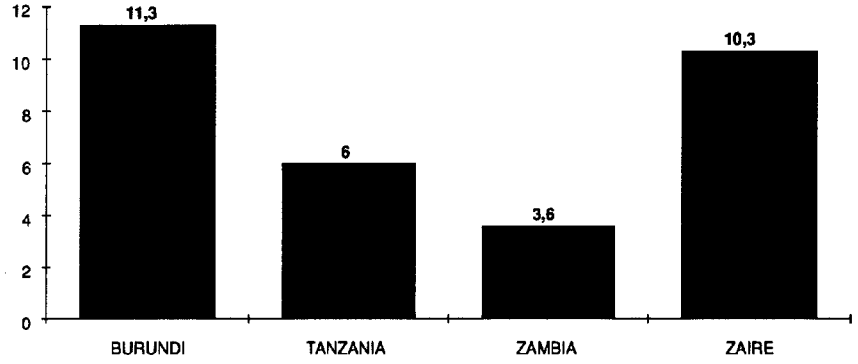

Fig 3. Distribution of fish landing sites per size class and per country

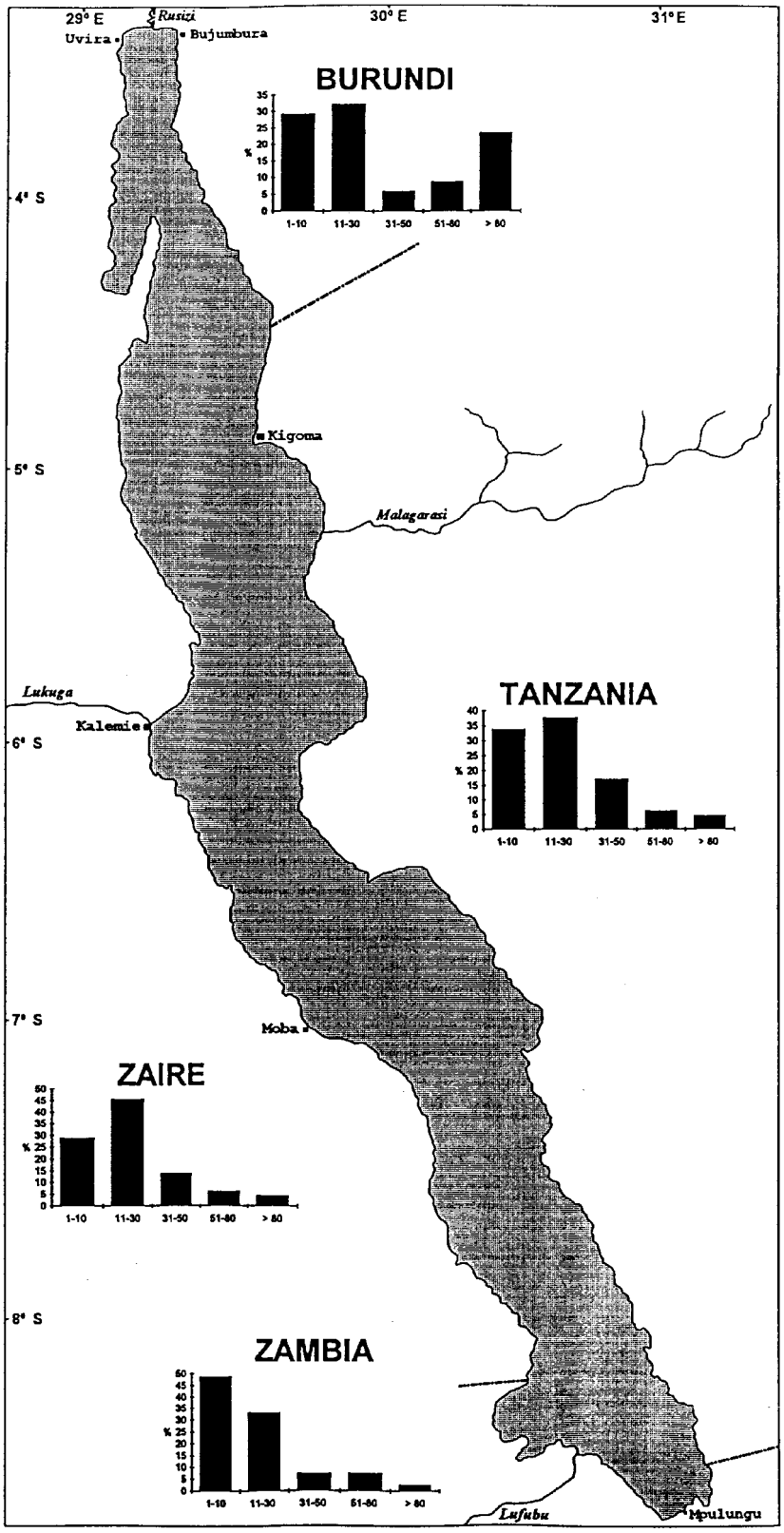

TABLE 4. Lake Tanganyika: number and density of fishing craft, per country and per stratum

