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REPORT ON THE FIRST WORKSHOP ON THE COORDINATION AND STANDARDIZATION OF FISHERIES STATISTICS FOR LAKE TANGANYIKA
(Bujumbura, 26–30 July 1993)

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) and the Arab Gulf Programme for United Nations Development Organizations
(AGFUND).

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 build-up of effective coordination mechanisms to ensure full collaboration between the Governments concerned.

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GCP/RAF/271/FIN PUBLICATIONS

Publications of the project are issued in two series:

* a series of **technical documents (GCP/RAF/271/FIN-TD)** related to meetings, missions and research organized by the project; and

* a series of **manuals and field guides (GCP/RAF/271/FIN-FM)** related to training and field work activities conducted in the framework of the project.

For both series, reference is further made to the document number **(01)**, and the language in which the document is issued: English **(En)** and/or French **(Fr).**

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1993 **GCP/RAF/271/FIN-TD/11 (En): 176pp.**

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1. INTRODUCTION

In 1989, the 5th CIFA Sub-Committee Meeting for Lake Tanganyika requested urgent assistance from FAO in developing a common approach and methodology in the collection and analysis of fishery statistics, information and data (CIFA, 1990).

The first results in that direction are covered by the present report, presenting the results of the first workshop on the coordination and standardization of fisheries statistics for Lake Tanganyika, organized and sponsored by the FAO/FINNIDA Project GCP/RAF/271/FIN 'Research for the Management of the Fisheries on Lake Tanganyika' (LTR). This regional project has its headquarters in Bujumbura and started the activities of its preparatory phase (18 months) in January 1992. This workshop was the first one to be organized in connection with the activities of the 'fisheries statistics subcomponent' of the project.

The workshop was held in the meeting room of LTR's headquarters in Bujumbura, Burundi, from 26 to 30 July 1993 and was attended by 12 participants and observers (see Annex 1) of the four countries sharing Lake Tanganyika, i.e. Burundi, Tanzania, Zambia and Zaïre.

The workshop was opened by LTR's biostatistician and workshop leader, after which the workshop agenda was adopted as shown in Annex 2.

During the second and third days of the workshop, the four countries each presented respectively a paper on their present fisheries frame survey and one on the catch assessment survey for Lake Tanganyika (Annex 3). Special emphasis was placed on institutional aspects, methodology, forms in use, compilation/analysis of data collected, publication of annual fisheries statistics reports, problems encountered and possible solutions for improving the systems in each country and for better coordination/ standardization of fisheries statistics amongst the four riparian countries.

During the fourth day of the workshop, a general working group discussion took place to formulate specific and general recommendations for the improvement of frame and catch assessment surveys in the respective countries and for the coordination/ standardization of the statistical systems and reporting amongst countries.

Before the closure of the workshop on the fifth day, 27 specific and general recommendations were adopted as listed in Chapter 3 and two standardized forms for Lake Tanganyika were proposed, one for the frame survey and one for the catch assessment survey result output (see Annex 5). These recommendations/forms will be presented to the Directors of Fisheries of the four countries during the next CIFA Subcommittee Meeting for Lake Tanganyika in Lusaka, Zambia, mid–October 1993 for their endorsement and, hopefully, subsequent implementation.

2. REPORT ON THE WORKSHOP

1. On Monday morning 26.07.93, the workshop participants dealt with administrative matters at LTR's headquarters office (hotel reservation, payment DSA, airticket reconfirmation, etc.).

2. In the afternoon, the workshop leader welcomed the participants on behalf of the LTR Project and explained the need to come up with clear recommendations which then would be considered by LTR and the sixth CIFA Subcommittee for Lake Tanganyika in October 1993.

3. The final agenda for the workshop was adopted as shown in Annex 2. The remainder of the afternoon was left to the participants of each country to finalize their country papers.

4. On Tuesday 27.07.93, the four countries presented their respective papers on the present frame survey systems in use for Lake Tanganyika (see Annex 3).

5. For Tanzania, the frame survey system or inventory of all fish production factors is a national one, used for all the waterbodies in the country. A recent UNDP/FAO Statistical Project came up with an 'improved' national system for the two/three yearly frame surveys, using 2 forms for collection of information at fish landing sites and from fishing households. Major problems encountered included the complicated administrative system, financial constraints and the absence of patrol boats for supervising purposes and for carrying out fisheries surveys along the mostly inaccessible Tanzanian shoreline.

6. For Burundi, the last frame survey was carried out in October 1992 by a number of resident recorders and a team of mobile supervisors, revealing a total number of 609 active artisanal liftnet units and an increased number (63) of Apollo units (large artisanal liftnet fishing units composed of two planked boats of 12 m length and a liftnet opening of up to 120 m circumference), mostly operating in the southern province (Makamba). The report on the detailed results of this frame survey was not yet finalized.

7. For Zaïre, some partial frame surveys were done in 1984 and 1991 for the northern portion of the Lake. The only complete aerial frame surveys of the Zairian coast of Lake Tanganyika were carried out by LTR in 1992 (Hanek *et al.*, 1993; Coenen *et al.*, 1993) and 1993. The constraints in Zaïre are numerous: inefficient administrative system, no budget, lack of trained personnel, no means for communication and for supervision, the bad economical and political situation in the country, etc.

8. For Zambia, due to financial constraints, no frame survey has been carried out on the Lake since years. However, frame survey data are partially updated during supplementary frame surveys which are running concurrently

with the four monthly catch assessments surveys.

9. On Wednesday 28.07.93, the four countries presented their papers on the present catch assessment survey systems in use for Lake Tanganyika (see Annex 3).

10. In Tanzania, 17 recording stations (11 in Kigoma Region, 6 in Rukwa Region) are responsible for collecting catch assessment survey (CAS) data. According to the improved system, implemented last year, total enumeration is done during 16 days per month, chosen at random, at the selected landing sites. Monthly CAS data, compiled on form 21B, are channeled through the Regional Fisheries Offices to the computerized statistical unit in Dar es Salaam where data are entered in the 4 computers available and analyzed using a software programme called TANFIS.

11. For each recording station, monthly catch estimates are arrived at by multiplying the average daily catch per boat times the number of boats times the number of days in the month. Annual reporting on Tanzanian fisheries statistics happens with considerable delays because the volume of fisheries statistics data, originating from all waterbodies in Tanzania, to be entered and analyzed in Dar–es–Salaam is becoming too big to be handled by the small, computerized statistical unit in the capital.

12. Problems encountered comprise inadequate funds, complicated administrative structure, communication and supervision problems, lack of transport and logistics, lack of training at all levels and delayed or non–payment of salaries and allowances. The importance of the reliability of the original catch/effort data collected by the beach recorders was emphasized: if, due to lack of supervision, training, motivation, etc., the original data are 'cooked', the final catch/effort estimates will be unreliable.

13. In Burundi, 15 fixed landing sites along the Burundian shoreline are selected for collecting catch/effort data. The length of the shoreline is only 159 km long (Hanek *et al.,* 1993) and very well accessible by road (contrary to the other 91 % of shoreline shared by the other 3 countries). Transmission of monthly catch/effort data to the computerized statistical unit located in the buildings of the Fisheries Department in Burundi is therefore not difficult. Catch/effort data are entered into the computer by a number of assistant-biologists and daily catch/effort estimates arrived at using a software, written in dBase III, and developed in 1991 by the UNDP/FAO Project BDI/90/002 'Informations et Statistiques de Pêches' (Bellemans, 1991).

14. Monthly and yearly catch/effort estimates are produced by landing site, stratum and province, but after the closure of the above mentioned UNDP/FAO project, the ability and means of the statistical unit to produce annual statistical reports and other reports in general is lacking. Due to lack of financial means, the maintenance of the computer

hardware, the purchase of spare parts (disks, listing paper, etc.) and the supervision of the beach recorders are becoming very difficult. There is also a lack of training, especially concerning the theoretical background of the software developed (what are the raising factors used in the programme, etc.).

15. In Zaïre, no regular and standardized catch/effort data collection system is in use to sample the 250 or more landing beaches present. The CAS forms (daily landing sheet, monthly sheet) developed for Zaïre in 1984 by Villegas and improved afterwards by Herman were never tested or put into use. Numerous financial. administrative, logistical and political constraints are making the implementation of any system impossible at the moment. Also the level of training of the few fisheries staff present on the shores of Lake Tanganyika is inadequate.

16. In Zambia, periodical catch/effort surveys are carried out every four months in the 4 strata of the Zambian shoreline. During 27 days, a mobile CAS group is visiting in each stratum 3 selected landing sites, randomly chosen within each of the 3 minor strata or MS (MSl, MS2 and MS3 are respectively landing sites with up to 5, from 6 to 10, and more than 11 fishing boats). In each selected landing site, the survey team spends 3 consecutive days to carry out a CAS using two forms and a weighing scale.

17. CAS data are sent to the Chief of the statistical unit in Chilanga, where fisheries data from all over Zambia are computer processed: catch estimates are produced for each minor stratum (MS) by multiplying the catch per boat night times the total number of boats in the MS times the time raising factor times the fishing activity rate. Industrial fishing companies are required by law to submit their monthly catch/effort statistics to Chilanga. Yearly estimates per waterbody are published afterwards in yearly fishery statistical reports and disseminated to all fishery areas.

18. On Thursday 29.07.93, due to the absence of another translator, the original idea of establishing two working groups, one on FS and one on CAS, was abandoned. Instead, during a plenary session, frame and catch assessment surveys were discussed and specific and general recommendations formulated concerning the improvement of both systems in each country and the possibilities of coordination and/or standardizing the systems for the four countries (see 3.1 and 3.2).

19. In general, the specific recommendations for each country included the need to increase (instead of the recent trend of decreasing) present budgets and availability of logistics to enable at least a status quo and even better an improvement in the execution, supervision, etc. of the surveys in question; and also the need of further training of fisheries staff at all levels, especially the beach recorders. For several countries, also the need to

centralize and/or simplify the complex administrational setup was stressed.

20. It was strongly recommended that the four countries organize biyearly simultaneous FS during the month of February, the first to be executed in February 1995 and coordinated by the LTR Project.

21. Concerning the views on lakewide coordination and/or standardization of fisheries statistics for Lake Tanganyika, it was unanimously recommended not to standardize the systems in use but to standardize annual fisheries statistical reporting output format and units to be used. A number of definitions and units were defined and two standard forms prepared, one for the FS and one for the CAS annual result output and recommendations were elaborated on the circulation of these outputs and the biyearly follow–up of fisheries statistics for Lake Tanganyika by the statistics coordinator of each country, the first follow-up meeting in 1995 to be coordinated by LTR.

22. On Friday morning 30.07.93, while the participants had a free morning, the workshop secretariat finalized the typing of the draft text of all recommendations formulated the day before. In the afternoon, before the closure of the workshop, all recommendations were again scrutinized in the final plenary session, some amendments/corrections made and the final list of recommendations was adopted as shown in Chapter 3.

3. WORKSHOP RECOMMENDATIONS

3.1. RECOMMENDATIONS FOR IMPROVING THE FISHERIES STATISTICAL SYSTEMS IN THE FOUR RIPARIAN COUNTRIES SHARING LAKE TANGANYIKA

TANZANIA

23. Observing that the budget to cater for the basic requirements in collecting fisheries statistics were inadequate, it is recommended that the Tanzanian government considers to increase the budget allocation.

24. In view of the administrative barriers in controlling and supervising beach recorders of fisheries statistics, it is recommended that all fisheries staff fall under the Director of Fisheries and that all should be on the payroll of the ministry responsible for fisheries.

25. It was realized that the level of education standard of beach recorders is discouragingly low and as a result the quality of data collected was affected equally. Therefore it is recommend that at least secondary school leavers be considered to be recruited as beach recorders and present staff should be trained to improve the quality of data to be collected in the future.

26. Realizing that the shoreline of Lake Tanganyika in Tanzania is mostly inaccessible by road, it is recommended that two boats with out—board engines be considered as essential requisites to ease conducting surveys and supervising of the two regions.

27. In order to detect changes in the fisheries, it is recommended that frame surveys be conducted at least every two years.

28. It was further observed that all data collected is directed to Dar es Salaam for analysis. Since the amount of data to be entered in the computer there is getting too big, it is recommended that entry of data be decentralized to the regions. Gradually, the regions belonging to different waterbodies will have to be equipped with computers and staff trained to input data into the computer.

29. It was observed that beach recorders were also deployed to perform other duties other than fisheries data collecting. It was therefore recommended that beach recorders should not be associated with fisheries law enforcement activities and revenue collection.

ZAMBIA

30. In general, funds allocated for fisheries statistical surveys are inadequate and hence surveys are not done satisfactorily. Therefore, it is recommended that the budgetary allocation should be increased.

31. Since the little funds made available for the surveys are in most cases not released by the Provincial Fisheries Development Officer holding the funds, it is recommended that funds for surveys be centralized.

32. Because sending out a mobile survey team is very costly, and because permanent staff stationed in the field, covering a certain area, could lift that burden, it is recommended that all dilapidated staff houses built long time ago be considered for rehabilitation in order to send permanent staff in several locations on the Zambian shore of Lake Tanganyika.

33. Because socio—economic aspects are absent from the fisheries frame survey forms, it is recommended that this element should be considered for inclusion in the forms in order to be able to establish and determine socio—economic parameters.

34. Because the surveys are carried out during only 3 days at each selected landing site every 4 months and estimated catch/effort results derived from these 3 days proved to be not very reliable, it is recommended that the number of sampling days be chanced from 3 to at least 10 days during each four monthly survey.

ZAÏRE

35. It is recommended that adequate budgets should be made available to carry out frame and catch assessment surveys.

36. The level of education of fisheries beach recorders being very low, it is recommended that all fisheries staff, especially beach recorders, be trained adequately to improve the quality of fisheries data collected.

37. In order to avoid the complexity and inefficiency of the classic administrative system, it is recommended that the former fisheries centers of Kalemie and Baraka be reopened and made operational and an extra center be opened in Moba (south end of the Lake), directly to be controlled by SENADEP.

38. It is also recommended that the fisheries data be analyzed by computer.

39. Realizing that the shoreline of Lake Tanganyika in Zaïre is mostly inaccessible by road, it is recommended that four boats with out—board engines be considered as essential requisites to ease conducting surveys and supervision of the four regions.

BURUNDI

40. It is recommended to avail adequate budgets for carrying out the annual frame and catch assessment surveys, especially to revive supervision activities and to sustain the activities of the computerized data input center at headquarters.

41. It is recommended that further training of beach recorders and the assistant-biologists at headquarters (especially regarding the theoretical background of the software used) be considered.

42. It is recommended that the frame-survey forms should be revised to include questions on socio—economic aspects.

3.2. RECOMMENDATIONS ON THE COORDINATION/STANDARDIZATION OF THE FISHERIES STATISTICAL SYSTEMS ON A LAKEWIDE BASIS

43. It is strongly recommended that the four countries undertake simultaneously a frame survey every two year during the month of February. the first one to be executed in February 1995. It is further recommended that this first, simultaneous frame survey would be coordinated by the FAO/FINNIDA GCP/RAF/271/FIN Project.

44. Because it was unanimously decided that the adoption of one uniform statistical system for the four countries is just impossible, it is recommended that at least the biyearly

and yearly, minima statistical output of respectively frame and catch assessment surveys results should be standardized in order to be comparable.

45. It is recommended to use the following definitions of statistical items:

— landing site: is the place where fishermen land their fresh fish catch for the first time;

— active fisherman: an individual involved in the actual fishing operations;

- unit of fishing effort: is the effort exercised by one fishing boat (unit) per night (day);

- CPUE: is the catch caught by one fishing boat (unit) per night (day);

— planked boats, catamarans, trimarans: composed of boats of 5—8 m of length;

- Apollo: composed of boats of 10-12 in of length and having a liftnet opening of at least 100 in circumference;

- industrial unit: composed of a boat of a length of 15 in or more, using a purse seine net and assisted by one or more auxiliary vessels.

46. Concerning the minimum, standardized output for the two yearly frame surveys, it is recommended that the following statistical items be enumerated (proposed form shown in Annex 4):

— total number of landing sites;

— total number of active fishermen;

— total number of fishing craft by type (the following types are to be considered: dugout, planked boats e.g. catamaran, trimaran and Apollo, fiberglass boat, industrial unit);

- total number of fishing gear by type (liftnet, industrial purse seine, chiromila or ring net, beach seine, gill—net, scoop net, trap, hookline, handline) for both the industrial and artisanal fisheries (traditional fishery to be included in the artisanal fishery);

— total number of in—board and out-board engines.

47. Concerning the minimum, standardized output for the yearly catch assessment surveys, it is recommended that the following statistical items be enumerated (proposed form is shown in Annex 5):

- total yearly catch and total yearly catch by species according to the following species or species–groups:

  * *Limnothrissa/Stolothrissa*
  * *Lates* (*Lates*) spp.
  * *Lates (Luciolates) stappersii*
  * *Tilapia* spp.
  * Others

- total yearly catch by type of fishery:

  * artisanal fishery:

    –liftnet fishery
    -gillnet fishery
    -beach seine fishery
    -other artisanal fishery types, totaled or in detail when data available

  * industrial fishery

– a summary of frame survey results can be attached in annex if data available.

48. It is recommended that the standard result outputs of each country for the yearly CAS and two-yearly FS be sent by each country to the Directors of Fisheries and the statistical coordinators of the other 3 countries and to the CIFA Subcommittee for Lake Tanganyika in FAO, Rome, Italy.

49. Lastly, it is recommended that every two years. after the simultaneous frame survey, the statistical coordinators! officers–in–charge of each country meet in alternatingly one of the countries to assess and discuss the latest results of frame and catch assessment survey outputs in particularly and the fisheries statistics, their coordination and the management implications for the Lake Tanganyika fishery in general. The first meeting of the coordinators around mid-1995 should be coordinated by the FAO/FINNIDA GCP/RAF/271/FIN LTR Project.

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Annex 1 : List of participants

WORKSHOP ON THE COORDINATION AND STANDARDIZATION OF FISHERIES STATISTICS FOR LAKE TANGANYIKA

(Bujumbura, 26-30.07.1993)

LIST OF PARTICIPANTS

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Annex 2: Agenda

WORKSHOP ON THE COORDINATION AND STANDARDIZATION OF FISHERIES STATISTICS FOR LAKE TANGANYIKA

(Bujumbura, 26—30.07.1993)

AGENDA

Monday 26.07.93

- Morning : Arrival of participants Administrative matters
- Afternoon : Opening of the Workshop Adoption of the Agenda

Finalization of country papers

Tuesday 27.07.93

— Morning : Presentation of country papers on frame survey (Tanzania, Burundi)

Discussion of country papers

— Afternoon : Presentation of country papers on frame survey (cont. : Zaïre, Zambia)

Discussion of country papers

Opening drink

Wednesday 27.07.93

— Morning : Presentation of country papers on catch assessment survey (Tanzania, Burundi)

Discussion of country papers

— Afternoon : Presentation of country papers on catch assessment survey (cont.: Zaïre, Zambia)

Discussion of country papers

Thursday 28.07.93

— Morning : Frame and Catch Assessment Survey working group sessions: formulation of specific and general recommendations

— Afternoon : General discussion and framing of:

- specific recommendations for the improvement of frame and catch assessment surveys;
- general recommendations for the coordination and standardization of fisheries statistics for Lake Tanganyika

Friday 28.07.93

— Morning : Secretariat: typing recommendations

Visit to fish landing site around Bujumbura

Viewing of LTR's aerial frame survey video recordings

— Afternoon: Adoption of specific and general recommendations for the improvement and coordination/standardization of fisheries statistics of Lake Tanganyika, for submission to LTR's Scientific Committee and CIFA Lake Tanganyika Subcommittee in October 1993

Closing of the Workshop

Annex 3A

TANZANIA FISHERIES STATISTICAL SYSTEM WITH SPECIAL REFERENCE TO LAKE TANGANYIKA

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PAPER PRESENTED AT THE WORKSHOP ON THE COORDINATION AND STANDARDISATION OF FISHERIES STATISTICS FOR LAKE TANGANYIKA BUJUMBURA - BURUNDI 26/07/93 TO 30/07/93

ABSTRACT

It is estimated that the total production for Lake Tanganyika can be as much as 300,000 metric tons per year. Over the past eight years the annual fish production from the Tanzanian part of the Lake has been fluctuating between 59,494 metric tons recorded in 1989, and 114,963 highest ever recorded in 1985. In 1991 the production was 63,505 metric tons.

The statistical method used to derive these estimates is divided into two phases. Phase I is the inventory of all fish production factors, done once in every two years. This survey produces the baseline data to be used as the raising factors in the estimation of the total production. The second phase is the catch assessment survey (CAS). Information on daily catch and related effort is collected on selected days at selected beaches. Using these data, and the baseline data obtained from the frame survey, the annual fish production is estimated.

In this paper both phases of the current statistical system are discussed. Finally a discussion on the problems and suggestions for possible solutions are made.

I. INTRODUCTION

Lake Tanganyika covers a surface area of 32,900 km^2, shared by four countries, namely Burundi 6%; Tanzania 41%; Zaïre 45% and Zambia 8%.

The potential yield of the lake is not known as there have not been any lake wide surveys in recent years, but production from the whole lake has been estimated at 300,000 metric tons per year. Production from the Tanzania part of the lake has been fluctuating between 59,494 metric tons for 1989 and 114,963 metric tons for 1985 in the past eight years. In recent years production has stabilized at about 60,000-65,000 metric tons. In 1991 the production was 63,503 metric tons.

The fishery of Lake Tanganyika is mainly targeted on two clupeid species, namely *Stolothrissa tanganicae* (locally known as dagaa) and *Limnothrissa miodon* (Lumbo); and four *Lates* species namely *Lates stappersii* or *Luciolates* (migebuka), *L. mariae* (Sangara), *L. microlepis* (Nonzi); and *L. angustifrons* (gomba). (Johanneson, 1974; Ellis, 1978, Bayona 1988; Lindqvist and Mikkola, 1989, Coulter, 1991). These pelagic species constitute over 80% of the total fish production in the Tanzania waters of the lake. (Katonda and Kalangali, 1993) (see also Annex llB). Of the clupeids *S. tanganicae* is the most important commercial species in the lake.

Collection of fisheries statistics is done by the Fisheries Division. Fisheries statistics have been collected on the lake since the pre—independence days. This information is required for proper management and development of the fisheries. Without reliable statistics development projects can neither be planned nor their effects evaluated. However, collection of accurate statistics in a country as big as Tanzania with a wide variety of fisheries is not easy. The problem is further complicated by the fact that all our fisheries are largely artisanal, with a large number of fishermen operating small fishing crafts, using a variety of gears and landing at numerous small landing sites along the coast.

A variety of statistical systems have been used over the past 25 years, and there have been revisions and improvements as the situation required. The system which was used for data collection and processing since the early seventies was able to give the general trend of the fisheries but was considered incapable to provide all the information required for proper planning and management purposes. Moreover the accuracy of the data was also questionable in some quarters.

So as to improve the data collection and processing system the government embarked on a project financed by UNDP and executed by FAO to improve and strengthen the fisheries statistical unit in 1989. In the execution of this project and improved system was evolved and has now been introduced all over the country. It is important to mention here that this system is applied to all fisheries in the country.

Initiation of the improved system was done in phases in the

later half of 1992, starting with lake Victoria in May 1992 and ending with the minor water fisheries in November 1992. In lake Tanganyika the system started in November, 1992. In this paper we present the improved system which has now been adapted in all fisheries all over the country. The system is in two phases. Phase I is the frame survey (FS) and Phase II is the catch assessment survey (CAS).

Also discussed are the problems and constrains of this new system and suggestions for possible solutions given.

It is important to note that the old system which was in use since the early seventies up to April 1992 is not discussed here in length because it has already been discussed in a paper titled "The Fisheries statistics of Lake Victoria – Tanzania sector" (see Lyimo *et. al*., 1990).

II. GOVERNMENT INSTITUTIONS INVOLVED IN FISHERIES MATTERS

In Tanzania, the Fisheries Division in the Ministry of Tourism, Natural Resources and Environment is the body responsible for fisheries management and conservation. Prior to 1972, all employees in the fisheries sector were employed by the Central Government represented by the Director of Fisheries. The administrative, planning and management relationship of government institutions involved in fisheries matters was then as shown in Fig.1. The Director of Fisheries had the control of all fisheries staff through the Regional and District Fisheries Officers.

In 1972, however, it was decided to decentralise the system so that the staff in the districts and regions were employees of the District and Regional Development Directors. The Director of Fisheries, who is legally charged with the management and development of the fisheries resources, lost his administrative control over the fisheries staff employed by the District and Regional Development Directors. The only relationship left was that of advise and flow of technical information. The situation was further complicated when the Local Governments (Town and District Councils), which had been abolished in 1972, were reintroduced in 1982. The administrative, planning and management relationship of government institutions involved in fisheries matters after reintroduction of local governments is shown in Fig. 2.

III. TANZANIA FISHERIES INFORMATION SYSTEM:

FRAME SURVEY (FS) (INVENTORY OF FISH PRODUCING FACTORS)

1. <u>Objectives</u>:

The objectives of the frame survey are:–

i) To secure data on the number and nature of fish producing factors such as fishing house holds, fishing boats, fishermen, landing centres, fishing

villages and fishing units as well as provide information relating to the facilities available at landing sites/fishing villages, processing and marketing facilities in order to quantify the economic structure of the fishing industry in the country.

ii) To provide raising factors for estimating the total fish production.

iii) To provide sampling frames for various sample surveys that may be undertaken in future.

2. Coverage:

The survey covers all fishing villages and fishing landing centres in the country. For Lake Tanganyika the coverage is from the boarder with Burundi in the North to the boarder with Zambia in the South.

3. Survey Method:

Survey frame:

The existing list of landing sites/fishing villages based on previous surveys act as the frame of the survey. The survey is based on complete enumeration of all the fishing villages and landing sites.

4. Questionnaires:

Two questionnaires have been designed for carrying out the survey and coded for computer processing to cover all the items of inquiry. A sample of the two questionnaires is attached (annex 1 and 2). Form I – Inventory of fish producing factors:– landing sites approach relates to landing sites while Form 2 - Inventory of fish producing factors:- Household approach relates to fishing house holds. These two forms are an improvement over the old form with additional information.

5. Basic definitions:

Some basic definitions used in this survey are given below:–

i) Landing site

A site where fishermen land their catches for the first time after conducting fishing operations.

ii) Fishing craft

A craft used for fishing at least 10 days during the last one year.

Type : It may be plank boat, dugout canoe or any other type.

Active : A craft engaged in fishing for at least 10 days during the last 3 months period.

Non-active : A craft engaged in fishing less than 10 days during the last 3 months period.

iii) Fisherman

An individual earning whole/part of his livelihood through fishing operations. A further division is made as:

- Owner : A person participating in actual fishing and owns either a boat or gear or some other relevant fishing implements.
- Labourer : A person participating in actual fishing but does not own any boat or gear or fishing implements and paid for either in kind or cash.
- Absentee : An individual who earns whole or part of his livelihood through fishing but he himself does not participate in fishing activity and therefore, hire labour to undertake fishing operations by using fishing boats, fishing gear or other fishing implements owned by him.
- Resident : A fisherman living in the fishing village visited for at least six months during the last year.
- Non-resident : A fisherman living in the fishing village visited for less than six months during the last year.

iv) Auxiliary boat

A boat in operation with another boat to complete the fishing activity. As for example in Liftnet, a trimaran will have three boats, while a catamaran will have two boats working together to complete the fishing activity. Similarly in beach seine operations, the boats with lights to attract fish will be taken into consideration while dealing with the main beach seine boat.

v) Household

Residential unit where fishermen live under one roof on permanent/temporary basis having a combined eating arrangement.

- Permanent:

Lived in the household at least for six months during the last year.

— Temporary:

Lived in the house less than six months during the last year.

6. <u>Methodology</u>:

The field operation is carried out by overland approach when it is possible to move along the coast overland. In the Islands and other inaccessible areas however, water approach or the combination of both approaches are followed. The whole coastline is divided into several sectors, the criteria of division being either administrative and or barriers so that it is possible to cover the coastline of each sector by moving overland/water approach. These sectors are known as stations. A station comprises of a number of landing sites and villages. The selected landing sites where daily catch records one collected are known as recording stations. The Tanzanian coast of L. Tanganyika is divided into 2 administrative region namely Kigoma and Rukwa regions. These are in turn divided into districts and finally into station. Each sector/station is assigned to one or more field enumerators depending on the size and availability of staff. The inventory survey is carried out simultaneously in all the sectors. The field enumerators cover the length of the cost mile by mile listing down all the survey items.

In the landing site approach; Inventory form I is used. This form is completed by interviewing the fishermen at the landing site. In this approach data is collected by physical verification and hence more reliable. Survey items included in this form are:—

i) Names of recording stations

ii) Names of landing sites

iii) Amenities present at the landing sites

iv) Fishermen by different categories
- Owner — Resident
  Non-resident
- Labourer — Resident
  Non—resident

v) Fishing Units in combination with gear type:
- Trimaran unit
- Catamaran unit
- Beach seine unit
- Scoopnet unit
- Gill net unit
- Hook & Line unit
- Long line unit

vi) Fishing boats: Type Active
Non active
Means of propulsion
— motorised
— sail & paddle

In the house hold approach inventory form 2 is used. In this approach the enumerator move from fishing house hold to house hold interviewing the fisherman. A part from using this data to compare with that obtained in the landing site approach, some idea on boats which were away for fishing during the survey period may also be obtained.

Survey items included in Form 2 are:—

i) Names of recording stations

ii) Names of landing Sites

iii) Names of fishing villages

iv) Fishermen
- — Owner — Resident
- Non—resident
- Labourer — Resident
- Non—resident
- —Absentee fishermen — Resident
- Non—resident

v) Fishing boats (as in form I)

vi) Fishing units (as in form I)

vii) House holds:
- Fishing
- Fish processing
- Fish trade
- Boat building
- Farming
- Others

Periodicity:

According to the old system the annual fishing village survey was conducted annually in November/December.

According to the new improved system now in use the survey will be conducted once in every two/three years depending on need and availability of funds.

The first frame survey was conducted on Lake Tanganyika in October 1990 for Kigoma Region (Northern part of the lake) and April 1991 in Rukwa region (Southern part of the lake). This was updated in December 1992.

Publication of results:

The information collected is tabulated through the computer and summaries published in the annual statistical report. Annexes 3 – 8 are summaries of the survey conducted in L. Tanganyika in 1990/91.

There are a total of 97 landing sites according to the 1990/91 frame survey of Lake Tanganyika. Annex 9 is A map of Lake Tanganyika showing the major landing sites.

IV. TANZANIA FISHERIES INFORMATION SYSTEM: CATCH ASSESSMENT SURVEY (CAS)

1. OBJECTIVE:

Catch and effort data is collected on a daily basis with the aim to provide data on fish production by fishing units species/species group, and values at each of the selected landing sites for a calendar month. The data collected from the selected landing sites is used to construct estimates of the fish
production for an area eg. Region and finally the water body eg. L. Tanganyika.

2. SURVEY DESIGN:

The design involves sampling over space and time.

i) Selection of Landing Sites (Recording station):

Data is not collected at all the landing sites as listed down from the frame survey. Out of the total, a few landing sites are selected where data is collected. The selected Landing sites are known as the recording stations. Each recording station is manned by one or more enumerators depending or the size and availability of staff. Selection of recording stations is not done randomly. Factors like accessibility, permanency and number of fishing units landing at the site are usually taken into consideration.

Along the whole coast of lake Tanganyika there are 17 such recording stations.

ii) Primary sampling unit (PSU):

Within the recording station a ‘day’ is taken as the primary sampling unit and a boat landing is the enumeration unit. A calendar month is the period of estimation. Data is collected for 16 days selected randomly every month using table of random numbers. Selection of the days on which data will be collected is done by the Regional Fisheries Statistics supervisor and distributed to the recording station.

Hence the recording days are uniform in the Region. A copy of the work programme is sent to headquarters for reference. On the sample days data are collected at the selected landing sites (recording stations).

Survey forms:

Two types of forms are used for data collection. These are form 21A (annex lB) and form 21B (annex 2B).

These forms are very similar to the old forms 21A (annex 3B) and 21B (annex 4B) used in the old system. The only difference is that a few items of information
have been added.

Items added include:

i) Time of arrival of the boat
ii) Time spent on fishing
iii) Type of Unit:

a) Fishing Unit (FU) - an ordinary single fishing unit.

b) Fish carrier (FC) a boat used to collect fish from fishing vessels on the lake and bring the fish to the landing sites.

c) Multiple Fishing Unit (MFU) - a fishing boat which on its way to the landing site collects fish from other units on the lake and bring it to the landing site.

iv) Number of fishes (for the big sized fish which can be counted).

v) Gear size/type

3. COLLECTION OF DATA.

An enumerator is provided with form 21A (a booklet) which is used at the beach. On the sample day at the recording station the enumerator collects data on all the landings of the day. The landing boat (fishing unit) is the enumeration unit. Data for each fishing unit are recorded separately. At the end of the day data collected on form 21A is transcribed on to Form 21B. Two sets of forms 21B are prepared. At the end of the month forms 21B are sent to the District/Regional office where it is checked for any mistakes and or inconsistencies. One set of form 21B is passed on to the fisheries headquarters for data input into the computer and final processing. One set of form 21B remains in the Regional Office.

4. PROCESSING OF DATA.

Processing at District/Regional level:

In this initial stage it has been proposed that at District/Regional level data should be processed and estimates made using the old system so as to provide alternative estimates for comparison purposes. One set of forms 21B is retained for this purpose. At this stage no further processing of the raw data is done at District/Regional level according to the new introduced system.

