

LAKE VICTORIA  
FISHERIES RESEARCH PROJECT  
PHASE II

LVFRP/TECH/00/08

**Technical Document No. 8**

Fisheries Co-Management Options at  
Kiumba Beach: A Participatory Pilot  
Study.

This document may be referred to as follows: SEDAWOG, 2000. Fisheries co-management options at Kiumba Beach: a participatory pilot study. *LVFRP Technical Document No. 8*; LVFRP/TECH/2000/08. The Socio-economic Data Working Group of the Lake Victoria Fisheries Research Project, Jinja.

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This activity of the Lake Victoria Fisheries Research Project was funded by the European Development Fund of the European Union (7ACP-RPR-372). SEDAWOG gratefully acknowledges its support. SEDAWOG gratefully acknowledges the support and assistance of J. A. Agwanda (KMFRI, Mbita), M. A. Otieno (KMFRI, Mbita) and G. Ochieng.

The Participatory Rural Appraisal (PRA) training workshop on which this report is based was held at the International Centre for Insect Physiology and Ecology Field Centre at Mbita Point, Kenya, from March 1<sup>st</sup> to March 16<sup>th</sup>, 2000.

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SEDAWOG



# FISHERIES CO-MANAGEMENT OPTIONS AT KIUMBA BEACH: A PARTICIPATORY PILOT STUDY.

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### List of Acronyms

CBO	Community Based Organisation
EDF	European Development Fund
EU	European Union
FCS	Fisheries Co-operative Society
FIRI	Fisheries Research Institute, Uganda
FD	Fisheries Department, Kenya
KMFRI	Kenya Marine and Fisheries Research Institute
LVFRP	Lake Victoria Fisheries Research Project
PRA	Participatory Rural Appraisal
TAFIRI	Tanzania Fisheries Research Institute

## EXECUTIVE SUMMARY

This report represents the key output of a training workshop hosted by the Lake Victoria Fisheries Research Project (LVFRP) for researchers from each of the riparian countries' fisheries research institutes. The workshop aimed to train the researchers in participatory research techniques which they could use to undertake a study of community-based institutions and organisations which could potentially be involved in fisheries co-management. A central focus of the workshop was a study to identify the community-based organisations and institutions which operated at Kiumba beach and this study is reported here. Separate reports which include details of the training process and the participatory methods used, are available (Sarch 1995, 2000).

The report centres on the information generated from the participatory pilot study conducted by the workshop participants and the community at Kiumba Beach over the course of a week in March 2000. A range of participatory research techniques were used and the discussion and diagrams which resulted from them form the basis of this report. The workshop participants undertook a preliminary analysis of these findings and this has been synthesised at the end of this report.

The key issues for fisheries co management of Kiumba which emerged from this study are:

- The focus of fishing efforts at Kiumba is on the Nile perch fishery. The beach is dominated by the boat crews who catch Nile perch on a daily basis for most of the year and by the Kiumba Fisheries Co-operative Society (FCS) through which most of this fish is sold. Declining Nile perch catches are an important management issue. There is also a market for the undersized and juvenile fish which are caught on long lines, gill nets and also by beach seine netting. These fish are sold either as bait or to women who smoke or dry them, often transport them to market and sell them as an important source of income. The impact of this trade on stock recruitment is another crucial issue for fisheries management.
- Declining and juvenile catches cannot simply be attributed to the inability of the fishing community at Kiumba to restrict their fishing efforts. Some fisheries management measures are complied with and others are not. For example, drift nets and fish poisoning were widely condemned at Kiumba, whereas beach seines were operated openly without censure. The reasons why management measures restricting mesh sizes and beach seining were not complied with included the increasing problem of gear theft on the lake and the perceived incompetence of the Fisheries Department.
- A range of different management measures were considered. These included restricting effort through for example, increasing licensing costs, closed seasons for some species and closed areas for others; relocating effort towards the centre of the lake; and restricting demand through consumer awareness raising and planning restrictions on processing factories. There was concern over what the impact of these measures would be on the livelihoods of those who depended on the fishery. Irrespective of their potential impacts, most of these management measures would be ineffective unless the key problems of gear theft and the ineffective fisheries department were solved.
- The two most important CBOs, in terms of the size of their membership and their role in the fishery, are the Kiumba Fisheries Co-operative Society and the Kiumba Beach Committee. The fishermen at Kiumba perceive the beach committee to be the most effective organisation to enforce fisheries regulations. The beach committee could play an important role in co-managing the fishery from Kiumba beach. However, the study revealed significant problems in the operation of the Kiumba FCS and the beach committee. These included financial disputes and considerable mistrust between the two organisations.

## 1. INTRODUCTION

The Lake Victoria Fisheries Project (LVFRP) is funded by the European Development Fund (EDF) of the European Union (EU) and the Governments of Uganda, Kenya and Tanzania. The project operates through the fisheries research institutes of these latter countries, and relies upon their staff. The LVFRP aims to tackle three distinct areas: firstly, the socio-economics of Lake Victoria's fisheries. In this field, the project has aims to complete four major surveys before its completion in 2001. These are a fish marketing survey, a nutritional survey and a co-management sub- research project which includes a survey and the 'Three Beaches Study'; the second area the project addresses is stock assessment and related biological and limnological studies; and finally, the project provides a strong technical support component through, for example, the maintenance of the research institutes' research trawlers, and the funding of short term technical inputs to its main study areas. Through all of these activities, the LVFRP aims to design a management plan for the fisheries of Lake Victoria. It is intended that the plan should be supported by the studies that it has carried out, and that it outputs - in the form of sustainable fisheries - may endure well beyond the completion of the project.

As part of its goal to develop a management plan for the fisheries of Lake Victoria, the LVFRP has undertaken the co-management sub-project. This has been designed to assess the informal and formal institutions which shape how the lake's fishery is used and managed, and ultimately to consider how these could be incorporated in a framework for the co-management of the lake's fishery. The sub-project includes the three beaches study, the objective of which is to investigate the use of community-generated regulatory institutions in three individual fishing communities in each of the riparian countries. Participatory research techniques have a potentially valuable role in investigating such community based institutions and a pilot study using such techniques is reported here.

### 1.1 Report objectives

This report represents the key output of a workshop hosted by the LVFRP designed to train researchers from each of the riparian countries' fisheries research institutes in participatory research techniques which they can use to undertake the three beaches study. A central focus of the workshop was a study to identify the community-based organisations and institutions operated at Kiumba beach. This pilot study enabled the workshop participants to test and develop their participatory research skills. Separate reports which include details of the training process and the participatory methods used, are available (Sarch 2000a and b). The objectives of this report are:

1. To show how participatory research methods were used to learn about fishing livelihoods at Kiumba Beach.
2. To identify and understand Kiumba's community-based organisations and institutions which have a role in the lake's fishery.
3. To consider the key issues which arise from this study for the involvement of communities and community-based organisations and/or institutions such as those at Kiumba Beach, in the co-management of Lake Victoria's fishery.

### 1.2 Report scope and structure

The report centres on information generated from the pilot study with the community at Kiumba Beach on Rusinga Island. The study of Kiumba beach was a central component of a PRA training workshop which aimed to allow workshop participants to develop their participatory research skills. The LVFRP project sees such skills as a crucial first step in its assessment of the potential for co-management of Lake Victoria's fishery.



Participatory research seeks to fully utilise relevant secondary formation and an outline of that available for Kiumba beach is presented in Section 2.0. The main part of the report presents the findings of the PRA in Section 3.0. One of the key concepts of participatory research is that the context of the research is as important as the research findings themselves and in keeping with this, the research techniques used to generate the information presented in section 3.0 are explained along side the major research findings.

The report has been written for both the community of Kiumba, whose livelihoods are at its centre, and for the fisheries research institutes which are seeking to improve the management of Lake Victoria's fishery and sustain those livelihoods. Key issues for the lake's management were discussed by the co-authors of the report and the Kiumba community and these are synthesised in section 4.0 of the report. It is hoped that the report will contribute to the fisheries managers' understanding of fishing communities.

## 2. REVIEW OF SECONDARY INFORMATION

A full bibliography of the literature of socio-economic relevance to the fisheries of Lake Victoria is available elsewhere (Geheb 1997a). Broadly, the literature may be divided into four main study areas: biology, lake management, socio-economy and anthropology and fisheries development, each of which is discussed briefly below. The discussion that follows is drawn from Geheb 1997.

### 2.1 The biology of the Lake Victoria fishery

Most of the literature on the lake concerns its biology. Prior to the early 1960's, much of this literature focused, at first, with the identification and taxonomy of the lake fish species (Bailey 1968; Garrod 1959; Graham 1929; Welcomme 1972). Later, in reaction to changes in catch volume, particularly within Kenya's Nyanza Gulf, literature turned to consider catch declines, particularly within the commercially important tilapia fisheries (Beauchamp 1955, 1956; Cadwalldr 1965; Garrod 1960, 1961a, 1961b; Graham 1929). In the light of these declines and the inability of the authorities to curb them, discussion then turned to examining the possibility of stocking the lake with exotic species. Much of this dialogue considered the possibility of stocking the lake with a predator so as to make more (commercially) efficient use of the *Haplochromis* species flock, which, at the time, constituted some 80 per cent of the lake ichthyomass, and which was considered a 'trash' species (Anderson 1961; Beverton, 1959; Fryer 1960; Graham 1929). This discussion continued for some time after both the Nile perch and several tilapia species had been introduced (Fryer 1972, 1973a, 1973b; Jackson 1973; Stoneman et al 1973; Worthington 1973). Of particular concern to this literature was how the *Haplochromis* species flock would fare given that the latter was, at the time, the Nile perch's primary source of food. These concerns were accentuated because of the remarkable evolutionary abilities and characteristics of the *Haplochromis* species, of which little was known (Fryer and Iles 1969, 1972). In addition, this literature contemplated the possible impact of exotic tilapia on the ecology of endemic species.

Much recent literature on Lake Victoria has considered the way in which the Nile perch contribute to the mass extinction of several hundred *Haplochromis* species, as well as seeking to identify as many of the remaining *Haplochromis* species as possible (cf. Goldschmidt et al, 1993; Ochumba *et al.*, 1992; Ogutu-Ohwayo 1990; Seehausen 1995; Seehausen and Witte 1995; Witte *et al.*, 1992; Kaufman 1992; Kaufman and Ochumba 1993). Recent literature has also considered the changing diet of the Nile perch following the demise of the *Haplochromis* species flock (Mkumbo, 2000).

## 2.2 Lake management

Early concerns with the management of the lake arose out of declining catches, and, later, considered the apparent failure of introduced regulations on stemming declines in the fishery (Beauchamp 1955, 1956; Beverton 1959; Colony and Protectorate of Kenya 1961; Garrod 1960, 1961b; Graham 1929; Geheb 1997, 1999; Mann 1969). Despite the failure of these regulations and their subsequent repeal, similar regulations were introduced to Lake Victoria after the independence of its riparian states (Hayanga 1992; Republic of Kenya 1989, 1991). Much of the literature on this subject has not recommended the inclusion of communities in the lake management system but has, instead, reiterated the need for formal regulations, and demanded that more are created, implemented and enforced (cf. Dunn and Ssentongo 1992; Greboval 1989, 1990; Kudhongania-Akiki 1972; Ochumba 1994; Ochumba and Manyala 1992). There have, however, been some suggestions for alternative management strategies which have considered community involvement in management and co-management as specific management options for the fishery (Geheb 1997, 1999; Harris *et al.*, 1995, 1996; Wilson 1993; Wilson *et al.*, 1996).

## 2.3 Socio-economy

Early attention focused primarily on traditional fishing techniques and their effectiveness (Dobbs 1927; Fearn 1961; Fosbrooke 1934; Graham 1929; Kollmann 1899; van Someren 1959; Whitehead 1956, 1959; Worthington and Worthington 1933), although some did try to relate changes within the fishery and fishing techniques to socio-economic conditions (Beverton 1959; Garrod 1960). Later work on the socio-economic conditions of the lake's fishers is primarily concerned with fishermen's earnings, catch rates, estimates concerning numbers of fishermen, gear types, boats and other base-line data (Hoekstra *et al.* 1991; Ochumba and Mainga 1992; Reynolds and Greboval 1988; Reynolds *et al.* 1992; Riedmiller 1994; Prado *et al.*, 1991; SEDAWOG 1999). Some work has been done on primary fish markets (Adhiambo 1992; Bon 1988; Ogunja 1992; Tettey 1988), lake-side fish processing techniques (Peyton 1988) and the role of women in the fish industry (Medard and Wilson 1996; Ogotu 1992, 1993). Little work has been generated on fishing communities themselves, although there are exceptions (Jansen 1972; Dykstra and Dykstra 1987; Harris 1992; Harris *et al.*, 1995; Odhiambo 1970; Wilson, 1993). That literature which has alluded to the role of fishing within lake-side communities is largely confined to those texts exploring the history, society and anthropology of the lake region's ethnic groups (Ayot 1977, 1979; Cohen and Odhiambo 1989; Ocholla-Ayayo 1976; Ogot 1967).

## 2.4 Fisheries development

Early work in this area considered the commercial exploitation of *Haplochromis* stocks with the view of establishing a fish cannery (Gee and Gilbert 1967a, 1967b, 1968; Chilvers, no date). These discussions were related to a later debate considering the possible merits (or lack of them) for establishing a trawler-based fishery on the lake (Kuhongania-Akiki 1973; Jansen 1972, 1977). In addition, developmental initiatives have also focused on the reduction of post-harvest wastage, improvement of access roads to beaches, marketing, hygiene, preservation, the development of beach-side facilities and other development possibilities (cf. Jansen, 1977; Lake Basin Development Authority, 1983; Republic of Kenya, 1966, 1969, 1974, 1988c, 1988e). Much recent discussion on the fishery's development has focused on the rise of the Nile perch fillet processing industry (Jansen 1997; Abila and Jansen 1997; Gibbon 1997; Reynolds and Greboval 1988; Reynolds *et al.*, 1995).

## 2.5 Rusinga Island

Rusinga Island is part of the lake-side district of Suba. It is bounded to the north by the Rusinga Channel and to the east by the Mbita Passage. It is the largest of a group of Kenyan Islands that include Mfangano, Takawiri and Ngothe Islands. The island itself has no major towns, and it served primarily

by the small town of Mbita to which it is connected by a causeway. Mbita town is served by graded roads connecting it to Homa Bay to the east and Sori to the south.

The Mbita Causeway is an important feature of the island's life, its trade and, indeed, for the rest of Kenya's Lake Victoria fishery. In the past, water entered the Nyanza Gulf through the Mbita Passage between Rusinga Island and the mainland, passed around the Nyanza Gulf in an anticlockwise rotation, and exited through the Rusinga Channel. When, in 1983, the Mbita Causeway was completed, water no longer entered the Nyanza Gulf through this entrance (Geheb 1997; Geheb and Binns 1997). Although the distance from the mainland to the island is no more than 500 metres, fishers claim that the water volume that passed through it was great and the current extremely strong, such that many people who tried to cross the channel died when their boats capsized. The clusters of evil spirits, 'nyawawa' living on either shore are said to be testimony to this (Geheb 1997). This current, it is said, brought 'good' water to the Gulf, pushing the 'bad' water out in front of it through the Rusinga Channel. As a direct consequence, fishers argue that fish are no longer attracted to the Gulf, but remain in the open lake and well beyond Kenya's territorial waters. This claim, however, has been refuted elsewhere (Wandera, 1992: 80).

The people of Rusinga are of Bantu origin, having landed on the island following their flight from persecution in Uganda. Ayot (1979) claims that the choice of these islands for settlement by the BaSuba was because their favourite fish, the *semutundu* was available in large supplies at the time of their arrival. Their settlement did not go unnoticed to their neighbours to the east, the Luo, with whom they were eventually assimilated. Little remains of their original LuSuga language, and there is little, today, to identify Rusingans as separate from Luos. There are two main BaSuba clans: the Wanyama and the Waware. The island is also home to a large population of Luo Karichwonyans settled around Nyagina beach on the eastern side of the island.

