

**ARTISANAL FISHERY IN SOCIO-ECONOMIC DEVELOPMENT  
OF RURAL COMMUNITIES IN MALAWI: A CASE STUDY  
OF ENCLAVE VILLAGES OF LAKE MALAWI NATIONAL PARK**

by

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## ABSTRACT

Fishing, and artisanal fishing in particular, plays a key role in the provision of rural employment and more importantly, household food security in the developing nations. The importance of artisanal fishery is shown in Malawi where artisanal fishery produces between 85-95% of the total fish production, and about 70% of the animal protein in human consumption comes from fish. About 43,000 people are employed directly in artisanal fisheries and approximately 100,000-150,000 are indirectly employed within the artisanal fishery.

Owing to increasing human population in the developing countries coupled with the common-property, open-access nature of the fish resource, the resource has not been able to cope with the ever-increasing socio-economic demand placed on it. The resource is so degraded that it is has started to decline beyond capacity to sustain itself. This study was an attempt to examine and understand the artisanal fishery as it contributes to the socio-economic well being of the rural population particularly, the enclave communities of Lake Malawi National Park.

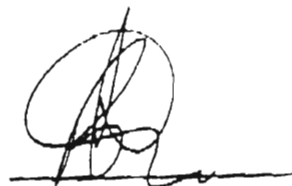
The present study used structured interviews, focus group interviews, key informant interviews and personal observation to collect socio-economic information of the fishery. These research tools revealed that among the enclave communities income levels are low and unsustainable due to declining productivity of fishing. The decline may be a result of increasing human population, weak community-based institutions, limited agriculture, poor infrastructure with regard to processing and marketing of fish, limited supplementary and alternatives economic activities, and the fishing methods. Documentary information was used to contextualize artisanal fishery, to examine and understand the common-property and open-access nature of the fish resource as it relates to the exploitation of fish among the enclave communities.

Integrated development that brings together conservation and socio-economic development is the only option that will increase the income of the enclave communities to sustainable levels and achieve the Park's conservation objectives. The socio-economic intervention options should

include provision of basic social facilities such as education, health, safe water etc, increase the economic power of the enclave communities through irrigation, adding more value to the fishery, engaging in aquarium trade, community-based eco-tourism and beekeeping. These options would lead to socio-economic sustainability among the enclave communities and would bring about the conservation objectives of the Park.

**DECLARATION OF ORIGINALITY**

The work contained in this thesis is my original work and has not previously in its entirety nor in part been submitted at any university for a degree or a diploma. Where information from other sources is used in the text, it has been fully acknowledged.

A handwritten signature in black ink, featuring a large, stylized initial 'B' followed by a series of loops and a long horizontal stroke at the end.

Brighton Kalembeni Kumchedwa

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## ABBREVIATIONS AND ACRONYMS

ADMADE	Administrative Management Design for Game Management Areas
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CBNRM	Community-based Natural Resource Management
DNPW	Department of National Parks and Wildlife
DREA	Department of Research and Environmental Affairs
EE	Environmental Education
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GNP	Gross National Product
GoM	Government of Malawi
IIED	International Institute for the Environment and Development
IUCN	International Union for Conservation of Nature and Natural Resources
LIRDP	Luangwa Integrated Resource Development Project
LMNP	Lake Malawi National Park
MALDECO	Malawi Development Corporation
MEY	Maximum Economic Yield
MK	Malawi Kwacha
MSY	Maximum Sustainable Yield
NAPENAREMA	Nankumba Peninsula Natural Resource Management
NGO	Non-governmental organization
NRC	Natural Resources Committees
NTFP	Non-timber forest products
SADC	Southern African Development Community
SEDOM	Small-scale Enterprise Development of Malawi
US\$	United States Dollar
UN	United Nations



UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWB	Women's World Banking in Malawi
WWF	World Wide Fund for Nature

## GLOSSARY OF TERMS

Artisanal fishery:	Village-based fishery using plank boats and dug out canoes.
Beach seine net:	A long net with floats on the top edge and weights on the bottom edge, pulled through the water from the beach.
Bombe:	Chichewa name for <i>Bathyclarias</i> genus.
By-catch:	The accidental catch of untargeted fish, usually making up a minor portion of the total catch. Sometimes called incidental catch.
Catch per unit of effort:	The amount of fish caught as a result of a certain amount of effort.
Chambo seine net:	A large, D-shaped net used in the open water by crew of 6-9 fishermen to catch small, schooling fishes such as usipa and utaka.
Chambo:	Chichewa name for the three closely related <i>Oreochromis spp.</i>
Cichlid:	A member of the fish family, Cichlidae that has about 2000 species in Africa alone.
Co-management:	The approach that focuses on the relationship between beneficiaries and the developer sometimes called bottom-up approach.
Common-property resource:	A communally owned resource
Conservation:	The process of management of living resources, which ensures that utilization, is sustainable.
Crewmember:	An employee of the owner of a fishing gear.
Cyprinid :	A member of the large fish family, Cyprinidae.
Demersal trawl:	A large scoop-like net dragged along the lake bottom by an industrial fishing boat.
Dug out canoe:	A canoe carved out of a single tree trunk.
Effort:	A common fisheries term used to quantify the energy or action expended to catch fish.
Enclave village:	In the case of Lake Malawi National Park, a village completely surrounded by designated park terrestrial area.
Endemic:	Occurring naturally in a single area and nowhere else.

Fishing craft:	Boat, raft or canoe used by fishermen to fish.
Fishing gear:	Net, line, trap or other device used to catch fish.
Frame survey:	A count of all the fishermen, fishing craft and fishing gears in an area.
Gear owner:	The owner of a fishing gear.
Haplochromines:	A very diverse group of cichlid fishes.
Integrated development:	Development that ensures social, economic and ecological balance.
Kambuzi:	Chichewa word for small, sand-dwelling cichlids usually occupying shallow water.
Kambuzi seine net:	A small-meshed beach seine net targeted on kambuzi.
Kampango:	Chichewa name for the cat fish <i>Bagrus meridionalis</i> .
Mbuna:	Chichewa name for small, colourful, rock-dwelling cichlids.
Middleman:	Fish trader who buys from fishermen sell it directly to the consumer or a retailer.
Ncheni:	Chichewa name for the fish in the genus <i>Ramphochromis</i> .
Ningwe:	Chichewa name for the fish called <i>Labeo cylindricus</i> .
Nkacha :	A seine net used in the open water by a crew of 6-9 fishermen in tow plank boats.
Open-access resources:	A free for all resource.
Pelagic:	Fish that live mostly or entirely in open water far from shore.
Property:	A right to a benefit stream.
Property regime:	A system of rights and duties that characterizes the association of individuals to one another with regard to a particular resource.
Spawning:	The shedding of sperm or eggs by fish, which if successful, leads to reproduction.
Species:	Animals or plants, which breed and produce fertile offspring under natural conditions.

## CHAPTER 1

### INTRODUCTION AND RESEARCH METHODOLOGY

#### 1.1 Introduction

Rural communities in the southern African region and in other developing countries are dependent on the natural resource base for their survival strategies (Chanda and Kalibamu 1995). Fish is one of the natural resources that rural communities rely on for their survival. It is widely accepted that, in most developing countries, artisanal fisheries are an important sub-sector within the fisheries industry (Bland 1992). Artisanal fishery is defined as:

*labour intensive and conducted by artisanal craftsmen whose level of income, mechanical sophistication, quantity of production, fishing range, political influence, market outlets, employment and social mobility and financial dependence, keep them subservient to the economic decisions and operating constraints placed on them by those who buy their production* (FAO 1975 cited in Pizzali 1988).

Artisanal fisheries are of enormous socio-economic importance in many parts of the world (Emmerson 1980). They play an important role as a major source of animal protein and in the provision of employment (Pizzali 1988). In Malawi fish provides 70% of the animal protein (Donda 1993; Hara 1993). 85-90% of the fish production comes from artisanal fisheries (Bland 1992). In 1992, About 43,000 people were directly employed in artisanal fisheries and indirectly employed approximately 100,000-150,000 people (Bland 1992). While agriculture is the primary means of subsistence, fishing is also an important economic activity in Malawi (Mkandawire *et al.* 1989).

While fishing contributes more than any other animal production activity to protein intake and employment in the developing countries, and fishery products are important for the food security of many coastal populations, many marine and fresh water resources are on the decline (Fabri 1996). Carner (1984) observed that rural communities are degrading the fish resource in an effort

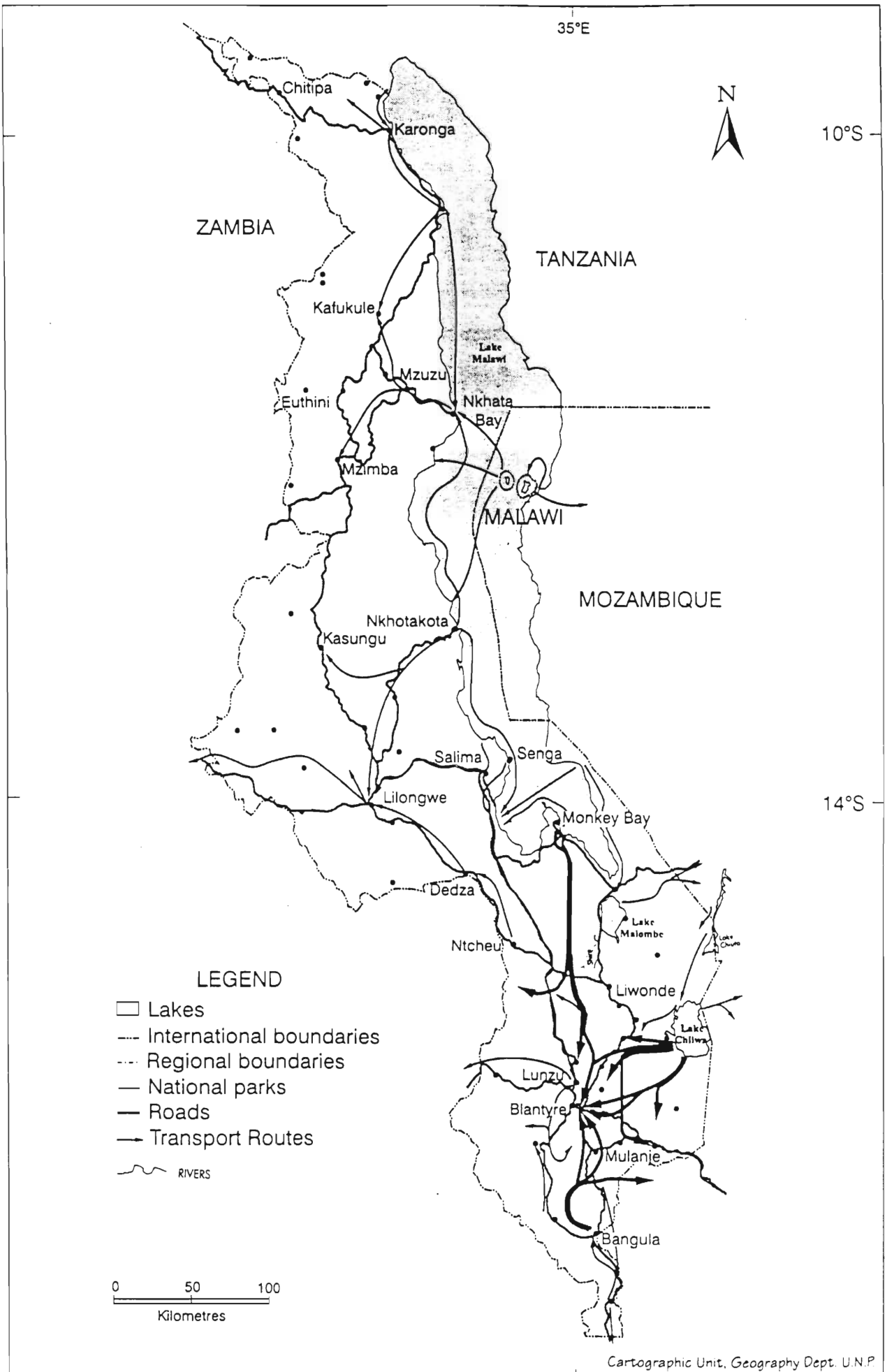
to earn a living. The industry is now characterized by low productivity, which has led to low levels of income among the fishing communities in developing countries (Carner 1984). Low-income levels among the poor reinforce over-fishing. It is now widely accepted that links between poverty, high population growth, and environmental degradation are circular and mutually reinforcing (World Bank 1994). “The poor in their efforts to survive add to the degradation of the natural resource base” (Carner 1984:143). The consequence is that the cycle of poverty, unless broken, condemns poor people to ever-worsening conditions. If these developments continue unchecked, a global fishery crisis is inevitable (Loayza 1992).

In order to reverse the situation, Goodland (1995) proposes a conceptual framework of integrated development that is sustainable which takes both socio-economic and environmental variables into consideration. Sustainable development is based on two propositions:

- reducing poverty and investing in people are essential for environmental sustainability; and
- promoting the efficient use of the resources benefits both the environment and the economy (World Bank 1994).

Investing in the enclave communities, with the aim of reducing poverty and population growth, is an urgent moral imperative and is essential, in the long run, in order to arrest over-fishing. For many of the enclave communities, earning more income or accumulating needed assets means, “mining” the limited fish resource accessible to them.

Malawi’s main fishery resources are Lake Malawi, Lake Malombe, the Upper Shire River, Lake Chilwa, Lake Chiuta and Lower Shire River (Map 1). Dominating Malawi’s inland waters is Lake Malawi. This is a massive, fresh water sea, which supports a wide variety of the fisheries. This thesis is based on Lake Malawi and Lake Malawi National Park in particular.



Map 1 : Major fishing areas and fish transport routes (Govt. of Malawi, 1983)

Three main types of fisheries exist on Lake Malawi, which include industrial (semi-commercial and commercial); ornamental and artisanal fisheries (Smith 1993; Munthali 1997). The Malawi Development Corporation (MALDECO) largely practises industrial or commercial fishing, which is highly mechanized. The semi-commercial fishery is made up of 16 pair trawl operators allocated fishing zones (Munthali 1997). In all, industrial fisheries contribute 25% of the fisheries' production on Lake Malawi (Smith 1993). The ornamental fishery does not deal with food fish species. It exports live fish, mainly the colourful rock-dwelling cichlids, locally known as *Mbuna*. It is believed that other fish species are also exported (Konings 1990b cited in Smith 1993). Artisanal or traditional fishery is the oldest and comprises small-scale fishermen who operate from villages scattered along the lakeshore. 75% of fish production on Lake Malawi comes from artisanal fishery (Smith 1993).

It is the artisanal fishery of the enclave villages of Lake Malawi National Park (LMNP) that this thesis is directed at. LMNP was established in 1980 to conserve selected examples freshwater fishes of Lake Malawi. The Park encases five fishing villages located on the beaches around the periphery of the Nankumba Peninsula. The enclave villages were designed to allow villages existing before the establishment of the Park to continue their traditional way of life undisturbed. The combined population of all five enclave villages is over 10,000 (Smith, 1993). These are predominantly fishing villages. Fishing is usually done from plank boats with or without outboard engines, and dug out canoes.

### **1.1.1 The problem statement**

Fish biologists report that Lake Malawi appears to be reaching its maximum sustainable yield and the species diversity of the lake is currently under threat (Mkandawire *et al.* 1989). At global scale, over-exploitation of fish is attributed to common-property of and free access to the resource, among other factors. "Fishing represents the best example of exploitation of common property resources" (Loayza 1992:ix). Bland (1992) observed that the common-property, open-access nature of the resource has been identified as one of the major factors leading to over exploitation. In addition to this, increasing human

population, coupled with technological advancement in fishing method; changes in climate, and sedimentation of the lake and rivers due to poor agricultural practices all contribute to declining aquatic resources (Munthali 1997; Ribbink<sup>1</sup>, pers.comm.).

While numerous biological studies of Lake Malawi's fish populations exist (Lewis *et al.* 1986; Bootsma 1992; Bootsma and Hecky 1993; Turner 1994, Tweddle *et al.* 1994; Banda *et al.* 1994; Banda and Tomasson 1997; Munthali 1997), hardly anything seems to be documented about socio-economic factors in the artisanal fishery (particularly in the study area) e.g. income earned, management systems; alternative income sources; and constraints on the activity (Bland 1992). The problem of over-fishing cannot be understood in isolation: the socio-economic factors of the fishery must be taken into consideration. This study focuses on the socio-economic aspects of artisanal fishermen in the enclave villages of Lake Malawi National Park.

### **1.1.2 The purpose of the study**

The aim of this study was to document and achieve an understanding of the artisanal fishery as it contributes to the socio-economic welfare of the rural population, particularly the enclave communities of the Park.

### **1.1.3 Specific objectives of the study**

The specific objectives of the study were to document and understand:

- resource use regime, particularly common-property regime as it relates to exploitation of fish resource;
- factors that influence fishermen to engage or not engage in fishing;
- role of women in the fishery;

---

<sup>1</sup>

Dr A.J. Ribbink is the Manager for SADC/GEF Lake Malawi/ Nyasa Biodiversity Conservation Project, Salima, Malawi.



- methods used in fishing and their impacts on the fishery and other factors of over-fishing;
- fish trading and consumption as they both relate to exploitation of fish;
- income earned and alternative sources of income;
- perception and attitudes of fishermen of the fishery;
- community-based structures as they relate to management of the fishery; and
- intervention options which may be necessary to ensure sustainable fishery.

## **1.2 Research methodology**

The field research was carried out between August and October 1997. The first two weeks were for identifying the issues in the enclave villages. Informal interviews were used with some members of the enclave villages. Following the identification of the issues, a number of questions were developed. These question were then tested in one of fishing communities, which happened to be outside the study area. The sole aim was to test whether the questions were clearly worded, understandable and answerable. This resulted in rewriting and reordering some questions, which gave a final product of an interview schedule (Appendix 1).

In the present study, information was largely collected by a survey that used structured interviews with gear owners, beach traders and crewmembers; semi-structured interviews with key informants, consumers, wholesalers and retailers; unstructured interviews for focussed group interviews and personal observation.

### **1.2.1 Structured interviews for gear owners, beach traders and crewmembers**

In the first place, all five enclave villages of the Park were sampled for the structured interviews. Each enclave village was considered as a stratum assigned to three groups of gear owners, crewmembers and beach traders. Three interviewers and the researcher himself interviewed a total random sample of 208 (Table 1.1) comprising of these three groups. This represented a 3<sup>rd</sup> of those involved in fishing activity.

Then a list of names for people owning fishing gear was obtained in each village with the help of a village headman and leaders of beach village committees. This formed a sampling frame from which a simple random sample was obtained by picking every 3<sup>rd</sup> name on the list. “In a simple random sample, each member of the population under study has a chance to be studied” (Cohen and Manion 1994:87).

Unlike with gear owners, it was not possible to get the list of beach traders and crewmembers as the two groups keep on changing. However, interviewing every 5<sup>th</sup> beach trader and every 5<sup>th</sup> crewmember found on a particular day drew the samples for the two groups.

The interview was done face to face and interviewers were not allowed to deviate from the wording of neither the questions nor the order in which they were asked and the interviewers asked questions and recorded the responses. This meant that information was collected through structured interviews.