COUNTRY/ STRATUM	CANOES		CATAMARANS		TRIMARANS		INDUSTRIAL UNITS	
	NO.	UNITS/KM	NO.	UNITS/KM	NO.	UNITS/KM	NO.	UNITS/KM
BURUNDI								
I	594	11,65	24	0,47	0	0,00	0	0,00
II	426	9,26	60	1,30	0	0,00	6	0,13
III	492	7,94	61	0,98	0	0,00	7	0,11
TOTAL	1512	9,51	145	0,91	0	0,00	13	0,08
TANZANIA								
I	766	8,91	84	0,98	3	0,03	0	0,00
II	191	2,73	107	1,53	1	0,01	0	0,00
III	346	4,55	155	2,04	0	0,00	0	0,00
IV	155	1,94	13	0,16	0	0,00	0	0,00
Kigoma Region	1458	4,67	359	1,15	4	0,01	0	0,00
V	283	3,72	98	1,29	0	0,00	0	0,00
VI	392	4,67	91	1,08	2	0,02	0	0,00
VII	176	2,15	48	0,59	0	0,00	0	0,00
VIII	161	2,24	61	0,85	0	0,00	0	0,00
IX	35	2,33	1	0,07	0	0,00	0	0,00
Rukwa Region	1047	3,18	299	0,91	2	0,01	0	0,00
TOTAL	2505	3,91	658	0,26	6	0,00	0	0,00
ZAMBIA								
I	112	4,31	0	0,00	0	0,00	0	0,00
II	166	6,38	7	0,27	0	0,00	5	0,19
III	148	2,31	0	0,00	0	0,00	0	0,00
IV	268	3,01	2	0,02	0	0,00	2	0,02
V	53	5,30	0	0,00	0	0,00	0	0,00
TOTAL	747	3,47	9	0,04	0	0,00	7	0,03
ZAIRE								
I	288	8,23	0	0,00	0	0,00	0	0,00
II	570	8,26	0	0,00	0	0,00	0	0,00
III	2072	19,19	0	0,00	0	0,00	0	0,00
IV	673	8,63	0	0,00	0	0,00	0	0,00
Moba	3603	12,42	0	0,00	0	0,00	0	0,00
V	709	10,43	0	0,00	0	0,00	0	0,00
VI	545	6,90	0	0,00	0	0,00	5	0,06
VII	210	10,00	0	0,00	0	0,00	0	0,00
Kalemie	1464	8,71	0	0,00	0	0,00	5	0,03
VIII	261	5,93	33	0,75	0	0,00	0	0,00
IX	304	5,74	195	3,68	1	0,02	0	0,00
X	254	2,85	26	0,29	0	0,00	0	0,00
XI	285	4,32	93	1,41	0	0,00	0	0,00
Fizi	1104	4,38	347	1,38	1	0,00	0	0,00
XII	556	23,17	73	3,04	0	0,00	2	0,08
Uvira	556	23,17	73	3,04	0	0,00	2	0,08
TOTAL	6727	9,16	420	0,57	1	0,00	7	0,01
GRAND TOTAL	11491	6,57	1232	0,70	7	0,00	27	0,02

TABLE 5. Lake Tanganyika: Number and density of traditional/artisinal fishing craft and landing sites, per country and per stratum

COUNTRY/	CANOES		LANDING SITES	
STRATUM	NO.	DENSITY/KM	NO.	DENSITY/10 KM
BURUNDI				
I	642	12,6	14	2,75
II	546	11,9	11	2,39
III	614	9,9	9	1,45
TOTAL	1802	11,3	34	2,14
TANZANIA				
I	943	11	22	2,56
II	408	5,8	15	2,14
III	656	8,6	26	3,42
IV	181	2,3	4	0,50
KIGOMA	2188	7	67	2,15
V	479	6,3	3	0,39
VI	574	6,8	20	2,38
VII	272	3,3	19	2,32
VIII	283	3,9	15	1,50
IX	37	0,5	3	2,00
RUKWA	1651	5	60	1,68
TOTAL	3839	6	127	1,90
ZAMBIA				
I	112	4,3	9	3,46
II	180	6,9	8	3,08
III	148	2,3	11	1,72
IV	272	3,1	11	1,24
V	53	5,3	2	2,00
TOTAL	765	3,6	41	1,91
ZAIRE				
I	288	8,2	16	4,57
II	570	8,3	28	4,06
III	2072	19,2	73	6,76
IV	673	8,6	23	2,95
MOBA	3603	12,4	140	4,83
V	709	10,4	22	3,24
VI	545	6,9	11	1,39
VII	210	10	9	1,43
KALEMIE	1464	8,7	42	2,00
VIII	327	7,4	17	2,70
IX	697	13,1	27	5,09
X	306	3,4	14	1,57
XI	471	7,1	11	1,67
FIZI	1801	7,1	69	2,55
XII	702	29,2	6	2,50
UVIRA	702	29,2	6	2,50
TOTAL	7570	10,3	257	3,23
GRAND TOTAL	13976	8	459	2,50

TABLE 6. Classification of landing sites according to size class, per country and per stratum.