The Mbita causeway has enabled trucks from the Nile perch filleting factories access to the island and, in doing so, created a sustained market for the island's chief economic output, fish. Virtually all of the Nile perch landed on the island is sold through these channels. Many of these trucks gather at the causeway and await fish to be brought to them by bicycle transporters (*jo-orongi*) from various points around the island. Kiumba Beach, however, has, attracted several filleting factories who send trucks direct to the beach.

In addition to these marketing channels, the Nile perch fishery has had other local impacts. These include deforestation and possibly nutritional deficits. The Nile perch has a very high fat content, and so requires substantially more wood-fuel to smoke than other species of fish. Perch smoked in a traditional kiln ('lunyu') needs as much as a kilo of wood fuel per kilogram of fish (Peyton 1988). This meant that as the market for Nile perch first expanded (in the 1980's), many areas along the lake shore were rapidly deforested. On Rusinga Island today, trees only remain only on the highest reaches of Rusinga Hill, and the island now imports wood fuel from other islands (cf. Kamweti, 1992; Yongo, 1994).

The island also relies heavily on agriculture, although rainfall is both erratic and poor. As a consequence, Rusingans rely on more drought-resistant crops, such as millet, maize and sorghum (cf. Herring, 1979). In the past the islanders practised elaborate forms of terracing and intensive agriculture to counter the vagaries of weather patterns, which, when first observed, impressed colonial administrators immensely (Conelly 1994). In the 1930's, however, as demands for salaried employment and cash incomes escalated in the lake region, farming on the island was neglected and the land ignored as a direct result of labour loss to the fishery and other national economic sectors (Conelly 1994). More recently, some islanders have turned to farming horticultural crops - particularly kale and tomatoes - for which there is a high local demand, especially during the dry season from December to January. This activity is carried out on small, lake-side plots called *orundu* which are irrigated by hand.

The hard work involved in their up-keep, along with problems from marauding monkeys and hippos, has ensured that orundu farming is not widespread, and largely restricted to northern areas of the lake shore along the Utajo Peninsular.

### **3. KIUMBA BEACH**

Kiumba beach is located on the north-east coast of Rusinga Island. The beach is 8 km by road from the nearest town and Suba district headquarters, Mbita. Suba District includes the 16 islands in Kenya's sector of Lake Victoria of which, the biggest in size are Rusinga and Mfangano. Kiumba beach is in Wanyama sub-location, one of 4 sub-locations in the Rusinga West location. Rusinga West is one of 7 locations in Mbita division. Besides Mbita, there are 3 divisions - Central, Gwassi and Mfangano - that together form Suba district.

Kiumba is strategically placed in its proximity to Mbita town and ease of communication by water and road transport. The Nile perch landed at Kiumba exceeds that of the other seven beaches which have been gazetted and is thus considered the most important on the island. The other gazetted beaches in Rusinga island are Utajo, Luanda Rombo, Litare, Uta, Kolunga, Sienga and Nyangwina. Politically, Kiumba beach falls under Mbita parliamentary constituency. This constituency has 8 electoral wards, Kiumba being in Rusinga island ward. The other wards in Mbita are Lambwe, Gembe, Rusinga island, Gwassi north, Mfangano island, Kaksingri, Gwassi east and Gwassi west.

Kiumba beach was one of several fishing communities involved in Geheb's (1997) study of fishing and farming livelihoods on Kenya's shore of Lake Victoria in 1994. His study revealed the importance of livelihood flexibility to the communities of the lake shore. This was demonstrated by the switches between farming and fishing that the fishermen interviewed had made in response to the changing nature of the lake's fishery and the institutional regime that governed access to it. He interviewed eighteen fishers at Kiumba Beach who, in 1994, all agreed that theirs was a fishery in decline. At that stage, the beach focused its fishing effort on both the tilapia and Nile perch fisheries. Relations between beach members and the Fisheries Department (FD) were not good, and many felt that there were contradictions in the actions of the Fisheries Department with regards to the control of theft and licensing. In 1994, farming was considered to be important to Kiumba's fishers and Geheb's respondents highlighted the food expenditure savings which farming made and its predictability in comparison to the fishery. For some, however, the idea of investing in farms or farm land was considered unwise imprudent given the recent end of a prolonged drought.

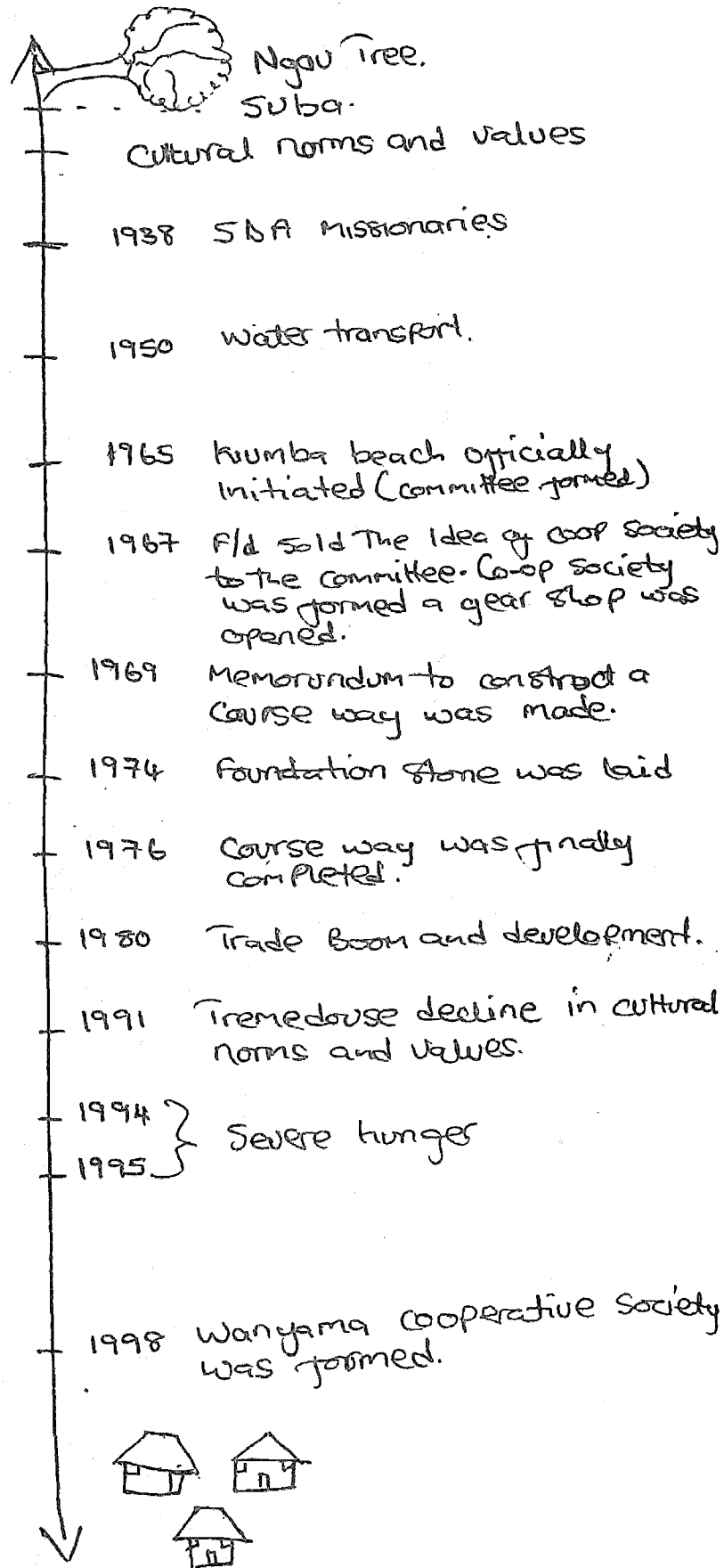
#### **3.1 Community History**

The initial contacts with the Kiumba community were made on the day preceding the study. A small group visited the beach and met with the secretary manager of the fisheries co-operative society (FCS) and the assistant chief of Wanyama sub-location. Plans were made for the team to camp in a field close to the beach, for a hotel proprietor to provide meals for the team, and a community meeting was arranged for the following afternoon.

The meeting was called by the FCS secretary-manager and opened by the beach leader. It was reasonably well attended by older community members and the fishermen landing on the beach and provided an opportunity for the team to explain the rationale for their visit and the objectives of the study. This prompted some questions about how Kiumba could gain from the study. The team explained how the study would provide them with an opportunity to put their views to the fisheries agencies of the lake and gave a brief introduction to some of the participatory methods which was hoped would be useful for this. As the meeting broke up, a group of the older community members who had attended the

meeting were asked if they would explain the community's origins and history. The elders were very willing to participate and wanted to ensure that key events were recorded. The time line in Figure 1 outlines the key events which were discussed by the elders.

Figure 1 Timeline of key events in the history of Kiumba Beach



The first inhabitants of Rusinga Island were Luos from the Wanyama clan. According to the elders, the Suba arrived from Uganda in the early 1930's. They came in search of land, food and fish and settled in Ramogi hills. Some migrated to Kisumu and those who remained pushed the Luo indigenes east and settled on their land. Eventually, Suba - Luo intermarriages occurred and the Suba were eventually assimilated by the Luo. Although there are some efforts to provide schooling in Suba, the elders explained that their children were not interested. Nonetheless, the Suba continue to dominate neighbouring Mfangano Island where their cultural norms persist. Kiumba beach was initiated in 1965 by the Luo. The name Kiumba came from the word 'umba' which refers to the soil used for decorating pots and smearing houses. An important symbol for Kiumba community is the big Ngou tree located on the lake shore. This is where community meetings were held before the fish *banda* was built. Key events highlighted by the elders time line include (see Figure 1):

- In 1938, the missionaries of SDA church arrived and the old cultural norms and values began to decline as converts rejected their traditional beliefs.
- Between 1974 - 75 the community of Kiumba was struck by drought and famine
- The Mbita causeway was completed by 1983 and this brought about a series of developments e.g. the construction of permanent houses, increased population and a fish trade boom
- In 1998, Kiumba co-operative society was formed with intentions of improving the fishermen's well-being.

### 3.2 The natural resource base

The district development plan considers Rusinga Island to be a low potential area for agriculture and cattle rearing. In contrast to the poor farming potential of the island, the lake's fish stocks are an important source of income and protein. As there are no major rivers or streams on the island, the lake also represents an important source of water for domestic use and for transport.

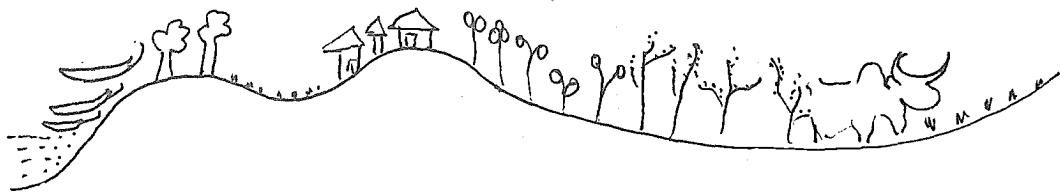
Following on from the community meeting, a small group of younger men were asked about the natural resources exploited by the Kiumba community. They explained that the Wanyama clan considers the natural resources such as the neighbouring hills, forests, farmland, water, sandy beaches and those of Ngothe Island to be under their jurisdiction and they used piece of chalk and various symbols to draw a map of these. This has been redrawn in Figure 2. It shows the natural resources available to the Wanyama clan and key roads. Following the construction of the map, the men were asked if they would lead a transect walk through the community and another man was asked to lead a simultaneous shoreline transect walk. The transect diagrams in Figures 3 and 4 were drawn up from the discussions which accompanied each walk. These show how the community use their natural resources in various ways. The community keeps animals e.g. indigenous cattle, sheep, goats, donkeys and chickens. Arable land is used for farming during rainy season when crops like millet, maize, cow pea, cabbages and vegetables are grown on the slopes of Wanyama hill and near the shores of the lake to the east and west of Kiumba beach. The community have only one farming season in a year. They start preparing their fields between December and March and harvest from May to July. No one lives on the slopes of the Wanyama hills although the land is sub-divided among the community who inherited it from their grand parents.

At the foot of the hill, Gumba forest was considered as an important resource. It consists of two types of tree, the *Ngou*, fig, tree and the *Siala* tree which the community uses to make floaters, masts and oars for fishing and for firewood. The shoreline transect walk in Figure 4 revealed that some of these trees were used as the location for sacrifices when the rain failed. Their leaves were used to anoint boats when catches failed. The people who live in Kiumba are also involved in sand extraction from the beach, which they use for building of permanent houses.

The local communities also exploit the lake's fisheries and in particular the Nile perch and *dagaa* or *omena* fisheries. They use long lines, beach seines and mosquito seines for the *dagaa* fishery. However, in recent years Kiumba beach has concentrated on catching Nile perch. Fishers based on Ngothe Island also land at Kiumba beach to sell their fish to the factory trucks which arrive daily

Several of the economic activities on Kiumba beach have resulted in environmental degradation e.g. cutting of trees, sand harvesting from the lake and farming near the shoreline. Poor sanitation has also polluted the beach. The shoreline transect walk also revealed the impacts of soil erosion on the farm plots along the walk. Another problem mentioned were the hippopotami which came on shore during the night and destroyed crops.

Figure 3 Transect of Natural Resources at Kiumba Beach



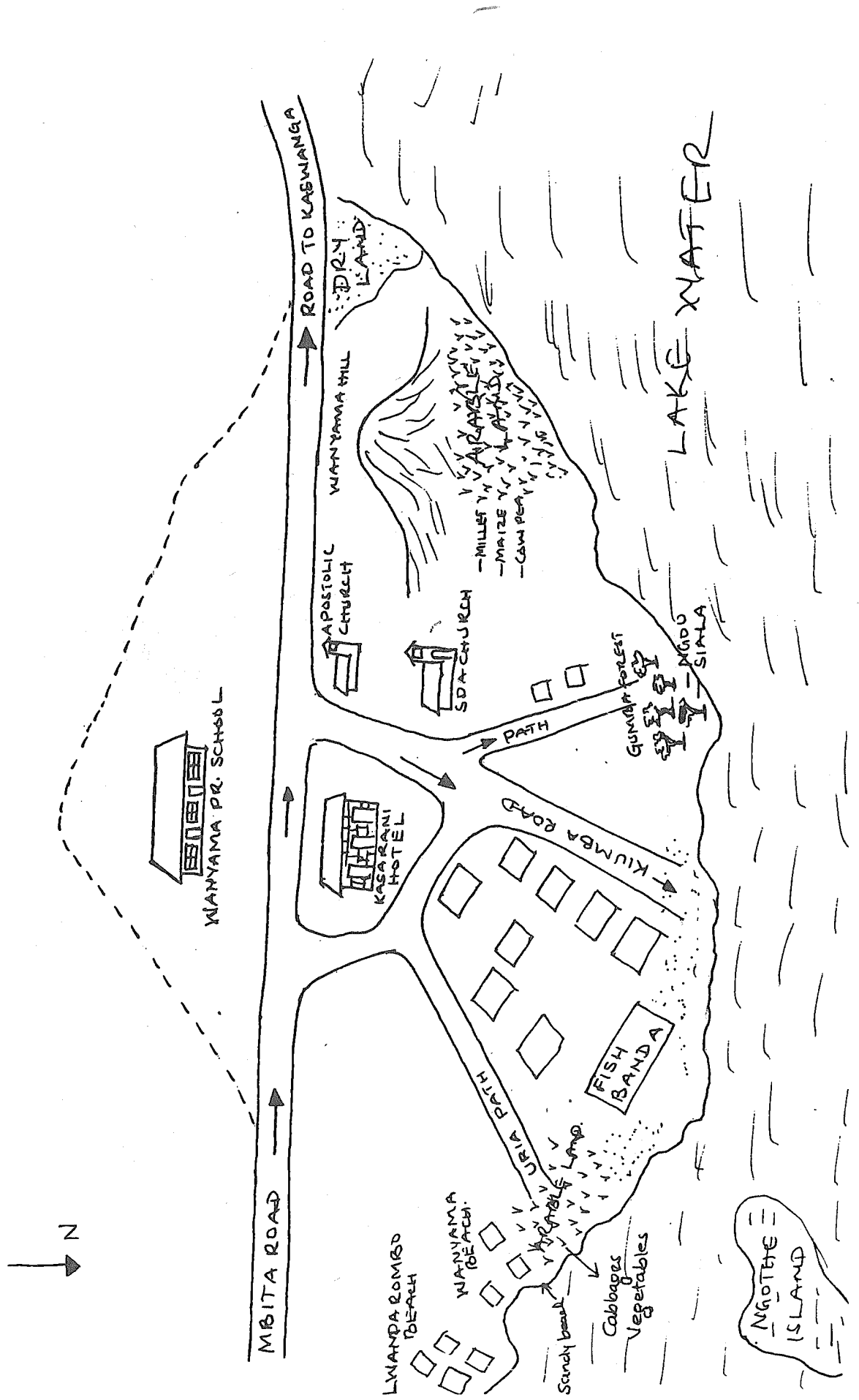
Natural Resources	Beach	Open ground	Farmland	Grazing land
Resource use	Landing boats	Drying <i>dagaa</i> fish, gear and sails, landing boats	Cropping: millet, maize, cowpea, vegetables	Grazing cattle, goats, sheep and donkeys
Main users	Whole community		Sowing done by women and men, women do weeding	Young boys
Seasons	Year around		Cultivation during December to March, harvesting in May and June	Year around
Problems			Drought, low soil fertility	Dry season lack of grazing