Table 1.1 Sample size for the structured interviews in the enclave villages

Village	Gear owner	Crewmember	Beach trader	Total
Chembe	23	32	19	74
Msaka	28	23	12	63
Mvunguti	24	9	9	42
Chidzale	5	5	5	15
Zambo	5	3	6	14
Total	85	72	51	208

Enumerators were used for two reasons. First, to conduct the survey quickly thereby minimizing discussion and consequent influence on respondents. Second, it was felt necessary that enumerators from the same enclave villages (i.e. one from each village) be

used to minimize suspicion among respondents with regard to the objectives of the inquiry about the fishery. Third, since using names of gear owners drew the sample of the gear owners, there was need to have people among the interviewers who knew the respondents. Fourth, considering the high illiteracy levels in the study area, there was need for enumerators to translate questions used in the interview and recorded responses.

Co-operation from respondents was necessary considering the fact that the study was done on a population in a conservation area and generally relations between parks and adjacent communities have been described as tense all the time (IIED 1994, Panos 1997, Western *et al.* 1994). This research took place at a time when the relations were souring between the Park and the community. There were disagreements, with one of the enclave villages, over the government's proposal of shifting the park gate to a position where two of the enclave villages were going to be physically enclosed.

Enumerators were trained in the procedures of conducting an interview. They practised recording the responses in one of the villages for a day before actually embarking on the survey. Training is one option of reducing bias, so that an interviewer is more aware of the possible problems (Cohen and Manion 1994).

#### **1.2.1.1 Why structured interviews were used as a research tool**

It was possible for the researcher to make direct comparisons between responses given by different respondents given commonality of questions asked and the effort to standardise the interview experience. In doing so it ensured a degree of reliability of the findings (Cohen and Manion 1994).

Considering high illiteracy levels, particularly in the rural areas including the enclave communities, the face to face interviews made it possible for respondents to answer questions without any literacy skills. Kitwood observes that this is one way of collecting accurate data as long as the interviewer is able to establish a

good rapport, ask the questions in an acceptable manner and the respondents choose to co-operate (Kitwood 1977 cited in Cohen and Manion 1994).

The face to face interviews meant that someone was available to clarify the meaning of any confusing questions. For instance, it was possible for the interviewers to answer questions concerning the purpose of the study and clear up any misunderstandings that arose in the process of interviewing the respondents. Using interviews as a research tool, response rate is relatively high as compared to other methods such as mailed questionnaire.

Despite these advantages, structured interviews as a research tool have been criticised by a number of writers (Chambers 1983; Cohen and Manion 1994; Neuman 1994).

#### **1.2.1.2 How limitations of structured interviews were minimised**

In such cases where respondents provided inadequate information the interviewers were taught to probe for more information. Where the respondents seemed to give responses outside the interview schedule, interviewers were advised to direct the interview. Interviewers were also told not lead respondents to the answers to ensure that they did not seek answers that supported their preconceived notions on the subject matter.

Mindful of the fact that structured interviews are limited in both scope and number of respondents covered (Babbie 1992; Cohen and Manion 1994), independent checks with other more sensitive and in-depth techniques were done. These techniques included focus group interviews, key informants and personal observation.

### **1.2.2 Focus group interviews**

Focus group interviews<sup>2</sup> were used as one way of collecting information in this study. Enclave villages of Chembe and Msaka were chosen because they are two enclave villages with the biggest human population of the five enclave villages (Table 1.1). With the help of the three enumerators and the community leaders, the researcher was able to identify 24 people in each enclave village, which were split up in two groups. The respondents in this category excluded all those who were interviewed in the structured interviews. Consequently, there were two meetings for each village and each group comprised 12 members comprising gear owners, crewmembers and beach traders. These meetings were done on the same day to ensure that respondents from the two groups did not influence each other in their responses. The aim was to cross-check on certain issues that had cropped up in the structured interviews and have a wide scope of issues covered in this study. The focus group interviews were used as one of the tools of data collection because of the advantages which will be discussed below.

#### **1.2.2.1 Why focus group interviews were used as a research tool**

The focus group interviews were used because they are a valuable tool for collecting qualitative information (Anonymous 1997). This technique promoted discussion among respondents thereby yielding a wide range of information. It also exposed in-depth dynamics of issues with rich explanatory value, which was not possible in the structured interviews. It was possible to obtain information from a number of respondents within a short time. It was an efficient way of collecting data in terms of money and time (Cellier 1994; Cohen and Manion 1994). Focus group interviews as a research tool have limitations, which were taken into consideration in this study.

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A focus group interview is defined as a small group of people brought to a central location for an intensive discussion with a moderator who focuses on various issues in accordance with the general trend of the question area (Anonymous 1997).

### **1.2.2.2 How limitations of focus group interviews were minimised**

To ensure that every member of the group participated in the discussion, the researcher made sure every member of the group was given the opportunity to express his/her opinions. To avoid covering a limited number of issues, the researcher made a list of all issues to be covered and made sure all the important issues were tabled for discussion.

### **1.2.3 Key informants**

Considering that it is commonly possible to collect valuable information from a few members of the communities who are particularly knowledgeable about certain matters, the present study used key informants as one source of information. Based on the issues that were identified prior to the implementation of the structured interviews and following those came up in the structured interviews but required further investigation, the study used semi-structured interviews with key informants to get factual information needed for explaining the existing conditions. Key informants are defined as “individuals who are likely to provide needed information, ideas, and insights on particular subjects” (Kumar 1978b cited in Cellier 1994:103). For this particular study, it meant those people who are involved in fishing, community-based conservation in natural resources and fish research. Nichols concludes “key informants are most reliable on factual matters” (Nichols 1991:13).

As key informants, those involved in fishing, the researcher decided to talk the oldest fisherman in each enclave village. The aim was to get a historical perspective of the fishery with regards to methods used in fishing, abundance of fish, species of fish caught and uses of fish.

To get information on community-based natural resource management particularly in fisheries management, government officers practising community-based natural resource management were identified from the Departments of Fisheries and National Parks and Wildlife. For each Department, the head for extension services was interviewed. In

addition, the two extension officers (one from each Department) responsible for the study area were interviewed.

Considering that the on going Southern Africa Development Community (SADC)/Global Environmental Facility (GEF) Lake Malawi/Nyasa Biodiversity Conservation Project is one of the major fisheries research projects taking place on Lake Malawi, two key informants were identified from this project. They provided some insights with regards to fisheries management and the status of fish on the lake in general.

#### **1.2.4 Semi-structured interviews with wholesalers, retailers, and consumers**

The researcher conducted semi-structured interviews with retailers, wholesalers, and consumers at Lilongwe Produce Market (central region of Malawi). It was felt necessary to interview these people to get an understanding of the marketing situation of fish and to determine pressures on the fish resource. At random, 5 wholesalers, 20 retailers and 17 consumers were interviewed. Appendix 2 is a copy of the interview schedule used.

To get the sample of the wholesalers, with the help of the market master all wholesalers were identified. Then the researcher interviewed every 5<sup>th</sup> wholesaler. This resulted in 5 wholesalers interviewed. The same procedure was followed for the retailers. For the consumers, the sample was identified by interviewing every 3<sup>rd</sup> consumer that came to buy fish from the market each day the researcher visited the market.

#### **1.2.5 Personal observation**

Personal observations played an important role in exposing some issues pertinent to the aims and objectives of this study as discussed below.

At the landing site, the researcher was able to pick information on a number of issues. The issues included types of fish caught; types of crafts used in fishing; processing procedures and processing structures available at each landing site; roles of women as a lot of them

were seen processing fish through sun drying; and buying and selling procedures.

In the enclave villages, it was possible to get a picture of availability of cultivable land and provision of social infrastructure such as running water, schools, clinics markets, roads etc in each of the enclave villages.

At the Lilongwe Produce Market, it was possible to get information on types of fish available at the market; types of fish mostly purchased by consumers and magnitude of people buying fish at the market.

#### **1.2.6 Interpretation of data**

The present study relied on the perceptions and opinions of the enclave communities, including retailers and consumers, on the socio-economic aspects of the fishery.

Responses collected through open-ended questions in both structured and semi-structured interviews were coded (post-coded answers). Then frequency tallies were generated for both post-coded and pre-coded responses from all respondents. The frequency tallies that were obtained were then used to produce graphs and tables which provided the basis for description of perceptions and opinions on the fishery.

Responses from unstructured interviews with key informants and the focus group discussions were grouped according to similarities. This provided another basis for describing perceptions and opinions on the fishery. This led to the conclusion that fishing in the enclave communities is unsustainable. Based on this conclusion, possible socio-economic intervention options in order to avert the situation are discussed.



## **CHAPTER 2**

### **DESCRIPTION OF MALAWI AND THE STUDY AREA**

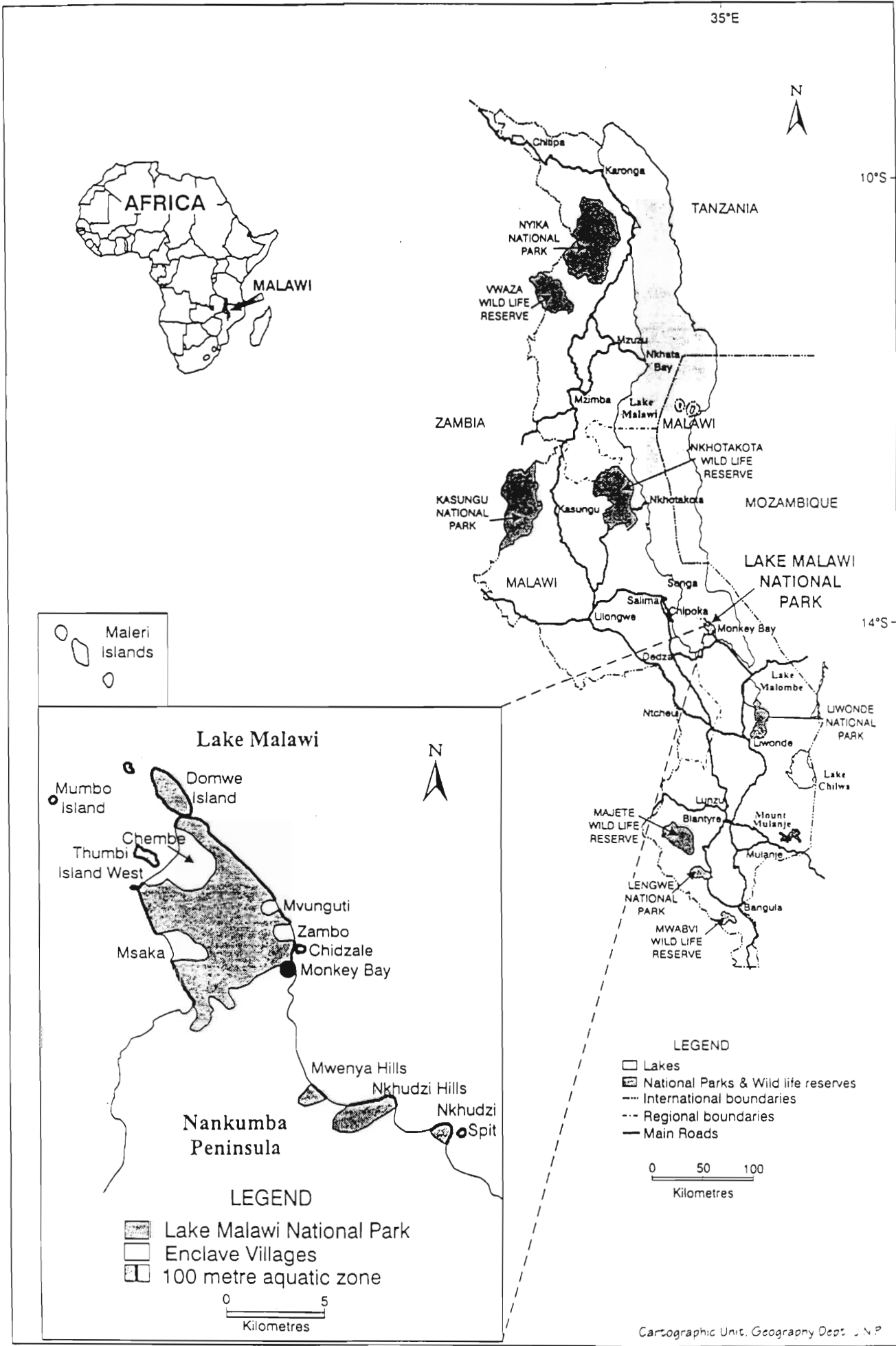
#### **2.1 Malawi**

##### **2.1.1 Geography**

Malawi is a landlocked country in southern Africa with a total area of 118,484 km<sup>2</sup>. 20% is under water, dominated by Lake Malawi. Other water bodies include Lakes Chilwa, Malombe, Chiuta and the Shire River and its associated marshes (Map1). Malawi lies between latitudes 9° and 17° South and longitudes 32° and 36° East, at the southern end of the Great East African Rift Valley. Its north-south length is about 900 km and its width varies from 80 km to 169 km. Malawi is within the tropics and shares boundaries with Tanzania, Mozambique and Zambia (Map 2). Administratively, Malawi has three regions and 26 districts.

##### **2.1.2 Demography**

Malawi's population is estimated to be 11 million with a population growth rate of 3.2% which translates into a doubling time of 21 years (Mzima 1996). According to Bland (1992), the population is projected to reach 12 million by the year 2000. The relatively high population growth rate is attributed to a high level of fertility (a total fertility rate is 6.7) and the declining mortality. Although the mortality rate is going down, infant mortality still remains high in Malawi at 134 deaths per 1000 live births. The persistent high birthrate has resulted in an increasingly young population. The average life expectancy at birth still remains low at 45 years (Bland 1992). The average population density is between 85-105 persons per square kilometre, higher than that of its neighbouring states and most African states (UN/GoM 1993 in Abbot 1996; Bland 1992).



Map 2 : Malawi and the Study Site at Lake Malawi National Park. (Modified from the National

The population is unevenly distributed among the three regions, as 50% is concentrated in the southern region, giving a population density of 125 persons per square kilometre. Population density for the arable land is estimated to be 1,732 persons per square kilometre. According to Bland (1992), this high density for the arable land makes 56% of the smallholder households own less than one hectare of land, below the minimum land holding size for food-sufficiency. This acute land pressure contributes to land fragmentation, persistent cropping, reduced soil fertility, food insecurity and environmental decay. Malawi is one of the world's five worst population situations with direct negative impacts on natural resources (Kalipeni 1994 in Mzima 1996). Increasing population decreases agricultural potential in other areas, hence many people migrate into the enclave communities to take up fishing (Bland 1992; Grenfell 1993). This may result in pressure on the fish resource and may eventually lead to low levels of income among the enclave communities.

The increasing human population in the enclave communities accelerates the rate of deforestation in the Park's terrestrial area (Smith 1993; Grenfell 1993; Abbot 1996). Deforestation leads to sedimentation of the Park's aquatic areas, which, in the long run, may affect the Park's fish species.

### **2.1.3 The country's economy**

Malawi has no mineral resources to exploit, rather, agriculture is the backbone of the economy. Limited resources coupled with rapidly expanding population constrain the economy. Agriculture generates between 37-40% of the Gross Domestic Product (GDP); about 90% of the national export revenue; and about 75% of total employment (Sahn *et al.* 1990; GoM 1985; UN/GoM 1993 in Abbot 1996). A number of crops are grown, including maize as the main staple food, sorghum, rice, millet, cassava and groundnuts. The main export crops are tobacco, tea and sugar, other minor cash crops are cotton, coffee and groundnuts.

Prior to the 1970s, economic growth was high, standing at the rate of 6%, which represented 3% per capita growth rate (Bland 1992). Although Malawi enjoyed a high economic growth rate prior to the 1970s, Malawi is still one of the world's poorest countries, with a per capita GNP of approximately US\$210.

The worsening of trade terms, the hike in oil prices, increasing global interest rates, growing dependence on agriculture as foreign exchange earner, and external problems as a result of the Mozambican civil war stagnated the economic growth of Malawi (GoM 1985 in Abbot 1996; Bland 1992; Sahn *et al.* 1990).

The relatively low GNP translates to poverty, particularly for rural communities (GoM 1996). The enclave communities are not any better than other rural communities (Bland 1993). Over-fishing is closely linked to poverty among the enclave communities (Bland 1993; Munthali 1997).

Agriculture in Malawi is dualistic in nature, divided into the small-scale (smallholder) and the estate sectors. The smallholder sector has about 1.6 million families cultivating approximately 1.8 million hectares for subsistence production and it is a major contributor to the nation's food production (Abbot 1996). Production from the smallholder sector has been low because of increasing human population (Pryor 1990). Poor agricultural production leads to food insecurity among enclave communities. If this happens could, in a way, influence over-fishing particularly when the communities rely only on fishing for their livelihoods (Sahn *et al.* 1990; Munthali 1997).

## **2.2 Lake Malawi**

Lake Malawi (referred to hereafter as the lake) is the southernmost basin in the African Great Rift Lakes system. Croft (1981) describes Lake Malawi as more of an Inland Sea than a lake, being 587 km long and up to 80 km wide. Its shoreline ranges from low-lying swamps through sandy beaches to steep hillsides plunging over a thousand metres into the lake. The lake is shared by

three countries Malawi, Tanzania and Mozambique but with the biggest share to Malawi (Map 2).

The lake is important to Malawi as a means of transport, a reservoir of fresh water, for production of hydroelectric power and provision of food and employment. The lake's outstanding feature is its fish. The lake contains the most diverse community of freshwater fish species of any lake in the world (Croft 1981; Lewis *et al.* 1986). Munthali (1997) observes that the actual number of species has not been verified. The fish species are estimated to be between 500-1000 (Croft 1981; Ribbink 1991 as cited in Munthali 1997; DREA 1994). Most of the fish belong to the family Cichlidae, of which all but four out of an estimated population of over 350 species are endemic to Malawi (Croft 1981).

The establishment of Lake Malawi National Park (LMNP) and its maintenance is crucial because it contains a remarkable natural heritage. The Park's ecosystem is the base for socio-economic development, not only for the enclave communities but also for the nation as a whole. LMNP offers both consumptive and non-consumptive uses of the fish resource.

## **2.3 Lake Malawi National Park (LMNP)**

### **2.3.1 Location**

LMNP, (referred to as the Park in this thesis) established by the Government of Malawi in 1980, is found in the southern end of Lake Malawi. The Park encompasses the northern end of Nankumba Peninsula (sometimes known as Cape Maclear Peninsula) and its offshore islands. It includes thirteen islands; several disjunct mainland portions and waters within 100 m of the shoreline of the terrestrial components (Map 2). The Park covers a total area of 93 km<sup>2</sup>. In recognition of the uniqueness of the Park, it was given the status of World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1984 (Bootsma 1992). According to Croft (1981); Grenfell, (1993) and Smith (1993) the main objective of establishing the Park is:

*to preserve a sample of lake Malawi biome, with particular reference to the rocky lakeshore and its specialist cichlid communities ....*

### **2.3.2 Flora and fauna of LMNP**

The most conspicuous and diverse fishes are the brightly coloured, small, rock-dwelling cichlids, locally known as *Mbuna* (Croft 1981) with over a hundred species in the Park area alone (Smith 1993), above half of the described species in the whole lake (Grenfell, 1993). Grenfell (1993) observes that Peter Davies introduced some cichlid species that did not exist in the waters of the Park in 1970. These species were taken from other parts of the lake that do not form part of the Park. According to Lewis *et al.* (1986), Fryer (1959) & Ribbink *et al.* (1991) in Smith (1993) these fishes are of a major ecological, evolutionary and tourist importance. The tourist attraction of the fish offers an opportunity for the enclave communities to improve their low income levels through the non-consumptive use of the fish resources such as tourism and other related activities. This may also help to bring about conservation of the Park's fish resources. Table 2.1 shows some of the cichlid species that are endemic to the Park.

