Shared Resource Management on the Zambezi/Chobe Systems in Northeast Namibia: Current Practices and Future Opportunities

Report of First River Survey and Collection of Information from Fish Markets, Including Survey Manuals and Forms

NINA Project Report no.18

Directorate Resource Management
Ministry of Fisheries and Marine Resources
Private Bag 13 355 Windhoek
Namibia

Norwegian Institute for Nature Research
Tungasletta 2
N-7485 Trondheim
Norway

WWF

USAID

Shared Resource Management on the Zambezi/Chobe Systems in Northeast Namibia: Current Practices and Future Opportunities

Report of First River Survey and Collection of Information from Fish Markets, Including Survey Manuals and Forms

Tor F. Næsje*, Clinton Hay**, John Purvis***, Hashali Hamukuaya****, Servatius Kapirika** and James Abbott*****

* Norwegian Institute for Nature Research, Tungasletta 2, NO-7485 Trondheim, Norway

** Ministry of Fisheries and Marine Resources, Private Bag 2116, Mariental, Namibia

*** Ministry of Fisheries and Marine Resources, Private Bag 13355, Windhoek, Namibia/ Namibia Nature Foundation, Post Office Box 245, Windhoek, Namibia.

**** Ministry of Fisheries and Marine Resources, Private Bag 13355, Windhoek, Namibia

***** Department of Geography, University of Western Ontario, London, Ontario N6A 5C2, Canada

Norwegian Institute for Nature Research (NINA) issue the following publications:

NINA Project Report
This series presents the results of the institutes' projects when the results are to be made available in English. The series may include reports on original research, literature reviews, analysis of particular problems or subjects, etc. The number of copies printed will depend on demand.

In addition to this report series published in English, NINA publish the following series in Norwegian:

NINA Fagrapport (Scientific Reports)
This series present the results of NINAs own research work, overviews of problems, existing knowledge within a topic, literature reviews and material gathered from outside sources. The reports are issued as an alternative or a supplement to international publication when timing, the nature of the material or the sector targeted, call for it.

NINA Oppdragsmelding (Assignment Report)
This is the minimum report supplied by NINA when exter-nal research or investigative assignments have been com-pleted. The numbers of copies are limited.

NINA Temahefte (Topic)
These series present special topics. They are targeted at the general public or specific groups in the community, e.g. the agricultural sector, environmental departments, tourism and outdoor recreation, organizations etc. It is therefore more popular in its presentation form, with more illustrations than the previously mentioned series.

Most of the publications mentioned above are in Norwegi-an, but will also have an English abstracts and legends of figures and tables in English.

NINA NIKU Fact Sheet (Fakta-ark)
These double-pages sheets give (in Norwegian) a popular summary of other publications to make the results of NINAs and NIKUs work available to the general public (the media, societies and organizations, various levels of nature management, politicians and interested individuals).

In addition, NINA's and NIKU's staff publish their research results in international scientific journals, symposia proceedings, popular science journals, books, newspapers, and other relevant publications. NINA-NIKU also has a WWW home page:
http://www.nina.no

Accessibility: Open

Project no.: 13590

Signature of responsible person:
Torbjørn Forseth

Næsje, T. F. , Hay, C., Purvis, J., Hamukuaya, H., Kapirika, S. & Abbott, J. 2002. Shared Resource Management on the Zambezi/ Chobe Systems in Northeast Namibia: Current Practices and Future Opportunities. Report of First River Survey and Collection of Information from Fish Markets, Including Survey Manuals and Forms. - NINA Project Report 18: 1-72.

Trondheim, June 2002

ISSN: 0807-3082
ISBN: 82-426-1320-6

Management areas:
Fish, humans, sustainable utilisation

This publication was made possible through support provided by the US Agency for Development (USAID) Namibia Mission and the World Wildlife Fund (WWF) under the terms of the Co-operative Agreement No. 690-A-00-99-00227-00. The views expressed in this document are the views of the editor or contributors and are not necessarily those of USAID or WWF.

Editor: Tor F. Næsje
Norwegian Institute for Nature Research

Design and layout: Kari Sivertsen
NINA•NIKUs Graphic Office

Photos: Tor F. Næsje

Print: Norservice A/S

Stock: 400

Address to contact:
NINA•NIKU
Tungasletta 2
NO-7485 Trondheim
NORWAY
Tel.: +47 73 80 14 00
Fax.: +47 73 80 14 01
http://www.nina.no

Contracting sponsor:
World Wildlife Fund (WWF)
Ministry of Fisheries and Marine Resources (MFMR)
Norwegian Institute for Nature Research (NINA)

Preface

The White Paper "Responsible Management of the Inland Fisheries of Namibia" (**Ministry of Fisheries and Marine Resources 1995**) was finalised in December 1995, and forms the basis for a new law and regulations concerning fish resources management in the different freshwater systems in Namibia. The stated policy in the White Paper and the draft bill on inland fisheries, aims to ensure a sustainable and optimal utilisation of the freshwater resources and to favour utilisation by subsistence households over commercialisation. The Zambezi and Chobe Rivers are shared with the neighbouring countries Botswana, Zambia and Zimbabwe. The fish resources within these rivers play an important role in all these countries and should therefore be co-managed to ensure the effective control of the fish resources to the benefit of all countries and communities.

The importance of the Zambezi and Chobe Rivers for the local communities cannot be over-emphasised. The fishery in the Caprivi is important for several reasons as the fishery provides a crucial source of protein, employment and income for households in the region (**Purvis 2001**). The trade in fish products is especially important to the poorest households, which have few other means of generating an income. A further important aspect is the potential importance of the barter of fish products for other essential commodities.

Since all perennial rivers in Namibia border on neighbouring countries, management of the fish resources also depends on regional co-operation. It must also be taken into consideration that the fish resources might be exploited through subsistence, commercial and recreational fisheries. When implementing fisheries regulations for such complex systems, information on the fish resources and their exploitation is needed. At present management regulations and control measures are different in countries sharing the same fish resources.

Based on a series of studies, recommendations will be given for management actions in the Zambezi and Chobe Rivers to involve local, national and international authorities and stakeholders and to secure a sustainable utilisation of the fish resources for the benefit of local communities and future generations. In addition to the present study of the exploitation of the fish resources, several other important aspects of the resource management in the Zambezi and Chobe Rivers have been studied. These studies include a description of the fish resources (**Hay et al. in prep.**), fishing competitions (**Næsje et al. 2001**), the socio-economic infrastructure of the local societies (**Purvis 2001**), and the migration and habitat utilisation of important fish species (**Økland et al. 2000** and **Hay et al. in prep**). The studies of fish migrations conclude that certain fish species may migrate between countries, both across and along the river system, and emphasise the importance of a joint local and regional co-management of the fish resources.

The purpose of the present project, of which this consultancy is part, is to move towards the implementation of joint management of the fish resources in the Caprivi through the collection of information on the fishery whilst improving our understanding of the management systems. Achieving this purpose will aid in the development of future management strategies for the aquatic resources both in Namibia and in co-operation with neighbouring states. The full project description is included as Appendix 3. In the present report, we describe and discuss our experiences from the first pilot survey of the fisheries in the Zambezi and Chobe Rivers and the fish market in Katima Mulilo. We also give recommendations regarding the study design in the continuation of the project.

We would like to express our gratitude towards the Director Dr. Burger Oelofsen in the Ministry of Fisheries and Marine Resources, World Wildlife Fund, Namibia Nature Foundation and Norwegian Institute for Nature Research for their support to the project. We are also thankful to Ministry of Fisheries and Marine Resources staff Andries Kahuika, Bernard Sezuni and Savege Simulebu, and our excellent "captain" Rolly Thompson, particularly in the conduct of the fieldwork. And, thank you to the many fishermen and women who continue to participate in the project activities; Mike and Stephnie Cavanagh and Nigel and Laura Hayes from Island View Lodge for their hospitality, and Odd T. Sandlund for commenting on an earlier draft of the report.

Trondheim/Windhoek, June 2002
T. F. Næsje, C. J. Hay & J. Purvis.

Contents

Upper left:
Project team.

Middle left:
Landing of subsistence catch where project team and female customers are waiting.

Lower left:
Project personnel registering subsistence catch.

Lower right:
Project personnel registering fish for sale in the Katima Mulilo fish marked.

1 Background

This report has been prepared as a part of an agreement between the Namibian Nature Foundation and the Norwegian Institute for Nature Research signed 31st January 2002. The Terms of Reference for the consultancy are included as **Appendix 1**. The report, forms and record sheets are based on the implementation and experiences obtained during the first river-based survey of the project "Shared Resource Management on the Zambezi/Chobe Systems in Northeast Namibia: Current Practices and Future Opportunities", hereafter called SRM (**Appendix 2** and **3**). The fish market in Katima Mulilo was visited to get up to date information to plan and make survey manuals and forms for the market study. The objective of the forms used in the rivers, lakes and floodplain surveys, hereafter called the River Survey, is to collect quantitative data on the subsistence fishery whilst developing consistency in approach in such work between co-operating countries (Objective (a) in the agreed Project Proposal **Appendix 3**).

The results from the River Survey will complement other ongoing and planned surveys being undertaken with fisherfolk in the region (see Section 2). A catch record survey is presently being performed in the Impalila-Kasika area. In this survey fishermen record their gill net fishing effort and catches for five consecutive days every month. In addition, fish recorders make periodic visits to fishing villages to record catches and activities. Results from these studies will be used in conjunction with the results from the River Survey.

The objectives of the consultancy have been achieved through five specified tasks where the consultant has:

1 Provided technical and practical guidance and assistance in the planning and implementation of the first survey in two areas in the Zambezi-Chobe systems (Area 1: Impalila-Kasika; Area 2: Kalimbeza - Lisikili), in close co-operation with members of staff from the MFMR, Project staff and local counterparts.
2 Provided technical and practical assistance in the planning and implementation of the first survey of the fish market in Katima Mulilo, in close co-operation with members of staff from the MFMR, Project staff and local counterparts.
3 Provided practical, on the job training to members of staff from the MFMR, Project staff and local counter parts during the survey work building up local capacity.
4 Prepared a Survey Manual to guide MFMR and Project staff in the conduct of later surveys (fishing and market activities).
5 Prepared a Report of Survey on the conduct of the first survey on the river and the first survey in the market.

The survey work described in this report includes work being undertaken by a range of partners included in the project activities. Some has already been started by the Project or the MFMR, other pieces are still being planned and some is being undertaken in partnership with a visiting PhD researcher. It was an important achievement of this consultancy that a team-spirit was developed where all research was critically reviewed by all of the different partners, and it has been built into a coherent, integrated set of survey activities all feeding towards the same goal: improved fisheries management.

The field work of the consultancy took place in Windhoek, Mariental and Caprivi between the 30th January and 23rd February 2002 (see detailed itinerary in **Appendix 2**). The work has been performed in close collaboration with the project participants: Hashali Hamukuaya, Clinton Hay, Servatius Kapirika (Ministry of Fisheries and Marine Resources), John Purvis (Namibian Nature Foundation / Ministry of Fisheries and Marine Resources), Tor F. Næsje (Norwegian Institute for Nature Research), James Abbott (University of Western Ontario), Bernard Sezuni (Integrated Rural Development and Nature Conservation (IRDNC)/project staff), Savege Simulebu (project staff), and Rolly Thompson (project staff).

The results from the survey work performed during the consultancy will be compiled with future river surveys and published in later reports. No analysis has been conducted at this stage although systems and formats for analysis are being developed.

Upper left:
Seining party.

Middle left:
Recreational fishermen with three-spot tilapia.

Middle right:
Subsistence gillnetting.

Lower left:
Sivandi, traditional gear.

Lower right:
Sunrise over Zambezi River.

2 Project actions and responsibilities

During this first survey, daily meetings were held amongst the Project Staff. During these meetings current project experiences were discussed, and present and future actions planned. Based on the experience from the current fieldwork and the data obtained, a detailed work-plan was agreed upon. Director Burger Oelofsen (MFMR), Chief Fisheries Biologist Clinton Hay (MFMR) and John Purvis (MFMR/NNF) have the overall responsibilities for the Project. To obtain the best possible outcome for the Project, responsibilities and tasks have been delegated among the Project Staff. Project and associated activities, responsibilities and participants are described below.

As explained above the consultancy attempted to bring together the various survey activities into a coherent plan of action. The activity components are:

- River survey
- Fish market survey
- Community Catch Data Collection (CCDC) Project
- Case studies
- Fishing lodges and recreational fishing
- Village and household surveys

Each of these components is described in more detail below. The Appendices show the manual and forms for the survey work addressed particularly by the consultancy i.e., the River Survey and the Fish Market and Household Survey.

