

## Small Scale Fisheries of Malawi: An Outline of Lake Malombe Fisheries

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### Abstract

Small-scale fisheries contribute significantly to food security and income of many people in developing countries. Therefore this study was aimed at outlining the small-scale fisheries of Lake Malombe in Malawi with the overall goal of improving its management consequently improving the livelihood of the fishing communities. Lately fisheries production in the lake has been on the decline. Co-management approach to fisheries management was first initiated around Lake Malombe in 1993 to address this problem. The strategy seems promising for small water bodies although there are some operational processes that are not yet in place including some legal framework. In order for small scale fisheries to be sustainable open access should be replaced with limited access. The organization, composition and sustainability of the local organizations should be carefully considered.

**Key words:** Small-scale fisheries, Co-management, Beach Village Committee

### 1. Introduction

Fishing is the traditional occupation for most of the rural communities along the lakes and rivers in Malawi. Fisheries have been an integral part of the life of the people of Malawi and play a very significant role in the national economy as well as food security of many households. Over 70% of animal protein consumed comes from fish and contributes about 4% to Gross Domestic Product (Njaya, 1998). The fisheries sector in Malawi has two main groups namely; small scale fisheries and large scale fisheries. The small scale usually use traditional methods but contribute over 85% of the total fish catch and constitute 90% of the fishers (Fisheries Department, 2004).

Fisheries activities in Malawi are not only concentrated around Lake Malawi but also takes place in lakes Malombe, Chiuta, Chilwa and the Shire River. In order to develop a robust fisheries management system, it is important to understand the fishery of a particular water bodies as well as the socio-economic background of its fishers when putting a management system in place (Pomeroy, 1995). Therefore this paper outlines the fisheries of Lake Malombe focusing mainly on the production trends, targeted species, gears used, socio-economic background of the fishers and the management system in place.

### 2. Study Area

Lake Malombe lies between latitude  $14^{\circ}21'$  to  $14^{\circ}45'$  south and longitudes  $35^{\circ}10'$  to  $35^{\circ}20'$  East in the southern district of Mangochi. It is part of the Great Rift Valley system. It is the third largest lake in Malawi. The lake is 30 km in length and 15 km in width with a maximum depth of 7 m. The Upper Shire River, about 13 km long, flows from the southern tip of Lake Malawi before widening to form Lake Malombe (Fig. 1) (FAO, 1993). Fishing is the major socio-economic occupation for the communities around Lake Malombe. The population of the area in 2000 was estimated at about 69,000 fishing families residing in at least 45 villages. There were over 65 fishing beaches around Lake Malombe with 488 gear



Figure 1: Map of East Africa and Malawi showing the location of Lake Malombe

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owners, 3,697 crewmembers operating in the lake (Fisheries Department, 2004).

### 3. Socio-economic characteristics of the fishing communities

#### 1) Ethnic composition

The area surrounding Lake Malombe is densely settled by a population who are primarily of Yao tribe who immigrated into the area in the 19th century and therefore most fishers (77.5%) belong to this tribe (Bell, 1998). This means most of the people have the same cultural background and this might be of importance when implementing a community based management system. A few fishers of Chewa, Lomwe and Nyanja tribe are also found operating in the lake. The area falls into areas of two Traditional Authorities or Chiefs Mponda and Chowe.

#### 2) Education

Most of the people in the area lack formal education. This might be because of poverty. The children too are involved in activities that would bring food for survival and therefore might not have time to go to school. Consequently, a large number of fisher-entrepreneurs (45%) lack formal education, but most of them have basic knowledge of reading, writing in vernacular language and calculation (Matiya, 1998).