Although the principal goal of the Park is to conserve the fishes, which live in the coastal waters, the terrestrial fauna also benefits from the protection offered by the Park. A number of mammal species exist (Appendix 3).

The terrestrial areas consist of steep slopes littered with large boulders and characterized by loose, sandy soils. The dominant form of vegetation is open-canopy *Brachystegia* woodland and some shrubs are replacing lost vegetation in areas of heavy deforestation (Smith 1993). The commonest tree species in the Park is *Brachystegia bussei* locally known as *miombo* (Grenfell 1993). Table 2.2 lists some of the dominant tree species of the Park.

Table 2.1 Some of the endemic cichlid fishes in LMNP

<i>Petrotilapia nigra</i>
<i>Pseudotropheus spp</i>
<i>Pseudotropheus ater Cynotilapia spp.</i>
<i>Labidochromis mylodon</i>
<i>Labidochromis pallidus</i>
<i>Melanochromis spp.</i>
<i>Otopharynx spp</i>
<i>Otopharynx lithobates</i>
<i>Petrotilapia spp</i>
<i>Pseudotropheus cyaneus</i>
<i>Pseudotropheus flavus</i>
<i>Pseudotropheus greshakei</i>
<i>Pseudotropheus heteropictus</i>
<i>Pseudotropheus xanstomachus</i>

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Source: modified from Grenfell, (1993)

The enclave communities collect a wide range of forest products from the Park woodlands (Abbot1996). Abbot (1996) argues that forest products collected from the Park woodlands play an important role in the socio-economic status of enclave communities. Utilization of the forest products by the enclave communities, to some extent, relieves pressure on the fish resource, although Abbot observes that the enclave communities collect forest products illegally from the Park’s woodlands. Dead wood can be collected from the Park’s woodlands with a permit from the Park management. The government may consider legalising the collection of the forest products particularly non-timber forest products (NTFPs) on a controlled basis (Abbot 1996).

Table 2.2 Common tree species of the LMNP

<i>Acacia albida</i>
<i>Acacia campylacantha</i>
<i>Adansonia digitata</i>
<i>Azelia quanzensis</i>
<i>Brachystegia bussei</i>
<i>Combretum spp.</i>
<i>Dalbergia nitidula</i>
<i>Diplorhynchus mossambicensis</i>
<i>Euphorbia bilocularis</i>
<i>Lonchocarpus capassa</i>
<i>Markhamia obtusifolia</i>
<i>Sterculia africana</i>
<i>Tamarindus indica</i>
<i>Thespesia garckeana</i>

Source: Grenfell (1993)

2.3.3 Enclave villages

The Park is unique in the sense that of all national parks in Malawi, it is the only Park that encompasses human communities (referred to as enclave communities in this thesis). Lake Malawi National Park was created on the understanding that enclave villages would not have to be moved (Smith 1993 citing Croft 1981). There are five enclave fishing villages, namely: Chembe, Chidzale, Zambo, Msaka and Mvunguti located on the beaches around the peninsula (Map 2). These villages are classified as artisanal fishing villages because the residents rely primarily on fishing, fish exporting and fish selling for their livelihood (Grenfell 1993).



### 2.3.3.1 Chembe fishing village

Historically, no people inhabited Chembe until 1880 (Grenfell 1993). Because of the large space of fishing beach and strategic positioning of the bay, availability of fish and availability of agricultural land, fishermen moved into this area, making it the largest of all enclave villages in the Park. Chembe is located on the northwest shore of the Nankumba Peninsula on the southwest arm of the lake (Map 2). The village has a beach of 3.5 km long.

Almost all residents of Chembe belong to a *Chewa* ethnic group. The population of Chembe is increasing with time (Table 2.3). Grenfell (1993) observes that the average of 3.2 people per household rose to 4.2 people per household in 1992. The 1992 WWF independent census indicated that approximately 50% of population in Chembe village is aged <15.

The high population growth rate increases the pressure on the fish resource and the available agricultural land in Chembe Village. The fact that half of the population represents the young age means that the population is growing exponentially which threatens the fish resource (GoM 1996).

In terms of facilities, Chembe Village has a primary school, there are a number of rest houses and restaurants, a produce market and several small shops. The road, which leads to the village, is impassable in the worst rainy season. In Chembe Village there is no clinic, maize mill, or borehole.

The poor road infrastructure cuts off Chembe community from markets for their products, particularly fish. The enclave communities are not able to meet high overhead costs resulting from poor road infrastructure, if anything fishermen are forced to sell their fish to middlemen at the beach at lower prices than at the market (Peacock and Parker 1983 cited in Hara 1993).

Chembe Village has a total of 1892 acres of cultivatable land, which according to Grenfell (1993) is virtually all used to grow maize crop. The production of maize for food only denies the community of Chembe an alternative source of income hence making them rely on fishing alone.

Table 2.3 Population for Chembe fishing village

Year	Resident	Intercensal %	Information source
1910	555		Ft Johnston District Notebook
1920	695	2.3	Ft Johnston District Notebook
1940	1135	2.5	Ft Johnston District Notebook
1966	1865	1.8	National Census
1977	2055	0.9	National Census
1987	3125	4.2	National Census
1992	4670	8.4	Independent Census, World Wide Fund for Nature (WWF)

Source: modified from Smith (1993)

2.3.3.2 Msaka Fishing Village

The first people to settle at Msaka Village were of a *Chewa* ethnic group from Ntcheu district of the central region. These first settlers were attracted to this place because they were able to make fishing nets from a locally found *thingo* tree (Grenfell 1993). These early settlers were later joined by a group of *Tonga* from Nkhata Bay, an ethnic group from the northern region of Malawi. Other ethnic groups followed them from Karonga, Mulanje, Mangochi and Thyolo. Msaka grew, making it the second largest enclave-fishing village of the Park.

Msaka is located on the southwest shore of the Nankumba Peninsula on the southwest arm of Lake Malawi (Map 2). The ethnic composition of Msaka Village can be described as 50% *Tonga* from the northern region, 40% *Chewa* who are native to the area and 10% are *Yao* of the southern region (Grenfell 1993). Just as at Chembe, population has increased steadily over the years (Table 2.4). A youthful population accounting for approximately 41% of the total population characterizes this population increase. The number of people per household, in 1992, was 3.4 persons.

The increasing human population in Msaka Village has negative connotations for the fish resource. More people depending on a limited fish resource leads to competition among the community which in turn reduces the per capita cash flow from the activity.

Table 2.4 Population for Msaka fishing village

Year	Population	Information source
1977	1546	National Census
1987	2441	National Census
1992	2534	WWF census

Source: modified from Grenfell (1993)

At the time LMNP was being set aside, Msaka Village had 352 acres of land for agriculture. All of it, by 1980, was under cultivation. In terms of basic social infrastructure, Msaka has a primary school, a number of restaurants, rest houses, shops and a market. A dirt road exists which periodically becomes impassable during the rainy season. There is no clinic, maize mill or borehole.

The impacts of inadequate land for cultivation, poor road network and lack of other social infrastructure discussed for the community of Chembe Village also apply to Msaka Village.

### 2.3.3.3 Mvunguti Fishing Village

Prior to its settlement as a fishing village, fishermen used Mvunguti as a landing site for fishing. In the 1960's fishermen from the northern region of Malawi, particularly from Karonga, Rumphi and Nkhata Bay districts, migrated into this area for fishing a small type of fish, locally called *usipa* (*Engraulicypris sardella*). The beach is 0.5 km in length. It is located on the northeast shoulder of Nankumba Peninsula (Map 2).

As pointed out by Grenfell (1993), 50% of the population of the village is *Tongas* and the rest are *Tumbukas* from the northern region. Table 2.5 shows the population distribution over the years. As in other enclave villages, the population of Mvunguti has increased steadily over the years.

As the case is with other fishing villages, Mvunguti Village has an inadequate social infrastructure. It has a number of small shops and a marketplace. There is no school which means children have to attend school in Zambo Village that is approximately 1km away. There is no road, transport is largely by boat or a canoe and a 1½-hour walk through the hills to the nearest urban centre called Monkey Bay. There is no clinic, residents go to Monkey Bay (Map 2). Just as there is an inadequate social infrastructure, there is no land for agriculture in this fishing village which means a heavy reliance on the Park resources such as fish and forest products for the community's livelihood.

Table 2.5 Population for Mvunguti fishing village

Year	Population	Information source
1977	661	National Census
1987	1682	National census
1992	2200	Estimate*

Source: Modified from Smith (1993)

\*Estimated by Grenfell (1993)

2.3.3.4 Zambo Fishing Village

Zambo is believed to have been named after a fish locally known as *chambo* (*Oreochromis spp.*). Supposedly it is where fishermen found large numbers of *chambo*. The village has a beach about 0.5 km long. Zambo is situated on the eastern shore of Nankumba Peninsula (Map 2). The population of Zambo has slowly increased over the period 1977-1992 (Table 2.6). In 1992 over 40% of the population were less than 15 years of age which represents a young population. In the same year the average household size was 3.2 persons.

In terms of infrastructure, Zambo has a market, a primary school and a few small shops. It does not have a maize mill, a clinic, a borehole, or a road. Transport is by boat or 2-Km walk to Monkey Bay.

Zambo has 90 acres of land for agriculture, which by 1980 was all under cultivation. Maize is the primary crop grown by the community of Zambo.

The disadvantages of subsistence agriculture, increasing human population and an inadequate infrastructure that have been discussed for other enclave villages are also applicable to the community of Zambo.

Table 2.6 Population for Zambo fishing village

Year	Population	Information source
1977	353	National census
1987	414	National census
1992	420	WWF census

Source: Smith (1993)

### 2.3.3.5 Chidzale Fishing Village

Chidzale is the most lately inhabited fishing village of all the enclave villages of the Park. It is believed that by 1980 there were only 17 homesteads. Its inhabitants came from the northern region of Malawi. It is situated on the eastern beach of Nankumba Peninsula (Map 2). It has a beach of 0.2 km long. Due to its young age, the village participated in 1992 WWF population census only, which recorded a total population of 175 residents with 4.3 persons per household (Smith 1993; Grenfell 1993).

No basic social infrastructure exists in Chidzale Village such as a road, clinic, school, market, shops etc. Residents have to travel either by foot or by boat to Monkey Bay for all the services. There is no land for agriculture in Chidzale which means residents rely wholly on the fishing for their livelihood.

The limitations on socio-economic development in the enclave communities and the negative impacts on fish resources of the Park of an inadequate infrastructure, increasing population, and a low agricultural productivity as discussed for other enclave communities also apply to Chidzale enclave community.

## **2.4 Summary**

The poor economic growth of the country leads to poverty among the enclave communities and other rural communities. The population is increasing in all enclave communities. The enclave communities are generally characterised by inadequate infrastructure, such as a poor road network, lack of health facilities and other social facilities. All this translates into poverty among the enclave communities. There is need to understand how poverty can lead to further degradation of the Park resources and how artisanal fishery can improve the economic status of the enclave communities which is pertinent to accomplishing conservation objective of the Park.

## CHAPTER 3

### ARTISANAL FISHERY IN MALAWI: AN OVERVIEW

#### 3.1 Introduction

This chapter will discuss the impact of the early fishing technology, limited trade in fish, low population and traditional practices on the fishery. It will argue how the coming of missionaries and colonialists, socio-economic forces such as high human population growth and the failure of management strategies imposed on the fishing communities may have exacerbated pressure on the fish resource.

#### 3.2 Original artisanal fisheries

The early stages of artisanal fisheries in Malawi can be understood by reviewing the fishing methods, uses of fish, traditional practices in fisheries management, low human population and its impact on the fish resources.

##### 3.2.1 Fishing methods and uses of fish

In the 19<sup>th</sup> century, fishing played an important role in the economy of the people particularly the *Mang'anja* tribe living along the lakeshore (McCracken, 1987a). The original artisanal fishing was predominantly male dominated and used kinship ties to mobilize labour (McCracken 1987a). The original artisanal fisheries used various types of nets, hooks, traps and poison (Banda & Tomasson 1997) and all gears were made out of locally available material. One of them was a local shrub called *thingo* from which fibre was used to make nets for open-water seine (*chirimila*) and gillnets locally known as *matchela* (Kapeleta 1980). Fish were eaten fresh within the household (Banda & Tomasson 1997) whereas dried fish was exchanged for agricultural products such as maize and beans in the nearby towns of Zomba and Blantyre (McCracken 1987a).



While fishing contributed to socio-economic welfare for the people living along the lakeshore, it was not the only source of people's livelihood. Fishing was not an all year long activity, as the case is today, and for most people fishing was not a full time activity as they were involved in farming and other non-agricultural activities (Kapeleta 1980; McCracken 1987a).

This resulted in the fishing activity being sustainable as little pressure was put on the fish resource. Excess labour was diverted to other economic activities such as agriculture, cotton weaving and salt-production. Not only did other economic activities divert labour but they also provided other sources of income which lessened the pressure on fishing for a living, and kept fishing resources at sustainable levels. This is in sharp contrast to the present situation in the enclave communities, which rely on the fishing activity for a living.

### **3.2.2 Traditional practices in artisanal fisheries management**

Fishing has not been restricted to particular fishing grounds (McCracken 1987a). It has been characterized by open-access where no individual had exclusive rights over fishing grounds. Prior to colonization, chiefs and village headmen through ritual practices regulated fishing. In the study area, as early as 1860, Yao chiefs through ritual practices controlled fishing. The traditional customs that regulated fishing included taboos, or normative religious beliefs (Munthali 1992).

The traditional customs regulated human dependence on fish resources in the study area. Munthali (1992) observes that dependence was harmonised and maintained because local fishermen and local leaders developed conservation methods based on the normative traditional and cultural values, which were adaptable and acceptable. Traditional conservation practices were about sustaining food supplies as well as cultural or religious heritage (Panos 1997). Any lack of support in conservation by the enclave communities may frustrate conservation efforts and puts a doubt on the survival of the Park.

### **3.2.3 Low population and fisheries management**

From 1901 to 1945, population for Malawi grew at an average of about 2.5% per year (Pryor 1990). Relatively lower than the current population growth rate of 3.2% per year. Hayes (1979) cited in Munthali (1992) observes that slave trade and diseases inhibited human population growth. Low human population may have placed less demand on the fish resources, unlike the current high population, which places a demand on the fish that cannot be met by the fish stock stocks.

The availability of off-farm activities, agriculture, sustainable methods of fishing, limited trade, traditional controls and low levels of human population regulated fishing to sustainable levels, which enabled human beings to live in harmony with the fish resources. After this period, the fish resources faced external pressures, some of which exist today.

## **3.3 Trends in artisanal fisheries**

The coming of missionaries and colonialists to Malawi may have led to some negative impacts on the fish resources.

### **3.3.1 The coming of foreign Missionaries**

The coming of foreign missionaries in Malawi is believed to have introduced some negative impacts on fish resource conservation practices, particularly the traditional controls practised by the natives. Elston (1975) cited in Munthali (1992) observed that missionaries suppressed those elements of culture of the native that contravened the missionaries' religious beliefs. This may have attenuated traditional practices that were pertinent to conservation of the fish resources. Munthali (1992) concludes that the coming of missionaries marked the dawn of an era that characterized the cultural weakening of some of the conservation based normative traditional beliefs in Malawi.

### 3.3.2 Colonization and fishing

By the late 18<sup>th</sup> century European colonial expansion and economic penetration in southern Africa began to cause major environmental changes (Grove 1987). Malawi became a British colony as early as 1891 (McCracken 1987b).

The coming of colonialists in Malawi brought a capitalist development, which created an economic opening for the country (McCracken 1987b). By 1931, fishing had become an important part of the colonial economy (McCracken 1987a). This meant expanding the fish market, which resulted in fishing becoming a major source of making money. Competition among fishermen ensued with an increase in beach effort through the use of new fishing technology.

This may have resulted in more pressure on the fish resource. Prior to this period, small forms of trading characterized fishing. Dried fish was exchanged for agricultural products such as maize and beans in the nearby districts (Kapeleta 1980; McCracken 1987a). Alder (1980), cited in Munthali (1992) argues that limited trade in fishing regulated the fish resources within sustainable levels for further exploitation. This meant expanding the market increased economic pressure on the fish resource as it widened fish trading. Fishermen on the southern arms of Lake Malawi (where the Park is located) started making a long distance journey into the Shire Highlands districts of Malawi where dried fish was sold at 3 times higher than it could be at the lake (McCracken 1987a).

The colonial government also introduced a hut tax<sup>1</sup> on the native communities (McCracken 1987b). This resulted in an additional pressure on fishing as it meant that apart from fishing for food and exchanging for agricultural products, fish had to be exchanged for cash in order to cover the hut tax (McCracken 1987a, 1987b).

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This was the amount of money each household had to pay to the colonial government for services rendered to the communities by the colonial government.

Between 1896 and 1897, the colonial government promoted under the relevant Acts of Parliament regulations for protection and control of vital ecological niches throughout the country (Hayes 1979 cited in Munthali 1992). This was the birth of a colonial concept of conservation, which hinges on sheltering nature behind official boundaries. This philosophy of conservation depends on laws promulgated and enforced by government (Munthali 1992; Panos 1997), and meant excluding people from the fish resources they relied on. Communities lost the rights they had had over natural resources. The consequence has been conflict between conservationists and the resource users. The establishment of LMNP was based on this philosophy which means that the enclave communities lost some of their rights over the fish resources they relied on. This has resulted in friction between the Park management and the enclave communities, which threatens the survival of the Park.

### **3.3.3 Socio-economic forces on the fish resources**

By the middle of the 20<sup>th</sup> century the rate of population growth in developing countries had arisen to unprecedented levels as mortality declined and life expectancy increased (World Bank 1992). An increase in population leads to an increased number of people entering the labour force. The land resource and the traditional land management have not been able to adapt to this pressure (World Bank 1992). Surplus labour results in migration of people. Low education levels make it difficult for the poor to move into new fields of employment (Bland 1993). This has triggered migration from other areas into the fishing communities where education is not so important.

Population growth leads to large family sizes, which have large number of dependants. This means increases in expenditures on health, food, education etc (Hulmer and Turner 1990). The household head, a fisherman in this case, is put under considerable pressure to provide cash for clothing, food, school fees, and other living expenses. In a study by Donda (1993) in Mangochi District (where the Park is located), 90% of fishermen fed 6 or more people. 12 % of the 90% feed more than 20 people per day and the highest

number of people being looked after by one fisherman reported in this study was 50. This indicates the increased pressure on the fish resource of the Park.

Severe deprivation of basic needs in terms of food, health, shelter, education and lack of means and opportunities to fulfil these basic needs (Bland 1993) characterises the rural communities, including the enclave communities. “In their marginal circumstances, they become degraders of the resources...” (Lewis 1988:18).

### **3.4 The current management of artisanal fisheries**

Having been exposed to these pressures, the fishery may start to show signs of over-exploitation, for instance, through low catch or low species diversity, which may eventually result in, economically inefficient fishery. The result has been a centralized fisheries management, which reflects the old colonial concept of conservation. The argument for this management set up is that it is only the government institution, which can ensure economic efficiency, equity and effective administration of the exploitation of the fish resource (Hara 1996).