Figure 4 Shoreline transect of natural resources at Kiumba Beach



Land use	Cropping, maize and millet	Residential	Cropping	Residential	Landing site	Residential	Fallow	Cropping	Landing site, bathing
Resources	trees, sacred trees and farmland	Trees, bushes	Farmland, bushes	Trees, bushes				Farmland	
Soil type	Rocky								
Problems	Monkeys	Soil erosion		Hippopotami, poor soil					

Figure 2 Map of Wanyama Clan Resources





### 3.3 Socio-economic issues

The community at Kiumba beach is involved in several economic activities. The major economic activity on these beach is fishing. Others include farming, fish processing and manual labour. Secondary sources of income include shop keeping, restaurants, tailoring, carpentry, boat-making, house renting, trading in cereals and vegetables, and charcoal selling. Different people in the community were asked to describe and explain the activities through which they made a living. They were also asked about how they utilised the money acquired from these activities and several matrices were drawn by different individuals which examined the reasons why different activities were preferred. These are redrawn in Figure 5. An old woman drew a seasonal calendar to explain how she switched between farming and fish trading at different times of the year and this has been redrawn in Figure 6.

#### 3.3.1 Fishing.

Fishing and associated activities such as processing and trading are a major source of income for nearly everyone spoken to at Kiumba. Fishermen described how they earned more income from fishing than any other activity, including farming. Overall, the Nile perch trade was considered to be the most important fishery to the community as the Nile perch represented the bulk of the fish landed on the beach. A fisherman drew the matrix in Figure 5a to compare the income he earned from various activities and the reasons why different activities were valued.

Figure 5 Matrices to compare different sources of income

a) Fisherman

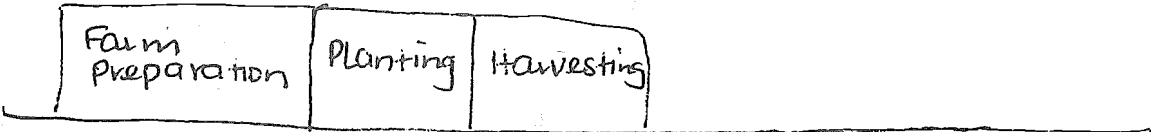
Saving	○○ ○	○○ ○	○○○○ ○○○ ○○
Income	○○○ ○○	○○ ○○	○○
experience	○○○ ○○○ ○	○○○ ○○	○○ ○○
	FISHING	FARMING	LIVESTOCK.

b) Labourer

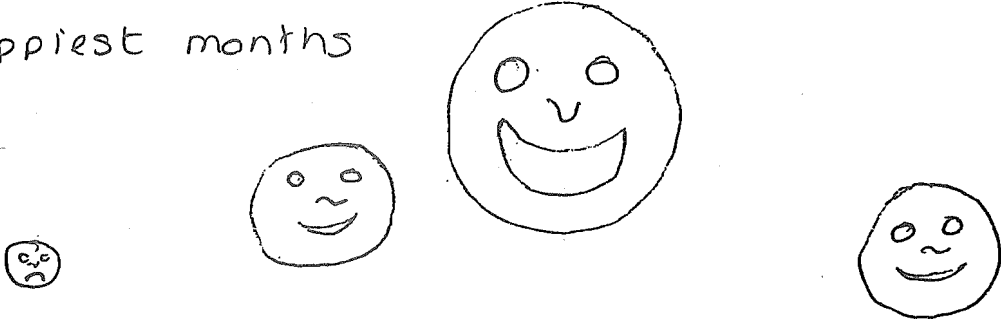
Food	○○○	○○○ ○○○ ○○○ ○○○	○
Income		○○ ○	○○
	farm labour	his own farm	fishing.

Figure 6 Seasonal availability of income from fish trading and farming

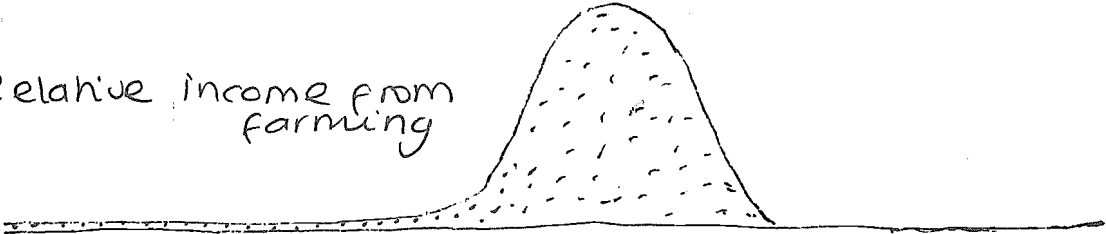
Farming Calendar



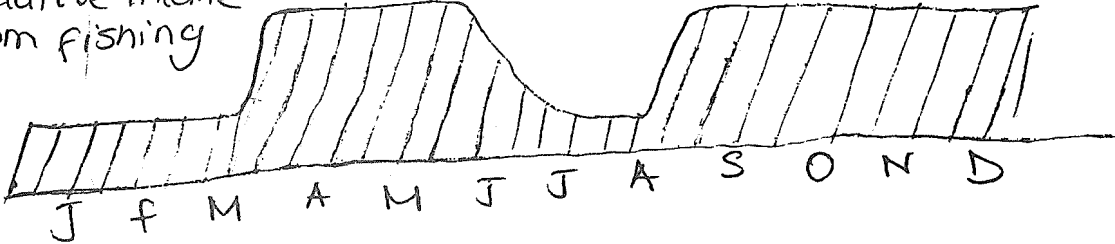
Happiest months



Relative income from farming



Relative income from fishing



### 3.3.2 *Fish processing and trading*

Fish trading is another important activity on the beach. There are two levels of fish trade: the large scale commercial fish trade; and artisanal fish trading and processing. The artisanal fish trade level was dominated by women who trade in juvenile, factory reject fish and *dagaa* fish. This fish may be bought and sold fresh or processed and then sold. The women traders buy fish daily and process it in small amounts until they have enough to take to the market. They smoke this fish using kilns located at the edge of the beach. When fish catches are low the women, divide themselves into groups so that one group takes fish for one day and the other for the following day. They also work together to sell their processed fish in distant markets. As transport is a constraint, the women who process fish cannot go to the market every day. On average they may go twice a week to the market and will pool their resources to arrange for a lorry to pick them up from the beach when they have enough fish to take to outside markets. Their major markets include Mbita, Awendo, Mumias and Nairobi. Some women will stay up to a week away.

Some women combine fish trade with other trades like selling cereals and vegetables. This is to maintain a constant income during the low fish supply seasons. The seasonal calendar in Figure 6 shows fish income drops in July and August and how this is compensated for by farm harvests. Peaks in the availability of fish occur in April, May, June during the rainy season when there is a high catch of juvenile fish.

### 3.3.3 *Farming*

Farming in Kiumba is dependent on rainfall. This has been low in recent years, and farming is predominantly for subsistence purposes, although some surplus is sold. Crops grown include maize, finger millet, tomatoes, vegetables and cowpeas. There is one farming season and land holdings are small and fragmented. Farming is combined with other activities such as fishing and fish trading. Fishermen will farm when catches are low.

### 3.3.4 *Livestock rearing*

Livestock rearing is an important economic activity. Livestock are an indicator of wealth and are used as a form of saving income earned from the fishery. Animals are sold when necessary, often to purchase fishing gear and boats. Livestock are also used to plough farms and will be hired out for this. Their milk is an additional source of family income.

### 3.3.5 *Other sources of income*

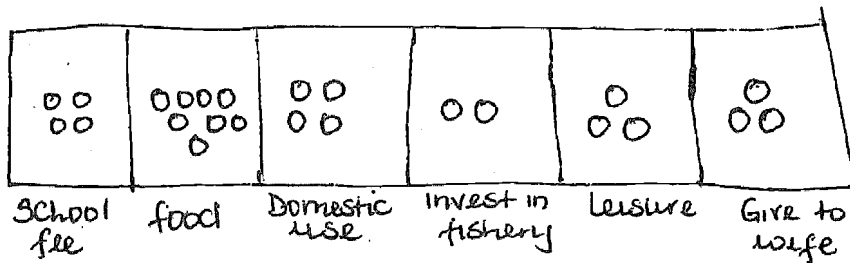
Some women cook and sell food from kiosks around the beach. Once fishermen have landed and sold their fish, they pass by the kiosks and will buy a cup of porridge or tea especially if they land in the morning. When they land at noon they may take some food but they prefer to eat meals at home. This business is highly dependent on the fishery and when catches and fish prices are low, business suffers. Many fishers are migrants and have rented houses at the beach. House rent ranges from KSh. 150 to KSh. 1000 and leasing shops and kiosks is a lucrative source of income for their owners.

Cereals and other agricultural products are also traded from shops close to the beach. This is mainly done when fishermen land and sell their catch. Maize, beans, tomatoes, onions and vegetables were the main products being sold at the time of the study. Fish traders who go out to sell fish in other markets may come back with maize to sell at the beach. These products are in high demand during the dry months. Other trades include tailoring, carpentry, boat making, charcoal selling and second hand clothes.

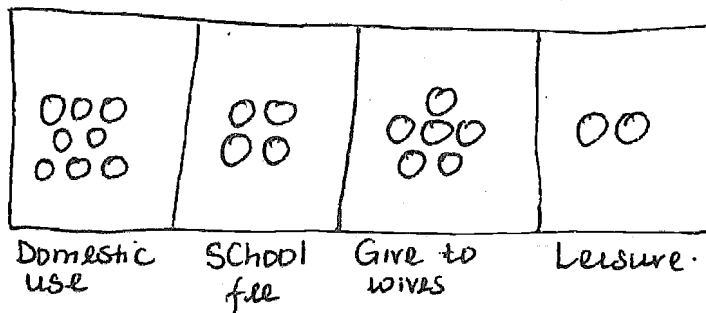
3.3.6 Expenditure

Different people in the community use their income in different ways. Some of these include provision of domestic goods and food, education, for reinvesting back into the fishery and/or buying livestock, for leisure, and for investing in farming. A boat owner and a hired labour were asked to draw a matrix to describe how they spend their incomes. These matrices have been re drawn in Figure 7.

Figure 7 Matrices of expenditure drawn by a) a boat owner and b) a farm laborer



a) boat owner's relative expenditure



b) farm labourer's relative expenditure

### 3.3.7 Poverty at Kiumba

Two participatory research techniques were used to investigate the well being of different groups within the Kiumba community. These techniques included wealth ranking and a series of pie charts which were used by three informants from different wealth strata to describe their different sources of income.

After explaining that the purpose of the wealth ranking exercise, a list of approximately 60 household heads was drawn up with the help of the beach leader. It included households within the boundaries of the beach and included both male and female household heads.

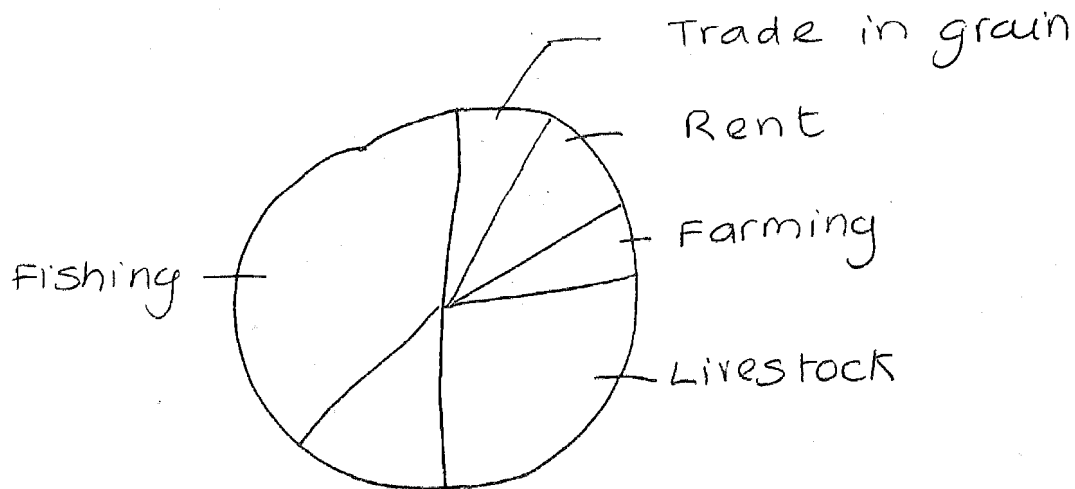
The research team then held private discussions with four informants. The aim of these was to investigate the community's perceptions of well-being. The team explained that they were not interested in how much property is owned by an individual household, rather the team was interested in why some households were better off than others. After a discussion about the meaning of well-being in Kiumba, each informant was asked to rank the different households in the community according to their relative well-being. After each interview, each household was given a score according to how it was ranked and a weighted average of all four scores was calculated. These were used to derive the well-being strata in Table 1.

**Table 1 Wealth ranking at Kiumba Beach**

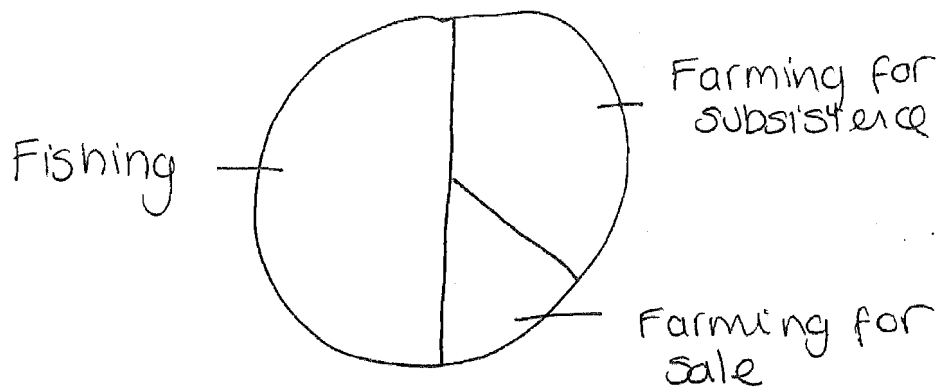
<i>Socio-economic stratum</i>	<i>No of houses or 'udi' ranked</i>	<i>Proportion of houses or 'udi' ranked</i>
<i>'Jamoko'</i> . These people own land, live in permanent houses, own may boats and rent houses to others. They can afford good food, they employ others. Their children are at school and they have high levels of income and savings. They have many children and a good business acumen	5	8%
<i>'Diere'</i> . This is the middle group, these people own a few (less than five) boats, live in at least one permanent house. They are able to educate some of their children and can afford good food once in a while. They usually have some assets, e.g. a bicycle, a cow etc.	31	48%
<i>'Jachan'</i> . These are the poorest people. Some of them own nothing. They include old men and women with no children and drunkards. Those who do have children cannot afford to send them to school. The poor have small incomes, do not save and have no business acumen. They often quarrel at home. This group includes casual labourers who do not own land and crew members who do not own boats.	29	44%

The team investigated the various sources of income to households in each of these strata. Pie charts were produced from interviews with respondents in each strata and these have been redrawn in Figures 8a to c. Each respondent was asked to consider a pile of stones to represent his annual income, he was then asked to divide the stones according to the contribution which each source made to his annual income.