#### 3) Household size

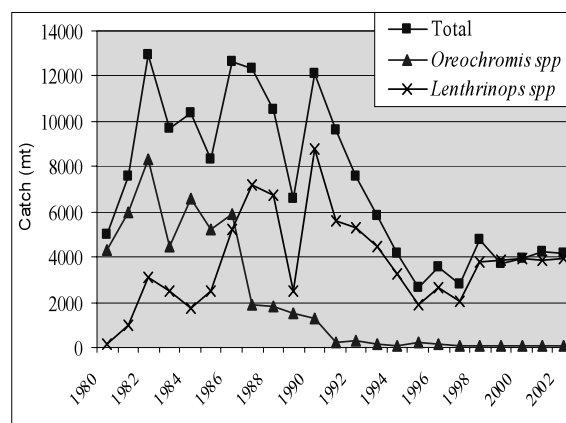
The average number of children per family is 6 children. This is higher than the national average of 5 (National Statistical Office, 1999). Besides, a family is also expected to help other members of their extended families. Therefore it is not uncommon to have a household with over 10 members. Most of the fishers are married to more than one wife. This might be because of Islam, which allows polygamy, is the dominant religion in the area or because of poverty fishers are seen as better off and can marry to more than one wife.

#### 4) Income sources

Fishers were of the opinion that “nobody should put all their eggs in one basket”. To diversify the risk they also invest outside their fishing businesses, but fishing was the main cash income source for 80% of them. Almost all fisher-entrepreneurs (86%) own agricultural land with the main crops being maize and rice. Almost all fishers own livestock, mainly poultry and goats.

### 4. Fisheries Production

In the 1980's when the fishery was near its peak, the lake produced over 12,000 mt of fish, representing approximately 17% of Malawi's total production. However, the fishery has experienced a rapid decline in annual catches from about 12,000 mt in 1988 to nearly 3,700 mt in 1999 (Fig. 2). The lake now contributes 2-5% of the



Data Source: Fisheries Department, 2004

Figure 2: Total fish catch, *Oreochromis* spp. catches and *Lethrinops* spp. catches from Lake Malombe

total fish production (Fisheries Department, 1999).

This represents a considerable loss in income levels of the fishers and nutrition to the communities. The economic value of the lake that was at MK42 million (US \$0.396 million) in 1988 was reduced to about MK4 million (US\$37,735) in 1996 (Fisheries Department, 1999). The high valued *Chambo* (*Oreochromis* spp.) declined while *Kambuzi* (*Lethrinops* spp.) which is not of high value increased although of late its production has also been decreasing. The lake provided a living example that fisheries resources are finite and therefore can extinct if not properly managed.

### 5. Fish Species Composition in the Lake

Cichlids dominate the fishery in Lake Malombe. In terms of species composition, *Lethrinops* spp., locally known as *Kambuzi*, is the most abundant fish in the lake. This species, with an average length of 8 cm, constitutes of over 70% of the fish catches. In the 1980's *Chambo* (*Oreochromis* spp.) used to constitute over 66% of the fish catch. Now the *Chambo*, with an average length of 27 cm and high valued, constitute only 3% of the catch. Other species in the lake include *Mcheni* (*Rhamphochromis* spp.) catfish (7%), *Mbaba* (*Buccochromis* spp.) (11%) and others including *Kampango* (*Bagrus meridionalis*) (Fisheries Department, 2004).

#### 1) Description of the species in the lake

##### (1) *Kambuzi*

The present fisheries of Lake Malombe are dominated by the exploitation of medium to small cichlids locally known as *Kambuzi* comprising the genera *Lethrinops*, *Otopharynx* and *Copadichromis* (Fig. 3). These are demersal and semi-pelagic cichlids and account for over 70% of the total landing from the lake. The length at first maturity is 6-8 cm.



Source: Fisheries Department, 2004

Figure 3: *Copadichromis* spp.

#### (2) Chambo (*Oreochromis* spp.)

The *Chambo* is the most famous and most popular food species in Malawi. They are mouth brooders and breed in shallow waters of 5-20 m. The average length at first maturity is 27 cm (Fig. 4) and fetch high price on the market (Palson, et.al, 1999)



Source: Fisheries Department, 2004

Figure 4: *Oreochromis* spp. from Lake Malombe

#### (3) Catfish (*Clarias gariepinus*)

Catfish constitutes a small but appreciable proportion of the Malombe landings. A remarkable feature of this fish is its capability of breathing atmospheric air thereby making it survive in all water bodies including swamps or other waters with seasonal drying. It possesses a broad and flattened head with barbels, followed by a slender scaleless body. It is the biggest fish in the lake growing 1 m in length and a maximum of 20 kg in weight (Fig. 5).