Processing at Fisheries Headquarters:

Processing of the data at the headquarters is done electronically using computers. The statistics section has four PCS for this purpose. Preparation of a suitable program TANFIS for processing the data was completed in June 1993. When copies of form 21B are received from the field are first checked for accuracy and or any inconsistencies before being entered into the computer.

Two types of information is entered into the computer:—

a) The baseline data obtained from the Frame survey.

b) The catch effort data on form 21B.

After integration of the data several types of reports can be generated as required. Estimations are done on a monthly basis.

Annual estimations are obtained by adding together all the monthly estimates.

Types of reports generated are:—

i) Monthly estimates by landing sites (recording stations).

ii) Monthly estimates for the Region.

iii) Monthly estimates for a specific water body eg. L. Tanganyika, L. Victoria etc.

iv) Sample statistics by landing site.

v) Sample statistics by region.

vi) Data ranges by landing site.

vii) Data ranges for the region.

All these are obtained as computer printouts. Annex 5B is an example of these reports relating to Lake Victoria. Similar reports will be generated for every region and water body.

5. PRESENTATION OF RESULTS.

i) Data are presented in the fisheries annual statistical Reports produced every year. The data are presented in a form of summary tables. In the old system there were seven tables which are proposed to be maintained in the improved system with some minor alterations and or additions.

These tables are:— TABLE I: Summary of fisheries statistics from a specific water body.

TABLE II: Comparison of statistics for the current year and the previous year by station.

TABLE III The weight of fish caught in metric tons by species and by station.

TABLE IV: The value of fish caught in 000's Tsh (Ex-vessel price) by species and by station.

TABLE V: The average selling price per kg in Tsh by species and by station.

TABLE VI: Species percentage composition of the total catch by species and by station.

TABLE VII The average catch per boat per gear type in kgs CPUE) by station.

Annexes 6B - 12B are extracts from the 1991 statistical report relating to Lake Tanganyika.

ii) Information on Industrial/semi-industrial fisheries:

Data on production from industrial/semi industrial fisheries are collected on a complete enumeration basis.

6. OTHER TYPES OF DATA COLLECTED.

i) Market statistics:

Market statistics are collected in a few selected urban markets with the aim of providing information on fish distribution, marketing channels and consumer prices. Data a collected on fishery form 22 (annex 13B).

Type of information collected include:

a) Type of product and species: whether the fish is fresh or processed and if processed, whether smoked, sundried or fried.

b) Source of the fish.

c) Weight and value of the fish.

ii) Movement of fish:

Form 28 (annex 14B) is used to collect information on movement of fish from the source to consumer centres. This information collected at railway stations, bus stations, etc. include the following :

a) Species and type of product.

b) Mode of transport:- i.e. whether transported by rail, bus or water.

c) Weight of fish.

d) Destination.

In recent years not much emphasis was put on the collection market statistics and movement of fish hence leading to availability of scanty data which is not very useful. It is the aim of the fisheries division to improve this situation in future.

V. PROBLEMS AND CONSTRAINS ENCOUNTERED AND SUGGESTIONS FOR POSSIBLE SOLUTIONS: -

i) Constraints:

Major constraints facing fisheries data collection are
to a big degree due to financial constrains and complicated administrative set up. These include:—

a) Poor supervision in the field due to the difficulty geographical conditions of the

country and poor/inadequate transport facilities.

b) Lack of/inadequate working equipment such as weighing scales, calculator etc.

c) Lack of adequate training for both the field enumerators and supervisor. Most enumerators are primary school leavers without any prior training in fisheries.

d) Lack of adequate transport facilities for the field enumerators as well as District/Regional supervisors.

f) Due to the administrative decentralization policy of the country there is no smooth flow of information from the Ministry to the Regions/Districts. Under this set up field enumerators are not employees of the Ministry responsible for fisheries. These enumerators are employed by their respective Local Authorities under the Ministry of Local Government and Regional Administration. In this case direct supervision and answerability is difficult. In some cases enumerators are assigned other duties by their employer such as revenue collection over and above their normal duties of data collection.

In other cases these staff are transferred from their station to other duties without the knowledge of the fisheries division.

g) After introduction of the improved system a big volume data is being received at fisheries headquarters where the limited number of staff can not handle the entry of data into the computers and produce monthly estimates in time.

e) Lack of incentives to field staff. Salaries are low and not paid regularly on time. Also when they travel outside their stations they are not paid their subsistence allowances due to lack of funds.

ii) Suggestions for possible solutions:

So as to overcome the constrains listed above the following solutions are suggested:—

a) The government should increase the budgetary allocation for data collection purposes. If this will be effected the problems of lack of working facilities, transport and supervision will be eliminated to some extent.

b) In-service training of field staff and Regional/ District supervisors should be emphasized. Field enumerators should have at least Secondary School education with some fisheries training to at least certificate level. Regional/District supervisors should have Secondary School education and at least a fisheries diploma.

c) It is recommended that the Government should seriously think of centralising all the Ministries activities in the Regions/Districts so as to have a smooth administrative set up. All field staff should be employed by the Central Government so that they will be answerable to the parent ministry. This will assure smooth flow of information, proper supervision and answerability.

d) So as to ease the data input and hasten data analysis it is proposed that data input be decentralised. Instead of sending all the raw data to fisheries headquarters for processing it is proposed that data entry be done at the Regional offices and then send it to fisheries headquarters on a diskette ready for the final processing. Already three lab—top have been acquired to start decentralization on a pilot scale.

VI. VIEWS ON POSSIBLE COORDINATION AND STANDARDIZATION

So as to have proper management of shared fisheries resources, the need for standardization of fisheries statistics can not be over emphasized.

There have been lengthy discussions on the issue of standardization in the past, but so far no concrete steps have been taken.

It is felt that before we can talk of standardization it is necessary to do the following first :

i) Study and understand the type of fishery being practiced by the different countries. For some the fisheries are industrial or semi—industrial, while in other it is largely artisanal. In Tanzania for example the fishery is over 95% artisanal.

ii) Look at the types of gears used and the type of species caught in the different countries.

iii) Look in detail at the statistical systems in use in the different countries and their suitability to the type of fishery existing in that country.

iv) Look at the possibility of having a uniform statistical system, bearing in mind the differences observed above and the financial capability.

After that we will need to :

a) Decide on items of information to be standardized.

b) Decide on how to report on the selected items. To do this a special questionnaire could be designed for use by all riparian states.

The following are suggestions of items of information which could be standardized:—

i) Fishing effort: - Type and number of fishing crafts.
- whether industrial, semi industrial or artisanal.

ii) Fishing gears in use by type and size.

iii) Species: - Type of species caught.
— species percentage composition.

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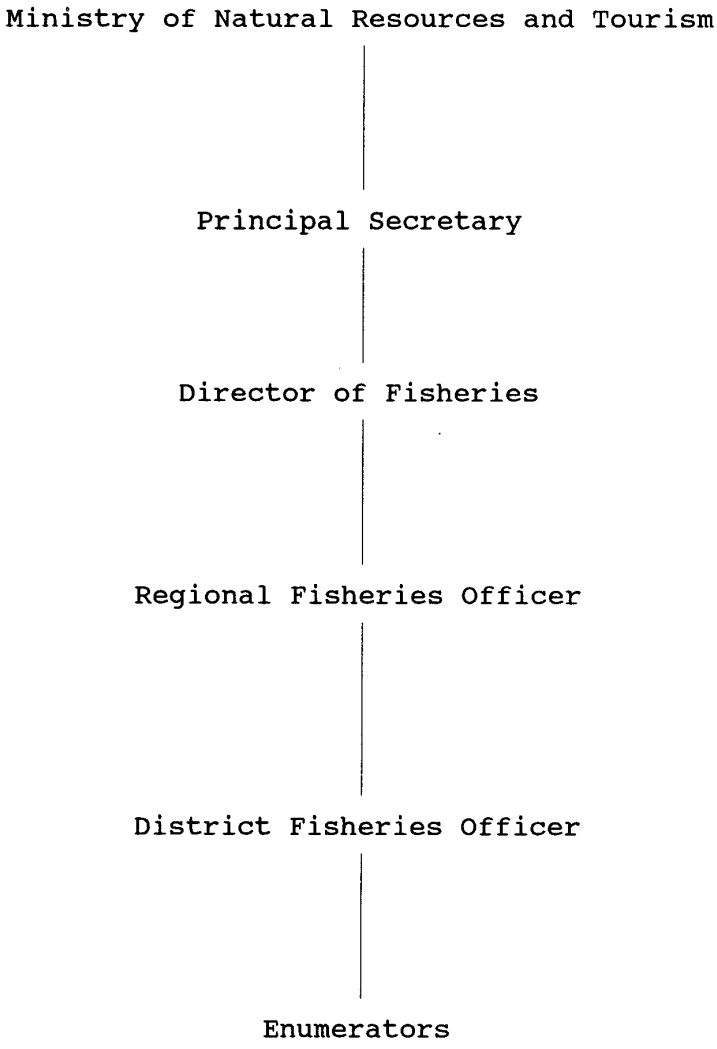


Fig. 1 The Administrative, Planning and Management Relationship of Government organisations involved in fisheries matters before decentralization in 1972

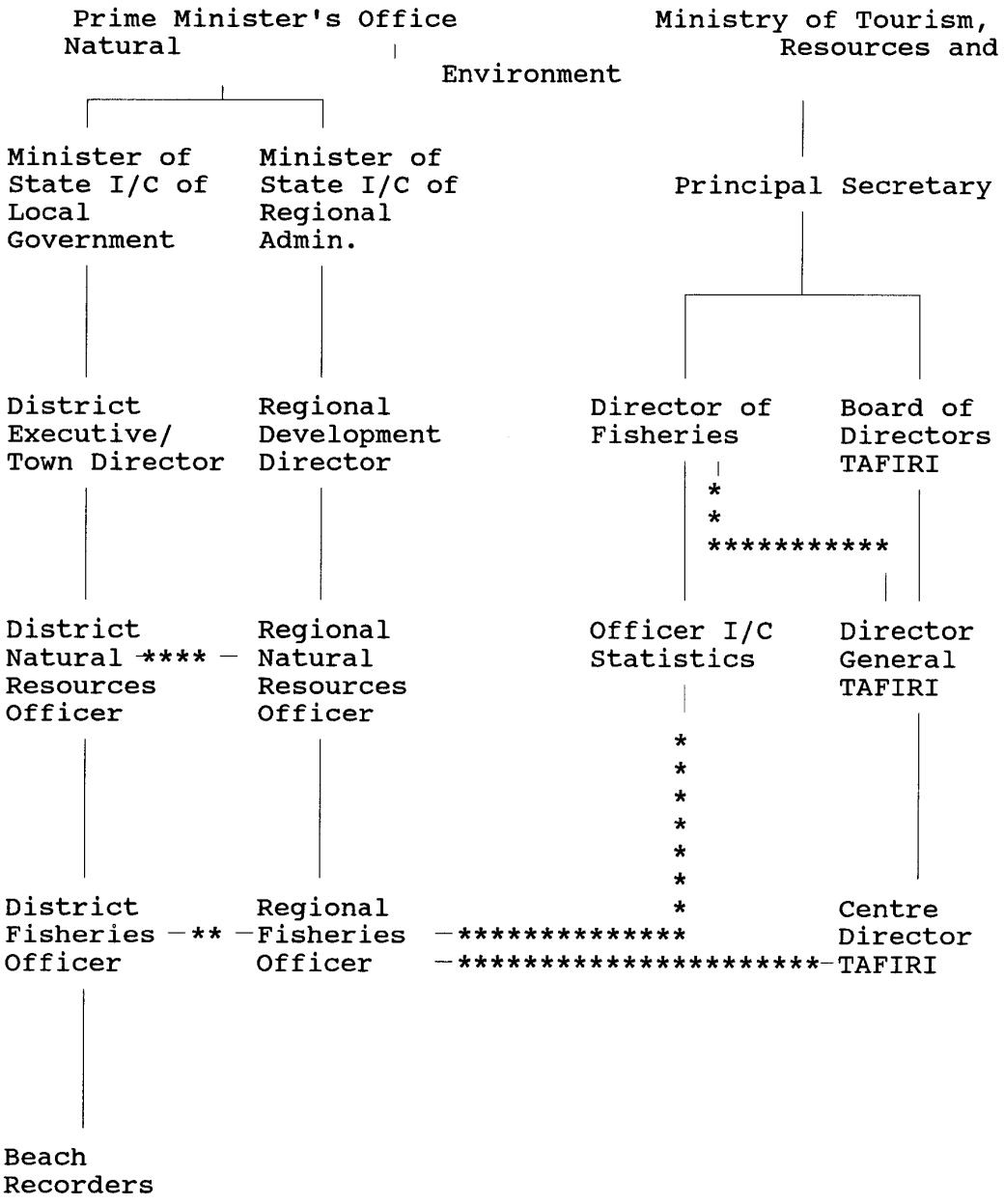


Fig.2 The administrative, planning and management relationship of various government organisations involved in fisheries matters in Tanzania at present.

Key: —— Administrative and management responsibility
**** Technical information flow

FISHERY INVENTORY FORM - 1

ANNEX 1

INVENTORY OF FISHING FACTORS (LANDING SITE APPROACH)

Landing site _____
District _____
Approach _____

Permanent ( )
Seasonal ( )
→ season _____

Main Fishery _____

(1)	(2)	(3)						(4)				(5)							(6)		(7)	(8)	(9)
Landing site	Nr of Craft	Fishing craft						Fisherman				Gear							Auxiliary boat		Owner (village)	Disposal (Market)	Remarks
		Type (Reg #)	Type Non Reg.	Active/ Inactive	Propulsion			Resident		Non Resident									Type	No (Reg#)			
					S/S	IB (HP)	OB (HP)	owner	Labour	owner	Labour												
Name: _____																							
Amenities:																							
Bicycle ( )																							
Pick up ( )																							
Kiln ( )																							
Frying unit( )																							
Market ( )																							
Fishing eq. shop ( )																							
Boat repair shop ( )																							
Water trans ( )																							
Others (specify) ( )																							
Processed fish land: YES( ) No ( )																							
↓																							
Origin _____																							
Frequency _____																							
Transport _____																							

Supervisor

Name: _____

Signature: _____

Date:

Enumerator

Name: _____

Signature: _____

FISHERY INVENTORY FORM - 2

INVENTORY OF FISHING FACTORS (HOUSEHOLD APPROACH)

ANNEX 2

Village _____

District _____

Approach _____

(1)	(2)	(3)			(4)					(5)						(6)		(7)	(8)	(9)
Serial No. of House hold	Head of House hold (Respondent)	Fishermen			Craft					Gear						Auxiliary craft		Landing site	Disposal / Market	Remarks
		Owner	Labour	Absentee	Type (Reg #)	Active/ Inactive	Propulsion									Type	No (Reg#)			
							S/P	IB/EP	OB/EP											

Supervisor

Name: _____

Signature: _____

Date: _____

Enumerator

Name: _____

Signature: _____

Date: _____

Fishermen in Kigoma Region

Fisheries Inventories in Lake Tanganyika – 1990/91
Kigoma Region
A. Fishermen

Recording Station	Landing Site	Fishermen							Total
		Owner			Labour			Absentee	
		Resident	Non Resident	Subtotal	Resident	Non Resident	Subtotal		
Kagunga	Rusoro	5			295		295		
	Mkwalo	3			287		287		
	Zasho	33	1	34	246	5	251		
Subtotal		41	1	42	828	5	833	58	933
Mwangongo	Kasegela	6	0		710	0			
	Kiziba	17	2	19	300	33	333		
	Bugamba	1	0	1	218	0	218		
	Mwangongo	5	0	5	316	4	320		
Subtotal		29	2	31	1544	37	1581	58	1670
Mtanga	Mtanga	22	0	22	296	0	296		
	Kazinga	24	0	24	232	0	232		
	Kigalye	4	0	4	170	0	170		
	Kalalangapo	15	0	15	90	0	90		
	Kagongo	12	0	12	108	0	108		
Subtotal		77	0	77	896	0	896	80	1053
Kibirizi	Kibirizi	21	1	22	159	1	160	22	204
Subtotal		21	1	22	159	1	160	22	204
Ujiji	Ujiji	16	0	16	31	0	31		
	Ujiji Forodhan	13	0	13	18	0	18		
Subtotal		29	0	29	49	0	49	0	78
Kasoke	Kachakala	2	0	2	10	0	10		
	Kasaba	0	0	0	7	2	9		
	Kimbwela	36	2	38	155	16	171		
Subtotal		38	2	40	172	18	190	70	300
Mwakizenga	Rungunga	12	2	14	36	4	40		
	Kabeba	48	10	58	112	26	138		
	Kimba	36	3	39	80	11	91		
	Kampawde	9	0	9	13	0	13		
	Myobozi	87	21	108	200	62	262		
Subtotal		192	36	228	441	103	544	103	875
Sunuka	Mafandikani	0	0	0	32	4	36		
	Sunuka	1	0	1	62	0	62		
	Mkuyu	18	0	18	137	0	137		
	Nyansimbi	7	2	9	80	20	100		
	Msihezi	0	0	0	20	4	24		
	Lubengera	0	0	0	8	0	8		
	Grando	0	2	2	0	19	19		
	Karago	9	0	9	11	0	11		
Subtotal		35	4	39	350	55	405	83	527
Kamaramsenga	Terembo	0	0	0	108				
	Mgondizi	5	0	5	39				
	Kambofi	0	0	0	53				
	Kampu	5	0	5	82				
	Lusango	5	0	5	25				
	Itigi	6	0	6	222				
	Kamaramsenga	6	0	6	20				
	Kagwigawe	5	0	5	51				
	Basungura	0	8	8	0				
	Kasha	3	7	10	35				
	Nsasa	0	6	6	0				
Subtotal		35	21	56	635	191	826	38	920
Mgambo	Rukuma	1	0	1	19	0	19		
	Kanyesi	4	0	4	17	0	17		
	Buhingu	14	0	14	95	0	95		
	Katumbi	1	0	1	69	0	69		
	Kalolwa	5	0	5	72	0	72		
	Kalilani	4	0	4	335	0	335		
Subtotal		29	0	29	607	0	607	45	681
Kalya	Kalya	0	0	0	45	21	66		
	Sibwesa	20	2	22	326	12	338		
	Kashagulu	3	3	6	13	11	24		
Subtotal		23	5	28	384	44	428	23	479
Grandtotal		549	72	621	6065	454	6519	580	7720

Household survey in Kigoma Region

Fisheries Inventories in Lake Tanganyika – 1990/91
Kigoma Region
C.Household survey

Recording Station	Landing Site	Villages	Households							Absentee Fisher men
			Fishing	Fish Process	Fish Trade	Boat Build	Farming	Others	Total	
Kagunga	Rusoro	Kakunga	45	38	58	0	29	26	196	32
	Mkwale	Zashe	9	44	11	0	12	11	87	26
	Zashe									
Subtotal			54	82	69	0	41	37	283	58
Mwangongo	Kasegela	Mwamgongo	15	49	27	5	22	18	136	18
	Kiziba	Bugamba	0	10	11	0	2	4	27	8
	Bugamba	Kiziba	1	50	24	0	32	30	115	32
	Mwangongo									
Subtotal			16	109	62	5	56	30	278	58
Mtanga	Mtanga	Mtanga	0	154	12	0	5	0	171	58
	Kazinga	Kigalye	0	106	4	0	8	0	118	22
	Kigalye									
	Kalalangapo									
	Kagongo									
Subtotal			0	260	16	0	13	0	289	80
Kibinzi	Kibinzi	Kibinzi	9	26	2	0	0	11	48	22
Subtotal			9	26	2	0	0	11	48	22
Ujiji	Ujiji									
	Ujiji Forodhan									
Subtotal										
Kaseke	Kachakala	Kaseke	49	0	13	0	84	62	208	42
	Kasaba	Kasaba	11	0	0	0	15	6	32	5
	Kimbwela	Bangwe	34	20	0	0	12	0	66	23
Subtotal			94	20	13	0	111	68	306	70
Mwakizenga	Rungunga	Mwakizenga	0	156	36	1	98	9	300	93
	Kaboba	Ilugala	0	8	2	0	3	1	14	8
	Kimba									
	Kampawda									
	Myoboza									
Subtotal			0	164	38	1	101	10	314	103
Sunuka	Mafandikani	Sunka	37	0	4	0	0	0	41	36
	Sunuka	Mkuyu	37	0	0	0	0	0	37	24
	Mkuyu	Kirando	31	0	0	0	0	0	31	22
	Nyansimbi	Karago	18	0	0	0	0	0	18	7
	Msihozi	Sigunga	0	136	86	0	0	18	240	0
	Lubongera									
	Kirando									
	Karago									
Subtotal			123	136	90	0	0	18	367	83
Kamaramsenga	Herembo	Kamaramsenga	0	10	15	0	35	0	60	18
	Mgondizi	Herembo	0	7	11	0	34	0	52	14
	Kambeti	Mgambazi	0	1	6	0	8	0	15	6
	Kempu									
	Lusango									
	Itigi									
	Kamaramsenga									
	Kagwigawe									
	Basungura									
	Kasho									
	Nsasa									
Subtotal			0	18	32	0	77	0	127	38
Mgambo	Rukuma	Rukuma	1	0	2	0	56	0	59	0
	Kanyasi	Buhingu	4	0	6	0	20	2	32	0
	Buhingu	Igalula	21	0	3	0	88	2	114	0
	Katumbi	Nkokwa	39	0	37	0	44	1	121	45
	Kalolwa									
	Kalilani									
Subtotal			65	0	48	0	208	5	326	45
Kalya	Kalya	Kalya	1	0	5	0	171	3	180	5
	Sibwesa	Sibwesa	0	0	6	0	58	113	177	10
	Kashagulu	Kashagulu	0	0	0	0	58	2	60	0
Subtotal			1	0	11	0	287	118	417	23
Grandtotal			361	815	381	6	894	297	2754	580

ANNEX 5

Fishing units and boats in Kigoma Region

Fisheries Inventories in Lake Tanganyika – 1990/91
Kigoma Region
B.Fishing units and boats

Recording Station	Landing Site	Fishing units							Boats		
		TM	CM	BS	SCN	GN	HL	Total	Active	Non Active	Total
Kagunga	Rusoro	0	20	7	0	0	39	66	91	5	96
	Mkwale	0	3	13	0	0	2	18	35	0	35
	Zasho	0	6	7	0	0	67	80	85	8	93
Subtotal		0	29	27	0	0	108	164	211	13	244
Mwangongo	Kasegela	0	0	33	0	0	0	33	75	0	75
	Kiziba	0	11	11	0	0	29	51	60	16	76
	Bugamba	0	0	9	0	0	0	9	26	0	26
	Mwangongo	0	6	15	0	0	2	23	37	8	45
Subtotal		0	17	68	0	0	31	116	198	24	222
Mtanga	Mtanga	0	9	12	0	0	0	21	114	0	114
	Kazinga	0	6	12	0	0	1	19	88	0	88
	Kigalye	1	17	6	0	0	0	24	60	0	60
	Kalalangapo	0	1	7	0	0	0	8	36	0	36
	Kagongo	3	0	3	0	0	0	6	41	0	41
Subtotal		4	33	40	0	0	1	78	339	0	339
Kibinzi	Kibinzi	0	21	0	30	2	2	55	90	0	90
Subtotal		0	21	0	30	2	2	55	90	0	90
Ujiji	Ujiji	0	1	3	0	13	0	17	21	0	21
	Ujiji Forodhan	0	2	0	0	14	1	17	15	4	19
Subtotal		0	3	3	0	27	1	34	36	4	40
Kaseke	Kachakala	0	0	0	6	0	0	6	6	0	6
	Kasaba	0	0	1	2	1	0	4	1	3	4
	Kimbwela	0	32	1	34	5	0	72	63	41	104
Subtotal		0	32	2	42	6	0	82	70	44	114
Mwakizenga	Rungunga	0	0	8	0	5	1	14	14	2	16
	Kabeba	0	2	1	82	2	0	87	74	15	89
	Kimba	0	0	2	55	0	1	58	52	9	61
	Kampawde	0	1	0	2	6	0	9	10	0	10
	Myobozi	0	31	0	79	0	1	111	116	26	142
Subtotal		0	34	11	218	13	3	279	266	52	318
Sunuka	Mafandikoni	0	9	0	0	0	0	9	18	0	18
	Sunuka	0	8	1	11	0	0	20	17	11	28
	Mkuyu	0	18	9	8	0	0	35	52	7	59
	Nyansimbi	0	26	0	0	0	0	26	52	0	52
	Msihezi	0	6	0	0	0	0	6	12	0	12
	Lubengera	0	4	0	0	0	0	4	8	0	8
	Kirando	0	2	1	1	1	0	5	5	2	7
	Karago	0	1	0	1	10	0	12	12	1	13
Subtotal		0	74	11	21	11	0	117	176	21	197
Kamaramsenga	Herembe	0	15	0	21	0	0	36	48	3	51
	Mgondizi	0	2	0	17	2	0	21	23	0	23
	Kambofi	0	6	0	13	1	0	20	26	0	26
	Kompu	0	8	0	28	0	0	36	44	0	44
	Lusange	0	3	0	9	0	0	12	15	0	15
	Itigi	0	29	0	61	0	0	90	118	0	118
	Kamaramsenga	0	0	0	13	0	0	13	13	0	13
	Kagwigawe	0	7	0	11	0	0	18	26	0	26
	Basungura	0	0	0	28	0	0	28	28	0	28
	Kasho	0	2	0	43	0	0	45	47	0	47
	Nsasa	0	2	0	41	0	0	43	45	0	45
Subtotal		0	74	0	285	3	0	362	433	3	436
Mgambo	Rukuma	0	0	3	1	0	0	4	4	0	4
	Kanyasi	0	4	0	1	3	0	8	12	0	12
	Buhingu	0	23	0	3	8	2	36	57	2	59
	Katumbi	0	17	0	0	1	0	18	36	0	36
	Kalolwa	0	13	2	0	3	0	18	33	0	33
	Kalilani	0	0	33	0	2	0	35	68	0	68
Subtotal		0	57	38	5	17	2	119	210	2	212
Kalya	**Kalya**	**0**	**15**	**0**	**0**	**1**	**0**	**16**	**31**	**0**	**31**
	Sibwesa	**0**	**0**	**30**	**0**	**1**	**0**	**31**	**74**	**0**	**74**
	Kashagulu	**0**	**6**	**0**	**0**	**0**	**0**	**6**	**12**	**0**	**12**
Subtotal		**0**	**21**	**30**	**0**	**2**	**0**	**53**	**117**	**0**	**117**
Grandtotal		4	395	230	601	81	148	1469	2134	175	2309

ANNEX 6

Fishermen in Rukwa Region

Fisheries Inventories in Lake Tanganyika–1990/91
Rukwa Region
A. Fishermen

Recording Station	Landing Site	Fishermen							Total
		Owner			Labour			Absentee	
		Resident	Non Resident	Subtotal	Resident	Non Resident	Subtotal		
Karema	Karema	1	0	1	85	31	116		
	Kaselamnyaka	0	0	0	74	0	74		
	Isimwa	1	0	1	6	0	6		
	Kasangantongwe	1	1	2	32	11	43		
	Subwa	8	3	11	121	49	170		
	Tupondogoro	3	0	3	19	0	19		
	Wyumbayamunga	0	0	0	27	0	27		
	Kangwena	1	0	1	35	4	39		
Subtotal		15	4	19	399	95	494	45	558
Kirando	Kalila	11	1	12	40	33	73		
	Kanchui	4	0	4	7	4	11		
	Bumanda	1	38	39	0	0	0		
	Kabwe	19	2	21	89	30	119		
	Korogwe	0	26	26	0	67	67		
	Utinta	23	4	27	223	156	379		
	Katete	20	1	21	85	31	116		
	Chongo	20	0	20	53	18	71		
	Isaba	9	0	9	15	4	19		
	Kazovu	37	0	37	109	0	109		
Subtotal		144	72	216	621	343	964	205	1385
Kipili	Kipili	22	0	22	66	0	66		
	Mkinga	5	0	5	88	0	88		
	Mgna [illegible]	3	0	3	127	0	127		
	Namansi	13	1	14	63	4	67		
	Kerenge	15	4	19	39	13	52		
	Ulwile	3	0	3	78	0	78		
Subtotal		61	5	66	461	17	478	50	594
Kizumbi	Msamba	52	0	52	91	16	107		
	Lyapinda	12	0	12	29	11	40		
	Kasanga	8	1	9	37	10	47		
	Izinga	34	1	35	95	31	126		
	Ninde	12	0	12	41	3	44		
	Mwinza	22	1	23	77	18	95		
	Wampembe	31	6	37	80	67	147		
	Kizumbi	11	0	11	28	0	28		
Subtotal		182	9	191	478	156	634	32	857
Kala	Kipeta	1	0	1	44	7	51		
	Miyengwa	0	0	0	34	0	34		
	Kamimbi	2	0	2	30	0	30		
	Chowe	0	0	0	8	0	8		
	Lusekele	3	10	13	18	7	25		
	Mpasa	7	0	7	171	28	199		
Subtotal		13	10	23	305	42	347	38	408
Kasanga	Songambele	17	0	17	95	15	110		
	Kalepa	4	9	13	22	30	52		
	Muzi	28	0	28	91	16	107		
	Kilewani	12	4	17	114	7	121		
	Lusambo	18	3	21	113	41	154		
	Samazi	33	2	35	188	3	191		
	Molwe	6	1	7	25	0	25		
	Kipanga	15	3	18	80	5	85		
Subtotal		133	22	155	728	117	845	27	1027
Grandtotal		548	122	670	2992	770	3762	397	4829

Fishing units and boats in Rukwa Region

Fisheries Inventories in Lake Tanganyika – 1990/91
Rukwa Region
B. Fishing units and boats

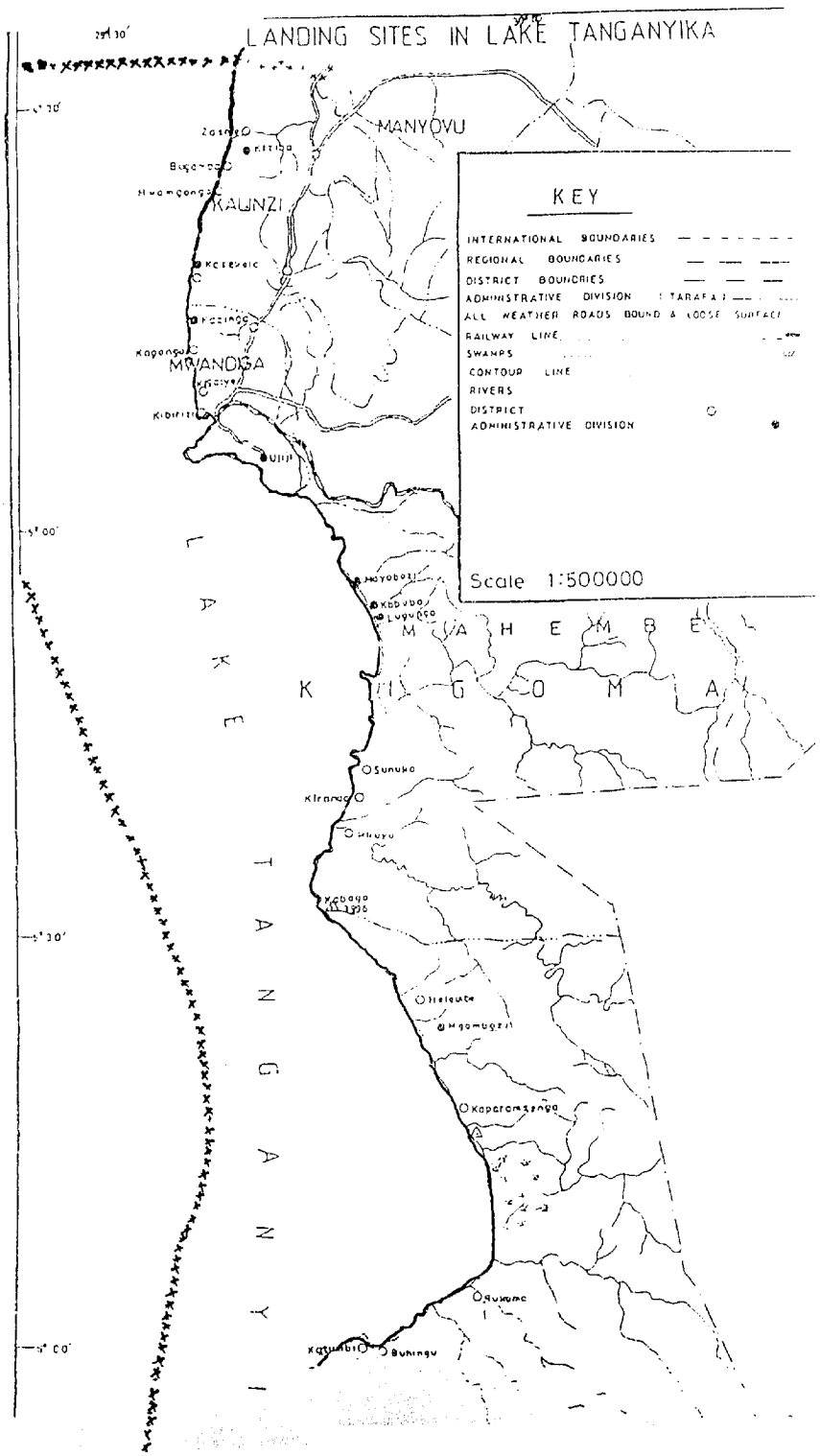
Recording Station	Landing Site	Fishing units								Boats		
		TM	CM	BS	SCN	GN	HL	LL	Total	Active	Non Active	Total
Karema	Karema	0	0	2	14	0	0	0	16	25	8	33
	Kaselamnyaka	0	11	0	3	0	0	0	14	26	2	28
	Isimwa	0	0	0	1	1	0	0	2	2	1	3
	Kasangantongwe	0	9	0	1	0	0	0	1	18	2	20
	Subwa	0	40	0	2	3	0	0	45	75	13	88
	Tupondogoro	0	0	0	2	1	0	0	3	5	0	5
	Wyumbayamunga	0	0	0	2	0	0	0	2	8	0	8
	Kangwena	0	6	2	0	0	0	0	8	15	3	18
Subtotal		0	66	4	25	5	0	0	100	174	29	203
Kirando	Kalila	0	0	0	17	0	0	0	17	30	11	41
	Kanchui	0	0	0	5	1	0	0	6	4	3	7
	Bumanda	0	0	0	7	0	0	0	7	6	6	12
	Kabwe	0	20	0	20	5	0	0	45	68	5	73
	Korogwe	0	18	0	2	1	1	0	22	44	0	44
	Uinta	0	65	39	6	0	0	0	110	180	1	181
	Katete	0	0	0	51	2	0	0	53	60	2	62
	Chongo	0	0	0	34	2	0	0	36	38	2	40
	Isaba	0	1	2	1	1	10	0	15	16	0	16
	Kazovu	0	0	0	61	6	29	0	96	46	13	59
Subtotal		0	104	2	237	24	40	0	407	492	43	535
Kipili	Kipili	0	3	2	2	20	6	0	33	29	1	30
	Mkinga	0	0	1	12	4	0	0	17	17	0	17
	Mgwa-Mwamba	0	27	0	5	2	1	1	36	64	1	65
	Namansi	0	0	1	11	1	1	0	14	24	0	24
	Kerenge	0	4	0	4	9	10	0	27	31	3	34
	Ilwile	0	11	0	5	2	1	0	19	32	0	32
Subtotal		0	45	4	39	38	19	1	146	197	5	202
Kizumbi	Msamba	0	0	2	19	5	14	1	41	59	5	64
	Lyapinda	0	0	0	6	3	0	0	9	16	0	16
	Kasanga	0	0	0	6	0	1	0	7	14	0	14
	Izinga	0	2	0	16	8	1	0	27	46	3	49
	Nindo	0	7	0	2	2	0	0	11	21	0	21
	Mwinza	0	7	0	9	4	0	0	20	33	1	34
	Warnpemba	2	19	1	10	0	1	0	33	60	1	61
	Kizumbi	0	1	3	1	4	0	0	9	11	0	11
Subtotal		2	36	6	69	26	17	1	157	260	10	270
Kala	Kpeta	0	12	0	1	0	0	1	14	24	2	26
	Miyengwa	0	8	0	0	0	0	0	8	16	0	16
	Kamimbi	0	8	0	0	0	0	0	8	13	3	16
	Chowe	0	2	0	0	0	0	0	2	3	1	4
	Lusukelo	0	9	0	0	0	8	0	17	12	6	18
	Mpasa	0	24	0	16	0	0	0	40	73	9	82
Subtotal		0	63	0	17	0	8	1	89	141	21	162
Kasanga	Songambele	0	4	0	9	3	7	10	33	28	17	45
	Kalepa	0	0	0	6	9	3	0	18	5	13	18
	Muzi	0	3	0	13	18	0	3	37	33	9	42
	Kilewani	0	5	3	11	5	5	0	29	24	21	45
	Lusambo	0	7	7	9	18	0	0	41	26	22	48
	Samazi	0	11	0	25	8	17	0	61	39	43	82
	Molwe	0	0	0	2	11	7	0	20	14	0	14
	Kpanga	0	0	4	7	8	0	0	19	10	12	22
Subtotal		0	30	14	82	80	39	13	258	179	137	316
Grandtotal		2	344	30	469	173	123	16	1157	1443	245	1688