#### **3.4.1 Management objectives**

The main objectives of introducing management of the fisheries are to prevent biological over-fishing and to maintain fish species biodiversity<sup>2</sup> within the ecosystem. The argument here is that if too many fish are caught the stock size will continue to decrease to a point where either all fish are caught or where it becomes so difficult to catch the fish that the fishermen are unable to make a living from fishing.

#### **3.4.2 Regulation techniques**

While the majority of the regulatory techniques have been developed to address the problems associated with commercial fisheries, they have also been enforced among the

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Biodiversity in this case refers to the great variety and variability of the fish species.

artisanal fishermen (Bland and Donda 1994). Regulations, which do not restrict access, have been and continue to be used in the management of the fish resources.

#### **3.4.2.1 Restriction of gear type**

Some fishing gears are not permitted because they are biologically damaging to the fish stocks. For instance, there is a ban on a local gear called *nkacha* in the artisanal fishery. While regulations have been used to regulate seine netting, they have negative impacts particularly on the poor fishing communities. Bland (1992) asserts that fishing gears that are restricted on the argument of biological damage incline to place the poorer fishing communities at a comparative disadvantage. The fishermen are denied the opportunity to reap the benefits of cost-effective technology.

#### **3.4.2.2 Restriction of gear selectivity**

Mesh size is regulated to prevent catching juvenile fish. This attempts to obtain and maintain the most productive or valuable age structure. Allowable mesh sizes for the gillnets is 50-125 millimetres whereas that for *chirimila* is 4cm and the central panel mesh size is 3 cm (Smith 1993). Bland (1992) argues that this method of managing the fishery will increase competition among fishermen in the areas where the resource is already under pressure. Competition among fishermen reduces individual returns from fishing, making fishing unrewarding economically. Once this happens, income levels become low and unsustainable which leads to declining fishery. Bland and Donda (1994) doubt the effectiveness of such management strategies, as it is likely that enforcement will be difficult and costly because of spatial distribution and dynamism of artisanal fishermen.

#### **3.4.2.3 Closed season and closed areas**

Closed seasons and closed areas contribute to management strategies and have a wide distribution among the tropical fisheries, developed both inadvertently and

purposely in both marine and fresh water environments (Bland and Donda 1994).

According to Bland (1992), closed seasons and closed areas have a degree of acceptability among fishermen, which enhances their legitimacy. Closed seasons entail prohibiting fishing during certain period of the year in order to preserve stocks during a critical period, say, the period of spawning. Closed areas represent those areas where fishing is prohibited. However, the closed seasons and closed areas may lead to fluctuating cash and food flows thereby becoming problematic for poor households in the enclave villages.

#### **3.4.3 Implications of the regulation techniques**

These techniques do not address the problem of open-access associated with the fish resource. They may protect stocks biologically but do nothing to improve the economic efficiency of the enclave communities (Hara 1996). The approach is often not suitable for Malawi because of its limited financial means and expertise to manage fisheries resources in widely dispersed fishing grounds (Pomeroy 1994 in Hara 1996). As a result, fisheries' regulations have not been adequately enforced. The result has been continued over-exploitation of the fish, which is showing signs of declining.

### **3.5 Summary**

In the early days, primitive technology, low human population, limited form of fish trading which involved exchanging fish for food, and traditional practices regulated the artisanal fishery in Malawi. The coming of the missionaries, colonialists and increasing human population led to the fishery to start experiencing pressure. The missionaries and the colonial government suppressed traditional practices that were pertinent to conservation of the fish resource. The increasing human population coupled with the incursion of the missionaries and the colonialists increased the volume of fish trade. Just as in the colonial era, the post-colonial government intervened with centralized management strategies that were externally formulated and imposed on the fishing communities. These strategies have failed to achieve the intended objectives, if anything the fishery is showing further signs of decline.

## CHAPTER 4

### FISHERIES MANAGEMENT: A CONCEPTUAL AND POLICY FRAMEWORK

#### 4.1 Introduction

This chapter reviews different approaches to the analysis of a common-property regime as it relates to loss of property rights among the enclave communities. It is contended that the establishment of the Park infringed on enclave communities' rights to fish in certain areas of the lake. Hardin's *Tragedy of the Commons* is analyzed and critically presented as it relates to utilization of the fish resource among the enclave communities and the threats posed both to the Park and the fish resource. A critique is given of the biological and economic models that have influenced the management systems of fish resource and have failed to solve the problem of over-fishing or to improve the socio-economic status of the enclave communities.

As an alternative to the two models (biological and economic), it is argued that there should be a shift to a community-based approach as a management tool of common-property resources, of which fish is one. Zimbabwe's Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) as one of such programmes is summarized and lessons for community-based fisheries management in Malawi and the enclave communities in particular are spelt out.

#### 4.2 Resource regimes

Bromley and Cernea (1989) define a resource regime as a system of rights and duties characterizing the association of individuals with one another with respect to a particular resource (fish in this study). Property, according to Bromley and Cernea, "is not an object such as land, but is rather a right to a benefit stream that is only as secure as the duty of all others to respect the conditions that protect that stream. When one has a right, one has the expectation in both the law and in practice that their claims will be respected by those with duty" (Bromley and Cernea 1989:5).

These resource regimes are categorized as: private property; common-property, non-property (open-access), and state property regimes. Different types of resource regimes and their



characteristics are summarized in Table 4.1.

Table 4.1 Summary of different types of resource regimes

State property	The state protects the fish resource on the behalf of the society. Individuals have a duty to observe use/access rules as determined by the state or the managing agency.
Private property	An individual has rights of exclusion and transferability, as well as access, withdrawal, and management.
Common-property	An individual possesses neither the right of exclusion nor the right of transferability but only the rights of access, withdrawal and management. The common management group (the “owners”) has the right to exclude non-members, and non- members have a duty to abide by the exclusion.
Non-property	No exclusive property rights to fish resources that may occur on the state owned or communal owned or private owned water bodies. No defined groups of users or “owners” and so the benefit stream is available to anyone. The fish is an “open-access resource”.

Source: Schlager (1990); Cousins (1992)

**4.3 Growing interests in common-property regimes over natural resources**

Bromley and Cernea (1989) argue that the emerging interest in the common-property regimes was not started by academics, rather it was a result of practical problems encountered by those wanting to introduce development interventions. It has become necessary for the development practitioners to understand the common-property regimes. Degradation of the Park’s fish resources cannot be addressed at grass-roots level, so long as the very nature of property and

authority systems over fish resources are seriously misunderstood in policy design (Bromley and Cernea 1989).

Historically, Hardin's (1995) *Tragedy of the Commons* has been influential in analyzing the common-property resource in Africa (Cousins, 1992) and all over the world. For some time now, Hardin's allegory of the *Tragedy of the Commons* has had a remarkable currency among researchers and development practitioners. Not only has it turned out to be an influential model within which a social scientist analyzes natural resource issues, but also it appears explicitly and implicitly in the formulation of many programmes and projects (Emmerson 1980).

#### 4.3.1 Hardin's *Tragedy of the Commons*

Using a grazing example, Hardin, argued that

*“whenever a number of herdsmen turn their cattle loose in a pasture that is jointly owned, the common will soon be ruined, because the pasture has limited carrying capacity and each herdsman gets full benefit of adding to the herd, while the drawbacks arising from over exploitation of resources are shared by all herdsmen”* (Hardin, 1968 in Ency. of Env. Biol. 1995:428).

Hardin's grazing example can be adapted to enclave communities. Each additional fishing craft that a fisherman brings to a communally owned fishing ground gives him or her profit which is a function of the increment of one fishing craft (Hardin 1984). The negative side is that any increase in fishing craft leads to a decline in the fish resources and the consequences are shared by all members of the enclave communities. Each fisherman in the enclave communities is thus locked in a system that induces him to increase his share without limits, in a resource that is limited (Bland 1992).

Since common-property nature of the fish resource encourages over-exploitation, private ownership of the resource is a viable option (Hardin 1984). The right of exclusion is critical. By excluding or preventing others from entering and harvesting from a resource, the individual who possesses the right of exclusion faces the incentive

to invest in increasing productivity or simply maintaining the resource (Schlager 1990). Alchian and Domsetz (1973 as cited by Schlager 1990) support Hardin (1984) as they observe that when the flow of units through a resource governed by communal property rights system becomes scarce, the units will be used up unless individual private rights systems are developed. The argument is that an individual member of the enclave communities is discouraged from investing in maintenance of the biodiversity of fish resources because the other members of the community will reap the benefits of his efforts. Scott (1955) in Arnason (1992), points out that a single informed owner of a fishery would not fall into the trap of excessive exploitation of a resource. Common-property of fish resource compels enclave communities to over-exploit fish stocks, even against their own better judgement. de Alessi (1980) in Schlager (1990), concludes that private property rights systems work better than common-property rights systems. Hardin (1984) is of the opinion that a fish resource as a common-property will survive under common-property systems only when the property owners appoint a manager to control its exploitation hence the establishment of the Park among the fishing communities of *Nankumba* Peninsula.

Hardin's postulations, which falsified the common-property regime, have come under fire from a number of scholars (Bromley and Cernea 1989; Cousins 1992).

#### **4.3.2 Weaknesses of *Tragedy of the Commons***

The emphasis of the model on privatization ignores the fact that efficiency of a private property regime will depend on the physical characteristics of the resource. Fish is a fugitive resource, which cannot be easily seen or easily enumerated and it is mobile. This implies that it is difficult to privatize ownership of fish resources among the enclave communities. In addition, there are spatial and seasonal variations in distribution of the fish resources (Netting 1976 in Schlager 1990). Thus, fish resources are valuable if they are held collectively among the enclave communities.

The *Tragedy of the Commons* model deflects the attention away from the traditional practices that are able to overcome degradation of the fish resources and make the

common-property regimes viable among the enclave communities (Bromley and Cernea 1989). The establishment of the Park under the phenomenon of the *Tragedy of the Commons* may have erred because it neglected the traditional conservation practices of the enclave communities, which enabled them to live in harmony with the common-pool fish resources. The establishment of the Park should have been accompanied by renewal of the traditional conservation practices among the enclave communities, which were weakened by infusion of missionaries and colonialism and socio-economic pressures.

It is apparent that the *Tragedy of the Commons* confuses an open-access regime (a free-for all) with a common-property regime. Ciriacy-Wantrup and Bishop (1975) as cited in Cousins (1992), argue that common-property is not “everybody’s property”. For instance, the community of that particular village communally owns the fishing ground in each enclave village. Common-property refers to a set of collectively held rights, which include the rights of access, withdrawal, management, and exclusion. They further argue that the concept “property” has no meaning at all without this feature of exclusion of all who are not either owners or have some arrangement with owners to use the resource in question (fish resource in this particular study). With the right of exclusion, members of the enclave communities would have the incentives to invest in the maintenance and use of the fish resource, since they would capture the benefit of their investment, (Ciriacy-Wantrup and Bishop 1975; Runge 1986, Bromley 1986 as cited in Schlager 1990).

Swallow (1990) in Cousins (1992) summarises the differences between common-property and open-access regimes. In common property:

- no single individual has exclusive rights to tap the resource;
- group members have secure expectations that they can gain access to future use of the resource;
- there are functioning membership standards;
- there are communally-defined criteria for resource use; and
- there is an enforcement device for disciplining deviant behaviour.

In open-access:

- there are no social authorities that define and enforce the rights of the individuals or the groups to use the resource; and
- each resource user ignores the consequences of his/her behaviour on others.

Runge's game theory, which is equally applicable to the enclave communities, explains that the decision to limit fishing for the survival of the fish resource is made by the group, where the crucial thing is the level of collective co-operation from the members. Over-fishing may not be the ultimate result of common-property, it is caused by the inability of group members to coordinate and enforce actions (Runge 1986 in Cousins 1992). Dahlman (1980) in Schlager (1990) concludes that common-property in some situations performs better than other property rights system, and cannot, therefore, by definition, be considered inefficient. The implication is that fish resources can survive among the enclave communities under the common-property regimes so long as the traditional conservation practices are revived and supported throughout by the Park management.

#### **4.4 Management strategies of fish as a common-property resource**

Fish resources are a common-property and are free goods for the individuals and scarce goods for enclave communities. Under unregulated exploitation, they can yield no rent. Economic rent can only be accomplished from fishing subject to a unified directing power (Gordon 1954 in Schlager 1990). This may have led to a belief that only government can solve the problem of degradation of the fish resources in the Park and outside it (Bromley and Cernea 1989). Consequently, nationalisation of the fish (as it is a common-property resource) with more scientific management has been the order of the day (Bromley and Cernea 1989). The decision-making authority of the enclave communities as the resource users has been replaced by top-down government control.

##### **4.4.1 Maximum Sustainable Yield (MSY)**

Maximum sustainable yield (MSY) is a typical biological measure designed to manage fish stock (Arnason 1992). It is a physical measure used to prevent biological over-

fishing and it also maintains biodiversity within the system (Bland 1992). This model imposes an upper limit on total allowable catch through such measures as area and seasonal closures, and gear type restrictions. If well adhered to, total allowable catch restrictions are well suited to conserving the fish stocks. Emmerson (1980) notes that by specifying yield that can be estimated for each species in a stock of fish, MSY offers an objective benchmark for use in setting goals.

Despite being a useful tool in fisheries management, the model has faced a number of criticisms. It has been noted that this management tool has not been effective as there is continued over-fishing all over the world. Limiting fishing effort by restricting type of gear has worked in reverse (Arnason 1992). Fishermen in the enclave communities have increased investment in variable inputs such as labour, net, more powerful outboard engines etc. In reality, this model has raised the effort and has encouraged capitalization in the fishing fleet among the enclave communities (Arnason 1992). This enables fishermen to fish for a shorter time but at the same level (Anderson 1986 in Schlager 1990). It has increased the cost of fishing among the enclave communities while failing in its purpose of reducing effort to a level that maximizes income. Income from fishing among the enclave communities may remain the same but capital and variable costs are higher than the returns, hence fishermen are operating on negative net profits.

MSY fails to pay attention to species interdependence, it assumes that the environment is stable and there is no chance of over-exploitation if effort cannot be reduced (Bland 1992). However, there are other factors like climatic changes, pollution, sedimentation etc. that contribute to degradation of the fish resource.

Setting and enforcing biological fishery restrictions among the enclave villages is invariably costly. Efforts to enforce the regulations have largely been unsuccessful for a variety of reasons, budgetary constraints being one of the most important of these (Hara 1996).

It is unlikely that fishermen in the enclave communities and managers will co-operate in keeping approximate track of the crude but important indicators of fishery biological health: fishing effort, catch weight and catch composition (Yap 1977 cited in Emmerson 1980). For the fishermen in the enclave communities it is an additional cost to them for no tangible returns. For them to keep records means they must have writing materials and writing skills which represent another cost to them. In such situations self-regulation offers the best prospects in managing the fish resource among the enclave communities.

#### **4.4.2 Maximum Economic Yield (MEY)**

Gordon (1955) in Arnason (1992) was one of the early economists who thought that the biological management tool of fisheries management should be replaced by MEY. It is defined as the difference between total cost, on the one hand, and the total proceeds (or total value of harvest), on the other. "Fisheries management, after all was meant to benefit man and not fish" (Gordon 1955 cited in Emmerson 1980:14). Gordon's thinking was centred on the common-property nature of the fish resource, which to him, was resulting in economic over-fishing. As more fishermen enter the fishing activity in the enclave communities, the catch has to be shared among more people, which results in low returns from fishing. The management tool proposed by Gordon (1955) aims at limiting fishing effort and capital to optimal levels so that the enclave communities are able to realize the potential economic benefits of the fishery (Arnason 1992).

This policy framework has not gone unopposed. Bromley (1969) in Emmerson (1980) noted that the failure of the model to include in its analysis the issue of distribution of the returns among fishermen renders it not useful in fisheries management among the enclave communities. The study shows that there are variations in the income from fishing among the members of the enclave communities, i.e. some earn more than others.

Arnason (1992) observes that while MEY might sound a viable management tool, it does not, in any case, achieve its objectives. Limiting effort does not help because effort is a composite of many things. Fishermen in the enclave communities resort to substitution, from restricted inputs to unrestricted. “As long as there is still economic rent in the fishery, there will be an incentive for fishermen in the enclave communities to find ways to bypass the restrictions” (Arnason 1992:5) thereby bringing the Park to a collapse.

According to Gordon (1955), for the fishing activity to be economically sustainable for the enclave communities, it is necessary to reduce investment in labour and fishing crafts. Cutting back on the labour force is an unwelcome move. Considering that the enclave communities have low levels of education, lack supplementary and alternative economic activities, it is not possible that they would abide by it. It would mean leaving a lot of members of the enclave communities virtually with no employment. Emmerson (1980) concludes that it is socially unjust to displace enclave communities from their employment. Social unsustainability among the enclave communities will lead to degradation of the fish resource (Goodland 1995) which is a menace to the survival of the Park.

These models have failed to integrate conservation and human socio-economic development. There is a need to consider alternatives, amongst which integrated conservation and development models are suitable.

#### **4.5 Community-based natural resource management (CBNRM)**

A centralized administration in common-property resource management may have been influenced by Hardin’s *Tragedy of the Commons* which postulated that common-pool resources are exposed to tremendous pressure by the resource users which if unchecked will lead the resources into extinction (Hara 1996). This led to a management approach that has been exclusively biologically aligned, whose rules were developed, founded on research findings and enacted on the enclave communities without their consultation (Bland and Donda 1994).



#### 4.5.1 Reasons for the shift from government led to CBNRM

The concept of community-based natural resource management, according to Little (1994) entails any of the following; local level, voluntary, people-centred, participatory, decentralised or village level. According to Little (1994), CBNRM should embody conservation of fish in the Park and outside it as one of its outcomes and it should be associated with some material benefit on the part of enclave communities. “Cases where local communities in low income areas manage their resource bases with the prime objective of conservation, rather improved social and economic welfare are virtually non-existent” (Little 1994:350).

There are a number of reasons why community-based conservation is important for the survival of the Park. Despite the quality of law enforcement with regard to conservation, the truth of the matter is that the enclave communities continue a day-to-day interaction illegally with the fish resources of the Park. It is further noted that, across the world, perhaps half of the protected areas are being encroached by humans (Borrin-Feyerabend 1996 cited in Kothari *et al.* 1997).

The government has increasingly become aware that centralized administration will not be able to carry out the task of managing the fish resource single handedly because it is usually under staffed, and underfunded (Rashid<sup>1</sup>, pers.comm.). Eventually, the government has turned to local communities for their support. It has been noted that communities’ involvement in common-pool resources management will help cut down on financial requirements on the part of the government, as the enclave communities will share responsibilities and benefits with the former (Kothari *et al.* 1997). With the autonomy conferred on the enclave communities, they should be able, in theory, to define their own preferences, they would develop at their own pace and their own way. They would learn their lessons and structure their own skills in the maintenance of fish resource as a common-property (Western *et al.* 1994).

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It has been argued in the previous chapter that traditional practices of conservation enabled humans to live in harmony with the fish resources. Klemeyer (1994) admits that cultural forms and traditions can be put to certain uses that are vital in meeting the difficult duty of bringing about enormous change in human sensitivity in respect to fish resource conservation as a common-pool resource.