Source: Fisheries Department, 2004

Figure 5: Catfish from Lake Malombe

#### (4) Mcheni (*Rhamphochromis* spp.)

This is a group of ferocious predators found in all habitats, from shallow swampy areas such as Lake Malombe, to the pelagic zone of Lake Malawi. They are important commercially, and are caught by hand lines,

and gill nets. The group is composed of more than 20 species, which feed principally on small mid-water fishes including *Engraulicypris sardella*, *Diplotaxodon* spp. and *Copadichromis* spp. The commonly found species in Lake Malombe is *Rhamphochromis longiceps*. It has a total length of 20 cm and the smallest in the group of *Rhamphochromis* spp. (Fig. 6) (Turner, 1996)

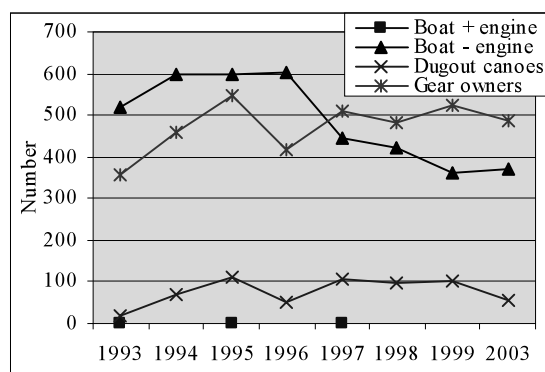


Source: Fisheries Department, 2004

Figure 6: *Mcheni* (*Rhamphochromis* spp.)

## 6. Fishing Gears in Lake Malombe

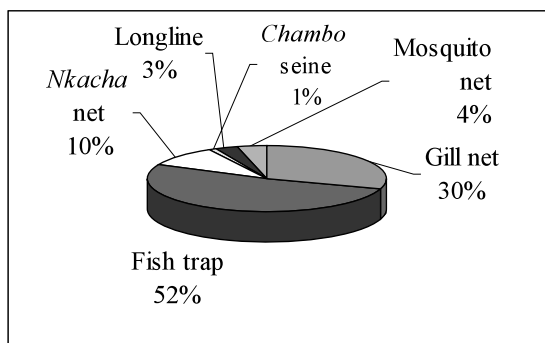
The fish exploitation technology in Lake Malombe is at the artisanal level, although it is for both subsistence and commercial purposes. In 2003 there were 488 gear owners; 3,697 crewmembers and 1,500 traders. Generally the number of boats has been decreasing (Fig. 7). The number of plank boats without engines increased by 3% from 362 boats in 1999 to 372 boats in 2003. On the other hand, dug out canoes have decreased by 45% from 102 canoes in 1999 to 56 canoes in 2003. There was no boat with engine operating in the lake in 2003. This underlines the fact that the fishery is small scale (Fisheries Department, 2004). The decrease in crafts might be due to reduced fish catches, which has forced some fishers to move to other water bodies.



Data Source: Fisheries Department, 2004

Figure 7: Number of Boats and Boat Owners in Lake Malombe

The main fishing gears that are used with this type of craft are 1) gill nets, 2) *kambuzi* beach seine nets, 3) *nkacha* seine nets, 4) long lines 5) fish traps (description of these nets is given later). Gill nets used to be the commonly nets in the lake but they have been on the decrease. Fish traps are now the commonly used fishing gear (Fig. 8). As can be seen the fishing methods being



Data source: Fisheries Department, 2004

Figure 8: Gears used in Lake Malombe by their proportion

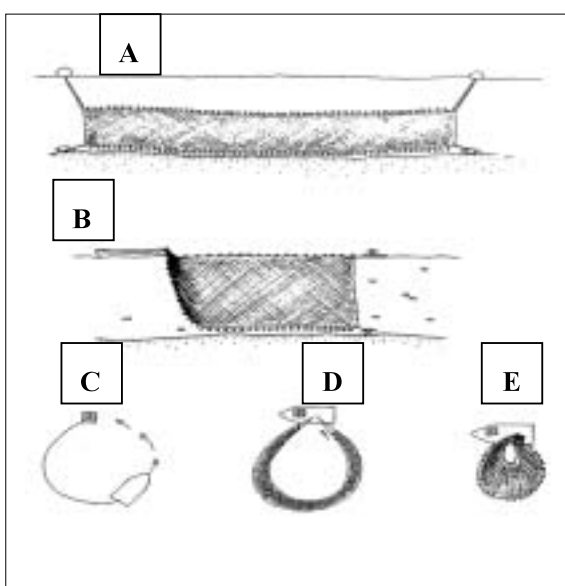
used in Lake Malombe are traditional in nature with no boats with engines. These methods are very effective since Lake Malombe is a very shallow lake with maximum dept of 7 m.