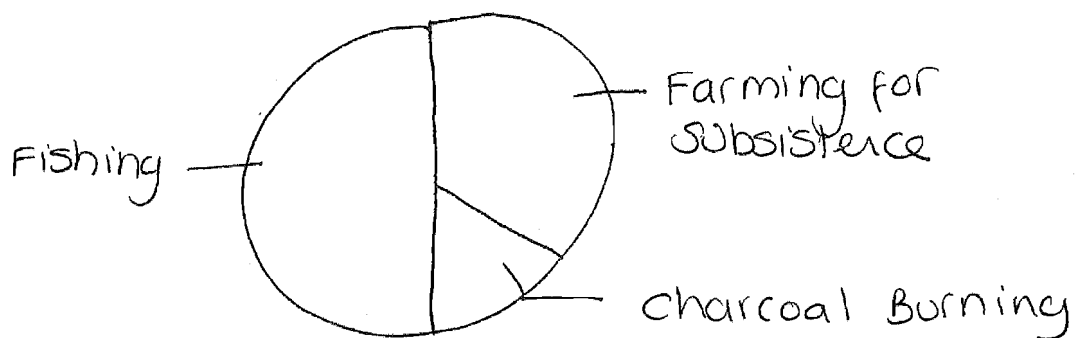
Figure 8 Pie charts drawn to show the contribution of different sources of income to men considered as a) wealthy, b) middle class, and c) poor



(a) 'wealthy' sources of income



(b) 'middle-class' sources of income



(c) 'poor' sources of income

Fishing was an important source of income to the men in each wealth stratum. The wealthy own boats and fishing gear but seldom go to the lake to fish. The middle class man owns 2 boats and sometimes accompanied his boats on fishing trips. The poor man was a crew member. All informants interviewed ranked fishing as their main source of income. Destruction of fishing gears by other fishermen was mentioned a major problem.

Farming also provided some income to the men in each stratum. Whereas the wealthy were able to grow crops on a large scale and to sell their surplus, the poor man explained how he farmed for subsistence purposes only. While the wealthy man considered farming to be his least important source of income, farming was second only to fishing in importance to the middle class and poor informant. Inadequate rainfall was mentioned as a major constraint to farming around the beach.

Livestock rearing was another source of income to wealthy households. Whereas the wealthy man kept several animals, the poor man rarely had a chicken. Livestock and particularly cows provide the wealthy with milk and when catches are low, animals can be sold as an alternative source of income. Diseases such as east coast fever were mentioned as a problem.

The pie chart discussions revealed that the wives of the wealthy man undertook trading activities on his behalf and these made a major contribution to the household's income. Dishonest customers who did not pay their bills were mentioned as an important problem. Rental housing provided another source of income for the wealthy man. Charcoal burning was mentioned as a source of income for the poor man. Although this led to environmental degradation, he felt he had no other alternative.

As can be seen the wealthy have a diversity of income sources whereas the middle class and the poor rely predominantly on fishing and to a smaller extent farming. The rich are able to save and to accumulate capital in livestock and other investments such as rental housing. One informant believed that business acumen was crucial for the movement of a household from one stratum to another. This would enable them to invest in fishing boats and gears and thus move up the wealth strata.

### 3.2.8 Women's involvement in the fishery

Women participate in buying and selling of *dagaa*. This is dependent on fishermen who land with wet *dagaa* from the lake in the early morning. From here *dagaa* is sun dried on the mosquito nets or open grass areas at the beach. Most *dagaa* processors are women and children who sell the sun dried *dagaa* at the beach or transport it to distant markets.

Processing *dagaa* takes about 1 day on a bright shiny day and a bit longer on a cloudy day. Women spend 2 days or 3 in distant markets selling the processed fish. Besides the *dagaa* fishery these women are involved in the processing of Nile perch rejected from the fish *banda* by the fish factory buyers or agents. They buy rejected Nile perch at reduced prices, scale it and process it using smoking kilns.

Juvenile Nile perch is also processed at this beach by women. They buy this fish from fishermen using beach seines. These gears are responsible for harvesting immature Nile perch and women act as middlemen between the fishers and the consumers at the various markets in Mbita, Kisumu, Luanda, Mumias, Homa Bay, Awendo etc.

At Kiumba beach, some women own gears and boats. 35 women own gill nets and mosquito nets for both Nile perch and *dagaa* respectively. These women employ men as crews to fish for them and they are paid a certain percentage of money from the sales. Women are also involved in pulling or fishing using beach seines and at the end of the day they get a small share of the catch. In the co-operative

society at this beach some women are employed to perform clerical duties and about 10 women are members.

### 3.3.9 *Children in the fishery*

Children at Kiumba participate in some fishing activities. A few children help in sun drying *dagaa* and receive a small quantity of the dried fish as their remuneration. Child labour is also used to scale Nile perch before smoking and for collecting the firewood used by women to operate the smoking kilns. These children are normally between 7 - 15 years of age and are mostly from poor families or orphans and are forced to look for work to make ends meet. Boys from as early as 9 years old join the fishing fleets as crew members.

Boys and girls provide labour to pull in beach seine nets. They will receive a small quantity of fish from the catch at the end of the day. Beach seining is not regulated and anybody may participate including men, women and children. No one expressed concern about this and although the assistant chief was aware of it, he said he could not control it since the landing site is not fenced off.

One advantage is that these children get money and are able to buy some domestic belongings for themselves rather than burdening their parents or guardians. Younger boys also earn a small income from off-loading nets from boats after fishing trips.

The economy has changed forcing women to join hands with men in income generating activities. Farming used to be a profitable enterprise but now it is no longer very productive. Family lives are so demanding these days that you can not depend on one income generating activity alone. Women have been able to reduce this gap in family incomes.

### 3.3.10 *Men's domination of the fishery*

Men at this beach are predominantly fishermen. They constitute the overwhelming proportion of boat owners and almost all crew members. Fish processing, e.g. *dagaa* sun drying, is done by men as well as women, although it is mostly done by women. Selling fish is done by men mostly since they own the fishing gears. Men own beach seines and organise the seining routines. At this beach, men dominate the administration including that of the fisheries co-operative society. The beach committee is also dominated by men who administer the landing site affairs.

### 3.3.11 *Links between the fishery and other sectors of the economy at Kiumba*

The team met with a group of young fishermen to discuss the land tenure system, and how they use their fishing income to invest in farming and other activities. Although fishing is the main economic activity for the majority of the Kiumba beach community, it is seasonal and fish catches peak twice a year, in April to June and then again in September and October. Trading is often an important secondary economic activity. They mainly trade in fish, agricultural produce and other merchandise at different times of the year. Income from trade is invested in farming and also in livestock such as cows, goats, pigs etc.

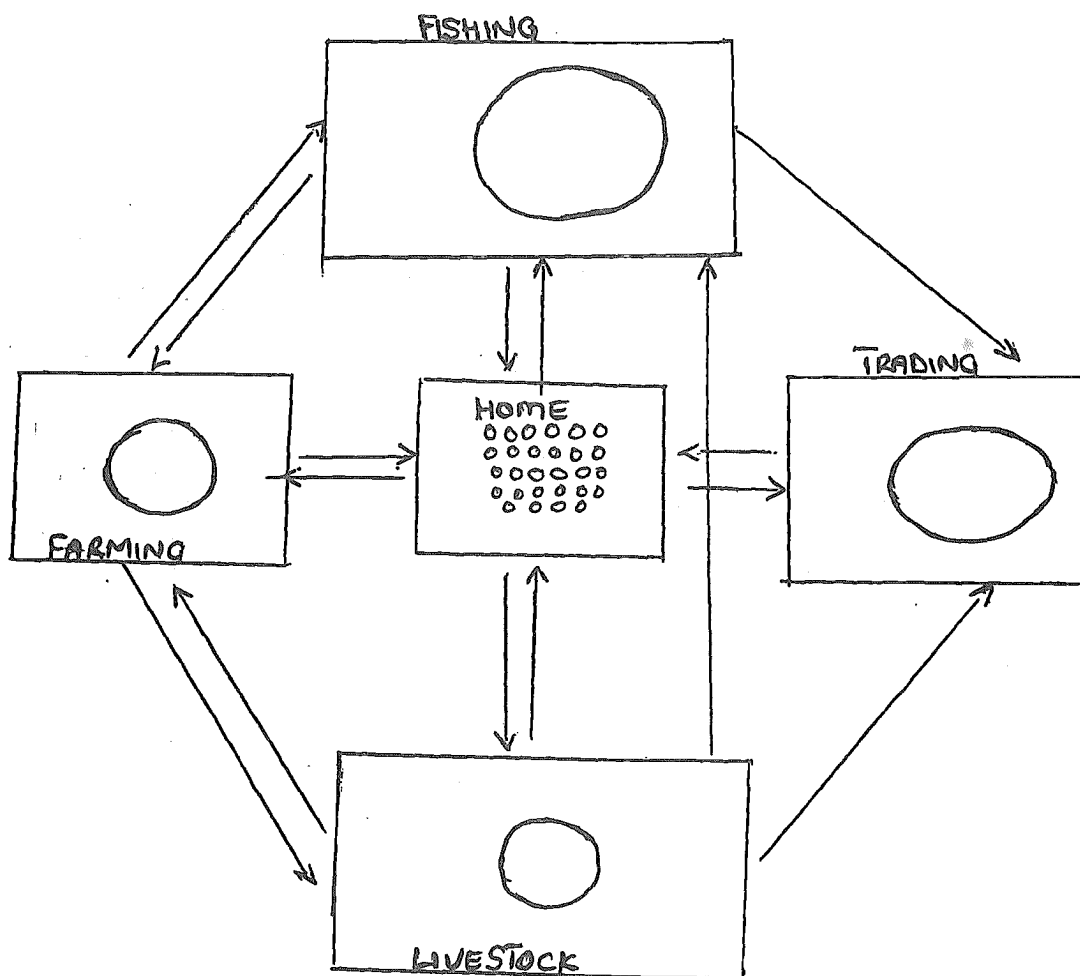
The fishermen ranked farming as their third source of income. They considered it to be of less importance because there was only one short growing season. Farm land is prepared from January to March and cultivation begins in April - May and harvest is in July and August.

Most fishermen own some livestock, e.g. a few cows, goats, sheep and/or pigs. Livestock are valued because they acts as a bank and enable fishermen to save. When the fishing industry declines, animals



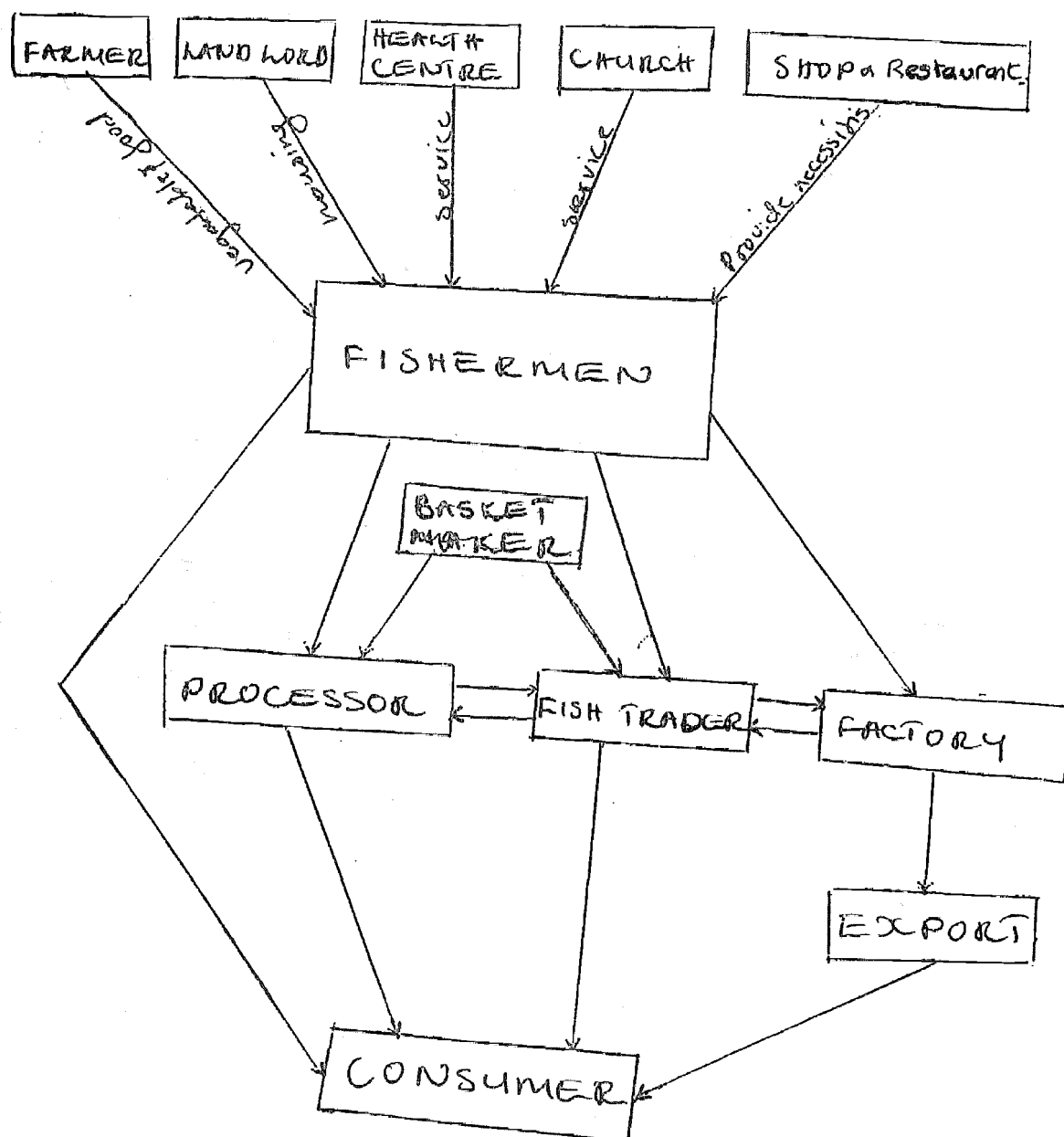
are sold to boost the business or during hungry periods, animals are sold to buy food. Cows are also used for ploughing. When the fish trade is steady, more livestock are purchased. The process chart in Figure 9 was redrawn from this discussion and it illustrates the horizontal linkages between various economic activities in Kiumba village.

Figure 9 Horizontal linkages between fishing and other sectors of the economy at Kiumba



A series of interviews with farmers, cooked food sellers and shop keepers revealed that although fishing is major activity at Kiumba, many other activities directly depend on it. Fishermen cannot satisfy their needs only with fish. They depend on a range of goods and services which provide income and employment for other members of the Kiumba employment. The process chart in Figure 12 was redrawn from these interviews and illustrates the vertical linkages which fishing has created in Kiumba.