Unfortunately, forces beyond control of the local communities have weakened the culture that formed the basis of fish conservation in the enclave communities. The shift from “top-down” approaches to community-based approaches will afford local communities opportunities to re-build their lost identities, restore their pride in their own innovative capacities, and protect their cultural uniqueness, if they so wish (Kothari *et al.* 1997).

Kothari *et al.* (1997) observe that all over the world, people are demanding a great voice in decision-making and have aspirations to re-establish some control over and right to the resources which sustain their livelihoods. This is true for the enclave communities. To this effect, the move towards CBNRM is a matter of primary human right and social justice to the enclave communities.

#### **4.5.2 CBNRM in fisheries management in Malawi**

When assessing the early failures in fisheries management all over the world, biological orientation is always singled out as the main causes (Bland 1992, cited in Bland and Donda 1995). The government has increasingly become aware that fisheries management is more about people than about fish (Bland and Donda 1995), and has realized that unless it works with local communities who rely on this resource for their day-to-day livelihoods, the Park will not succeed (Panos 1997). More than that, there is little or no point for the government to carry on with a strategy that cannot achieve its objectives because of lack of adequate funding (Hara 1996). It is not, however, worthwhile to hand over absolute control to the local communities (Hara 1996) because the enclave communities need allies, including the state, if they are to realize proprietary claims. They also require help from collective arrangements to overcome

internal conflicts and reach external actors. Local communities themselves look for integration with and need the assistance of actors in the outside world (Murphree 1994). In view of all these, co-management is a necessity between the local communities and the government in common-pool resource conservation (Lawry 1990 cited in Murphree 1994). The concept of co-management brings the traditional “top-down” management approach and the “bottom-up” strategy together (Donda and Mtika 1995). In other words, it means focussing on the enclave communities who bear the costs of conservation and on the government as patterners in development. In its broadest sense CBNRM includes natural resources or biodiversity protection by, for, and with the local community (Western and Wright 1994).

The government is making some strides in CBNRM within the fisheries management. A pilot project in community-based fisheries management was implemented around Lake Malombe and the Upper Shire River (Map 1). This area was given the first priority because the *Oreochromis* spp.(*chambo*), had declined in both Lake Malombe and the Upper Shire River and *kambuzi* (*Haplochromus* spp.) stocks were showing signs of declining (Donda and Mtika 1995).

Currently the government is making an effort to establish conservation structures at grass-roots level in the enclave communities of the Park which will be called Nankumba Peninsula Natural Resources Management (NAPENAREMA) (Zakohera<sup>2</sup>, pers. comm.).

#### **4.5.3 Experiences from other countries in CBNRM**

In southern Africa, known examples of CBNRM include Luangwa Integrated Resource Development Project (LIRDP), Administrative Management Design (ADMAD) both of Zambia, and Zimbabwe’s Communal Areas Management Programme for Indigenous Resources (CAMPFIRE).

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#### 4.5.3.1 Zimbabwe's CAMPFIRE

CAMPFIRE entails efforts by the Government of Zimbabwe to

- seek the free-will participation of communities in a strategy that embodies long-term resolutions to maintenance of natural resources;
- facilitate group ownership with specified rights of access to common-property resources; and
- promote formulation of local level structures to manage the common-property resources for the benefit of the communities themselves and the environment (Madzudzo 1996; Panos 1997).

CAMPFIRE has succeeded in:

- reviving the understanding among local communities of the interdependence between natural resources and local communities themselves;
- eradicating or curbing poaching of wildlife;
- facilitating local level natural resource institutions;
- rejuvenating conservation of common-property resources; and
- improving socio-economic status at both household and village levels (Murphree 1994; Nangati 1992, cited in IIED 1994).

CAMPFIRE has faced some limitations such as:

- failure of council members to devolve real responsibility and power to more local communities to manage their own natural resources (wildlife);
- corruption through embezzlement of funds (IIED 1994).

#### 4.5.3.2 Lessons for Malawi from CAMPFIRE

Notwithstanding its failures, CAMPFIRE “is becoming a test bed for people-centred conservation . . . ” (Panos 1997). It offers a number of lessons to southern Africa region.

CAMPFIRE has demonstrated that enclave communities who are daily in touch with the fish resource are the best custodians of the resource (Panos 1997). “There is a tradition among these and many other indigenous groups, of stewardship of the land and its natural resources . . . for survival and responsibility to the younger generations” (Klemeyer 1994:327).

Hara (1996) citing Ostrom (1994) warns of “blueprints” in community-based conservation in which policymakers and donors alike prescribe to the enclave communities what is to be done in a particular situation. Metcalfe (1994) highlights that the CAMPFIRE avoided using the technique of “blueprint” in its implementation. He gives an example of one ward where 80% of the revenue collected from safari contracts was given to the community without specifying the use of the money. Voluntarily the concerned villagers voted some of the money to acquire a grinding mill, clinic and schools while keeping a portion as household income. “The village became involved in its own land-use planning and the people built wildlife into range management plans” (Metcalfe 1994:181). This calls for “empowering people to mobilize their own capacities, . . . make decisions and control activities that affect their lives” (Cernea 1985 cited in IIED 1994:18).

CAMPFIRE demonstrates how to address the issue of rights of exclusion and inclusion among the enclave communities. Metcalfe (1994) observes that non-members or those who did not register did not benefit from the collections from CAMPFIRE which means that members have the right to exclude those outside, and in turn non members have a duty to abide by the ruling. This is an important condition for the fish resource as a common property to be sustained (Emmerson 1980; Schlager 1990; Cousins 1992). Each enclave village should be identified as a unit of production and this unit must be holding the proprietorship responsible for management and benefits and decision-making (Murphree 1993 cited in Metcalfe 1994; Madzudzo 1996). CBNRM will not succeed in the enclave villages so long as management boundaries in regard to

rights to access to the fish resource as a common-property remain obscured (Metcalf 1994). The government should officially grant community-based rights and demarcate the spatial boundaries of the existing systems (Lynch and Alcorn 1994). “When existing systems are rooted in the local ecology and already possess legitimacy in the minds of local people, recognition facilitates more environmentally and culturally appropriate evolution and development” (Lynch and Alcorn 1994:388).

CAMPFIRE has also demonstrated that production units should be identified in the enclave villages. These production units have to be small enough, encompassing a homogenous community (Madzudzo 1996) in order to maintain the fish resource within limits as set up by the social, economic, political and ecological constraints (Murphree 1993 in Metcalf 1994). “A communal resource-management regime is enhanced if it is small enough for all members to meet face to face, to enforce conformity with rules through peer pressure, and to create a long-standing identity” (Metcalf 1994:182).

If the problem of over-fishing as a result of uncontrolled fishing which is associated with common-property nature of the fish resource is to be dealt with, CAMPFIRE has shown that the enclave communities have to formulate rules, monitor and enforce them effectively (Metcalf 1994). Appropriators who violate operation rules should be brought to book by other appropriators (Hara 1996) and if necessary by the government.

#### 4.6 Summary

Property rights is one of the issues in the management of the fish resource as a common-property resource and in this study, in particular that have to be considered. First, the establishments of the Park made enclave communities lose some of their rights to fish in certain areas. Second, the property rights are not properly defined among the enclave communities with regard to fish as a common-property resource hence it has been so over-fished that it is showing signs of decline.

Centrally formulated and enforced management strategies have failed to address the problem of over-fishing thereby making the fishery unsustainable. In an effort to redress the problem, CBNRM by analysing CAMPFIRE is advocated as a strategy for management of the fish resource among the enclave communities.

CHAPTER 5

ANALYSIS OF FINDINGS

5.1 Introduction

The first section of this chapter gives details of the socio-economic background of respondents in the enclave communities with respect to age, gender, educational attainment, crops grown, livestock owned, and provision of supplementary and alternative economic activities. The next section analyses fishing methods and the catch composition in the enclave communities. This is followed by a qualitative assessment of fish stocks by respondents with regard to missing food fish species and declining catch, and respondents’ opinions about the declining fishery. Then the chapter highlights on the existence of traditional controls in fisheries management among the enclave communities. An account of fish marketing which deals with the market channels, pricing, distribution and fish consumption is given. The chapter closes by synthesising the major findings.

5.2 Socio-economic background of respondents in the enclave villages

5.2.1 Age of respondents in the enclave villages

Table 5.1 shows that 1% of those who have fishing gear are aged 17 and below. 40% of gear owners are aged 40 and above. The crew has 16% aged 17 and below. Most (46%) of the crew are in the age group 18-25. 49% of the beach traders are aged between 26 and 35 whereas those in the age group 18-25 represent 28%.



Table 5.1 Age distribution (%) of gear owners, crew and beach traders

Category	Age group in years				
	<17	18-25	26-35	36-40	>40
Gear owner (n = 85)	1	18	27	14	40
Crew (n = 72)	16	46	19	7	12
Beach trader (n = 51)	2	28	49	12	9

An examination of findings on entry age into the fishing activity revealed that 18% of the respondents started fishing activity while they were less than 10 years old. At the age of 10 and below, one would enter the fishing activity to help with processing of the catch, repairing of fishing gear or sitting on the boat, until one has grown old enough (15 years and above) to be a member of the crew (personal observation). This may also indicate that entry to the labour force within the fishing activity is not restricted. 40% entered the fishing activity when they were aged between 10 and 20 whereas 22% started fishing activity between 21 and 30 and 20% entered the fishing activity aged 30-40 (Table 5.2).

Table 5.2. Entry age distribution (%) into fishing activity among the enclave communities (n = 208)

Age group in years	Respondents %
<10	18
10-20	40
21-29	22
30-40	20

Two main reasons attract people into fishing activity: fishing for food for the household (40%) and for cash (for food and services) which accounted for 55%. Other minor reasons (such as out of interest) make up 5% only.

**5.2.2 Gender of respondents in the enclave communities**

Among the gear owners 83% are men and 17% are women. All crewmembers are men. 84% of the beach traders are women whereas 16% are men respectively (Table 5.3).

Table 5.3 Gender distribution (%) amongst gear owners, crew and beach traders

Group	Sex %		
	Male	Female	Total
Gear owner (n = 85)	83	17	100
Crew (n = 72)	100	0	100
Beach traders (n = 51)	16	84	100

Further analysis of the findings on the roles of women in the fishery has shown that women engage in processing the catch, and selling the catch either at the landing site (within the village) or in the markets in both urban and rural areas. According to the findings of the present study, women engage in fish buying to supplement the husband’s catch in the household.

**5.2.3 Marital status of respondents in the enclave communities**

Marital status for the gear owners is as follows: married 86%, divorced 2%, widowed 5% and single 7%. For the crew, 58% are married, 6% are divorced and 36% are single. For the beach traders 77% are married, 12% are divorced, 6% are widows and 5% are single (Table 5.4).

Table 5.4 Distribution (%) of marital status amongst gear owners, crew and beach traders

	Marital status %			
Group	Married	Divorced	Widow	Single
gear owners (n = 85)	86	2	5	7
Crew (n = 72)	58	6	0	36
Beach traders (n = 51)	77	12	6	5

The relatively high percentage of respondents who are married among gear owners and beach traders relate to their relatively old age. The relative young age among the crew explains the high percentage of respondents who are single.

Distribution of household heads among the gear owners indicates that 86% are household heads and 14% are just members in their respective households. In the category of the crew 56% are household heads and 44% are dependants. In the beach traders' group, 21% are household heads and 79% are ordinary members in their respective households (Table 5.5).

Table 5.5 Distribution (%) of household heads amongst the gear owners, crew and beach traders

Category	Household head	Dependants
Gear owner (n=85)	86	14
Crew (n = 72)	56	44
Beach trader (n = 51)	21	79

The findings reveal that there are some families, which are female-headed households. Two types of female-headed households are identified. On one hand there is *de facto* where the male partner is temporarily out to work, on the other hand, the *de jure* female-headed household is when the partner has left permanently which could be a result of death, or divorce. Without necessarily losing sight of the fact that not all female-headed households are poorer than the male-headed, such households are rendered vulnerable, i.e., high risk of food insecurity. A community with many female-headed households is not conducive to both socio-economic development and conservation because they are by and large, associated with poverty, which may promote over-fishing among the enclave communities.

#### **5.2.4 Highest level of education attained by the respondents in the enclave villages**

Figure 5.1 shows that the majority of the respondents in the sample, 65%, 71% and 71% of the gear owners, crew and beach traders respectively, have attained basic primary school qualification. A small proportion of respondents in all three categories indicated that they attained secondary school education. 4% of gear owners have gone as far as tertiary education but none has done so for the beach traders and the crew. Figure 5.1 further shows that the highest proportion of respondents who have no formal education occur in the category of beach traders.

A relatively high proportion of respondents without education among the beach traders may reflect the gender inequality in provision of education since over half of this group are females. For the crew, high proportion of those who have not attained tertiary education may be accounted by their relatively young age i.e. they are school schooling. It may also be indicative of the fact that fishing attracts young people to join the activity thereby promoting school dropout among the youth.

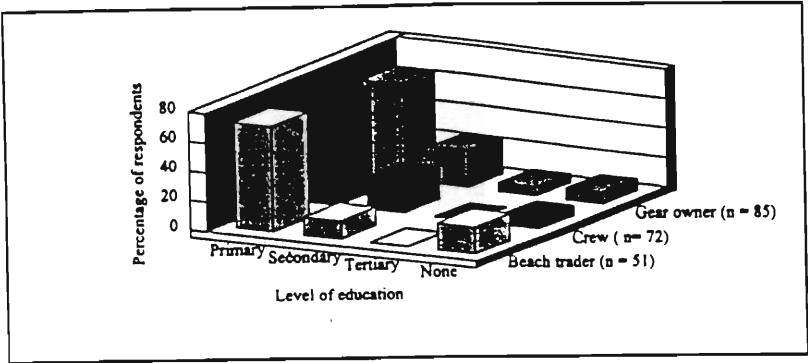


Figure 5.1 Distribution (%) of education levels amongst gear owners, crew and beach traders

**5.2.5 Crops grown and livestock owned by the household in the enclave villages**

Improved socio-economic conditions may relieve the pressure on the fish resource. In the present study respondents were asked which crops they had grown in the last 12 months and livestock they own, and what income was earned from farming and livestock.

The primary crop grown by the households in the enclave villages is maize (Figure 5.2). Other crops grown are sorghum and groundnuts. Some respondents indicated that they did not grow any crops (Figure 5.2). All those respondents who grow maize crop indicated that maize is used mainly for food for the households

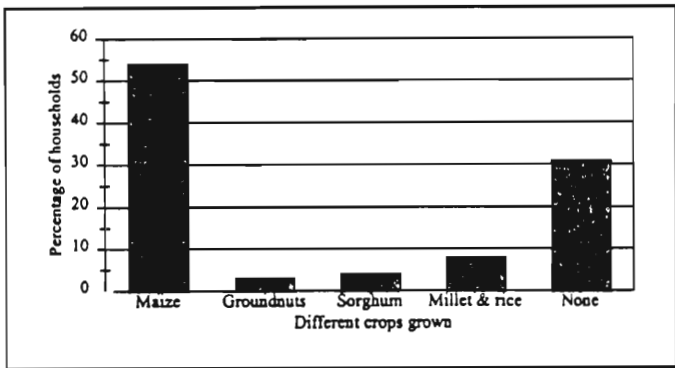


Figure 5.2 Distribution (%) of households in the enclave villages cultivating different crops (n = 208)

The findings on livestock show that by far, the majority (90%) of respondents does not have any type of livestock. Only 10 % have livestock, which includes poultry (chickens, ducks), goats and a small proportion of cattle (Figure 5.3).

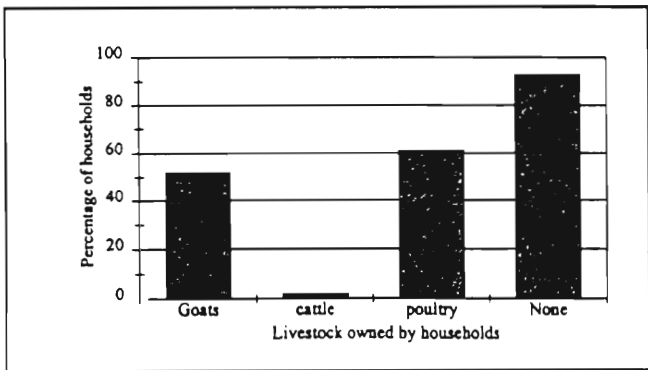


Figure 5.3 Percentage of households who own Livestock in the enclave villages (n = 208)

The present study faced some constraints in analysing the income earned from crops and livestock for three main reasons. First, records of their income are not kept which is not surprising given the high illiteracy levels among fishing communities. Second, they are not required to keep any records of their activities. Third, there was reluctance to reveal financial transactions from their activities.

It appeared that crops and livestock do not provide substantial income to the households in the enclave villages. 12% of households that grow crops estimated a yearly income of between Malawi Kwacha (MK) 100.00<sup>1</sup> and MK500.00. 6% earn over MK1, 000.00 in a year from crops. The rest earn <MK 100.00 in a year.

Households that own livestock estimate a yearly income of between MK100.00 and MK500.00 (18%) and 10 % earn over MK1, 000.00 in a year from livestock.

#### **5.2.6 Supplementary and alternative economic activities**

Many respondents (79%) revealed that they do not have any supplementary or alternative sources of income and only 21% of the respondents have other sources of income. Table 5.6 shows the distribution of the alternative sources of income among those involved in fishery.

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<sup>1</sup> One South African Rand = MK8.00

Table 5.6. Distribution (%) of alternative sources of income  
Amongst those involved in the fishery (n\* = 44)

Source of income	%
Pension	5
Part time employment	3
Transporter	10
Small business(firewood & tomato selling)	33
Grocery	23
Resort owner	2
Tour guide	24

\*Question answered by only those who indicated that they had other sources of income

For those with part time employment, some are employed as support staff, for instance, at the Park administration office, rest houses, tourist lodges etc. For those households, which earn an income from being transporters, the mode of transport includes cars, canoes and boats. Those doing small businesses engage in selling firewood and tomatoes. The job of tourguide is mostly taken by the youths that are part of the crew. They usually go fishing at night and during the day they work as tourguides (Table 5.6).

### 5.3 Types of gear used in the fishery by the enclave communities

Gear type used in fishing influences both the catch and the catch composition. In Malawi artisanal fisheries are characterized by a multi-gear and multi-species use. Based on the sample of the crewmembers, in the enclave communities the open-water seine net locally known, as *chirimila* is the commonest (63 %) type of fishing gear used which is followed by gillnets (16%). Beach seine and longlines comprise 16% and 7 % respectively (Figure 5.4).



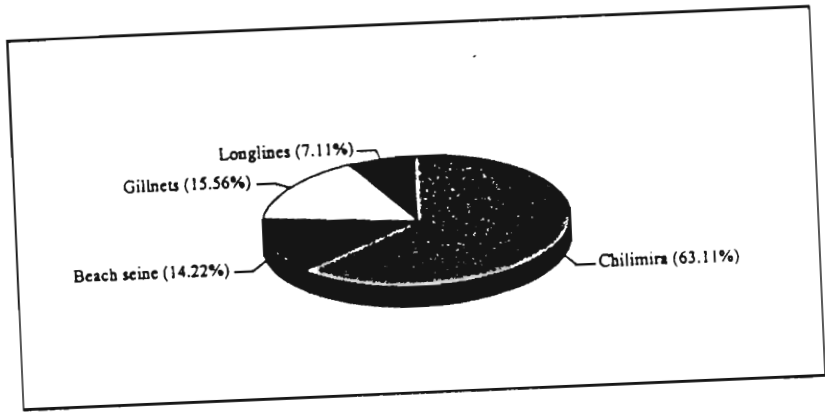


Figure 5.4 Distribution (%) of gear types used by the enclave communities (n = 157\*)

\*Question answered by gear owners and crewmembers only.