Household survey in Rukwa Region

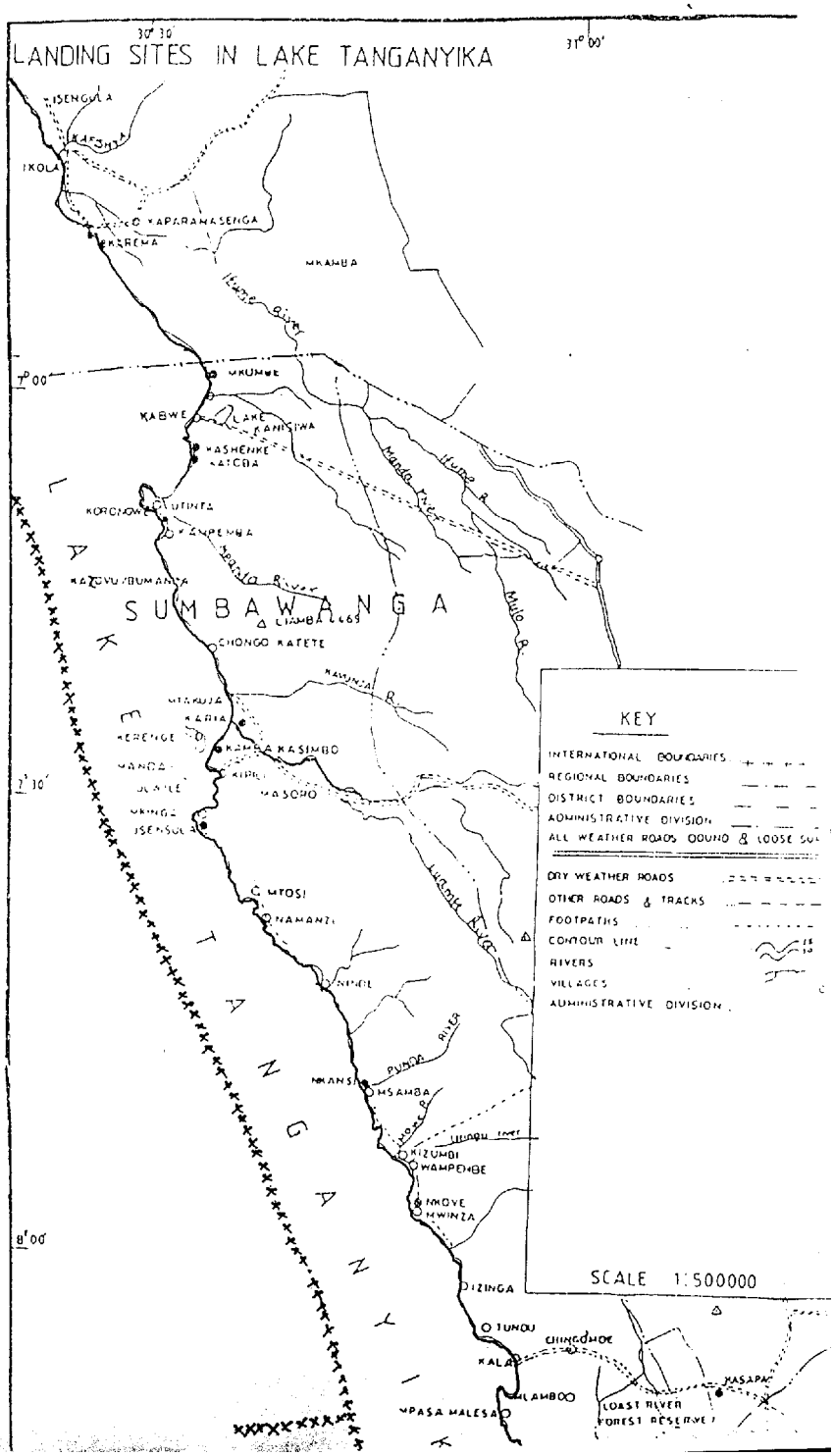
Fisheries Inventories in Lake Tanganyika – 1990/91
Rukwa Region
C.Household survey

Recording Station	Landing Site	Villages	Households					Absentee Fisher men
			Fishing	Farming	Fish Trade	Others	Total	
Karema	Karema	Karema	8	8	0	0	16	8
	Kaselamnyaka	Ikola	11	16	1	0	28	0
	Isimwa	Isengule	15	14	1	0	30	0
	Kasangantongwe							
	Subwa							
	Tupondogoro							
	Wyumbayamunga							
	Kangwena							
Subtotal			34	38	2	0	74	8
Kirando	Kalila	Utinta	234	101	1	0	336	73
	Kanchui	Katete	7	54	0	1	62	31
	Bumanda	Chongo	13	35	0	0	48	17
	Kabwe	Isaba	4	17	0	0	21	3
	Korogwe	Kazovu	27	50	0	1	78	11
	Utinta	Bumanda	14	7	0	0	21	9
	Katete	Korogwe	36	27	0	1	64	17
	Chongo	Kabwe	42	35	12	0	89	29
	Isaba	Kalila	25	35	0	0	60	15
	Kazovu							
Subtotal			402	361	13	3	779	205
Kipili	Kipili	Mvuna	0	49	0	6	55	18
	Mkinga	Ulwile	0	28	2	0	30	11
	Mgna [illegible]	Mkinga	0	21	0	0	21	12
	Namansi	Kipili	0	47	0	0	47	3
	Kerenge	Kerenge	0	51	0	15	66	3
	Ulwile	Namansi	0	59	0	0	59	2
		Kisambala	0	27	0	0	27	1
Subtotal			0	282	2	21	305	50
Kizumbi	Msamba	Wampembe	1	50	0	0	51	8
	Lyapinda	Kizumbi	0	10	0	0	10	2
	Kasanga	Izinga	0	59	0	0	59	3
	Izinga	Lyapinda	0	22	1	0	23	3
	Ninde	Msamba	0	18	0	0	18	1
	Mwinza	Mwinza	0	25	1	0	26	6
	Wampembe	Ninde	0	30	0	0	30	9
	Kizumbi							
Subtotal			1	214	2	0	217	32
Kala	Kipeia	Lolesha						3
	Miyengwa	Kala						8
	Kamimbi	Kilambo						4
	Chowe	Mpasa	Not collected					11
	Lusekele	Tundy						4
	Mpasa	Kipela						1
		Miyengwa						2
		Maleza						4
		Pahali						1
Subtotal								38
Kasanga	Songambele	Samazi	0	49	0	0	49	12
	Katepa	Muzi	0	26	0	0	26	5
	Muzi	Lusambo	3	51	0	3	57	4
	Kilewani	Kilewawi	0	86	0	2	88	4
	Lusambo	Kafyoko	0	15	0	0	15	1
	Samazi							
	Molwe							
	Kipanga							
Subtotal			**3**	**227**	**0**	**5**	**235**	**26**
Grandtotal			**440**	**1122**	**19**	**29**	**1610**	**359**

Annex-1: Map of Lake Tanganyika



Annex-1: Map of Lake Tanganyika (Contd)



Date: _____ 19____ ANNEX 1B

Type of Boat	Boat Reg No.	Type Gear Size	No. of Gear	No. of Men	Species	Weight (Kgs.)	Value (Shs.)	No. of Fish	FU, FC & MFU	No. of FU	Arr. time	time for fis. coll.	Remarks	Super-visor	Beach Leader

ANNEX 2B

The United Republic of Tanzania

Ministry of Tourism, Natural Resources and Environment

Fisheries Division

(F.S.F. 21B)

DAILY RECORD OF FISH LANDED

Region ..... District ..... Station ..... Waters .....

NOTE: (a) Weight in kilograms
(b) Value in T.Shs
(c) No. of Fish

	1	2	3	4	5	6	7	8	9			10			11			12			13			14		
									SPECIES															TOTAL		
Date	Type of boat	Registration No.	Type/ No. of Gear & size	No. of men	FU FC MFU	No. of FU	Arrival time	Duration for fishing/ collection	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c
TOTAL																										

Recorder's Name

Designation

Date: _ _ _ _ _ _ _ 19_ _ _ _

Type of Boat	Boat Reg. NO.	Gear Size	No. of gear	No. of Fishermen	Species	Weight (Kgs)	Value (Shs)

ANNEX 4B

F.S.F. 21

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF LANDS NATURAL RESOURCES AND TOURISM
FISHERIES DIVISION

DAILY RECORD OF FISH LANDED

TYPE AND SIZE OF GEAR ________________

NOTE: In the columns below put weight in kilograms in (a) and value in Shillings in (b)

Region : ________________ Station ________________ Water ________________

1	2	3	4	5			7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		25		26	
Date	Type of Boat	Boat Registration No.	No of Gear	No of Men	SPECIES																																								TOTAL	
					a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
TOTAL																																														

Recorder's Name : ________________ Designation : ________________

L. VICTORIA	Region...: KAGERA		Period...: 07/92
Landing site	No. of sample days	No. of boat landings	No. of reported boats(census)
Nyamkazi	16	165	23
Nyamirembe	14	71	8
Katete	16	21	9
Katunguru	16	76	10
Chato	9	85	7
TOTAL	71	418	57 Region: 797

SAMPLE STATISTICS		MONTHLY ESTIMATES	
TOTAL landing days.....	71		
TOTAL vessel landings...	418	13,395	
Confidence limits at 95 %		11228 - 15562	CV= 8 %

SPECIES	CATCH(KG)	PERCENT	CATCH(KG)	
ALL SPECIES	54,070	100.00 %	1,631,543	
Confidence limits at 95%.....			1306199 - 1956887	CV= 10 %
BAGRUS	22	0.04 %	669	
CLARIAS	84	0.16 %	2,529	
DAGAA	4,976	9.20 %	150,151	
HAPLOCHROM	13	0.02 %	392	
LATES	41,420	76.60 %	1,249,827	
MORMYRUS	5	0.01 %	147	
PROTOPT.	69	0.13 %	2,088	
T.NIL	4,712	8.71 %	142,189	
TILAPIA	2,769	5.12 %	83,551	

L. VICTORIA Region...: KAGERA Period...: 07/92

Landing site...: Chato

SAMPLE STATISTICS			MONTHLY ESTIMATES		
No. of landing days.....	9		31		
No. of vessel landings..	85		293		
Confidence limits at 95 %			243 - 343	CV=	8 %
SPECIES	CATCH(KG)	PERCENT	CATCH(KG)		
ALL SPECIES	6919	100.00 %	23832		
Confidence limits at 95%.....			19572 - 28092	CV=	8 %
LATES	3344	48.33 %	11518		
PROTOPT.	69	1.00 %	238		
T.NIL	2998	43.33 %	10326		
TILAPIA	508	7.34 %	1750		

L. VICTORIA Region...: KAGERA Period...: 07/92

Landing site...: Katunguru

SAMPLE STATISTICS			MONTHLY ESTIMATES		
No. of landing days.....	16		31		
No. of vessel landings..	76		147		
Confidence limits at 95 %			137 - 157	CV=	3 %
SPECIES	CATCH(KG)	PERCENT	CATCH(KG)		
ALL SPECIES	5527	100.00 %	10709		
Confidence limits at 95%.....			9438 - 11980	CV=	6 %
LATES	5527	100.00 %	10709		

L. VICTORIA Region...: KAGERA Period...: 07/92

Landing site...: Katete

SAMPLE STATISTICS			MONTHLY ESTIMATES	
No. of landing days.....	16		31	
No. of vessel landings..	21		41	
Confidence limits at 95 %			35 - 47	CV= 7 %
SPECIES	CATCH(KG)	PERCENT	CATCH(KG)	
ALL SPECIES	4865	100.00 %	9426	
Confidence limits at 95%.....			5260 - 13592	CV= 21 %
LATES	2604	53.53 %	5045	
TILAPIA	2261	46.47 %	4381	

L. VICTORIA Region...: KAGERA Period...: 07/92

Landing site...: Nyamirembe

SAMPLE STATISTICS			MONTHLY ESTIMATES	
No. of landing days.....	14		31	
No. of vessel landings..	71		157	
Confidence limits at 95 %			127 - 187	CV= 9 %
SPECIES	CATCH(KG)	PERCENT	CATCH(KG)	
ALL SPECIES	5409	100.00 %	11977	
Confidence limits at 95%.....			8673 - 15331	CV= 13 %
LATES	3695	68.31 %	8182	
T.NIL	1714	31.69 %	3795	

L. VICTORIA	Region: KAGERA	Period: 07/92
Landing site.....:	CHATO	
Species.....:	LATES	
Boat type.....:	PC	
Gear type.....:	GN07	
Catch in Kg.....:	1,551	46.4 % of species
No. of vessel landings.....:	20	23.5 % of landings
CPUE in Kg/vessel landing.....:	77.55	
No. of fishing hours.....:	223	23.2 % of tot hrs
CPUE in Kg/fishing hour.....:	6.96	
No. of gear units.....:	275	
CPUE in Kg/gear unit.....:	5.64	
Total value in TSh.....:	74,750	45.5 % of species
Price in TSh/Kg.....:	48	
Average weight of fish in Kg.....:	5.60	

L. VICTORIA	Region: KAGERA	Period: 07/92
Landing site.....:	CHATO	
Species.....:	LATES	
Boat type.....:	PC	
Gear type.....:	HANDLINE	
Catch in Kg.....:	1,366	40.8 % of species
No. of vessel landings.....:	18	21.2 % of landings
CPUE in Kg/vessel landing.....:	75.89	
No. of fishing hours.....:	206	21.4 % of tot hrs
CPUE in Kg/fishing hour.....:	6.63	
No. of gear units.....:	7,580	
CPUE in Kg/gear unit.....:	0.18	
Total value in TSh.....:	68,300	41.5 % of species
Price in TSh/Kg.....:	50	
Average weight of fish in Kg.....:	6.83	

L. VICTORIA Region...: KAGERA Period...: 07/92

Landing site...: Nyamkazi

SAMPLE STATISTICS			MONTHLY ESTIMATES	
No. of landing days.....	16		31	
No. of vessel landings..	165		320	
Confidence limits at 95 %			261 - 379	CV= 9 %
SPECIES	CATCH(KG)	PERCENT	CATCH(KG)	
ALL SPECIES	31350	100.00 %	60741	
Confidence limits at 95%.....			50524 - 70958	CV= 8 %
BAGRUS	22	0.07 %	43	
CLARIAS	84	0.27 %	163	
DAGAA	4976	15.87 %	9641	
HAPLOCHROM	13	0.04 %	25	
LATES	26250	83.73 %	50860	
MORMYRUS	5	0.02 %	10	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Landing site	CHATO		
Species	T.NIL		
Boat type	PC		
Gear type	GN04		
Catch in Kg	1,308	43.6 % of species	
No. of vessel landings	24	28.2 % of landings	
CPUE in Kg/vessel landing	54.50		
No. of fishing hours	271	28.1 % of tot hrs	
CPUE in Kg/fishing hour	4.83		
No. of gear units	228		
CPUE in Kg/gear unit	5.74		
Total value in TSh	67,750	44.4 % of species	
Price in TSh/Kg	52		
Average weight of fish in Kg	0.64		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Landing site	CHATO		
Species	T.NIL		
Boat type	PC		
Gear type	GN06		
Catch in Kg	1,620	54.0 % of species	
No. of vessel landings	18	21.2 % of landings	
CPUE in Kg/vessel landing	90.00		
No. of fishing hours	207	21.5 % of tot hrs	
CPUE in Kg/fishing hour	7.83		
No. of gear units	119		
CPUE in Kg/gear unit	13.61		
Total value in TSh	81,500	53.4 % of species	
Price in TSh/Kg	50		
Average weight of fish in Kg	1.70		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Landing site		CHATO	
Species		LATES	
Boat type		PC	
Gear type		LONGLINE	
Catch in Kg		427	12.8 % of species
No. of vessel landings		5	5.9 % of landings
CPUE in Kg/vessel landing		85.40	
No. of fishing hours		56	5.8 % of tot hrs
CPUE in Kg/fishing hour		7.63	
No. of gear units		2,570	
CPUE in Kg/gear unit		0.17	
Total value in TSh		21,350	13.0 % of species
Price in TSh/Kg		50	
Average weight of fish in Kg		7.76	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Landing site		CHATO	
Species		PROTOPT.	
Boat type		PC	
Gear type		HANDLINE	
Catch in Kg		69	100.0 % of species
No. of vessel landings		18	21.2 % of landings
CPUE in Kg/vessel landing		3.83	
No. of fishing hours		206	21.4 % of tot hrs
CPUE in Kg/fishing hour		0.33	
No. of gear units		7,580	
CPUE in Kg/gear unit		0.01	
Total value in TSh		3,450	100.0 % of species
Price in TSh/Kg		50	
Average weight of fish in Kg		9.86	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Landing site.....:	CHATO		
Species.....:	TILAPIA		
Boat type.....:	PC		
Gear type.....:	GN07		
Catch in Kg.....:	318	62.6 % of species	
No. of vessel landings.....:	20	23.5 % of landings	
CPUE in Kg/vessel landing.....:	15.90		
No. of fishing hours.....:	223	23.2 % of tot hrs	
CPUE in Kg/fishing hour.....:	1.43		
No. of gear units.....:	275		
CPUE in Kg/gear unit.....:	1.16		
Total value in TSh.....:	16,300	61.5 % of species	
Price in TSh/Kg.....:	51		
Average weight of fish in Kg.....:	2.00		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Landing site		CHATO	
Species		T.NIL	
Boat type		PC	
Gear type		HANDLINE	
Catch in Kg		70	2.3 % of species
No. of vessel landings		18	21.2 % of landings
CPUE in Kg/vessel landing		3.89	
No. of fishing hours		206	21.4 % of tot hrs
CPUE in Kg/fishing hour		0.34	
No. of gear units		7,580	
CPUE in Kg/gear unit		0.01	
Total value in TSh		3,500	2.3 % of species
Price in TSh/Kg		50	
Average weight of fish in Kg		7.00	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Landing site		CHATO	
Species		TILAPIA	
Boat type		PC	
Gear type		GN04	
Catch in Kg		190	37.4 % of species
No. of vessel landings		24	28.2 % of landings
CPUE in Kg/vessel landing		7.92	
No. of fishing hours		271	28.1 % of tot hrs
CPUE in Kg/fishing hour		0.70	
No. of gear units		228	
CPUE in Kg/gear unit		0.83	
Total value in TSh		10,200	38.5 % of species
Price in TSh/Kg		54	
Average weight of fish in Kg		2.00	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	BAGRUS		
Boat type	PC		
Gear type	LONGLINE		
Catch in Kg	14	63.6 % of species	
No. of vessel landings	47	11.2 % of landings	
CPUE in Kg/vessel landing	0.30		
No. of fishing hours	453	9.1 % of tot hrs	
CPUE in Kg/fishing hour	0.03		
No. of gear units	67,550		
CPUE in Kg/gear unit	0.00		
Total value in TSh	1,900	69.1 % of species	
Price in TSh/Kg	136		
Average weight of fish in Kg	4.67		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	CLARIAS		
Boat type	FC		
Gear type	* UNSP *		
Catch in Kg	26	31.0 % of species	
No. of vessel landings	1	0.2 % of landings	
CPUE in Kg/vessel landing	26.00		
No. of fishing hours	12	0.2 % of tot hrs	
CPUE in Kg/fishing hour	2.17		
No. of gear units	2,500		
CPUE in Kg/gear unit	0.01		
Total value in TSh	2,000	22.5 % of species	
Price in TSh/Kg	77		
Average weight of fish in Kg	8.67		

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	BAGRUS	
Boat type	PC	
Gear type	GNO4 1/2	
Catch in Kg	2	9.1 % of species
No. of vessel landings	13	3.1 % of landings
CPUE in Kg/vessel landing	0.15	
No. of fishing hours	15	0.3 % of tot hrs
CPUE in Kg/fishing hour	0.13	
No. of gear units	19	
CPUE in Kg/gear unit	0.11	
Total value in TSh	150	5.5 % of species
Price in TSh/Kg	75	
Average weight of fish in Kg	2.00	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	BAGRUS	
Boat type	PC	
Gear type	GNO6	
Catch in Kg	6	27.3 % of species
No. of vessel landings	86	20.6 % of landings
CPUE in Kg/vessel landing	0.07	
No. of fishing hours	488	9.8 % of tot hrs
CPUE in Kg/fishing hour	0.01	
No. of gear units	1,474	
CPUE in Kg/gear unit	0.00	
Total value in TSh	700	25.5 % of species
Price in TSh/Kg	117	
Average weight of fish in Kg	6.00	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	DAGAA		
Boat type	PC		
Gear type	SCOOPNET		
Catch in Kg	1,258	25.3	% of species
No. of vessel landings	6	1.4	% of landings
CPUE in Kg/vessel landing	209.67		
No. of fishing hours	44	0.9	% of tot hrs
CPUE in Kg/fishing hour	28.59		
No. of gear units	6		
CPUE in Kg/gear unit	209.67		
Total value in TSh	8,900	20.8	% of species
Price in TSh/Kg	7		
Average weight of fish in Kg	23.74		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	HAPLOCHROM		
Boat type	PC		
Gear type	B.SEINE		
Catch in Kg	13	100.0	% of species
No. of vessel landings	31	7.4	% of landings
CPUE in Kg/vessel landing	0.42		
No. of fishing hours	291	5.9	% of tot hrs
CPUE in Kg/fishing hour	0.04		
No. of gear units	31		
CPUE in Kg/gear unit	0.42		
Total value in TSh	1,800	100.0	% of species
Price in TSh/Kg	138		
Average weight of fish in Kg	0.00		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	CLARIAS		
Boat type	PC		
Gear type	GN06		
Catch in Kg	7	8.3 % of species	
No. of vessel landings	86	20.6 % of landings	
CPUE in Kg/vessel landing	0.08		
No. of fishing hours	488	9.8 % of tot hrs	
CPUE in Kg/fishing hour	0.01		
No. of gear units	1,474		
CPUE in Kg/gear unit	0.00		
Total value in TSh	800	9.0 % of species	
Price in TSh/Kg	114		
Average weight of fish in Kg	7.00		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	CLARIAS		
Boat type	PC		
Gear type	GN07		
Catch in Kg	7	8.3 % of species	
No. of vessel landings	121	28.9 % of landings	
CPUE in Kg/vessel landing	0.06		
No. of fishing hours	337	6.8 % of tot hrs	
CPUE in Kg/fishing hour	0.02		
No. of gear units	722		
CPUE in Kg/gear unit	0.01		
Total value in TSh	800	9.0 % of species	
Price in TSh/Kg	114		
Average weight of fish in Kg	7.00		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species		LATES	
Boat type		FC	
Gear type		* UNSP *	
Catch in Kg		200	0.5 % of species
No. of vessel landings		1	0.2 % of landings
CPUE in Kg/vessel landing		200.00	
No. of fishing hours		12	0.2 % of tot hrs
CPUE in Kg/fishing hour		16.67	
No. of gear units		2,500	
CPUE in Kg/gear unit		0.08	
Total value in TSh		30,000	1.0 % of species
Price in TSh/Kg		150	
Average weight of fish in Kg		2.00	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species		LATES	
Boat type		PC	
Gear type		B.SEINE	
Catch in Kg		3,117	7.5 % of species
No. of vessel landings		31	7.4 % of landings
CPUE in Kg/vessel landing		100.55	
No. of fishing hours		291	5.9 % of tot hrs
CPUE in Kg/fishing hour		10.71	
No. of gear units		31	
CPUE in Kg/gear unit		100.55	
Total value in TSh		131,300	4.2 % of species
Price in TSh/Kg		42	
Average weight of fish in Kg		0.00	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	DAGAA		
Boat type	PC		
Gear type	CAST NET		
Catch in Kg	2,950	59.3 % of species	
No. of vessel landings	24	5.7 % of landings	
CPUE in Kg/vessel landing	122.92		
No. of fishing hours	179	3.6 % of tot hrs	
CPUE in Kg/fishing hour	16.48		
No. of gear units	24		
CPUE in Kg/gear unit	122.92		
Total value in TSh	26,450	61.8 % of species	
Price in TSh/Kg	9		
Average weight of fish in Kg	24.18		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	DAGAA		
Boat type	PC		
Gear type	D.SEINE		
Catch in Kg	504	10.1 % of species	
No. of vessel landings	5	1.2 % of landings	
CPUE in Kg/vessel landing	100.80		
No. of fishing hours	38	0.8 % of tot hrs	
CPUE in Kg/fishing hour	13.26		
No. of gear units	1		
CPUE in Kg/gear unit	504.00		
Total value in TSh	5,250	12.3 % of species	
Price in TSh/Kg	10		
Average weight of fish in Kg	0.00		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species		LATES	
Boat type		PC	
Gear type		GN06	
Catch in Kg		8,566	20.7 % of species
No. of vessel landings		86	20.6 % of landings
CPUE in Kg/vessel landing		99.61	
No. of fishing hours		762	15.4 % of tot hrs
CPUE in Kg/fishing hour		11.24	
No. of gear units		1,645	
CPUE in Kg/gear unit		5.21	
Total value in TSh		714,100	22.6 % of species
Price in TSh/Kg		83	
Average weight of fish in Kg		2.40	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species		LATES	
Boat type		PC	
Gear type		GN06 1/2	
Catch in Kg		702	1.7 % of species
No. of vessel landings		10	2.4 % of landings
CPUE in Kg/vessel landing		70.20	
No. of fishing hours		154	3.1 % of tot hrs
CPUE in Kg/fishing hour		4.56	
No. of gear units		70	
CPUE in Kg/gear unit		10.03	
Total value in TSh		33,720	1.1 % of species
Price in TSh/Kg		48	
Average weight of fish in Kg		4.03	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	LATES		
Boat type	PC		
Gear type	GNO4 1/2		
Catch in Kg	440	1.1 % of species	
No. of vessel landings	13	3.1 % of landings	
CPUE in Kg/vessel landing	33.85		
No. of fishing hours	64	1.3 % of tot hrs	
CPUE in Kg/fishing hour	6.88		
No. of gear units	18		
CPUE in Kg/gear unit	24.44		
Total value in TSh	7,240	0.2 % of species	
Price in TSh/Kg	16		
Average weight of fish in Kg	4.40		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	LATES		
Boat type	PC		
Gear type	GNO5		
Catch in Kg	1,145	2.8 % of species	
No. of vessel landings	24	5.7 % of landings	
CPUE in Kg/vessel landing	47.71		
No. of fishing hours	238	4.8 % of tot hrs	
CPUE in Kg/fishing hour	4.81		
No. of gear units	111		
CPUE in Kg/gear unit	10.32		
Total value in TSh	30,360	1.0 % of species	
Price in TSh/Kg	27		
Average weight of fish in Kg	4.32		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species		CLARIAS	
Boat type		PC	
Gear type		LONGLINE	
Catch in Kg		44	52.4 % of species
No. of vessel landings		47	11.2 % of landings
CPUE in Kg/vessel landing		0.94	
No. of fishing hours		453	9.1 % of tot hrs
CPUE in Kg/fishing hour		0.10	
No. of gear units		67,550	
CPUE in Kg/gear unit		0.00	
Total value in TSh		5,300	59.6 % of species
Price in TSh/Kg		120	
Average weight of fish in Kg		7.33	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species		DAGAA	
Boat type		PC	
Gear type		B.SEINE	
Catch in Kg		264	5.3 % of species
No. of vessel landings		31	7.4 % of landings
CPUE in Kg/vessel landing		8.52	
No. of fishing hours		291	5.9 % of tot hrs
CPUE in Kg/fishing hour		0.91	
No. of gear units		31	
CPUE in Kg/gear unit		8.52	
Total value in TSh		2,200	5.1 % of species
Price in TSh/Kg		8	
Average weight of fish in Kg		24.00	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	LATES		
Boat type	PC		
Gear type	GNO7		
Catch in Kg	11,645	28.1 % of species	
No. of vessel landings	121	28.9 % of landings	
CPUE in Kg/vessel landing	96.24		
No. of fishing hours	1,660	33.5 % of tot hrs	
CPUE in Kg/fishing hour	7.02		
No. of gear units	2,273		
CPUE in Kg/gear unit	5.12		
Total value in TSh	662,890	21.0 % of species	
Price in TSh/Kg	57		
Average weight of fish in Kg	3.75		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	LATES		
Boat type	PC		
Gear type	HANDLINE		
Catch in Kg	1,732	4.2 % of species	
No. of vessel landings	22	5.3 % of landings	
CPUE in Kg/vessel landing	78.73		
No. of fishing hours	259	5.2 % of tot hrs	
CPUE in Kg/fishing hour	6.69		
No. of gear units	11,000		
CPUE in Kg/gear unit	0.16		
Total value in TSh	86,560	2.7 % of species	
Price in TSh/Kg	50		
Average weight of fish in Kg	5.31		