## 7. Description of Fishing Gears used

### 1) Gill net

A gill net is a rectangular gear usually made from 4 or 6 ply multi-filament twine. The headline length can vary from 100 m to 3200 m and the depth from 5 m to 25 m. It is normally used with a single planked boat (with or without an engine) and a crew of four. The net may be surface set or bottom set (Fig. 9A) and this net is traditionally a passive gear, which is set in the evening and retrieved the following morning. In Lake Malombe, two active methods of using gill nets have been observed:

1. The net may be slowly dragged behind two boats in a pair-trawling manner (Fig. 9B)



Source: FAO, 1993

Figure 9: Gill net operation in Lake Malombe

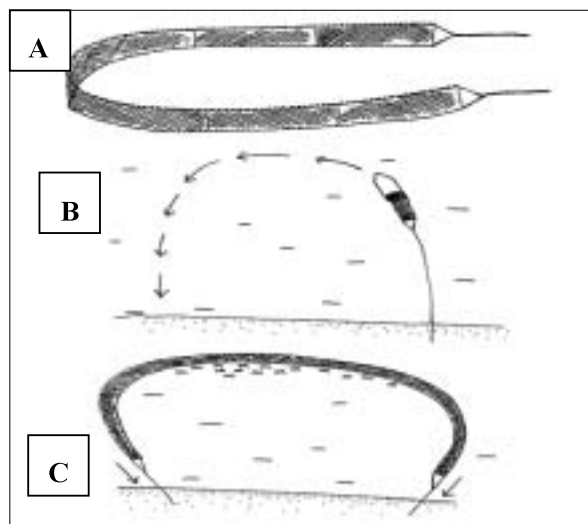
2. The gill net may be used as an open-water seine net (Fig. 9C-E)

### 2) Beach Seines

These include *Chambo* seine, *Kambuzi* seine and Mosquito net. These gears are all similar in construction (Fig. 10A). The main differences in these gears are the headline and mesh size.

- *Chambo* seines range in length from 300 m to 2500 m and typically have a mesh size of over 80 mm (3 inch).
- The length of a *Kambuzi* seine ranges from 40 m to over 1500 m and typically has a mesh size of 25 mm (1 inch).

Mosquito nets are also called *Usipa* beach seines and range in length from 20 m to 250 m. The mesh size of this gear is approximately 1 mm. (FAO, 1993)



Source: FAO, 1993

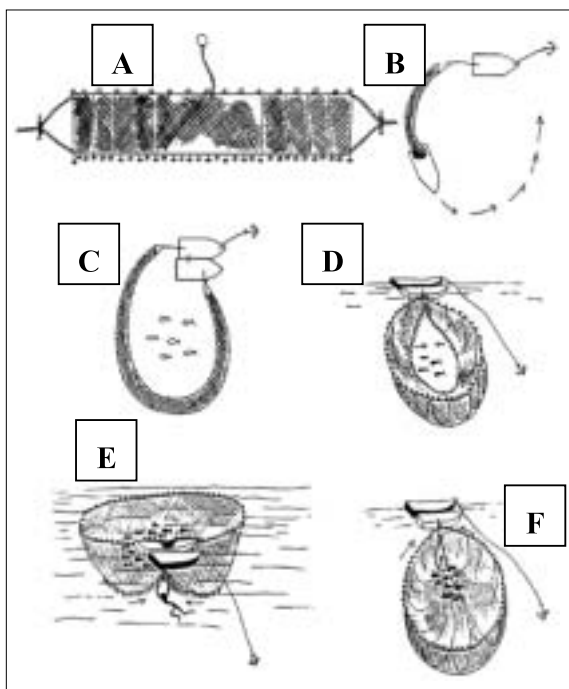
Figure 10: Beach seine operation

All beach seines are operated in a similar manner. The net consists of a long panel of netting, which is weighted to the lake bottom. The net is cast from the beach in a semi-circle using a plank boat (Fig. 10B). After deployment, both sides are pulled onto the beach simultaneously by two sets of people, thereby entrapping the fish surrounded by the net (Fig. 10C).