Figure 10 Vertical linkages with the fishing industry in Kiumba



Fishermen need things like nets, hooks, line, clothes, and from the church they get spiritual services such as prayers and the word of God. In addition to these, property owners rent their houses to fishermen, the health centre provides advice and treatment to the fishermen, and fishermen, usually the crew, get their food from restaurants along the beach. As well as the goods and services on which fishermen rely, there are also a range of activities which rely on the fishing industry, e.g. the traders who buy fish.

### 3.3.12 *Kiumba Communications*

The beach has one major road, the ring road, which has two major branches; one towards the Unyanda peninsula and the second is towards Kiumba beach (see Figure 11). There are other minor roads and paths to individual houses. Generally the road is poor and impassable during the rainy season. The road is maintained by the Government and to a smaller extent by the community members. Currently the beach community has no water transport service and they rely on these roads. There is no regular public transport service from Kiumba. Although community members will board trucks and other vehicles visiting the beach, they need to use other means of transport. Bicycles are the most reliable means of transport to Mbita town. An interview with elders revealed that, some will use donkeys especially for heavy luggage, e.g. fish, cereals, construction materials.

When asked more about how they communicate among themselves and with others outside Kiumba, a group discussion with old men identified the following means:

- There are some literate people who can read English language newspapers and rely on letters for communications.
- The Christian community, particularly the SDA and Apostolic churches dominate the Kiumba beach, and hence church leaders often make announcements which are passed on to other community members.
- The beach also uses formal and informal meetings, *baraza*, to convey various messages to community members. This system has been in operation since their ancestors' time and is regarded as the best mass communication in their locality.
- Some people own radios and listen to both local and foreign news.
- Different drumming beats are used to indicate different meaning to the community. E.g. the church drums which call church members to attend masses are quite different from those sounded when some one had died.
- Whistling is commonly used for calling each other and sometimes to alert someone if something bad is going to happen ahead of him. Men always do it. For example, crew members will whistle to alert others that nets have been stolen, the factory trucks have arrived etc.
- Alarm calls were mentioned as another alternative and women's sharp voices were preferred. mentioned to be the most preferred
- Greetings allow the community to ask each other detailed questions about the well being of their families and this provides a forum to spread good and bad news.
- Another common means of communication is the use of the metal ring hanging on the "fish *banda*" as a bell. When this is struck, people gather immediately to listen what message is going to be conveyed to them.
- Messages will be sent by sons, relatives and even daughters to convey different messages. The seriousness of the message will determine who should convey it.

Figure 11 Map of Rusinga Island ring road

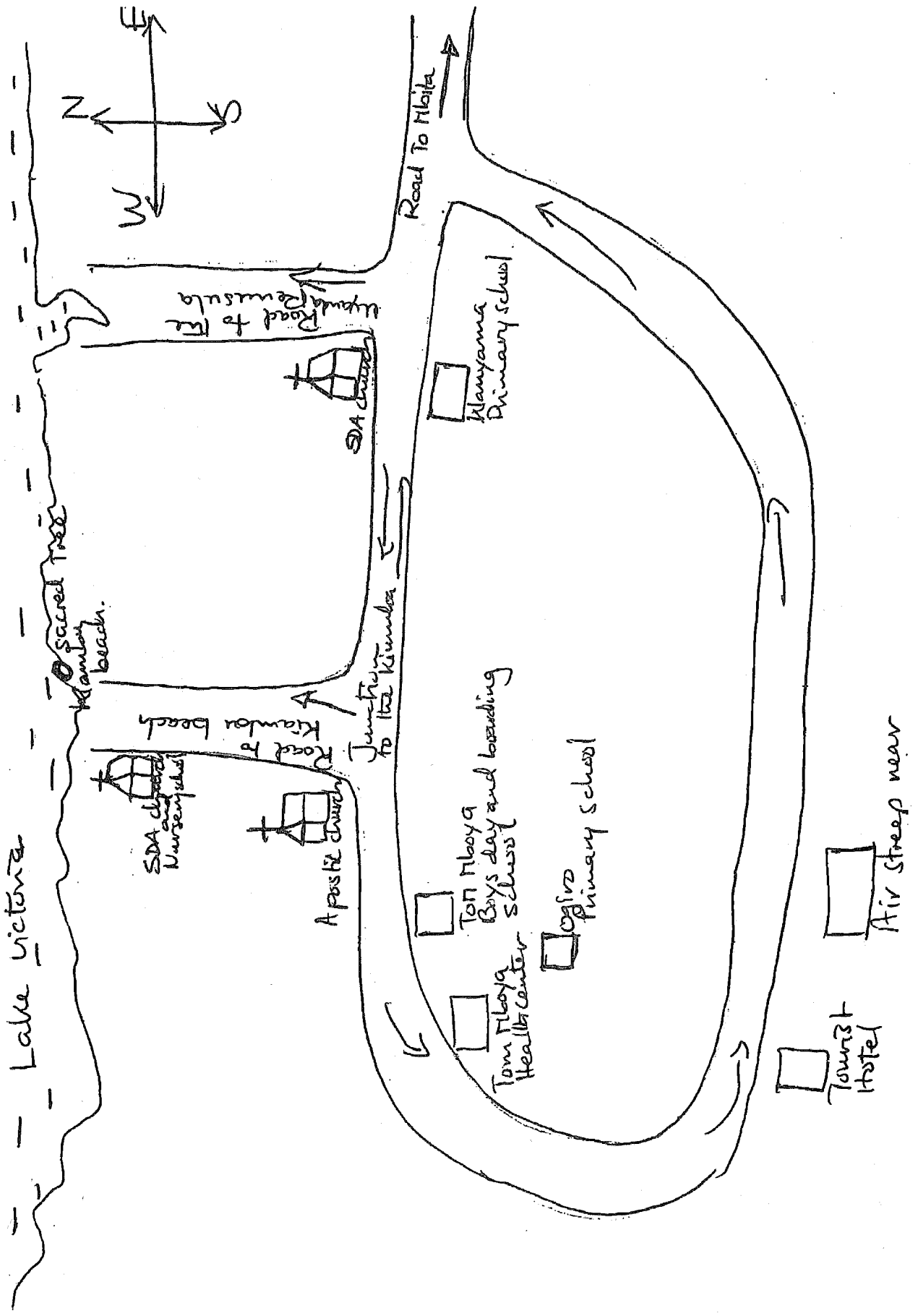
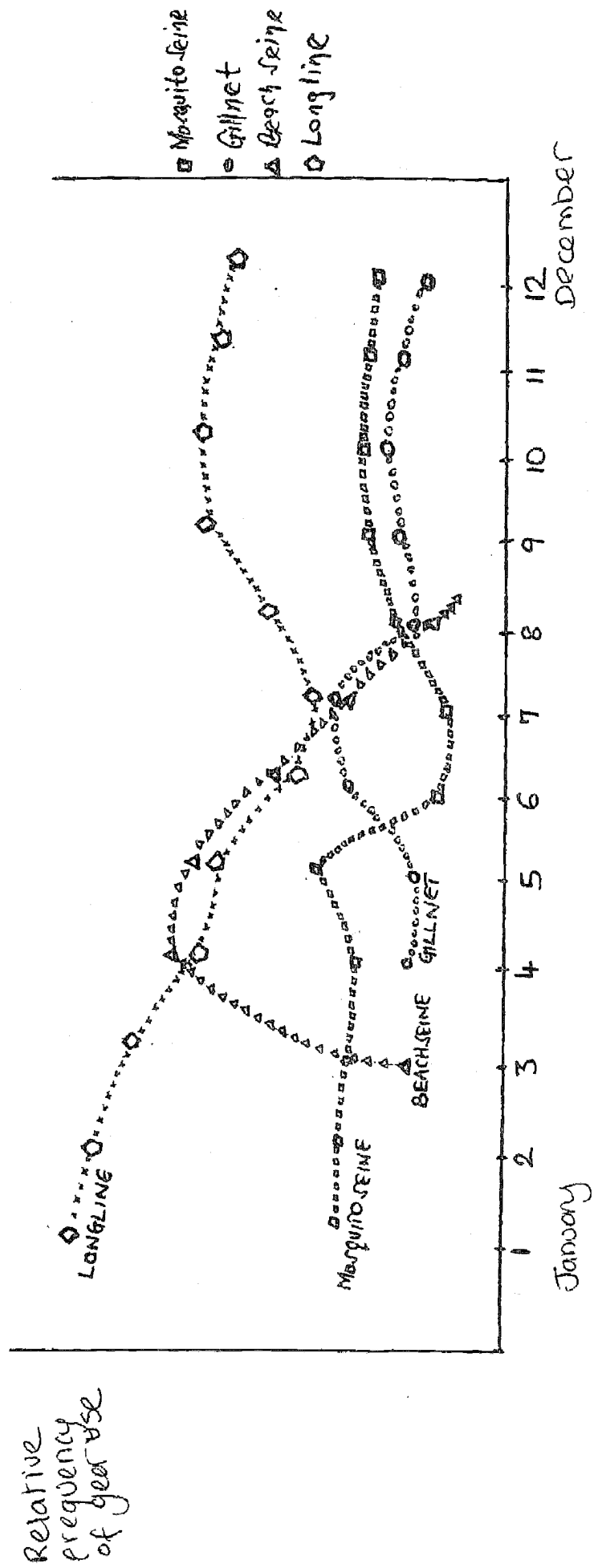


Figure 12 Seasonal Calendar of Fishing Gear used at Kiumba Beach



### 3.4 The fishery: trends and status

A group discussion with fishermen was used to investigate the different gears which were used at Kiumba beach. The fishermen constructed a seasonal calendar to describe their gear use patterns and this has been redrawn in Figure 12.

There are four types of fishing gear used by fishermen of Kiumba beach. They explained that the gear which is used most frequently during much of the year is the long-line. They use three different types of long-lines. They differ in the material which is used to make the rope on which hooks are suspended. Long lines can be made of manila, '*usi*' (nylon) or '*tennis*', a shiny synthetic material. The second most frequent gear used is the beach seine or *dina*. Use of the *beach seine* exceeds that of long lines for three months of the year, April to June. The mosquito seine, *ambega*, and gill net, *net*, are also important gears but they are used less frequently by the fishermen of Kiumba beach.

The use of the different gear types varies seasonally. Use of the long-line peaks in January to March and then again in September to November. Use of both the beach seine and the mosquito seine peaks in April and May. Use of the gill net peaks in June and July. The use of most gears is at their lowest in June and July. This is the period associated with extremely low water temperatures, caused by a condition locally termed '*yugni*' which coincides with the appearance of certain stars in the sky.

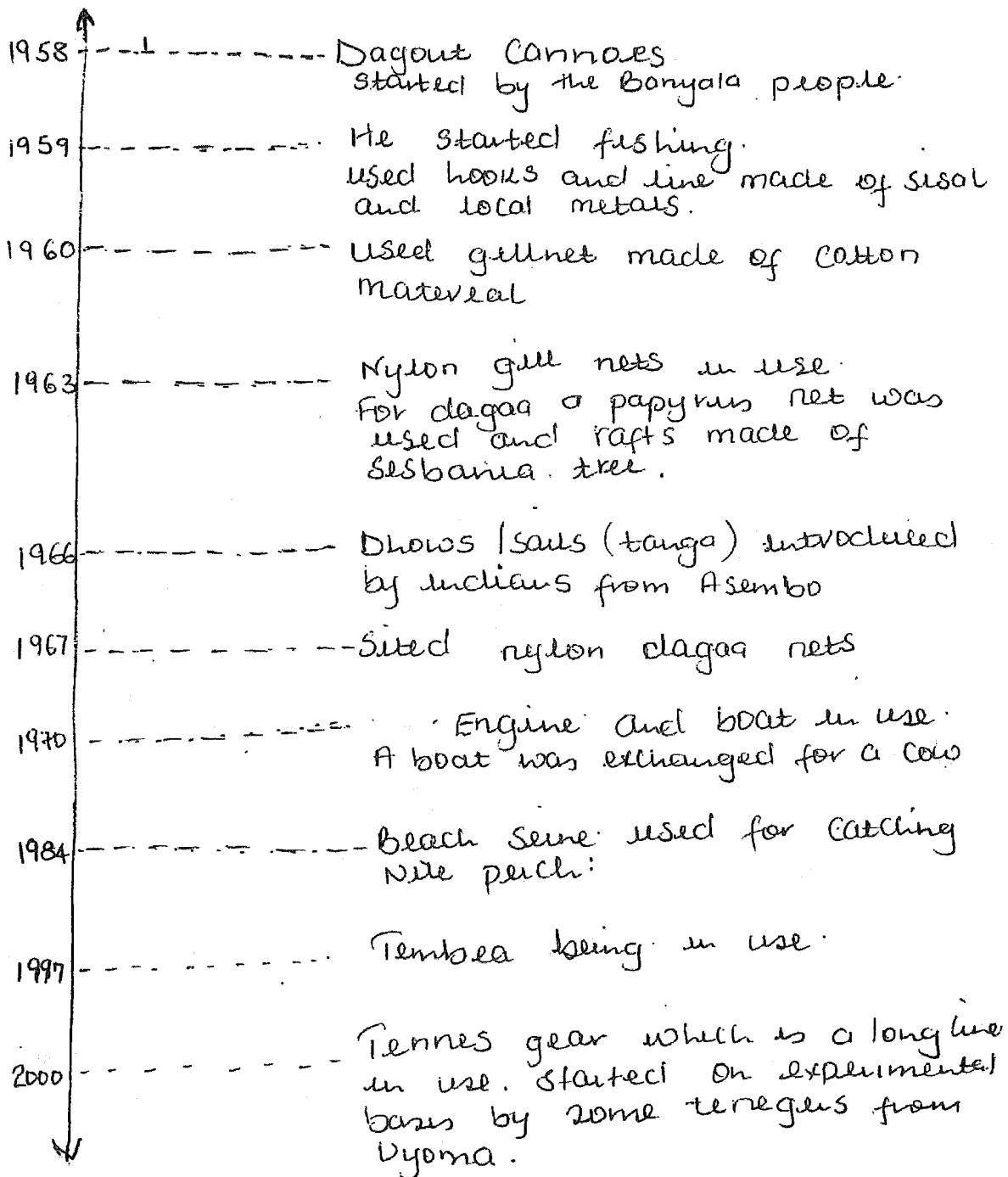
#### 3.4.1 Changes in the fishing industry

There have been important changes within the fishery of Lake Victoria. These include changes in the gears used and in the species composition in the lake. Individual fishermen were asked to use time lines to describe the changes they had experienced working in the lake's fishing industry. The time line of gear technology changes has been redrawn in Figure 13.

Important changes in gear technology include the change from the traditional gears like the papyrus nets, rafe, and dugout canoes to new technologies such as engine boats, use of sails and improved gill nets. Gill nets have changed from being made with sisal, a local material, to being made with manila and recently with tennis strands which are shiny and catch more fish.

The species composition of fish catches from the lake have changed dramatically with the disappearance of some species and the introduction of others, notably the Nile perch. In the period before 1970, fishermen at Kiumba beach caught and traded '*ngege*' (tilapia), '*fuani*' (*Barbus* spp.), '*kamongo*' (*Protopterus* spp.), '*fulu*' (*Haplochromis* spp.), '*okoko*' (*Synodontis* spp.) and '*mumi*' (*Clarias* spp.). In 1973, these species started disappearing. The original tilapiine species, locally known as '*mbiru*' and '*ngege*', also disappeared, to be replaced by '*nyamami*' (*Oreochromis niloticus*). In the 1980s, '*mbuta*' (Nile perch) became abundant and dominant, together with *dagaa* (which is also known as *omena* or *Rastrineobola argentea*) and *nyamami*. These three are, in that order, the leading fish species currently caught in Kiumba.