5.4 The catch composition

*Usipa* (*Engraulicypris sardella*) is the main catch (41%) in the study area. *Utaka* (*Copadichromis virginalis*) is another species that dominates in the catch (38%). *Kampango* (*Bagrus meridionalis*), *ncheni* (*Ramphochromis spp.*) and *bombe* (*Bathyclarias spp.*) constitute 13%, 6% and 1% respectively of the catch in the study area (Figure 5.5).

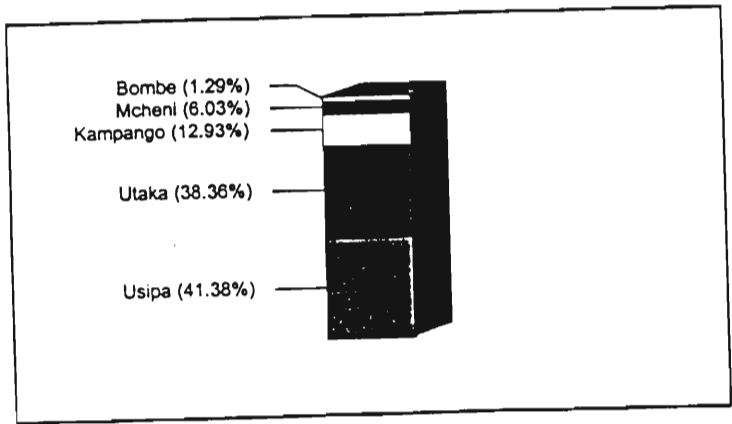


Figure 5.5 Distribution (%) of catch composition categorized according to the local names (n =157)

**5.5 Qualitative fish stock assessment by the enclave communities**

Qualitative assessment of the fish stock by those involved in the fishery provides insights into perceptions of existing conditions of the fish resource, particularly food fish species.

The questions included fish species that do not appear very often in their catch but were there in the past; respondents were asked to compare the catch of the last 12 months to that of 5 years ago; and the catch / unit of effort of 5 years ago to that of the last 12 months.

**5.5.1 Fish species reported missing by the enclave communities**

Figure 5.6 shows that most respondents (25%) reported that *nchila* (*Labeo mesops*) is missing from the catch followed by *ngumbo* (*Barbus johnstonii*). It was reported that *sanjika* (*Opsaridium microcephalum*) is also missing from the catch. Although *utaka* is one of the species that is still caught in the study area, it was observed that it is becoming rare as compared to its quantity in the past. Other species reported scarce are *chambo* (*Oreochromis spp*), *kampango* (*Bagrus meridionalis*), *ningwe* (*Labeo cylindricus*), and *mpasa* (*Opsaridium microlepis*).

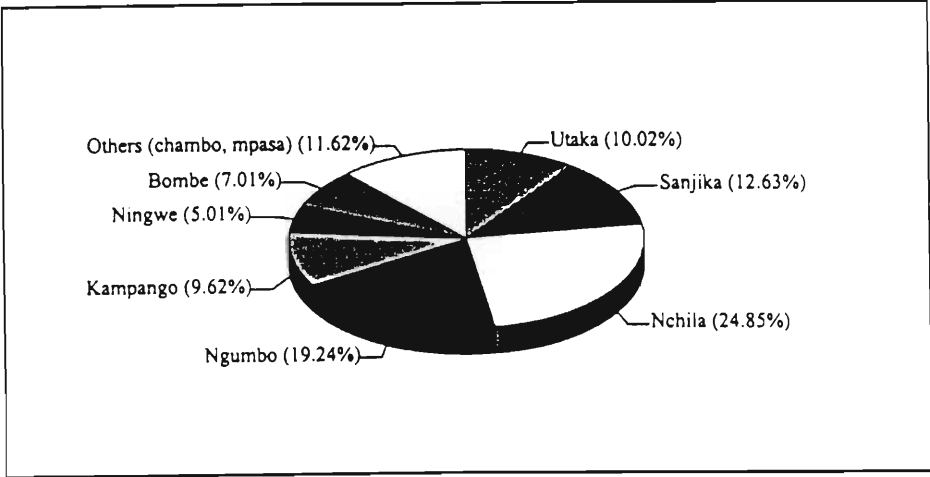


Figure 5.6 Distribution (%) of fish reported missing categorized according to local names (n = 157\*)

\*Question answered by crewmembers and gear owners, each respondent giving more than one response

5.5.2 Opinions of the declining fishery

Since the enclave communities are aware of the declining food species, their opinions of the causes and control measures to be put in place are essential for achieving sustainable use.

Opinion (of the sample of the enclave communities) on the declining fishery shows that 61% of the respondents strongly agree; 22% agree; 9% disagree and 7% remain neutral or they are unsure of the situation (Figure 5.7).

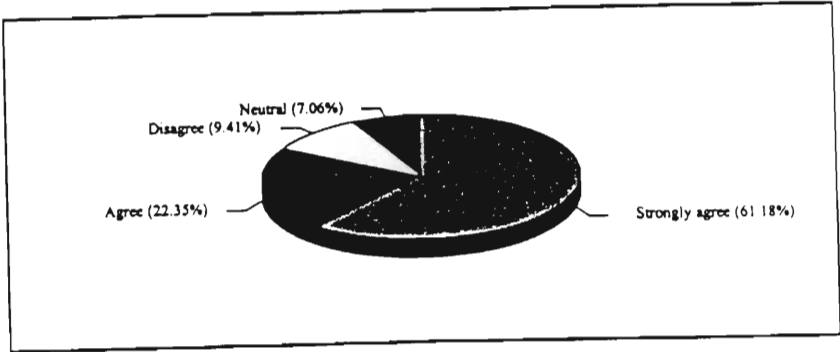


Figure 5.7 Distribution (%) of responses enquiring as to whether the fishery was declining (n = 208)

Comparisons between the catch of the last 12 months and that of 5-10 years ago showed that 84% of the interviewees observed that the catch is going down as compared to 5-10 years ago. 11% thought that the catch is increasing; and 5% indicated that there is no change between the two (Table 5.7a).

Table 5.7a Distribution (%) of responses comparing catch of the last 12 months and that of 5 years ago (n\* = 157)

Opinion	Percentage
Catch of last 12 months has increased	11
Catch of 5 years ago is more	84
Catch has remained the same	5

Subjective assessment of the catch/ unit of effort by respondents in the enclave communities shows that 89% believe that catch/unit of effort has decreased; 10% think that it has not changed; and 1% believe that the catch/unit of effort has improved (Table 5.7b)

Table 5.7b Distribution (%) of responses enquiring whether the catch/unit of effort is declining (n\* = 157)

Opinion	Percentage
Has decreased	89
Has remained the same	10
Has increased	1

\*Questions answered by the crew and gear owners only.

5.5.3 Perceived causes of the decline of the fishery

The perceived causes for the declining fisheries are: increasing human population (38%); fishing methods (25%); big commercial companies (19%); God’s creation (7%); and climatic change (8%). 3% of the respondents had no idea of the possible causes of the decline of the fishery (Table 5.8).

Table 5.8 Distribution (%) of perceptions of the causes of declining fishery among the enclave communities (n = 172\*)

Variable	Percentage
Poor fishing methods	25
Population pressure	38
God’s nature	7
Climate change	8
Big commercial companies	19
No idea	3

\*Those respondents who agreed that the fishery is declining. One respondent was giving

more than one response to one question.

**5.5.4 Corrective measures to fisheries management as suggested by the enclave communities**

Surprisingly, only 10% of the respondents felt that for the fish resource to be properly managed there is a need for community participation in management initiatives. Other possible control measures suggested were, fishermen should be encouraged to use proper fishing gear (27%); promote fish farming to meet the demand for food thereby reducing pressure on the lake fishery (7%). 7% of the respondents observed that the socio-economic status of the enclave communities should be improved by providing income-generating activities. 11% pointed out that the big commercial companies should reduce fishing. 13% are of the opinion that nothing should be done because fish is the only means of survival among the enclave communities. 8% had no idea as to what needs to be done (Table 5.9).

Table 5.9 Distribution (%) of suggested control measures to the fishery (n = 172\*)

Control measure	Percentage
Communities to be involved	10
Do nothing fish is for survival	13
Use proper fishing methods	27
Construct dams for fish farming	7
Reduce fishing for commercial purposes	20
Follow family planning	8
provide income generating activities	7
No idea	8

\*Respondents who agree that fish resource is declining. One respondent was giving more than one response to a question.

## **5.6 Pressure placed on the fishery by the enclave communities**

As the number of fishermen utilizing fish resource (in this case the beach fishers) increases, competition among fishers becomes such that returns start to reduce. Fishers will tend to invest more in labour and fishing gear. In order to understand this scenario in the enclave communities, respondents were asked whether they had plans to invest more in fishing gear or whether they planned to leave the enterprise. The crew and beach traders were also asked whether they had any plan to quit the enterprise.

### **5.6.1 Increasing fishing gear by the gears owners in the enclave communities**

Most (85%) gear owners indicated that they had plans for increasing fishing gear and 15% indicated that they had no plans for increasing fishing gear. The main reason given for increasing fishing gear is to increase the catch rate in the face of stiff competition. Increasing catch brings more food and cash to the household.

Four main reasons for not increasing fishing gear as given by the gear owners were: satisfied with the prevailing conditions (25%); low catch (50%); lack of money to buy extra gear (20%); and old age (5%).

### **5.6.2 Plans to quit the fishing activity**

Seventy percent of the respondents (gear owners, crew and beach traders) revealed that they did not have any plans to quit the enterprise because they were satisfied with the activity and they had no start-up capital to engage in another economic activity. Those (30%) who indicated that they would like to leave the enterprise reasoned that they might do so because of low catch (53%), low prices (36%), and no interest (3%). Some (8%) indicated that they would not necessarily quit the enterprise, rather they planned to diversify their economic activities by engaging in small businesses like starting grocery

shops, selling second hand clothes etc. These responses accord with those relating to acquisition of additional fishing gear.

**5.7 Community institutions in fish resource management among the enclave communities**

In 1996, DNPW set up Natural Resources Committees (NRCs) among the enclave communities. Only 39% of respondents indicated that they had heard about their existence. Most (71%) of the interviewees did not have any knowledge about NRCs.

It was further observed by those respondents who knew of the existence of NRCs that NRCs were introduced for the purpose of starting guinea fowl farming in the study area with the sponsorship from the 5<sup>th</sup> Country United Nations Development Programme (UNDP).

Opinions on the current fisheries legalisation revealed that 69% of the respondents were concerned because the current Fisheries Legislation discriminates against them. The rest (31%) indicated that they were not concerned with the legislation.

66% of respondents were of the opinion that enclave communities should have local institutions<sup>2</sup> for fisheries management; 29% believed that the government should continue managing it alone; and 5% wanted the fishing communities to manage the fish resource on their own (Table 5.10).

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<sup>2</sup> Institution, in this case refers to the organizations at community level which bring together a group of people with some common interest (Murphree, 1994).



Table 5.10. Distribution (%) of preferences for management options among the enclave communities

Management option	Percentage
Government continue controlling	29
Communities manage alone	5
Government and communities	66

5.8 Economy of fishing in the enclave villages

5.8.1 Marketing channels

Marketing channels are very important as far as profit margins for the fishers are concerned. The more people that are involved in handling fish before it gets to a consumer the lower the profits to the fishermen. If the fisher is cut off in the chain, right at the beach level, the returns are meagre.

In this study, interviews with key informants showed that the fish, like many market commodities, change hands before reaching the consumer. This may take any of the following scenarios:

- at the landing site fish is sold unprocessed to a retailer who sells it either unprocessed to the consumer or it is processed then sold to the consumer,
- the catch is sold unprocessed to a trader, sometimes referred to as a “fish monger” who, in turn, sells the fish unprocessed to a retailer who finally sells the fish unprocessed to the consumer,
- fish is processed then sold to retailer who sells it to a consumer, and
- fish is processed then sold to a wholesaler who sells it to a retailer who, in turn, sells to a consumer.

### 5.8.2 Pricing structure of fish

The present study failed to establish a price structure because the wholesalers, fishers, as well as the retailers were circumspect about revealing the true price. This coupled with the complexity involved in the artisanal fishery made it difficult to establish a pricing structure within the time available for the study.

Wholesalers, retailers, crew, beach traders and gear owners, however, pointed out that the price of fish is influenced by the supply and demand principle. The higher the supply, the lower the price and the lower the supply the higher the price. It also became apparent that how often a retailer or a wholesaler will buy fish for selling is largely influenced by the supply and demand. Fish is sold by volume using a fixed container, particularly for small fish like *usipa* and *utaka*. Size and quality of fish determine the price for big fish such as *kampango*, *chambo*, *mcheni* etc.

This study (through personal observation) revealed that beach prices although not quantified in any distance, are lower than the market prices.

### 5.8.3 Revenue from fishing activity accruing to the enclave communities

Revenue from fishing, which accrues to the enclave communities, is important because money is required for food and services.

Analysis of annual gross income indicates that 14% of the gear owners earn between MK1, 000 and MK10, 000 per annum. Most (86%) gear owners earn over MK10, 000.

This is a low rate when one considers the capital investment and the number of people employed. Because catches are declining further, capital investment seems unwarranted.

Half (50%) of the crew earn an annual income between MK500 and MK1, 000. 40% of the crew earn between MK1, 000 and MK10, 000. 5% gets less than MK100.00 and another 5% gets over MK10, 000.00 in a year. Within the crew there are team leaders who

act as marksmen when they go fishing. Such people earn more than the rest of the crew.

For the beach traders, 2% earn less than MK100.00 from trading in fish. Most beach traders (49%) earn between MK500.00 and MK5, 000.00. 18% earn between MK5000 and MK10, 000.00 and 6% earn over MK10, 000.00 from fish trading.

**5.8.4 Attitudes towards fishing as an economic activity**

The way fishermen perceive fishing, as an economic activity will determine whether they continue fishing or give up fishing. Respondents were asked their perceptions towards fishing as an income-generating activity.

Analysis of perceptions indicates that nearly all respondents considered fishing a viable economic activity. 90% considered fishing a profitable enterprise, whereas 10% regarded fishing as not as profitable enough (Figure 5.8). They still stayed in it because they were able to derive cash that was immediately required for food and services.

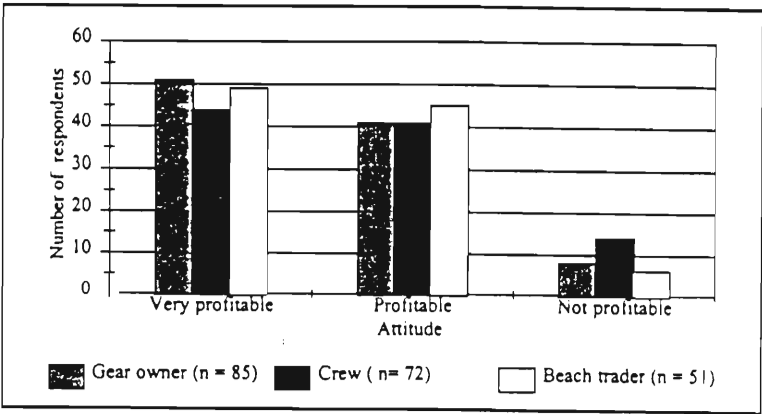


Figure 5.8 Distribution (%) of perceptions towards fishing according to gear owners, crew and beach traders

**5.8.5 Sources of fish sold at Lilongwe Produce Market**

Wholesalers and retailers at Lilongwe Produce Market (which is in one of the major cities (Map 2) indicated that the fish sold comes from Salima (20%), Mangochi(40%), and Zomba(4%). Most fish sold at Lilongwe Market comes from Mangochi District. The study area is located in Mangochi, which is almost 300 km from Lilongwe. This confirms the finding that fish from the study area is distributed to many parts of the country. This distribution translates into pressure for the fish resource in the study area. In view of this, this study considered issues at market level.

**5.8.6 Means of getting fish from the lake to the market**

From the sample, it is clear that the middlemen play a role (36%) in distributing fish in the market. Most (56%) wholesalers and retailers in towns rely on public transport to get fish. A small proportion (8%) of retailers and wholesalers prefer to use a hired vehicle to collect fish from the lake (Figure 5.9).

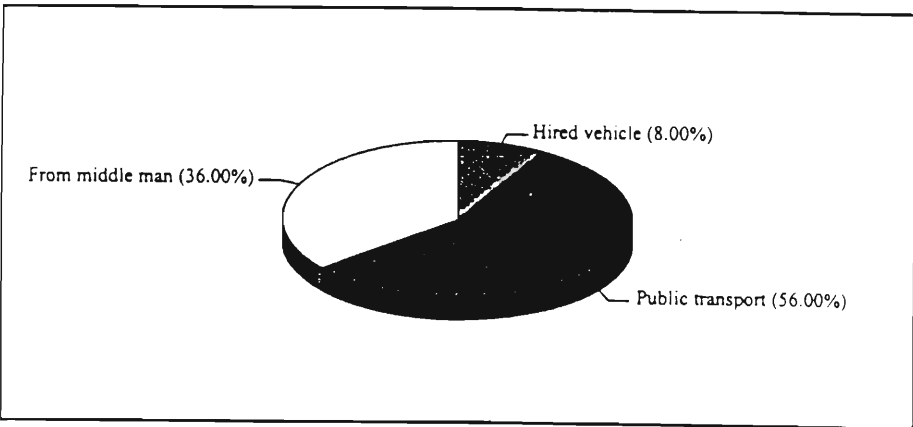


Figure 5.9 Distribution (%) of forms of transporting fish from the lake to the market

### 5.8.7 Fish consumption

Analysis of findings on fish preference from 17 consumers interviewed at Lilongwe Produce Market revealed that the most preferred fish is dried *usipa* (35%). Other fish species bought included dried and fresh *chambo* (15% and 5% respectively), dried *utaka* (18%), dried *ncheni* (10%), *kampango* (7%) and *mlamba* (10%).

The main reasons why respondents preferred the fish species above include: these types of fish are affordable (40%); processed fish is easy to store as it has a long shelf life (30%), they are palatable species (20%) and they are the only fish available (20%).

### 5.9 Access to credit in the enclave communities

Most (95%) respondents indicated that they did not have any chance of borrowing money from any lending institution; 5% have had access to credit facilities from the Small-scale Enterprise Development of Malawi (SEDOM), Women's World Banking in Malawi (WWB) and the Fisheries Department.

### 5.10 Summary of the major findings

Most respondents express the view that the fishery is changing and declining. Their monetary needs are increasing and constraints on adding value (processing and marketing) force people to increase fishing.

Fishing draws young people away from school and contributes to an illiterate population. It is common that specialized skills, not known in all households of the enclave communities, are often necessary to utilize fish resource efficiently. The illiterate population results in long term negative ineffectiveness.

There are few alternative economic activities in the enclave communities. Few, if any households among the enclave communities, can meet their needs through one activity, hence some people are able to diversify their economic activities but opportunities are limited. Exploitable resources

(land, fish) are on their limits. For instance, agriculture does not offer any economic opportunities among the enclave communities because decreasing land-holding size, lack of arable land, adverse climatic conditions and unfertile soils, hamper productivity.