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	MORMYRUS	
Boat type	PC	
Gear type	GNO4 1/2	
Catch in Kg	1	20.0 % of species
No. of vessel landings	13	3.1 % of landings
CPUE in Kg/vessel landing	0.08	
No. of fishing hours	15	0.3 % of tot hrs
CPUE in Kg/fishing hour	0.07	
No. of gear units	19	
CPUE in Kg/gear unit	0.05	
Total value in TSh	50	5.0 % of species
Price in TSh/Kg	50	
Average weight of fish in Kg	1.00	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	MORMYRUS	
Boat type	PC	
Gear type	GNO6	
Catch in Kg	1	20.0 % of species
No. of vessel landings	86	20.6 % of landings
CPUE in Kg/vessel landing	0.01	
No. of fishing hours	488	9.8 % of tot hrs
CPUE in Kg/fishing hour	0.00	
No. of gear units	1,474	
CPUE in Kg/gear unit	0.00	
Total value in TSh	100	10.0 % of species
Price in TSh/Kg	100	
Average weight of fish in Kg	1.00	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	LATES	
Boat type	PC	
Gear type	LONGLINE	
Catch in Kg	13,873	33.5 % of species
No. of vessel landings	47	11.2 % of landings
CPUE in Kg/vessel landing	295.17	
No. of fishing hours	564	11.4 % of tot hrs
CPUE in Kg/fishing hour	24.60	
No. of gear units	73,870	
CPUE in Kg/gear unit	0.19	
Total value in TSh	1,458,070	46.2 % of species
Price in TSh/Kg	105	
Average weight of fish in Kg	2.65	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	MORMYRUS	
Boat type	PC	
Gear type	B.SEINE	
Catch in Kg	1	20.0 % of species
No. of vessel landings	31	7.4 % of landings
CPUE in Kg/vessel landing	0.03	
No. of fishing hours	291	5.9 % of tot hrs
CPUE in Kg/fishing hour	0.00	
No. of gear units	31	
CPUE in Kg/gear unit	0.03	
Total value in TSh	350	35.0 % of species
Price in TSh/Kg	350	
Average weight of fish in Kg	0.25	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	T.NIL	
Boat type	PC	
Gear type	GN04	
Catch in Kg	1,462	31.0 % of species
No. of vessel landings	28	6.7 % of landings
CPUE in Kg/vessel landing	52.21	
No. of fishing hours	307	6.2 % of tot hrs
CPUE in Kg/fishing hour	4.76	
No. of gear units	249	
CPUE in Kg/gear unit	5.87	
Total value in TSh	73,910	33.4 % of species
Price in TSh/Kg	51	
Average weight of fish in Kg	0.62	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	T.NIL	
Boat type	PC	
Gear type	GN04 1/2	
Catch in Kg	203	4.3 % of species
No. of vessel landings	13	3.1 % of landings
CPUE in Kg/vessel landing	15.62	
No. of fishing hours	40	0.8 % of tot hrs
CPUE in Kg/fishing hour	5.08	
No. of gear units	12	
CPUE in Kg/gear unit	16.92	
Total value in TSh	8,120	3.7 % of species
Price in TSh/Kg	40	
Average weight of fish in Kg	0.67	

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	MORMYRUS		
Boat type	PC		
Gear type	GN07		
Catch in Kg	2	40.0 % of species	
No. of vessel landings	121	28.9 % of landings	
CPUE in Kg/vessel landing	0.02		
No. of fishing hours	337	6.8 % of tot hrs	
CPUE in Kg/fishing hour	0.01		
No. of gear units	722		
CPUE in Kg/gear unit	0.00		
Total value in TSh	500	50.0 % of species	
Price in TSh/Kg	250		
Average weight of fish in Kg	0.33		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	PROTOPT.		
Boat type	PC		
Gear type	HANDLINE		
Catch in Kg	69	100.0 % of species	
No. of vessel landings	22	5.3 % of landings	
CPUE in Kg/vessel landing	3.14		
No. of fishing hours	206	4.2 % of tot hrs	
CPUE in Kg/fishing hour	0.33		
No. of gear units	7,580		
CPUE in Kg/gear unit	0.01		
Total value in TSh	3,450	100.0 % of species	
Price in TSh/Kg	50		
Average weight of fish in Kg	9.86		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	T.NIL		
Boat type	PC		
Gear type	GNO7		
Catch in Kg	25	0.5 % of species	
No. of vessel landings	121	28.9 % of landings	
CPUE in Kg/vessel landing	0.21		
No. of fishing hours	283	5.7 % of tot hrs	
CPUE in Kg/fishing hour	0.09		
No. of gear units	647		
CPUE in Kg/gear unit	0.04		
Total value in TSh	750	0.3 % of species	
Price in TSh/Kg	30		
Average weight of fish in Kg	3.13		

L. VICTORIA	Region: KAGERA	Period: 07/92	
Species	T.NIL		
Boat type	PC		
Gear type	HANDLINE		
Catch in Kg	70	1.5 % of species	
No. of vessel landings	22	5.3 % of landings	
CPUE in Kg/vessel landing	3.18		
No. of fishing hours	206	4.2 % of tot hrs	
CPUE in Kg/fishing hour	0.34		
No. of gear units	7,580		
CPUE in Kg/gear unit	0.01		
Total value in TSh	3,500	1.6 % of species	
Price in TSh/Kg	50		
Average weight of fish in Kg	7.00		

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	T.NIL	
Boat type	PC	
Gear type	GNO5	
Catch in Kg	993	21.1 % of species
No. of vessel landings	24	5.7 % of landings
CPUE in Kg/vessel landing	41.38	
No. of fishing hours	190	3.8 % of tot hrs
CPUE in Kg/fishing hour	5.23	
No. of gear units	79	
CPUE in Kg/gear unit	12.57	
Total value in TSh	39,720	18.0 % of species
Price in TSh/Kg	40	
Average weight of fish in Kg	0.66	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	T.NIL	
Boat type	PC	
Gear type	GNO6	
Catch in Kg	1,959	41.6 % of species
No. of vessel landings	86	20.6 % of landings
CPUE in Kg/vessel landing	22.78	
No. of fishing hours	329	6.6 % of tot hrs
CPUE in Kg/fishing hour	5.95	
No. of gear units	165	
CPUE in Kg/gear unit	11.87	
Total value in TSh	95,040	43.0 % of species
Price in TSh/Kg	49	
Average weight of fish in Kg	1.51	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	TILAPIA	
Boat type	PC	
Gear type	GN05	
Catch in Kg	322	11.6 % of species
No. of vessel landings	24	5.7 % of landings
CPUE in Kg/vessel landing	13.42	
No. of fishing hours	32	0.6 % of tot hrs
CPUE in Kg/fishing hour	10.06	
No. of gear units	12	
CPUE in Kg/gear unit	26.83	
Total value in TSh	16,100	17.3 % of species
Price in TSh/Kg	50	
Average weight of fish in Kg	2.00	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	TILAPIA	
Boat type	PC	
Gear type	GN06	
Catch in Kg	1,568	56.6 % of species
No. of vessel landings	86	20.6 % of landings
CPUE in Kg/vessel landing	18.23	
No. of fishing hours	72	1.5 % of tot hrs
CPUE in Kg/fishing hour	21.78	
No. of gear units	83	
CPUE in Kg/gear unit	18.89	
Total value in TSh	28,320	30.5 % of species
Price in TSh/Kg	18	
Average weight of fish in Kg	5.21	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	TILAPIA	
Boat type	PC	
Gear type	GN04	
Catch in Kg	190	6.9 % of species
No. of vessel landings	28	6.7 % of landings
CPUE in Kg/vessel landing	6.79	
No. of fishing hours	271	5.5 % of tot hrs
CPUE in Kg/fishing hour	0.70	
No. of gear units	228	
CPUE in Kg/gear unit	0.83	
Total value in TSh	10,200	11.0 % of species
Price in TSh/Kg	54	
Average weight of fish in Kg	2.00	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species	TILAPIA	
Boat type	PC	
Gear type	GN04 1/2	
Catch in Kg	371	13.4 % of species
No. of vessel landings	13	3.1 % of landings
CPUE in Kg/vessel landing	28.54	
No. of fishing hours	64	1.3 % of tot hrs
CPUE in Kg/fishing hour	5.80	
No. of gear units	18	
CPUE in Kg/gear unit	20.61	
Total value in TSh	21,950	23.6 % of species
Price in TSh/Kg	59	
Average weight of fish in Kg	1.00	

L. VICTORIA	Region: KAGERA	Period: 07/92
Species.....:	TILAPIA	
Boat type.....:	PC	
Gear type.....:	GNO7	
Catch in Kg.....:	318	11.5 % of species
No. of vessel landings.....:	121	28.9 % of landings
CPUE in Kg/vessel landing.....:	2.63	
No. of fishing hours.....:	223	4.5 % of tot hrs
CPUE in Kg/fishing hour.....:	1.43	
No. of gear units.....:	275	
CPUE in Kg/gear unit.....:	1.16	
Total value in TSh.....:	16,300	17.6 % of species
Price in TSh/Kg.....:	51	
Average weight of fish in Kg.....:	2.00	

TABLE 1

ANNEX 6B

SUMMARY OF FISHERY STATISTICS FROM THE TERRITORIAL WATERS OF L. TANGANYIKA FOR THE YEAR 1991.

	Kigoma	Rukwa	Total
Total No. of Fisherman	8822	4829	13651
Total No. of Vessels	1664	1628	3292
Wt. of Fish in M.tons	27847.4	35656.2	63503.4
Value of Fish in 000's Tshs	1870305.2	1584077.3	3454382.5
Gears in use by Type & Size:-			
Gillnets:-			
2"	-	76	76
2 1/2"	660	-	660
3"	263	2192	2455
3 1/2"	123	1760	1883
4"	17	254	271
4 1/2"	-	9	9
5"	-	116	116
6"	10	-	10
Total No. of Gillnets	1073	4407	5480
Total No. of Liftnets	647	346	993
Total No. of Purse Seine	3	-	3
Total No. of B/Seines	229	30	259
Total No. of Scoopnets	550	469	1019
Total No. of Hooks	9753	15652	25405
ENGINES:-			
Number of Outboard engines	[illegible]		
Number of Inboard engines	[illegible]		

TABLE 11

COMPARISON OF STATISTICS FOR THE TERRITORIAL WATERS OF LAKE TANGANYIKA FOR THE YEARS 1990 1991

Station	No.of Fisherman		No.of Vessels		Wt.of Fish (M.Tons)		Wt/Fishermen		Wt/Vessels		Value of Fish (000's)		Value/Fishermen		Value/Vessels	
Years	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991
KAGUNGA	920	1036	40	[illegible]	630.8	[illegible]	3.7	0.2	15.8	7.1	39179.0	20714.3	42.6	19.9	979.5	714.2
MWAKGONGO	2164	1882	107	[illegible]	4655.3	1425.4	2.2	0.7	43.5	13.9	278003.0	[illegible]	128.5	49.1	2598.2	907.0
MTANGA	1306	944	59	[illegible]	588.3	663.3	0.5	0.7	10.0	9.2	33525.0	48832.8	25.7	51.7	568.2	678.2
KIBIRIZI	750	775	170	205	6144.5	[illegible]	8.2	14.0	35.1	51.8	592560.0	[illegible]	790.1	1023.9	3485.7	3771.2
UJIJI	77	78	33	24	105.9	83.7	1.4	1.0	3.2	3.4	11195.0	6864.5	145.4	88.0	339.2	286.0
KASEKE	296	[illegible]	88	[illegible]	[illegible]	[illegible]	6.5	[illegible]	21.9	3.9	[illegible]	[illegible]	[illegible]	111.2	1321.9	289.8
MWAKIZEGA	351	229	337	[illegible]	4104.3	[illegible]	4.8	16.8	12.2	34.8	[illegible]	[illegible]	[illegible]	1309.5	837.9	4223.8
SUNUKA	757	1192	141	417	1632.7	[illegible]	3.5	0.9	11.5	2.7	[illegible]	80253.9	[illegible]	67.3	660.2	192.5
KIPALAMSE	1266	540	472	107	4747.6	[illegible]	3.8	13.2	10.1	67.0	301341.0	188906.3	238.0	349.8	638.4	1765.4
MGAMBO	710	892	131	144	2950.2	2253.4	4.2	2.5	22.5	15.6	267454.0	[illegible]	376.7	251.5	2041.6	1520.3
KALYA	493	503	72	87	1007.3	555.6	2.0	1.1	14.0	6.3	64207.0	40062.0	130.2	79.6	891.8	460.4
SUB-TOTAL	9304	8822	1650	1664	29506.4	27847.2	3.1	3.1	17.3	16.7	2079266.0	[illegible]	223.5	212.0	1260.2	1123.9
KALA	726	405	365	162	7721.1	6964.8	10.7	17.0	21.3	42.9	174035.3	105520.8	239.7	258.6	476.8	651.3
KIZUMBI	650	857	268	270	1036.7	1834.7	1.6	2.1	3.9	6.7	15201.7	70191.7	23.0	81.9	56.7	259.9
KIRANDO	1252	1385	1137	535	6400.1	[illegible]	5.1	3.9	5.6	10.3	376367.8	263560.4	300.6	190.2	331.0	492.6
KASANGA	2599	1027	427	316	14885.0	14885.0	5.7	14.4	34.9	47.1	642335.9	642335.9	247.1	625.4	1504.3	2032.7
KIPILI	511	594	433	202	3111.0	4610.1	2.0	7.7	7.2	22.8	127452.7	406918.1	249.4	685.0	294.3	2014.4
KAREMA	745	558	215	203	3144.3	1839.2	4.2	3.2	14.6	9.0	95550.4	95550.4	128.3	171.2	444.4	470.6
SUB-TOTAL	6493	4229	2845	1628	36359.2	[illegible]	5.6	7.3	12.8	21.9	1430947.8	[illegible]	220.4	32.8	503.0	97.3
TOTALS	15797	13551	4495	3292	64865.5	63503.4	4.1	4.6	14.4	19.2	3510213.8	3454382.5	220.2	253.0	780.9	1049.3

TABLE III

THE WEIGHT OF FISH CAUGHT IN METRIC TONS.FROM THE TERRITORIAL WATERS OF LAKE TANGANYIKA FOR THE YEAR 1991

REGION	STATION	Tilapia	Haplochr.	Boul.	Sarotherr.	Mastac.	Bagrus	Clarias	Synod.	Euch.	Barbus	Cithar.	Hydro.	Lates	Luciol.	Dagaa	Diplo.	Capocta	Bathyb.	Others	TOTALS
	KAGUNGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.9	260.0	0.0	0.0	0.0	0.0	276.9
	KWAMGONGO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	561.9	863.5	0.0	0.0	0.0	0.0	1425.4
	KTANGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.0	621.3	0.0	0.0	0.0	0.0	663.3
	KIBIRIZI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3195.5	7426.1	0.0	0.0	0.0	0.0	10621.6
	UJIJI	3.8	23.5	3.2	1.9	4.3	4.2	4.2	0.0	7.9	1.1	1.1	3.4	11.6	0.0	0.5	4.0	2.1	7.0	0.0	83.7
KIGOMA	KASERE	0.0	2.5	1.5	0.0	5.9	1.0	0.0	0.0	1.3	0.2	0.4	0.1	6.4	37.5	1110.6	0.3	0.0	3.0	0.0	1173.7
	MWAKIZEGA	0.0	0.0	3.2	0.0	3.5	0.3	0.0	0.0	4.9	0.1	0.0	0.0	9.3	627.3	1826.1	0.0	0.0	0.8	0.0	2474.2
	SUNUKA	0.0	0.0	3.0	0.0	5.6	0.0	0.0	0.0	1.5	0.0	0.0	0.0	30.4	77.4	1017.7	0.0	0.0	4.7	0.0	1141.7
	KIPALANSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.0	7088.8	0.0	0.0	0.0	0.0	7177.8
	MGAMBO	0.0	0.3	0.4	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	2251.5	0.0	0.0	0.0	0.0	2253.4
	KALYA	0.4	5.5	2.1	0.1	3.1	1.4	0.0	0.0	1.4	0.2	0.0	0.0	4.2	0.0	531.6	0.2	0.1	3.2	0.0	555.6
	SUB-TOTAL	4.2	31.8	13.4	4.0	23.2	6.9	4.2	0.0	17.0	1.7	1.5	3.5	65.2	4647.5	22997.8	4.5	2.2	18.7	0.0	27847.2
	KALA	73.8	261.1	103.3	0.0	112.5	11.9	0.0	0.0	34.5	0.0	4876.4	0.0	550.1	595.0	14.4	7.9	13.6	10.3	0.0	6964.8
	KIZUMBI	0.0	0.0	14.5	0.0	35.6	6.7	0.0	0.0	2.0	0.0	0.0	0.0	25.1	1729.9	5.4	20.1	1.8	3.6	0.0	1854.7
	KIRANDO	443.1	740.4	957.4	42.2	1099.4	97.2	48.4	20.7	192.7	0.0	0.0	0.0	595.3	1009.1	27.1	80.5	176.8	0.0	0.0	5521.2
	KASANGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1412.6	13473.4	0.0	0.0	0.0	0.0	14886.0
	KIPILI	241.4	119.6	563.2	0.0	252.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	453.3	1516.7	0.0	1196.9	0.0	56.9	0.0	4510.1
	KAREMA	125.8	80.0	79.1	50.8	70.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	284.1	1046.8	0.0	20.4	11.4	69.2	0.0	1839.2
	SUB-TOTAL	885.1	1201.1	1717.5	93.0	1569.8	115.8	47.4	20.7	229.2	0.0	4876.4	0.0	2397.9	7310.1	13520.3	1325.8	203.6	140.0	0.0	35656.0
	GRAND TOTAL	889.3	1232.9	1730.9	101.9	1593.0	122.7	51.6	20.7	246.2	1.7	4877.9	3.5	2463.1	11957.6	36518.1	1330.2	205.9	158.7	0.0	63503.2

TABLE IV

THE VALUE OF FISH CAUGHT IN 000'S T.SHS. FROM THE TERRITORIAL WATERS OF LAKE TANGANYIKA FOR THE YEAR 1991

REGION	STATION	Tilapia	Haplochr.	Boul.	Simochr.	Trylo.	Bagrus	Clarius	Synod.	Euch.	Barbus	Cithar.	Hydro.	Lates	Luciol.	Dagaa	Dipno.	Capocta	Bathyb.	Others	TOTALS
	KAGUNGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1086.7	19654.6	0.0	0.0	0.0	0.0	20741.3
	KWAKGONGO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38536.4	53980.5	0.0	0.0	0.0	0.0	92516.9
	KTANGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3237.9	45594.9	0.0	0.0	0.0	0.0	48832.8
	KIBIRIZI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	166266.1	605842.7	0.0	0.0	0.0	0.0	773108.8
	UJIJI	360.0	1276.5	392.2	179.2	412.9	393.5	363.6	0.0	758.4	70.1	119.4	309.0	1072.7	0.0	46.7	335.3	205.0	664.9	0.0	6864.5
KIGOMA	KASEKE	0.0	0.0	319.9	0.0	539.0	218.7	0.0	0.0	71.1	59.9	0.0	11.0	2016.8	3461.1	78404.4	21.5	0.0	566.0	0.0	85789.4
	MWAKIZEGA	0.0	1167.2	432.2	0.0	1554.6	117.6	0.0	0.0	945.7	0.0	299.8	0.0	1550.1	2006.8	291084.8	235.2	0.0	129.1	0.0	298829.1
	SUNUKA	0.0	0.0	454.0	0.0	540.2	0.0	0.0	0.0	307.3	0.0	0.0	0.0	35.1	8407.6	70342.4	0.0	0.0	242.8	0.0	80283.9
	KIPALANSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	751.5	7198.7	180946.1	0.0	0.0	0.0	0.0	188906.3
	NGAMBO	0.0	21.2	55.2	0.0	132.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.2	0.0	233083.2	0.0	0.0	0.0	0.0	233336.4
	KALYA	102.9	514.5	291.6	171.5	765.4	329.3	0.0	0.0	233.2	75.4	0.0	0.0	867.9	0.0	36203.1	54.8	34.3	415.1	0.0	40062.0
	SUB-TOTAL	463.5	2980.1	1911.1	351.0	4347.7	1059.1	363.6	0.0	2215.7	205.4	419.2	320.0	5401.3	230201.3	1616183.4	647.8	243.3	2017.9	0.0	1870331.4
	KALA	3693.0	12941.8	5107.9	0.0	5527.1	525.7	0.0	0.0	1726.4	0.0	24382.5	0.0	19933.9	29271.6	720.4	395.9	674.2	519.2	0.0	105520.8
	KIZUMBI	0.0	0.0	526.2	0.0	1950.2	430.1	0.0	0.0	141.9	0.0	0.0	0.0	2280.8	61639.0	0.0	2726.6	145.4	241.2	0.0	70191.7
RUKWA	KIRANDO	16479.3	17223.7	70055.6	2871.6	60080.1	3955.6	682.3	243.1	6257.5	0.0	0.0	0.0	44454.1	21472.1	9335.2	1220.6	10015.6	0.0	0.0	253560.4
	KASANGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68385.1	573950.8	0.0	0.0	0.0	0.0	642335.9
	KIPILI	8665.5	3178.0	44509.3	1017.9	9810.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55328.1	151673.2	0.0	119689.9	0.0	2846.8	0.0	405918.1
	KAREMA	2349.0	9655.4	3543.0	0.0	17237.0	1600.0	685.4	0.0	0.0	685.5	0.0	0.0	22685.0	15827.1	0.0	0.0	3200.0	12972.0	0.0	93550.4
	SUB-TOTAL	31187.9	42020.9	129846.0	4089.5	94934.7	8201.4	1367.7	243.1	8125.8	685.5	24382.5	0.0	154682.9	348328.1	584006.4	124033.0	14035.2	16579.2	0.0	1584077.3
	GRAND TOTAL	31651.4	45007.0	131757.1	4440.5	99282.4	9260.5	1731.3	243.1	10341.5	890.9	24801.7	320.0	161084.2	578529.4	2200189.8	124680.8	14278.5	18597.1	0.0	3454407.2

TABLE V

THE AVERAGE SELLING PRICE PER KILO BY SPECIES BY STATION FOR FISH CAUGHT IN THE TERRITORIAL WATERS OF LAKE TANGANYIKA FOR THE YEAR 1991.

REGION	STATION	Tilapia	Haplochr.	Boul.	Synodo.	Thyla.	Bagrus	Clarius	Synod.	Euch.	Barbus	Cithar.	Hydro.	Lates	Lucioc.	Dagaa	Otopo.	Capocta	Bathyb.	Others	TOTALS
KIGOMA	KAGUNGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.3	75.6	0.0	0.0	0.0	0.0	74.9
	MWAMGONGO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.8	52.5	0.0	0.0	0.0	0.0	64.9
	MTANGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	77.2	73.4	0.0	0.0	0.0	0.0	73.6
	KIBIRIZI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.0	81.7	0.0	0.0	0.0	0.0	72.8
	UJIJI	95.0	84.3	91.6	95.8	95.8	93.7	87.6	0.0	95.8	84.3	107.6	92.2	92.5	0.0	86.5	84.3	99.5	95.5	0.0	82.0
	KASEKE	0.0	0.0	197.7	0.0	199.0	212.3	0.0	0.0	84.7	295.5	0.0	91.7	213.9	92.4	70.6	0.0	0.0	189.3	0.0	73.1
	MWAKIZEGA	0.0	0.0	155.7	0.0	247.8	392.0	0.0	0.0	210.2	0.0	0.0	0.0	167.2	3.2	159.4	0.0	0.0	161.4	0.0	121.2
	SUNUKA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	108.7	69.1	0.0	0.0	0.0	0.0	70.3
	KIPALANSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.9	25.6	0.0	0.0	0.0	0.0	26.3
	MGAMBO	0.0	0.0	145.3	0.0	143.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	147.3	0.0	103.5	0.0	0.0	0.0	0.0	103.5
	KALYA	357.3	0.0	138.9	81.7	251.1	238.6	0.0	0.0	172.7	362.0	0.0	0.0	205.6	0.0	68.1	0.0	263.8	129.7	0.0	72.1
	SUB-TOTAL	110.5	93.7	142.9	88.4	187.5	153.3	87.6	0.0	130.6	116.4	227.6	91.2	98.2	49.5	70.3	145.6	109.1	108.0	0.0	67.2
RUKWA	KALA	50.0	0.0	49.4	0.0	50.0	44.2	0.0	0.0	0.0	0.0	0.0	0.0	23.4	49.2	50.0	50.1	0.0	50.4	0.0	15.2
	KIZUKBI	0.0	0.0	43.2	0.0	75.5	64.2	0.0	0.0	31.0	0.0	0.0	0.0	90.9	35.6	0.0	135.7	80.8	67.0	0.0	38.3
	KIRANDO	37.0	23.3	73.2	0.0	55.0	38.5	14.4	11.7	32.5	0.0	0.0	0.0	76.0	21.3	0.0	15.2	56.7	0.0	0.0	47.7
	KASANGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.4	42.6	0.0	0.0	0.0	0.0	43.2
	KIPILI	35.9	0.0	75.0	0.0	37.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	0.0	88.3
	KAREMA	18.5	109.8	122.6	0.0	244.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.9	15.2	0.0	0.0	279.7	187.6	0.0	52.0
	SUB-TOTAL	35.2	35.0	75.5	0.0	80.6	47.7	28.9	11.7	33.6	3.0	0.0	0.0	64.5	43.7	43.2	93.6	68.9	115.4	0.0	44.4
	GRAND TOTAL	35.6	36.5	76.1	43.6	82.4	53.6	33.6	11.7	42.0	518.0	5.1	91.2	65.4	45.4	60.2	93.7	69.4	117.2	0.0	54.4

TABLE VI

SPECIES COMPOSITION IN PERCENTAGE BY STATION FOR FISH CAUGHT IN TERRITORIAL WATERS OF LAKE TANGANYIKA FOR THE YEAR 1991.

REGION	STATION	Tilapia	Haplochr.	Bou.	Strocchr.	Thylo.	Bagrus	Clarias	Synod.	Euch.	Barbus	Cithar.	Hydro.	Lates	Luciol.	Dagaa	Dipno.	Capoeta	Bathyt.	Others	TOTALS
	KAGUNGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	93.9	0.0	0.0	0.0	0.0	100.0
	MWAMGONGO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.4	60.6	0.0	0.0	0.0	0.0	100.0
	MTANGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	93.7	0.0	0.0	0.0	0.0	100.0
	KIBIRIZI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.1	69.9	0.0	0.0	0.0	0.0	100.0
	UJIJI	4.5	[illegible]	[illegible]	3.2	5.1	5.0	5.0	[illegible]	[illegible]	1.3	1.3	4.0	13.9	0.0	0.6	4.8	2.5	8.3	0.0	100.0
KIGOMA	KASEKE	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.8	3.2	94.6	0.0	0.0	0.3	0.0	100.0
	MWAKIZEGA	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.4	25.4	73.8	0.0	0.0	0.0	0.0	100.0
	SUNUKA	0.0	0.0	0.3	0.0	0.5	0.0	0.0	0.0	0.2	0.0	0.0	0.0	2.7	6.8	89.1	0.0	0.0	0.4	0.0	100.0
	KIPALANSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	98.8	0.0	0.0	0.0	0.0	100.0
	NGAMBO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.9	0.0	0.0	0.0	0.0	100.0
	KALYA	0.1	1.0	0.4	0.4	0.6	0.2	0.0	0.0	0.3	0.1	0.0	0.0	0.8	0.0	95.7	0.0	0.0	0.6	0.0	100.0
	SUB-TOTAL	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	16.7	82.6	0.0	0.0	0.1	0.0	100.0
	KALA	1.1	3.7	1.5	0.0	1.6	0.2	0.0	0.0	0.5	0.0	70.0	0.0	12.2	8.5	0.2	0.1	0.2	0.1	0.0	100.0
	KIZUMBI	0.0	0.0	0.5	0.0	1.4	0.4	0.0	0.0	0.1	0.0	0.0	0.0	1.4	94.3	0.3	1.1	0.1	0.2	0.0	100.0
RUKWA	KIRANDO	8.0	13.4	17.3	2.9	19.9	1.8	0.9	0.4	3.5	0.0	0.0	0.0	10.6	18.3	0.5	1.5	3.2	0.0	0.0	100.0
	KASANGA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5	90.5	0.0	0.0	0.0	0.0	100.0
	KIPILI	5.3	2.6	12.3	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.2	32.9	0.0	25.0	0.0	1.2	0.0	100.0
	KAREMA	6.9	4.3	4.3	2.8	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.4	56.9	0.0	1.1	0.6	3.8	0.0	100.0
	SUB-TOTAL	2.5	3.4	4.9	0.3	4.4	0.3	0.1	0.1	0.6	0.0	13.7	0.0	6.7	20.5	37.9	3.7	0.6	0.4	0.0	100.0
	GRAND TOTAL	1.4	1.9	2.7	0.2	2.5	0.2	0.1	0.0	0.4	0.0	7.7	0.0	3.9	18.8	57.5	2.1	0.3	0.2	0.0	100.0

TABLE V11

THE AVERAGE CATCH PER BOAT PER GEAR TYPE IN KGS. FOR FISH CAUGHT IN THE TERRITORIAL WATERS OF LAKE TANGANYIKA FOR 1991

REGION	STATION	D/SEIN	SC/NETS	LIFT NETS	B/TRAPS	TRAPS	H.LINES	GN2"	GN2 1/4"	GN2 1/2"	GN3"	GN3 1/2"	GN4"	GN4 1/2"	GN5"	GN6"	GN7"
	KAGUNGA	28.5	-	28.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWAMGONGO	56.3	-	178.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	MTANGA	31.3	-	36.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	KIBIRIZI	-	-	251.4	-	-	-	-	-	-	-	-	-	-	-	-	-
	UJIJI	-	-	-	-	-	-	-	-	-	9.2	11.9	-	-	-	-	-
KIGOMA	KASEKE	-	-	91.3	-	-	20.2	7.3	5.8	9.4	8.3	6.7	-	-	-	-	-
	MWAKIZEGA	-	22.5	54.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUNUKA	-	229.5	48.9	-	-	-	-	-	-	-	-	-	-	-	-	-
	KIPALAMSE	-	41.4	51.7	-	-	9.3	-	-	-	-	-	-	-	-	-	-
	KGAMBO	-	28.8	59.3	-	-	-	-	-	-	8.7	-	-	-	-	-	-
	KALYA	62.2	-	-	-	-	-	-	-	6.3	7.6	8.6	-	-	-	-	-
	SUB-TOTAL	178.3	382.4	733.0	0.0	0.0	29.5	7.3	5.8	15.7	33.8	27.2	0.0	0.0	0.0	0.0	0.0
	KALA	21.2	-	54.1	-	-	11.7	-	-	-	-	-	-	-	-	-	-
	KIZUMBI	-	-	21.8	-	-	199.1	-	-	4.3	5.3	-	-	-	-	-	6.0
RUKWA	KIRANDO	-	-	211.3	-	-	-	-	-	-	22.3	-	-	-	-	-	-
	KASANGA	274.3	-	-	-	-	23.7	-	-	-	-	-	-	-	-	-	-
	KIPILI	184.4	-	-	-	-	98.5	-	-	-	-	34.8	70.2	-	54.5	-	-
	KAREMA	49.8	-	-	-	-	31.1	-	-	-	-	-	-	-	-	-	-
	SUB-TOTAL	529.7	0.0	287.1	0.0	0.0	364.1	0.0	0.0	4.3	28.6	34.8	70.2	0.0	54.5	0.0	6.0
	GRAND TOTAL	1197.7	382.4	1397.3	0.0	0.0	757.6	7.3	5.8	34.3	90.9	96.8	140.5	0.0	109.0	0.0	12.0

ANNEX 13B

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF NATURAL RESOURCES AND TOURISM
FISHERIES DIVISION

T.S.F 22

RETAIL MARKET SURVEY DAILY RECORDING SHEET FOR *FRESH/PROCESSED FISH

REGION..... MARKET.....

Source			Source			Source			Source	
Type and Species	WT (Kgm)	VALUE in (Shs)	Type and Species	WT (Kgm)	VALUE in (Shs)	Type and Species	WT (Kgm)	VALUE in (Shs)	Type and Species	WT (kg)
TOTAL			TOTAL			TOTAL			TOTAL	

Date..... 19.... Surveyed by..... Designation...

United Republic of Tanzania

Ministry of Natural Resources and Tourism
Fisheries Division

F.S.F 28

TRANSPORTATION OF FISH

From _____ During the Month of _____ 19__

In the columns below (1) "Type" — Fresh, Frozen, Dried, Smoked, Fried
(2) "Mode of Transport" — Rail, Road, Bus, Air, Private Transport

...AND SPECIES	MODE OF TRANSPORT	PLACE OF DESTINATION											TOTAL (Kilograms)
		WEIGHT IN KILOGRAMS											

Annex 3B

RECHERCHE POUR L'AMENAGEMENT DES PECHES AU LAC TANGANYIKA

ATELIER SUR LA COORDINATION ET LA STANDARDISATION DES STATISTIQUES DES PECHES POUR LE LAC TANGANYIKA
26-30 JUILLET 1993

BUJUMBURA - BURUNDI

LES STATISTIQUES DES PECHES AU BURUNDI: ENQUETE CADRE

par

NZEYIMANA Emmanuel

Bujumbura, Juillet 1993

L'ENQUETE CADRE.

DEROULEMENT DE L'ENQUETE CADRE.

1. OBJECTIF DE L'ENOUETE.

Les objectifs de l'enquête cadre sont:

- de pouvoir disposer d'un bilan des caractéristiques structurelles de la pêcherie artisanale et coutumière sur le lac Tanganyika.
- de pouvoir disposer d'informations quantifiées exactes sur le nombre d'unités de pêche.
- de pouvoir disposer des facteurs d'extrapolation ajustés an vue de la compilation préliminaire pour un déroulement d'une enquête socio—économique.

2. METHODOLOGIE UTILISEE.

Les opérations de terrain an vue de la collecte des données d'inventaire de la flottille artisanale et coutumière ont été grandement facilitées par la nombre important d'observateurs disponibles. Elles se sont déroulées au mois d'octobre 1992. Les opérations de terrain ont été faites par une équipe de:

1. Observateurs fixes:

   * 18 observateurs de plage (affectés à leur centre d'enquête de résidence respectif).
   * 1 superviseur de terrain.
   * 6 assistants biologistes.

2. Eguipes de supervisions mobiles:

   * 6 Assistants biologistes.

Les observateurs résidant dans un centre de débarquement furent affectés à ce centra tandis que les 6 assistants biologistes et le superviseur de terrain étaient chargés du suivie technique des observateurs et de la collecte des informations dans les centres ne possédant pas d'observateurs résidents.

La période de déroulement de l'enquête d'inventaire coïncide à la période de la saison des pluies à la remontée des mukeke àpartir du sud du pays.

L'on pense ainsi avoir saisi les caractéristiques de la flottille artisanale et coutumière durant leur période d'activités importantes au cour de l'année.