COUNTRY/ STRATUM	SIZE CLASSES OF LANDING SITES					
	1-10 CANOES	11-30 CANOES	31-50 CAONES	51-80 CANOES	> 80 CANOES	TOTAL
BURUNDI						
I	4	6	0	2	2	14
II	3	4	1	0	3	11
III	3	1	1	1	3	9
TOTAL	10	11	2	3	8	34
TANZANIA						
I	5	6	4	4	3	22
II	3	7	5	0	0	15
III	8	11	5	2	0	26
IV	1	1	1	0	1	4
KIGOMA	17	25	15	6	4	67
V	0	1	1	0	1	3
VI	7	8	3	1	1	20
VII	14	3	1	1	0	19
VIII	4	9	2	0	0	15
IX	1	2	0	0	0	3
RUKWA	26	23	7	2	2	60
TOTAL	43	48	22	8	6	127
ZAMBIA						
I	4	5	0	0	0	9
II	2	2	0	2	2	8
III	8	2	1	0	0	11
IV	4	4	1	1	1	11
V	1	0	1	0	0	2
TOTAL	19	13	3	3	3	41
ZAIRE						
I	9	4	2	1	0	16
II	13	11	3	1	0	28
III	19	34	11	5	4	73
IV	7	13	0	2	1	23
MOBA	48	62	16	9	5	140
V	6	8	5	1	2	22
VI	2	5	2	1	1	11
VII	2	5	0	2	0	9
KALEMIE	10	18	7	4	3	42
VIII	4	11	2	0	0	17
IX	6	16	3	2	0	27
X	7	5	2	0	0	14
XI	0	8	2	0	1	11
FIZI	17	40	9	2	1	69
XII	0	0	1	2	3	6
UVIRA	0	0	1	2	3	6
TOTAL	75	120	33	17	12	257
GRAND TOTAL	147	192	60	31	29	459

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AERIAL FRAME SURVEY : BURUNDI (29.09.1992)

STRATUM I

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
BORDER OF ZAIRE					
GATUMBA (LS)	19				
	24				1
RUSIZI-RIVER					
	14				
KAJAGA (LS)	24				
	8				
CIMENTAL (LS)	24				
	3				
PORT OF BUJUMBURA					13
	8				
KIBENGA (LS)	21				
KANYOSHA (LS)	62				2
	24				
NYAMUGARI (LS)	171				3
03°30'00"					
NYABAGE (LS)	11	3			
KABEZI (LS)	8				
	2				
GAKOMBERA (LS)	7				
	3				
MIGERA (LS)	40	13			
	5				
KIRASA (LS)	8				
GASANGE (LS)	6				
GITAZA (LS)	89				
	6	1			
RUTUNGA (LS)	7	7			
SUBTOTAL	594	24	0	0	19

STRATUM II

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
	4	2			
NYARUHONGOKA (LS)	3	4			
	12	2			
MAGARA (LS)	97	20			
	15				
GATARE (LS)	19	4			
SHANGA (LS)	2	3			1
	6	1			
MINAGO (LS)	11	10			
	2				
GUGARO (LS)	15				
KAGONGO (LS)	92			2	
	3	1			
KIZUKA (LS)	10	9		1	
	11	1			
KINANI (LS)	10				
NYACIJIMA (LS)		2			
	6				
RUMONGE (LS)	108	1		3	10
SUBTOTAL	428	60	0	6	11

STRATUM III

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
04°00'00'' S					
	20				
KARONDA (LS)	53	19			1
KIGWENA-GIKUMU (LS)	14				
BUZENGO (LS)	2	1			
	8				
MUGURUKA (LS)	109	6		7	
	6	2			
MVUGO (LS)	149	1			
GIFURUZI (LS)	6				
	10				
NYANZA-LAC (LS)	34	3			
	1				
GASABA (LS)	8	1			
KABONGA (LS)	38	19			4
	2				
SUBTOTAL	492	61	0	7	8
GRAND TOTAL	1512	145	0	13	38

AERIAL FRAME SURVEY : TANZANIA (29. - 30.09.1992)

STRATUM I

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
BORDER OF BURUNDI					
04°26'38'' S					
KAGUNA (LS)	30	9			3
SANZE (LS)	2	1			
ZASHE (LS)	23	2			1
	1				
KIZIBA (04°32'19" S, 29°30'42" E)	5	1			
	2				
BUGAMBA (LS)	71	6			1
MWAMGONGO (LS)	44				4
(04°37'09" S, 29°37'43" E)					
VILLAGE (04°38'40" S)	23				1
VILLAGE (04°38'20" S)	105	2			1
VILLAGE (04°40'30" S)	62				3
	8				
VILLAGE (04°42'10" S)	81	1			
VILLAGE (04°42'50" S)	10				
VILLAGE (04°43'40" S)	22	1			
		1			
KAZINGA (LS)	56	1			
VILLAGE (04°45'30" S)	12	1			
MTANGA (LS)	65	6			1
	4	1			
VILLAGE (04°47'27" S, 29°35'51" E)	4	1			
KATONGWE POINT					
	11	10			2
KAGONGO (LS)	25	4			
LEMBA (LS)	15	1			
NANDWA POINT					
	6				
			2		
CITY OF KIGOMA	40	11	1		17
	14	7			
VILLAGE (04°54'30" S)	22	14			
	3				
ULOMBOLA (LS)		3			
SUBTOTAL	788	84	3	0	34