In the case of the enclave communities, resolving the problem of the declining fishery as perceived by many people requires a multi-sectorial approach involving a broad front of issues and initiatives. These initiatives should include social, economic and environmental interventions among the enclave communities. The aim should be to integrate population, health, and welfare programmes etc. with fisheries development and management actions, to ensure a sustainable exploitation of the fish resources.

## CHAPTER 6

### DISCUSSION AND CONCLUSION

#### 6.1 Introduction

The present study has shown that the economies of the enclave communities are perceived by most respondents in the fishery to be unsustainable and inadequate, and to be leading to social and environmental unsustainability. With this scenario, the Park's objective of conserving selected examples of Lake Malawi's fish species may not be achieved. This chapter explores the challenge of improving the economic levels of the enclave communities to such levels that they are conducive to promoting social and environmental sustainability. Socio-economic and environmental sustainability in the enclave villages will promote the conservation objectives of the Park. It is argued in this chapter that a holistic approach to development and conservation is needed which entails implementing intervention options encompassing social, economic and environmental issues. The last section of this chapter draws the conclusions from the study.

#### 6.2 Conceptual framework for reducing poverty among the enclave communities

The process of raising income levels to sustainable levels in order to achieve the conservation objective of the Park can be understood by following the conceptual model presented in Figure 6.1. The model suggests that in order to carry out the conservation objectives of the Park, an integrated rural development approach should be followed. An integrated rural development is a strategy towards the goal of reducing rural poverty by addressing social, economical and environmental issues (Goodland 1995).

#### 6.3 Social factors

The intervention options, which can promote economic growth to acceptable levels in the study area, will include, provision of education, development of social infrastructures, consideration of property rights, and strengthening grass-roots institutions.

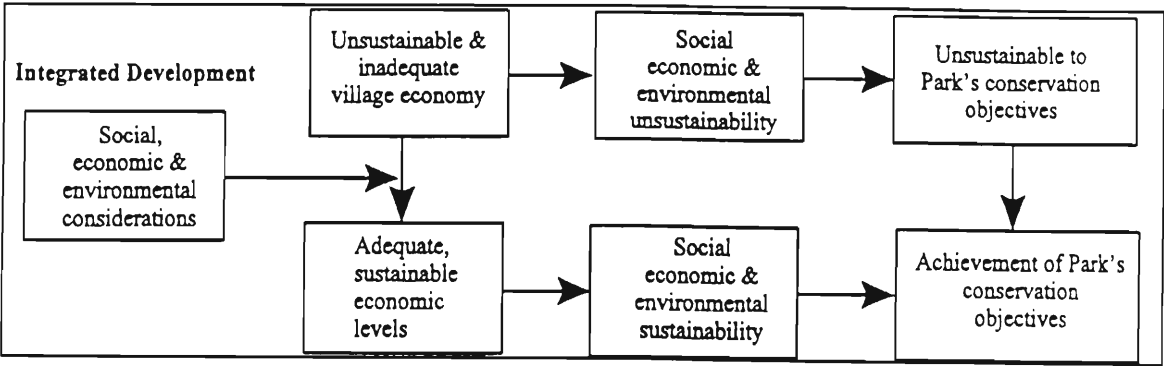


Figure 6.1 Conceptual framework for achieving conservation objectives of the Park

Source: modified from Goodland (1995)

6.3.1 Provision of education among the enclave communities

This study, based on the sample, has shown that high illiteracy levels characterize the fishing communities of the enclave villages. Possible factors leading to a high illiteracy rate could be low access to educational facilities, poor school facilities where they were available, negative attitude toward education and inability to pay for school fees (Bland 1992) and early entry into the fishery. Kapeleta (1980); Grenfell (1993); Smith (1993), and FAO (1993) attributed high illiteracy levels in Mangochi District (where the enclave communities are located) to the fact that the majority of the residents are Moslems who, in the early days, were unwilling to send their children to government schools.

Another interesting thing on the findings on levels of education in the enclave communities, as shown by the sample of this study, is the relatively high proportion of respondents without education among the beach traders. This may reflect the gender inequality in provision of education since over half of this group are females. These findings seem to agree with World Bank (1993) study in Sub-Saharan Africa, which revealed that only a small percentage of females who enroll in grade 1 actually complete



primary school. At secondary school level substantially fewer females than males complete secondary school whereas at tertiary level, females are under-represented.

Levels of education were investigated because first, education is one of the important indicators of socio-economic welfare among communities (Sahn *et al.* 1990). Literacy is one factor that “partially reflects a combination of quantity and quality of public and private services, as well as the general economic position of the household” (Sahn *et al.* 1990:5). Hulme and Turner (1990) observe that there is a positive relationship between education and rural development. Orivel (1983) cited in Hulme and Turner (1990) claims that solid evidence exists for positive effects of formal education on production and productivity among rural communities. He further observes that education facilitates communication, gives a better vocabulary, enables people to establish superior contacts and allows access to written information. It follows that education of enclave communities is an important variable in the issue of reducing over-exploitation of fish (van Rensburg 1992) and raising the people’s income levels. Educated people are more receptive to change and have the ability to visualize a planned future than those who have no formal education (IUCN 1987 cited in van Rensburg 1992). An added year of schooling raises an income by almost 10-20% (World Bank 1993).

Second, education especially of women, can prove effective on fertility decline, and is conducive to sustainable utilization of natural resources like fish. Donda (1993) notes that the high numbers of children among fishing communities are found among high illiteracy levels in the population. This relates closely to the notion that households with high educational attainment particularly among females (van Rensburg 1992), generate more substantial social benefits. Educated women have healthier, fewer and more educated children, as schooling tends to improve a mother’s knowledge and use of health practices. Each additional year of schooling is estimated to decrease the mortality rate of children under age 5 (World Bank 1993).

It follows that, education is such an important factor in sustainable utilization of the fish resource among the enclave communities. Therefore there is need to improve education levels among the enclave communities. Literacy skills is essential in the use of new technology that may be needed in improving agriculture, improving handling and processing in the fishery, or facilitating other economic activities.

### **6.3.2 Development of basic social infrastructure in the enclave villages**

Another aspect of social development entails meeting the physical needs<sup>1</sup> of the communities. Human development interventions among the enclave communities, such as those to improve health, nutrition, and education, will help reduce population growth, make people better able to use the fish resource efficiently, and provide them with the means of improving their physical well being and productivity (World Bank 1994). The provision of such things as accommodation, food, medical care, access to safe water, sanitation etc. is crucial to ensure social stability among the enclave communities.

The findings (personal observation) of this study and Grenfell (1993) revealed poor basic social infrastructures and services in the enclave communities. For example, poor water and sanitation services, poor transport network to allow them access to markets and social services, and lack of access to the basic health service. Water borne diseases such as typhoid, cholera, bilharzia etc. are associated with unsafe water or poor sanitation (World Bank 1992) which are debilitating or fatal. It is impossible to envisage achievement of sustainability under such circumstances. Conservation authorities need to acknowledge that a sustainable Park is not attainable unless the problem of social infrastructure and services is addressed.

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“ The level of satisfaction of the needs of the population assured by the flow of goods and services enjoyed in a unit of time” (Townsend 1970 cited in Hattingh 1992:26).

Provision of basic social infrastructure, such as safe water and proper sanitation, is necessary to ensure a health community, which is supportive of the Park's conservation objectives. Access to safe water, medical care and proper medication remains an urgent issue among the enclave communities, if the Park's conservation objectives are to be achieved.

### **6.3.3 Clarifying property rights among the enclave communities**

Property rights play an important part in the exploitation of fish resource of the Park. According to Vink (1986) fishermen have the right to fish and earn income from fishing and to the security of this opportunity to fish but they do not necessarily own the fish resource.

The present study has shown that fish resources have been partitioned. Rocky areas fall under the control of the Park authorities whilst beach areas a communally held property where the ownership is vested in the community and the usufructory rights are vested in the fishermen.

Despite over-exploitation of the fish resource, communal ownership has been useful among the fishing communities. It acted as an expression of group unity and territorial sovereignty (Jeppe 1980b cited in Vink 1986), which is important for socio-political unity and traditional authority structures. This arrangement has, however, contributed to poor exploitation of fish resource in a number of ways. King (1974) cited in Vink (1986) argues that under communal ownership, land has no market value hence making it less economic. The same argument can be applied to fishing grounds, which are communally owned in the study area. The implication is that they cannot be leased or sold or mortgaged.

It has been argued in Chapter 4 that communally owned fishing grounds, of the enclave villages, coupled with increasing human population pressure on the fish resource

inevitably leads to over-fishing (Bland 1993 citing Hardin 1968). Communal rights to fishing grounds remove incentives for individuals to limit fishing in order to protect or conserve the carrying capacity of the fish resource of the Park (Vink 1986).

On the property rights, the study has shown that the fish resource is a Park property particularly in the 100m zone and it is a common-property in the beaches within the enclave villages and outside the Park. The fishing regulations are ineffective consequently the fishery is declining.

The issue of property rights needs to be sorted out to be able to develop incentives for conservation. The government must define physical boundaries and recognize the rights through legislation, which will form the basis for the tenure security. "... individual fisherman's perception of tenurial<sup>2</sup> security has more impact on his decisions than seemingly secure tenure guaranteed only by social structure under pressure to change" (Vink 1986:26). Related to property rights is the role of institutions in enhancing economic development, which is essential in bringing to sustainable levels of the economy of the enclave communities.

#### **6.3.4 Strengthening grass-roots institutions in the enclave villages**

Based on the sample of this study, majority (71%) of the respondents did not have any idea of existence of grass-roots institutions in the enclave villages. Over half (69%) of the respondents of the sample indicated that they would like to participate in fisheries management.

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Tenure is the set of rights which a person or a private entity holds in fish.

In view of these findings, only those social interventions, which ensure that development processes reach down to those who need it most by giving the poor a voice and a role in development policies (World Bank 1994), are essential among the enclave communities.

Strengthening grass-roots institutions among the enclave communities will give the communities a voice and a role in the affairs that shape their lives. An institution embodies informal customary restrictions and formal legal commands and the enforcement features of both (Furubotn and Richter 1990 cited in Wynne 1995). Wynne (1995) argues that institutions are crucial to economic development as they regulate, no matter imperfectly, the social behaviour of individuals. van Heck (1979) describes rural organizations as important agents in economic development because:

- they are started by the people themselves;
- they are more flexible to objectives and in set-up;
- their leaders are members who are mainly poor and who reach decisions in face-to-face relationship; and
- their activities are related to day-to-day situations and needs of the rural poor.

Inadequate support from government and probably immigration may have contributed to the weakening of grass-roots institutions among the enclave villages (Bell and Donda 1993, Munthali 1997). This should be a concern for Park authorities because “unorganized people do not participate actively in societal decisions affecting their lives because they are both objectively and subjectively powerless . . . perceive themselves as helpless ... in the face of forces beyond their control” (van Heck 1979:32). It is only when people are organized that they move from short-term to consider long-term systemic issues. Grass-roots institutions in the enclave villages must be revived in order for the Park to achieve its conservation objectives. This issue cannot be over emphasized at this stage.

The present study has shown clearly that economic issues are primary determinants of the manner in which resources are used. It is doubtful whether the improvement of social conditions alone among the enclave communities of the Park will lead to fruition of the

Parks conservation motive.

## **6.4 Economic options**

The income levels of the enclave villages must be raised to levels that are acceptable and conducive to conservation of the fish biodiversity of the Park. A number of possible economic intervention options are considered.

### **6.4.1 Increasing agricultural productivity in the enclave villages**

The findings of this study (Figure 5.2) showed that the primary crop grown is maize and 90% of the respondents did not have any livestock. Worthy noting is the finding that only 55% of the households (from the sample) grow maize. It is necessary to improve agricultural productivity among the enclave communities because crops grown and livestock owned by a household play an important role in the socio-economic development of the household. Both crops and livestock contribute to food self sufficiency and a flow of income to a household (Scoones and Wilson, 1989; Sahn *et al.* 1990). That is probably why agriculture occupies an important place in the process of rural development (Vink 1986).

Agriculture is Malawi's largest economic sector both in labour force and in production. Its growth has been an important source of dynamism for the economy as a whole (Pryor 1990). Worth considering in this discussion is smallholder agriculture which constitutes 86% of the total agricultural production. At national scale, however, production from smallholder agriculture has been slow.

Agricultural productivity is low and continues to fall as the population increases and land is degraded through poor agricultural practices. Productivity is further affected by minimal use of inputs such as fertilizers, decreasing land-holding size, poor access to credit facilities and markets, inadequate extension services and adverse climatic conditions (Bland 1993).

Smallholder agriculture is also affected by the traditional land tenure, which inhibits capital investment thereby inclining towards subsistence production, which in turn reduces income among the smallholder farmers (Pryor 1990). Agricultural productivity is further worsened by agricultural policy which promotes cultivation of cash crops which fetch high prices by large estates whereas smallholder farmers have been largely associated with food production (Pryor 1990).

This study reveals that in the enclave villages the problem is aggravated further by inaccessibility of arable land for cultivation. The enclave villages fall within a conservation area where cultivation is not allowed beyond the demarcated areas for agriculture, and where land for agriculture exists it has already been brought under cultivation. Not only is the shortage of land a problem but also, the soils are susceptible to erosion, have a poor nutrient status and are very marginal for agriculture (Grenfell 1993). In addition, the area experiences comparatively high temperatures with relatively low rainfall which ironically has resulted in persistent drought along the lake shore (Kapeleta 1980; Munthali 1997). Low levels of rainfall can be supplemented by introducing irrigation and soil fertility.

#### **6.4.1.1 Development of irrigation**

Irrigation has been practiced throughout the world from historic times with the goal of improving the economic well being of rural communities (Rogers 1983). The availability of water from Lake Malawi means that there is potential for irrigation to improve agricultural productivity. Ogg (1995) cited in Lewis (1997) argues that introduction of irrigation would offer supplementary and alternative source of income among the enclave communities.

#### **6.4.1.2 Potential benefits from irrigation**

A number of assumptions underlie the introduction of irrigation among the enclave communities. The enclave communities will engage in intensive cultivation, which will be characterized by multi-cropping (Rogers 1983). Not only will those households with land grow maize for food, they will also grow other crops, such as cotton, which fetch high prices on the markets (Rogers 1983). This will ensure both food security and sustainable income levels among the enclave communities (Lewis 1997) as the production costs will be offset by high yields resulting from irrigation. Putting the available land under intensive cultivation may in the long-run help to redistribute land to those households without land because those with land will be able to harvest more from less land. Also higher levels of production could increase employment opportunities.

While the introduction of irrigation has the potential for the socio-economic development of the enclave communities through improved food security and income from sales, it also has the potential to redirect the dependency away from the fishery. It may promote a sustainable fishery, which is compatible with the Park's objective of conservation.

Introduction of irrigation among the enclave villages requires new technology and markets. Low levels of education, poor soil fertility and poor infrastructure among the enclave communities may hamper its effectiveness. Both governmental and the interested non-governmental organizations (NGOs) should consider irrigation as an option of furthering the socio-economic development of the enclave communities and conservation of the fish resource along with some inputs such as fertilizers, training, extension, and marketing (Ogg 1995 cited in Lewis 1997).



Increasing agricultural productivity through irrigation alone is not enough to bring about acceptable income levels among the enclave communities. It is necessary to consider other economic options such as adding value to the fish and allowing enclave communities to engage in aquarium trade.

#### **6.4.2 Increasing returns from the fishery**

Options that can be explored by enclave communities include increasing returns from the fishery by adding value to the fish product and engaging in aquarium trade.

##### **6.4.2.1 Increasing yield from the fishery**

The perception that one gets from findings of this study (Table 5.7a) is that the fishery is declining. This confirms a study in northern and southern parts of Lake Malawi when Munthali (1997) reported all his respondents acknowledged that there is a decline in fish resource, particularly in food fish species. It is further indicated (Table 5.8) that the perceived causes of the decline in the fish resource is a result of increasing human population and poor fishing methods among others.

Increasing population has direct impacts on the fishery. First, increasing human population means more people joining the fishery, as entry to the fishing industry is not restricted. This translates into fishing pressure.

Second, according to the interviews with consumers, in Malawi, fish may be the only cheap source of animal protein. This is confirmed by the fact that in 1989 fish consumption in Malawi was the third highest in the SADC region (GOPA 1989). Fish being the main source of protein supply among the country's population means a high demand placed on the fish from the market thus the pressure on the fish resource.

While increasing population has negative impact on the fish resource, each fishing method (Figure 5.4) used in the enclave villages has its own negative impacts on the fish resource. With the exception of longlines, the rest of the methods used in artisanal fisheries are described as small-meshed seine 6-20 mm (Turner 1994). The use of small-meshed seines makes juvenile tilapilines, which are concentrated in shallow water, vulnerable (Turner and Mwanyama 1992 in Turner 1994). For instance, Smith (1993) observes that in one of the enclave villages, *chilimira* seine net (which is the most popular method (63%) of catching fish in the enclave villages according to the sample of this study) was observed to contain over 50 by-catch species. The by-catch species consisted of *sanjika*, *kampango*, *mpasa*, *chambo*, and *mbuna* (rock-dwelling cichlids).

Consequently, species of less economic value but which are important ecologically are caught as a by-catch<sup>3</sup> in fishing for a species (such as *usipa*) which is less vulnerable to fishing pressure (Turner 1994). Brunder (1981) in Turner (1994) suggests that these circumstances led to a collapse of species of skates from the Irish Sea.

Use of such methods by the enclave communities poses a threat to the fish resource because over 75% of the artisanal fisheries' catch is taken by these nets (Banda *et al.* 1994).

The problem of fishing methods coupled with other problems is resulting in low production from the lake as shown in Table 6.1. This picture should alert fishery managers to widespread over-fishing (Turner 1994) in the southern arms of Lake Malawi which includes the Park. It follows that any increases in yield from the fishery may be catastrophic. If it is not possible to increase yield, alternative ways

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<sup>3</sup> By-catch species are species not targeted (Smith 1993).

of increasing the value of the fishery by the enclave communities should be considered.

Table 6. 1 Fish production on southern arms of Lake Malawi

Year	Artisanal fisheries
1986	135.28
1987	145.77
1988	136.99
1989	198.76
1990	121.09
1991	163.32
1992	210.59
1993	122.5
1994	119.05
1995	87.24

*Production in metric tonnes ('00)*

Source: modified from Banda and Tomasson, (1997)

6.4.2.2 Adding value to the fishery

In view of the declining catch, adding value to the fish caught seems a logical way of increasing income without exacerbating pressure on the fish stocks. This can be achieved by capturing a greater share of the profit in the market. Improving post-harvest technology to reduce spoilage can also add to productivity (Horn 1987; Bland 1993).

This is not possible in the enclave communities because they are physically isolated from markets with poor communication routes and are technologically poor as very basic fish processing and handling infrastructure characterizes them. Owing to poor transport facilities and the high costs involved in fresh fish transportation (being a perishable commodity) most fishermen are unable to take their fish to markets because they fear high overhead costs and the unknown (FAO 1993). Processing (dried or smoked) fish provides a solution to the perishable commodity problem but this makes demands on time which is exacerbated by involvement in transporting and retailing.