Il est néanmoins prévu de mener des opérations de comptage de la flottille active régulièrement (sur une base mensuelle si possible) afin de cerner de manière plus exacte le dynamique de la flottille au cours de l'année.

La carte schématisant les divers centres de pêche reconnus avant le démarrage des opération de terrain est présentée à la figure 1. Outre cette carte, il avait été demandé aux équipes mobiles de la supervision de prêter une attention particulière à l'existence éventuelle des centres de pêche non—inventories.

3. INVENTAIRE TOTAL DES UNITES.

La méthodologie de recensement utilisée a permis d'établir le nombre total d'unités de pêche artisanales et coutumières actives (opérationnelles) ainsi que le nombre d'unités hors-usages sur les diverses plages visitées.

Elle a également permis de quantifier le nombre d'unités de "renfort" de manoeuvre et d'identifier les unités artisanales améliorées, appelées "Apollo", utilisées par la pêche artisanale. Dans les paragraphes qui suivent, les donnée sont présentées par entité administrative réelle (Province) pour raison de simplicité, de concordance à la réalité actuelle et utilité pratique pour les administrateurs.

Les distinctions entre unités actives, inactives et hors-usages ont été effectuées selon les définitions suivantes, retenues pour le déroulement des opération de terrain:

Unité active : unité pratiquant la pêche les jours de l'enquête

Unité inactive : unité apte à naviguer mais n'allant pas montré d'activité de pêche durant las jours de l'enquête.

Unité hors-usage: unité n'étant pas apte à entreprendre la pêcha au moment du déroulement de l'enquête.

3.1 PECHE ARTISANALE.

La pêche artisanale se pratique grâce à l'existence de 609 catamarans opérationnels, répartis le long de la côte Burundaise du lac Tanganyika.

3.2 UNITES DE PECHE ARTISANALE.

Lors du déroulement de l'enquête cadre, on a inventorié 609 unités de pêche artisanale actives et 106 unités hors—usages. Dès

lors, le taux d'activité de la flottille artisanale était de 88 % et les embarcations hors—usage ne représentaient qu'un taux de 10 % de la flottille totale. La formulaire est an annexe.

3. 2. 1 UNITE DE "RENFORT".

Les unités de "renfort" sont constituées d'une unité simple an planche (bois) portant trois à quatre lampes d'attraction additionnelles et manoeuvrée par une seule personne au moyen de rames, afin de renforcer le pouvoir d'attraction des catamarans. cas unités de renfort sont utilisées d'une manière semblable aux porte—lampes de la pêche industrielle; c'est-à-dire que, la pirogue de renfort se joint à la pirogue portant la filet lors du départ à la pêche. L'introduction de cette nouvelle technique de pêche rend nécessaire l'introduction de nouvelles approches méthodologiques statistiques, car les prises par unité de pêche seront an fonction de la présence de cas portes—lampes et de leur nombre par unité de pêche. Durant l'enquête cadre l'on a totalisé 8 unités de "renfort".

3. 2. 2. UNITE DE "MANOEUVRE".

Las unités dites de manoeuvre sont des unités an planche simple et munies d'un moteur de 25 CV, an général. Elles opérant an remorquant les unités de catamarans non—motorisé vers et de retour des lieux de pêche. Durant le recensement, l'on a pu distinguer l'existence de 12 unités de "manoeuvre", Cas unités de manoeuvres se contiennent dans les plages importantes telles que Magara, Kagongo, Rumonge, Mvugo et Nyanza— Lac (au sud du pays).

3. 2. 3. UNITE DITE "APOLLO".

L'introduction récente des filets "apollo" de taille plus grande (jusqu'à 120 mètres de coté alors que les carrelets moyens font de 55 à 65 mètres de côté) opérés à partir de catamarans avec un équipage de huit à onze personnes et la disponibilité de quatorze à dix—neuf lampas (dont les lampes de puissance égale à celle utilisées par la pêche industrielle), procurant des captures journalières souvent supérieures à celles des unités industrielles. Durant l'enquête, on a pu distinguer 63 de ces unités; 44 se consomment dans la province de MAKAMBA.

3.3 PECHE COUTUMIERE.

Elle se pratique grâce à l'existence de 251 unités non-motorisées pêchant principalement dans la partie nord de la côte Burundaise du lac Tanganyika. Lors du déroulement de l'enquête cadre, on a inventorié 251 unités de pêche coutumière activa

36 unités hors—usages = pirogues. Dès lors, le taux d’activité de la flottille coutumière était de 85% et les embarcations hors-usage représentaient un taux de 15% de la flottille coutumière. Ce dernier est donc plus élevé que celui de la pêche artisanale.

4. CARACTERISTIOUES STRUCTURELLES DES VILLAGES DE PECHE.

Dans la province de Bujumbura, on a pu identif 1er vingt centres de pêche répartis sur les 60 km de côte que compte cette province. La province de Bururi, avec ses 62 km de côte ne présente que douze centres de pêche tandis que sur les 43 km de côte de la province de Makamba, on a identif lé sept centre de pêche.

FORMULAIRE DE L'ENQUETE CADRE

DEPARTEMENT DES EAUX
PECHES ET PISCICULTURE

PROJET PNUD/FAO/BDI/90/002
STATISTIQUES ET INFORMATIONS
DE PECHE

E N Q U E T E C A D R E
(MOIS.)

Formulaire EC-1

Nom de l'enquêteur: _____
Date de l'enquête : ../../....

Province: _____
Commune : _____

S U J E T S D' I N F O R M A T I O N .	
1. Identification de la plage	1. Nom de la plage :_____ !_!_!

2. Embarcation opérationnelle (indiquez le nombre)	EMBARCATIONS DE ...									
	PECHE ARTISANALE			PECHE COUTUMIERE			PECHE APPOLO		REN-FORT	MANOEU-VRE
Dates d'enquêt	actif	non actif	hors usage	actif	non actif	hors usage	actif	non actif		
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NOTES :

Prix essence : ... Fr.Bu. par litre
Prix pétrole : ... Fr.Bu. par litre
Prix Lampe Anchor : ..... Fr.Bu.
Prix Lampe Drum : ..... Fr.Bu.
Prix Moteur 15 CV : ..... Fr.Bu.
25 CV : ..... Fr.Bu.
40 CV : ..... Fr.Bu.
Prix Manchons (12 pièces) : ..... Fr.Bu.
Prix Carrelet Kamba mbili : ..... Fr.Bu.
Prix Carrelet Kamba tatu : ..... Fr.Bu.
Prix Carrelet Kamba sita : ..... Fr.Bu.
Prix Senne plage : ..... Fr.Bu.
Prix F.M.Encercl. : ..... Fr.Bu.
Prix F.M.Dormant : ..... Fr.Bu.
Prix Lusenga : ..... Fr.Bu.
Prix pirogue 4 m : ..... Fr.Bu.
Prix pirogue 6 m : ..... Fr.Bu.
Prix pirogue 8 m : ..... Fr.Bu.
Prix pirogue 9 m : ..... Fr.Bu.

Notez par une croix la présence ou l'absence de :

Station d'essence : présent |__| Absent |__|
Mécanicien moteur : présent |__| Absent |__|
Constructeur pirogues : présent |__| Absent |__|
Magasin vente engins pêche : présent |__| Absent |__|

RECENSEMENT INDIVIDUEL PAR UNITE DE PECHE DANS LA PLAGE

Explication des sigles à utiliser

Embarcation : M = pirogue coutumière;
C = catamaran
B = bois;
P = plastique (= lamellé collé);
M = métal
O = opérationnel;
H = hors usage
âge : mettez l'âge depuis la construction, en mois

Moteur : M = unité avec moteur;
SM = unité sans moteur
../.. = mettez la date d'achat du moteur

Lampes : std ..= nombre de lampes standard s'il y en a
anch..= nombre de lampes "ANCHOR" s'il y en a
drum..= nombre de lampes "DRUM" s'il y en a
s'il n'y a pas de lampes, ne rien mettre

Engin : type d'engin le plus souvent utilisé sur l'unité
utilisez les codes suivants :

Car = carrelet	Nas = nasses
Lig = lignes simpl	App = Appollo
Pal = palangrotte	Epe = épervier
FME = F.mail.encer.	Spl = senne de plage
FMD = F.mail.dorma.	Lus = Lusenga
Mou = moustiquaire	Aut = autre (spécifiez)

âge : mettez l'âge de l'engin en mois
Origine : .....= indiquez la plage d'origine de l'unité.
Nombre de pêcheurs: .....= indiquez le nombre de pêcheurs travaillant sur l'unité.

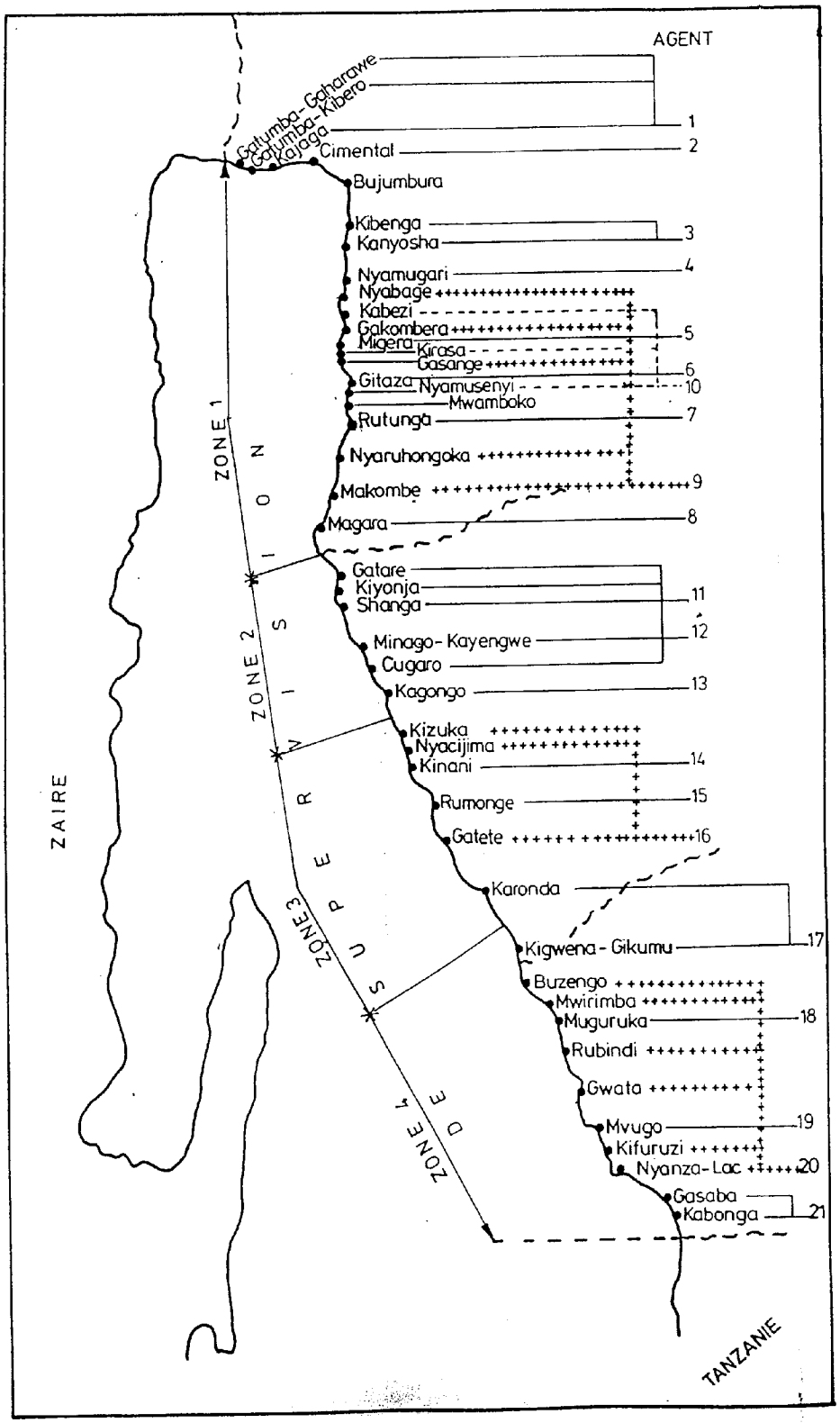
Nom de la plage : ________________ Date d'enquête : ../../....
Province : ________________ Commune : ____________

RECENSEMENT INDIVIDUEL PAR UNITE DE PECHE									
nr	EMBARCATION âge		MOTEUR âge	LAMPES types			ENGIN	ORIGINE UNITE	Nbre de PECHEURS
ex	MBO	âge..13	M 08/91	ST.O	ANCH.O	DRUM.O	../..	MINAGO	.. 1 ..
1	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..
	...	âge ...	.. ../..	ST..	ANCH..	DRUM..	../..	....	..

DEROULEMENT DES OPERATIONS DE TERRAIN.

#	centre à inventorié	Observateur (Nom)	# de centres	Zone de supervision	Province
1	KATUMBA-GAHARAWE	Nzisabira S.		Katumba	
2	KATUMBA-KIBERO	Nzisabira S.	2		B
3	KADJAGA	Sintule L.	1	Nzisabira	
4	CIMENTAL	Gateretse D.	1	(Zone 1)	U
5	KIBENGA	Nteziriba G.	1		
6	KANYOSHA	Hakizimana S.	1	Kanyosha	J
7	NYAMUGARI	Ndayiziga B.	1	Nyamugari	
8	NYABAGE	Nyamushanu S.			U
9	KABEZI	Nyamushanu S.		Nyamushanu	
10	GAKOMBERA	Nyamushanu S.		(Zone 2)	M
11	MIGERA	Kandikandi S.	1		
12	KIRASA	Nyamushanu S.	4	Kirasa	B
13	GASANGE	Gahungu E.		Gasange	
14	KITAZA	Ndayizeye O.	1	Gahungu	U
15	NYAMUSENYI	Gahungu E.		(Zone 3)	
16	MWAMBOKO	Gahungu E.			R
17	RUTUNGA	Gahungu E.	4	Rutunga	
18	NYARUHONGOKA	Ndayishimiye		Nyaruhon.	A
19	MAKOMBE	Ndayishimiye	4		
20	MAGARA	Kana M.	1	Ndayishimi	
				(Zone 4)	
21	GATARE	Ndayishimiye			
22	KIYONJA	Ndayishimiye		Kiyonja	B
23	CHANGA	Nikomeze E.	4	Changa	
24	MINAGO_KAYENGWE	Nkundwanabake	1		U
25	CUGARO	Nikomeze E.		Nikomeze	
26	KAGONGO	Ramazani M.	1	(Zone 5)	R
27	KIZUKA	Nikomeze E.		Kizuka	
28	NYACIJIMA	Kabandana L.		Nyacijima	U
29	KINANI	Ndayisaba A.	1		
30	RUMONGE	Ndorimana G.	1	Kabandana	R
31	GATETE	Kabandana L.		(Zone 6)	
32	KARONDA	Niyibigira JM	1		I
33	KIGWENA_GIKUMU	Kabandana L.	3	Kigwena	
34	BUZENGO	Ndimunzigo B.		Buzengo	
35	MWIRIMBA	Ndimunzigo B.			
36	MUGURUKA	Misigaro E.	1	Ndimunzigo	M
37	RUBINDI_BUGANZA	Ndimunzigo B.		(Zone 7)	A
38	GWATA	Ndimunzigo B.	4	Gwata	K
39	MVUGO	Ndayishimiye	1	Mvugo	A
40	KIFURUZI	Tumba D.		Tumba	M
41	NYANZA_LAC	Tumba D.		(Zone 8)	B
42	GASABA	Tumba D.	3		A
43	KABONGA	Nyandwi A.	1	Kabonga	

Figure 2: Carte des villages de pêche visités.



Annex 3C

RECHERCHE POUR L'AMENAGEMENT DES PECHES AU LAC TANGANYIKA

ATELIER SUR LA COORDINATION ET LA STANDARDISATION DES STATISTIQUES DES PECHES POUR LE LAC TANGANYIKA
26-30 JUILLET 1993

BUJUMBURA - BURUNDI

LES STATISTIQUES DES PECHES AU BURUNDI: EVALUATION DES CAPTURES

par

NZEYIMANA Emmanuel

Bujumbura, Juillet 1993

EVALUATION DES CAPTURES.

METHODOLOGIE UTILISEE.

Le Burundi a trois formes de pêche:

* **Pêche artisanale.**

* **Pêche coutumière.**

* **Pêche industrielle.**

1. PECHE ARTISANALE.

Nous avons quinze plages opérationnelles dont chacune a un observateur qui doit être sur le lieu très tôt afin de pouvoir suivre du premier au dernier débarquement.

Le travail de l'observateur

L'observateur de plage doit savoir le nombre d'unités par catégorie de pêche an utilisant le formulaire F-l qui est constitué comme suit:

la date de ce jour, unités existantes, unités résidentes et unités sorties (cf. le Formulaire F—l). Il recueille quelques informations auprès des pêcheurs et enregistre les captures journalières et les prix.

Il y a un deuxième formulaire A-l qui explique l'effort journalier par typa de pêche, unité échantillonnée, nombre de pêcheurs, heure de sortie, heure de rentrée et nombre de coups, sans oublier la distinction d'espèces de poissons (cf. le formulaire A-1).

Les pêcheurs utilisent les caisses an bois pour faciliter le transport des poissons, et une caisse simple est estimée à 50kg. Il y a d'autres caisses superposées estimées à plus ou moins 70 kg, les opérations se font uniquement sur les unités échantillonnées.

A la fin de chaque campagne de pêche, l'observateur présente ses données mensuelles que les assistants biologistes entrent dans l'ordinateur avec le logiciel dbase III Plus et passent enfin au traitement de cas données.

Estimation par campagne de pêche.

Facteur d'extrapolation iournalier=

Nbre d'unités sorties / Nbre d'unités échantillonnées.

Capture par unité d’effort=

Prises totales par espèce/ Nbre de sorties totales.

2. LA PECHE COUTUMIERE:

Cette pêche n’est pas suffisamment suivie, mais nous récoltons quelques données suivant les engins, certains pêcheurs coutumiers commencent le matin pour rentrer dans l’après midi, d’autre débarquent dans les endroits non fréquentés.

Mais avec le projet BDI/0090 qui a fait un effort pour suivre cette pêche, on a pu évaluer les différents sortes d’engins utilisés dans les eaux Burundaise actuellement an nombre de sept engins à savoir: Lusenga = Epuisette, Senne de plage, Filet mai11. Dormant, Filet mai11. Encerclant, Nasses, Lignes, et enfin Moustiquaires.

La récolte des informations est la même que la pêche artisanale, et sur le formulaire journalier, on enregistre que le poids pêché par chaque engin et enfin la valeur totale. La formule de l’extrapolation est la même.

3. PECHE INDUSTRIELLE

TOUTES les unités industrielles sont an nombre de 13, ils débarquent sur un seul lieu, au marché de Nyakabiga. Le Département des Pêches dispose des agents chargés du comptage de la production de chaque unité, de l’effort journalier, de la quantité par espèce et par bateau, et du prix par espèces et par bateau.

DEPARTEMENT DES EAUX,
PECHE ET PISCICULTURE.

EFFORT DE PECHE MENSUEL.

NOM DE L'OBSERVATEUR:

FORMULAIRE F.1

NOMBRE DE SORTIES PLAGE:

DATES	UNITES EXISTANTES	UNITE RESTANTES	UNITES SORTIES	UNITES CHOISIES	OBSERVATIONS
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
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..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
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..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....
..../.../93	.....	.....	.....	.....	....

DEPARTEMENT DES EAUX
PECHE ET PISCICULTURE.

PECHE ARTISANALE

FORMULAIRE A_1

NOM DE l'OBSERVATEUR

DATE

NOM DE LA PLAGE

EFFORT JOURNALIER:..... .Sorties CATAMARANS
..... .Sorties APOLLOS

UNITE ECHANTILLONN .		1	2	3	4	5	6	7	8	9	10
TYPE/METHODE PECHE											
NOMBRE PECHEURS											
HEURE SORTIES											
HEURE RENTREE											
NOMBRE DE COUPS											
KAHUZO	PRISE TOT										
	PRIX										
NDAGALA	PRISE TOT										
	PRIX										
NYAMUNYAMU	PRISE TOT										
	PRIX										
MUKEKE	PRISES TOT										
	PRIX										
SANGALA	PRISE TOT										
	PRIX										
AUTRES	PRISE TOT										
	PRIX										

DEPARTEMENT ES EAUX
PECHES ET PISCICULTURE

PECHE COUTUMIERE

FORMULAIRE A-1

NOM DE L'OBSERVATEUR : _____

DATE : ../.. ..

NOM DE LA PLAGE : _____

EFFORT JOURNALIER	
.... sorties Lusengas (1,)	..... sorties Nasses (1,5)
.... sorties Sennes de Plage (1,)	..... sorties Lignes (1,6)
.... sorties F.maill.Dormant (1,)	..... sorties Moustiqu.(1,7)
.... sorties F.maill.Encercl.(1,)	

UNITE ECHANTILLONN.		1	2	3	4	5	6	7	8	9	10
TYPE/METHODE PECHE											
NOMBRE PECHEURS											
HEURE SORTIE											
HEURE RENTREE											
NOMBRE DE COUPS											
SINGA/KIBONDE/KIVUM BUKA/KAVUMGWE/JOMBO	POIDS										
N'GEGE/KUHE	POIDS										
NDAGALA	POIDS										
CAPITAINE	POIDS										
SANGALA	POIDS										
IMBIRIBI	POIDS										
AUTRES	POIDS										
PRISES TOTALES	POIDS										
	PRIX										

DEPARTEMENT DES EAUX,
PECHE ET PISCICULTURE

MARCHE CENTRAL DE BUJUMBURA
PECHE INDUSTRIELLE

NOM D'OBSERVATEUR:..... **DATE:..../.../1993.**

1. BATEAU: SAMOS PLAGE: KAHUZO Caisse: NYAMUNYAMU Caisse: PRIX: PRIX NDAGALA Caiss: MUKEKE Caisse: PRIX: PRIX: SILURE Poids: SANGALA Caisse: PRIX: PRIX: CAPITAINE Poids: DIVERS Caisse: PRIX: PRIX:	5. BATEAU: MELINA PLAGE: KAHUZO Caisse: NYAMUNYAMU Caisse: PRIX: PRIX: NDAGALA Caisse: MUKEKE Caisse: PRIX: PRIX: SILURE Poids: SANGALA Caisse: PRIX: PRIX CAPITAINE Poids: DIVERS Caisse: PRIX: PRIX:
2. BATEAU: ST NICOLAS Plage: KAHUZO Caisse: NYAMUNYAMU Caisse: PRIX: PRIX: NDAGALA Caisse: MUKEKE Caisse: PRIX: PRIX: SILURE Poids SANGALA Caisse PRIX: PRIX: CAPITAINE Poids: DIVERS Caisse: PRIX: PRIX:	6. BATEAU: ST GEORGES PLAGE. KAHUZO Caisse: NYAMUNYAMU Caisse: PRIX: PRIX: NDAGALA Caisse: MUKEKE Caisse: PRIX: PRIX: SILURE Poids: SANGALA Caisse: PRIX: PRIX: CAPITAINE: DIVERS Caisse: PRIX: PRIX:
3.BATEAU: MARILENA Plage: KAHUZO Caisse: NYAMUNYAMU Caisse: PRIX: PRIX: NDAGALA Caisse: MUKEKE Caisse: PRIX : PRIX: SILURE Poids : SANGALA Caisse: PRIX: PRIX : SIlURE Poids: DIVERS Caisse: PRIX PRIX	7.BATEAU: TAXIARCHIS: PLAGE: KAHUZO Caisse: NYAMUNYAMU: PRIX: PRIX: NDAGALA: MUKEKE Caisse: PRIX: PRIX: SILURE Poids: SANGALA Caisse: PRIX PRIX: CAPITAINE Poids: DIVERS Caisse: PRIX PRIX

EVOLUTION HISTORIQUE DE LA PRODUCTION DES PECHERIES BURUNDAISES
DU LAC TANGANYIKA DE 1970 A 1991

PRODUCTION EN TONNES.

PECHE ARTISANALE.

ANNEE	NBRE UNITES	NDAGALA T.	AUTRES T.	SANGALA T.	MUKEKE T.	TOTAL T.
1970	516	3473	287	?	?	3760
1971	516	4693	183	?	?	4876
1972	418	1238	32	?	?	1270
1973	65	1312	24	?	?	1336
1974	134	6716	3	12	45	6776
1975	259	7123	402	22	287	7834
1976	451	9496	28	126	1812	11462
1977	574	13572	177	164	4399	18312
1978	751	11276	154	42	3135	14607
1979	442	8302	72	20	1040	9434
1980	500	19950	7	7	1061	21025
1981	600	9038	5	6	1050	10099
1982	656	11008	0	1	896	11905
1983	670	8717	0	10	4313	13040
1984	602	11431	0	6	2157	13594
1985	613	9392	18	29	1685	11124
1986	660	12632	5	16	1875	14528
1987	556	8269	111	16	2993	11389
1988	582	10484	0	23	2494	13001
1989	623	14030	0	1	2827	16858
1990	671	16179	7	8	1920	18114
1991	645	17935	1	11	1935	19882

Pêche artisanale de 1974 à 1991: valeurs révisées.

PECHE COUTUMIERE.

PRODUCTION EN TONNES

ANNEE	NBRE UNITES	NDAGALA T.	AUTRES T.	TOTAL T.
1970	1459	4064	10	4074
1971	1459	5963	3	5966
1972	1200	1258	588	1846
1973	386	1145	423	1568
1974	527	1917	158	1575
1975	729	3567	261	3828
1976	707	2617	1077	3694
1977	866	5456	116	5572
1978	1000	6525	179	6704
1979	706	2037	327	2364
1980	372	822	275	1097
1981	285	387	613	1000
1982	258	360	640	1000
1983	255	350	650	1000
1984	269	340	660	1000
1985	269	320	680	1000
1986	337	310	690	1000
1987	341	300	700	1000
1988	380	290	710	1000
1989	376	280	720	1000
1990	425	116	551	667
1991	408	302	766	1068

Pêche coutumière de 1981 à 1989 : valeurs estimatives minimales.

PECHE INDUSTRIELLE

PRODUCTION EN TONNES

ANNEE	NBRE UNITES	NDAGALA T.	SANGALA T.	MUKEKE T.	AUTRES T.	TOTAL T.
1970	13	3686	544	1227	-	5457
1971	15	5511	363	180	-	6054
1972	13	3763	248	316	-	4327
1973	14	4655	259	707	-	5621
1974	15	5087	157	967	-	6211
1975	18	4037	319	1788	-	6144
1976	22	4877	472	3354	12	8715
1977	19	2886	431	3307	22	6646
1978	17	1447	91	2480	24	4042
1979	20	2534	79	2054	3	4670
1980	22	4101	64	2243	1	6409
1981	22	3852	58	1883	3	5796
1982	21	3773	78	2038	5	5894
1983	19	2222	119	3597	8	5946
1983	20	4173	53	2095	4	6525
1985	17	3581	30	1016	2	4629
1986	17	2492	80	1670	6	4248
1987	16	1900	168	1369	3	3440
1988	16	1831	32	1146	7	3016
1989	16	2560	19	752	1	3332
1990	16	2127	33	587	1	2748
1991	15	2057	25	464	2	2548

Pêche semi-industrielle de 1980 à 1991: Valeurs corrigées mais non ajustées pour les unités de la SUPOBU.

Annex 3D

RECHERCHE POUR L'AMENAGEMENT DES PECHES AU LAC TANGANYIKA

ATELIER SUR LA COORDINATION ET LA STANDARDISATION DES STATISTIQUES DES PECHES POUR LE LAC TANGANYIKA
26-30 JUILLET 1993

BUJUMBURA - BURUNDI

Les statistiques des pêches au Zaïre:

Enquête Cadre.

par

KISALIMA KATSONGO

SEUNDI MBONDI

ET

MAMBONA WA BAZOLANA

Bujumbura, Juillet 1993

ENQUETE CADRE AU ZAIRE

1. INTRODUCTION

Le Zaïre se félicite de l'occasion qui lui est offerte par la FAO/FINNIDA dans le cadre du projet RLT pour participer à cet atelier sur la coordination et la standardisation des statistiques des pêches pour le lac Tanganylka, de ce 26 au 30 juillet 1993 et nous an remercions les organisateurs. Nous sommes persuadés que cet atelier nous permettra de faire des échanges fort utiles d'idées, d'informations et d'expériences.

La fonction statistique existe dans l'administration des pêche depuis l'époque coloniale. Elle est caractérisée jusqu'à cas dernières années par des séries des chiffres des pêcheurs—propriétaires d'unités de pêche et des totaux des captures.

Ces informations sont recueillies de plusieurs manières par les services régionaux, sous—régionaux et de zones de l'ECNT et au cours des missions ponctuelles. Ces données souvent incomplètes, sont peu fiables et leur utilité reste moindre dans la planification du développement de la pêche.

Le système de permis de pêche ne contribue pas à la collecte des statistiques, il est plus utilisé pour l'augmentation des recettes financières.

Les deux méthodes pouvant parfois fournir des données de bonne qualité ne sont pas efficaces.

Le caractère ponctuel des missions ne permet pas de constituer de longues séries des statistiques continues sans lesquelles l'économiste, le biologiste et l'administration ne sauront interpréter scientifiquement les phénomènes constatés.

En outre, il n'est pas souvent possible de vérifier les déclarations des armateurs à cause de l'insuffisance des moyens logistiques et le nombre très limité du personnel qualifié. La conséquence est que les données disponibles sont peu fiables.

La collaboration avec le PNUD/FAO, dans l'exécution du projet d'appui institutionnel au secteur pêche, a dernièrement permis l'ouverture des centres de pêche sur les principaux plans d'eau du pays. Ces unités sont sur terrain le prolongement du Service National de Promotion et de Développement de la Pêche (SENADEP).

2. CADRE INSTITUTIONNEL EN MATIERE DES STATISTIQUES DES PECHES.

Au Zaïre, la pêche dépend du Ministère de l'Environnement, Conservation de la Nature et Tourisme depuis 1975. Le service de pêche a d'abord fonctionné comme cellule, puis un bureau ensuite une division an 1982. Les insuffisances et les limitations de cette division ont fait éclore an 1984, lors du premier séminaire sur la pêche, l'idée d'une structure appropriée et efficace pour la gestion de la pêche.

Le Ministère de l'Environnement a signé an 1990 , l'arrêté portant création d'un service spécialisé dénommé "SERVICE NATIONAL DE PROMOTION ET DE DEVELOPPEMENT DE LA PECHE" (SENADEP).

Une des quatres Divisions de SENADEP a dans ses attributions les statistiques de pêche. Sur les principaux plans d'eau, huit centres créés dans le cadre de la coopération avec le couple PNUD/FAO, s'occupent de l'exécution des programmes du SENADEP.

De cas huit centres, celui de Kalemie et deux autres sur le fleuve ont fermé leurs portes suite aux événements de pillage an septembre 1991, lesquels événements ont fait que PNUD/FAO suspendent leur appui au secteur pêche au Zaïre.

Le SENADEP a d'énormes besoins d'appui logistique et de formation du personnel pour bien jouer son rôle de conseiller auprès du décideur politique et de l'opérateur économique.

3.1 ENQUETE CADRE (1984)

L'année 1984, du 21 juin au 2 juillet, une enquête cadre avait été effectuée dans le secteur nord du lac Tanganyika, soit d'Uvira à la baie de Burton (UBWARI). L'objectif initial était de couvrir toute la côte zaïroise du lac pour déterminer le nombre des pêcheurs par catégorie, le nombre et le type d'unité de pêche ainsi que la localisation des campements et villages de pêcheurs avec leurs sites de débarquements. Les lieux d'approvisionnement des pêcheurs an équipement et intrants devaient être aussi relevés sans oublier l'information sur le traitement et la commercialisation du poisson.

3.1.1 CONCEPTION

Cette première enquête cadre du lac Tanganylka sur la côte zaïroise peut se résumer de la manière suivante:

- l'équipe d'enquêteurs était composée de

  * un chef de section à la coordination sous—régionale de l'environnement à Uvira.

  * le chef de bureau des pêches maritimes (Informations et Statistiques) de la Division des pêches du Ministère de l'Environnement. Celui—ci venait de participer du 20 mai au 24 juin 1984 à Bujumbura aux travaux de l'Atelier sur les statistiques des pêches dans les eaux intérieurs.

  * un expert conseil, consultant au Projet ZAI/003. Ce dernier était l'un des animateurs de l'atelier cité ci—dessus.

Les enquêteurs devaient accéder à chaque campement/village des pêcheurs et sites de débarquement à l'aide d'une embarcation

à louer auprès des armateurs ou des missionnaires d'Uvira. Aucune embarcation n'ayant été disponible, l'approche par eau fut abandonnée au profit de la voie routière au moyen d'une Jeep.

Pour rassembler les données requises, l'équipe se servait du formulaire Fl présenté par G.P. BAZIGOS dans la document de travail FIP/T133 de 1975 sur la conception des enquêtes statistiques halleutiques-Eaux intérieures.

Compte tenu du facteur temps et surtout des ressources financières, il n'était pas possible d'effectuer une quelconque prospection avant l'enquête. Toutefois l'équipe disposait d'une carte de la région pour la localisation des sites, villages et toute autre infrastructure éventuelle. Cette carte ne correspondait plus aux réalités du terrain an ce qui concerne les routes et l'emplacement des campements/villages des pêcheurs.