2.1 River Survey

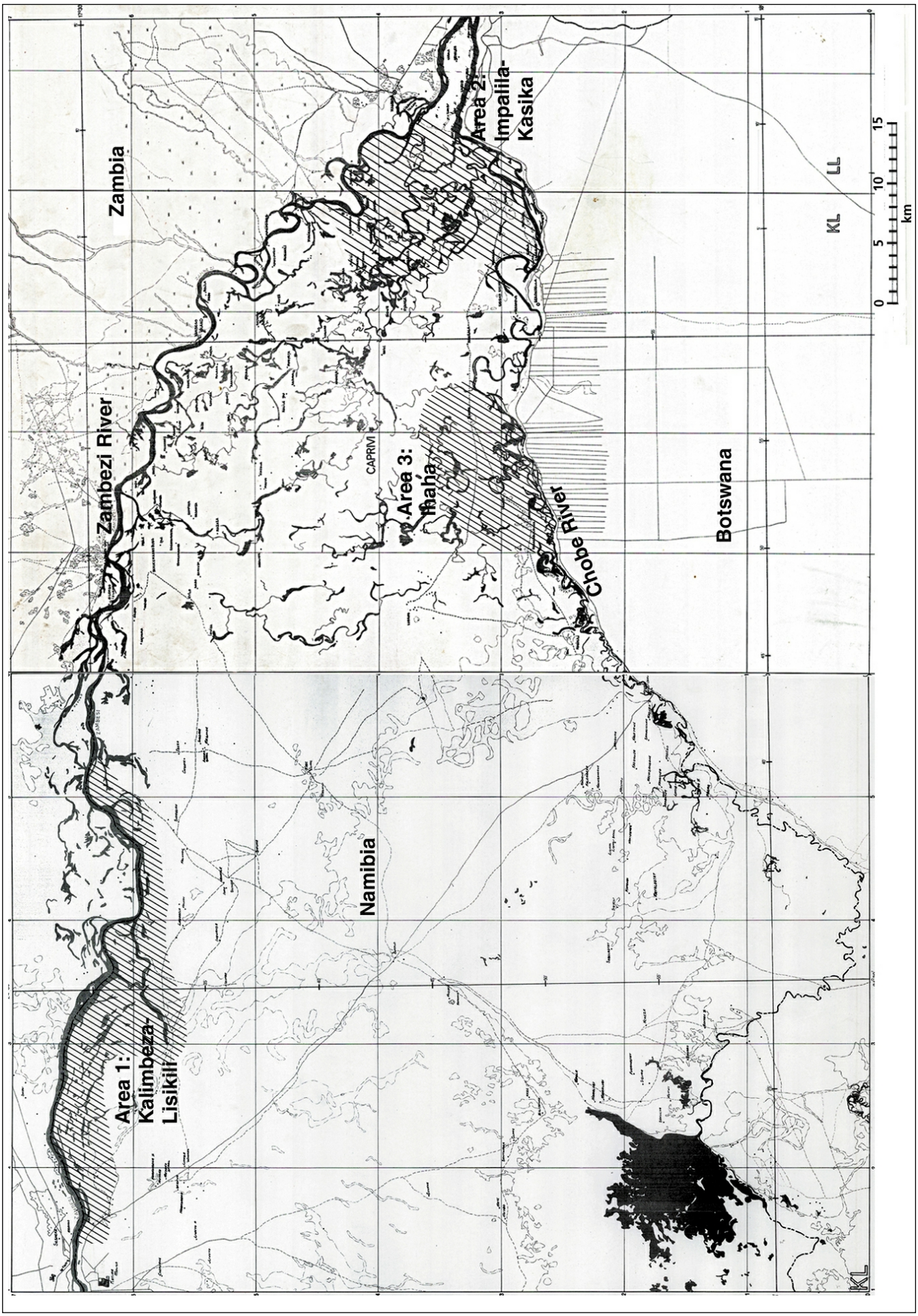
Personnel:
Tor F. Næsje (main responsible) and Clinton Hay (main responsible), John Purvis, Savege Simulebu, Bernard Sezuni, and Rolly Thompson (to be expanded to cover the Game Guards operating under the Conservancy structure).

Data collection:
Monthly, started February 2002.

Survey description:
The River Survey will be performed in three areas of the Zambezi and Chobe River systems (**Figure 1**). These three areas, Kalimbeza-Lisikili, Impalila- Kasika and Ihaha, are representative for larger areas in the respective parts of the river systems in terms of biophysical and demographic characteristics, and information can be extrapolated to most of the Zambezi-Chobe system. The information collected during the River Survey will be supplemented with data from sociological studies on fishery livelihoods carried out in the same areas.

The River Survey will be done on a monthly basis. During these surveys subsistence fishing effort with different gears, catch in the respective gears, and recreational fishing activity will be recorded (for more detailed information see Survey Manuals and Forms).

The greatest challenge during the fieldwork is to sample areas that are representative for the whole river section studied. The subsistence fishing effort and activity, and the areas that are exploited will change with the flood cycle and the season. Therefore, a dynamic and adaptive sampling procedure must be adopted. An area or section of the river may be representative for a larger area during one period, but not exploited at all during another. Therefore, the areas and sections studied may vary between periods. It should however be stressed that it is important to survey areas with both high and low fishing activity to obtain representative data.


Zambia
Zambezi River
Area 1:
Kalimbeza-
Lisikili
Namibia
CAPRIVI
Area 3:
Mahaha
Area 2:
Impalila-
Kasika
Chobe River
Botswana
KL
LL
0
5
10
15
km

To optimise data collection, each area recorded should be surveyed first in the evening when gill nets are set, and thereafter in the following morning when the gill nets are emptied. Through this scheme, fisherfolk will also become more familiar with the survey activity, and recording the effort and catches might become easier during the morning survey. If the survey activities have to be restricted due to logistical constraints, the morning survey should be given priority. The evening survey should start when the fishing activity with gillnet increases (approx. at 16.00 hrs). In the morning it is important to be out on the river starting the survey with the break of dawn (approx. 05.00 - 05.30 hrs), and the survey will end when the subsistence with gillnet. 11.00 - 12.00 hrs). During the survey period it is also important to register subsistence fishing activity that takes place during other parts of the day, for example seining, drag netting and the use of traditional gears.

If possible, each section of the river or area should be surveyed once (evening and morning) and a new area recorded the next day. In this way one will obtain the most representative results, especially during high water when large areas, including floodplains, are covered with water. New habitats should be included as they become available during the rise and fall of the water level. During low water, when the fishing activity is mostly linked to the main river and backwaters, the same area may be surveyed twice during one sampling period (i.e. month).

Depending on the season of the year, the time spent in the different areas to get a representative sample may change due to variations in the effort that has to be invested to get representative samples. The given number of days spent in the three different areas (see below) is therefore an approximate suggestion. The documented survey methods proposed in this report may be adjusted according with experiences acquired during the project, especially given the changes in the environment as the water rise.

Whenever the opportunity arises, one should register subsistence and recreational fishing activity. Seining and drag net activities may take place all through the day and should also be registered during additional trips on the river. On such additional trips it is important to record the size of the area surveyed and the route (see survey forms).

Data sampling effort:
The fieldwork starts on the first Tuesday of every month. Participants in fieldwork are Savege Simulebu, Bernard Sezuni, local game rangers and Rolly Thompson in collaboration with Clinton Hay and Tor Næsje. The routes suggested are based on the low water situation before flooding of the floodplains, and may be subject to alterations in accordance with changes in activities and movements of the fisherfolk.

A) Kalimbeza and Lake Lisikili 5 to 6 days (**Figure 1**): At least one of the days should be spent at Lake Lisikili. If it is not possible to register fishing effort and catch on the lake, time should be spent in the villages interviewing fishermen and -women about their fishing effort and catches in Lake Lisikili. The three main routes surveyed in February, before floodplains were inundated, was: 1) around Kalimbeza Island, 2) from Island View Lodge to Caprivi Cabins, and 3) from Island View Lodge to Nanombe.

B) Impalila and Kasika 5 to 6 days (**Figure 1**). If only 5 days are spent on the survey in the Kalimbeza area 6 days might be spent in the Impalila and Kasane area, including boat travel to and from Katima Mulilo. In this area we have defined three routes: 1) on the Chobe River from Kasane to Kings Den Lodge and from Savanna Lodge to backwaters at Kaseno Kasika, only surveying the Namibian side of the river, 2) the Kasai Channel and Indibi backwaters, and 3) the Zambezi River from Impalila Island to Kalikalika.

C) Ihaha 2 to 3 days (**Figure 1**). The two defined routes to be travelled are Ihaha East and Ihaha West.

2.2 Fish Market and Household Survey

Personnel*:*
James Abbott (main responsible), Clinton Hay, John Purvis, Savege Simulebu, and Tor F. Næsje.

Data collection: Monthly, started February 2002.

Survey description:
An important component of the socio-economic research on the Caprivi fisheries is an examination of the fish markets in the region. The specific goals of the market survey are to determine on a monthly basis the overall flow of fish into the market and the market environment that characterises product, price and vendor. In this way, the data can be compared against the results from the catch effort and household surveys as a means of better understanding what factors influence the use of fish as a source of income.

Data sampling effort:
In order to achieve these goals, several different types of data are collected in the last five days of each month. The distribution between vendors selling fresh, dried and mixed fish is recorded (Market Form A, sheet M1, page 1). From this, a random selection of minimum five dried, fresh and mixed vendors each is made. Originally the survey intended to follow approximately 25 market vendors with quarterly surveys. However, while most market stalls were filled by vendors, there was a high level of turnover of specific vendors. The randomly selected vendors are then approached and if consent is given, interviewed on their fish stock and supply characteristics (Market Form B, sheet M2, pages 1 to 3).

Early observations indicate that fish is supplied to vendors throughout the day. Therefore, the market survey will also measure the volumes of fresh and dried fish that come to the market, their origin and their means of transport (Market Form C, sheet M3, page 1). Initial surveys have also identified some "collection areas" for fresh and dried fish throughout the floodplain. As a rapport with the vendors is established, efforts will be made to follow and describe the supply of fish at their sources, in order to better understand this important component of the subsistence fishery in the Caprivi.

2.3 Community Catch Data Collection (CCDC) Project

Personnel:
Servatius Kapirika (main responsible), Fisheries Interest Group - Impalila, Clinton Hay, John Purvis, Bernard Sezuni, Savege Simulebu, and Game Guards.

Data collection:
Five continuous days every month.

Survey description:
Ten fishermen and two fisherwomen are recording their gill net catches on five consecutive days of each month. Gill net mesh size, species and body-length are recorded for each individual fish. The fishing effort is registered for all their fishing activity all through the month. The fisherfolk are visited regularly to collect data and to discuss problem areas in data recording. Catches are recorded from the Zambezi River, the Indibi Channel and the Chobe River, and are therefore representative for the Impalila area. These data will supplement the other catch data recorded through the River Surveys.

2.4 Case Studies

Personnel*:*
John Purvis (main responsible), James Abbott, Savege Simulebu, and Bernard Sezuni.

Data collection:
Throughout the year, at least quarterly.

Survey description:
The objective of this component is to undertake broader consultations with fisherfolk in villages in the study area in order to provide qualitative, largely descriptive information on the fishing activities and future fishery management options in the study sites. This will complement and provide better understanding of the patterns of fishing which are emerging in other survey components.

Data sampling effort:
Activities within this component are more participatory in nature. They include resource/river/channel mapping to examine management techniques, ownership, access issues; preparation of GPS-based maps including villages and fishing sites, fishing camps, seasonal fishing activity calendars; and discussions and activities around the management systems in the past, present and future.

2.5 Recreational Fishing and Fishing Lodges

Personnel*:*
Clinton Hay (main responsible), Tor F. Næsje, John Purvis, Savege Simulebu, Bernard Sezuni, and Rolly Thompson.

Data collection:
Continuous all year.

Survey description:
During all activities on the river by Project Staff, both ordinary surveys and additional activities, the recreational activity, should be monitored. The basic information to be recorded are areas and time of survey, number of recreational boats seen, number of rods in use and description of the fishing activity (trolling, spinning or using worms, fishing from land). In addition personnel should register the recreational catch: numbers of each species, body lengths and for how long time the fishing activity has gone on. In addition, meetings have been held with Savannah Lodge (Chobe River) and Island View Lodge (Zambezi River) to discuss the possibility of collecting more information on recreational fishing effort and catches. Both lodges were very positive, and agreed to use the prepared forms to collect recreational data. (For more detailed information see Survey Manuals and Forms).

Recreational and sport fisherfolk (anglers clubs) may also take part in this part of the survey, and use the forms to record own catches and fishing effort.

Data sampling effort:
Continuous by Lodges and recreational/sport fisherfolk, and monthly by the Survey Team.

2.6 Village/Household Studies

This component falls into two categories: (i) Household Interview Survey, and (ii) Household Questionnaire survey.

(i) Household Interview Survey

Personnel:
James Abbott (main responsible), Savege Simulebu, Bernard Sezuni, Clinton Hay, and Tor F. Næsje.

Data collection:
Quarterly interviews began in March 2002.
Survey description:
Random stratified selection of fifteen households per study site using the three sites targeted for the other surveys (Kalimbeza – Lisikili, Kasika – Impalila, and Ihaha). These households will be visited and interviewed using a semi-structured interview (SSI) technique.

Data sampling effort:
Using the SSI at regular intervals during the year it is hoped to gain a better understanding of the incentives and motivations regarding peoples' fishing and other livelihood activities.

(ii) Household Questionnaire Survey

Personnel:
John Purvis (main responsible), Consultants, James Abbott, Savege Simulebu, Bernard Sezuni, Clinton Hay, and Tor F. Næsje.

Data collection:
A one-off questionnaire will be completed in June and July 2002.

Survey description:
Although the consultants (implementers) have not yet been appointed, they will design and implement the questionnaire in about 300 households across the Zambezi and Chobe floodplains in the study areas. The focus of the Questionnaire will not be only fishing (although a fishing inventory will be one output), but will also look at fishing in relation to other livelihood activities. The information from the survey will be used in refining a model of a household.

Data sampling effort:
One-off survey in 2002.