### 3) Nkacha Net

The *Nkacha* Net is a rectangular gear (Fig. 11A) with a length of 120 m to 500 m and a mesh size from 6mm (1/4 inch) to 25mm (1 inch).

For operation, the footrope of the net is weighted to the bottom. The gear is operated using two plank boats and seven crewmembers. The net is cast in circular manner (Fig. 11B, C & D) and crewmember dives down to tie the foot ropes together (Fig. 11E), effectively forming a bag within which fish is trapped (Fig. 11F).

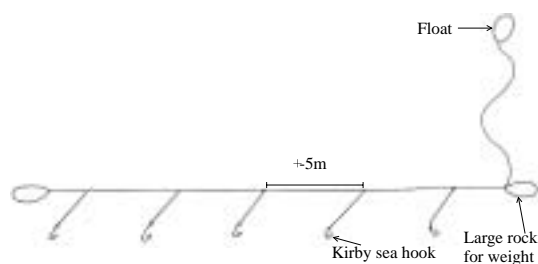


Source: FAO, 1993

Figure 11: Nkacha net in Lake Malombe

#### 4) Long lines

Long lines are a passive gear. They consist of a strong length of cord onto which monofilament traces and hooks are attached at intervals (Fig. 12). These hooks are baited with pieces of fish.



Source: FAO, 1993

Figure 12: Long lines in Lake Malombe

The long line is then weighted to the bottom and is generally set overnight and lifted the following morning. Hook sizes are generally larger than those used for hand lines.

#### 5) Fish Traps

These are generally funnel-valve traps (Fig. 13). These are generally set in shallow rivers or lake areas. The trap may also be used in conjunction to a weir or fence, which serves to guide the fish into the trap.



Source: FAO, 1993

Figure 13: Fish traps used in Lake Malombe

### 8. The Fisheries Management System

#### 1) Fisheries Policy and Law

The new Fisheries Law has given the power to local communities to jointly manage the fisheries resources with government. In this case the government and the local communities have powers to make regulations regarding management of fisheries in a specific water body. Therefore there are rules and regulations for Lake Malombe that have been jointly formulated by local communities and government.

#### 2) Property rights

The fishery in Lake Malombe for a long time was not a private resources but rather a common property resource with open-access in nature. Therefore before a person becomes a fisher he/she must get permission from local leaders. However, nobody has ever been denied access of the fishery. Furthermore, there is no control system that would reserve specified lake areas for certain fishing villages. Any fisher is entitled to fish everywhere in the lake. As a result half of the fishers move between beaches in search for better fish catches.

#### 3) Gear Registration and Licensing

Any fisher must register and pay an annual license fee for his fishing net. Usually this is after been granted permission to operate on a particular beach by a local leader in the area. The license fees are paid at the nearest Fisheries Office. The licensing fee varies according to the type of net used (Table 1). The license describes the gear to be used and the beach that the fisher would land.

It should be noted that the license fee is paid for the net used and not the boat. This is because normally some

Table 1: Annual Gear Basic Fees

Type of Net	Gear Fee
Gill net	MK15/100 m (US\$0.14)
Nkacha net	MK150/50 m (US\$1.42)
Kambuzi seine	MK100/50 m (US\$0.94)
Chambo seine	MK150/50 m (US\$1.42)

Data Source: Fisheries Department, 2005

fishers share boats. It must be said that the license fees have not controlled the number of fishers, as the amounts paid are very low.

#### 4) Participatory Fisheries Management Program (PFMP)

This was a co-management program that was introduced in Lake Malombe in after unsuccessful government controlled system. Co-management, which is defined as an arrangement where responsibility for resource management is shared between the government and user groups, was adopted in 1993. The initial objectives for the introduction of this co-management approach were mainly; to promote recovery of the fisheries of Lake Malombe and Upper Shire to a level that could sustain an annual catch of 10,000 mt. This would be achieved by articulating the views of the fishing communities in fisheries management, thereby having a successful management system (Bell, et al 1993). To this effect a total of 31 Beach Village Committees (BVC) composed of both gear owners and non-fishers were formed around Lake Malombe and Upper Shire River.