3.1.2 DEROULEMENT DE L'ENQUETE ET METHODOLOGIE

L'équipe d'enquêteurs avait visité les plages et les campements/villages des pêcheurs par route. La majeure partie de la région avait été ainsi couverte mais une petite zone au sud de Baraka avait été visité par pirogue motorisée. Dans chaque site, l'information requise était rassemblée par interviews auprès des groupes des pêcheurs à l'aide du formulaire Fl an annexe avec quelques petites modifications après les trois premières plages.

Le chef de Bureau servait d'interprète dans les interviews. Pour vérifier les déclarations des pêcheurs, les unités de pêche sur la plage étaient chaque fois comptées avant ou après l'entrevue selon chaque site.

Les résultats de cette enquête cadre indiquent que les nombres des pêcheurs et d'unités de pêche sont bien plus élevés que ceux fournis par les statistiques officielles disponibles àla coordination sous—régionale de l'environnement à Uvira. En annexe se trouve le condensé des résultats.

3.2 ENQUETE CADRE (1991)

Elle a été effectuée par le Projet PPEC/FAO et la CRSN/UVIRA de la frontière burundaise à KAZIMIA sur une distance d'environ 250 km du 04 au 12/01/1991. Les objectifs de l'enquête étaient de pouvoir disposer:

— d'un bilan des caractéristiques structurelles de la pêcherie artisanale et coutumière;

— d'informations quantifiées précises sur le nombre d'outils des pêchas an vue d'une comparaison avec les résultats des anciens recensements et d'études sur l'évolution des pêcheries;

— d'informations préliminaires an vue du déroulement d'une enquête socio—économique.

3.2.1 METHODOLOGIE

Elle a été réalisée à l'aide d'un bateau et d'un véhicule. Pour faciliter l'analyse du recensement, la partie couverte était subdivisée an trois strates. La première de la frontière burundaise (Kamylvira) à Baraka, la seconda de Mushimboki à Manga et la dernière de Rasi à Kazimia.
Enfin, deux formulaires ont été utilisés (Voir Annexes).

3.2.2 RESULTATS

Sont repris dans le tableau an annexe.

3. 3 ENQUETE CADRE AERIENNE (1992 et 1993)

Le RLT vient d'effectuer deux recensements: enquête cadre, la première du 29/09 au 03/10/1992 et la seconde du 19/05 au 21/05/1993. Elles avaient comme objectifs de vérifier la longueur de la côte du lac Tanganyika, de déterminer le nombre et la
densité des unités de pêche par km de côte, de classifier les sites de débarquement et obtenir les données de référence pour une future évaluation de la pêcha au lac Tanganyika.

3.3.1 METHODOLOGIE

Ces enquêtes avaient couvert la totalité de la côte du lac Tanganyika et ses îlots par avion et à l'aide d'une caméra vidéo.

3.3.2 LES RESULTATS POUR TOUTE LA COTE ZAIROISE

Ils se présentent de la manière suivante:
6727 pirogues, 420 catamarans, 1 trimaran, 7 unités industrielles et 210 bateaux de transport. Pour la longueur de la côte zaïroise, le RLT a trouvé 795 km (43%) contre 675 km (45%) trouvé précédemment. Un total de 275 sites des débarquements des pêcheurs a été relevé durant l'enquête.

3.4 LA COMPILATION ET LE TRAITEMENT DES DONNEES

La compilation ainsi que le traitement des données ont été faits par des initiateurs de cas enquêtes. Les rapports issus de cas travaux ont été publiés par la FAO.

3.5 PROBLEMES ET SOLUTIONS PROPOSEES

Les problèmes rencontrés sont de trois ordres:
d'abord, nous avons les problèmes financiers qui font que cas enquêtes ne se déroulent que de façon sporadique et discontinue; à cela s'ajoute les problèmes matériels et logistiques; et enfin le manque du personnel qualifié.

Vu les problèmes épinglés ci-hauts et compte tenu de l'importance de l'Enquête Cadre, il est souhaitable que la côte zaïroise soit régulièrement couverte du Nord au Sud.

Bien que cela entre dans les attributions du Gouvernement qui jusque là se trouve dans l'impossibilité de les réaliser, il conviendrait que le RLT puisse intervenir directement dans les financement an équipement nécessaires et an formation continue du personnel de la conception et du terrain.

En outre, pour permettre à nos cadres de s'imprégner de la méthodologie de l'enquête, l'approche par eau/route soit privilégiée.

3.6 COORDINATION ET STANDARDISATION

Actuellement, bien que deux formulaires différentes aient été utilisés lors de l'exécution de 2 premières enquêtes citées plus haut, l'administration de la pêche vulgarise le premier formulaire car il contient beaucoup plus d'informations. Ce même formulaire doit être utilisé et au Nord et au Sud.

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ANNEXES

Annexe 1: Formulaire F.1 d'enquête cadre 1984
Annexe 2: Formulaire F.2 d'enquête cadre 1984
Annexe 3: Instructions à utiliser dans l'E.C.
- Résultats de l'enquête cadre UVIRA - BARAKA sur le lac Tanganyika 1984
Annexe 4: Formulaire sur le recensement des embarcations zaïroises 1991
Annexe 5: Formulaire sur les caractéristiques des villages et la méthode de pêche

TABLEAUX

Tableaux la & lb: Résultats de l'E.C., Uvira - Baraka, Lac Tanganyika (Juin 1984).
Tableau 2: Résultats du recensement effectué an 1991 de Kavimvira (Uvira) à Kazimia (FIZI).

A10.14 Form. F1

ENQUETE CADRE

Enquêteur_____ No. de code du site de pêche [ ] [ ] [ ]

Date [ ] [ ] [ ]

A. 1. Village: _____ 2. Plage: _____

3. Ethnie(s) des armateurs: _____

4. Ethnie(s) des pêcheurs: _____

B. 1. Les pêcheurs utilisent-ils la plage pour:

débarquement de poisson [ ] 1 mouillage [ ] 2

2. L'utilisation de la plage est:

continue [ ] 1 temporaire [ ] 2 sporadique [ ] 3

3. Les pêcheurs vivent-ils dans le site de pêche à titre:

permanent [ ] 1 temporaire [ ] 2

Observations:

Date de l'enquête ☐☐☐ No. de code ☐ ☐☐

C. 1. Les pêcheurs font-ils des migrations?

Oui ☐ 1 Non ☐ 2

Si la réponse est OUI

2. Quelle est la proportion de pêcheurs qui font des migrations?

3. Où ont-ils pêché l'année précédente?

	Période	
	du	au

D. 1. Pêchent-ils chaque mois de l'année?

Oui ☐ 1 Non ☐ 2

Si OUI

Quand arrêtent-ils de pêcher?

Pleine lune ☐ 1 Autre (indiquez) _____ 2

Si NON

a) Période d'arrêt du _____ au _____
b) " " du _____ _____

Observations:

Form. F1

Date de l'enquête ☐☐☐ N° de code ☐ ☐☐

E. 1. Quand débarquent-ils la plus grosse partie des captures?

le matin ☐ 1 l'après-midi ☐ 2 pas d'horaire ☐ 3

F. 1. Quel genre d'engins et d'embarcations utilisent-ils pour pêcher?

Engin principal		Période		Nombre d'embarcations					
				Piroque					
Code	Nom	du	au	petite	grande	porte-lampe	Senneur	Catamaran	Trimaran
01	Harpon								
02	Epervier								
03	Nasse								
04	Ligne flottante								
05	Palangre								
06	Filet dormant								
07	Filet frappé								
08	Senne de plage								
09	Carrelet								
10	Senne								
11									

Observations:

Form. F1

Date de l'enquête ☐☐☐ No. de code ☐ ☐☐

G. 1. Nombre d'embarcations avec moteur ☐☐☐

H. 1. Combien de pêcheurs travaillent à la plage?

Type de pêche	Pêcheurs		
	Principaux	Assistants	Total
Nasse Ligne flottante Palangre Filet dormant Filet frappé Senne de plage Catamaran Senne			
à pied			

I. 1. Ont-ils d'autres occupations?

Oui ☐ 1 Non ☐ 2

Si OUI

a) Agriculture ☐ b) Autre ☐ A spécifier _____

2. Temps consacré le mois dernier à une autre occupation:

<1 semaine ☐ 2-3 semaines ☐

1-2 semaines ☐ >3 semaines ☐

Form. F1

Date de l'enquête [ ][ ][ ] No. de code [ ] [ ][ ]

J. 1. Principales espèces de poissons capturées:

a) Ndakala [ ] d) Tilapia [ ]

b) Mukeke [ ] e) _____ [ ]

c) Sangala [ ] f) _____ [ ]

K. 1. Type de poisson commercialisé:

Frais [ ] 1 Séché [ ] 2 Fumé [ ] 3

2. Où les pêcheurs vendent-ils les captures?

Ici [ ] 1 Ailleurs [ ] 2

3. A qui vendent-ils les captures?

Commerçant local [ ] 1 Commerçant non résident [ ] 2

4. Combien de fois les commerçants non résidents viennent-ils?

_____

5. D'où viennent-ils? _____

L. 1. Type d'organisation des pêcheurs:

Aucune [ ] 1 Précoopérative [ ] 2 Coopérative [ ] 3 Association avec des commerçants [ ] 4

Autre [ ] 5 Spécifier _____

Observations:

ENQUETE-CADRE

Form. F2

Enquêteur _____ No. de code du site de pêche [ ] [ ] [ ]

Date [ ] [ ] [ ]

A1. Où les pêcheurs achètent-ils leurs embarcations?

_____

2. Valeur normale d'achat des embarcations neuves

Embarcation	Type/Valeur (Z)	
	Petit	Grand
Pirogue monoxyle Pirogue en planches		

3. Où achètent-ils leurs engins de pêche?

_____

4. Valeur unitaire normale d'achat des engins neufs

Engin	Z	Engin	Z
Ligne flottante palangre filet dormant filet frappé		senne de plage carrelet	

5. Où achètent-ils leurs lampes? _____

6. Valeur normale d'achat d'une lampe neuve _____

7. Demandez le prix unitaire du carburant

Carburant	Unit.	Prix Z	Lieu de provenance
Pétrol Essence			

COMMENT REMPLIR LES FORMULAIRES A UTILISER DANS L'ENQUETE CADRE

No. de code du site de pêche:

Afin d'identifier la plage dans le traitement des données, l'enquêteur devra remplir les espaces vides d'après le modèle suivant:

A		B	C

A. Code pour la zone où se trouve la plage

01: Frontière burundaise - Kamba plage

02: M'Boko - Moma Village

03: Moma plage - Museke

04: Museke - Cap Kalamba

05: Cap Kalamba - Fleuve Mukungu

06: Fleuve Mukungu - Kalemie

07: Kalemie - Fleuve Luhanda

08. Fleuve Luhanda - Moba

09: Moba - Fleuve Luluvia

10: Fleuve Luluvia - Fleuve Lunangwa

11: Fleuve Lunangwa - Cap Kipimbi

B. Numéro d'ordre dans la zone du village auquel appartient la plage

C. Numéro d'ordre des sites ou plages appartenant au même village. S'il y a une seule plage marquez 00.

A1. 1. Village: Nom(s) du village

2. Plage: Nom(s) de la plage

4. Ethnie(s) des pêcheurs

- Pêcheurs: ceux qui pratiquent effectivement la pêche, soit comme propriétaire, soit par des moyens de production

C. 2. Où ont-ils pêché l'année précédente?

Indiquez les secteurs où on a pêché et les périodes de pêche.

F. 1. Nombre d'embarcations par catégorie d'engin de pêche, c'est-à-dire le nombre d'embarcations qui ont utilisé l'engin indiqué comme engin de pêche principal. Notez toutes les unités qui appartiennent à la plage, même si elles sont en déplacement.

G. 1. Nombre d'embarcations avec moteur:

Indiquez dans les observations le nombre de moteurs par type d'embarcation.

H. 1. - Pêcheurs à pied: Pêcheurs qui n'utilisent pas d'embarcations ou qui font un type de pêche non signalé dans le tableau. Dans le dernier cas, indiquez dans les observations le type de pêche pratiqué.

- Pêcheurs assistants: ceux qui aident à tirer le filet soit à partir de la plage soit d'embarcations auxiliaires pendant les opérations de pêche.

bateaux / engins	pirogue			catamaran	trimaran	chaseur
	monoxyle	planche	métal			
moustiquaire						
nasses						
senne de plage						
lusenga						
autres						
Nombre d'unités rapporté						

B. Nombre de moteurs: .....

C. Nombre d'embarcations de transport: .....

Formulaire sur les caractéristiques des villages et la méthode de pêche

1. l'occupation du site de pêche par les pêcheurs est-elle:

__/1 continue
__/2 saisonnière
__/3 sporadique

2. l'activité de pêche dans le site est-elle:

__/1 continue
__/2 saisonnière
__/3 sporadique

3. Utilisation des engins

	mois d'utilisation
Carrelet	1 2 3 4 5 6 7 8 9 10 11 12
Ligne simple	1 2 3 4 5 6 7 8 9 10 11 12
Palangrotte	1 2 3 4 5 6 7 8 9 10 11 12
F.mail.encerc.	1 2 3 4 5 6 7 8 9 10 11 12
F.mail.dormant	1 2 3 4 5 6 7 8 9 10 11 12
Moustiquaire	1 2 3 4 5 6 7 8 9 10 11 12
Nasses	1 2 3 4 5 6 7 8 9 10 11 12
Senne de plage	1 2 3 4 5 6 7 8 9 10 11 12
Lusenga	1 2 3 4 5 6 7 8 9 10 11 12
Autres	1 2 3 4 5 6 7 8 9 10 11 12

4. Nombre de jours moyens de pêche/mois lunaire: .....

5. Marché le plus proche: .....

Marché le plus utilisé: .....

6. Mode de conservation du poisson:

__/salé __/sêché __/fumé __/frais __/autres

destination: ....
....% ....% ....% ....% ....%

7. Approvisionnement le plus proche en bateaux:.....

8. Approvisionnement le plus proche en filets:.....

9. Méthode de partage des gains:

....% pour le propriétaire
....% pour les pêcheurs

partage des coûts:

....% propriétaire
....% pêcheurs

TABLEAU 1a

AlO.13

TABLEAU 1a : RESULTATS D'ENQUETE-CADRE, UVIRA-BARAKA, LAC TANGANYIKA (Juin 1984)

Ville/Village	Plage	No. Pêcheurs	Unités de pêche: Palangre	Ligne flottante	Filet maillant	Senne de plage	Filet frappé	Catamaran	Trimaran	Senneur
Kavimvira	Kilomoni									
Uvira	Mulongwe Uvira Centre Kilibula									
	Kivovo	210 1/								6
Kalunge	Kalunge	151	1/	1/		10		7		
Kabimba	Coopérative	31	2 1/			3		1		
	Kabimba	29	1 1/	2 1/		3		1		
	Karakamba	23	3 1/	5 1/		3				
Katonga	Kiziba	47				5	3			
	Katongo	48				7				
Kikongo	Kalomo	22						5		
	Kigongo	56		8 1/	2	3		7		
	Magunga	26		2 1/		1		4		
	Kashombe	40		2 1/		5				
Makobola 1	Kamba	165	6	25	1 1/	11	1	19	2	
Makobola B	Kilimba	77		15 1/	2	7		1		
Kasekesi	Kasekesi	44	2	3 1/		3		5		
Munene	Mukunka	192	5	22	12	6		12		
Ilakala	Ilakala	48	7	1/	12			12		
Swima	Swima	58	7 1/	12 1/	2	14		10		
Lusambo	Ake 2	154	7 1/	10 1/	4	1		34	1	
	Abeka	50	3	12		1		7		
Mukwetsi	Mukwetsi	74	2	31	2	2	1	7		
Kabumbe	Kagombo	104	4	2	3	2		20	1	
M'Boko	M'Boko Centre	270	5	25	9	9		45	1	
Lukutwe	Kanga 1	59		20	2		2	7		
	Kangeta	87	2	1	1			20		
Basimukuma	Lusambo	155	1	1/	2	2		27	5	
Bamate	Katungub 1	77		4	2		3	15		
Lusenda	Lusenda	72	4	3	3	5	1	8		
Lulinda	Toma	103	5	15	5	1	1	15		
Elomyonga	Elomyonga	35		15				5		
Mukolwe	Mukolwe	60		8	2			12		
Buko	Buko	52		2	1	1		11		
Lubumba	Lubumba	104	3	12			2	20		
Lweba	Lweba	166	2	1/	2	3	2	27	4	
Kandali	Andale	81		1/	4	2	1	15		
Kalundja	Kalundja	135	2	1/	2	2	1	24	2	
Baraka	Baraka Centre	42		16 1/	1			10		
	Matata	32 (F)						8		
Moma	Moma village	69			7	2	5	7		
	Moma plage	64						16		
	Mushimbaki									
Mandinka	Mandinka	222	15			35		8		
	Kitupu	82			13	5				

1/ Pêcheries secondaires.

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Tableau 1b : Résultat du dernier recensement effectué en 1984 de Kivovo (zone d'Uvira) à Kitupu (zone de Fizi), d'après Villegas L., 1984

	Uvira	Fizi	Total
Ligne simple (*)	25	172	197
Palangre (*)	6	60	66
Filet maillant	2	93	95
Filet encerclant	4	19	23
Senne de plage	51	102	153
Catamaran	44	408	452
Trimaran	2	14	16
Senneur	6	-	6
Total			
Unités de pêche	140	868	1.008
Pêcheurs	848	2.767	3.615
Plages/débarcadères	16	29	45

(*) Pêche de subsistance (en grande partie)

Source: Maes M. et al., 1991.

Tableau 2 : Résultat du recensement effectué en 1991 de Kavimvira (zone d'Uvira) à Kazimia (zone de Fizi).

	Nbre de villages et débarcadères	Nombre de pêcheurs			Nombre d'unités			Nombre d'engins		
		art.	cout.	ind.	art.	cout.	ind.	art.	cout.	ind.
Strates										
Strate 1	34	2.218	1.692	30	374	929	1	374	879	1
Strate 2	2	74	622	-	12	339	-	12	322	-
Strate 3	37	1.760	492	-	295	556	-	295	459	-
Zones										
Uvira	8	1.212	1.198	-	204	-	1	204	437	1
Fizi	87	2.840	1.608	-	477	-	-	477	1.223	-
Total	95	4.052	2.806	30	681	1.824	1	681	1.660	1

Source: Maes M. et al., 1991

Annex 3E

RECHERCHE POUR L'AMENAGEMENT DES PECHES AU LAC TANGANYIKA

ATELIER SUR LA COORDINATION ET LA STANDARDISATION DES STATISTIQUES DES PECHES POUR LE LAC TANGANYIKA 26–30 JUILLET 1993

BUJUMBURA - BURUNDI

Les statistiques des pêches au Zaïre:

Enquete d'evaluation des captures.

par

KISALIMA KATSONGO

SEUNDI MBONDI

ET

MAMBONA liA BAZOLANA

Bujumbura, Juillet 1993

ENQUETE D'EVALUATION DES CAPTURES AU ZAIRE

1. INTRODUCTION

Le Zaïre se félicite de l'occasion qui lui est offerte par la FAO/FINNIDA dans le cadre du projet RLT pour participer à cet atelier sur la coordination et la standardisation des statistiques des pêches pour la lac Tanganyika, de ce 26 au 30 juillet 1993 et nous an remercions les organisateurs. Nous sommes persuadés que cet atelier nous permettra de faire des échanges fort utiles d'idées, d'informations et d'expériences.

La fonction statistique existe dans l'administration des pêcha depuis l'époque coloniale. Elle est caractérisée jusqu'à cas dernières années par des séries des chiffres des pêcheurs—propriétaires d'unités de pêche et des totaux des captures.

Ces informations sont recueillies de plusieurs manières par les services régionaux, sous—régionaux et de zones de l'ECNT et au cours des missions ponctuelles. Ces données souvent incomplètes, sont peu fiables et leur utilité reste moindre dans la planification du développement de la pêche.

Le système de permis de pêche ne contribue pas à la collecte des statistiques, il est plus utilisé pour l'augmentation des recettes financières.

Les deux méthodes pouvant parfois fournir des données de bonne qualité ne sont pas efficaces.

Le caractère ponctuel des missions ne permet pas de constituer de longues séries des statistiques continues sans lesquelles l'économiste, la biologiste et l'administration ne sauront interpréter scientifiquement les phénomènes constatés.

En outre, il n'est pas souvent possible de vérifier les déclarations des armateurs à cause de l'insuffisance des moyens logistiques et le nombre très limité du personnel qualifié. La conséquence est que les données disponibles sont peu fiables.

La collaboration avec le PNUD/FAO, dans l'exécution du projet d'appui institutionnel au secteur pêche, a dernièrement permis l'ouverture des centres de pêcha sur les principaux plans d'eau du pays. Ces unités sont sur terrain le prolongement du Service National de Promotion et de Développement de la Pêche (SENADEP).

2. CADRE INSTITUTIONNEL EN MATIERE DES STATISTIQUES DES PECHES.

Au Zaïre, la pêche dépend du Ministère de l'Environnement, Conservation de la Nature et Tourisme depuis 1975. Le service de pêche a d'abord fonctionné comme cellule, puis un bureau ensuite une division an 1982. Las insuffisances et les limitations de cette division ont fait éclore an 1984, lors du premier séminaire sur la pêche, l'idée d'une structure appropriée et efficace pour la gestion de la pêche.

Le Ministère de l'Environnement a signé an 1990 , l'arrêté portant création d'un service spécialisé dénommé "SERVICE NATIONAL DE PROMOTION ET DE DEVELOPPEMENT DE LA PÊCHE" (SENADEP).

Une des quatres Divisions de SENADEP a dans ses attributions les statistiques de pêche. Sur les principaux plans d'eau, huit centres créés dans le cadre de la coopération avec le couple PNUD/FAO, s'occupent de l'exécution des programmes du SENADEP.

De cas huit centres, celui de Kalemie et deux autres sur le fleuve ont fermé leurs portes suite aux événements de pillage an septembre 1991, lesquels événements ont fait que PNUD/FAO suspendent leur appui au secteur pêche au Zaïre.

Le SENADEP a d'énormes besoins d'appui logistique et de formation du personnel pour bien jouer son rôle de conseiller auprès du décideur politique et de l'opérateur économique.

3. ENQUETE D'EVALUATION DES CAPTURES

L'enquête d'évaluation des captures proprement dite n'a jamais été organisée sur la côte zaïroise du lac Tanganyika. Si toute la côte avait été couverte par l'enquêta cadre; l'analyse des données allait permettre de planifier et de préparer une Enquête d'Evaluation des capturas.

Toutefois, des formulaires d'E.E.C sont disponibles grâce au concours de deux consultants. VILLEGAS (1984) a au le privilège d'apprêter les documents modifiés an 1990 par HERMAN (Formulaires an annexe). Le protocole relatif à cas formulaires constitue an lui-même la méthodologie de l'E.E.C.

3.1 Protocole d'enquête d'évaluation des captures

L'agent devra visiter deux fois par semaine, pendant la période de pêche, la ou les plage(s) dont il est responsable. Au cours de chaque visite à une plage, l'agent mesurera les quantités débarquées d'un nombre fixe d'unités de pêche de chaque type et déterminer le nombre total d'unités de chaque type présent à sa plage. Il enregistrera cas informations sur le formulaire 1.

3.1.1 FORMULAIRE 1: Débarquement journalier

L'agent devra utiliser le formulaire i selon las instructions suivantes:

— Sur tous les formulaires, les identifications (du pays, du plan d'eau, centre, etc..), sont reprises.

— Unités de mesure : celles utilisées par les pêcheurs pour mesurer les quantités débarquées, c.à.d., caisses, paniers, bassine, etc... Si nécessaire, la conversion an "kg de poissons"

se fera sur le formulaire 2.

- Unité de pêche - (type) :cette colonne permet l'enregistrement de quatre types d'unités de pêche. L'enquêteur notera les noms des types de pêche enquêtés. Il enregistrera séparément les données relatives aux trois types principaux et groupera l'ensemble des autres sous une même rubrique "divers". L'unité de type 1 sera la plus utilisée. Au total, il devra contrôler, par jour, 3 unités de chaque type, donc 4 x 3 = 12 unités.

— Espèces : il inscrira dans la partie supérieure des colonnes 1 et 2 les "noms commerciaux" des 2 principales espèces débarquées. La somme des espèces moins importantes, ou qui n'ont pas été triées avant le débarquement, sera enregistrée sous espèces 3. "divers". Si l'unité de mesure de quantité utilisée par las pêcheurs, n'est pas la même pour les 3 espèces, la colonne 4 reste vide. Le total des captures an kg, se fera sur le formulaire 2.

— Par type de pêche : l'agent contrôlera trois unités (a, b, c), la 1ère au début de la période de débarquement, la seconde au milieu, la 3ème vers la f in. Les unités contrôlées doivent être prises au hasard. Il notera les quantités débarquées, exprimées dans l'unité de mesure reprise an haut du formulaire. Une unité contrôlée, avant une prise nulle, compte comme les autres. Elle ne peut être éliminée de l'échantillon. Elle compte pour une sortie avec un débarquement nul.

— Dans la dernière colonne, toujours par type d'unités, l'enquêteur comptera
- le nombre d'unités s/plage {(**=** celles qui ont pêché + celles qui ont chômé **=** (l)};
- le nombre de sorties **(=** celles qui ont pêché) **=** (2).

— FA est un facteur d'augmentation qu'on utilise pour estimer le total débarqué le jour de la visite. Il sert àextrapoler les données obtenues sur les unités contrôlées, à l'ensemble des unités qui ont pêché, le jour de la visite. Il est égal à

FA **=** nombre des sorties le jour de la visite **= L21** nombre de débarquements contrôlés (3)
Par type de pêcha, nous aurons un facteur d'augmentation FA.

— A. Tot. contrôlé pour chaque espèce, faire la somme des débarquements contrôlés.

- B. Tot. débarqué **=** tot. contrôlé x FA (toujours exprimé an unité de mesure pêcheurs: paniers, caisse ***...).***
(ligne B = ligne A x FA.)

* L'enquêteur utilisera 1 formulaire par visite, 2 par semaine; 2 x 2 x 52 **=** 104 formulaires par an et par plage.

3.1.2 FORMULAIRE 2: Débarquement mensuel par type d'unité de Pêche.

Le formulaire 2 servira à estimer le débarquement mensuel par tv~e d'unité pour la plage contrôlée. La 1ère partie est un résumé des visites effectuées à la plage.

A partir des données enregistrées à chaque visite, sur des formulaires 1, l'enquêteur préparera, à la f in de chaque campagne de pêche, par type d'unités, 3 exemplaires du formulaire 2 - (1 exemplaire pour lui, 1 exemplaire pour le Chef du Centre, 1 exemplaire pour le Service Pêche de Kinshasa).

* (4 types de pêche x 3 exemplaires/type = 12 formulaires seront utilisés par mois et par plage).
  12 x 12 = 144 formulaires par an et par plage.

— Identification, toujours très importante avec nom du type d'unité de pêche, secteur (industriel, semi-industriel, artisanal), centre, etc..., également des espèces débarquées et des unités de mesure utilisées, ainsi que leurs équivalents kg (ligne B).

— Reprendre du formulaire 1 pour les visites successives du mois : - date de visite
  - nombre d'unité sur plage = (1) de form.1,
  — nombre de sorties = (2) de form.l,
  - par espèce : B. tot. débarqué. (ligne B du form.l)

  Une visite durant laquelle un type d'engins de pêche n'a pas été utilisé, est prise an compte comme les autres. Elle compte avec son nombre de sortie et de capture égale à zéro.

- A. Total : (ligne A à calculer) = la somme des débarquements respectifs contrôlés.

- C. Total kg = Total estimé pour l'ensemble des visites, exprimé an kg. (ligne C = ligne A x ligne B)
  Ce n'est qu'après la conversion an kg, que l'on peut calculer le total des prises contrôlées (colonne 4).

Dans la dernière colonne:
- nombre jours de visita (1) à la plage;
— nombre jours de la campagne de pêche (2), généralement le mois:
  - FT est un facteur d'augmentation (s/le temps) qu'on utilise pour estimer le débarquement mensuel des unités de la plage. Il permet d'extrapoler les données calculées pour les jours de visite, à l'ensemble des jours de la campagne de pêche.
    FT = nombre de jour de la campagne de pêche = 121 nombre de jour de visite (1)
  - D. Débarquement mensuel total plage - kg
    Ligne D = Ligne C x FT (exprimé an kg)

Ces valeurs calculées représentent pour le type de pêche, le

total des prises pour le mois à cette plage.

Remarque: Le facteur FT est aussi utilisé pour estimer le nombre total de sorties par mois pour la plage: valeur (7)

Dans la dernière colonne, l'agent calculera:
— le nombre moyen d'unité sur la plage par jour (5) =

$$\frac{\text{somme du nombre d'unités sur plage lors des visites}}{\text{nombre de jours de visite}} = \frac{(3)}{(1)}$$

Cette valeur (5) sera reprise comme mesure de l'échantillon ou nombre d'unités sous contrôle à la plage (exprimé an nombre, n.)
— le nombre mensuel de sorties par unité =

$$\frac{\text{nombre total de sorties sur plage}}{\text{nombre moyen d'unités sur plage}} = \frac{(7)}{(5)}$$

Ce résultat est une mesure de l'activité du type de pêche. Cette activité est exprimée an nombra de sortie par unité de pêche (s/u).
— La dernière ligne du tableau sert à calculer les "Prises par Unité d'Ef fort = PUE", (ou CPUE = Catch Par Unit Effort, des anglophones) = ligne D: (7).

Elle est exprimée an nombre de kg par sortie (kg/s). Ces valeurs caractérisent l'efficacité de l'engin de pêche. Elles montrent la différence entre 100 kg pêchés par unité de pêche ou 100 kg pêchés par 100 unités. Le biologiste se sert de cas valeurs pour exprimer "l'abondance" des poissons dans un milieu.

Ici sont clôturés les calculs concernant la plage. Rappelons que pour une même plage, le formulaire 2 est utilisé pour chacun des types de pêche (engins) présents à la plage.

Une troisième subdivision, dans le temps, s'impose. Les calculs se feront par campagne de pêche, généralement les mois.

Pour le lac Tanganyika où la pêche à la lumière est dominante, la pêche se pratique principalement pendant les nuits sans lune. Tous les enquêteurs travailleront sur base des mois lunaires et non des mois calendriers. La pêche àla palangre et au filet frappé sera alignée sur ce même schéma.

Du fait que la pêche au Tanganyika se pratique principalement à la lumière, tous les pêcheurs rentrent àla plage de debarquament au lave du jour. Ceci facilita grandement la collecte des statistiques. L'enquêteur doit être sur la plage de 5h30' à 7h30'.

Une autre situation se présente au Pool Malebo sur le Zaïre, près de Kinshasa. Les débarquements ont lieu toute la journée. Le chef de centre doit alors envisager une autre stratification dans le temps. L'enquêteur collectera les statistiques de 6h à 12h les jours paires; de 12h à 18h las jours impaires. Sur la formulaire 2, le facteur temps FT, sera multiplié par 2 car l'observation ne se fait que pendant une 1/2 période de débarquement.

3. 1. 3 Evaluation mensuelle par strate

La stratification géographique nous a fait diviser la zone à couvrir an plusieurs strates. A l'intérieur d'une de cas strates, l'unité primaire d'échantillonnage a été la plage. A cette plage, l'unité secondaire d'échantillonnage a été l'unité de pêche.

Un facteur d'augmentation FA, portant sur le nombre d'unités sous contrôle et un facteur d'augmentation FT, portant sur le nombre de jours de contrôle, ont été utilisés pour estimer les captures de la plage.

Nous avons vu que le but des stratifications est d'obtenir des sous—secteurs ou strates plus homogènes quant à leurs caractéristiques.

L'évaluation globale des captures doit se faire àl'intérieur de cas strates. Chaque plage sous contrôle antre avec son "poids" dans l'estimation finale.

Le résultat de l'enquête cadre nous donne le nombre d'unités par strate. Pour l'estimation finale par strate, nous devons tenir compte de ce recensement cadre et des résultats obtenus aux plages. La fiche de travail FT2 vous est proposée à cet effet. Elle sera recopiée, dans le registre du centre avant d'effectuer las calculs.

La fiche de travail FT2: Evaluation mensuelle par strate (Calculs), sert au regroupement par engins, des données des plages d'une même strate. Elle est divisée an deux parties:

- La première recevra, par type d'engin, la résumé des résultats obtenus aux plages sous—contrôle: les valeurs (5) et les valeurs de la ligne D**. Débarquement mensuel total plage — Kg**, provenant des formulaires 2 des plages.
  Tot. **=** somme des résultats des plages. Calcul des PUE strate:

  $$\frac{\text{Tot. sorties ~laqes}}{\text{Tot. unités plages}} \quad (s/u)$$

  $$\frac{\text{Tot. total kg plages}}{\text{Tot. sorties plages}} \quad (kg/s)$$

- La deuxième partie sert à l'évaluation par strate et par type de pêche.
- La première colonne **Unité n**. **=** le nombre d'unités dans la strate, résultat de l'enquête cadre.
- La deuxième colonne, **Sorties n**. **=** le nombre d'unités dans la strate multiplié par les sorties par unité strate (an provenance de la première partie de FT2).
- La troisième colonne, **Prises tot. kg =** le nombre de Sorties Strate multiplié par la PUE strate (kg/s an provenance de la première partie de T2).

La fiche de travail FT3 : Evaluation mensuelle par strate (Résultats> reprend, par strate les résultats obtenus pour les différents types de pêche. Il ne faut pas oublier ici, d'inclure les résultats obtenus par recensement des sorties et des prises,

tels ceux de la pêche industrielle, strate 1 nord-Tanganyika. Chaque tableau de regroupement des données contiendra:

— 1) l'identification du plan d'eau, strate, centre, date, etc...
— 2) les données nécessaires pour apprécier la couverture de la population ou taille de l'échantillon: (nombre d'unités sous—contrôle aux plages).
- 3) la taille de la population: (nombre d'unités de pêche, résultat de l'enquête-cadre).
- 4) l'effort de pêche exprimé soit par le nombre de sorties, soit par le nombre de sorties/unité.
— 5) les prises, soit totales capturées, soit les PUE kg/sortie.