3 Survey manuals and forms: River Survey

The following manuals and forms have been prepared to study the fishing effort and catches of subsistence and recreational fisherfolk in the River Survey:

- Recording of Subsistence Fishing Effort (*Sheet 1, page 1*)
- Recording of Subsistence Catch (*Sheet 1, page 2*)
- Recording of Own Recreational Fishing (*Sheet 2*)
- Recording of Observed Recreational Fishing Activity (*Sheet 3, page 1*)
- Recording of Recreational Fish Catches (*Sheet 3, page 2*)
- Recording of Observed Seining and Drag-Net Fishing on additional trips (*Sheet 4*)

Forms and sheets must be stored in a safe place after information has been filled in. They should never be taken back out in the field or on the water. Make photocopies as often as possible. Data can not be reproduced, and lost data sheets are the loss of important information!

Filled in forms should always be given to the main responsible of the activity for photocopying. Three photocopies should be taken of each data-form (one for Hardap, one for Norway and one for Caprivi) that is filled in. The originals should be kept in the Ministry of Fisheries and Marine Resources office in Katima Mulilo. Please note that the results from the river survey are confidential, and should not be communicated to persons outside the project team. It is important to create good relationships and some results may cause unnecessary concern.

Recreational fishing and seining (drag-netting) may be registered on additional trips on the river. However, to avoid biased results please decide before you go if you are going to record fishing activity. Data should be registered in the appropriate form and please remember date, distance and area travelled (GPS and/or name), time and where the activities were registered (GPS and/or name), and please describe the activity.

Forms to be completed on the regular AM/PM survey:
- Recording of subsistence fishing effort (*Sheet 1, page 1*)
- Recording of subsistence catch (*Sheet 1, page 2*)
- Recording of observed recreational angling (*Sheet 3, page 1*)
- Recording of observed recreational catch (*Sheet 3, page 2*)

Forms to be completed on additional trips (decide before going out)
- Recording of observed seining/dragnetting fishing activity (not record catches unless appropriate) *(sheet 4)*
- Recording of observed recreational fishing activity (not recording catches unless appropriate) *(sheet 3, page 1 and 2)*

3.1 Subsistence Fishing Effort (*Sheet 1, page 1*)

Instruction for use:

The heading on the form should be filled in on page 1. Do not forget to put date and AM (morning) or PM (evening) on all sheets from each survey. Explanation to form:

1) **No:** Each record or interview is given separate numbers (record no) to identify the source of information. Start with 1 on each survey. *Example: Evening (PM) 1, 2, 3, 4, 5, 6; Morning (AM) 1, 2, 3, 4, 5, 6, 7, 8, 9.*
   If the same gear, e.g. gill net is recorded both in the evening and morning, please write it down. *Example: No 7 AM the same as No 7 PM (evening).*
2) **Time:** Time when record was taken.
3) **GPS position:** GPS position of gear in water, on land or position where interview was taken. Mark clearly the units that are being used.
4) **Information from:** Information can be obtained from interview with fisherfolk, gears in water or on land. The activity of people when interviewed shall also be written down. *Examples: a) Setting out net,* or *b) Mending net on land,* or *c) Preparing to set out net.*
5) **Gear in use:** Give name of gear recorded. *Examples: Gill net,* or *Siyandi,* or *Seine,* or *Rod and line.*
   Mesh size – length: For each net or fisherman interviewed write down mesh size and total length of gill net or dragnet with this mesh size. *Example: 2 inch 100 m, 3 inch 200 m etc.*
6) **Gear not in use:** If you are told that some of the gill nets or drag nets are not in use, i.e. stored for use next month or later, please make a note of gear type, mesh size and length. Note down additional gear. *Example: If the person interviewed tells you that he has a seine net in addition to the gill nets recorded you may write it down here.*
7) **No, sex and age of persons fishing with gear:** Male (M)/Female; (F) Adult (A)/Juv. (J). Give the number, sex and age of person(s) using the fishing gear. *Example: 3 M A and 1 F J*.
8) **Village/fishing camp:** Give the name of the village or fishing camp where the persons using the fishing gear is living in when interviewed. *Example: Lisikili.*
9) **Fishing Nam./Zamb./Bot.:** Write down where the fishing activity takes place. *Example: Namibian side of the river (NOT the nationality of the fisherman).*
10) **Mainstr./backwater/floodplain:** Write down the description of where the gears are set either in mainstream, backwater or floodplain.
11) **Running/still water:** Write down if the fishing gear is standing or being used in running water (current) or in still water (water without directional current). *Example: Still water.*
12) **Position of gear-vegetation:** Position of gear with respect to vegetation. *Examples: a) Out from vegetation,* or *b) In vegetation,* or *c) Along vegetation.*
13) **Water depth:** Write down the water depth(s) where the fishing gear is used. *Example: 1.5-3.0 m* (taken from the echosounder).
14) **Comments:** Here you may write down whatever remarks you may have, or make a note. For example use a letter and write your note on the backside of the record form. *Example:* Write *a)* in the form and comments like *Gill nets set on bottom, sinking. Fisherman's name was Jonatan (Zambian).*

SUBSISTENCE FISHING EFFORT:

Date:..... AM/PM..... From-to:..... Time start:..... Time end..... *Page no:*

GPS start: S..... E..... GPS turning: S..... E..... GPS end: S..... E.....

Weather:..... Water temp.: ..... Total km..... One or two ways:..... (Describe route on separate sheet)

	1) No:	**Example:**					
	2) Time	17 hrs 45					
	3) GPS position	S 17° 31.428 E 24° 36.564	**S** **E**	**S** **E**	**S** **E**	**S** **E**	**S** **E**
INFO FROM	**Interview**	X					
	Activity of person interviewed	Setting gill nets					
	Gear in water						
	Gear on land						
DESCRIBE GEAR	**5) Gear in use (mesh size — length):**	Gill net 2 inch 100 m					
		Gill net 3 inch 300m					
		Dragnet 3 inch 300m					
	6) Gear not in use:	Gill net 2 inch 200 m					
		Drag net, 3 and 4 inch, 300 m					
	7) No, sex (M/F) and age (A/J)	2 M A, 1 F J					
	8) From village/fishing camp	Kalimbeza					
	9) Nam./Zamb./Bot. side	Zambian					
POS. GEAR	**10) Mainstre/backwa/floodpl**	Mainstream					
	11) Running/still water	Running					
	12) Position of gear-vegetation	Along veg.					
	13) Water depth	1-5 m					
	14) Comments						

3.2 Subsistence Fishing Catch (*Sheet 1, page 2*)

Instruction for use:

When a fisherman is met on the river (in the survey area or not) and if there is a catch, then this form should be used to record the catch. If the catch is from a net which is recorded as part of the standard survey (sheet 1, page 1) then there should be a cross-reference and the form attached to the other form. If there is no record to cross-reference to match, then the date, position, etc should be noted.

Write down for each fishing party or fisherman:

1) **Gear type used**
2) **Mesh size (gill net or drag net/seine) the fish were caught in, or all mesh sizes if fish are pooled**
3) **Length of fishing time**
4) **The length of each gill net for each mesh size, or length of drag net**
5) **Species and body length of each fish caught**

Minimum 15 fish of each species caught in each mesh size must be length measured. If more than 15 fish of one species has been caught, 15 randomly selected individuals should be measured and the number of unmeasured fish written down. Information on the gear can be left out if recorded on effort form. Reference **must** be given to **Record no** in effort form.

Example:
a) *Gill net, 2 inch, 100 m: Tigerfish: 34.0 cm, 35.5 cm 32.0 cm Redbreast: 24.5 cm, 25.2 cm*
b) *No 5, 16 Feb (reference to effort form): Tigerfish: 34.0 cm, 35.5 cm 32.0 cm Redbreast: 24.5 cm, 25.2 cm.*
c) *Seine 4 inch, 300 m, 3 hours fishing: Tigerfish 34.0 cm, 35.5 cm, Greenhead 34.4 cm, 24.5 cm, 34.2 cm, 34.3 cm, 34.5 cm, 35.2 cm, 37.4 cm 35.3 cm, 35.4cm, 35.3cm 34.2 cm, 34.5 cm, 35.2 cm, 37.4 cm, 35.3 cm, plus 29 more greenhead (altogether 44 greenhead).*

SUBSISTENCE FISHING CATCH:

Sheet 1; Page 2

Gear in use	Fishing time	Mesh size	Length of net	Species	Body-lengths

3.3 Recreational Fishing Activity (*Sheet 2*)

Instruction for use:

Sheet 2 should be used to record recreational fishing activity. This form is mainly to be used by lodge owners to record the fishing activity based from the lodge or by recreational/sport fishermen to record their catches. To avoid biased results please do decide **before** you go out if you are going to record all the fishing activity. Please use one form for each trip on the river. It is important to be able to register the fishing effort of the fishing teams. Therefore, it necessary to write down the time spent on the river and how many rods that are used to catch the fish. **All fish of all species**, large or small, landed or released should be recorded. Please, do not forget to make a note whether the fish is landed or released.

If two or more fishing parties are fishing at the same day, separate sheets should be used to be able to separate catches and efforts.

RECREATIONAL FISHING ACTIVITY: *Sheet 2*

Page no:..

Fill in one form for every trip. *All* fish, released or landed, must be recorded. Decide *before* the trip if you are going to record catches!

Date:..... Fishing from-to:..... Fishing started (time):..... Fishing ended (time):.....

Weather:..... Water temp.: ..... Total km..... No fish caught (X):.....

Species	Body length (cm)	Weight (g) (not necessary)	Time caught	Where was the fish caught Name or GPS	Trolling, spinning, or worms	Released or landed	Comments
Example: Threespot	34.5 cm		17 hrs 45 min	Kalimbeza, Isl. View Lodge	Spinning	Released	Male
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

3.4 Observed Recreational Fishing Activity (*Sheet 3, page 1 and 2*)

Instruction for use:

Sheet 3 is to be filled in to record observed recreational fishing activity performed when being out on the river. Page 1 is for the activity observed, and page 2 is to record the details of the catch etc after conducting the interview.

One form should be filled in for every trip. To avoid biased results, please decide whether you are going to record the recreational activity before you start your trip, and remember, no activity is also an important result.

Registration of recreational activity shall be registered on all trips on the river. Remember to write down start and end time of trip/survey.
Write down for each boat or boats if together (Sheet 3, page 1):

1) **Number of persons in boat/fishing party**
2) **Number of fishing rods in use**
3) **Type of fishing activity (trolling or stationary i.e. spinning or worm)**
4) **Time when the fishing activity was observed**
5) **Area where the fishing activity was observed (or GPS position)**

Example: *a) 1 speedboat, 4 persons in party, 2 rods in use, trolling, 14 hrs 45, Kalimbeza*
b) 2 boats, 6 persons in party, 3 rods in use, fishing from land (stationary), 15 hrs 25, S 24°35.354, E 14°35.987.

Sheet 3, page 2 can be used to record the catches and other details from the recreational fishermen after a short interview. But, subsistence fishing effort is the main focus so not too much time should be spent on the recreational aspect during regular survey recordings.

OBSERVED RECREATIONAL FISHING ACTIVITY:

Fill in one form for every trip. All observed recreational fishing must be recorded. Decide *before* you go out if you are going to fill in form.

Date:..... Trip from, to and back:.....Trip started (time):..... Trip ended (time):.....

Weather:..... Water temp.: ..... Total km..... No recreational fishing observed (X):.....……...

Number of people in boat/party	Number of rods in use	Time fishing observed	Where was the fishing observed, name or GPS	Trolling, spinning, or worms	Fishing from land or boat	Comments
Example: 6	2	17 hrs 45 min	Kalimbeza, Isl. View Lodge	Spinning	Land	No catch after 2 hrs fishing
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

REGISTRATION OF RECREATIONAL CATCH:

Fill in one form for every trip. *All* fish, small or large, released or landed, must be recorded. Decide *before* trip if you are going to record catches!

Date:..... Fishing from-to:..... Fishing started (time):..... Fishing ended (time):.....

Weather:..... Water temp.: ..... Total km..... No fish caught (X):.....

Species	Body length (cm)	Weight (g) (not necessary)	Time caught	Where was the fish caught Name or GPS	Trolling, spinning, or worms	Released or landed	Comments
Example: Threespot	34.5 cm		17 hrs 45 min	Kalimbeza, Isl. View Lodge	Spinning	Released	Male
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

3.5 Observed Seining Activity (*Sheet 4*)

Instruction for use:

Sheet 4 is to be filled in to record observed seining and drag-net activity in addition to the regular survey recordings. Decide whether you are going to record your observations **before** you go out on the river to avoid biased results.

For example these forms may be used on the long river trips to Impalila or Ihaha.

Recreational fishing and seining (drag-netting) may be registered on additional trips. However, to avoid biased results please do decide **before** you go out if you are going to record fishing activity. Please remember to fill in date, distance and area travelled (GPS and/or name), time and where the activities were registered (GPS and/or name) and describe the activity as above.

OBSERVED SEINING ACTIVITY: *Sheet 4*

Fill in one form for every trip. All observed seining or drag netting must be recorded.

Decide *before* you go out if you are going to fill in the form.

Date:..... Trip from, to and back:.....

Trip started (time):..... Trip ended (time):.....….....

Weather:..... Water temp.: ..... Total km….....

No seining activity observed (X):…….....