STRATUM II

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
05°00'00'' S					
MASAKA POINT (05°02'21" S, 29°46'07" E)					
	3	7			
MAYOBOSI-river		19			
BUGURI (LS)	12	6			
	1				
MWAKIZEGA (LS)	27	4			
KABEBA (LS)	27				
LUGUNGA (LS)	11				
MALAGARASI-river	27	2			
	4	9			
KARAGO (LS)	4	4			
MWIGA (LS)	1	6	1		
	6	1			
MUTUNDIKONE (LS)	5	1			
SUNUKA (LS) (05°20'45" S, 29°46'35" E)	13	4			
LUGUFU-river					
	11	4			
VILLAGE (05°24'55" S)	4	3			
KIRANDOO-POINT					
	3	1			
KABORO-POINT		1			
VILLAGE (05°26'30" S)	8	8			
VILLAGE (05°27'00" S)	3	14			1
MKUYU POINT					
VILLAGE (05°29'30" S)	19	13			
	2				
SUBTOTAL	191	107	1	0	1

STRATUM III

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
05°30'00'' S					
	12				
VILLAGE (05°31'40" S)	11				
FISHING CAMP (05°32'00" S)		13			
FISHING CAMP (05°32'35" S)	3	9			
SINDUKA (LS)	9	20			1
SEGUNGA (LS)	8	4			1
	12				
KANGWENI-river	4	5			
	2				
KUNGWE BAY					
KANGWENI (LS)	2	2			
VILLAGE (05°38'10" S)	1	2			
VILLAGE (05°38'25" S)	9	9			
VILLAGE (05°38'35" S)		4			
VILLAGE (05°38'40" S)	3	8			
LUNGONYA-river					
	1				
VILLAGE (05°40'00" S)	7				
KANGWENA (LS)	39	4			
	2				
FISHING CAMP (05°42'45" S)	43	4			
KABWE (LS)	21	13			
	3				
VILLAGE (05°45'40" S)	2	5			
ROSANGE (LS)	19	6			
MGONDOZI (LS) AND -river	26	14			1
05°46'32" S, 29°56'21" E					
KAPARAMSEMBE-river	3				4
	13				
LUBALISI-river	3				
BULIMBA (LS)	17				1
LUGUNGWISI-river	1	1			
LUKOMA (LS)	7				
KANYASA (LS)	17				1
	2				
LAGOSSA-river (05°57'09" S, 29°52'29" E)					
	2				
MGAMBO (LS)	5	14			3
KALELA POINT	2	2			
KALILABILENGE (LS)	15				
	5	3			1
VILLAGE (05°59'40" S)	6	1			
	3				
VILLAGE (05°59'55" S)	6	12			3
SUBTOTAL	348	155	0	0	16

STRATUM IV

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
06°00'00'' S					
KATUMBA POINT					
SITOLO FISHING CAMP	9	2			
BULU POINT					
KALILANI FISHING CAMP	76	10			
	7	1			
PASAGULU POINT					
MIYAKO POINT					
RESEARCH CAMP					
KASIHA RESEARCH CAMP					1
SINSIBA FISHING CAMP					
FISHING CAMP (06°08'20" S)	8				2
N'GANJA FISHING CAMP					
MUSOFWE BAY					
LUAHAGALA POINT					
LUBUNGWE BAY					
10 MINUTES BREAK	11				
(06°14'45" S - 06°27'45" S)					
NANGA BAY (06°28'00" S)					
MAKOLA (LS)	44				
SIBWESA POINT					
SUBTOTAL	156	13	0	0	3
TOTAL KIGOMA REGION	1458	359	4	0	54

STRATUM V

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
06°30'00" S					
20 MINUTES BREAK					
(06°29'20" S - 06°41'59" S)	126	18			
IKOLA (LS)	14	3			3
SUMBWA FISHING CAMP	25	53			7
SUMBWA SPIT					
KAREMA (LS)(06°49'00" S)	34	6			1
	3	2			
20 MINUTES BREAK					
06°51'46" S - 07°02'12" S	81	16			2
SUBTOTAL	283	99	0	0	13

STRATUM VI

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
20 MINUTES BREAK					
06°51'46" S - 07°02'12" S					
KABWE (LS)	14	17			7
UDACHI BAY	11	10			7
	6	1			
KASINDE (LS)	8				
	2	1			
UTINTA (LS)	41	23	2		6
	3	5			
VILLAGE (07°07'00" S)	11	1			1
	3	1			
KATONDO POINT	1				
	8				
KORONGWE BAY (07°09'40" S)	12				1
KAMBEMBA FISHING CAMP		4			
	3	2			
MKALASI POINT	8	2			
	4				
BUMANDA (LS)	14				
	4				
KAZOVU (LS)	53				
	3				
VILLAGE (07°16'30" S)	9				
VILLAGE (07°17'20" S)	5				
VILLAGE (07°17'40" S)	7				
	1	1			
CHONGO (LS)	20	4			
KATATE (LS)	38	2			
	3				1
VILLAGE (07°21'45" S)	22				2
	12				1
MANDA ISLAND	5				
SHORT BREAK					
07°26'32" S - 07°27'00" S	16	14			
CITY OF KIPILI					
VILLAGE (07°27'25" S)	15				
	3				
KALUNGU (LS)	16	3			4
NGOSA POINT	8				
	3				
SUBTOTAL	392	91	2	0	30