It is important that comprehensive feasibility studies be conducted to determine the viability of promoting processing and marketing amongst fishers. Such an analysis should address training, technical, financial and logistical assistance concerning the entire production cycle, i.e. from capture to processing, distribution and marketing of fishery products, including promotional efforts and consumer information (Horn 1987; Hara 1993; Bland 1993).

#### **6.4.2.3 Community participation in ornamental fish trading**

The ornamental fishery exports live fish for the aquarium fish market. Trade in *Mbuna* started in 1962 and peaked in the 1970s, when over 400,000 fishes were being exported annually by three companies to Europe and Asia (Ribbink *et al.* 1983 cited in Munthali 1997). Grenfell (1993) observes that following the first exposure outside of the country, the ornamental fish trade in Malawi has expanded and the lake's cichlids are now shipped all over the world. This indicates a potential for income-generating activity for the enclave communities, which could in the long run increase their income levels. For the enclave communities to optimize the opportunity effectively, however, they would require training, technical, financial and logistical assistance in the ornamental fish trade which would have to be supplied by government and interested NGOs. The communities

will have also to be given access to the areas from which fish can be harvested.

#### **6.4.3 Developing eco-tourism and related activities**

Findings on the alternative sources of income show a relatively high percentage (79% of the sample) of households without alternative sources of income. Munthali (1997) concurs that Malawi has inadequate off-farm employment opportunities for its people especially those in rural areas hence the communities of the enclave villages have to engage in the fishing activity in order to earn a living. Since supplementary and alternative sources of income play a role in the socio-economic development of households, limited, or absence of, other economic activities may push people into fishing activity and may make them rely entirely on fishing for their livelihood (Bland 1992,1993; Munthali 1997). This builds pressure on the fish resource, which may in turn result into the decline of the fishery as reported by the present study. Eco-tourism is a possible source income-generating activity for the enclave communities hence it may be a possible option to ease the pressure on the fish resource.

Eco-tourism is defined as “tourism that advances conservation, protects the biological integrity of the resource, provides a cultural or environmentally positive experience for the visitor and leads to sustainable development” (Grenfell 1993:52). ZAI (1994) cited in Lewis (1997) concurs that resource-based tourism is a possible option of economic development among the rural communities which if well implemented leads to sustainable utilization of natural resources.

Malawi is becoming increasingly popular for international tourists, because of recent expanded advertising campaigns by the Department of Tourism and “word of mouth” of people travelling in Africa. Lake Malawi National Park is probably the most visited tourist attraction in Malawi (Grenfell 1993). This implies that tourism has both socio-economic and environmental potential that will lead to local economic development, which in turn will relieve pressure on the fish resource, and this is a necessary condition for the Park to

survive.

The Park has three national monuments that include the remains of the first Livingstonia Mission and the mission graveyard, a naturally weathered rock bearing unusual linear criss-cross markings and the Otter Point, a scenically beautiful rock outcrop noted for its diverse fish species, which are all attractive to tourists. In addition, the Park has beautifully coloured rock-dwelling cichlids, beautiful beaches and islands, all of which are tourist attractions.

Tourism in the Park is not fully developed, either by the government or private investors. The Park's infrastructure is so poorly developed that it fails to capture the full potential of the market. Three privately owned tourist lodges exist in the area.

Ashley and Garland (1994) present four options, which may be applied in an effort to shift the economy of the enclave villages to sustainable levels desirable for the conservation of the Park's fish biodiversity. Each of these options is discussed below:

#### **6.4.3.1 Up-market lodge with no community involvement**

A private investor puts up a tourist facility without involving the community. In this scenario socio-economic benefits to the enclave villages will include wages as community members are employed. Munthali (1997) rightly point out that Malawi offers inadequate off-farm employment opportunities to its people especially those in rural areas. Bland (1993) adds that fishing communities are characterized by limited alternative income-earning activities.

While this model appears appealing, it has limitations because income is limited to a small sector of the population and the community loses control of their resource. On its own it may not be sufficient to bring the much-desired change in the economic levels of the enclave villages. Hence the need to consider other

models for tourism.

#### **6.4.3.2 Private up-market lodge: Revenue sharing with communities**

This entails a private developer owning a tourist facility that employs local people and the owner decides voluntarily to share part of the revenue with the communities. The same benefits as in the first model will accrue to the enclave village communities. In addition, it reduces the inequalities in income distribution among members of the enclave communities. Irrespective of the money, the money sharing arrangement encourages community participation in decisions on how to spend the money. This can give rise to powerful local institutional arrangements (Ashley and Garland 1994). If this were to take place, it would be to the advantage of the enclave villages where institutions are weak. Strong local institutions can be an ally for conservation of the Park's fish biodiversity. The Department of National Parks and Wildlife (DNPW) which has a tourist facility in the Park needs to be moving in this direction in order to ensure the survival of the Park in the face of poverty-stricken enclave communities. The sharing arrangement of revenue between the communities and the Park would be: make proportion of funds available to the Park to support park management, another share of funds would go to the Central government, some to the enclave communities. This will, however, not be enough and other options should be assessed.

#### **6.4.3.3 Joint venture; up-market lodge**

The model envisages enclave communities forming a joint venture with private investors. The communities have entitlements to profits but do not initially engage in management. Ashley and Garland (1994) observe that a private operator will provide capital and marketing whereas the community will provide land. The sharing of profit is on 50:50 basis. Enclave communities will gain the same socio-economic benefits as in the other first two models but this model makes the link

between conservation and tourism more apparent to those involved. The coming of private investors may also trigger the provision of other basic social infrastructure, which can have many spin-off benefits.

#### **6.4.3.4 Community enterprises**

These would include such activities as boat/ canoe hiring around the islands, campsites, cultural services such as crafts, and dances. DNPW initiated craft making among women in one of the villages, but this needs to be expanded across all villages as markets are developed, understood and serviced. Ashley and Garland (1994) observe that with this arrangement communities could establish a community fund useful for developing a community infrastructure, which the enclave communities might be lacking. Promoting community enterprises would form the basis for human and institutional development, as communities would have to develop some skills. As people draw benefits from the conservation and eco-tourism they will become committed to the goals of the Park.

#### **6.4.3.5 Potential of eco-tourism in conservation and development**

Ryle and Grasse (1991) argue that at the local level, direct financial awards to the individuals who provide food and accommodations, who share their knowledge of local flora and fauna, and who produce souvenirs and handicrafts are essential. If their livelihoods are based on, or to some degree dependent on, the preservation of habitats, they will be able to avoid other, less sustainable forms of support. Indeed eco-tourism has the potential to support conservation and development among the enclave communities. Ashley and Garland (1994) caution that the impact of a tourism enterprise on socio-economic development of the enclave communities and conservation of the fish resource of the Park will depend on the following factors:



- the scale of benefits received by local people (most important is whether they outweigh the short term costs of conservation);
- the extent to which the benefits are clearly perceived as dependent on the fish resource, and therefore on sustainable management; and
- whether benefits reach all resource users;

For a resource-based tourism to be successful in conservation and development, Lindberg (1991) argues that it should be accompanied by the support services such as shops, clinic, produce market etc. Ryle and Grasse (1991) observed that tourism infrastructure must be put in place if visitation is going to take place. The enclave communities have to ensure that they have proper accommodations and ground transportation, guides who are able to interpret natural and cultural history, proper access to natural habitats etc. (Ryle and Grasse 1991). It is also necessary to encourage cultural sensitivity among the enclave communities towards tourists. Tourists need to be greeted by “warm” smiles (Ryle and Grasse 1991). While tourism is a possible option in fostering socio-economic development and conservation among the enclave communities, it is clear that it will not arise spontaneously. To be meaningful and to quickly divert pressure from the fishery, a well considered and carefully multifaceted strategy is essential.

#### **6.4.4 Introduction of beekeeping as an economic activity**

Beekeeping has been suggested as a source of wealth generation. In Malawi, beekeeping has a long tradition. During the course of the 20<sup>th</sup> century, beekeeping declined because of expanding human population, which accelerated deforestation of forests, particularly *miombo* vegetation (GoM 1991).

Beekeeping has been reintroduced in Malawi within the integrated development projects with the aim of developing it as a viable alternative source of income for rural communities whilst achieving conservation. Banda and Boer (1993) and

Adams and McShane (1992) cited in (IIED 1994) observe that beekeeping has helped to change rural communities' attitudes of conservation particularly those around Vwaza Wildlife Reserve and Nyika National Park (Map 2). Not only has it improved perceptions towards conservation but also it has improved the local income of the communities around these conservation areas. By 1994, some beekeepers were able to make "an equivalent of \$5.70/day, ten times the national average" (Banda and Boer 1993; Adams and McShane 1992 cited in IIED 1994:27).

Commercial beekeeping requires suitable vegetation; suitable vegetation; water, which the bees need for evaporative cooling of their hives during hot periods; beekeeping equipment and a market for its products. The presence of *miombo* vegetation and availability of water from the lake satisfies some of these conditions. In view of this, beekeeping has the potential of fostering local economic development and consequently the sustainable use of fish resource among the enclave communities of the Park.

## **6.5 Environmental sustainability**

According to Goodland (1995) environmental sustainability aims at improving the welfare of people by protecting the resources that they exploit for their livelihoods. This leads to sustainable development, which is defined by World Bank (1992) as "development that lasts . . . where current generation should meet their needs without compromising the ability of future generations to meet their own needs" (World Bank 1992). Those who call for environmental sustainability argue that benefits from human activity have been exaggerated, and the costs of environmental loss have been ignored (Chanda and Kalabam 1995). This means restricting exploitation of fish resource within the carrying capacity of the fish resource. It has been argued in this chapter that only when socio-economic status of the communities is improved can environmental sustainability be achieved.

## **6.6 Conclusions from the study**

The present study demonstrates the importance of the fishery for both rural subsistence practices and economic activities. Furthermore, this study has shown that the general perception among fishermen is that the fishery is declining. Despite, that the fishery might be declining, the fishermen still think that the fishery will continue to meet demands placed on it by them.

In view of this, there is need to urgently implement innovative fisheries management that addresses socio-economic development and conservation issues. This should address a range of conservation and development issues. There is need to improve agricultural productivity through introduction of irrigation and provision of support services. Instead of increasing yield from the fishery, fishermen should work towards adding value to the fishing industry. The enclave communities need to take up community-based eco-tourism as one way of bringing about socio-economic development and conservation among the enclave communities. By emulating CAMPFIRE initiative, the enclave villages should take up the challenge of managing the fish resource. All these will on the long run ensure both social economic development and conservation of the fish resource among the enclave villages.

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**APPENDIX I: STRUCTURED INTERVIEW SCHEDULE FOR FISHERMEN**

Date administered.....1997

Name of fishing village.....

**AFFILIATION**

<b>GEAR OWNER</b>	<b>1</b>
<b>BEACH TRADER</b>	<b>2</b>
<b>CREWMAN</b>	<b>3</b>

1 At what age did you start fishing/to be a crewman/ beach trader?

<10	1
11-20	2
21-29	3
30-40	4

2 Why did you take up fishing/crewmanship/ beach trader?

To make money	1
To get food	2
Out of interest (as a hobby)	3
Others (specify)	4

3 What type of fishing gear do you use?

Chilimila	1
Beach seine	2
gillnets	3
Longlines	4
Beach traps	5
Others (specify)	6

4 Do you have any plans of withdrawing from fishing/crewmanship to join another economic sector?

Yes	1
No	2

4.1 If yes, why?

Declining fish catch (not profitable)	1
Low prices	2
Financial hardships	3
Lack of interest	4
Others (specify)	5

4.2 If no, why?

Not enough money to venture into another economic activity	1
Satisfied with the way things are	2
Others (specify)	3

5 If you are gear owner, would you like to increase your fishing gear?

Yes	1
No	2

5.1 If yes, why?

To have more fish for food	1
To have more fish for sale	2
Others (specify)	3

5.2 If yes, how do you plan to acquire extra fishing gear?

Will buy using the money made out of fishing	1
Will make them myself using local materials	2
Others (specify)	3



5.3 If no, why?

Happy with the fishing gear that I have right now	1
No need to expand because of declining catch	2
No money to expand to buy extra gear	3
Not enough time available	4
No space for extra fishing gear	5
Others (specify)	6

6 Did you have access to any credit facilities (to boost your fishing activity/your job of being crewman/ trader) in the last 12 months

Yes	1
No	2

6.1 If yes, from which organisations-----

7 If you are a crewman, why did you drop fishing on your own?

Did not find time for it	1
Did not find fishing on my own profitable	2
Declining fish catch	3
Low prices fetched by fish	4
Lack of money to sustain fishing	5
Lost interest in fishing	6
Others (specify)	7

8 .1 Which fish species do you usually catch when you go fishing?

-----

8.2 Is there any special reason why you catch the species of fish you have mentioned above?

Yes	1
No	2

8.3 What would be the reason? -----

9 Which fish species do not appear very often in your catch when you go fishing?

Utaka	1
Sanjika	2
Nchila	3
Ngumbo	4
Kampango	5
Ningwe	6
Bombe	7
Others (specify)	8

10 When you compare this year’s catch and the catch of 5 years ago which one is more?

Catch of the last 12 months	1
Previous catch (i.e. 5 years ago)	2
No difference (the same)	3
No idea	4

11 When you compare the catch/unit of effort of 5 years ago and of this year

has it increased( ie you spend more time, or you go longer distances than before)	1
has it remained the same	2
has it gone down ( you spend shorter time, or you go shorter distances than before)	3
Others (specify)	4

12 Some people believe that the fishery is changing (i.e. declining fish resource particularly food species)

Strongly agree	1
Agree	2
Disagree	3
Neutral	4

12.1 If you agree, what are the causes of the change?-----

12.2 How has the change affected your fishing/ crewman activity?-----

12.3 In your opinion, what needs to be done in order to reverse the situation?-----

13 Are you concerned that Fisheries legislation does not respect traditional controls on fishery?

Yes	1
No	2

13.1 If yes, would you like

government to continue controlling	1
the community to have total ownership of the fishing village	2
Co-manage ( government together with the community	3
Others (specify)	4

14 In your fishing village, do you have any community-level groups to look at fishing matters?

Yes	1
No	2

14.1 If yes, what are its duties? -----

14.2 Do you help with any decisions in your group?

Yes	1
No	2

14.2.1 If no, who makes all the decisions?

Village headman	1
Group leader	2
Government extension officer	3
Others (specify)	4

14.3 If you don't have a community group, do you have any plans of establishing one soon? -----  
-

15 Do you have a market for your fish?

Within your village	1
Outside your village	2
Market in a nearby town/city e.g. LL, BT, MJ etc.	3
No market	4
Don't know	5
Others (specify)	6

16 How much money did you make in the last 12 months (in Malawi Kwacha) from fishing or from your job of being a crewman?

<500	1
501-700	2
701-1000	3
1001-2000	4
2001-5000	5
5001-10000	6
>10,000	7

17 Do you consider time spent on fishing or as a crew member profitable?

Very profitable	1
Quite profitable	2
Not profitable	3
I don't know	4

18 Which problems do you encounter in your fishing activity?

Low catch due to reducing fish resource	1
lack of market	2
Lack of money to expand	3
Lack of space to expand	4
Stealing of fishing gear by other fishermen	5
Others (specify)	6

**PROFILE OF RESPONDENT**

**STATUS**

1 Sex

Male	1
Female	2

2 Are you household head?

Yes	1
No	2

3 Age

Age group	
<17	1
18-25	2
26-35	3
36-40	4
>40	5

4 Marital status

Married	1
Divorced	2
Widow	3
Single	4

5 Education

Primary	1
Secondary	2
Tertiary	3
Others (specify)	4

**CROPS GROWN AND LIVESTOCK**

1 Which crops did you grow in the last 12 months?

Tobacco	1
Maize	2
Groundnuts	3
Sorghum	4
Others (specify)	5

2 About how much money did you make from the crops that you grew in the last 12 months (in Malawi Kwacha)?

101-500	1
501-1000	2
1001-2000	3
>2000	4

3 What livestock do you have?

Cattle	1
Goats	2
Pigs	3
Sheep	4
None	5
Others (specify)	6

4 About how much money did you make from the sale of livestock in the last 12 months (in Malawi Kwacha)?

0	1
0-100	2
101-500	3
501-1000	4
1001-2000	5
>2000	6

## OTHER SOURCES OF INCOME IN THE HOUSEHOLD

1 Are there any other sources of income apart from fishing/ farming?

Yes	1
No	2

1.1 If yes, would you name them?

Full time employment	1
Family remittance	2
Pensioner	3
Businessman ( resort owner, transporter, grocery etc)	4
Tour guide/ tourism	5
Others (specify)	6

1.2 How much did you make from these other sources of income in the last 12 months?

101	1
101-500	2
501-1000	3
1001-2000	4
>2000	5



APPENDIX II: MARKET SURVEY INTERVIEW SCHEDULE

Wholesaler/Retailer	1
Consumer	2

1 What type of fish do you usually sell/buy?

Usipa	1
Utaka	2
Milamba	3
Mcheni	4
Chambo	5
Kampango	6

2 What form of fish do you usually sell/buy?

Boiled	1
Sun dried	2
Smoked	3
Fresh	4

3 Which are the sources of fish that you sell?

Mangochi	1
Salima	2
Zomba	3
Others	4

4 What are the wholesale and retail prices for the fish that you are selling?-----

5 If you are a consumer, do you prefer beef/pork/chicken to fish?-----

6 How often do you buy fish?-----

7 If the price of fish went up, would you

buy more fish	1
buy less fish	2
buy the same amount of fish	3
stop buying fish altogether	4
others	5

8 How do you obtain your fish from the lake?

Own vehicle	1
Hired vehicle	2
Middleman	3
Public transport	4

9 How could the marketing of fish be improved?-----

### APPENDIX III: LARGE MAMMALS OF LMNP

Scientific name	Common name
<i>Aonyx capensis</i>	Cape clawless otter
<i>Canis adustus</i>	Side-striped jackal
<i>Cercopithecus albogularis</i>	Vervet Monkey
<i>Cercopithecus pygerythrus</i>	Nchima Monkey
<i>Civettictis civetta</i>	Civet
<i>Crocuta crocuta</i>	Spotted Hyena
<i>Felis serval</i>	Serval
<i>Galago senegalensis</i>	Lesser Bushbaby
<i>Galerella sanguinea</i>	Slender Mongoose
<i>Genetta tigrina</i>	Large-spotted Genet
<i>Heterohyrax brucei</i>	Yellow-spotted Dassie
<i>Hippopotamus amphibius</i>	Hippopotamus
<i>Hystrix africaeaustralis</i>	Porcupine
<i>Lepus saxatilis</i>	Scrub Hare
<i>Loxodonta africana</i>	Elephant
<i>Lutra maculicollis</i>	Spotted-necked Otter
<i>Oreotragus oreotragus</i>	Klipspringer
<i>Otolemur crassicaudatus</i>	Thick-tailed Busybaby
<i>Panthera pardus</i>	Leopard
<i>Papio ursinus</i>	Chacma Baboon
<i>Paraxerus cepapi</i>	Tree Squirrel
<i>Potamochoerus porcus</i>	Bushpig
<i>Procavia capensis</i>	Rock Dassie
<i>raphicerus sharpei</i>	Sharpe's Grysbok
<i>Silvicapra grimmia</i>	Common Duiker
<i>Tragelaphus scriptus</i>	Bushbuck
<i>Tragelaphus strepsiceros</i>	Kudu

Source: Grenfell (1993)