Number of people in seining party	Time fishing observed	Where was the fishing observed, name or GPS position	Fishing on Nam./Zamb. /Botsw. side of river	Comments
Example: 6	17 hrs 45 min	Kalimbeza, Isl. View Lodge	Namibian	Approx 300m long seine

4 Survey manuals and forms: Fish Market and Household Survey

The following manuals and forms have been prepared to study the fishing market in Katima Mulilo, the market vendors and their suppliers:

- Market Survey Form. Part A: General Market Characteristics (*Sheet M1, page 1 and 2)*
- Market Survey Form. Part B: Vendor Interviews (*Sheet M 2, page 1 - 3)*
- Market Survey Form. Part C: Stock Turnover (*Sheet M 3, page 1)*

The household survey in the three study areas will involve the completion of semi-structured interviews and forms shown on sheet M4, pages 1 to 7.

Additional activities under this heading (such as community consultations, meetings etc) will be reported elsewhere and do not form a part of this manual. Similarly the questionnaire (one-off) will involve a different set of survey instruments (questionnaire, semi-structured interviews and focused group discussions) are yet to be developed.

4.1 Market Survey Form: General Market Characteristics (*Sheet M 1, page 1 and 2*)

Instruction for use:

Sheet M1, page 1, is to be filled out at the beginning of each day of the survey of the Katima Mulilo fish market survey. The numbered boxes on sheet M1 represent stall in the fish market. For each numbered market stall please note if the vendor is selling fresh (F), dried (D) or mixed dried and fresh (M) using the appropriate letter in the respective box. Note also the time the survey was made, the weather and the date.

Sheet M1, page 2, should be filled out at the same time as page 1, once a month. The units used are those commonly sold in the market and prices should be in Namibian dollars.

MARKET SURVEY FORM:

FORM A: GENERAL MARKET CHARACTERISTICS

To be filled out before beginning individual vendor surveys. Note number of vendors Location and proportion of each type of fish preparation being sold.

Date	**Time**	**Weather**

6	12	18	24	30	36	42	48	54
5	11	17	23	29	35	41	47	53
4	10	16	22	28	34	40	46	52
3	9	15	21	27	33	39	45	51
2	8	14	20	26	32	38	44	50
1	7	13	19	25	31	37	43	49

ENTRANCE

GENERAL MARKET CHARACTERISTICS (continued)

OTHER MARKET PRICES:

COMMODITY	AMOUNT (kg)	PRICE
MAIZE MEAL		
RICE		
OIL		
CHICKEN		
BEEF		
BEANS		

EXCHANGE RATES:

One Namibian Dollar buys:

USD	
GBP	
BWP	
ZAK	

4.2 Market Survey Form: Vendor Interview (*Sheet M 2*)

Instruction for use:

By using sheet M1, make a random selection (by picking numbers out of a hat) of minimum five vendors in each group (fresh, dried and mixed). Approach the selected vendors and ask if they would consent to be interviewed.

Remember, use judgement by pausing the interview if they are too busy with a customer.

Sheet M2 is to be used to interview fish vendors at the fish marked.

MARKET SURVEY FORM:

PART B: VENDOR INTERVIEWS

Date	Time	Interviewer:
Vendor	Stall #	

Make a visual assessment of the fish on the table. Note species, size and preparation

SPECIES (local name)	Size interval (mm)	No of individuals within the size group	Preparation (fresh/dried/smoked)	Price

Question 1. Do you have other fish under the table/stored elsewhere?

Yes☐, No☐

Question 2. May I count the fish you have stored?

SPECIES (local name)	Size interval (mm)	No of individuals within the size group	Preparation (fresh/dried/smoked)

Question 3. How do you obtain the fish you are selling in Katima?

		Where?
Family member catches it	☐	……..
Buys fish from a fisherman at riverside	☐	……..
Buys fish from fisherman in her/his own village	☐	……..
Travels to other village and buys fish	☐	……..
Buys it from fish vendor	☐	……..

Question 4. How long does it take you on average to get enough fish to go to market?

…… days/weeks

Question 5. What causes the biggest delay in getting to market? Vendor can name up to three factors, please ask her to rank them in importance.

		RANK
Getting enough fish	☐	……..
Getting fish species you want	☐	……..
Getting fish sizes you want	☐	……..
Preparing fish	☐	……..
Transport	☐	……..
Other 1	☐	……..
Other 2	☐	……..

Question 6. How do you travel from your village to the place you collect your fish and to the market?

Walking		How much is the 1-way fare for you?……..For your fish?…….
Private Car		How much is the 1-way fare for you?……..For your fish?…….
Bus/combi		How much is the 1-way fare for you?……..For your fish?…….
Other		How much is the 1-way fare for you?……..For your fish?…….

Question 7. Do you bring any other things to the market to sell and how often?

	Never	*Sometimes*	*Always*	
Vegetables				
Reeds				
Mats				
Baskets				
Other ……				

Question 8. Do you ever sell fish outside of Katima? *Yes* ☐ *No* ☐

If yes, please give us some details (where do you sell the fish? Which months? How do you get to there? How much is the fare to get to where you sell fish?)
……..
……
……
……

Question 9: Do you have a preferred species/size of fish? *Yes* ☐ *No* ☐

If yes, what species/size do you like to sell?……...
Why?…….

Question 10: Do you have a preferred state of preparation? *Yes* ☐ *No* ☐

If yes, what state of preparation do you like to sell?……
Why?……

Question 11: During this time of the year, what is the best & worse time of day for fish sales?

Morning	Best ☐	Worst ☐	Why?……..
Afternoon	Best ☐	Worst ☐	Why?……..
Evening	Best ☐	Worst ☐	Why?……..

Question 12: What is the best/worst time of the year for selling fish at the market?

	BEST	**WORST**	**WHY?**
Litabula	☐	☐	……
Muunda	☐	☐	……
Maliha	☐	☐	……
Mbumbi	☐	☐	……

Question 13: Do you take advance payments for fish orders ?
Yes ☐ *No* ☐

Question 14: Do you get a resupply of fish during your stay? *Yes* ☐ , *No* ☐

Question 15: If you do get a resupply, do you wait until your original stock is completely sold? *Yes* ☐ , *No* ☐

4.3 Market Survey Form: Stock Turnover (*Sheet M 3*)

Instruction for use:

Sheet M3 is to be used to measure by weight the flow of fish into the market as well as the state of preparation, storage, origin and means of transport. Record stock turnover on the same days that sheets M1 and M2 are used. The data recorder should be immediately inside the entrance to the market when a load of fish arrives. Approach the vendor respectfully and briefly explain the goals of the study and ask if you can weigh the container he or she is carrying. Place the container in the cradle and record the weight to the nearest 500 grams. The additional weight of the container and the ice will be corrected for afterwards.

Please remember to also fill in the time, date, condition and origin of the fish as well as how it was transported to the market.

MARKET SURVEY FORM:

PART C: STOCK TURNOVER SHEET

To be taken for five days. The recorder(s) will be at the market entrance closest to the hospital. Each person arriving with fish will be asked if their fish can be weighed.

Date	**Recorder**	**Weather**

TIME	**FISH CONDITION** 1= fresh 2=dried/smoked 3=mixed	**CONTAINER** 1=cooler with ice (be sure to count blocks so this can be subtracted from weight 2=cooler without ice 3=plastic basin with ice 4=plastic basin without ice 5=hessian sack 6=other (specify)	**ORIGIN OF FISH** (write village, fishing camp or general area)	**TRANSPORT** 1=bakkie/cab 2=private car 3=mokoro	**WEIGHT** (kg)

4.4 Household survey (*Sheet M 4*)

Instruction for use:

The process leading up to the actual household survey occurs in three stages:

1 The stratification, by wealth, of the households in each village. This is done in conjunction with the village headman. First the headman is asked to name each household head in the village. It is important that the definition of the "household" be clarified between interviewer and the headman; usually it is defined as a group of people who regularly eat from the same pot. The headman is then asked to rank the households in different wealth categories. Again, definitions of wealth must be agreed upon as well as how many categories exist in that specific village.

2 Once the households have been ranked, the interviewer should try to see if there are any common traits among the households within each category by going through each household and asking the headman why it was placed in a certain category. The information can be used later to test if significant correlation exists within categories.

3 The random stratified selection of households. No less than half of the households in each category should be sampled. A selected household should then be approached and the time should be taken to explain the survey, focussing especially on the goal of the survey which is to better understand the importance of fish as a source of food and income in different households in different areas in the Caprivi.

The initial survey of each household will be done using sheet M4. Follow up surveys will consist of semi-structured interviews which will come from the initial analysis of the results from form M4. Follow-up surveys should be done every two months.

HOUSEHOLD SURVEY QUESTIONNAIRE:

Name:	Area:	Village
Date:	Time:	Int:

DEMOGRAPHICS

1.Age_____ 2. Single _ / Married_ / Widowed _ / Divorced_

3.Highest Education: None _ / Standard ___ / Grade _____ / Diploma ____

4. Please describe the people in your household:

AGE	GENDER	Relationship to HH head 1= Head 2= Wife/Husband 3= Child 4= Other relation 5= Other permanent
67+		
61-67		
54-60		
48-53		
42-47		
36-41		
30-35		
24-29		
18-23		
12-17		
6-11		
0-5		

5. Are there any members of family who are mostly or permanently away?

AGE	GENDER	Relationship to HH head 1= Head 2= Wife/Husband 3= Child 4= Other relation 5= Other permanent	Years Away	Occupation 1= salary 2= piece 3=unemp 4=other	Remittance
67+					
61-67					
54-60					
48-53					
42-47					
36-41					
30-35					
24-29					
18-23					
12-17					
6-11					
0-5					

Land Owned and Operated by Household

Area (ha)	Type 1= forest 2=swamp	How obtained 1=inherit 2=bought 3=mafisa	Use 1=planted 2=idle 3=rent	Crops 1=mealie 2=millet 3=sorghum 4=pumpkin 5=veg	Field cult. 1=men 2=women 3=children 4=labour 5=mixed	Use 1=consump 2=sell 3=mixed

Livestock

Type 1=cow 2=goat 3=chicken 4=guinea	# Now	# Year ago	Born	Died	Bought	Sold	Gift in	Gift out	Eaten by Family	Price

House Construction

House Type	Number	Power 1=line 2=solar 3=batt.
mud hut		
planking		
rock		
cinderblock		

Household Assets

Item	# owned	Current Price
Hoe/Spade		
Axe		
Panga		
Watch/Clock		
Radio		
Telephone		
Bicycle		
Plough		
Vehicle		

Food Consumption

TYPE OF FOOD	# OF DAYS IN WEEK	AMOUNT EATEN PER DAY	CURRENT PRICE PER UNIT
MAIZE			
FISH			
MEAT			
MILK			
CHICKEN			
VELD FOODS			
BREAD			

Food Stocks and Losses

CROP NAME	DATE OF LAST HARVEST	TOTAL STORED LAST HARVEST	AMOUNT IN STORE NOW	WHEN STORE RAN OUT
MAIZE				
MAHANGU				
MILLET				
VEGETABLES				
PUMPKINS				

Food Purchases this month

ITEMS	LOCATION	QUANTITY	PRICE

Response to Shocks

EVENT (describe event)	WHEN	DFFECTS OF EVENT	RESPONSE (How did Household Recover?)

Fishing

GEAR	SIZES	HOW OFTEN USED	PREF. & WHY?
MOKORO			
SINYANTI			
GILL NET			
KASHITO			
DRAG NET			

Do you fix your own nets? Yes☐, No☐
Do you have or give access to a mulapo? Yes☐, No☐

Changes in Gaining a Living

At present, members of this household gain a living by:

1	2	3

Has this pattern changed over the last five years or so? *YES / NO*

If yes, then what were the main activities for gaining a living five years ago?

Paying attention to farming, does the household have farm activities (different crops or animals) than five years ago? *MORE/LESS/SAME*

Why?

Would the household like to engage in any specific new farming activity, or expand any existing activity

YES/NO

If yes, specify what.

What is preventing this from happening?

Moving to non-farm activities, does the household rely Non-farm activities than before?

MORE/LESS/SAME

If the household is relying *more* or *less* on non-farm activities than before, what are the main reasons for this?

During the past five years, has the situation of this households been

BETTER / WORSE / SAME

What are the main reasons given by household members for these changes or trends?

During the past five years, the amount of land available to the household for agriculture

REDUCED / SAME / INCREASED

If available land has reduced or increased, what have been the reasons for these changes?

Paying attention to fishing, does the have household fishing activities (different crops or animals) than five years ago?

MORE/LESS/SAME

Why?

Has the HH started "new" fishing activities in the past five years

MORE/LESS/SAME

Why?

Would the household like to engage in any specific new fishing activity, or expand any existing activity

YES/NO

If yes, specify what.

What is preventing this from happening?

During the past five years, the amount of fish available to the household

REDUCED / SAME / INCREASED

If available fish has reduced or increased, what have been the reasons for these changes?