STRATUM VII

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
07°30'00" S					
FILE BAY	5				1
KATALE BAY	3				
SUKOPWE BAY	1	1			
VILLAGE (07°32'10" S)	3	1			
SAMGAMWISA BAY	2				
KOLWE BAY	3				
	3				
VILLAGE (07°34'00" S)	8				
	1				1
VILLAGE (07°34'30" S)	4				
MTOSI BAY	5				
NAMANSI (LS) (07°37'00" S)	16	1			
CHAMEPA POINT		2			
	3				
KASESHA (LS)		2			
FISHING CAMP (07°39'20" S)		3			
FISHING CAMP (07°39'30" S)		4			
NINDE (LS)	5				
	2				
KILAMBO FISHING CAMP (07°45'21" S)	3				
MTEGO BAY	10				
	1				
MSUWI FISHING VILLAGE	1				
MSAMBA (LS)	14				2
KASULO FISHING VIILLAGE	3				
LUPATA (LS)	4				1
	7				
LYAPINDA (LS)	8				
KIZUMBI (LS)	5				
NGANGA (LS)	20				
	1				
WAMBEMBE (LS)	18	20			3
	4				
MWINZA (LS)	13	14			1
SUBTOTAL	176	48	0	0	8

STRATUM VIII

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
08°00'00" S					
LUSEMBWA (LS)	4	4			2
IZINGA (LS)	6	11			1
ITANGA (LS)	9	1			
LYELA (LS)	5	7			
SHORT BREAK					
08°05'32" S - 08°07'00" S	6	3			
KALA (LS)	21	6			
VILLAGE (08°09'10" S)	5	1			1
LOLESHA (LS)	8	6			1
		5			
BREAK					
08°11'20" S - 08°17'00" S					
NKONKONTI (LS)					
KATILI (LS)					
KALEPA (LS)					1
LAMVYA BAY	1				
SAMAZI (LS)	33	7			8
	1				
FISHING CAMP (08°22'10" S)	12				1
MOLWE (LS)	1				
MUZI (LS)	7	1			6
					1
SONGAMBELE (LS)	4	6			1
LUSEMBO (LS)	10	3			1
FORT MWALA					
KILEWANI (LS)	27				
KAFYOKO POINT	1				1
SUBTOTAL	161	61	0	0	24

STRATUM IX

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
08°30'00" S					
KANTALAMBA-river	1				
VILLAGE (08°33'50" S)	2				2
	2				
KAPPELE (LS)	15				
KIBWA (LS)	14	1			6
KALAMBO-river	1				
BORDER					
SUBTOTAL	35	1	0	0	8
TOTAL RUKWA REGION	1047	299	2	0	84
GRAND TOTAL	2505	658	6	0	138

AERIAL FRAME SURVEY : ZAMBIA (30.09 and 01.10.1992)

STRATUM I

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
BORDER OF TANZANIA (08°36'00" S)					
KALAMBO-river (08°36'00" S)					
CHIPWA (LS)	9				
MIYAMBA (LS)	5				1
CHIKOYE-JAILO SINKALA (LS)	17				2
CHISANZA (LS)	14				2
EMELE ZOMBE (LS)	15				
WHITE MIPANGO (LS)	11				1
MUZUMWA (LS)	3				
VILLAGE (08°42'30" S)	25				
VILLAGE (08°42'45" S)	4				
LUNZUA-river	9				1
SUBTOTAL	112	0	0	0	7

STRATUM II

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
VILLAGE (08°42'45" S)		2			1
KASENGA POINT					
MUTONDWE ISLAND					
MWINA POINT OF ISLAND	62	1			4
CHITUMBA (LS)	10				
WANZYE POINT					
	9	4			
MPULUNGU	41			5	31
Outside of MPULUNGU missed					
KUMBULA island					
MUSENDE (LS)	17				1
KASAKALAWE (LS)	22				6
	5				1
SUBTOTAL	166	7	0	5	44

STRATUM III

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
KATOTO (LS)	39				2
	4				
VILLAGE (08°46'30" S)	9				2
	1				
VILLAGE (08°43'12" S)	9				
VILLAGE (08°42'50" S)	5				
VILLAGE (08°42'40" S)	10				
VILLAGE (08°41'15" S)	14				2
	3				1
INFLOWING RIVER	2				
	6				
VILLAGE (08°37'30" S)	7				
VILLAGE (08°36'40" S)	8				
VILLAGE (08°36'20" S)	4				
	1				
VILLAGE (08°35'55" S)	2				
VILLAGE (08°34'00" S)	23				1
	1				
SUBTOTAL	149	0	0	0	6

STRATUM IV

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
BREAK 08° 33'43" S - 08°31'28" S					
MISSED KASOLOLO BAY					
KASABA BAY					
SUMBU GAME RESERVE					
	1				
RESORT LODGE NKAMBA					
08°36'00" S					
08°30'32" E					
VILLAGE (08°30'40" S)	52				3
		1			
SUMBU (LS)	27				7
					1
SAMAKI COMPLEX				2	
	4				
	3				
VILLAGE (08°28'55" S)	2				1
	3				
N´DOLE LODGE					
VILLAGE (08°28'20" S)	1	1			
VILLAGE (08°26'55" S)	36				
VILLAGE (08°26'10" S)	3				
VILLAGE (08°25'15" S)	1				1
MUSHI (LS)	93				3
VILLAGE (08°21'20" S)	18				1
VILLAGE (08°20'40" S)	13				
VILLAGE (08°19'40" S)	11				1
SUBTOTAL	268	2	0	2	18