* Nous faisons la différence entre les formulaires et les fiches de travail, uniquement par la nombre de "papiers" nécessaires dans le premier cas et donc la nécessité d'en préparer les copies à l'avance.

* Le registre du centre sera sous la responsabilité du chef de centre. Il sera attaché au Centre et non au Chef de Centre. En aucun cas, il ne pourra être déplacé, ni emprunté. Il doit être consulté sur place.

* Le registre du Centre sera quadrillé (ou quadrillé commercial). Les pages auront été numérotées jusqu'à la f in du registre. Les trois premières pages seront réservées pour la table des matières, La page quatre servira àl'identification du CENTRE, nom plan d'eau, nom chef de centre (de... à ...). Las pages suivantes contiendront:
— les résultats des enquêtes cadra;
- les définitions des unités de pêche retenues;
— la justification des divisions an strate;
— les noms des plages sous—contrôle et de l'enquêteur responsable;
— les calculs par strate, (FT2);
- les tableaux récapitulatifs par strate, (FT3)
— les tableaux annuels, (FT4, FT5,...)

Au fur et à mesure des années, les données seront ainsi cumulées et inséparables les unes des autres.

* Les estimations au niveau de la (ou des) strate(s) se feront par le chef de Centre une fois qu'il aura reçu tous les formulaires 2 de ses enquêteurs. Les calculs d'estimations se feront sur des feuilles quadrillées du registre du centre. las fiches de travail FT2 et FT3 seront dessinées dans le registre, au fur et à mesure, avant d'effectuer les calculs.

* Le chef du centra enverra, tous les trois mois, son rapport (copies des formulaires 2 des plages et copies des évaluations mensuelles par strate et par type de pêche) au SENADEP Kinshasa, donc an avril, juillet, octobre et janvier de chaque année.

* Le rapport du mois d'octobre devra en plus contenir une copie des résultats de l'enquêta cadre, avec las descriptions et

justifications des strates, descriptions des unités de pêche et leurs nombres par strate; les plages sous—contrôle avec les noms des collaborateurs.

* Les résultats de l'enquête cadre serviront aux estimations finales, jusqu'à l'enquête cadre suivante. En 1991, année de démarrage du système minimum de collecte des statistiques de pêche, les estimations finales mensuelles de janvier à mois de l'enquête cadre, ne seront faites que pour le rapport d'octobre 1991.

3. 2 Problèmes éventuels lors de l'exécution future de l'EEC et Solutions

En ce qui concerne l'Enquête d'Evaluation des Captures, bien qu'elle n'a jamais été réalisée sur aucun des plans d'eau du pays et an particulier sur le lac Tanganyika par le service compétent (ECN), il y a lieu d'indiquer que les problèmes de financement, de logistique et de formation du personnel se poseront pour l'exécution (future).

Les formulaires sont compliqués et lourds. Cela rend la vulgarisation difficile à cause du manque de formation du personnel. Aussi le problème des coefficients multiplicateurs semble déjà se poser.

L'exécution et réalisation de cas enquêtes d'évaluation des captures nécessitent l'appui financier important des organismes internationaux. La clarification et la maîtrise de la notion d'activité permettront de résoudre les problèmes relatifs aux formulaires.

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ANNEXES

1. Formulaire 1: Débarquement journalier.
2. Formulaire 2: Débarquement par type d'unité de pêche.
3. Feuille de Travail 1: Recensement des unités de pêche et pêcheurs.
4. F.T. 2: Evaluation mensuelle par strate (Calcul).
5. F.T. 3: Evaluation mensuelle par strate (Résultats).
6. F.T. 4: Résumés mensuels et annuels par type et par strate.
7. F.T. 5: Résumés annuels par strate.
8. F.T. 6: Résultats annuels par PLAN D'EAU.

ZAIRE : Service National de Promotion et de Développement de la Pêche.
B.P. 12348 Kinshasa.

FORMULAIRE 1 : Débarquement journalier

Nom plan d'eau : ..... Centre : .....

Zone adm..... Année ..... Enquêteur:
Village ..... Mois .....
Plage ..... Jour ....
Pt.débarq. ..... Visite n° .....

Unités de pêche (Type) i	Quantités pêchées				
	Unités de mesure				
	Espèces				
	1.	2.	3."divers"	4. Total	
Type 1 a					Nbre unités s/ plage (1)
..... b					
c					Nbre sorties(2)
(3)					
A. Tot.contrôlé					
B.Tot.débarqué					FA=(2):(3)=
Type 2 a					Nbre unités s/ plage (1)
..... b					
c					Nbre sorties(2)
(3)					
A. Tot.contrôlé					
B.Tot.débarqué					FA=
Type 3 a					Nbre unités s/ plage (1)
..... b					
c					Nbre sorties(2)
(3)					
A. Tot.contrôlé					
B.Tot.débarqué					FA=
Type 4 a					Nbre unités s/ plage (1)
"divers" b					
..... c					Nbre sorties(2
(3)					
A. Tot.contrôlé					
B.Tot.débarqué					FA=

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B.P. 12048 Kinshasa.

FORMULAIRE 2 : Débarquement mensuel par type d'unité de pêche

Nom plan d'eau : .....CENTRE : .....

Zone adm.:..... Année ..... Enquêteur:
Village ..... Mois .....
Plage .....
Pt debarq. .....

TYPE d'unité de pêche : .....Secteur pêche.....

Date	visite n°	nbr. unit.	nbr. sorti	Espèces débarquées 1.	2.	3."divers	4.Total	
	1							nbr.jours visite (1)
	2							
	3							nbr.jours pêche (2)
	4							
	5							FT = (2):(1)
	6							
	7							
	8							n.moyen unit. sur plage/jr. (3):(1)=(5)
	9							
A. Total		(3)	(4)					
Unités mesure								
B. kg/unit.mesure								
C. TOTAL kg AxB								
D. Débarquement mensuel total plage - kg (C x FT)			(7)					Nbre.mensuel sorties/unit (7):(5)=
Prises pr unité d'Effort D:(7) kg / sortie								

Renseignements indicatifs au niveau de la plage :
a) Poisson frais 1er choix : Prix / kg .....
b) Poisson frais dernier choix : Prix / kg .....
c) Disponibilité en matériel de pêche s/ place : .....
d) Provenance de ce matériel .....

ZAIRE: Service National de Pêche [illegible] Pêche.
B.P. 12340 Kinshasa.

ENQUETE-CADRE page :

FT 1 : Recensement des unités de pêche et pêcheurs
(A effectuer obligatoirement un fois l'an, entre mai et juillet.).

Nom plan d'eau : ..... Enquêteur: .....
Chef de centre : .....
Zone couverte de ..... à .....
page :

Date	Nom campement	Nbre embarcatio	Nbre pêcheurs	Engins de pêche nom	nbre	Remarques

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B.P. 12348 Kinshasa.

FT 2 : Evaluation mensuelle par strate. (Calculs)

Nom plan d'eau : ..... CENTRE : .....

Chef de centre :..... Année .....
Mois .....

Strate n°		Plages sous controle						Evaluation / strate		
Type	plage n° noms	Echt. unité n.	sort. n.	Espèces 1. kg	2. kg	3.div kg	4.total kg	Unité n.	Sorties n.	Prises tot. kg
1	1									
	2									
	3									
	4							E-C		
Total		x	x	x	x	x	x	x	xx	xx
PUE typ.str		–	x	x	x	x	xx	–		
%		–	–	x	x	x	100	–	–	–
2	1									
	2									
	3									
	4									
Total										
PUE typ.str		–						–		
%		–	–				100	–	–	–
3	1									
	2									
	3									
	4									
Total										
PUE typ.str		–						–		
%		–	–				100	–	–	–

ZAIRE: Service National de Promotion et de Développement de la Pêche.
B.P. [illegible]

FT 3 : Evaluation mensuelle par strate. (Résultats)

Nom plan d'eau : ..... CENTRE : .....
Année .....
Chef de centre :.....

Strate n°		Plages sous-controle						Evaluation strate		
Sect mois	Types	Echt. unité n.	sorti n.	Espèces 1. kg	2. kg	3.div kg	4.total kg	Unité n.	Sorties n.	Prises tot kg
art.	1			.						
j a n v .	2									
	3									
	4									
ind.	1									
199.. janvier évaluation totale strate										
art.	1									
f é v r .	2									
	3									
	4									
ind.	1									
199.. février évaluation totale strate										
art.	1									
m a r s	2									
	3									
	4									
ind.	1									
199.. mars évaluation totale strate										
art.	1									
a v r i l	2									
	3									
	4									

ZAÏRE: Service National de Promotion et de [illegible]ppement de la P[illegible]e.
B.P. 12348 Kinshasa.

FT 4 : Résumés mensuels et annuels par TYPE et par STRATE

Nom plan d'eau : ..... CENTRE : .....
Année .....
Chef de centre :..... Mois .....

Strate n°		Plages sous-controle PUE						Evaluation / strate		
Typ. 1	mois	Echt. n.	sorti s/u	Espèces 1. kg/s	2. kg/s	3.div kg/s	4.total kg/s	Unité n.	Sorties n.	Prises tot. kg
	J F M A M J J A S O N D									
		Total annuel type 1							x	x
		PUE annuelle type 1							x	x
2	J F M A M J J A S O N D									
		Total annuel type 2							x	x
		PUE annuelle type 2							x	x
3	J F M A M J J A S O N D									

ZAIRE : Service National de Promotion et de Développement de la Pêche. B.P.12348 Kinshasa.

FTS : Résultats annuels par strate.

Nom plan d'eau : ..... CENTRE : .....
Chef de centre : ..... ANNEE : .....

Str1	Secteur : .... Type 1				Type 2				Type 3				Ty.....		GRAND TOTAL
mois	Echt n.	Unit n.	Sort n.	Prises kg	Echt n.	Unit n.	Sort n.	Prises kg	Echt n.	Unit n.	Sort n.	Prises kg	Echt n.	Unit.....	PRISES kg
J F M A M J J A S O N D															
Tot	-	-	x	x	-	-	x	x	-	-	x	x	-		xx
PUE	-	-	s/u	kg/s	-	-	s/u	kg/s	-	-	s/u	kg/s	-		000000

Str2	Secteur .... Type 1				Type 2	Type 3	Ty.....	
	Ech. n.	Unit n.	Sort n.	Prises kg	Ech..... n.			
J F								

ZAIRE : Service National de Promotion et de Développement de la Pêche. B.P.12348 Kinshasa.

FT6 : **Résultats annuels** PLAN D'EAU : ..... ANNEE : .....

	STRATES	Secteur : ..... Type 1				Type 2				Type 3				Ty..	GRAND TOTAL
mois	n°	Echtn.	Unitn.	Sortn.	Prises kg	Echtn.	Unitn.	Sortn.	Prises kg	Echtn.	Unitn.	Sortn.	Prises kg	Echt.....	PRISES kg/t
J	1														
	2														
	3														
	4														
F	1														
	2														
	3														
	4														
M	1														
.	.														
.	4														
D	1														
	2														
	3														
	4														
TOT/type				x	x			x	x			x	x		xx
PUE				s/u	kg/s			s/u	kg/s			s/u	kg/s		000000

Annex 3F

The fisheries statistics data collection system in Zambia and fisheries statistics of Lake Tanganyika

Paper presented at the Workshop on the Coordination and Standardization of Fisheries Statistics for Lake Tanganyika. 26th to 30th July, 1993 in Bujumbura, Burundi

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1 Background

1.1 Fishery areas of Zambia

Although Zambia is a landlocked country, it is well provided with large Lakes, rivers, dams, swamps and streams. These water bodies are home to hundreds of fish species which provide a major source of income to a large number of commercial and traditional fishermen. Every year large quantities of fish are caught from these waters of Zambia. Recorded fish production has risen from 13,000 tons in *1952* to 67,489 tons in 1992. The work force, excluding fish traders and marketeers, has also increased from 15,000 in 1964 to about 29,000 in 1992. Fishermen employ about 24,000 boats of various sizes ranging from a canoe to powered vessels.

Within Zambia's boundaries are two of the largest river systems in Southern Africa. Namely, the Congo and the Zambezi river systems. It is the flood plains, lakes and swamps of these river systems together with 6% of Lake Tanganyika that form the greater part of the fisheries of Zambia. A brief outline of the types of fisheries of Zambia are given here below.

Mweru-Wantipa comprises a shallow area of lake and swamps. It is situated in the Northern part of the country. Like Tanganyika, it has no major outlet and for its size Mweru Wantipa is fairly productive. The 2124 traditional fishermen using about 5000 boats contribute about 13% to the national fish production.

The shallow lake of Mweru and Luapula river make up the Mweru Luapula fishery. It is home to over a 100 fish species and contributes about 10% to the national fish production.

Lake Bangweulu consists of lakes, swamps and lagoons. For their size, the lakes are less productive than the swamps. The shores of these lakes and swamps are inhabited by about 7,800 fishermen employing about 7,000 boats. Fish production is within 15% of the country' s total catch.

The Kafue river system consists of three important fishery areas. The Kafue flood plains, Lake Itezhi-tezhi (man made) and Lukanga swamps. Together they contribute *15%* to the total fish production of the country.

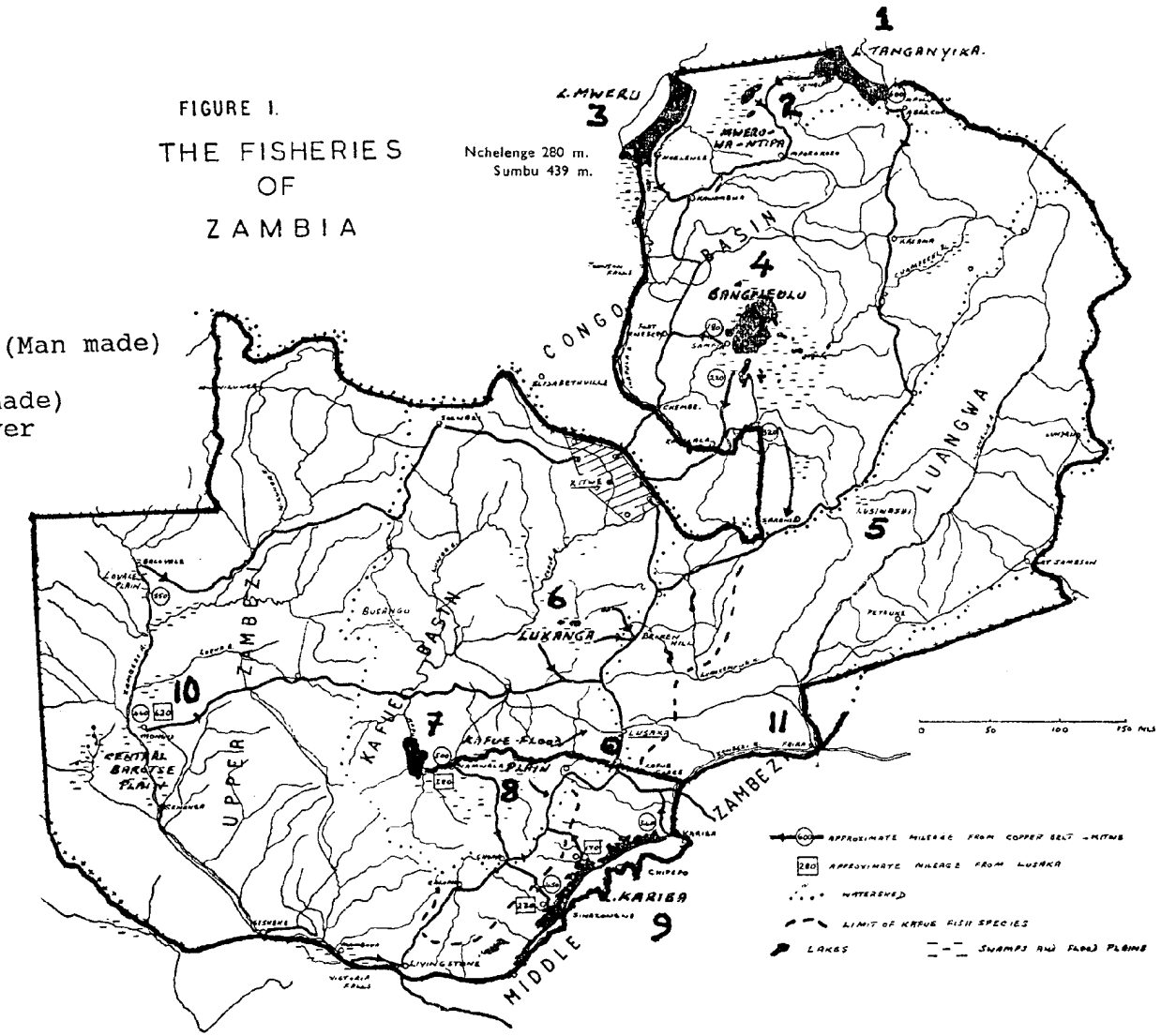
Upper Zambezi river is largely of the flood plain type. It includes the main flood plain and a small fishery at Mambova to the south of the country. Productivity of this fishery is positively correlated with flood regimes of the system. Depending on the flood regimes, its contribution to the national catch varies between 10-14%.

KEY

1 Lake Tanganyika
2 Lake Mweru Wantipa
3 Lake Luapula
4 Lake Bangweulu
5 Lake Lusiwashi
6 Lukanga swamps
7 Lake Itezhi Tezhi (Man made)
8 Kafue river
9 Lake Kariba (man made)
10 Upper Zambezi river
11 Lower Zambezi
Chilanga (HQ)

FIGURE 1.

THE FISHERIES OF ZAMBIA



Lake Kariba is a deep man made lake formed by damming the middle Zambezi river at Kariba Gorge. The catch of the introduced

Limnothrissa miodon (sardine) from Lake Tanganyika contributes about *57%* to the sardine fishery in the country.

Lake Tanganyika is an ancient and one of the deepest lakes in the world. It is separated from other river systems and is home to hundreds of fish species some of which are endemic to it.

Minor fisheries include rivers like Luangwa, Lower Zambezi (below the dam wall), Chambeshi and lake Lusiwashi. See figure 1 for the location of these water bodies in Zambia and Table 1 for contributions to total fish production in the country.

Table 1: The inshore fisheries of Zambia.

Fishery areas	**Estimated catch (t) by fishing area**			
	1989	**1990**	**1991**	**1992**
L. Bangweulu	9019	9101	11539	10629
Mweru-Luapula	7190	7522	6987	6398
L. Tanganyika	9093	9970	8072	8576
L. Kariba	2650	2359	1973	986
Mweru-Wa-Ntipa	7039	8490	7220	8938
Lukanga	1401	2613	1870	*
Lusiwashi	218	403	523	1143
Lower Zambezi	141	201	490	623
Upper Zambezi	8358	4213	8403	9605
Kafue	8569	7335	5362	7601
Itezhi-tezhi	196	387	610	439
TOTALS	**53,814**	**52,594**	**53,150**	**54,938**

Notes: = no fishing due to an outbreak of cholera in the area*

The inshore fishery consists of the the following species groups:

Tilapia, Serranochromis, Other Cichlids, Mormyridae, *Hydrocynus,* Other Characids, Citharinidae, Cyprinidae, Schilbeidae, Clariidae, *Synodontis,* Bagridae, Clupeidae (or dagaa: only in

the artisanal fishery of L. Tanganyika), *Lates* (also caught by the artisanal fishery on L. Tanganyika), and Others.

This year's total fish production, excluding aquaculture data, is:

Artisanal fishery	:	54,938 t
Commercial fishery	:	12,551 t
TOTAL	:	**67.489 t**

1.2 Development of the statistical data collection system in Zambia.

The collection of fisheries statistics in Zambia dates back to *1952* when the fisheries Division of the department of Game and Fisheries was under the Northern Rhodesia Government. At that time there was no one general system of collecting fisheries statistics applicable to all capture fisheries. Each officer in charge of a station had his own system which in his opinion suited the peculiarities of the water body in question (Kanondo, 1990). Basically, a large number of fish guards, here called enumerators, were distributed in selected fishing villages along the coastline where they collected data of various types. These enumerators lived with fishermen, collected data and sent them to their respective stations where the officer-in-Charge tabulated and processed them. Reports were written and sent to Chilanga (HQ) where consolidated reports were compiled.

It is not accurately known when this system was first introduced, but records of fish production date back to *1952.* From available data it would appear that two types of data were collected (i.e. production and marketing data). Data regarding fish production consisted of inputs and outputs of the fishing industry. This included data on landed weight and number of fish by species, gears (nets, baskets, etc.) used and number of fishermen by village. Under the marketing data category, which run concurrently with the production oriented system, data collected included weight, value and destination of fish bought and in transit to consumer centers along the line of rail. A number of marketing posts were, for this purpose, established in villages which looked big and permanent. In these villages marketing structures, where fish was sold, were built.

It is clear that this system of data collection involved a large number of field enumerators and that it lacked flexibility to follow up the dynamic nature of the fishing industry. More so, in fisheries where fishermen were highly mobile, this in turn affected the quality of collected data.

It is not accurately known how fish estimates were arrived at, but one would only guess that two approaches were possibly followed.

a)First approach

Since data on inputs and outputs of the fishing industry provided information on catch per unit effort (CPUE), effort and activity rates, fish estimated may have been arrived at by using the general formula. i.e.

CPUE * (total effort) * activity rate * time 1

Where:- a) CPUE is catch per unit effort;
b) total effort could be numbers of boats, nets, villages or fishermen;
c) Activity rate is a ratio of active effort to total effort; and
d) time is the reference period in days.

b)Second approach

As the marketing data provided information on weight of fish sold, it is only logical to assume that data on weight of fish consumed by fishermen were also collected. Assuming this is true and that all sold fish were recorded, independent fish estimated may have been arrived at by:

(Local * Fishermen * time) + weight 2

Where:- a) Local is weigh of fish consumed locally by fishermen;
b) Weight is fresh weight equivalent of fish sold; and
c) Time is as in (d) above.

Besides providing an independent estimate of fish production, marketing statistics provided a lot of valuable information on the pricing mechanisms and distribution of fish. Fish production figures arrived at this way were often under-estimates, in that fish sold from villages without markets was not covered.

2. Current fisheries statistical system

The current system of collecting fisheries statistics was designed and implemented by G. Bazigos, an FAO statistician at the time. The first surveys were done in January, 1976, after three years of a slice period (Bazigos *et al*, 1975*).* Sampling in space and time are the two major characteristics of this system. Furthermore, selection of samples is centered on the random theorem. The system employs three interrelated surveys. Namely, Catch Assessment Survey (C.A.S.), Frame Survey (FS) and the Supplementary Frame Survey (SFS).

2.1 Frame Survey (FS)

By this survey items of information needed to assess the size and structure of the fishery are collected. It is an inventory of fishing economic units (FEU) of the fishing industry. Data collected include:

a) Number of fishermen per village;
b) Number of boats by type;
c) Number of fishing gears by type and mesh size (recent development);
d) Number of fishing villages and their location on thematic map; and
e) Number of outboard engines.

2.1.1 Area stratification

In order to improve representativeness and precision of samples, all water bodies in Zambia are subdivided into zones called strata. Ideally each stratum had to represent a homogeneous habitat, but in absence of ecological data arbitrary demarcations have been used. The number of strata range between fisheries. Mweru Wantipa has 2 while Lake Bangweulu has 8 strata.

2.1.2 Field operations of FS

Teams of enumerators are sent into the field where they visit each and every fishing village within the established strata and collect data as indicated in 2.1 above.

2.1.3 Use of FS data

A series of FS data provide information on the mobility pattern of fishermen and the development of the fishing industry. The list of fishing villages provide data from which a sampling frame for use during CAS is established. The total number of fishing economic units provide overall effort which form a major input into fish production estimation formula.

Thematic maps produced provide useful information for subsequent surveys and planning.

2.2 Catch Assessment Survey (CAS)

This is a survey by which samples of input and output of the fishing industry are collected. As indicated above sampling in space and time is the main feature of this system. Field operations involve visits to selected villages and collect landing statistics for selected landings.

2.2.1 Stratifications of the fishing villages within established strata

In order to take full advantage of possible gains from stratification, fishing villages within each stratum are further divided into three groups called minor strata. The criterion used is the size of the fishing village (e.g. number of boats). For sampling purpose three fishing villages, here called primary sampling units (PSUs) are randomly selected within each established minor stratum. There are therefore 9 PSUs in each stratum.

2.2.2 Sampling within the selected PSU.

Within each selected fishing village information on landing statistics are collected from all active boats, if such boats are less than or equal to 10. Else a subsample of 6 boats are selected for further investigation.

2.2.3 Sampling duration and frequency

CAS enumerators spend three days in each PSU collecting the following catch data:

a) Landed weight and number of fish by species and boat;
b) Gears used (nets, baskets, beach seines, etc.);
c) Number of both active and existing boats;
d) Fishing activities for three days prior to the interview; and
f) Number of crew.

This means that a survey lasts for 27 days per stratum (i.e. 9 PSUs * 3 days of sampling). The survey is done once every four months.

2.3 Supplementary frame survey (SFS)

Supplementary frame surveys run concurrently with CAS. The main objective of the survey is to collect the current fishing effort exerted on the fishery. This entails visits to each and every fishing village to collect information on number of boats, nets, fishermen and engines. This is necessary because while the overall effort for the fishery may remain constant for a considerable length of time such effort may vary between strata over a very short period of time. Mobility of fishermen is very high in most of the fisheries of Zambia.

2.4 Data collection

In each fishery area, teams of CAS enumerators are sent to each established stratum to collect landing statistics. See appendix 1 for questionnaires used in these surveys.

Filled in questionnaires are sent to Chilanga (HQ) for processing and reporting.

2.5 Method of estimation:

Catch estimates for a given minor stratum is given by:

Catch in a minor stratum	=	Catch per boat per night (CPUE)	*	Total boats for minor stratum (B)	*	Time raising factor (C)	*	Activity rate (D)

Where:- i) CPUE is catch per unit effort from CAS;
ii) B are boats counted from SFS;
iii) C are numbers of days in four months; and
iv) D is the ratio of active boats to existing boats * 3 days of sampling.

The sum of minor strata estimates provides the stratum total. Similarly the sum of stratum estimates provides the fishery total catch for a given quadruple.

Estimates arrived at this way are compiled from which annual reports are produced and disseminated to all fishery areas.

3 Industrial fisheries statistics

In this paper the term industrial fishery refers to the pelagic fisheries of Lakes Kariba and Tanganyika. These fisheries are highly mechanized and entry is restricted. In Lake Kariba the fishery is based on *Limnothrissa miodon* and *Hydrocynus vittatus* while in L. Tanganyika the fishery is based on *L. miodon, Stolothrissa tanganicae, Lates* species and *Luciolates stappersii.* Fishing is done at night by light attraction. Entry into the fishery is not free. Each fisherman obtains a fishing permit which may cost up to K50,000.00 per vessel.

In this fishery each fisherman is requested by law concerning tenure and renewal of License to submit daily catch and effort statistics an monthly basis, data compiled this way is sent to Chilanga (HQ) for processing and reporting.

4 Problems

Areas of statistical concern and likely sources of error are as follows: -

a) The subdivisions based on the size of a fishing village in terms of boats is meaningless statistically. This is

because CPUE may not depend on the size of a fishing village, especially where boats from adjacent villages fish in the same waters;

b) Using the number of boats as a measure of fishing effort is controversial, especially in a multi-gear fishery, in that the number of gears per boat vary from anything between one and thirty;

c) There is also uncertainty concerning the duration of sampling sessions at each selected village. The present 3 days sampling period may not be optimal;

d) The selection of 9 villages from each stratum regardless of size of stratum and variance between strata introduces an equal probability for a village being sampled;

e) Sampling three times a year may not capture the seasonal catch variation;

f) The dynamic nature of the sampling frame results in the loss of time series catch statistics from which change in CPUE with time can be drawn;

g) CAS is a very expensive operation, especially for the third world countries. Due to economic constraints, most departments find it very difficult to carry out these surveys on regular basis. Consequently there are often many gaps in the data collected. This in-turn affects the quality of collected data and makes it difficult to use the data for developing management policies.

5. Recommendations

a) Since the subdivisions used are not sound and may introduce errors the practice should be discontinued;

b) Where fishing effort is concerned the best unit of measure may be to use fishing gear (eg. nets, beach seines, etc.);

c) The present sampling duration has not been verified. It is important that the optimal sampling duration be worked out. Preliminary investigations by Lupikisha (1991) indicate that 10-15 days of sampling is perhaps optimal;.

d) Ideally every village should have the same chance of being sampled. However, in light of economic constraints and the need to establish a time series of catch statistics, random selection may not be practical;

e) What fisheries of the third world countries require is a

simple sampling system which each country would be able to sustain with or without donor funds. There is no point in putting up a well designed system of data collection which falls into pieces when donor funds are withdrawn.

6.0 Fisheries statistics of L. Tanganyika

As indicated above, there are two fisheries on Lake Tanganyika. Namely, the artisanal and industrial fisheries.

6.1 The artisanal fishery

The artisanal fishery of lake Tanganyika is based on inshore fish species which can be grouped into 15 broad groups of fish (see Table *5).* Fishing, except for the clupeids, is confined to the shallow waters of the Lake.

6.1.1 Frame Survey data

The first comprehensive count of fishing economic units on the lake was done in 1972. Since then surveys, which enumerated villages, fishermen and boats have been conducted irregularly as part of data requirement of CAS.

For statistical purposes the coast line of Lake Tanganyika has been divided into four strata (see Figure 2). The indicated strata are also known as the East coast, South coast, West coast and Nsumbu area. The dividing lines between strata were decided by geographic convenience, and as such do not save any statistical purpose at all.

6.1.1.1 Number of villages

The number of fishing villages has, since 1972, not changed much in Lake Tanganyika. Generally stratum 2 has had the highest number of fishing villages throughout the years. This is not surprising considering that the Mpulungu main town is within this stratum. Mpulungu has a well developed road, social and health infrastructure, contrary to any other stratum.

Table 2: Number of fishing villages by stratum since 1972. Data from DoF annual and Frame Survey reports.

Stratum	1972	1973	1975	1986	1990
1	13	28(14)	18	18	15
2	24	39(12)	22(1)	21	27
3	12	46(14)	15(3)	12	23

4	12	32(6)	13	14	19
Total	**61**	**145(46)**	**68(4)**	**65**	**18**

Figures in brackets denote temporary (seasonal) camps.

Table 3: The density of r~hing villages, fishermen and boats (1990 data only).

Variable	Stratum				
	1	2	3	4	Total
Coast line (Km)	27	39	57	38	162 (239)
Villages/km	0.56	0.69	0.40	0.50	0.50
Fishermen/km	21.0	21.2	8.1	30.3	18.5
Boats/km	9.3	10.5	3.3	11.3	7.9

Data in brackets include coast line under National Parks

Table 3 shows the concentration of fishing villages, fishermen and boats in different strata. It is difficult to make meaningful comparisons between strata because the length of coastline in each stratum is not the same.

6.1.1.2 Number of boats

Table 4: Number of boats by stratum since 1972. Data from DoF annual and Frame Survey reports.