Appendix 1: ToR CONSULTANCY

AGREEMENT BETWEEN THE NAMIBIA NATURE FOUNDATION
(Hereinafter referred to as the NNF)

AND

NORWEGIAN INSTITUTE for NATURE RESEARCH (NINA-NIKU)
(Hereinafter referred to as the Consultant)

FOR

SHARED RESOURCE MANAGEMENT ON THE ZAMBEZI/CHOBE SYSTEMS IN NORTHEAST NAMIBIA: CURRENT PRACTICES AND FUTURE OPPORTUNITIES
(under funding provided by the USAID – Transboundary Funding, and administered by the NNF on behalf of the Ministry of Fisheries and Marine Resources)

IN ORDER TO PROVIDE

Consultancy services as Fisheries Biologist to the above project, reporting to Dr Clinton Hay (MFMR) and John Purvis (Project Executant)

1 BUDGET

The Consultant shall be paid from funds provided by the WWF under Grant Agreement No. AL48 signed on September 18th 2001. The budget for this Consultancy will be drawn from item 4a in the original project proposal.

2 SCHEME OF PAYMENT

The Consultant is responsible for ensuring that the work permit is legitimate.

The Consultant shall fulfill all the duties as laid out in the Terms of Reference as agreed and shown in Attachment 1. This consultancy will consist of ONE period work in the Caprivi region of Namibia and the preparation of documentation. The lump sum for the completion of the work will be paid on completion of the deliverables, and receipt of invoice submitted by the consultant, duly authorized by the Project Executant or nominated individual. Payment will be made by the WWF on behalf of the NNF in US$ directly to the bank account in Norway

Other payments for expenditure or activities in addition to the planned activities may be made on receipt of the agreed, appropriate and authorized invoice. Any amendment to the agreement must be put in writing and signed by all parties before additional activities are undertaken.

The consultant shall report to Dr Clinton Hay (Chief Fisheries Biologist – MFMR, Hardap) and Mr John Purvis (Project Executant – Zambezi/Chobe Fisheries Management project).

3 MEDICAL AID AND ASSOCIATED COSTS

The Consultant is totally responsible for his own medical insurance. The NNF will accept no responsibility whatsoever for the Consultant's healthcare.

The Consultant is responsible for his own travel, housing, accommodation, pension, social security and tax provisions.

4 SELECTION OF CONSULTANT

Given the unavailability of the original consultant for the proposed survey the above Institution has been selected on the basis of their unique experience combining previous work in fishing activity surveys in the Okavango (leading to the development of management regulations), their existing relationship with the MFMR and their training and capacity building work in the Caprivi region around fisheries telemetry surveys. Although the original proposal envisaged a consultant conducting the proposed survey work (in co-operation with Namibian counterparts) at four times during the year, his being unavailable has required a different approach. This first survey will be undertaken with the Consultant, permanent staff from the MFMR, staff from the Project and Caprivian assistants in an effort to build sufficient capacity and experience to ensure that the subsequent surveys can be undertaken by MFMR, Project Staff and Caprivian assistants – without the need for additional external consultants.

As such the Norwegian Institute for Nature Research (NINA-NIKU) has been identified as the appropriate partner. NINA-NIKU has a long record of research and survey work with the MFMR in the north-east of Namibia in both biological research and fishing effort surveys. The Institute have been assisting in a long running project on the Zambezi in a similar area to where the proposed survey work will be undertaken. Also the NINA-NIKU has a proven record of producing documentation from such research. NINA-NIKU have had considerable success in introducing methods of fisheries survey involving Telemetry and have been successful in the training of Namibians (MFMR staff) to adopt such methods. Their success can be measured by the fact that the freshwater section of the MFMR is recognized as being the leaders in fisheries telemetry methods in southern Africa.

As explained in the Terms of Reference (Attachment 1) one of the main objectives of the survey is to provide information for management. In the near future the MFMR has to advise the GRN (or the appropriate authority) on regulations for the management of the Zambezi and Chobe systems. Survey work undertaken on the Okavango river by MFMR (with Technical Assistance from NINA-NIKU) has been instrumental in designing the regulations for the Okavango river. It is envisaged that the survey work undertaken as part of this consultancy (complemented by other activities being undertaken as part of the Fisheries Management Project) will form the basis of developing regulations for the Zambezi/Chobe systems.

The contracting of NINA-NIKU by the Fisheries Management Project of Zambezi and Chobe for this activity is part of a wider and long-running picture of co-operation, cost sharing and technical assistance between the MFMR and NINA-NIKU.

5 ENTRY INTO FORCE AND TERMINATION

This overall agreement enters into force on the 1st February 2002 and shall remain valid until the 31st March 2002, unless terminated earlier by notice being given by the NNF or the Consultant to the other party.

Under this agreement the NNF may decide to withhold the disbursement wholly, or in part, or may decide to terminate the Agreement, if substantial deviations from the presented plan and budget occur (deliberately or due to circumstances beyond the Consultants control); if the main project objectives are endangered; if reports are not delivered as agreed or if the project develops unfavorably in terms of the objectives or in any other important respect. Before taking such a decision, the NNF shall initiate discussions with the Consultant and the Project Executant.

6 ARBITRATION

In the event of any dispute or difference arising between the parties relating to, or arising out of this agreement, the parties will immediately meet to attempt to settle such dispute or difference, and failing such settlement within a period of 14 days, the dispute or difference will be submitted to Arbitration, to be held in Windhoek, Namibia, in accordance with the provision of the Arbitration Act 42 of 1965.

7 PUBLICATION OF RESULTS

The results from the survey may be used by either of the contracting parties (and WWF) but it is envisaged that the results will be published as part of the ongoing Project Report series produced jointly by the NINA-NIKU and the Ministry of Fisheries and Marine Resources.

8 DELEGATION OF POWER

The parties hereby designate the following persons as authorized to act for and on behalf of their respective organizations with respect to this agreement:

For the Namibia Nature Foundation:

Dr C. J. Brown
Executive Director
P. O. Box 245, Windhoek
4th Floor Kenya House
Robert Mugabe Avenue
Windhoek
NAMIBIA
Tel: 00 264 61 248 345
Fax: 00 264 61 248 344

For the Consultant:

Dr. Tor Næsje
Chief Research Scientist
Norwegian Institute for Nature Research
Division for Aquatic Ecology
Tungasletta 2
NO-7485 Trondheim
NORWAY
Tel: 00 47 73 80 14 00
Fax: 00 47 73 80 14 01

Thus agreed to and signed in …….. on this ……....…day of ….....…….. in the year ……..

For the Consultant: Witnessed:

……..... …….....
Dr. Tor Næsje

For the Namibia Nature Foundation: Witnessed:

……..... …….....
Dr C. J. Brown

Attachment 1 – Terms of Reference

Terms of Reference

Design and implementation of fishery survey on the Zambezi and Chobe rivers in the Caprivi region incorporating capacity building for Ministry staff.

1 BACKGROUND

The Fisheries Management Project on the Zambezi and Chobe rivers in the Eastern Caprivi aims to improve our understanding of the fishery in this area and begin the promotion of as sustainable freshwater fishing industry in the region. The project will work closely with stakeholders in Namibia and adjacent countries to achieve the objectives. The project is concerned with the collection and analysis of information (social, economic and biological) which can be used in developing the long term management system on the floodplain areas. At the same time as collecting the information for management the project aims to develop capacity within the MFMR to continue the collection of data on the more social side of the fishery. The transboundary component of the project aims to assist the neighboring countries in the development of methodologies and skills to ensure their is some consistency between the survey work undertaken on the Namibian side of the river (for example) and those surveys being undertaken in Zambia.

The MFMR is active in the Caprivi Region through a number of projects addressing primarily the lack of information on the biological aspects of the fishery. In the past little attention has been directed to the social, community component of the fishery. With pressure on the Zambezi/Chobe fishery increasing the lack of up-to-date management information is becoming a serious bottleneck to the development of co-management of the resource.

2 OBJECTIVES OF THE CONSULTANCY

This planned consultancy will provide the first data-set on a variety of new fishery-related variables and will establish a methodology for the conduct of future surveys of this nature. In the same way that there are now accepted methodologies for the biological survey work between Namibia, Botswana and (to a lesser extent) Zambia it is hoped that this consultancy will begin the process of establishing accepted methodologies for fishing activity surveys between the different countries.

The consultancy will contribute to the achievement of Objective (a) from the agreed Project Proposal. This objective aims to collect quantitative data on the subsistence fishery whilst developing consistency in approach in such work between the co-operating countries. This first survey will involve a number of stakeholders and will set the methodology and systems for the conduct of future surveys which will be conducted by MFMR staff with assistance from the Project Staff.

The results from these surveys will complement the more qualitative surveys being undertaken with fishermen in the region. Surveys are currently underway where fishermen record their catches from their nets, and fish recorders make periodic visits to floodplain fishing villages to record catches and activities. Results from these activities can be used in conjunction with the results of this survey to broaden our understanding of the systems in operation in both quantitative and qualitative terms. A representative section of river will be surveyed and similar surveys at a later date may show up changes in the level of fishing activity.

The Consultancy will also develop a long term methodology for fishing activity surveys which can be undertaken regularly in the region to complement some of the biological work being undertaken. It is anticipated that the surveys will be repeated at three points during the year, and then a pattern will be established for quarterly surveys of this type.

The MFMR is tasked with the development of Regulations for the different water bodies in Namibia, and this survey will complement the ongoing data collection activities required for those regulations.
More specifically the four objectives for this consultancy:

- Design of a survey methodology to examine fishing activities on two representative stretches of river in the Caprivi region
- Design of a survey methodology to examine the operation of the fish market in Katima Mulilo
- Preparation of a survey manual to enable future surveys to be undertaken in a consistent fashion by staff from the MFMR
- On-the-job training of Ministry of Fisheries and Marine Resources staff and local partners in the conduct of such surveys

Achievement of these objectives should ensure that future surveys can be undertaken on the same stretches of river and in the Katima market by staff of the MFMR with assistance from local Caprivian counterparts.

3 SPECIFIC TASKS

The Consultant will:

(a) provide technical and practical guidance and assistance in the planning and implementation of the FIRST survey on two unidentified stretches of river (one stretch at Impalila/Kasika and the other in the area around Kalimbeza) in close co-operation with members of staff from the MFMR, Project staff and local counterparts.

The objective of the survey is to enable the Project and the MFMR to make an estimation of the nature and the scale of fishing activity on the river and backwaters through the year. This first survey will be repeated a further three times this year and is expected to become an integral component of the regular survey work undertaken by the MFMR. It will closely integrate with the existing biological survey work done on the river. At this stage the survey is expected to have the following characteristics:

- Identifying a representative 10 or 20 kms stretch of river and backwater (enabling rough scaling up to represent fishing activity on the entire Zambezi and associated floodplains)
- Traversing the agreed stretch of water twice a day (once during the day and once at night) for a period of five days in a row, recording fishing activities (gill netting, drag netting, spear fishing, traditional traps), gears and their location
- Select a sample of these fishing activities for more detailed sampling (e.g. one gill net per day to be lifted and the catch identified, weighed and measured) in co-operation with the fisherman

(b) provide technical and practical assistance in the planning and implementation of the first survey of the fish market in Katima in close co-operation with members of staff from the MFMR, Project staff and local counterparts.

The majority of the fish caught on the Zambezi river is sold through the market in Katima Mulilo. This is especially true of the fish caught in the areas adjacent to Katima. Other fishing sites (particularly along the Chobe) will send much of their fish to the market in Botswana, while the fish from isolated areas on the Zambezi may find its way to the Livingstone market in Zambia. The survey of the market in Katima Mulilo is in an effort to assess and measure the amount of fish which is being sold commercially as opposed to being consumed for subsistence. There is a large section of the fisherfolk sector catching fish for sale but the scale of this sector is unclear. The survey will provide a baseline for future monitoring of this type to see how the composition and scale of the marketed fish catch may change over time.

At this stage the survey is expected to have the following characteristics:

- Survey work in the market for two days in each quarterly survey
- Recording the following variables from each of the vendors: number of fish, type of fish, size of fish, assessment of the quality of fish, fresh/dried/smoked, price
- Short series of questions for the vendor (social status, source of fish etc) and the buyer (???)

(c) provide practical, on-the-job training to members of staff from the MFMR, Project staff and local counterparts during the survey work in order to build local capacity.

The survey work proposed as part of this consultancy will be the first of a series of surveys to be undertaken with support from the Fisheries Management Project and will then become an integral component of the survey work by the MFMR in the future. As such it is critical that the skills and methods to undertake such a survey are transferred to permanent Ministry staff during the course of this first survey. In addition because of the nature of the survey work (involving fisherfolk) there is a requirement for Caprivians to be fully involved. It is essential that a core group of perhaps two or three Caprivian individuals are exposed to the survey methods and can then be included in the later surveys. At this stage it is envisaged that the on-the-job training will include:

- Species identification,
- Accurate weighing and measuring of the fish,
- Use of GPS units for recording the location of fishing activities,
- Interviewing techniques for work with the fish vendors,
- Design and completion of data collection forms,
- Identification of fishing activities and systems,
- Skills in community liaison.

(d) prepare a Survey Manual to guide MFMR staff in the conduct of later surveys (fishing activities and market survey).

This first survey will provide the baseline in data collection and methodologies to be employed by the MFMR and project staff in the conduct of the future surveys. Although it is not expected that all the lessons will be learnt on this first survey, nor that the manual will be the last word on the methodologies to be employed – the manual must provide sufficient guidance for the Project Team and the MFMR to conduct later surveys in a style consistent with the first survey.

At this stage it is expected that the Survey Manual will include:

- River survey:

Record forms for the collection of data, position, conditions etc.,
Variables to be recorded and units to be used,
Timing of survey work on the river (day/night, day of the week etc),
Hints on ensuring accurate and consistent results are obtained.