Figure 13 A fisherman's timeline of gear technology changes in the fishery



### 3.5 Fisheries Management

This section examines the *de jure* fisheries management measures which apply to the fishery at Kiumba beach, the experience of the fisheries department (FD) office in implementing these in and around Kiumba and fishermen's opinions and *de facto* experiences of fisheries regulation in Kiumba.

#### 3.5.1 Fisheries management measures in law

Fisheries in Kenya fall under the Fisheries Act (RoK 1991a) and the Fisheries (General) Regulations (RoK 1991b). The main regulations which, at the beach level, will theoretically affect fishers' actions and for which the Fisheries Department is responsible to enforce, are as follows:

1. The use of explosives, poisons, any other noxious substance and electric shock devices are prohibited forms of fishing.
2. Trawling is prohibited within 5 nautical miles of any point of the Kenyan shores of Lake Victoria, or within the Nyanza Gulf.
3. Any 'seining net' of 50mm or less is prohibited, except for *dagaa*, where the minimum is 10mm.
4. Fish landed from Lake Victoria must not be less than 25mm Standard Length (the length from the top lip of a fish to the base of its tail fin), except for *dagaa*.
5. Any gill net of 127mm and less is a prohibited fishing gear in Lake Victoria.
6. Fish must be landed at 'fish landing stations' as designated within The Act.
7. All fishing vessels in Kenyan waters must be registered with the Fisheries Department.
8. No person may fish in Lake Victoria unless (1) he or she has a valid fishing license; (2) she or he is an employee of someone holding a valid license; (3) or if he or she is fishing for his/her own consumption.
9. No person may fish in a breeding ground or disturb fish that are breeding.

There are also other regulations for the fishery which can be enacted by the Director of Fisheries. For example, he or she may enact a rule that no one is allowed to fish in river mouths during those times that migrating fish are moving up or down rivers. Generally, if the Director wants to do this, she or he must either first get the approval of the Minister of Agriculture. In addition, the Fisheries Act says that that if the Director of Fisheries is to enact new laws, or bring in to force those laws and closed seasons that he wants, he must publish his intentions in the Government Gazette, a document in which all decisions of the Kenyan Parliament are published, as well as all of the Laws of Kenya. Thus, for example, despite statements in parliament that all trawling was prohibited in the Kenyan waters of Lake Victoria (The Standard 3.11.93: 3), this could not in fact become law because it was never published in the Kenya Gazette. The same is true concerning wide-spread beliefs that beach-seining is illegal in the Kenyan waters of Lake Victoria, although this has never been published in any Gazette.

The rules of the Fisheries Act can only be enforced by an 'authorised officer', which The Act says is "a fisheries officer, a police officer of or above the rank of inspector, an officer of the Kenya Navy or other armed force or a person appointed by the Minister, by notice in the Gazette, to be an authorised officer for the purposes of this Act" (RoK 1991a: 3). Fisheries Scouts, therefore, have no authority to punish offenders or seize gear under The Act.

#### 3.5.2 The role of the Fisheries Department in managing the fishery at Kiumba

The information on the role of Fisheries Department was obtained through semi-structured interviews with the District Fisheries Officer (DFO) of Suba District and his Deputy at the Suba District Fisheries Office in Mbita town. Both respondents were happy to participate in the interview.



The Department of Fisheries has 38 staff working in all 79 beaches of Suba District. Of these, only 3 fish scouts are assigned duties specifically in Rusinga Island. Kiumba, therefore shares the services of these three fisheries personnel with the other beaches in the Island. According to the DFO, in Mbita, the main duties of fisheries scout are:

1. To check that nets and boats are licensed
2. To ensure that the fisheries regulations of the Kenya Fisheries Act are not breached.
3. To organise fishermen and assist them to form beach committees
4. To provide training and extension services to fishermen
5. To collect fisheries data

The lack of adequate staff means that it is impossible to carry out all the above duties in every beach in the district. To minimise this problem, fisheries scouts have a plan to routinely visit each beach in turn. However, for a continuous exercise like data collection, only a few beaches are selected. Kiumba beach is not one of the beaches that have been sampled for daily data collection. The provision of training and extension services are also constrained by the inadequate fisheries personnel.

Fisheries personnel face a number of problems when working with fishing communities. First, fisheries scouts are trained as law enforcers. They undergo paramilitary training before their fisheries management training at Naivasha Fisheries Training Institute. Many fishermen see fisheries scouts as 'policemen' rather than as extension agents. Thus, there is a problem of relations between the Fisheries Department and fishers communities.

Secondly, the Fisheries Act is not expressly clear about some of the gears being used on the lake. One of the major problems in Kiumba is in relation to the drift net gear, or '*tembea*'. This gear destroys gill nets and long-lines belonging to Kiumba fishermen. Kiumba fishermen themselves do not operate any *tembea*. To control *tembea* is very difficult since the Fisheries Act does not include it: it is neither banned nor accepted.

Another problem is in relation to the enforcement of minimum mesh sizes regulations. Some fishermen do not understand why they cannot, for example use gill nets of mesh sizes below 4 inches. In 2000 alone, about 20 fishermen in Rusinga Island have been prosecuted in court for offences related to minimum mesh size nets. None of these however, were from Kiumba beach. Some fishermen acquire new nets and/or adjust the mesh sizes, after a licence has been issued for legal nets. This is very difficult to control since the fishermen will claim they have a licence for their nets.

If the fisheries scout is very strict, fishermen simply migrate to the next beach where rules are lax. This is one of the problems at Kiumba beach. Net theft is a problem to the fishing community at Kiumba. It is believed that most of the thieves come from neighbouring Islands in Ugandan waters. On the whole, Kiumba remains one of the most important beaches in Suba District. It contributes about 15 per cent of fish landed in the district.

### 3.5.3 *Offences and punishments at Kiumba Beach: the fishermen's perspective*

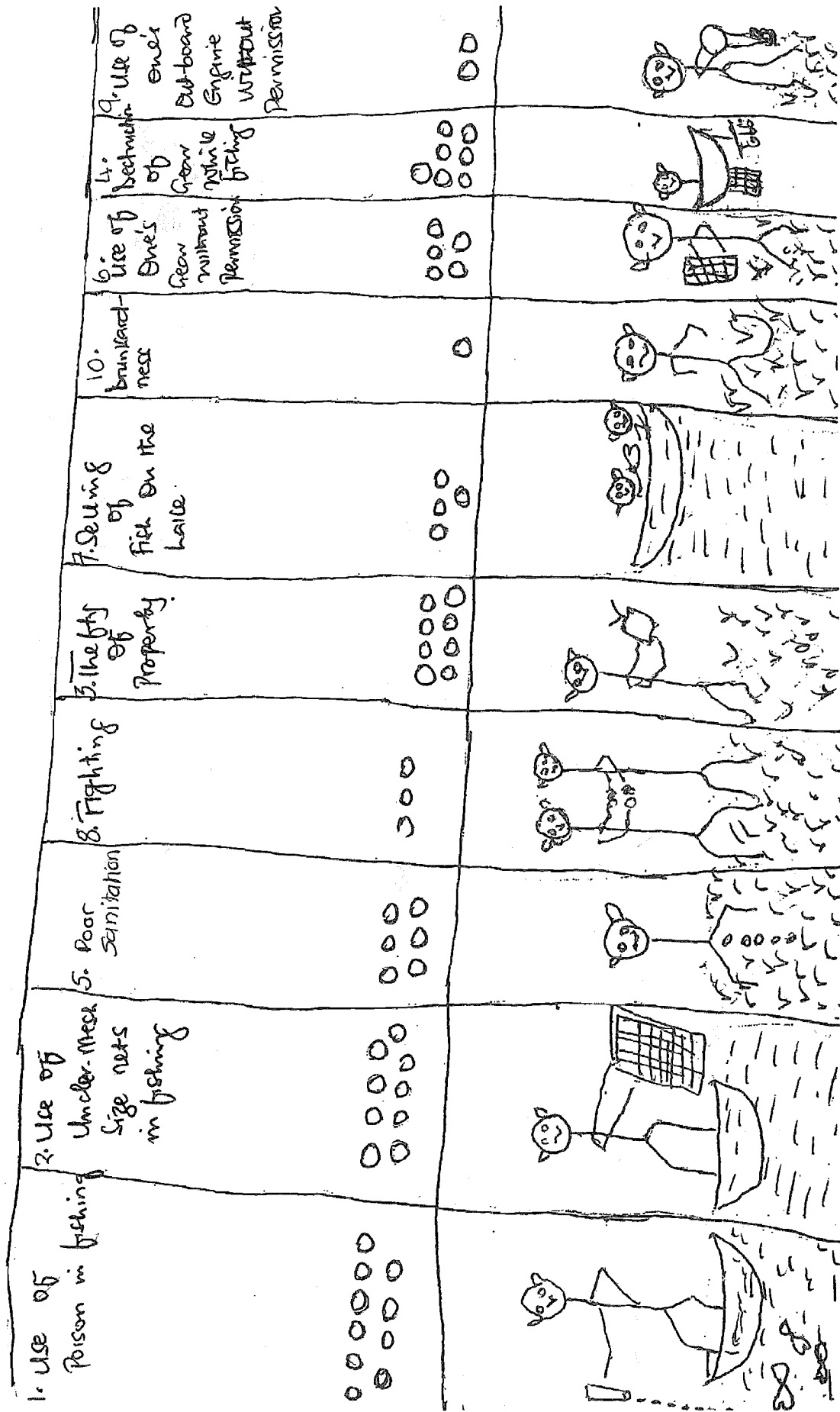
Like any other fishing community, Kiumba beach is faced with a number of offences. The research team discussed these with both young and elderly fishermen. The objectives of these discussions were to identify the common offences at Kiumba beach and which of these the fishermen ranked as most serious. The team also asked the informants to match offences with the punishments they considered to be appropriate and later asked them to match the institution and/or actor that they considered to be most suitable to administer punishments. Stones were used to rank the seriousness of a list of offences and two further matrices were produced. These have been redrawn in Figures 14, 15 and 16. A high number

of stones in a cell indicates the fishermen's opinion of how serious the offence is (Figure 14), how appropriate a particular punishment is for a particular offence (Figure 15) and how suitable a particular institution or actor is to punish a particular offence in (Figure 16). A fourth matrix was constructed in which fishermen were asked to explain which offences were punished in practice, this is redrawn in Figure 17. The discrepancy between the offences which should be punished (Figures 14 to 16) and those which are punished is discussed in the following subsection. The rest of this section focuses on the fishermen's opinions on what should happen.

The most common offences mentioned were:

1. The use of poison in fishing. This was ranked the worst offence. It involves use of chemicals (herbicides, etc.) to kill fish. The fishermen ranked it worst because of the likely impacts poison may have on fish consumers.
2. The use of under-sized fishing net mesh. The fishermen described how gill nets under the recommended mesh size were used and also how beach seines were operated with a mesh size of less than 2.5 inches. They ranked this offence second worst because it involves depletion of the fish stock and targets fish that have not reproduced yet.
3. Theft of property. This involves stealing household items such as televisions, radios and also fishing gear such as nets or outboard engines.
4. Destruction of fish gear. Fishermen explained that some of their passive gear, e.g. long lines and gill nets are destroyed by active gears and in particular by the drift nets known as *tembea*. Whenever, *tembea* and *rimba*, i.e. beach seine, fishermen operate their gear, they frequently gets entangled with passive gears. In order to disentangling the gear, *tembea* and *rimba* fishermen use knives and razor blades to cut gill nets and long lines.
5. Lack of sanitation. This includes littering the surrounding environment with rubbish and human waste. It is mainly committed by people who do not have pit latrines in their own homes. It was considered to be a threat to human health.
6. Use of someone's gear without permission. This offence cannot be classified as theft because the gear is usually returned. However, in the event that the gear is destroyed, then the fishermen consider it a serious offence. Sometimes the fishermen are deprived of their gears for five or more days and thus their source of income for those days.
7. Selling fish on the lake. This involves the sale of fish caught by crew members directly from the boat, before landing on the beach. This breaks one of most important rules of the fisheries co-operative society (FCS), i.e. all fish should be sold through the FCS at the landing site. The fishermen explained that this offence happens because of the better prices offered by buyers who seek out fishermen on the lake. Selling fish on the lake also has the advantage that all sizes of fish can be sold whereas at the beach, the FCS selects only the big ones.
8. Fighting. The main sources of fights are disagreements amongst fishermen about the use of gear and domestic quarrels.
9. The use of someone's outboard engine without permission. This is usually considered an offence where the outboard engine is used to for financial benefit, e.g. fishing or transportation. However, where the outboard engine is used for emergencies such as the transportation of the sick or rescuing the drowning, then it is not considered an offence.
10. Drunkardness. This was considered the least serious offences because fishermen take alcohol as a form of refreshment at the end of their day's work. However, where someone takes alcohol and becomes public nuisance then this is an offence.

Figure 14 Fishermen's ranking of serious offences at Kiumba Beach







The fishermen were also asked about the punishments which they considered most appropriate for each offence. Stones were used to indicate the best punishment for each offence, higher numbers of stones indicating a high level of suitability (see Figure 15). The punishments mentioned by the fishermen include gaol, banishment from the community, corporal punishment, suspension from fishing, fines and/or repayment and manual labour.

- Fishermen mentioned that the most suitable punishment for somebody found using poison to fish is imprisonment and if not, then the second option of suspension from the fishery should be considered.
- Whoever is found using under-sized mesh should be suspended from fishing for some time. The alternative punishment could be the banishment of the culprit from the community.
- Fishermen also feel that thieves should be jailed or sent away from the community. They feel that whoever is found destroying gear on the lake should be asked to pay. If he fails to do so then he should be suspended from fishing. They mentioned that those found littering the environment with rubbish or human waste should be whipped, fined and thereafter required to dig a pit latrine or dumping site.
- Whoever is found using someone else's gear should be taken to gaol. An alternative could be payment of a fine or banishment. Selling fish on the lake is tantamount to theft as the crew are stealing from the boat and gear owners.
- A habitual fighter should be banished or whipped. Alternative would be a fine and/or imprisonment. The fishermen also suggested that whoever is found using someone else's engine without permission should be whipped. In case of the destruction of the engine he should be asked to repair it.
- Fishers suggested that whoever gets drunk and becomes a nuisance to the community should be whipped. Habitual drunkards should be sent away from the community and imprisonment could be considered as the last option.

Another issue the team asked the fishermen to consider was the institution or organisation which they believed was most suitable to punish different offences. The pictures in the matrix in Figure 16 were drawn by fishermen to represent the various institutions and organisations they considered and stones were used to rank the most suitable institution for each offence. These included the fisherman themselves, the Assistant Chief of the sub location, the beach leader and beach committee, a doctor or public health inspector, a fisheries scout, other fisheries department staff, the police, and the judiciary or court system.





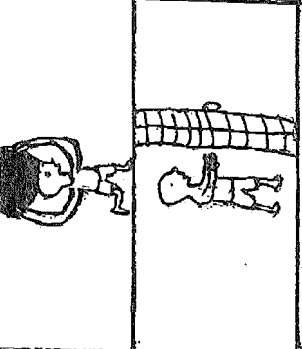

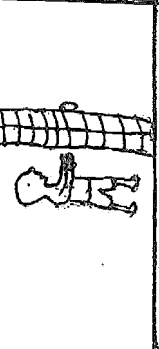





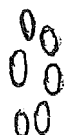




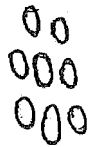

#### 3.5.4 Fisheries management in practice

Further discussion with fishermen revealed that although they were aware of fisheries management measures in practice, they did not conform with them all. They said that they had more serious problems which needed more attention than for instance undersize mesh e.g. theft, bribery and sanitation. The matrix in Figure 17 shows the offences which were punished in practice.

Theft caused the most problems in Kiumba. The weight of the stone allocated in the matrix diagram in Figure 17 reflects the frequency with which a particular punishment is administered to a particular offence. The fishermen considered that a fine was the most realistic punishment for a criminal rather than police action because after the fine has been paid, the criminal will have to change his behaviour if he is to continue to live with the community.