STRATUM V

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
VILLAGE (08°17'00" S)	32				
	11				
KAPUTA (LS)	10				2
SUBTOTAL	53	0	0	0	2
GRAND TOTAL	694	9	0	7	77

AERIAL FRAME SURVEY : ZAIRE (02. - 03.10.1992)

STRATUM I

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
BORDER OF ZAMBIA (08°13'40" S)					
	11				
VILLAGE (08°13'30" S)	24				
	9				
VILLAGE (08°09'20" S)	6				
VILLAGE (08°08'17" S)	4				
	2				
VILLAGE (08°08'00" S)	3				
VILLAGE (08°07'45" S)	4				
VILLAGE (08°07'20" S)	5				
VILLAGE (08°06'50" S)	3				1
VILLAGE (08°06'30" S)	3				
	10				
VILLAGE (08°06'28" S)	4				
LIVUA-river (08°06'26" S)	9				
VILLAGE (08°06'20" S)	3				
VILLAGE (08°04'04" S)	32				
VILLAGE (08°03'30" S)	60				
VILLAGE (08°03'30" S)	37				
VILLAGE (08°02'20" S)	15				1
VILLAGE (08°01'38" S)	26				1
LUKUSHIA-river (08°00'50" S)					
VILLAGE (08°00'22" S)	18				
SUBTOTAL	288	0	0	0	3

STRATUM II

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
08°00'00" S	21				
VILLAGE (07°59'30" S)	18				1
VILLAGE (07°58'50" S)	6				
VILLAGE (07°58'30" S)	6				
	2				
UPOTA (LS)	9				1
	18				2
VILLAGE (07°56'10" S)	10				
VILLAGE (07°55'50" S)	18				1
	6				
VILLAGE (07°55'30" S)	10				
	8				
VILLAGE (07°55'10" S)					1
VILLAGE (07°54'50" S)	17				2
VILLAGE (07°54'40" S)	20				1
LUNANGUWA-river (07°54'27" S)					
	17				2
VILLAGE (07°51'20" S)	6				
VILLAGE (07°51'10" S)	12				
VILLAGE (07°50'30" S)	12				
	14				1
VILLAGE (07°48'30" S)	30				2
	1				
VILLAGE (07°46'10" S)	5				
VILLAGE (07°45'50" S)	10				
VILLAGE (07°45'40" S)	4				
	1				
VILLAGE (07°44'10" S)	12				
	1				
VILLAGE (07°43'30" S)	5				
07°42'45" S					
VILLAGE (07°42'00" S)	9				
VILLAGE (07°42'10" S)	3				
	4				1
VILLAGE (07°41'40" S)	21				1
	1				
VILLAGE (07°40'50" S)	9				
	13				
VILLAGE (07°38'47" S)	43				
VILLAGE (07°37'40" S)	34				3
	4				
VILLAGE (07°36'20" S)	13				
MASANZA (LS) (07°34'54" S)	37				
VILLAGE (07°33'45" S)	14				
VILLAGE (07°33'00" S)	86				
KAPE KAYEMBE (07°30'00" S)					
SUBTOTAL	570	0	0	0	19

STRATUM III

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
KAPE KAYEMBE (07°30'00" S)					
VILLAGE (07°29'00" S)	14				
	11				
MUSANZE (LS)	33				
VILLAGE (07°27'45" S)	14				
	11				
VILLAGE (07°25'20" S)	27				2
VILLAGE (07°24'10" S)	16				
VILLAGE (07°23'30" S)	9				
VILLAGE (07°22'40" S)	29				
VILLAGE (07°22'00" S)	26				
VILLAGE (07°21'20" S)	49				1
KAZIBA (LS)	16				
KIPAMBA (LS)	14				
MWERAZI-river (07°18'33" S)					
ZONGWE (LS)	68				
LULUVIA-river (07°17'30" S)					
KASENGWE (LS)	22				
VILLAGE (07°17'00" S)	11				
VILLAGE (07°16'10" S)	48				1
VILLAGE (07°15'30" S)	6				
VILLAGE (07°14'10" S)	20				
	2				
VILLAGE (07°13'45" S)	10				
	1				
VILLAGE (07°13'10" S)	6				
	2				
VILLAGE (07°12'30" S)	7				
VILLAGE (07°10'35" S)	34				
	18				
VILLAGE (07°09'50" S)	6				
	16				
VILLAGE (07°09'50" S)	14				
VILLAGE (07°09'31" S)	41				1
VILLAGE (07°08'56" S)	37				
VILLAGE (07°08'20" S)	18				
KAMAMBA-river					
	2				
VILLAGE (07°08'00" S)	13				
	10				
VILLAGE (07°07'50" S)	18				
VILLAGE (07°07'50" S)	10				
	1				
VILLAGE (07°07'40" S)	20				
VILLAGE (07°07'40" S)	11				
RUKIS (LS)	99				
VILLAGE (07°07'00" S)	35				2
VILLAGE (07°06'30" S)	53				
VILLAGE (07°05'42" S)	14				
	11				
VILLAGE (07°05'20" S)	38				
VILLAGE (07°05'10" S)	38				1
VILLAGE (07°05'05" S)	9				
VILLAGE (07°05'00" S)	31				
	4				
VILLAGE (07°04'50" S)	7				
VILLAGE (07°04'45" S)	44				1
	2				
VILLAGE (07°04'35" S)	8				
	13				
VILLAGE (07°04'35" S)	8				
VILLAGE (07°04'30" S)	10				
VILLAGE (07°04'30" S)	11				
VILLAGE (07°04'30" S)	19				
VILLAGE (07°04'24" S)	30				
	5				
SUBURBAN OF CITY OF MOBA	478				3
MOBA-river	5				14
CITY OF MOBA	311				17
MULABOZI-river estuary	51				1
MULOBOZI-river (07°00'00" S)					
SUBTOTAL	2072	0	0	0	44