- Market survey:

Method of selecting the targeted vendors,
Timing and duration of the survey,
Variables to be monitored and units to be used,
Hints on ensuring that accurate and consistent results are obtained.

In addition the manual will address the methods to be used in the analysis of the data. It is not expected that the methods for analysis are detailed (this will come at a later stage and combine inputs from a range of other survey activities being undertaken) but that an indication is provided.

(e) prepare a Report of Survey on the conduct of this first survey on the river and in the market.

As explained earlier this is the first of a series of surveys to be undertaken and it is important that the Report of Survey sets a precedent for the surveys to follow. The Report of Survey must include:

- activities undertaken,
- lessons learned/issues raised,
- recommendations for the future,
- problems encountered.

4 DELIVERABLES

The Consultant will submit the following two deliverables:

A) Report of Survey covering both the fishing activity survey on the river and also the survey work undertaken in the market. The report will address the activities undertaken, the lessons learned and provide recommendations for the conduct of future surveys. The Report of Survey will include all results from the survey work undertaken.

B) Survey Manual to guide the MFMR and Project Staff in the conduct of consistent future surveys on the river and also in the fish market in Katima.

5 QUALIFICATIONS

The Consultant must have a proven track record in the conduct of surveys of fishing activity (and marketing) as well as being familiar with the environment, fisheries and systems in operation on the Zambezi and Chobe systems. As training and capacity building is a critical component of the consultancy the Consultant should be able to demonstrate experience and expertise in this area, especially in training of MFMR staff.

6 PROPOSED SCHEDULE

The consultancy work will be undertaken between the 1st of February and the 28th of February 2002. A team from the MFMR and the Fisheries Management Project will be in Caprivi during that period and all surveys, training and consultations must be conducted in this period. The preparation of the deliverables (Report of Survey and the Survey Manual) can be completed after February but final copies of the reports should be submitted to MFMR before the end of March 2002.

7 PAYMENT SCHEDULE

A lump sum payment of US$4900 will be made to the Consultant on completion of the specified tasks and the submission of the deliverables to the satisfaction of the contracting parties.

Appendix 2: ITINERARY RIVER AND MARKET SURVEY

The itinerary of the consultant and the River Survey was as follows:

29 January:	Departure Trondheim, Norway.
30 January:	Arrival Windhoek . Meeting project layout and planning of field work C. Hay, J. Purvis and T. Næsje.
31 January:	Windhoek. Meeting project layout and planning C. Hay, J. Purvis, J. Abbott and T. Næsje.
01 – 03 February:	Mariental. Fieldwork preparation.
04 – 05 February:	Travel to Katima Mulilo by car. Meeting with the Governor of Caprivi Bernard Sibalatini. Meeting with NDF. Meeting with NAMPOL. Meeting (Katima Mulilo): Project layout and planning of fieldwork C. Hay, S. Kapirika, J. Purvis, J. Abbott, A. Kahuika, B. Sezuni, S. Simulebu and R. Thompson (hereafter called Project Staff).
06 February:	Boat travel Katima Mulilo to Impalila, survey subsistence activity recreational fishing, making camp. Total 124 km surveyed.
07 February:	Surveys of subsistence and recreational activity Indibi, Kasai, Zambezi and Chobe. Total 78.8 km surveyed.
08 February:	Surveys of subsistence and recreational activity Indibi, Kasai, Zambezi and Chobe. Total 59.7 km surveyed.
09 February:	Surveys of subsistence and recreational activity Indibi, Kasai, Zambezi and Chobe. Total 37.2 km surveyed. Meeting Project Staff on project layout and data collection. Meeting with Savannah Lodge (Andre van Aardt) on recreational fisheries and collection of recreational data.
10 February:	Surveys of subsistence and recreational activity Indibi, Kasai, Zambezi and Chobe. Total 83.1 km surveyed. Meeting Project Staff on project layout, data collection and CCDC.
11 February:	Surveys of subsistence and recreational activity Indibi, Kasai, Zambezi and Chobe. Total 15.7 km. Meeting Project Staff on project layout and data collection.
12 February:	Meeting Impalila Island with the Fisheries Interest Group on the Community Catch Data Collection. Meeting Project Staff on project layout and data collection.
13 February:	Day survey recreational activity and travel Kasane to Kalimbeza. Total 124 km surveyed.
14 February:	Surveys of subsistence and recreational activity Zambezi. Total 25 km surveyed. Meeting Project Staff on project layout and data collection.
15 February:	Surveys of subsistence and recreational activity Zambezi. Total 102 km surveyed. Meeting Project Staff including Dr. H. Hamukuaya MFMR, on MFMR activities, project layout and data collection.
16 February:	Surveys of subsistence and recreational activity Zambezi. Total 131 km surveyed. Meeting Project Staff on project layout and data collection.
17 February:	Surveys of subsistence and recreational activity Zambezi. Total 56 km surveyed.
18 February:	Meeting with Regional Governors Office. Meeting Project Staff Visit local fish market in Katima Mulilo Meeting Ben Chanda (Zambia), African Wildlife Foundation (AWF), discussing SRM-project and regional collaboration.
19 February:	Workshop/Consultation between Ministry of Fisheries and Marine Resources and the Subsistence Fishery Stakeholders in Katima Mulilo.
20 February:	Project Staff meeting in Katima Mulilo.
20-21 February:	Travel to Hardap Mariental.
22 February:	Compiling fieldwork.
23 February:	Departure Windhoek for Norway.

During the field work of approximately 837 km of river, channels and backwaters in the Zambezi and Chobe River systems were surveyed registering recreational and subsistence fishing activity.

Appendix 3: PROJECT DESCRIPTION

Shared resource management on the Zambezi/Chobe systems in northeast Namibia: current practices and future opportunities.

Organisation:

Namibia Nature Foundation (NNF)
P. O. Box 245
Windhoek
Tel: 061 248345, Fax 061 248344, e-mail ddirector@nnf.org.na

on behalf of

Ministry of Fisheries and Marine Resources (MFMR)
Directorate of Resource Management
Private Bag 13355, Windhoek
Tel: 061 2053015, Fax: 061 220558, e-mail: boelofsen@mfmr.gov.na

Contact persons:

Dr Chris Brown, Director, NNF
Dr Burger Oelofsen, Director: Resource Management, MFMR
Dr Clinton Hay, Chief Fisheries Biologist, Freshwater Fisheries Institute, MFMR

Project location:

Caprivi and Windhoek

Project duration:

October 1st 2001 to September 30th 2002

Total amount:

N$ 1,500,095.59

Requested amount:

N$ 1,110,045.59 USAID TBNRM funds
N$ 390,000.00 MFMR/Match funds

Submission date:

August 30th 2001

Goal:

To work independently and with the other riparian states to implement an effective and practical management system to ensure the sustainable utilization of the fish resource in the rivers in and around the Caprivi, for the benefit of the local communities.

Purpose:

The purpose of the project is to move towards the implementation of joint-management of the fishery resource in the Caprivi through the collection of information on the fishery whilst improving our understanding of the management systems with a view to developing future management strategies for the aquatic resources in co-operation with neighbouring states.

Objectives:

1 Quantitative and replicable data regarding the nature and characteristics of the small-scale subsistence fishery on the Zambezi and Chobe rivers in the northeast is collected, whilst consistency in approach to data collection (biological and social) between the adjacent countries is developed.

2 The nature of the fishery management systems are identified, investigated and documented and their appropriateness for future management is assessed whilst various alternatives for the future management of the freshwater fisheries in the region are explored.

3 Working relationships (regarding biological, ecological and social), understanding and awareness regarding fisheries and resource management are established between relevant agencies both within the Caprivi region, in Namibia and internationally supported by the official recognition of the role of the Standing Committee on Fisheries.

EXECUTIVE SUMMARY

Shared fisheries resource management on the Zambezi/Chobe systems in northeast Namibia: current practices and future opportunities

JUSTIFICATION

The MFMR is active in the Caprivi Region through a number of projects addressing primarily the lack of information on the biological aspects of the fishery. Little attention has been directed to the social, community component of the fishery. With pressure on the Zambezi/Chobe fishery increasing the lack of up-to-date management information is becoming a serious bottleneck to the implementation of any co-management (see note 1) arrangements. Co-management systems require information both from the official parties and the communities. The proposed project aims to start the process of addressing this lack of information.

The rivers in the northeast are shared with other countries so some degree of consistency in the nature of the management information collected on both sides is required.

The community based natural resource management programme in Namibia has had considerable success in enabling local communities to take control over their resources (to date mostly confined to wildlife). As the fishery sector in the northeast tries to develop some scheme of co-management for the fishery resources it must not proceed in isolation from the other sectors. Other sectors may provide the appropriate institutional vehicle to enable some form of integrated natural resource management.

SUPER GOAL

To work independently and with the other riparian states to implement an effective and practical management system (local, national and international) to ensure the sustainable utilization of the fish resource in the rivers in the Caprivi, for the benefit of the local communities.

PURPOSE

The purpose of the project is to move towards the implementation of co-management of the fishery resource in the Caprivi through the collection of information on the fishery whilst improving our understanding of the management systems with a view to developing future management strategies for the aquatic resources in co-operation with neighbouring states.

ACTIVITIES/OBJECTIVES

The purpose will be achieved through the adoption of a two-pronged research approach in Caprivi region and Windhoek, and a range of linkaging activities:

(a) Collection of data regarding the nature, scale and extent of the fishery on the Zambezi/Chobe systems through quarterly surveys (20 days each) involving catch data sampling, semi-structured questionnaires, observations, participatory activities etc. whilst developing more consistency in biological survey work between the neighbouring countries (transboundary).

(b) Collection of information to enable an analysis of the current methods of fishery management in use on the floodplains (in Namibia, Zambia and Botswana), and their success or otherwise whilst undertaking a broad stakeholder analysis and literature review to explore options and assess the potential for the implementation of co-management systems for the fisheries of the Zambezi/Chobe system.

(c) The project will seek to work with and foster linkages with a range of organisations, agencies and communities in Namibia and in neighbouring countries.

Linkages, consultation and liaison with Traditional Authorities and Conservancies will be developed as possible vehicles for fisheries management and with other Ministries with concerns in resource management nationally and in the Caprivi.

Co-management being the sharing of management responsibilities over a resource between the central authorities/government and some form of community-based organisation at the local level.

The project will start to develop transboundary links, understanding, information flows and awareness through a range of workshops, field visits and exchange visits to the relevant countries. Liaison with and structured reporting to the Standing Committee on Fisheries in the region will be one example. As such the project implementation will make special provision to ensure that information, lessons and results are disseminated and that inputs and experiences from elsewhere are incorporated into the implementation.

DELIVERABLES

Submission of detailed work plan in late October after initial planning workshops with project team.
Submission of concise quarterly reports measuring achievements against planned work activities and problems.
Concise report of the research work undertaken and the results obtained – activity (a).
Concise report explaining the results of the assessment of the management systems currently operating with recommendations as to future actions and possibilities with regard to resource management – activity (b).
A political will and demand from the people of Caprivi that the residents manage their fisheries
Linkages established in Caprivi, nationally and internationally between fisheries related agencies and other parties interested in natural resource management such as Conservancies and Traditional Authorities.

1 PROJECT RATIONALE

1.1 Statement of need

The fishery resource in the Caprivi region is important as a source of protein for both fishing and non-fishing households, as a source of income and employment for many resource-poor households, provides an important trading and marketing commodity, particularly for female vendors, and is one of the features of the region that attracts visitors (for recreational fishery).

Recent work has provided anecdotal and qualitative indications that the pressure on the fishery resource of the Zambezi is increasing. There is, however, little quantitative or time-series data which can confirm the state of the resource. The Ministry of Fisheries and Marine Resources (MFMR) have conducted a number of biological surveys of fish populations in the Zambezi, but there is almost no recent data on the scale of the community or subsistence fishery in the Zambezi and Chobe systems.

With apparent pressure on the resource increasing there are indications that the current management system (being a combination of deliberate and inadvertent measures) is unable to cope with the pressure and demands. The MFMR in their White Paper of 1995 committed themselves to assisting in the implementation of a co-management style of control over the resources (note 1). Despite this commitment little progress has been made in the move to implementing this co-management style of fisheries management. The relative success of the community-based natural resource management (CBNRM) programme in Namibia and particularly the north east has raised questions and potentially opportunities as to whether that particular methodology or institutional set up may provide a suitable option for some type of community-based fishery management as envisaged by the MFMR.

The MFMR also recognises the difficulties in managing the rivers in the northeast given that they are joint resources and their management and use is shared with adjacent countries. The absence of any consistent management information, survey methodology or understanding of the aquatic resource use systems on different sides of the river is a major bottleneck which needs to be resolved before transboundary resource management initiatives can be developed.

In summary therefore the MFMR is taking heed of the warnings regarding the pressure on the fishery resource in the north east and attempting to collect information for management whilst looking at different options (e.g. using the Conservancies and/or traditional authorities as management institutions) and approaches for the implementation of management measures in collaboration with neighbouring countries.

1.2 Status of the natural resource base

One of the principal objectives of the proposed project is to assist the MFMR in their efforts to collect the information, examine the options and develop the linkages necessary to enable management of the fishery. At present there is insufficient information regarding the status of the natural resource base, and this is one of the principal areas that the proposed project hopes to address.