Figure 17 Offences which are punished in practice at Kiumba Beach

Punishments

Catch compensation					
cleaning					
banishment					
Police (gaol)					
Bush clearance					
Fine					
offences					
			Gear theft	Bribery	Poor sanitation

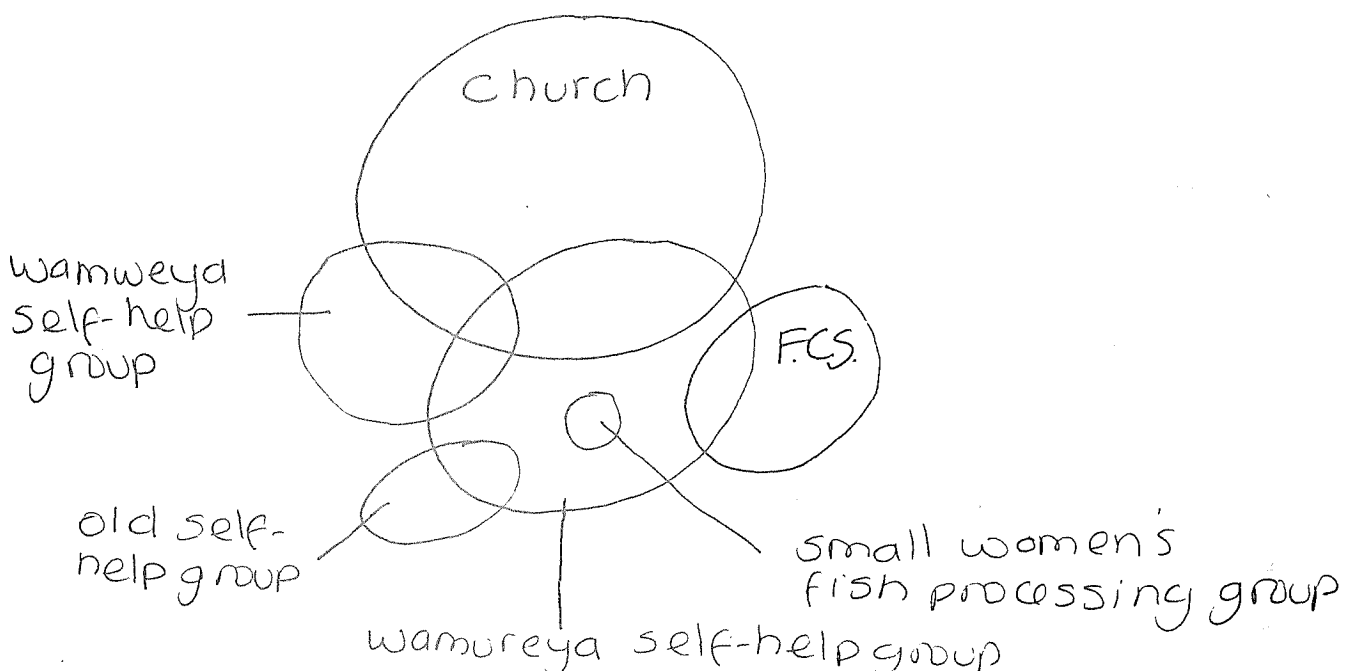
- Bush clearance work is given those who have defied the law in order to change their attitude and respect authority. It is very commonly practised.
- Banishment as a punishment is rarely practised because the community believe that they should give an opportunity to change to offenders.
- Police action was rare because the police are considered corrupt and offenders will be released once they have paid a bribe.
- If a fellow fisher has used another's oar without permission, then, when he lands, his whole catch will be handed to the owner of the oar because he would have gone fishing if his oar had not been taken.
- Bribery is commonly practised by rich people in influential position. The fishers believe that they can only be fined because when they are taken to police they come back that very day.
- The fishers agreed that there are some latrines and people are not allowed to defecate anywhere. When an individual is caught, he is asked to remove his mess and dispose of it in the right place. On instances when the individual is a public nuisance, then he is taken to police.

Despite the awareness which fishermen have of a wide range of fisheries management measures comparison of the matrices in Figure 15 and Figure 17 shows that in practice, several management are not conformed with. However, management regulations such as use of poison, licensing, trawling, are complied with. Although fishermen are aware of regulations concerning mesh sizes, the team observed that the fishermen used under-sized nets. In addition, Figure 18 shows that this offence was not punished at Kiumba. Moreover, interviews with women groups revealed that trading in juvenile fish is their major source of income. This also indicates that certain fisheries management regulations are not enforced despite the fact they are well understood. The team was also made to understand that no fish breeding grounds had been demarcated and Kiumba fishers were not restricted in where they fished.

### 3.6 Community Based Organisations in Kiumba

This section presents information on organisations at Kiumba beach. A wide range of community based organisations which operate in Kiumba was revealed during the study. In addition to the Beach Committee and the Kiumba Fisheries Co-operative Society (FCS) which were most prominently involved with the fishery, discussions with a group of married women revealed several different types of organisation. These included churches, clan-based self help groups and small groups of women who work together to share the tasks involved in fish processing. These links are illustrated in Figure 18 which has been redrawn from this discussion.

Figure 18 Venn diagram showing interactions between different women's groups at Kiumba Beach





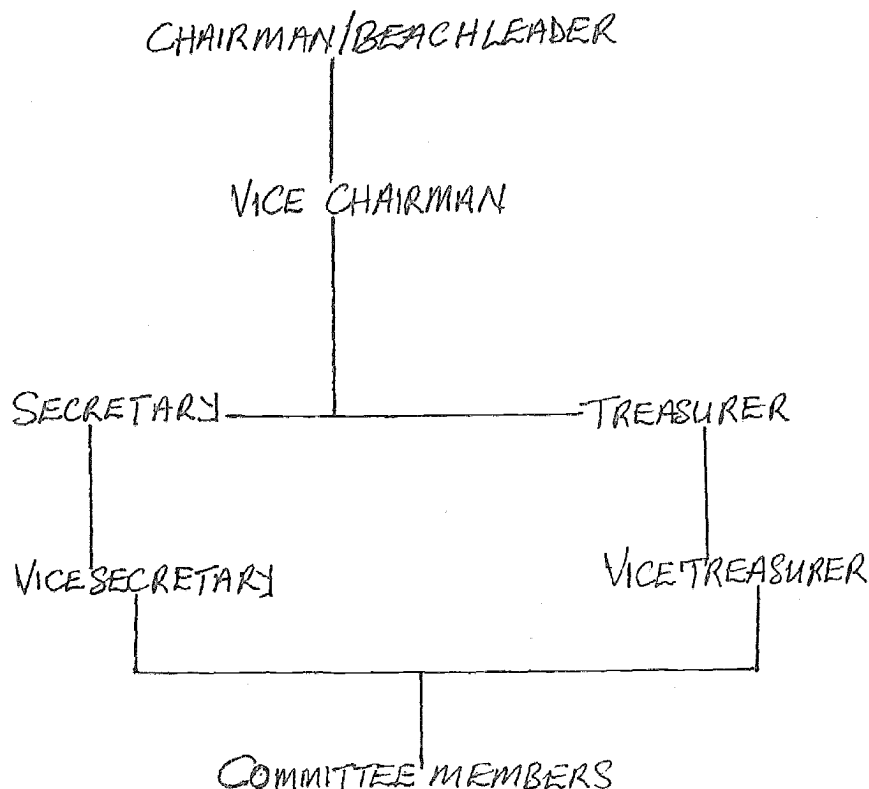
The remainder of this subsection explains the history and development of the co-operative movement at Kiumba, the co-operative hierarchy and the beach community hierarchy. Various PRA methods have been used to obtain and present this information. They include a time line, semi -structured interviews, hierarchy diagrams and Venn diagrams.

### 3.6.1 The Kiumba Beach Committee

Key members of the beach committee were asked to draw a hierarchy diagram of their committee. This has been redrawn in Figure 19. At Kiumba Beach, the overall head is the chairman or beach leader who is entirely responsible for the smooth running of the community and resolving disputes among his people. The beach leader must be a fisherman and have a good leadership qualities. The vice chairman or deputy beach leader assists the beach leader during his absence by settling disputes and welcoming visitors After the vice chairman the committee has a secretary who is responsible for keeping records and information relating to this beach committee. A vice secretary is also elected to assist the secretary. A good capable secretary must be patient and literate. The treasurer to the committee is responsible for handling the finances of the committee. He must be a honest and known by the community to be trustworthy. There is also a vice treasurer in case of the treasurers absence and he must have the same qualities as the full treasurer.

At the bottom of this hierarchy are the beach committee members. They are supposed to form the quorum whenever there are issues to be solved. These members must be active at this beach and well versed with the day to day life of the community. The beach committee is elected each year by the entire village community. According to the respondent, the election of a chairman or beach leader is very competitive.

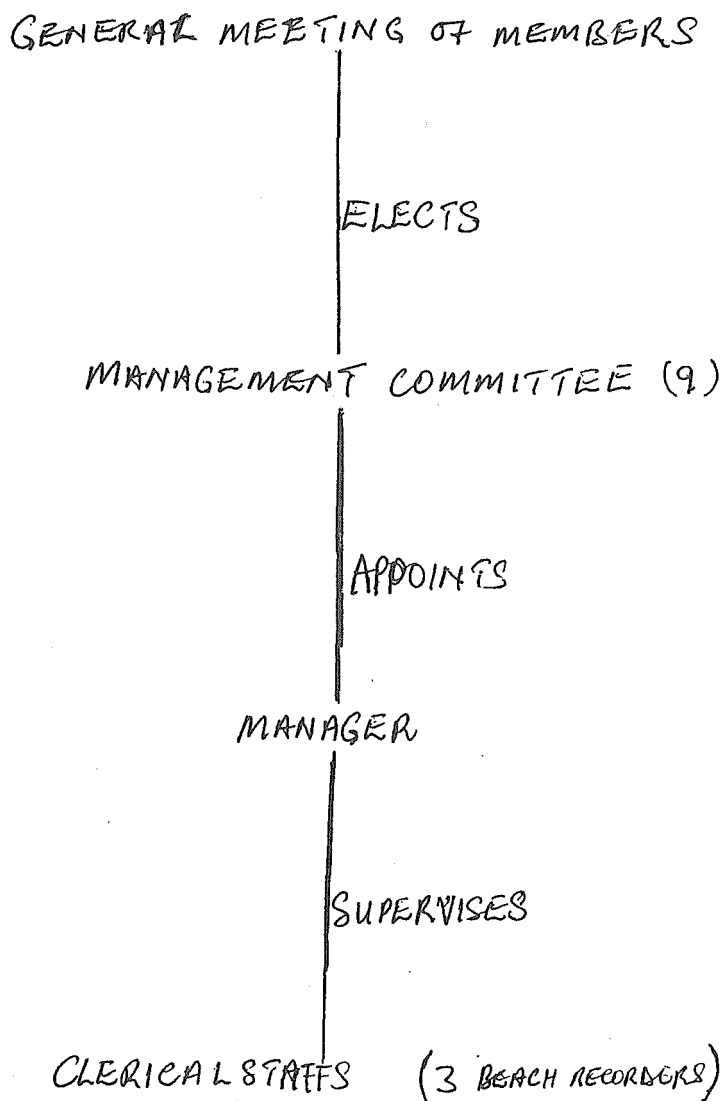
Figure 19 The Beach Committee hierarchy



### 3.6.2 The Kiumba Cooperative Society

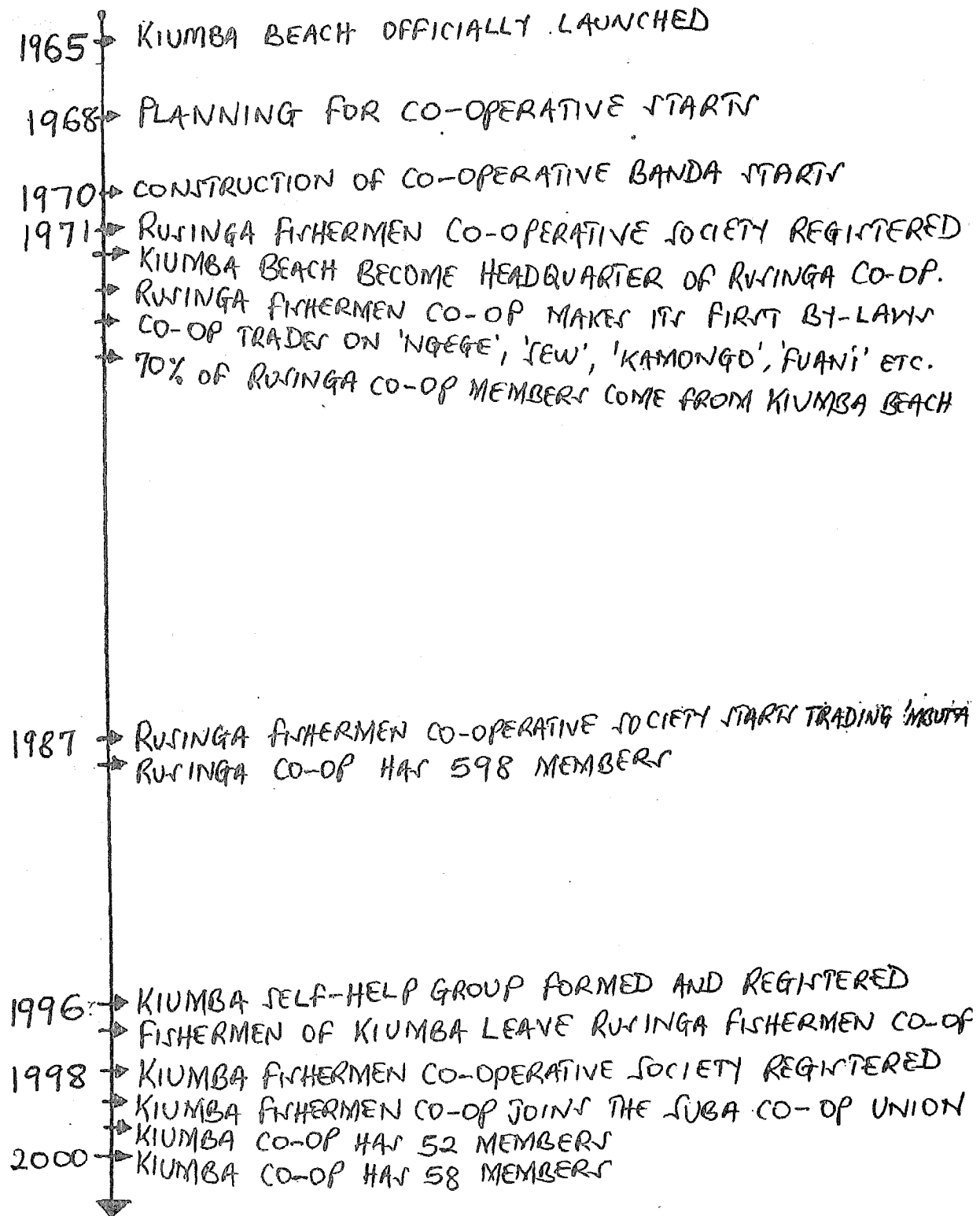
The secretary manager of the Kiumba Co-operative Society drew a hierarchy diagram to illustrate the different offices within the co-operative society. This diagram has been redrawn in Figure 20. At the top of the hierarchy, he indicated the general meeting of members who meet to discuss general issues and are responsible for electing the nine management committee members. The management committee acts as executive body for the society and has the powers to appoint the secretary-manager. His role is to oversee the overall smooth running of the society, he also supervises the clerical staff of the society. These staff are also appointed by the management committee and include three beach recorders who record the weight, price and the names of members who have sold fish to the FCS each day.