##### (1) Beach Village Committees (BVC)

These are local level organisation representing the fishing community. These are formed on all major beaches. The geographical area as well as number of fishers per group depends on the number of fishers at a beach and distance between beaches. The main role of BVC is to organize fishers and making sure rules and regulations are complied as well as controlling the number of gears on a beach.

### 9. Problems of Lake Malombe fishery and its management

#### 1) Poor Implementation of the Fisheries Policy and Law

The Fisheries Policy and Law recommend the devolution of management power to local level institutions. To this effect the Fisheries Department and local institutions are required to sign management agreement on transferring of authority and responsibility. Until now such agreements have not yet been signed (Matiya and Wakabayashi, 2004). This implies that the government legally still holds the power to manage the fisheries resources. The role of community can be challenged in a court of law proving that the process of transferring power to local communities has not completed. The Fisheries Fund has not yet been established and therefore cannot be funded from licensing fees by the Fisheries Department as stipulated by law.

#### 2) Decline in catches

The fish catches from the lake are still low since the fishery has not yet recovered. This entails loss in revenue consequently affecting the living standard of most of the people. Over 80% of the people get their income from fisheries. The situation is worsened by the fact that there are few income generating activities in the area.

#### 3) Lack of access restrictions

The fishery is still an open access resource therefore still prone to over exploitation. The fishing license does not limit a fisher to operate in a certain area nor restrict the number of days. The fishing license issued should limit a fisher to a certain area and specify the number of days for fishing. Movement of fishers between beaches should be discouraged as these migrant fishers show no concern about management especially if operating far from their home areas.

#### 4) Composition and the role of the BVC

Since the BVC have some members who have no fishing gear, the fishers are questioning their presence. In some cases the BVC is seen as a government institution as there is very little consultation between the committees and the fishing community. The local level institutions must have more people who have a big stake than few non-fishers. The BVC must always consult the fishing community before making major decisions.

#### 5) Sustainability of the BVC

The government with support of donors initiated the co-management system in Lake Malawi. Funds were made available to train some members of the local communities in fisheries management and group dynamics. However the sustainability of the activities initiated with support from donors is doubtful. No mechanisms were put in place to have the BVC run on their own without support from government. Secondly, the composition of the BVC has been changing frequently and this affects continuity of activities. To sustain the BVCs there is need to identify source of funding the activities. Licensing fees should be retained by the BVC to run its activities.

### 10. Conclusion and Recommendations

Fisheries are very important to local communities around Lake Malombe. It has been observed by FAO (1993) that in developing countries subject to a high unemployment rate, fishing is one of the last remaining job opportunities for a labor force lacking training and capital (land). The fishery is small scale and traditional in its operation. Overall the total production has declined considerably representing loss of income to the local communities. However, the number of gear owners is decreased over the years.

Participatory approach was adopted in the management of the fisheries resources. This system is best suited to small water bodies like Malombe since the people have the same cultural beliefs and religion. Beach Village Committees as local management groups are striving to move the management regime to community based.

Lake Malombe has a number of problems pertaining to the fishery and its management. These include low catches and lack of equally profitable alternative source of money. The unlimited entry into the fishery resulted into over fishing. The participatory approach being advocated

has not been fully implemented. Some legal requirements have not yet been fulfilled. The composition and role of BVC is still not clear to the fishing community.

In order to promote the fisheries in Lake Malombe, the open access should be replaced by limited access. The lake needs to be zoned and movement between zones should not be allowed. The Fisheries Law should be fully implemented to give power to the communities to manage the fisheries resources. The licensing fees should be retained by the BVC for administrative purposes. This would ensure sustainability of the local groups. The BVC should have more fishers than non-fishers to give it the legitimacy it requires. Those with high stake should have more representation as the success of agreements made depends on their compliance. The local groups must always consult with the fishing community to be seen that they represent the interest of the fishing community and not representing government.

In summary, co-management system has a chance to succeed if carefully planned and implemented. This might later develop into community based management system (after government has given all the powers to the communities). This is a long term solution for management of small water bodies as it is cheap and sustainable for developing countries like Malawi.

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