Note 1. Co-management being the sharing of management responsibilities over a resource between the central authorities/government and some form of community-based organisation at the local level

However, despite the lack of quantitative, "scientific" or irrefutable evidence of the status of the resource base a number of more qualitative indicators are used to describe the current resource base:

(i) The pressure on the resource has been increasing steadily in terms of both the gears used and the number of fisherfolk. The region has seen a gradual replacement of traditional gears with modern gears such as gill nets that are now the most common method seen on the plains. Especially at certain times of the year and in certain areas, dragnets are widely used. Fisherfolk themselves state that the number of fisherfolk is greater than ever before – one reason cited are the problems in other components of the livelihood system, which force the men to take to the water in search of food and cash.

(ii) Fisherfolk themselves explain that there is increasing conflict between the fishers from the Zambian side and those here on the Namibian side of the Zambezi. This conflict can be violent and almost all fisherfolk state that the number of incidences is increasing. Conflict between Namibian fisherfolk and the authorities in Botswana also appears to be escalating in some areas of the Chobe.

(iii) A number of species are said to have disappeared from the regular catch of fishermen in the areas close to Katima Mulilo, although these reports are only isolated cases

(iv) Fishing cannot be separated from the other activities that provide livelihoods to floodplain residents, and changes in one component will automatically result in a knock-on effect somewhere else. This is particularly noticeable when there are problems in the cropping component – either crop failures or marketing problems – and people turn to fishing as their primary source of cash income.

1.3 Achievements to date

Despite the shortage of manpower and the absence of a permanent office in the Caprivi Region, the MFMR have implemented a number of projects in the northeast, some of which are ongoing:

(i) Fish-ecological surveys
Several fish-ecological surveys have been carried out in the Zambezi, Chobe and Kwando Rivers since 1997. The following parameters were recorded during these surveys: Catch per unit effort of experimental gear, species index of relative importance, characteristics of reproduction, growth/age parameters, habitat preferences, migration, fish behavior and length frequencies. The results of these surveys are due to be published towards the end of 2001.

(ii) Study of migration and habitat use
A radio telemetry study has been undertaken in the Zambezi River to improve the understanding of the migration and habitat preferences of the different species in the river. The first project is published and data analysis of a second project is underway. This project is partly funded by the WWF.

(iii) Study of the recreational fishery
The recreational fishery in the Zambezi River was surveyed through the monitoring of a fishing competition held in 2000. The objective was to determine the impact these competitions and recreational fishermen have on the fish resource as well as on the local communities. The biological and socio-economic data were recorded and published.

(iv) Community Catch Data Collection Project
Members of the Fisheries Focus Group on Impalila Island are currently recording their catches from a variety of different mesh-sized nets for submission to the MFMR. The data from this ongoing project will give an indication of the nature of the fish catch from the subsistence fisheries. This project is partly funded by the WWF.

2 PROJECT FRAMEWORK

2.1 Justification

The project seeks to address the problems raised above through activities in the following areas:

6.0 Biological monitoring will continue to be conducted by the MFMR in the "Namibian" waters using systems and scientifically robust standards, whilst working (in Namibia and elsewhere) with representatives from the neighbouring countries to ensure the methodologies are consistent across the national boundaries.
7.0 Socio-economic information will be collected initially on the Namibian floodplains, but through involving representatives from the relevant agencies on the other side of the rivers, the survey work will be expanded and a consistent approach developed, piloted and used in Zambia.
8.0 On the broader, institutional side, the project will work to improve the understanding of the current position and future opportunities in fishery and natural resource management both in Namibia and in neighbouring countries – to move towards the identification of an appropriate co-management system. The project philosophy is one of developing links and fostering information exchange and such an approach will be seen throughout the work undertaken.

The people and politicians of the Caprivi region recognise the importance of the fisheries in the region and they are requesting some form of managed development of their fisheries. "Managed development" would take into account the need for controls and regulations whilst recognising that there should be some development of the opportunities in the sector so that the resource can contribute to the economic development of the region.

2.2 Goal and purpose

The long-term goal of the MFMR is to work independently and with the other riparian states to implement an effective and practical management system (local, national and international) to ensure the sustainable utilization of the fish resource in the rivers in and around the Caprivi, for the benefit of the local communities.

The purpose of the project is to move towards the implementation of joint-management of the fishery resource in the Caprivi through the collection of information on the fishery whilst improving our understanding of the management systems with a view to developing future management strategies for the aquatic resources in co-operation with neighbouring states.

2.3 Objectives

The main objective for this project is to improve the understanding of the exploitation of the fish resources and the socio-economic role of the harvested fish in local communities in Eastern Caprivi, with a view to improving the management practices to benefit low-resource groups in the communities. A dual research approach has been adopted in order to achieve this objective, with a third component aiming to ensure that institutional linkages and partnerships are developed whilst results are disseminated. The text below explains the approach and provides sub-objectives for each component:

(a) This component will aim to collect quantitative and replicable data regarding the nature and characteristics of the small-scale subsistence fishery on the Zambezi and Chobe rivers in the northeast whilst developing consistency in approach to data collection (biological and social) between the adjacent countries.

Specific objectives for this component include:
6.0 An estimate can be made of the fishing effort (number of fishers and amount of gear) on the

Zambezi/Chobe floodplains and the annual harvest taken from the rivers with estimates regarding the species and length/frequency for the subsistence catch.

7.0 Characteristics and conditions of the fisherfolk will be identified through questionnaire surveys in the targeted villages.

8.0 Some consistency is established in the subsistence fishery survey work undertaken on the Zambezi for the project, and future survey work (perhaps in months 6 – 12 of this project) on the Zambian and Botswanan side of the rivers.

9.0 Improved understanding of the operation of the Katima Mulilo fish market (species, numbers, vendors, value) with an initial assessment of the role of the Livingston fish market in Zambia.

10.0 Begin to establish consistency in the biological survey work initially between Namibia and Botswana regarding the ongoing surveys in the Okavango River, and then extending this system and methodology to the countries adjacent to the Zambezi.

(b) The management systems component will provide more qualitative information and assessment regarding the nature of the management systems and the appropriateness of various alternatives for the future management of the freshwater fisheries in the region.

Specific objectives for this component include:

i The existing (fishery) resource management systems on the Zambezi/Chobe floodplains are investigated and documented.

ii Alternatives and options for the implementation of co-management (being both community-management of resources and transboundary management) approaches to fisheries management (e.g. using the Conservancies and/or the Traditional Authorities) in the north are considered and documented with recommendations as to the future actions in this field.

iii Experiences in fisheries management (especially in floodplains and/or in southern Africa) are investigated.

(c) This component is recognition of the overall importance of liaison and linkaging for the project to achieve the objectives. The project will seek to work with and foster linkages with a range of organisations, agencies and communities in Namibia and in neighbouring countries.

Linkages, consultation and liaison between MFMR and Traditional Authorities and Conservancies in Namibia will be developed as possible vehicles for fisheries management and with other Ministries with concerns in resource management nationally and in the Caprivi. Similarly, links between the MFMR and local NGOs (such as IRDNC) will be actively promoted as part of the project. The project will maintain and develop transboundary links, understanding, information flows and awareness through a range of workshops, field activities and exchange visits to the relevant countries. Liaison with the Standing Committee on Fisheries will be maintained throughout. The project implementation will make special provision to ensure that information, lessons and results are disseminated and that inputs and experiences from elsewhere are incorporated into the implementation.

Specific objectives for this component include:

i Project staff are aware of the management systems operating in adjacent countries (or in similar floodplain environments) and use some of this experience in examining and developing options for management on the Zambezi.

ii Leaders, spokespersons or representatives of the fishing industry in Caprivi are exposed and involved in fishery related discussions locally, nationally and internationally (e.g. including the Conservancy model).

iii Information about the ongoing project and future desires of the MFMR, Communities and other agencies for the co-management of the resource are aired and shared at a number of workshops or conferences locally and internationally.

iv At least one meeting of the Standing Committee on Fisheries (and invited organisations) is attended by the project staff to introduce the survey work and methodology.

v Formal recognition of the Standing Committee on Fisheries is obtained from the member states and the organisation incorporates project results into future planning.

Assumptions
In order for the achievement of the objectives above to lead to the conditions outlined in the goal we make a number of assumptions:

6.0 At present the Government of Namibia's commitment to the development of co-management in fisheries and the implementation of the 1995 White Paper in the northeast is assured. However, sustained commitment will depend to some extent on the ability to demonstrate practical possibilities in the implementation of the White Paper and the development of legislation.
7.0 Recruitment of suitable staff for the project implementation.
8.0 Long term success of the goals documented here will be partially determined by the ability of the MFMR to attract and retain staff capable and committed to working in a collaborative fashion using multi–disciplinary approaches in the north east of Namibia.
9.0 The structure and funding for the MFMR and the Freshwater Fisheries Institute in particular are developed to support effective working (research and development) in the north east of Namibia.
10.0 Appropriate and widely accepted management options can be identified to meet the multiple objectives of the different stakeholders.
11.0 That the MFMR remains committed to establish and develop a presence in the north east of Namibia and assist the local and regional groups in achieving their shared goals of fishery management and development.
12.0 That appropriate, qualified and experienced staff and consultants are used for the implementation of the project and that counterparts or students are available from the MFMR as agreed.
13.0 That adequate MFMR resources (in terms of office space, administrative support, fieldwork support and the allocation of staff to support project activities) are made available for the project at all stages.
14.0 That the security situation in the Caprivi Region remains conducive to fieldwork.
15.0 That the Regional Government, Traditional Authorities and other interested parties co-operate in the studies and discussions at regional level.

2.4 Project approach

The MFMR is adopting an open and to some extent exploratory approach to the design and implementation of this project. A process approach will be adopted throughout with experiences and learnings from one component and activity feeding into the actual implementation of subsequent project activities. Recognising the relative lack of experience in social and management aspects of freshwater fisheries in the country, it is important that lessons are learned, documented and applied.

The MFMR also view this project as the starting point for much greater effective involvement in the management and development of freshwater fisheries in the northeast and in collaboration with neighbouring countries.

2.5 Project activities

A Project Planning Workshop will be conducted in Caprivi during October 2001 involving all the implementing parties to develop a shared mission and goal for the project and agree on detailed work plans, scheduling and methods to be used. Details of liaison and co-ordination with other stakeholders will be agreed at this point. The agreed work plan will be made available to the sponsors and other interested parties.

However, the following text provides an outline of the broad activities envisaged in order to achieve the objectives.

(a) Fishery information component

Objective:
Quantitative and replicable data regarding the nature and characteristics of the small-scale subsistence fishery on the Zambezi and Chobe rivers in the northeast is collected, whilst consistency in approach to data collection (biological and social) between the adjacent countries is developed.

	Sub-objective	**Activities**	**Notes/assumptions**
i	An estimate is made of the fishing effort and annual harvest taken from the rivers (estimates regarding the species and length/frequency of the subsistence catch)	Planning for the survey of the subsistence fishery Survey work in two selected villages, four times a year to monitor the fish catch of the subsistence fishers (1) (4) Initial survey work in two additional sites (2) Preparation of survey report	Co-operation of the fishers with the survey team and enumerators Community members must be active participants in the survey work as much as possible
ii	Characteristics and conditions of the fisherfolk identified and documented	Consultation to develop the survey tools (questionnaire design) Questionnaire surveys (one-off and also quarterly) using trained enumerators in the surveyed villages (3)	Co-operation of the fishers with the survey team and enumerators Appropriate survey methods are developed within the time frame.
iii	Consistency and co-operation in the social or subsistence fishery survey work undertaken on the Zambezi and Chobe, between neighbouring countries is established.	Results of the survey work are examined, collated and reported to the Standing Committee on Fisheries Zambian and Botswanan staff is trained as enumerators and can conduct surveys on their side of the river later in the project.	Agreement on method is reached. Staff or individuals are identified and resourced from Zambia and Botswana PhD student arrives and assists
iv	Improved understanding of the operation of the Katima Mulilo and Livingston fish markets	Survey the catches sold at Katima fish market (5) Semi structured interviews with the traders and vendors in Katima Initial assessment of the fish market in Livingston	Co-operation of the Council in Katima Mulilo.
v	Moves made towards establishing consistency (between Namibia, Botswana, and Zambia) in the biological survey work in the ongoing and proposed surveys.	Exchange visits between Botswana, Namibia and Zambia in the proposed and ongoing surveys.	Availability of resources is assured.

Notes:

(1) Kalimbeza village and Impalila/Kasika area. These sites match the ongoing biological survey sites used by the MFMR.

(2) Ibbu or Schukmannsburg or Lusese which may present a different environment and more varied systems than those areas on the channel itself

(3) Existing information, surveys, research projects and other data will be examined in order to assist in planning the survey for this project. The objective of this project is not to conduct the most comprehensive, detailed and broad survey of the region but to provide the appropriate level of usable information for management of the fisheries. A number of consultants will be engaged to assist in this process and a Ph.D. student from Canada will also be involved at different stages of the survey design, implementation and analysis.

(4) Survey activities (using a consultant, MFMR staff and trained enumerators) at the two sites will include variables such as:

6.0 Nature and description of fishing gear used (mesh sizes, lengths etc)

7.0 Sampling of fish catch to estimate catch per unit effort (cpue) and species composition of different gears

8.0 Characteristics of the different fishers using the different gears

9.0 Management aspects and access rights for the fisheries

(5) The survey of catches at Katima Mulilo market will measure variables such as:

6.0 price and species composition

7.0 characteristics of the people selling fish will be recorded

8.0 distribution channels of fish from the river to the market and the turnover of fish at the market will also be studied.