Figure 20 The Kiumba Co-operative Society Hierarchy



Historical information on the co-operative movement at Kiumba beach was obtained through a series of semi-structured interviews with the secretary - manager and two committee members of the Kiumba Beach Co-operative Society. An initial interview took place at the beginning of the study and a follow up was made two days afterwards. In both interviews the respondents demonstrated their wealth of knowledge on the history of their co-operative society. The secretary -manager drew the time line on the floor of the co-operative office, where the interviews were held. This has been redrawn in Figure 21.

Figure 21 History of the co-operative movement at Kiumba Beach



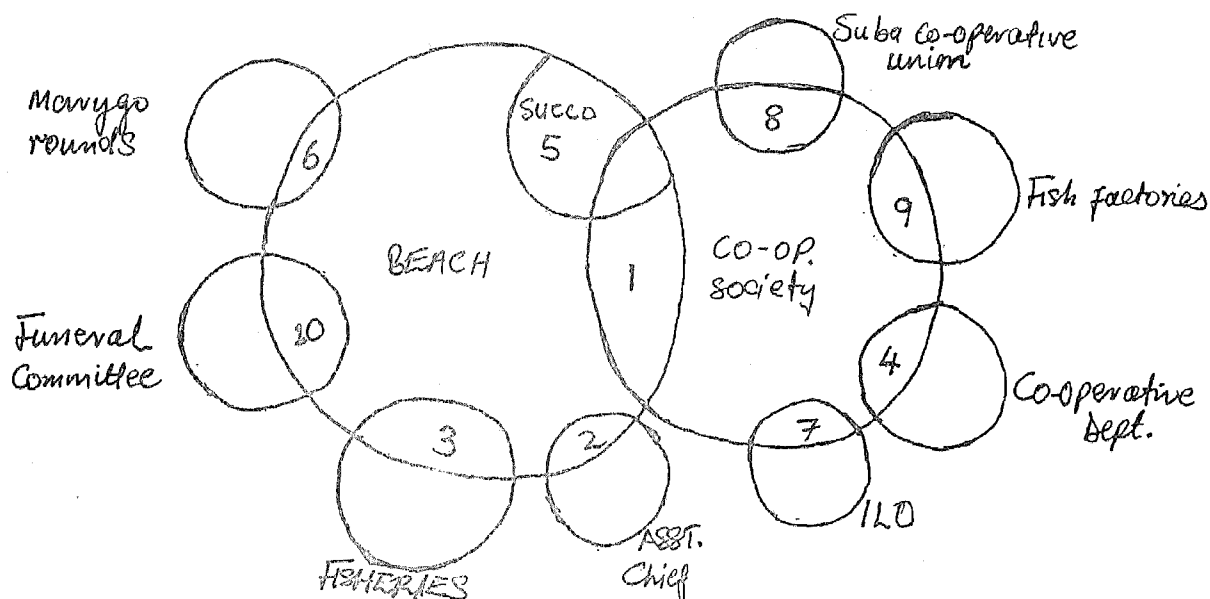
The history of the co-operative movement at Kiumba beach is nearly as old as the beach itself. Just three years after the inauguration of Kiumba beach in 1965, fishermen at the beach started discussing plans for a co-operative society. In 1970, construction of the fish *banda* started. The building was funded by the fisheries department (FD), under close supervision of the then Nyanza Provincial Fisheries officer, Mr. Solomon Oburu, whose home is just next to Kiumba beach. Mr. Oburu later became the Director of Fisheries in Kenya and this, in some ways, may have promoted the development of Kiumba beach and the co-operative society.

The fish *banda* was completed nine months later, and was handed over to the fishermen to use as the base for the planned co-operative society. In 1971 all the fishermen of Rusinga island came together and formed Rusinga Fishermen's Co-operative Society (FCS), which was registered in the same year. Kiumba beach then had the largest fish landing site and as 70 per cent of fishermen in the co-operative came from Kiumba, it was an obvious choice for the headquarters of Rusinga FCS. Between 1971 and 1996, Rusinga fishermen co-operative society had an average of 598 members. For all that time fishermen contributed to the co-operative society but did not receive a bonus or even credit to purchase fishing gear. At the same time there were reports of financial mismanagement. As a result, the fishermen of Kiumba beach decided to pull out of the Rusinga FCS.

An informal group, the Kiumba self-help group, was formed on the beach in 1996. It operated successfully for two years then in 1998, it formed the basis of a Kiumba FCS. The new FCS started with 52 members, all of them fishermen on Kiumba beach. The number has increased to 58 members in 2000. Between 1997 and 2000 the co-operative has had two leaders in succession: Tobias Odhiambo Gumba and John Okumbe. Kiumba FCS is affiliated to Suba co-operative union, which is an umbrella union of co-operatives in the whole of Suba district.

A group of fishermen were asked about the linkages between the Kiumba FCS, the beach committee and other organisations based both in and out of Kiumba. Some of the younger fishermen drew a venn diagram showing interactions and linkages between different smaller organisation groups and this has been redrawn in Figure 22.

Figure 22 Venn diagram showing organisational linkages at Kiumba Beach



In Figure 22, the biggest circle represents the beach committee which interacts with the second biggest circle representing the co-operative society. The fishermen were asked to explain the links between the organisations. These have been numbered on Figure 22 and are outlined below:

1. Kiumba FCS receives all the fish from caught by society members and ensures that it is marketed to factory agents. For each kilogram of Nile perch sold, two shillings is deducted, 50 cents go to the beach committee and 1.50 shillings go to the FCS. The society is also responsible for purchasing some gears like nets and supplying them to members through credit.
2. The assistant chief links the beach community to government. He organises fund raising to support the beach and also some funds are given by the beach to support government functions.
3. The Fisheries department helps to control net theft through the work of fisheries scouts. It also supervises the election processes of beach committee and aims to provide security to fishermen in the lake. The Fisheries department is charged with enforcing fisheries management regulations on the lake.
4. The co-operative dept. is responsible for regulating the Kiumba FCS procedures and monitoring its performance.
5. The SUCCO organisation is responsible for the savings of the beach committee and society members.
6. The merry-go-round operate on a reciprocal basis. Each member of the group contributes money on a regular basis and each agrees to allocate this to individual members at specific intervals agreed upon by the members.
7. The International Labour Organisation (ILO) has some links with the Kiumba FCS. It provides training to the co-operative members occasionally.
8. The Suba co-operative union which is more senior to Kiumba co-operative union provides some technical advice to this primary coop in running the union affairs.
9. Fish factories send trucks and agents to Kiumba beach to buy Nile perch so there is a strong union between these factories and the co-operative society which markets the fish at this beach.
10. The Funeral committee at Kiumba beach arranges funerals and organises funds and other resources to facilitate burial and transport needs when a life is lost.

It is clear that the beach committee and Kiumba FCS are the two institutions with recognised authority and legitimacy in the community. The beach committee interacts with a number of other institutions which are mainly community - based. The Kiumba FCS on the other hand, interacts with several other organisations many of which are externally based. Based on this observation, it appears that the co-operative has developed external contacts that could be valuable for a co-management strategy. However, conflicts between the FCS and the beach committee were mentioned. These were explained to arise from the conflict of interests between the two organisations. These are discussed in the following subsection.

### **3.7 Conflicts at Kiumba Beach**

The study at Kiumba beach revealed that there are considerable conflicts between the beach committee and the Kiumba FCS. There are also conflicts between the fishermen and the FCS, conflict between crew-members and boat owners and finally conflict between fishers and fisheries department.

#### *3.7.1 Conflict between the beach committee and Kiumba FCS*

The FCS committee members described the major role of the FCS in marketing of fish. It looks for markets, negotiates prices with fish factories and aims to save its members money. The beach committee is expected to maintain law and order on the beach, register the arrival of new boats and

collect revenue (e.g. an annual charge of KSh 3,000.00, known as '*kanyaga*' is made for each truck which uses the beach and a charge of kshs.100/- is made for each boat landed on the beach).

The FCS secretary manager mentioned conflicts with the beach leader (the chairman of the beach committee) over fish sales. Since the co-operative is responsible for fish marketing, the committee members are unhappy when the beach leader goes directly to factory agents in an attempt to cut out the co-operative. In the past, the beach leader has organised the fishermen to sell their fish from the lake without landing it at the co-operative's fish *banda*.

Conflicts also arise when the co-operative society sells fish to the agents on credit without the knowledge of the fishermen. This results in many complaints by the fishermen to the beach leaders. Fishermen also complain when the co-operative society refuses to negotiate increased fish prices with the factory agents. Other complaints include those about the weighing machines used by the truck agents which are inaccurate and considered to favour the fish factories by as much as half a kilo for every three kilos weighed. In general, fishermen consider conflict arises because the co-operative society is business minded and has no interest in their welfare. There are always complaints from the fishermen that the co-operative society does not provide loan facilities to its members.

Although the Kiumba FCS was initiated with high hopes in the community, mutual mistrust between the FCS and many other actors involved in the fishery pervaded much of the study at Kiumba beach. A series of interviews with key individuals revealed the ongoing conflicts in many parts at the fishery.

### 3.7.2 *Conflict between boat owner and crew members.*

A semi-structured interview with two boat owners, focused on their complaints about crew members being untrustworthy. The boat owners claimed that crew members will often go fishing and sell fish at a hidden landing place. Eventually, when the boat owner accompanies his crew, he will be aware of strange customers approaching him for fish. This will force the boat owner to quarrel with the crew. The boat owner can lose up to half of the fish landed this way.

Conflicts also arise when crew members go fishing without the boat owner's knowledge, he will only realise when others talk about his boat landing at the *banda*. Here you will find that crew members first disagree and then in the end they agree. The boat owner rarely dismisses a crew member because a new crew member could be worse and land without any fish. In any event, the boat owner is always in better position because he takes a larger share of the catch than his crew members.

### 3.7.3 *Conflicts between fishermen and the fisheries department*

Although fishermen are aware of fisheries regulations, they are not always complied with and conflict with the fisheries department (FD) arises when gear and boats are not licensed or registered. A FD officer will come and ask for the licence and ask fishermen why they don't obey the law. This will lead to disputes which can be sent to the police for resolution. Some fishermen consider that the FD is not trustworthy.

### 3.7.4 *Conflicts between fishermen and fish traders*

The interview went on to ask about the conflicts between fishermen and fish traders. Factory agents tell the FCS in the presence of the fisherman, that the money for the fish which they have bought is on the way. Since the fisherman do not deal with the agent directly, they will allow the fish to be taken and are then told that the fish were rejected by the factory even when the money for his catch has been paid to the FCS. The fisherman will go to the FCS and will be told that the money was not paid. Fishermen

suspect that it is a deal between the agents and the FCS office. Since fishermen are always busy they cannot go and confirm whether the fish reached the factory or not. They concluded that they are used to losses however they would prefer to be able to sell their fish directly to the factories. Alternatively, the fishermen requested that the factory gate fish buying prices to be announced through the radio and newspapers. This would enable them to learn what price agents are given at the factory and would help prevent the agents from cheating them.

#### 4. KEY ISSUES FOR THE MANAGEMENT OF THE LAKE VICTORIA'S FISHERY AT KIUMBA

The aim of this section is to synthesise and summarise the team's analysis of their participatory pilot study at Kiumba Beach. The section synthesises discussions among the team throughout the study and summarises the plenary discussion held in the closing session of the workshop. This considered the following issues which are used as a broad structure for the synthesis in this section:

1. The impacts of current fisheries management measures
2. The impacts of possible management measures
3. The potential of the involvement of community based organisations and institutions in co-management

There are three main fisheries which are exploited on Lake Victoria. These are the Nile perch fishery, the *dagaa* or omena fishery and the tilapia fishery. The focus of fishing efforts at Kiumba is on the Nile perch fishery. The beach is dominated by the predominantly male boat crews who use long lines to catch Nile perch on a daily basis for most of the year and also by the Kiumba Fisheries Co-operative Society (FCS) through which most of this fish is sold to the agents of filleting factories. Declining Nile perch catches are an important management issue. There is also a market for the undersized and juvenile fish which are caught on long lines, gill nets and also by beach seine netting. These fish are sold either as bait or to women who smoke or dry them, often transport them to market and then sell them as an important source of income. The impact of this trade on stock recruitment is another crucial issue for fisheries management. *Dagaa* catches are landed on Kiumba beach although this fishery was considered to be of secondary importance to the community at Kiumba. Furthermore, effort in this fishery is restricted by the lunar cycle which means that *dagaa* are only worth catching when the night is dark enough for the lamps which are used to aggregate them to be effective. The *dagaa* fishery was not considered to pose a management problem. Tilapia are the preferred fish for consumption (and processing) in Kiumba as elsewhere around Lake Victoria. Tilapia catches have declined so far in recent years that Tilapia are rarely landed on Kiumba beach.

Declining and juvenile catches cannot simply be attributed to the inability of the fishing community at Kiumba to restrict their fishing efforts. Some fisheries management measures are complied with and others are not. For example, drift nets and fish poisoning were widely condemned at Kiumba, whereas beach seines were operated openly without censure. The community restricted their use of drift nets for a variety of reasons, these included their preference for passive fishing gears which required less labour and were less expensive to buy. Passive gears were perceived to give the fish 'a chance' and to be 'fairer' than active gears which 'chased' fish. The reasons why management measures restricting mesh sizes and beach seining were not complied with included the increasing problem of gear theft on the lake. Fishers were increasingly unable to leave passive gears in place for fear that they would be stolen. Crew members who 'lost' their boat owner's gear this way were charged for it. The threat of theft means that fishing gears must now be accompanied. This increases labour costs and the attractiveness of active gears such as the beach seine. A second frequently mentioned reason for non-compliance was the

perceived incompetence of the Fisheries Department. Fisheries scouts were ineffective in punishing transgressors, either because they were members of the same community or because they accepted bribes to drop any charges.

A range of different management measures were considered. These included restricting effort through for example, increasing licensing costs, closed seasons for some species and closed areas for others; relocating effort towards the centre of the lake; and restricting demand through consumer awareness raising and planning restrictions on processing factories. There was concern over what the impact of these measures would be on the livelihoods of those who depended on the fishery. How would women replace the income they earn from trading in juvenile fish? What would be the impact of increased licensing costs on poor fishers who were only breaking even at the moment? Although the richer fishing households in Kiumba had been able to diversify into a range of income earning activities, the ability of the poor to diversify was severely constrained by their inability to save any of their earnings to invest in farming or livestock, for example. Irrespective of their potential impacts, most of these management measures would be ineffective unless the key problems of gear theft and the ineffective fisheries department were solved.

Fisheries co-management has been suggested as a possible solution to the ineffectiveness of the fisheries department. Fisheries co-management would involve fishing communities taking on some of the work of the fisheries departments. Key roles which fishing communities could take on could include monitoring their own exploitation of the fishery and enforcing fisheries regulations amongst themselves. The aim of the three beaches study, which this study has piloted at Kiumba, is to investigate whether there are community based institutions and organisations which could perform these roles. There is a wealth of different community based organisations (CBOs) which operate in Kiumba, many of which were considered to be potential routes for awareness raising initiatives. The two most important CBOs, in terms of the size of their membership and their role in the fishery, are the Kiumba Fisheries Co-operative Society and the Kiumba Beach Committee. The intricate matrix diagrams constructed by the fishermen at Kiumba illustrated how they perceived the beach committee to be the most effective organisation to enforcing fisheries regulations and as such the beach committee could play an important role in co-managing the fishery from Kiumba beach.

However, the study revealed significant problems in the operation of the Kiumba FCS and the beach committee. These included financial disputes and considerable mistrust between the two organisations. Despite its mandate to serve their interests, fishermen widely perceived the FCS as acting in the interests of its committee members, some of whom had close links with the fish processing factories, e.g. the chairman of the FCS was also the agent for the Nairobi based filleting factory. Although the fishermen placed their trust in the beach committee, the FCS did not and the secretary-manager of the FCS has accused the beach leader, i.e. chairman of the beach committee, of selling fish directly to factory agents. Resolving issues such as these and that of gear security on the lake will be an essential component of any fisheries co-management initiative.

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