STRATUM IV

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
MULOBOZI-river (07°00'00" S)					
	3				
VILLAGE (06°59'20" S)	76				
VILLAGE (06°59'10" S)	5				
	3				
VILLAGE (06°57'30" S)	30				
	7				
VILLAGE (06°56'50" S)	12				
	4				
VILLAGE (06°56'00" S)	6				
	7				
KWALI-river					
	18				
VILLAGE (06°53'25" S)	24				
	7				
VILLAGE (06°50'45" S)	20				
	4				
VILLAGE (06°50'00" S)	6				
VILLAGE (06°47'40" S)	27				
	2				
VILLAGE (06°47'20" S)	3				
VILLAGE (06°49'10" S)	4				
	4				
VILLAGE (06°48'35" S)	9				1
	4				
PALA (LS) (06°45'00" S)	18				1
	6				
VILLAGE (06°44'40" S)	29				
	8				
LUFUKO-river					
	21				
VILLAGE (06°42'30" S)	24				
	1				
VILLAGE (06°38'50" S)	17				
	20				2
VILLAGE (06°36'42" S)	18				1
VILLAGE (06°36'10" S)	14				1
	6				1
VILLAGE (06°34'40" S)	52				
VILLAGE (06°34'10" S)	8				
VILLAGE (06°33'45" S)	18				
	1				
VILLAGE (06°32'50" S)	16				
	1				1
KIKONDE (06°30'00" S)	110				10
SUBTOTAL	673	0	0	0	18
Territory of Moba	3903	0	0	0	84

STRATUM V

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
KIKONDE (06°30'00" S)					
VILLAGE (06°28'50" S)	11				1
VILLAGE (06°28'20" S)	3				
	3				1
KABWEMA (LS)	26				
	1				
VILLAGE (06°26'42" S)	39				2
VILLAGE (06°24'45" S)	5				3
	1				1
VILLAGE (06°23'35" S)	13				
VILLAGE (06°22'40" S)	3				
VILLAGE (06°21'50" S)	11				1
VILLAGE (06°20'55" S)	38				1
VILLAGE (06°20'25" S)	8				
	13				
MASANGA (LS) (06°18'32" S)	72				
	14				
VILLAGE (06°17'30" S)	83				2
	6				
LUBAYA-river (06°14'48" S)					
	2				
VILLAGE (06°13'50" S)	10				
VILLAGE (06°12'35" S)	29				
VILLAGE (06°12'20" S)	37				
VILLAGE (06°11'45" S)	42				1
	5				2
VILLAGE (06°10'00" S)	13				
VILLAGE (06°09'00" S)	20				
	1				
TUMBWE (LS) (06°07'00" S)	106				
	1				
MALEMBA (LS) (06°04'00" S)	42				1
	7				
LUBILAYE-river (06°02'10" S)	7				1
VILLAGE (06°00'50" S)	27				
06°00'00" S					
SUBTOTAL	709	0	0	0	17

STRATUM VI

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
06°00'00" S					
KALEMIE	158				18
LUKUGA-river	50			5	1
	7				
LUGUMBA-river (05°52'00" S)	18				
	50				
VILLAGE (05°47'55" S)	50				1
KASANGA (LS)	64				
	1				
VILLAGE (05°45'40" S)	29				
CAP POPELIN					
	15				2
LUBANDAIE-river (05°37'37" S)					
	19				
KAVALA ISLAND	19				
	8				
VILLAGE (05°35'00" S)	7				
VILLAGE (05°34'50" S)	10				
	2				
VILLAGE (05°33'30" S)	13				
	2				
VILLAGE (05°32'45" S)	14				
	8				1
05°30'00" S					
SUBTOTAL	545	0	0	5	23

STRATUM VII

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
05°30'00" S					
VILLAGE (05°29'40" S)	54				1
VILLAGE (05°29'32" S)	13				
	6				
KILISE-river (05°27'44" S)	6				
VILLAGE (05°26'02" S)	60				2
VILLAGE (05°25'50" S)	17				
VILLAGE (05°25'03" S)	11				
VILLAGE (05°24'40" S)	3				
VILLAGE (05°24'00" S)	12				
	6				
VILLAGE (05°22'00" S)	20				
	2				
BREAK (05°20'00" S - 04°50'07" S)					
SUBTOTAL	210	0	0	0	3
Territory of Kalemie	1464	0	0	5	43