(b) Socio-economic, management issues

Objective:
The nature of the fishery management systems are identified, investigated and documented and their appropriateness for future management is assessed whilst various alternatives for the future management of the freshwater fisheries in the region are explored.

The survey and research work for this component will involve community-based research and participatory activities in villages across the floodplain, literature reviews and detailed discussions with stakeholders locally, nationally and internationally.

	Sub-objective	**Activities**	**Notes/assumptions**
i	The existing (fishery) management systems on the Zambezi and Chobe floodplains are investigated and documented	Key informant interviews with fishers, indunas and others at various locations across the floodplain (1) Detailed case study in two sites on the floodplains (2) Preparation of report	Case study sites are identified early. Local stakeholders and communities must be involved in the process.
ii	Alternatives and options for the implementation of co-management approaches to fisheries management are considered and documented with recommendations as to the future actions	Consultations with stakeholders in Caprivi (e.g. Conservancies, Traditional Authorities, communities, NGOs), Windhoek and regionally. Review of relevant literature including enabling legislation in Namibia. Preparation of discussion paper regarding options for management at a later stage in the project.	
iii	Experiences in fisheries management (especially in floodplains and/or in southern Africa) are considered	Liaison with members of the Standing Committee on Fisheries Site visits to neighbouring countries to assess the effectiveness of management systems. Literature review of relevant papers	

Notes:

(1) Survey work will be one-off Focus Group type activities at a variety of locations across the floodplains – it is anticipated that there will be different degrees of management and systems in different locations on the floodplain and it is important to get a broad and almost complete idea of the regimes and their effectiveness. The sites will be selected to link with work being undertaken in activity (a).

(2) Sites to be decided but likely to be one near to Katima Mulilo and another at a location central in the floodplains – Schukmannsburg or Ibbu.

(c) Institutional development, linkaging and understanding component.

Objective:
Working relationships (regarding biological, ecological and social), understanding and awareness regarding fisheries and resource management are established between relevant agencies both within the Caprivi region, in Namibia and internationally supported by the official recognition of the role of the Standing Committee on Fisheries.

In addition to the organisational linkaging being developed, project staff and activities must take cognisance of and input into ongoing planning projects in the same locality (eg. Tourism Planning for Zambezi and Chobe systems in Caprivi, and the EIA process for the proposed sugar plantation adjacent to Lake Liambezi).

	Sub-objective	**Activities**	**Notes/assumptions**
i	Project staff are aware of the management systems operating in adjacent countries and use this in developing management options on the Zambezi	Exposure visits of project staff from the MFMR (and local staff) to the floodplains and fisheries in adjacent countries. Integration and information sharing with the ongoing GTZ study looking at the harmonisation of fishery laws Liaison and discussion around these options with representatives from the relevant government departments. Attendance of the project staff at the meetings of the Standing Committee on Fisheries.	Co-operation of local leaders in arranging the visit. Co-operation of the host agencies or authorities in planning the visit. Time frame of GTZ work is appropriate.
ii	Leaders, spokespersons or representatives of the fishing industry in Caprivi are exposed and involved in natural resource related discussions locally, nationally and internationally (e.g. use of Conservancy Committees and other approaches).	Involvement of local leaders (fisherfolk, Councillors, Traditional Authorities, other) in exposure visits or exchange visits to the neighbouring countries. Involvement of the local leaders in workshops or activities (local, regional) related to natural resource management and fisheries in particular.	Co-operation of local leaders in arranging the visit. Co-operation of the host agencies or authorities in planning the visit.
iii	Information about the ongoing project and future desires of the MFMR, Communities and other agencies for the co-management of the resource are shared at a workshops or conferences locally and internationally	Adequate distribution of the results of the work and experiences. Presentation of the work plans, results and experiences to interested parties at conferences and/or workshops as necessary.	Attendance at workshops is possible at appropriate times.
iv	Attendance at the Standing Committee on Fisheries by the project staff to introduce and	Development of the methodology Distribution to interested parties before the meeting. Discussion and agreement of	Timing and arrangements for the Standing Committee meeting are appropriate

	discuss the survey work and methodology.	methodology and procedures during the meeting.	Survey methodology is sufficiently advanced for discussion.
v	The Standing Committee on Fisheries is formally recognised (by member states and SADC) as an authoritative and operational body.	Liaison, consultation and motivation for formal recognition of the Committee. Standing Committee uses lessons from this project to influence actions and develop protocols, treaties etc.	Co-operation of all member states and SADC authorities with the Committee and its development.

2.6 Implementation plan

A Planning Workshop for the project implementing team is scheduled for the middle of October 2001 in Caprivi region. Liaison and co-ordination with local stakeholders (e.g. communities, leaders, NGOs) regarding project activities will begin during this process. As a result of these consultations, a detailed work plan will be developed, agreed and submitted to the appropriate agencies, stakeholders and the Standing Committee on Fisheries. Until this Workshop is complete, the previous lists of activities are the only level of detail allowed.

2.7 Beneficiaries

The main beneficiaries of the project will be the smallholder communal farmers, fisherfolk and residents of the floodplain areas of the Zambezi and Chobe systems. More specifically the beneficiaries in the longer term should include:

- Fisherfolk in the Caprivi region who will benefit from sustainable community-based management of the aquatic resource and the accompanying empowerment and expected improvement in livelihood security
- Floodplain dwellers who will continue to have access to aquatic resources and protein in particular
- The communities who are already managing their resources using a CBNRM approach and can now incorporate more fisheries components into their work
- Communities who are trying to manage or protect their resources without co-operation from authorities or individuals on the opposite side of the river.
- Women in fishing families who will maintain some degree of independence through maintaining their role in the transport and trading of fish
- Fisherfolk, staff and Governments in the neighbouring countries who will learn form the implementation and sharing of information built into the project
- The MFMR and other co-operating governments and agencies will increase their experience and expertise in collaborating with partners and conducting multi-disciplinary work.

2.8 Roles, responsibilities and organisational capability

The project will operate within the established structure of the MFMR and as such will become an integral component of its activities. The project will be managed by the Freshwater Fisheries Institute (Dr Clinton Hay) based in Hardap and the Directorate of Resource Management (Dr Burger Oelofsen) based in the MFMR office in Windhoek. The Fisheries Specialist will also take a leading role in the co-ordination of the project. The project will have an office in the MFMR in Windhoek whilst maintaining a strong presence in the northeast through fieldwork and consultations etc.

3.0 ACTION PLAN FOR DISADVANTAGED GROUPS

As outlined above and in section 5.0 below, there are a number of project components that seek to address issues related to Disadvantaged Groups.

The MFMR is committed to equal access of Namibian people to the natural resources of this country. The proposed system of co-management or community-based management for the fisheries of Caprivi will result in the empowerment of communities by ensuring their continued access to the fishery resources while at the same time improving the capacity of local people to manage their resources.

In particular the proposed project will work with women to try to ensure that the markets for fish are understood which in turn may lead to new markets being exploited for the fish.

In the employment of local staff for the implementation of the work preference will be given to suitable applicants who could be classed as disadvantaged, particularly students and recent graduates from natural resource related courses.

4.0 MONITORING AND EVALUATION PLAN

During the Work Planning Session for the project scheduled for October 2001 in Caprivi, full attention will be given to the issues of monitoring and evaluation. As activities are developed and agreed an integral component will be the establishment of a monitoring plan, which will be submitted with the Annual Work Plan. However at this stage it is possible to highlight a number of features likely to be included in the monitoring plan:

- Quarterly reports of all activities undertaken related to this proposal and the agreed Workplan with particular attention to capacity building activities and identification of any problems encountered
- Reporting through presentations and notes at any relevant steering group sessions
- Reporting to the authorities (Traditional and Regional Council Co-ordinating Body as MFMR)

5.0 CAPACITY BUILDING PLAN

5.1 Building capacity

The proposed project will aim to develop capacity, increase the level of expertise and raise awareness at different levels:

Ministry of Fisheries and Marine Resources - Namibia
As the agency responsible for the management of fisheries resources it is important that our knowledge and understanding of the wider fisheries picture and livelihood systems in the north is improved. A core group of MFMR staff will be involved in the planning and implementation of all survey work, liaison activities and consultations with the interested parties. Apart from the Project Managers (Dr C Hay and Br B Oelofsen) at least one representative from the FFI or the MFMR will be assigned full or part-time and permanently to the project.

"Young" fisheries graduates
Given that there will be regular (quarterly) fieldwork activities and a number of irregular visits to the field and adjacent countries, there is a good opportunity to introduce recent graduates or students to such work. Discussions with UNAM and the Polytechnic will be conducted to see how students or graduates can be incorporated into the later stages of the fieldwork.

Fisheries Ministries in adjacent countries
Through the range of workshops, exchange visits, trainings, and joint activities it is envisaged that the

staff and representatives from the neighbouring countries will develop capacity and learnings as a result of this project.
Interested parties in Southern Africa.
Particularly given that the rivers in the Caprivi are shared between various countries it is important that co-operation between the nations is encouraged. In this way, with full exchange of information, capacity and experience will be built up. The lessons and results of the proposed study will be disseminated and the benefits scaled up to input into the development of fisheries protocols, treaties, policies and legislation.

5.2 Project sustainability

The goal of the MFMR towards which this project will contribute is likely to require over ten years for full achievement. This proposed one year project is only one of the early stages moving the country towards that goal. However, there will be a number of discrete outputs form this project, and a number of components have been included to improve the chances for positive, sustainable impacts for Namibia. These project components include:

6.0 Attachment of permanent MFMR staff to work with the consultants, in order to build local capacity and expertise
7.0 Involvement of young resource management graduates to build the pool of experienced and qualified human resources on which the MFMR may draw at a later stage.
8.0 The documentation of project experiences, results and learnings will be an important process for the MFMR
9.0 The involvement of local people in the project activities where possible will ensure that local benefits are sustained.
10.0 Formal recognition of the Standing Committee of Fisheries
11.0 Development of long-standing protocol in fisheries research

6.0 INFORMATION SHARING PLAN

Stakeholders at all levels will be kept informed of the progress and results of the work contained in the proposal. Local (Caprivi region), national (Namibia), Regional (Southern Africa) and international audiences will be informed and given the opportunity to contribute at certain stages.

How will the information be shared?

7.0 Quarterly reports will be prepared and distributed to relevant stakeholders
8.0 Preparation of short articles and written pieces about the ongoing work
9.0 Presentation of papers at local, national and regional conferences (if identified)

It is anticipated that the potential for the use of CBNRM and more specifically Conservancy methodologies and approaches to the management of freshwater fisheries in the Zambezi and Chobe systems will be of considerable interest to many groups and organisations in the Region.

10.0 MANAGEMENT PLAN

he project will be managed by Dr Clinton Hay, Chief Biologist at the Freshwater Fisheries Institute in Hardap and Dr Burger Oelofsen, Director Resource Management for MFMR based in Windhoek. Regular meetings will be held of all staff involved in the project to assess progress, evaluate impacts and prepare documentation.

A number of locally recruited (i.e. from Caprivi) individuals will be hired for the fieldwork in Caprivi – and it is hoped that this pool of experienced individuals will be available for later work in CBNRM in the region.

11.0 PROJECT BUDGET

The project activities and the associated budget have been drawn up assuming a funding and implementation period of one year (October 1st 2001 to September 31st 2002). Should funding be available for only part of this period then adjustments will have to be made accordingly in targets, activities and budget.

List of earlier reports

Næsje, T. F., Breistein, J., Hay, C., Oelofson, B., Sandlund, O. T. & Wessels, S. 1999. Mitigating malaria in Namibia by biological control of mosquitoes. Report from a workshop. Namibia 14th-16th april 1998: 1-35.

Hay, C. J., Næsje, T. F., Breistein, J., Hårsaker, K., Kolding, J., Sandlund, O. T, & Zyl, B. v. 2000. Fish population, gill net selectivity, and artisanal fisheries in the Okavanga River, Namibia. Recommendations for a sustainable fishery. – NINA·NIKU Project Report 10: 1-105.

Økland, F., Hay, C. J., Næsje, T. F. & Thorstad, E. B. 2000. Movements and habitat utilisation of cichlids in the Zambezi River, Namibia. – NINA·NIKU Project Report 11: 1-18.

Hay, C.J., Næsje, T.F., Breistein J., Hårsaker, K., Kolding, J., Sandlund, O.T. & vZyl, B. 2000. Fish populations, gill net selectivity and artisanal fisheries in the Okavango River, Namibia. - NINA·NIKU Project Report 12: 1-8.

Økland, F., Hay, C. J., Næsje, T. F., Thorstad, E. B. & Nickandor, N. 2001. Movements and habitat utilisation of radio tagged carp (*Cyprinus carpio*) in a reservoir in the Fish River, Namibia. - NINA-NIKU Project Report 13: 1-28.

Næsje, T.F., Hay, C.J., Kapirika, S., Sandlund, O.T. & Thorstad, E.B. 2001. Some ecological and sosio-economic impacts of an angling competition in the Zambezi River, Namibia. - NINA·NIKU Project Report 14: 1-31.

Hay, C.J., Næsje, T.F., Kapirika, S., Koekemoer, J. H., Strand, R., Thorstad, E. B. & Hårsaker, K. 2002. Fish populations, gill net catches and gill net selectivity in the Zambezi and Chobe Rivers, Namibia, from 1997 to 2000. – NINA Project Report 17: 1-79.