Stratum	1972	1973	1975	1986	1990
1	239	220	312	227	252
2	461	290	304	441	410
3	73	199	118	130	187
4	187	349	233	261	429
Total	**960**	**1058**	**967**	**1059**	**1278**

The number of boats recorded (Table 4) include all boats found in the villages. It is difficult to say whether boats on the fishery have increased or not because other workers on the lake tended to exclude light boats during frame surveys. It is felt in this paper that this is not correct because even boats

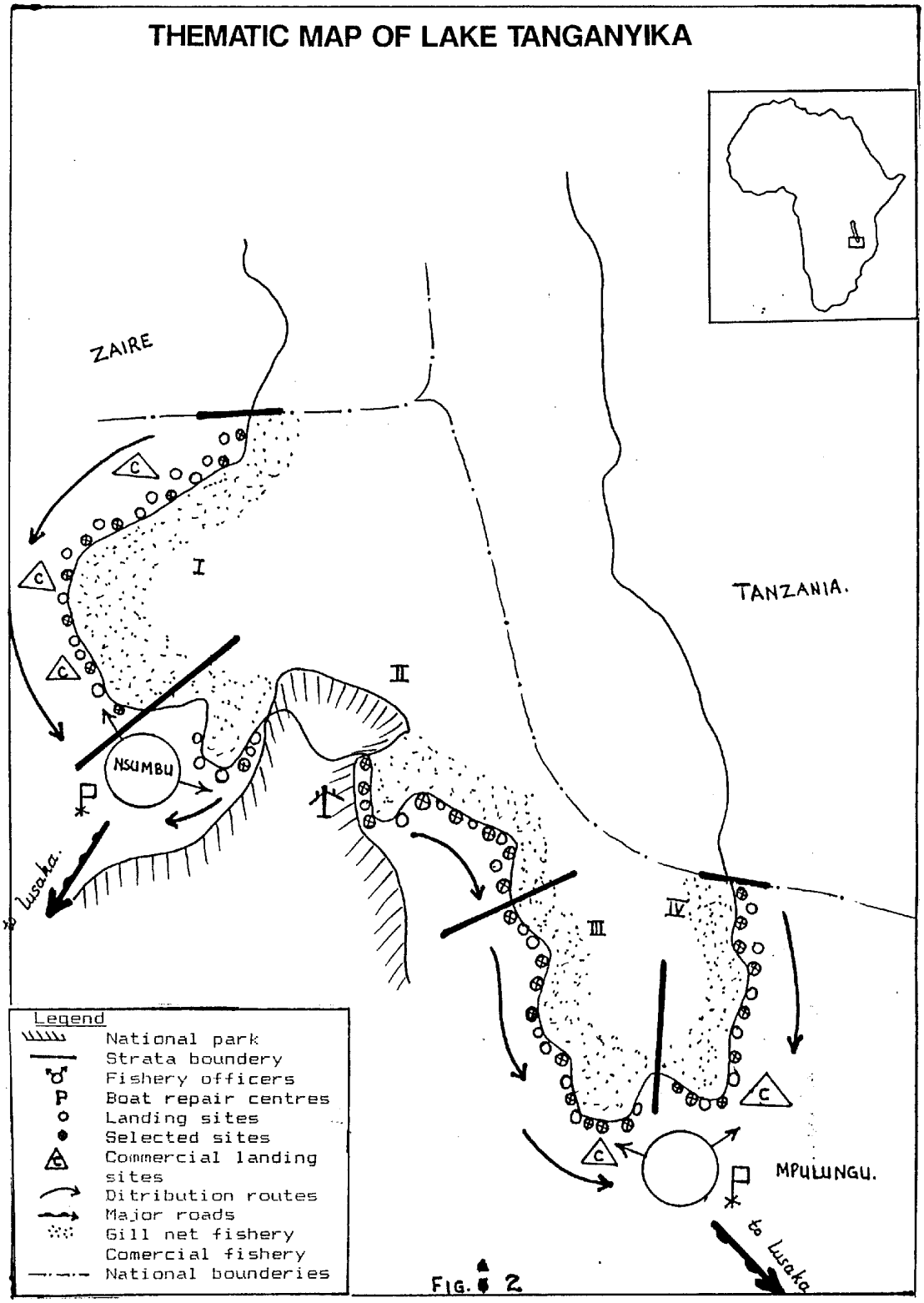

THEMATIC MAP OF LAKE TANGANYIKA
ZAIRE
TANZANIA.
NSUMBU
MPULUNGU.
to Lusaka.
to Lusaka
I
II
III
IV
C
P
Legend
National park
Strata boundery
Fishery officers
Boat repair centres
Landing sites
Selected sites
Commercial landing sites
Ditribution routes
Major roads
Gill net fishery
Comercial fishery
National bounderies

FIG. 2

that are used as light boats are gill netters at some time of the day. Only about 4% of all boats may be used for transportation of both people and goods. However, it could be said that the number of boats has increased from 960 in 1972 to 1278 in 1990.

Lake Tanganyika is one of the few fisheries where dugout canoes are not very common. The majority of boats (98%) are made of planks. The remaining 2% are dugout canoes.

6.1.1.3 Species composition of the inshore fishery

Table 5: Percentage species composition by weight of the artisanal fishery of Lake Tanganyika.

Species code number	Group of Fish	1980 species composition	1992 species composition
1	*Tilapia*	0.97	0.62
2	*Serranochromis*	0.03	0.01
3	Other cichlids	13.86	10.68
4	Mormyridae	0.02	0.01
5	*Hydrocynus*	0.68	0.43
6	Other characids	0.44	0.21
7	Citharinidae	0.27	0.08
8	Cyprinidae	0.50	0.35
9	Schilbeidae	0.32	0.41
10	Clariidae	1.54	2.04
11	*Synodontis*	0.23	0.20
12	Bagridae	1.69	1.11
13	Clupeidae	72.54	78.42
14	*Lates*	6.29	5.40
15	Other species	0.05	0.03
Total		**100.00**	**100.00**

The species composition of the catch for the inshore fishery has more or less remained the same over the past 10 years or so. However, it is apparent that the clupeids constitute about 70% of the artisanal fishery.

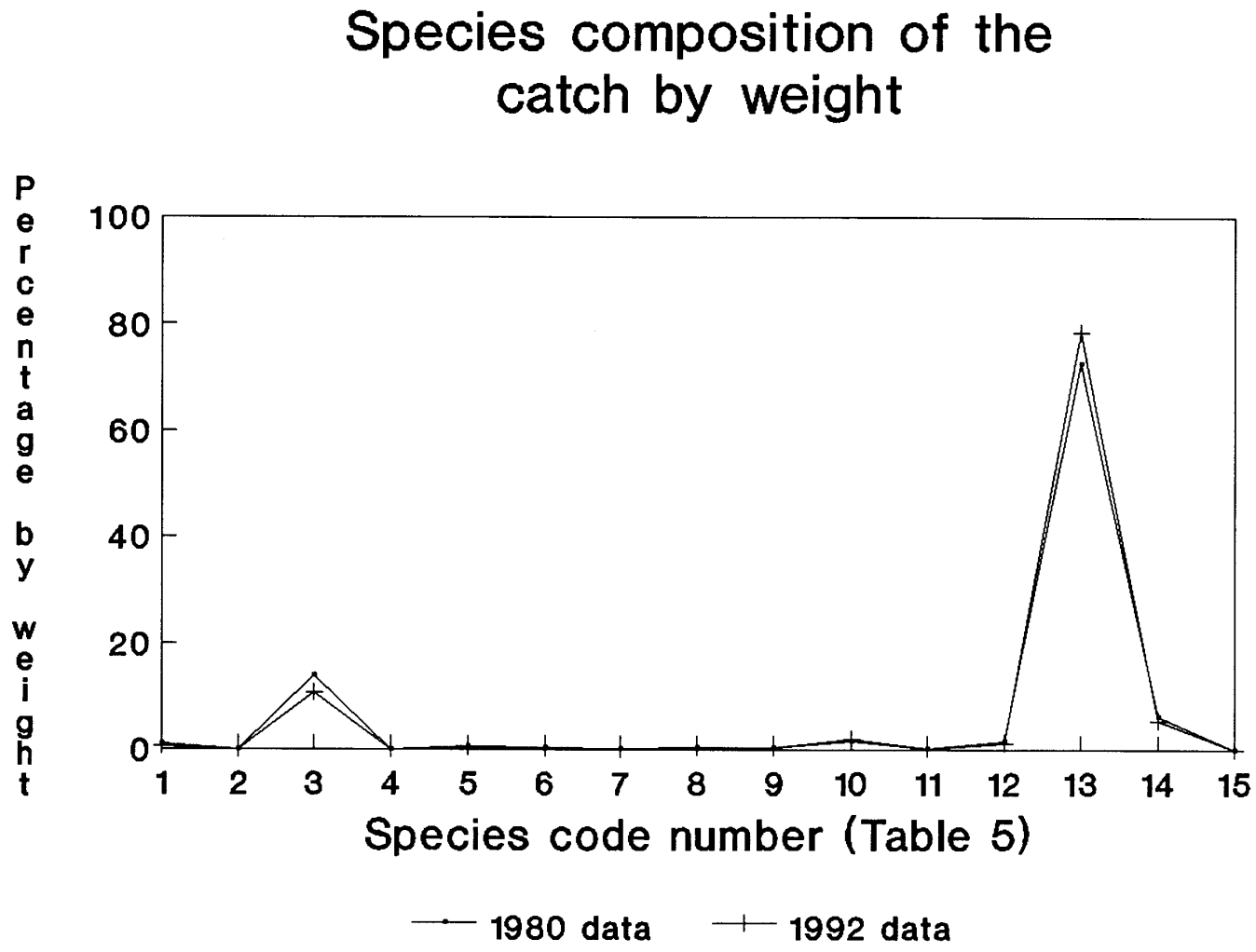

Species composition of the catch by weight
Percentage by weight
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Species code number (Table 5)
1980 data
1992 data

Fig.3:

6.1.1.4 Mesh size composition of gill nets

Table 6: Percentage mesh size composition of sampled gill nets in L. Tanganyika (1979 and 1990 data only).

Mesh size (mm)	% by number (1979)	% by number (1990)
50	1.7	7.2
63	19.7	30.9
76	21.7	28.1
89	10.5	9.9
102	17.0	15.0
113	1.9	1.2
121	2.6	3.9
139		0.3
152	1.9	1.9
165		0.9
178	5.7	0.7
190	3.1	-
202	3.7	-
215	-	-
228	0.7	-
241	9.8	-
253	-	-
Total %	**100**	**100**
n	**2008**	**3740**

Table 6 shows the mesh size composition of sampled gill nets over a 11 year period. The minimum mesh size allowed in Zambia is 76 mm. The occurrence of gill nets with mesh sizes less than 76 mm and indeed the shift from the use of larger towards smaller meshes may be an indication that larger fishes may be hard to come by.

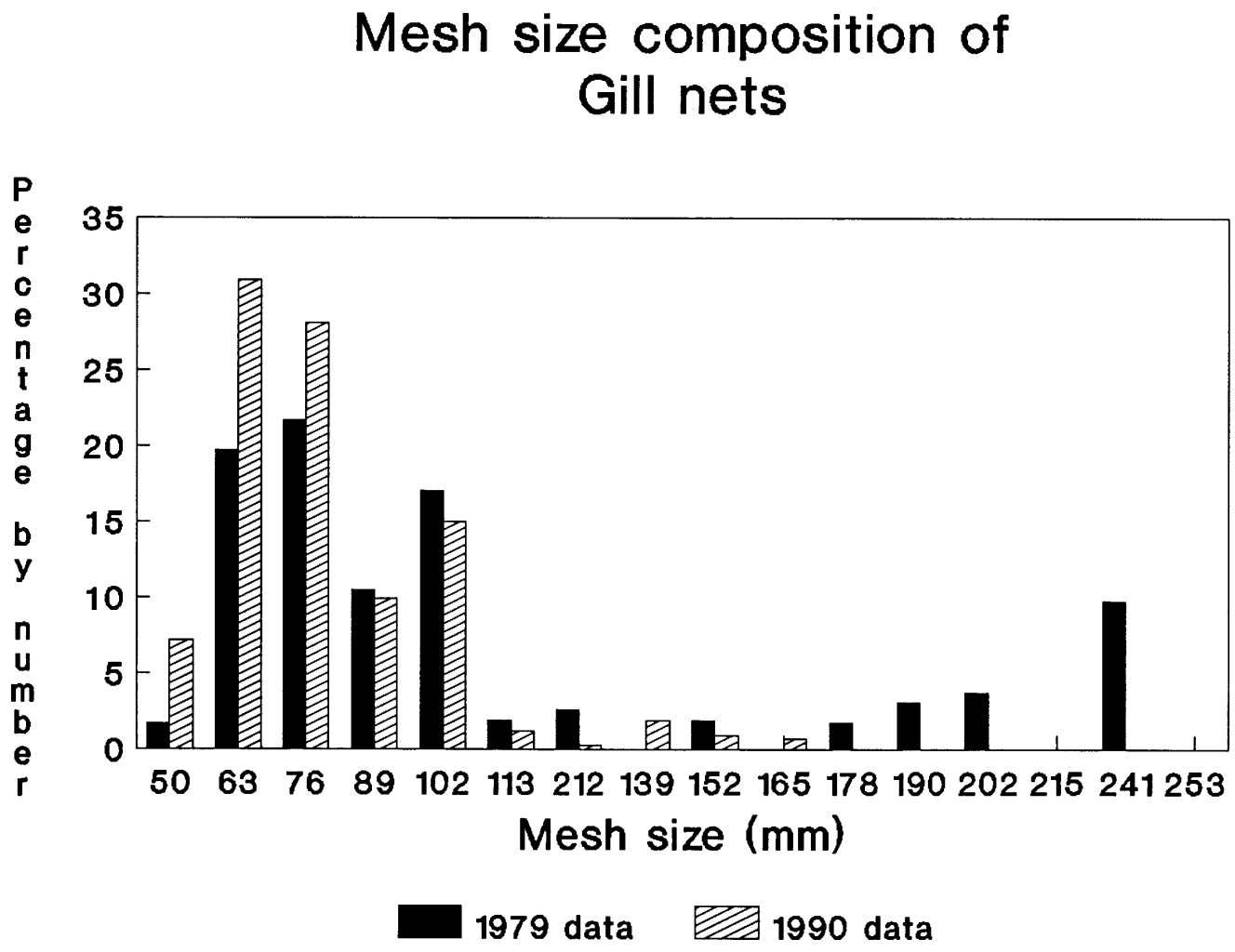

Mesh size composition of
Gill nets
Percentage by number
35
30
25
20
15
10
5
0
50 63 76 89 102 113 212 139 152 165 178 190 202 215 241 253
Mesh size (mm)
1979 data
1990 data

Figure 4:

6.1.1.5 Artisanal fish yields

Table 7: Estimated fish yield of L. Tanganyika since 1959. Data from DoF and CSO annual report.

Year	Fish yield (tons)	Kg/boat/day	Number of boats
1959	2971	-	-
1960	2943	-	-
1961	2000	-	-
1962	2076	-	-
1963	6900	-	-
1964	8232	-	-
1965	4207	-	-
1966	4453	-	-
1967	7820	-	-
1968	6976	-	-
1969	7066	-	-
1970	9263	-	-
1971	4628	-	-
1972	3865	14.13	960
1973	3539	11.74	1058
1974	2347	8.61	956
1975	5179	18.79	967
1976	4844	-	-
1977	6207	-	-
1978	5428	13.18	1445
1979	3119	19.15	572
1980	6747	33.96	697
1981	1983	13.96	498
1982	5720	19.06	1053
1983	5502	27.58	699
1984	7312	28.60	897
1985	8929	14.48	1164
1986	7494	24.74	1059
1987	8041	11.16	1528
1988	5594	21.83	899
1989	9093	33.19	963
1990	4868	36.40	1278
1991	5072	18.23	976
1992	8576	30.79	763

Notes: - Activity rate is estimated at 78% (i.e. 285 fishing days per year);
- Estimates of kg/boat/day are distorted by inclusion of the artisanal clupeid catch.

6.2 The industrial fishery

Fishing of pelagic fish stocks started in 1962 with only one company (SOPELAC) operating in Mpulungu. A year later another company (Irvin and Johnson) joined the fishery but stopped in 1977. Table 8 gives the number of industrial fishing units operating since 1980. The table also shows the development of this fishery.

6.2.1 Industrial fleet

Table 8: Number of industrial fishing units operating in both Mpulungu and Nsumbu area.

Year	Mpulungu		Nsumbu		Totals
	Ring Netters	Chiromila setters	Ring netters	Chiromila setter	
1980	2	0	0	0	2
1981	3	0	0	0	3
1982	3	0	0	0	3
1983	5	0	0	0	5
1984	*5*	0	2	2	9
1985	8	0	2	2	12
1986	10	1	2	2	15
1987	11	1	2	2	16
1988	13	1	2	2	18
1989	14	1	2	2	19
1990	14	1	1	0	16
1991	14	1	1	0	16
1992	15	4	1	0	20

Up until 1976 the only targeted species were the two clupeids. Generally *S. tanganicae* was the target species when it appears in large quantities in the dry season (JuneAugust), for the rest of the year *L. miodon* was the target. However, both species are caught throughout the year.

6.2.2 Industrial fish yields

Table 4: Estimated fish yield of L. Tanganyika since 1959. Data from DoF and CSO annual reports.

Year	Yield in tons	Effort (Boat nights)	Tons/ boat night
1963	807	220	3.66
1964	1206	414	2.91
1965	1484	*571*	2.60
1966	1293	*555*	2.33
1967	1497	532	2.81
1968	1624	*575*	2.82
1969	1555	*655*	2.37
1970	1572	651	2.41
1971	2360	518	4.56
1972	2416	858	2.81
1973	1949	963	2.02
1974	2175	-	-
1975	2261	-	-
1976	1657	-	-
1977	1659	503	3.29
1978	1050	352	2.98
1979	1100	452	2.43
1980	1509	581	2.59
1981	1892	878	2.15
1982	2290	971	2.36
1983	3020	1257	2.40
1984	4471	1836	2.44
1985	5971	2495	2.39
1986	5484	3021	1.82
1987	4411	3182	1.39
1988	5035	3525	1.43
1989	5293	3004	1.76
1990	5449	3650	1.49
1991	6041	5253	1.15
1992	5253	4565	1.15

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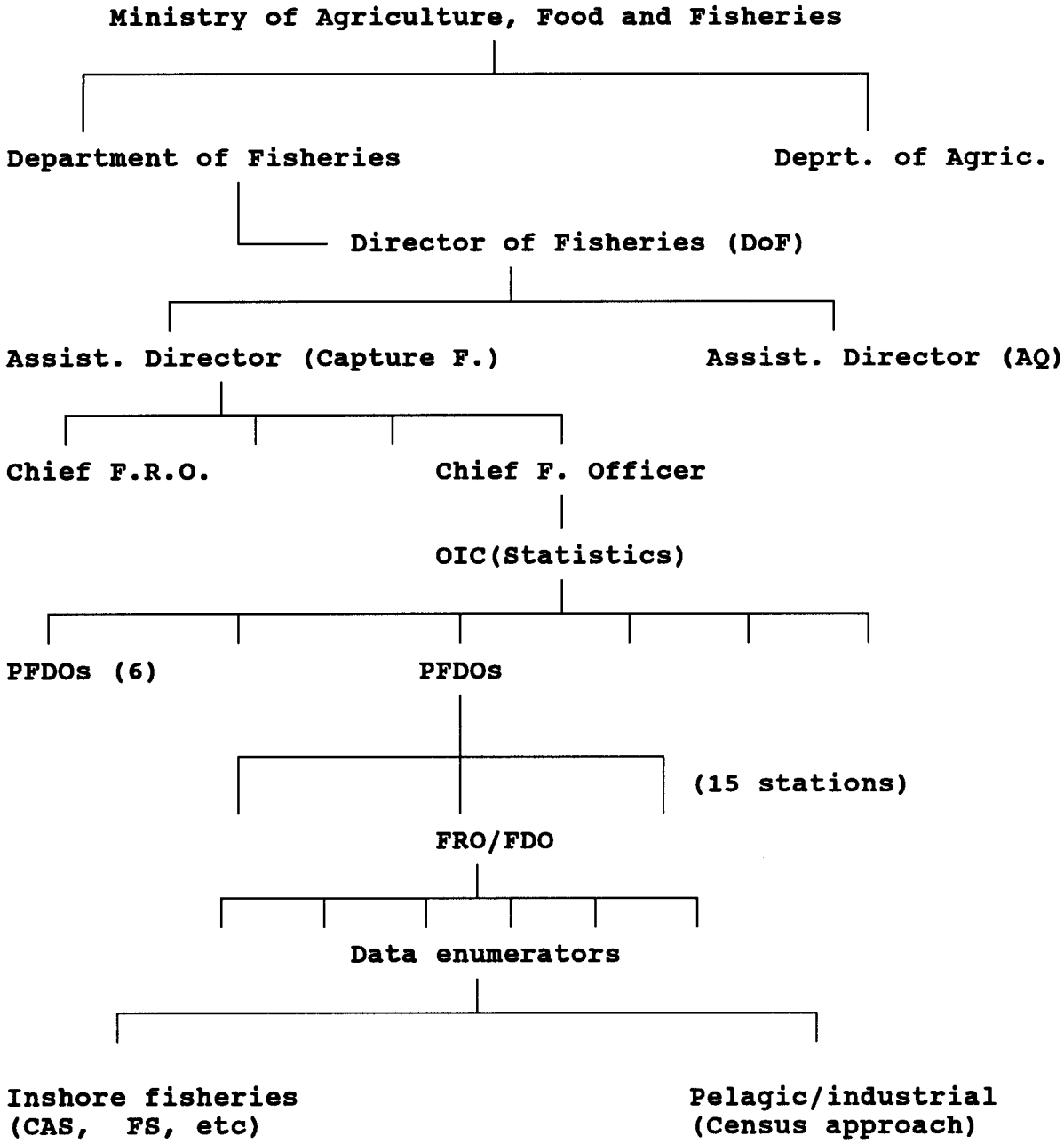
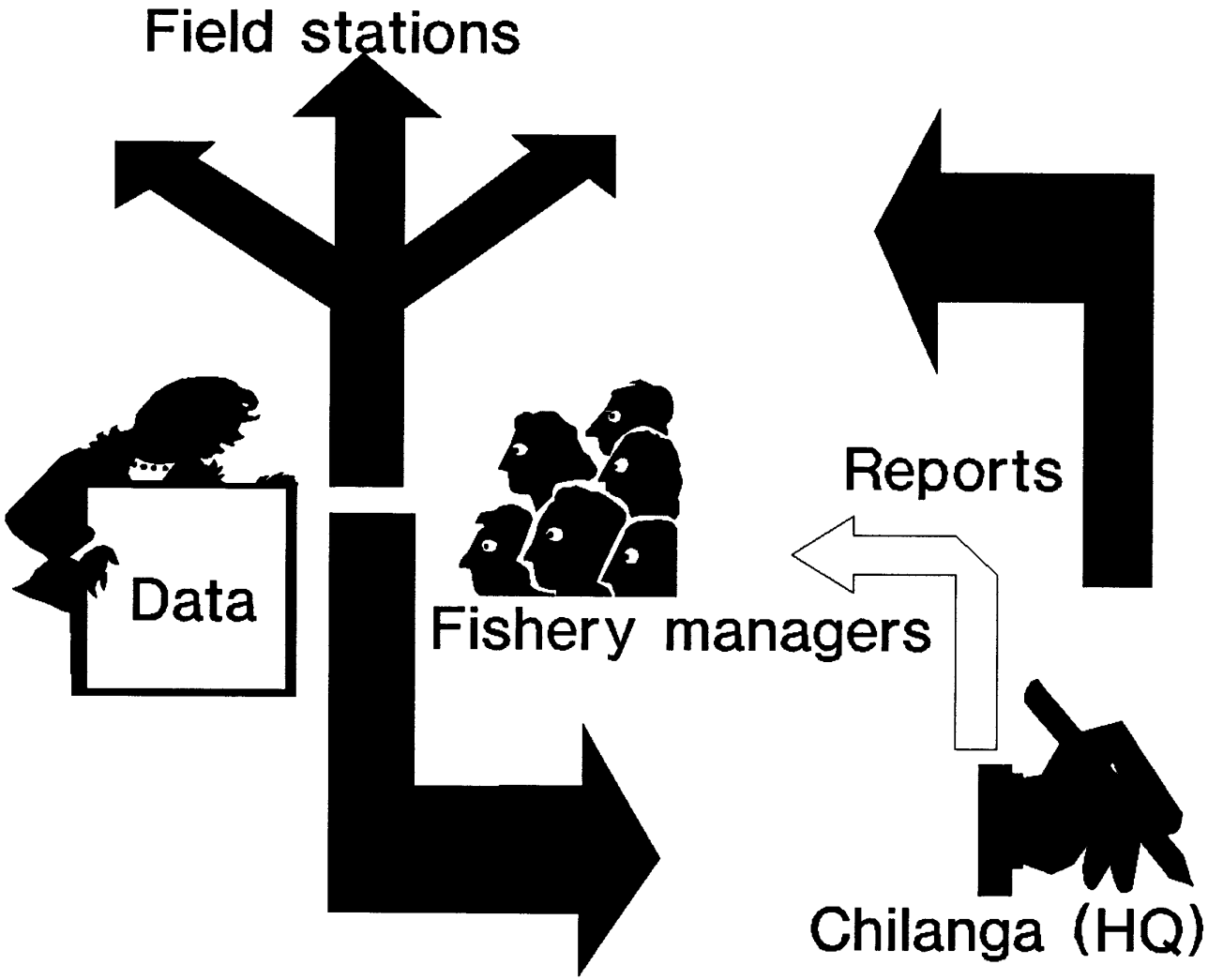
APPENDICES :

- *Institutional setup*
- *Data flow chart*
- *Frame Survey form*
- *Supplementary frame survey form*
- *CAS form*
- *Industrial & marketing enumeration forms*


Ministry of Agriculture, Food and Fisheries
Department of Fisheries
Deprt. of Agric.
Director of Fisheries (DoF)
Assist. Director (Capture F.)
Assist. Director (AQ)
Chief F.R.O.
Chief F. Officer
OIC(Statistics)
PFDOs (6)
PFDOs
(15 stations)
FRO/FDO
Data enumerators
Inshore fisheries
(CAS, FS, etc)
Pelagic/industrial
(Census approach)



Flow chart

FISHERIES STATISTICAL SURVEYS OF ZAMBIA

FRAME SURVEY OF _____ FISHERY

DATE OF SURVEY _____

NAMES OF RECORDERS _____

Identification Particualrs of the Fishing Sites	1. Name of the Fishing Site _____ 2. Location _____ 3. Stratum _____ 4. Map reference Number _____ 5. Permanent Village or Temporary Camp _____ 6. How many chisense boats _____ 7. Number of boats now at the beach or currently fishing from the beach ..... (a) Dugout Canoes ..... (b) Plank boats ..... (c) Metal Boats ..... (e) Asbetos ..... (f) Number of Engines ..... 8. Number of Fishermen ..... 9. Number of Gears: (a) Gill Nets ..... (b) Seine Nets ..... (c) Fishing Lines ..... (d) Fishing Traps ..... (e) Cast Nets ..... (f) Chisense Nets ..... (g) Spears .....
	Remarks _____

FISHERIES STATISTICAL SURVEYS OF ZAMBIA (Annex 3) Form 9

SUPPLEMENTARY FRAME SURVEY

Fishery: _____ Survey Month: _____ [ ] Stratum [ ]

Serial Number	Name of Village	Date of visit	Number of F/men	Number of fishing boats by type								
				Canoes	Plank Boats		Fibreglass		Metal boats		Number of active boats	Remarks
					Without engines	With Engines	Without Engines	With Engines	Without Engines	With Engines		

Compiled by: _____ Date: _____ Station: _____

REPUBLIC OF ZAMBIA - DEPARTMENT OF FISHERIES

Fishery ____________________

Name of Village ____________________

Recorders ____________________

CATCH ASSESSMENT SURVEY

PS2-SURVEY FORM A2

RECORD OF LANDINGS OF LOCAL BOATS

Survey Day ___ Page ___

★

Document: Fisheries Production Survey 2				Sample Code Number: Fishery	Stratum	[illegible]	PSU	Survey Day	Date: Day		Month		Year		[illegible]	Total Landings	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

CARD 1	Selected Landing	Name of Owner or Operator	Type of Gear	Gear Used: No.	Mesh size mm.	No.	Mesh size mm.	No.	Mesh size mm.	No.	Mesh size mm.	Seine/Trap: No. of draws traps	Mesh size mm.	Boat: Type	Crew	01 Tilapia: Number	Kilograms	02 Serranochromis: Number	Kilograms	03 Other Cichlids: Number	Kilograms	Next Card
19	20 21		22 23	24 25	26 27 28	29 30	31 32 33	34 35	36 37 38	39 40	41 42 43	44 45	46 47 48	49	50	51 52 53	54 55 56.57	58 59 60	61 62 63.64	65 66 67	68 69 70.71	72
1																						
1																						
1																						
1																						
1																						
1																						

CARD 2	Selected Landing		Type of Gear	04 Mormyridae: Number	Kilograms	05 Hydrocyon: Number	Kilograms	06 Other Characids: Number	Kilograms	07 Citharinidae: Number	Kilograms	08 Cyprinidae: Number	Kilograms	09 Schilbeidae: Number	Kilograms	10 Claridae: Number	Kilograms	Next Card
19	20 21		22 23	24 25 26	27 28 29.30	31 32 33	34 35 36.37	38 39 40	41 42 43.44	45 46 47	48 49 50.51	52 53 54	55 56 57.58	59 60 61	62 63 64.65	66 67 68	69 70 71.72	73
2																		
2																		
2																		
2																		
2																		
2																		

CARD 3	Selected Landing		Type of Gear	11 Synodontis: Number	Kilograms	12 Bagridae: Number	Kilograms	13 Clupeidae (dagaa): Kilograms	14 Lates: Number	Kilograms	15 Others: Number	Kilograms	Next Card
19	20 21		22 23	24 25 26	27 28 29.30	31 32 33	34 35 36.37	38 39 40.41	42 43 44	45 46 47.48	49 50 51	52 53 54. 55	56
3													
3													
3													
3													
3													
3													

Outboard engines
fibreglass boats
tents
camp beds

01-01-76

REPUBLIC OF ZAMBIA - DEPARTMENT OF FISHERIES

Name of Village _____

FISHERIES STATISTICAL SURVEYS CATCH ASSESSMENT SURVEY

Sample Code Number . . . [ ]

PS1-SURVEY

Date _____

FORM L1 LIST OF THE FISHING BOATS AND THEIR OWNERS OR OPERATORS			FORM A1 FISHING ACTIVITY "Did he go fishing...?"		
Serial Number	Type of Boat	Name of Owner or Operator	Today	Yesterday	Day before yesterday

PS2-SURVEY

Survey Day ___ Date _____

FORM L2 LIST OF THE OUTGOING BOATS AND INCOMING LANDINGS			
OUTGOING BOATS		INCOMING LANDINGS	
Name of Owner or Operator	Serial Number	Name of Owner or Operator	Sample Code Number

STAT. FORM 2
4cpds V462 7/87 4D

INDUSTRIAL CATCHES

1. Fishing Company.....
2. Month of.....
3. Vessel: Tyre.....
4. Type of Gear.....

Date	Locality	CATCHES IN KG					No. of Draws	No. of Light Boats
		Dagaa (wt.)	Pamba (wt.)	Mvolo (wt.)	Nyuvi (wt.)	Others (wt.)		
TOTALS								

FISHERY _____

SALES RECORDS FRESH FISH
DAILY RECORDS

STAT. SR1 _____
FISHING CAMP _____
RECORDER _____

DAY _____
MONTH _____
YEAR _____

DATE	Number of Buyer	ice bought: sources	ice bought: weight	Weight of fish sold(kg): others	Weight of fish sold(kg): Kapenta	Weight of fish sold(kg): Total	Total value of sales	Destination	Form of Transport	Estimated time to reach destination
LS										

FISHERY _____

SALES RECORDS DRY FISH

MONTHLY SUMMARY

STAT SR4 _____ DATE COMPILED _____

FISHING CAMP _____ MONTH _____

RECORDER _____ YEAR _____

Date	No of Buyer	Weight of Fish Sold (kg)		Total	Total Value Sales	Method of Processing Used		Destination	
		Others	Kapenta			Method	No	Place	No
						1		1	
						2		2	
						3		3	
						4		4	
						5		5	
						6		6	
						7		7	
						8		8	
						9		9	
						10		10	
						METHOD OF TRANSPORT			
						Method	No		
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						10			
						11			
						12			
						13			

Annex 4 : Proposed form for:

STANDARDIZED FRAME SURVEY RESULT OUTPUT FOR LAKE TANGANYIKA

YEAR: ....

Country : ..... Prepared by: .....

Date FS : ..... Approved by: .....

Total number of landing sites : .....
Total number of active fishermen : .....
Total number of active fishing units : ..... (1)

* total number of industrial units : ..... (2)
* total number of artisanal units : ..... (3)

- total number of trimarans : ..... (4)
- total number of catamarans : ..... (5)
- total number of appollos : ..... (6)
- total number of dugouts : ..... (7)
- total number of single planked units : ..... (8)
- total number of single fiberglass units : ..... (9)
- total number of other type (specify) : ..... (10)

(1=2+3; 4+5+6+7+8+9+10=3)

Total number of transport boats : .....
Total number of auxiliary boats : .....

(auxiliary boat = e.g. lampboat)

Total number of outboard engines : .....
Total number of inboard engines : .....

Total number of fishing gear per type :

* Industrial fishing :

- industrial purse seine net ('senne tournante industr.') : .....

* Artisanal fishing :

- chiromila ('senne tournante artisanale') : .....
- liftnet ('carrelet') : .....
- gillnet ('filet maillant') : .....
- beach seine ('senne de plage') : .....
- scoop net ('épuisette') : .....
- trap ('nasse') : .....
- handline ('ligne') : .....
- hookline ('palangre') : .....
- other ('autre'), specify : ..... : .....

REMARKS/OBSERVATIONS :

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.....
.....
.....
.....

Annex 5 : Proposed form for:

STANDARDIZED CATCH ASSESSMENT SURVEY RESULT OUTPUT FOR LAKE TANGANYIKA

YEAR: ....

Country : ..... Prepared by: .....

Date CAS : ..... Approved by: .....

Total annual catch (all species) : ..... tons (1)
Total annual catch by species(group) :

- Clupeids (Stolothrissa t./Limnothrissa m.) : ..... tons (2)
- Lates (Lates) spp. (3 species) : ..... tons (3)
- Lates (Luciolates) stappersii : ..... tons (4)
- Tilapia spp. : ..... tons (5)
- Others : ..... tons (6)

(1=2+3+4+5+6)

Total annual catch industrial fishing : ..... tons (7)
Total annual catch artisanal fishing : ..... tons (8)

- total annual catch liftnet fishery : ..... tons (9)
- total annual catch gillnet fishery : ..... tons (10)
- total annual catch beach seine fishery : ..... tons (11)
- total annual catch for other types of artisanal fishery, if data available :
  - ..... : ..... tons (12)
  - ..... : ..... tons (13)
  - ..... : ..... tons (14)

(1=7+8; 9+10+11+12+13+14=8)

Average catch per unit of effort ($\overline{CPUE}$) for each type of fishing, keeping in mind that the *unit of effort* is defined as *the fishing effort performed by one fishing unit per night (or per day, depending on when the fishing trip takes place)* :

* $\overline{CPUE}$ for industrial fishing : ..... kg/night
* $\overline{CPUE}$ for artisanal fishing :
  - liftnet fishery : ..... kg/night
  - gillnet fishery : ..... kg/night
  - beach seine fishery : ..... kg/night
  - ..... : ..... kg/night
  - ..... : ..... kg/night

REMARKS/OBSERVATIONS :

.....
.....
.....
.....

(if new FS data available for this year, add FS summary in annex)