STRATUM VIII

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
BREAK (05°20'00" S - 04°50'07" S)					
	22				
VILLAGE (04°48'00" S)	21				
VILLAGE (04°48'45" S)	46				
VILLAGE (04°47'32" S)	19				1
	1				
VILLAGE (04°44'30" S)	18				
	4				
VILLAGE (04°42'40" S)	1	7			
VILLAGE (04°42'00" S)	14				
VILLAGE (04°41'30" S)	10	3			
VILLAGE (04°41'00" S)	9	2			
VILLAGE (04°40'30" S)	5	1			
VILLAGE (04°39'40" S)	2	7			1
	5				
VILLAGE (04°38'50" S)	9	7			
	11				
VILLAGE (04°36'20" S)	8	2			
VILLAGE (04°35'50" S)	5	1			
	6				
VILLAGE (04°34'30" S)	2	2			
VILLAGE (04°33'10" S)	13				
VILLAGE (04°32'40" S)	32	1			1
LUKATI-river (04°31'38" S)					
04°30'00" S					
SUBTOTAL	241	33	0	0	2

STRATUM IX

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
04°30'00" S					
	2				2
CAP KALAMBA	4	13			
VILLAGE (04°31'10" S)	6	7			
	2				
VILLAGE (04°31'00" S)	3	8			
VILLAGE (04°29'00" S)	16	3			1
VILLAGE (04°28'20" S)	23	1			2
VILLAGE (04°27'10" S)	21				
	1				
VILLAGE (04°25'50" S)	2				4
VILLAGE (04°24'50" S)	18	1			
	7	1			1
VILLAGE (04°23'31" S)	17	2			
VILLAGE (04°22'20" S)	16	1	1		
VILLAGE (04°21'30" S)	4				
VILLAGE (04°21'00" S)	16	7			
	5				1
VILLAGE (04°18'43" S)	8	10			
VILLAGE (04°17'26" S)	13	16			
VILLAGE (04°16'40" S)	2	2			
VILLAGE (04°16'00" S)	5	9			
	3	1			
VILLAGE (04°14'40" S)	14	35			
	1				
VILLAGE (04°13'50" S)	2	22			
	11				1
VILLAGE (04°12'10" S)	20	18			
VILLAGE (04°10'45" S)	6	3			
	1	1			
VILLAGE (04°10'00" S)	5	5			
VILLAGE (04°09'10" S)	18	7			1
VILLAGE (04°08'30" S)	1	1			
VILLAGE (04°08'00" S)	10	1			
VILLAGE (04°07'15" S)	3	2			1
MUZIMU (LS) (04°06'16" S)	11	15			1
	1				
CAP MUZIMU					
VILLAGE (04°05'50" S)	2	3			
	6				
CAP BANZA-BURTON BAY					
SUBTOTAL	304	195	1	0	15

STRATUM X

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
CAP BANZA (04°03'00" S)					
START OF BURTON BAY					
VILLAGE (04°03'00" S)	4	16			
VILLAGE (04°04'10" S)	1	1			1
VILLAGE (04°04'30" S)	5				
VILLAGE (04°05'30" S)	19				
VILLAGE (04°08'10" S)	5				
VILLAGE (04°07'51" S)	5				
VILLAGE (04°08'10" S)	3				
	2				
VILLAGE (04°09'47" S)	2				
	7				
VILLAGE (04°14'46" S)	7				
	1				
VILLAGE (04°16'15" S)	18				
VILLAGE (04°17'00" S)	12				
	13				
VILLAGE (04°18'30" S)	23				
	42				
MUKUKU (LS) (04°08'22" S)	13				2
	3				1
CITY OF BARAKA (04°07'00" S)	47	5			16
	22	4			
04°00'00" S					
SUBTOTAL	254	26	0	0	20

STRATUM XI

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
04°00'00" S					
VILLAGE (03°59'44" S)	10	20			1
	11	3			
VILLAGE (03°56'50" S)	16	6			
	7				
VILLAGE (03°54'20" S)	6	8			
	18				1
VILLAGE (03°49'30" S)	5	3			1
VILLAGE (03°48'50" S)	7	7			
	10				
VILLAGE (03°47'10" S)	21				2
	32	8			10
VILLAGE (03°41'40" S)	5	8			1
	4	4			1
VILLAGE (03°37'21" S)	16	11			3
	5				
VILLAGE (03°35'30" S)	15	3			
	8				
VILLAGE (03°34'10" S)	21				1
	3				
MAKOBOLA (LS) (03°32'53" S)	64	12			2
	1				
03°30'00" S					
SUBTOTAL	285	93	0	0	29
Territory of Fizi	1104	347	1	0	61

STRATUM XII

POSITION, VILLAGE OR LANDING SITE	FISHING UNITS				
	CANOES	CATAMARANS	TRIMARANS	INDUSTRIAL UNITS	TRANSPORT BOATS
03°30'00" S					
KIGONGO (LS) (03°29'29" S)	59	9			
KATONGO (LS)	85				
	10				1
SUBURBAN OF UVIRA CITY	80				7
PORT DE KALUNDU	39			2	9
UVIRA	126	15			3
SUBURBAN OF UVIRA CITY	137	46			2
	20	3			
03°21'00" S					
BORDER OF BURUNDI					
SUBTOTAL	556	73	0	2	22
Territory of Uvira	556	73	0	2	22
GRAND TOTAL	6727	420	1	7	210